The Beauty and Benefits of Science

The theme for the meeting points to the “unreasonable effectiveness” of the scientific enterprise in creating economic growth, solving societal problems, and satisfying the essential human drive to understand the world in which we live. The phrase, “unreasonable effectiveness,” was coined in 1960 by physicist Eugene Wigner, who explored the duality of mathematics — both beautiful unto itself, and also eminently practical, often in unexpected ways.

The same duality exists in all fields of science. Basic research can be seen as a quest to understand the beauty that underlies our universe and the myriad phenomena that it contains.

We now appreciate the reality of a much richer set of connections. Fundamental scientific understanding creates whole landscapes on which practical applications may flourish. Basic research may create territories that, only later, become the real estate for new industries. Equally important are the cases where the “pull” of environmental or societal problems drives fundamentally new basic research.

The program of the 2013 AAAS Annual Meeting will highlight the rich and complicated connections between basic and applied research, and how they bring about both practical benefits and the beauty of pure understanding.

Call for Poster Submissions

Online entries will be accepted at www.aaas.org/meetings beginning 14 May 2012.

Student Poster Competition
Open to college undergraduate and graduate students only

The competition recognizes the individual efforts of students who are actively working toward a college-level degree. Winners in each category receive a cash award and framed certificate, and are congratulated in the journal, Science.

General Poster Session
Open to postdocs and professionals

This session provides an opportunity for postdocs and professionals to present their research to the broad community of scientists attending the AAAS Annual Meeting.
NSF Robert Noyce Teacher Scholarship Program Conference

Building Excellence in STEM Teaching

May 23-25, 2012
Renaissance Washington DC Hotel

Co-hosted by
American Association for the Advancement of Science (AAAS)
Education and Human Resources Program (EHR)
and
National Science Foundation (NSF) Division of Undergraduate Education (DUE)
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National Science Foundation (NSF) Robert Noyce Teacher Scholarship Program

The Robert Noyce Teacher Scholarship Program, first authorized under the National Science Foundation Authorization Act of 2002 (P.L. 107-368) and reauthorized in 2007 under the America COMPETES Act (P.L. 110-69) and the America COMPETES Reauthorization Act of 2010 responds to the critical need for K-12 teachers of science, technology, engineering, and mathematics (STEM) by encouraging talented STEM students and professionals to pursue teaching careers in elementary and secondary schools.

The program provides funding to institutions of higher education to provide scholarships, stipends, and programmatic support to recruit and prepare STEM majors and professionals to become K-12 teachers. Scholarship and stipend recipients are required to complete two years of teaching in a high-need school district for each year of support. The program seeks to increase the number of K-12 teachers with strong STEM content knowledge who teach in high-need school districts.

In addition, the program supports the recruitment and development of NSF Teaching Fellows, STEM professionals who complete Master’s degrees leading to teacher certification and receive salary supplements while fulfilling a 4-year teaching requirement. The program also supports the development of NSF Master Teaching Fellows by providing professional development and salary supplements while they are teaching for five years in a high need school district. A goal of the program is to recruit individuals with strong STEM backgrounds who might otherwise not have considered a career in K-12 teaching.

The American Association for the Advancement of Science (AAAS) is working with the NSF Robert Noyce Teacher Scholarship Program to identify and disseminate information about effective practices and strategies for attracting, selecting, and preparing new K-12 STEM teachers and retaining them in the stem teacher workforce. Project components include:

• Producing a general publication that highlights the accomplishments of the NSF Noyce Teacher Scholarship Program.
• Organizing proposal preparation workshops.

American Association for the Advancement of Science (AAAS)

The American Association for the Advancement of Science (AAAS) is the world’s largest general scientific society, and publisher of the journal, Science (www.sciencemag.org) as well as Science Translational Medicine (www.sciencetranslationalmedicine.org) and Science Signaling (www.sciencesignaling.org).

AAAS was founded in 1848, and includes some 261 affiliated societies and academies of science, serving 10 million individuals. Science has the largest paid circulation of any peer-reviewed general science journal in the world, with an estimated total readership of 1 million.

The non-profit AAAS (www.aaas.org) is open to all and fulfills its mission to “advance science and serve society” through initiatives in science policy; international programs; science education; and more. AAAS is a global organization, with offices in Washington, D.C. and Cambridge, U.K., and award-winning news correspondents reporting from an array of countries.

For the latest research news, log onto EurekAlert!, www.eurekalert.org, the premier science-news Web site, a Service of AAAS. For education and career resources visit the AAAS website at http://www.aaas.org/.
### Wednesday, May 23, 2012

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<th>Time</th>
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<tr>
<td>3:30 pm - 5:00 pm</td>
<td>Museum Tours for Scholars and Fellows <em>(optional)</em> (Grand Registration)</td>
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<tr>
<td>4:30 pm - 5:30 pm</td>
<td>New Awardees Session with National Science Foundation (NSF) (Mount Vernon Square)</td>
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<tr>
<td>Joan Prival, Noyce Lead Program Director, Division of Undergraduate Education (DUE), NSF</td>
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<td>Mary Lee Ledbetter, Program Director, DUE, NSF</td>
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<td>Noyce Monitoring System</td>
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<td>Chris Griffith, ICF International</td>
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<tr>
<td>7:00 pm - 10:00 pm</td>
<td>Registration (Grand Registration)</td>
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<td>Poster Setup (Renaissance Ballroom)</td>
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### Thursday, May 24, 2012

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<tr>
<td>7:00 am - 8:00 am</td>
<td>Registration (Grand Registration)</td>
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<td>Poster Setup (Renaissance Ballroom)</td>
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<td>Continental Breakfast (Foyer Grand Ballroom North)</td>
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<tr>
<td>8:00 am - 9:00 am</td>
<td>Opening and Welcome: (Grand Ballroom North &amp; Central)</td>
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<tr>
<td>Joan Prival, Noyce Lead Program Director, DUE, NSF</td>
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<td>Katherine J. Denniston, Acting Division Director, DUE, NSF</td>
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<td>Alan I. Leshner, Chief Executive Officer, AAAS and Executive Publisher, Science</td>
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<tr>
<td>Introduction:</td>
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<td>Joan Ferrini-Mundy, Assistant Director, Directorate for Education and Human Resources, NSF</td>
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<tr>
<td>Plenary Speaker:</td>
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<td>Carl Wieman, Associate Director for Science, White House Office of Science and Technology Policy</td>
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<tr>
<td>12:00 pm - 1:30 pm</td>
<td>Lunch and Keynote (Grand Ballroom North &amp; Central)</td>
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<tr>
<td>Keynote: “Enabled, Engaged, Empowered: The K-12 Student Vision for Personalized Learning and STEM Education”</td>
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<td>Introduction:</td>
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<td>Lee Zia, Program Director, DUE, NSF</td>
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<td>Keynote Speaker:</td>
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<td>Julie Evans, Chief Executive Officer, Project Tomorrow</td>
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<tr>
<td>1:30 pm - 2:45 pm</td>
<td>Poster Session 1 (Renaissance Ballroom)</td>
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<tr>
<td>3:00 pm - 4:15 pm</td>
<td>Concurrent Workshops: Session II (Meeting Rooms 2-15)</td>
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<tr>
<td>4:30 pm - 5:45 pm</td>
<td>Poster Session 2 (Renaissance Ballroom)</td>
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<tr>
<td>6:00 pm - 7:30 pm</td>
<td>Reception and Networking (Grand Ballroom South)</td>
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FRIDAY, MAY 25, 2012

7:00 am - 8:00 am  
Continental Breakfast  
(Foyer Grand Ballroom North)

Remove Poster Boards  
(Renaissance Ballroom)

8:00 am - 9:00 am  
Plenary Session  
(Grand Ballroom North & Central)

Introduction:  
Shirley M. Malcom, Director, EHR, AAAS

Plenary Speaker:  
James H. Shelton III, Assistant Deputy Secretary for Innovation and Improvement, U.S. Department of Education

9:10 am - 10:25 am  
Concurrent Workshops - Session III  
(Meeting Rooms 2-15)

10:35 am - 11:50 am  
Concurrent Workshops - Session IV  
(Meeting Rooms 2-15)

12:00 pm - 12:45 pm  
Plenary and Closing Remarks  
(Grand Ballroom North & Central)

Plenary:  
“Catalyzing Partnerships for Developing STEM Outreach Programs”

Introduction:  
Shirley M. Malcom, Director, EHR, AAAS

Plenary Speaker:  
Lynford L. Goddard, Assistant Professor, Department of Electrical and Computer Engineering, University of Illinois, Urbana

Closing Remarks:  
Joan Prival, Noyce Lead Program Director, DUE, NSF

12:45 pm  
Conference Adjourns

1:00 pm - 2:30 pm  
Museum Tours for Scholars and Fellows (optional)  
(Grand Registration - Grand Ballroom Level)
Katherine J. Denniston

Denniston received a B.A. in Biology from Mansfield University and a Ph.D. in Microbiology from The Pennsylvania State University. Following two years as a post-doctoral fellow in the Department of Genetics at the University of Wisconsin Madison, Denniston joined the National Cancer Institute as a Senior Staff Fellow. She then worked as a Research Assistant Professor in the Division of Molecular Virology and Immunology of Georgetown University.

In 1985, Denniston joined the faculty of Towson University, holding a variety of positions over the years. She was Professor of Biological Sciences and for many years held the position of Director of the Center for Science and Mathematics Education. In that position she ran a variety of programs including the Maryland Collaborative for Teacher Preparation II, the Maryland Educators' Summer Research Program, and the Maryland Governor's Academy for Science and Mathematics Teachers. Denniston and co-authors Robert Carat and Joseph Topping have published a chemistry text for allied health majors since 1989. General, Organic, and Biochemistry is in its seventh edition.

In 1999, Denniston became the Associate Dean of the Fisher College of Science and Mathematics and in 2008 was appointed Associate Provost of the university. She spent the 2002-2004 academic years as a program officer in the Division of Undergraduate Education (DUE) at NSF and returned to DUE as Deputy Director in 2010 and is currently serving as the Acting Division Director.

Julie Evans

Julie Evans is the CEO of Project Tomorrow, www.tomorrow.org, one of the nation’s leading education nonprofit organizations. Project Tomorrow (formerly known as NetDay) is dedicated to empowering K-12 students, teachers and parents to have a larger voice in improving education and learning. Evans has been CEO of this organization since 1999. Prior to this position, Evans enjoyed a successful 17-year career in national and regional sales and marketing management with Unisys and two education technology startups. Evans is a graduate of Brown University and serves on the Board of Directors of Project Tomorrow, the International Society for Technology in Education (ISTE), the TECHSETS Advisory Board, the TechAmerica Foundation Board and the Children's First Advisory Council. She has served on the Advisory Boards for the 2009 and 2012 Horizon K-12 Report and the 2009, 2010, 2011 and 2012 Horizon Higher Education Reports. Evans was selected in 2003 as a Frances Hesselbein in Community Innovation Fellow and is a frequent speaker, writer and commentator on children, education, science and technology issues. In April 2008, Evans was named as one of the Top Ten Most Influential People in Education Technology over the past 10 years by eSchool News, a leading national education publication.

Joan Ferrini-Mundy

Joan Ferrini-Mundy is Assistant Director of the National Science Foundation (NSF) Directorate for Education and Human Resources (EHR), a position she has held since February 2011, and is responsible for the leadership of EHR. She had served the Foundation in a number of capacities since 2007 including as inaugural director (through an Intergovernmental Personnel Act appointment) of the EHR Directorate’s Division of Research on Learning in Formal and Informal Settings.

From 2007 through 2009, Ferrini-Mundy was a member of the National Science and Technology Council’s (NSTC) Subcommittee on Education, and currently co-chairs the Strategic Plan workgroup of the National Science and Technology Council Committee on STEM Education. She is a member of the Mathematics Expert Group of the Programme for International Student Assessment (PISA), and in 2007-2008, representing NSF, she served as an ex officio member of the President's National Mathematics Advisory Panel, and co-chaired its Instructional Practices Task Group. From 1999 - 2011 Ferrini-Mundy held an appointment at Michigan State University (MSU), where she was a University Distinguished Professor of Mathematics Education in the Departments of Mathematics and Teacher Education, and Associate Dean for Science and Mathematics Education in the College of Natural Science. Her research interests include calculus teaching and learning, mathematics teacher learning, and mathematics and science education policy at the K-12 level. Ferrini-Mundy holds a PhD in mathematics education from the University of New Hampshire. She was elected a fellow of the American Association for the Advancement of Science in 2011.

Yolanda S. George

Yolanda Scott George is Deputy Director and Program Director, Education and Human Resources Programs, American Association for the Advancement of Science (AAAS). She has served as Director of Development, Association of Science-Technology Centers (ASTC), Washington, DC; Director, Professional Development Program, University of California, Berkeley, CA, a pre-college academic enrichment, university retention, and pre-graduate school program in STEM for minorities and women; and as a research biologist at Lawrence Livermore Laboratory, Livermore, California involved in cancer research and cell cycle studies using flow cytometer and cell sorters.

George conducts evaluations, project and program reviews, and evaluation workshops for both the National Institutes of Health and National Science Foundation, as well as reviews STEM proposals for private foundation and public agencies, including Carnegie Corporation of New York, the Ford Foundation, and the European Commission. She develops and coordinates conferences and workshops related to STEM undergraduate reform and recruitment and retention of minorities, women, and persons with disabilities in STEM. She works with UNIFEM, UNESCO,
L’Oreal USA and Paris and non-governmental organizations on gender, science, and technology initiatives related to college and university recruitment and retention and women leadership in STEM.

Over the last 25 years she has raised over $80 million for a variety of STEM education initiatives for colleges and universities, associations, and community-based groups. She currently serves as principal investigator (PI) or co-PI on several National Science Foundation (NSF) grants, including the Vision and Change in Undergraduate Biology Education; National Science Education Digital Library (NSDL) Biological Sciences Pathways; Historically Black Colleges and Universities-Undergraduate Programs (HBCU-UP); Robert Noyce Teacher Scholarship Program; and Transforming Undergraduate Education in STEM (TUES). In addition, George is the lead AAAS staff person for the L’Oreal USA Fellowships for Women in Science Program (postdoctoral fellowships) and the David and Lucile Packard Foundation HBCU Graduate Scholars Program (graduate school fellowships).

George serves on a number of boards or committees, including: Maria Mitchell Women in Science Awards Committee; McNeil/Lehrer Productions Online Science Reports Advisory Committee; the Center for the Advancement of informal Science Education Advisory Board; and the South Dakota Biomedical Research Network Advisory Committee; Burroughs Wellcome Fund, Science Enrichment Program Grants, Advisory Board; and The History-Makers, ScienceMakers, Advisory Board.

George has authored or co-authored over 50 papers, pamphlets, and hands-on science manuals. She received her B.S. and M.S. from Xavier University of Louisiana and Atlanta University in Georgia, respectively.

Lynford Goddard

Lynford L. Goddard received the B.S. degree (with distinction) in math and physics, the M.S. degree in electrical engineering, and the Ph.D. degree in physics from Stanford University, in 1998, 2003, and 2005, respectively. His doctoral research focused on characterization and modeling of 1.5 μm GainNASb/GaAs lasers. At Lawrence Livermore National Lab, he conducted postdoctoral research on photonic integrated circuits, sensors, and data processing systems.

Goddard joined the University of Illinois as an assistant professor of Electrical and Computer Engineering in 2007. His research group focuses on fabricating, characterizing, and modeling photonic sensors, integrated circuits, and instrumentation, as well as developing new processing techniques and testing novel semiconductor materials and devices. Applications include hydrogen detection for fuel cells, carbon dioxide detection for reducing post-harvest food loss, optical spectrum analysis and quantitative phase microscopy for metrology, and integrated microring Bragg reflectors for narrow linewidth lasers and next generation chip-scale communication systems.

Goddard is an Associate Editor of the IEEE Photonics Journal. He is the recipient of a Presidential Early Career Award for Scientists and Engineers (PECASE), nominated by the Department of Energy in 2008, and the inaugural AAAS Early Career Award for Public Engagement with Science in 2011. Goddard is an author or co-author of over 85 publications.

Alan I. Leshner

Alan I. Leshner has been Chief Executive Officer of the American Association for the Advancement of Science and Executive Publisher of the journal Science since December 2001. AAAS (triple A-S) was founded in 1848 and is the world’s largest, multidisciplinary scientific and engineering society.

Before coming to AAAS, Leshner was Director of the National Institute on Drug Abuse (NIDA) from 1994-2001. One of the scientific institutes of the U.S. National Institutes of Health, NIDA supports over 85% of the world’s research on the health aspects of drug abuse and addiction.

Before becoming Director of NIDA, Leshner had been the Deputy Director and Acting Director of the National Institute of Mental Health. He went to NIH from the National Science Foundation (NSF), where he held a variety of senior positions, focusing on basic research in the biological, behavioral and social sciences, science policy and science education.

Leshner went to NSF after 10 years at Bucknell University, where he was Professor of Psychology. He has also held long-term appointments at the Postgraduate Medical School in Budapest, Hungary; at the Wisconsin Regional Primate Research Center; and as a Fulbright Scholar at the Weizmann Institute of Science in Israel. Leshner is the author of a major textbook on the relationship between hormones and behavior, and has published over 150 papers for both the scientific and lay communities on the biology of behavior, science and technology policy, science education, and public engagement with science.

Leshner received an undergraduate degree in psychology from Franklin and Marshall College, and M.S. and Ph.D. degrees in physiological psychology from Rutgers University. He also has been awarded six honorary Doctor of Science degrees. Leshner is an elected fellow of AAAS, the National Academy of Public Administration, the American Academy of Arts and Sciences, and many other professional societies. He is a member of the Institute of Medicine of the National Academies of Science and Vice-Chair of its governing Council. He was appointed to the National
Shirley M. Malcom

Shirley M. Malcom, Director for Education and Human Resources (EHR) Programs at AAAS, has served as a program officer in the NSF Science Education Directorate; an assistant professor of biology, University of North Carolina, Wilmington; and a high school science teacher. Malcom received her Ph.D. in Ecology from the Pennsylvania State University; Master’s in Zoology from the University of California, Los Angeles; and Bachelor’s with distinction in Zoology from the University of Washington. In addition, she holds 15 honorary degrees.

Malcom serves on several boards, including the Heinz Endowments, Public Agenda, and Digital Promise. She serves as a trustee of Caltech and as a Regent of Morgan State University. In 2003, Malcom received the Public Welfare Medal of the National Academy of Science, the highest award granted by the Academy. She was a member of the National Science Board, the policymaking body of NSF, from 1994 to 1998, and of the President’s Committee of Advisers on Science and Technology from 1994 to 2001.

James H. Shelton, III

Jim Shelton is the Assistant Deputy Secretary for Innovation and Improvement, managing a portfolio that includes most of the Department’s competitive programs including i3, Promise Neighborhoods, and others focused on teacher and leader quality, school choice and learning technology.

Previously, he served as a Program Director for Education at the Bill & Melinda Gates Foundation, managing portfolios ranging from $2 to 3 billion in non-profit investments targeting increased high school and college graduation rates. Shelton has also been the East Coast lead for NewSchools Venture Fund, and co-founded LearnNow, a school management company that later was acquired. After four years in Atlanta advising CEOs and other executives on issues related to strategy, business development, and organizational design and effectiveness, he left McKinsey & Company as a senior manager. Upon leaving McKinsey, he joined Knowledge Universe, Inc., where he launched, acquired, and operated education-related businesses.

Shelton holds a bachelor’s degree in computer science from Atlanta’s Morehouse College as well as master’s degrees in business administration and education from Stanford University. Shelton currently resides in his hometown, Washington, D.C., with his wife and two sons (Sonia, Justice and Jameson).

Carl Wieman

Carl Wieman was confirmed by the United States Senate to serve as the Associate Director for Science at the White House Office of Science and Technology Policy in September 2010. Wieman previously divided his time between the University of British Columbia and the University of Colorado. At each institution, he served as both the Director of Collaborative Science Education Initiatives aimed at achieving widespread improvement in undergraduate science education and as a Professor of Physics.

From 1984 through 2006, he was a Distinguished Professor of Physics and Presidential Teaching Scholar at the University of Colorado. While at the University of Colorado, he was a Fellow of JILA (a joint federal-university institute for interdisciplinary research in the physical sciences) and he served as the Chair of JILA from 1993-95. Wieman has conducted extensive research in atomic and laser physics. His research has been recognized with numerous awards including sharing the Nobel Prize in Physics in 2001 for the creation of a new form of matter known as “Bose-Einstein condensate.”

Wieman has also worked extensively on research and innovations for improving science education; he was the founding Chair of the National Academy of Sciences Board on Science Education. He has received numerous awards, including the National Science Foundation’s Distinguished Teaching Scholar Award (2001), the Carnegie Foundation’s U.S. University Professor of the Year Award (2004), and the American Association of Physics Teachers’ Oersted Medal (2007) for his work on science education. Wieman received his B.S. in Physics from the Massachusetts Institute of Technology in 1973 and his Ph.D. from Stanford University in 1977.
Session I: Thursday, May 24, 2012
9:15am - 10:30am

1.1 This session includes two 30-minute presentations.

1.1A Teaching Fellows Learning About Teaching by Learning from Teaching: The TEACH/Here Residency Performance-Based Evaluation System

Length of Session: 30 minutes

Susan Benner, University of TN, Knoxville
Geri Landry, glandry@utk.edu, UTK
Lynn Hodge, lhodge@utk.edu, UTK
Michael Lawson, mlawso13@utk.edu, UTK Noyce Teaching Fellow

Target Audience: Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Evaluators/Education Researchers

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

One of the most promising tools available to teacher educators to achieve both accountability for their programs and provide an effective teaching tool for their teacher candidates is performance-based assessment. This session will describe the experience and progress of TEACH/Here (T/H) teaching fellows as they use the Teacher Performance Assessment (TPA) coupled with state-required performance-based teacher evaluation systems to prepare for their careers. The TPA includes a series of teaching events where educators evaluate and reflect on their own practice. The teaching fellows plan a 3-to-5 day learning segment for one class of students. They also collect evidence including: lesson plans, video clips of instruction, and student work samples. The TPA includes reflective commentaries where teachers explain their professional judgments underlying the artifacts collected during the planning and teaching event. From this experience the fellows learn from their own teaching by analyzing their instruction and from their own evaluation of student learning. Concurrently, the fellows participate in the state-required evaluation system used in their placements for in-service teachers. The Marshall-based Project COACH, used in Hamilton County, involves a series of “walk-through” mini-observations followed with feedback and teacher reflection. In Knox County the Teacher Educator Accelerator Model (TEAM) is also focused on teacher development through announced and unannounced observations and analysis of student learning. This presentation will describe the fellows’ progress as they used the TPA to prepare for their teaching positions while concurrently participating in these developmental evaluations.

1.1B Using Undergraduate Research with Noyce Teams to Encourage Learning Community Development and PBL Applications

Length of Session: 30 minutes

Brad Hoge, University of Houston Downtown

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Noyce Teacher Scholarship Program in Natural Sciences (NS) at the University of Houston Downtown (UHD) has faced many unique challenges due to our students’ backgrounds and Houston’s education workforce atmosphere. Recruitment and retention are impacted by students’ lack of preparation for the additional requirements of the Noyce program on top of their strenuous science degrees, and fears that jobs will not be available when they complete the program. These challenges are being met through the development of a supportive learning community which includes UHD faculty, Aldine ISD (AISD) mentor and junior teachers, and the Houston Urban Network for STEM (HUNSTEM). Groups of UHD/Noyce scholars are grouped with AISD mentor teachers, junior teachers, and UHD faculty mentors to form Noyce teams which meet face-to-face and use HUNSTEM to communicate and consider educational issues and challenges. HUNSTEM is a PK-16 learning community developed by the NS Department in collaboration with numerous educational partners across Texas as a medium to network science teachers with the scientific community of the greater Houston Area and connect them to available resources. UHD/Noyce Scholars also have the benefit of interacting with faculty and peers of the UHD Scholars Academy (SA). The SA provides peer-mentoring and tutoring as well as undergraduate research opportunities. UHD/Noyce students are encouraged to pursue undergraduate research. Summer research conducted by Noyce teams will provide all members invaluable experience with scientific research which will allow them to develop ideas for applying their experiences into project-based learning in the classroom.

1.2 An Urban-Rural University Partnership: Understanding the ‘Other’

Length of Session: 60 minutes

Deidre B. Sessoms, California State University, Sacramento
Kelly McDonald, mcdonald@csus.edu, California State University, Sacramento
Jennifer Oloff-Lewis, joloff-lewis@csuchico.edu, California State University, Chico
David Kagan, dkagan@csuchico.edu, California State University, Chico
Brandi Aranguran, Baranguran@csuchico.edu, California State University, Chico
Julia Smith, juliam.smith@yahoo.com, California State University, Sacramento, Noyce Scholar

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators
Topic: Partnerships

A recent report, “Transforming Teacher Education Through Clinical Practice,” from the National Council for Accreditation of Teacher Education (NCATE) blue ribbon panel on clinical teacher preparation and partnerships promotes developing collaborative professional communities and supporting strategic partnerships to prepare effective teachers (NCATE, November 2010). Two California State University campuses, Sacramento and Chico, have worked collaboratively with area school districts since 2007 to build an innovative partnership for preparing undergraduates and re-entry career changers as Noyce Scholars in math and science. The focus of our partnership has increased our capacity to effectively teach different populations of students, from small schools in rural farming communities to large urban comprehensive high schools. Two especially effective activities that will be described are 1) twice yearly collaborative professional development workshops at either site that capitalize on the different resources available in our respective communities and 2) student teacher “shadowing exchanges” where Scholars from rural schools spend 2-4 days with Scholars in urban schools, and vice versa. As a result of shadowing, Scholars have begun to address the stereotypes they may have of schools that are unlike those they have previously experienced, and some have pursued employment in geographical areas they had not initially considered. Faculty and Scholars from both campuses will share effective partnership activities and the impact those activities have had on us. Time will be allotted for participants to brainstorm partnerships, leaving with a template for action in their own Noyce Programs.

1.3 This session includes two 30-minute presentations.

1.3A Recruiting Majors for Noyce Teacher Scholarship Program

Length of Session: 30 minutes

Robert Ferdinand, East Central University

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers
Topic: Recruitment and Marketing Strategies

The project PI will present techniques used to market and recruit majors to their Noyce program. We would like to hear from the audience regarding new techniques for marketing and recruitment in an effort to get new and creative ideas for the same.

1.3B A Comprehensive Recruitment Strategy of STEM Professionals into K12 Teaching: Analyzing Data from Five Years of Marketing through Noyce Projects at Kennesaw State University

Length of Session: 30 minutes

Gregory T. Rushton, Kennesaw State
Nancy Overley, Kennesaw State

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers
Topic: Recruitment and Marketing Strategies

Since 2007, Kennesaw State University has been awarded two Noyce projects to recruit, prepare, and retain STEM majors and professionals into secondary K12 teaching careers in the physical sciences (i.e., chemistry or physics). To date, the two projects have attracted 53 candidates into the Master of Arts in Teaching (MAT) Chemistry or Physics programs, 25 of whom have been STEM career changers receiving Noyce funding through stipend support or fellowships. This presentation will focus on the development, implementation, evolution and analysis of the marketing plan for attracting the STEM professionals into education careers, towards the goal of devising a comprehensive recruitment strategy for Noyce projects across the country to consider when constructing their own advertising and marketing efforts for this population.

1.4 This session includes two 30-minute presentations.

1.4A Studio Classrooms: A Greenhouse for Growing Mathematics Leaders

Length of Session: 30 minutes

Thomas Dick, Oregon State University
Amber Clark, clarkam@onid.orst.edu, Oregon State University, Noyce Teaching Fellow
Alyssa Goss, gossaa@onid.orst.edu, Oregon State University, Noyce Teaching Fellow
Target Audience: Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers

Topic: Teacher Leadership

Our Noyce program requires that each scholar complete an action research project in their student-teaching classroom. This is a major learning component for prospective teachers and teacher leaders to integrate analysis and experimentation. It is a continuous formative assessment of all elements of the teaching process where the intern identifies a problem, seeks information, applies a possible solution, and then reflects on the results and next steps. The experience is formalized and includes input from both the university instructor and the cooperating teacher. Outcomes include development of the inquiry and reflection skills of the candidates, as well as concrete findings that inform their practice. We will describe the project as a whole, as well as specific studies. Each of three Noyce scholars will discuss their study in detail and present data to show impact in their classroom and beyond.

Their studies are briefly described below.

Study 1 investigated how graphing calculators can be used to support conceptual understanding in mathematics. The researcher varied teaching methods to investigate the effect on students’ conceptual understanding of using calculators in different ways.

Study 2 examined the effects of humanistic, research-based science stories on high school biology students’ identification with science -- that is, the extent to which they can see themselves as able to understand and do the work of a scientist.

Study 3 explored how having students identify self-relevant future goals and form related sub-goals affected their perception of relevance, task instrumentality, and achievement in a math class.

1.5 Using Connective Technology Resources in Urban Science Classrooms

Length of Session: 60 minutes

Pamela Fraser-Abder, New York University
Meagan Driver, myd210@nyu.edu
Alice Yang, ay518@nyu.edu
Jamie Dinsmoor, jld393@nyu.edu

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Participants will explore connective technology and will review web resources and instructional strategies that they can adapt and integrate into their own science curriculum.
During this workshop participants will explore the following three questions:

1.) What connective technology resources are available for teaching secondary science?
2.) Where can you find information on these resources?
3.) How can you integrate these resources into your curriculum?

We will explore the use of media, out-of-school education programs, non formal science institutions, museums and other science learning outlets as valuable segments of our nation's science education infrastructure. Strategies for using technology (e.g. the iPad and apps) to expose your students to institutional resources in your immediate neighborhood, the entire country and around the world will be discussed. At the end of the session attendees will have web resources and instructional strategies that they can adapt and integrate into their own science curriculum. Attendees are encouraged to bring their own iPad, iphone, laptops if possible.

1.6 Integrating Modeling Instruction Across the Curriculum: Establishing An Inquiry Paradigm

Length of Session: 60 minutes

Laird Kramer, Florida International University
Julian Edward, edwardj@fiu.edu, FIU
Ivette Vallejo, Noyce fellow, FIU

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, Evaluators/Education Researchers

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Florida International University has integrated Modeling Instruction into its Secondary Science and Mathematics: Teacher Preparation Programs to facilitate implementation of “guided inquiry” in our graduates’ classrooms. Potential teachers may first experience Modeling in an introductory course, may then facilitate learning as an undergraduate Learning Assistant in a Modeling course, and will take Modeling-based methods course(s) as part of their teacher preparation program. These experiences are coupled to ongoing year-round teacher professional development centered around Modeling.

This comprehensive deployment allows teacher candidates to experience Modeling from both the student and teacher perspectives and be inducted into a supportive professional development community. Participants in this interactive workshop will learn how Modeling can serve as the core of teacher preparation programs. After completing a Modeling activity, participants will learn how to integrate Modeling across the introductory and preservice curriculum and learn about the development of the university-level Modeling Instruction Curriculum.

1.7 The DUETS Program: Highly Effective Urban STEM Teachers

Length of Session: 60 minutes

Deborah A. Harmon, Eastern Michigan University, deborah.harmon@emich.edu, DUETS Scholars

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Understanding the need for the recruitment and retention of STEM teachers in urban classrooms, Eastern Michigan University (EMU) created the Developing Urban Educators Teaching STEM (DUETS) program. DUETS was built upon the foundation of two other highly successful programs aimed at recruiting STEM teachers and recruiting and retaining preservice teachers of color and teachers of color. EMU’s Creative Scientific Inquiry Experience Program, an NSF-funded STEP initiative, was created by faculty from chemistry, mathematics, and the Office of Academic Service-Learning to link introductory STEM courses in a cluster model with a one-credit University-Seminar with the intent to implement interventions and innovative pedagogy that support high academic standards, promote faculty collaboration across disciplines, and increase student performance and persistence in demanding fields. The Minority Achievement, Resiliency, and Success (MARS) Program was established in the College of Education at EMU to support minority students in the teacher preparation program by providing a senior seminar based upon understanding racial identity, developing cultural capital, professional skills, and urban/multicultural education. The MARS Program, in its eleventh year, has enjoyed a graduation rate of 100% with 99% of its students employed as teachers. The merging of these two programs led to the creation of a comprehensive support system that follows DUETS scholars through preservice into 5 years of teaching. The result has been STEM teachers who are highly effective in urban schools. This presentation will present the DUETS program, it successes, it challenges, and its positive impact on its sister programs.
1.8 Preparing Noyce Scholars for Effective Instruction of English Language Learners in STEM Classrooms

Length of Session: 60 minutes

Orlando B. Alonso, Lehman College, CUNY
Margo DelliCarpini, margo.dellicarpini@lehman.cuny.edu, CUNY

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Little research exists on effective ways to prepare secondary mathematics and science teachers to work with English Language Learners (ELLs) in the mainstream mathematics and science (MS) classrooms. Given the achievement gap that exists between ELLs and their native speaking counterparts in MS subjects and the growing numbers of ELLs in US schools, this becomes a critical issue since academic success for these students depends on the effectiveness of instruction they receive not only in the English as a second language classroom (ESL), but in the mainstream classroom as well. We describe the implementation of a course specifically designed to prepare Noyce scholars in MS teacher education programs to work with ELLs in MS classrooms through effective content and language integration and to provide opportunities for collaboration between these Scholars and ESL teacher candidates to target the needs of ELLs in the content and ESL classroom.

This course was co-developed and is co-taught by a Mathematics Education Professor and TESOL Professor with visits from a Science Education faculty member. We describe the rationale behind the development of the course, provide a detailed description of the course and its requirements, and present findings from the Noyce scholars enrolled in terms of positive change in knowledge, skills, and beliefs related to working with ELLs in secondary-level mainstream MS classrooms. We share lessons learned and modifications made to the course based on findings to date and offer suggestions for teacher education programs interested in developing and adopting similar coursework.

1.9 Project-based Inquiry as a Model for Teaching, Learning and Assessing Science in the Grade 7-12 Classroom

Length of Session: 75 minutes

Regina Toolin, University of Vermont
Beth White, Beth.White@UVM.edu, University of Vermont, Graduate Research Assistant

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

In this workshop, a model for understanding and applying principles of project-based inquiry (PBI) in the 7-12 science classroom will be presented. Participants will engage in an interactive discussion of PBI principles, examine a variety of PBI examples across the 7-12 spectrum and review a template for PBI design based on backward design curriculum principles. During the workshop, participants will utilize the PBI template to initiate the design of a project that may be integrated into their curriculum and teaching. The workshop will culminate in an open discussion about issues and limitations of PBI development and implementation in grades 7-12.

1.10 CCSS Standards for Mathematical Practice: What are They, and How Can They Improve Instruction Today?

Length of Session: 75 minutes

Davida Fischman, CSU San Bernardino

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Resources for Teachers

The Common Core State Standards (CCSS) encourage a conceptual approach to mathematics and provide a coherent development of K-12 mathematics through the grades. The CCSS document begins with Standards for Mathematical Practice, which describe a variety of expertise, proficiencies, and processes that are valuable tools for all students of mathematics. Implementation of these practices is crucial to the success of the CCSS.

Whether the content being taught is taken from the current state standards or from the Common Core Standards, these mathematical practices will help increase both understanding and capabilities for our students.

What is meant in each of the Standards for Mathematical Practice is not always obvious; this session will provide time and context to delve deeply into several of these standards to get a better sense of their richness and complexity. We will view and analyze videos to gain understanding of how these practice standards might play out in the classroom, and participants will develop their own strategies to incorporate them into current teaching today, so as to enrich the teaching of the current curriculum while getting a head-start on implementing the Common Core State Standards.
1.11 From Candidate to Teacher: Innovative Induction and Mentoring in the PhysTEC Noyce Program

Length of Session: 75 minutes

Jon Anderson, anderson.jon.p@gmail.com, Centennial High School, PhysTEC Noyce Program
B Lippit, B.Lippit@systemsbiology.org, Seattle Pacific University
Heidi Rowles, rowleh@spu.edu, Seattle Pacific University, Noyce Scholar
Jacob Clark Blickenstaff, blickenstaff@aps.org, American Physical Society

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators

Topic: Supporting New Teachers

The PhysTEC Noyce program works with six university campuses across the country to attract, prepare, and support new high school physics teachers. One of the most important components of induction and mentoring at our sites has been the hiring of Visiting Master Teachers (VMTs). VMTs are experienced high school physics teachers who act as the most direct contact between the program and our scholars. VMTs and scholars meet regularly, and communicate frequently by email and telephone. The VMTs' knowledge of the local school systems provides invaluable information to scholars as they look for employment and begin their first teaching positions.

The workshop facilitators include a current Noyce scholar from Seattle Pacific University (SPU), the VMT from SPU, and our VMT coordinator— a high school physics teacher. This workshop will be very interactive, as we ask participants to consider how best to support new science teachers as they transition from student teaching to their first employment. Our team will share what best practices have evolved over the years we have implemented the VMT program.

1.12 Recruiting Today's Engineering Students to Become Tomorrow's Teachers

Length of Session: 60 minutes

Trina Crowley, University of Massachusetts, Dartmouth, pcrowley@umassd.edu
Tesfay Meressi, University of Massachusetts, Dartmouth, tmeressi@umassd.edu
Justin Mare, University of Massachusetts, Dartmouth, jmare@umassd.edu
Matt Huberman, University of Massachusetts, Dartmouth, mhuberman@umassd.edu

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators, Evaluators/Education Researchers

Topic: Recruitment and Marketing Strategies

There are alarmingly low numbers of engineering students who choose to pursue teaching as a profession. This phenomenon has led to a lack of highly qualified, content knowledgeable teachers with engineering credentials in our K-12 schools. The purpose of this workshop will be to discuss ways in which K-12 schools are currently preparing students for engineering; to discuss how undergraduates, who select Engineering as their major, perceive teaching as a profession (as well as what or who influenced their ideas about teaching); and to look at selection criteria for acceptance to teacher licensure programs in regards to the Engineering student population. Outcomes from this workshop could be how we can increase the numbers of highly qualified, content knowledgeable engineering teaching professionals for K-12 classrooms, as well as how to inform more effective K-12 practices - such as coursework, programs, preparation, and recruitment methods for attracting engineers into the teaching profession where they could provide rich content material to their students. Leading this workshop will be the Associate Dean of the College of Engineering, two Noyce Scholars (one who had majored in Engineering, but changed to Mathematics, and one who has been in Mathematics his whole college experience) and the Director of Academic Programs, School of Education, Public Policy & Civic Engagement.

1.13 Social Media for STEM Educators: How to Build an Online Community Around STEM Ideas and Market Yourself as a Leader in the Field

Session Length: 60 minutes

Steven Fletcher, St. Edward's University, ssfitch@gmail.com
Jorge Sanhuela-Lyon, jsanhueal@mac.com, University of Texas at Austin

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff

Topic: Teacher Leadership

This session will address how social media (like facebook, twitter, tumblr, posterus, storify, pinterst) can be utilized by STEM educators. Participants will explore examples of ways that these tools have been used by journalists and others to tell stories and create global communities around current issues. They will then work together to translate themes that are useful in the work of STEM education. Examples of how teachers use social media in the classroom with students will also be explored and examined in the session. Participants will receive links to materials and
tutorials for using different online tools. Presenters include a science educator with an interest in innovation and an award winning multimedia journalist who also teaches online social media courses at UT Austin.

### 1.14 Why Don't You Just Tell Us the Information?: An Instructional Model for Moving Away from Teaching by Telling and Towards Guided Inquiry for the 21st Century Classroom

**Length of Session: 60 minutes**

Annabel D'Souza, Graduate Center-CUNY

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers

**Topic:** Resources for Teachers

Universities and the work force require that students have experience in identifying, locating, and analyzing requisite information, have the ability to solve intricate problems with real world applications, and are able to work with others cooperatively. For pre-service and in-service math and science teachers it is not enough to know what content to teach, but also how to teach it. Process-Oriented Guided Inquiry Learning (POGIL) is a nontraditional student-centered active learning approach to education that places an emphasis on constructivism, where students are encouraged to work in Learning Teams to construct and self-develop math and science concepts, and process skills, where students collaborate, communicate, critically think and problem solve. POGILs encourage student agency and participation in the learning process. This session will explore a POGIL activity and its alignment with the 3-stage Learning Cycle, discuss the types of questions that are used, and the ways in which the activity is sequenced.

### Session II: Thursday, May 24, 2012

3:00pm - 4:15pm

2.1 This session includes two 30-minute presentations.

#### 2.1A Implementing Noyce Program Training: Two Noyce Graduates Develop Innovative Strategies to Facilitate Student Success in a Drop-out Recovery Urban School

**Length of Session: 30 minutes**

Kimberly Bigioni, University of Toledo
Lisa Jones-Gast, knitzche1@aol.com, University of Toledo

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

Teaching at-risk students in a non-traditional community school provides unique opportunities and challenges in curriculum and instruction. Two Noyce graduates reflect on their Noyce program training and share their teaching experiences at an on-line, self-paced credit recovery high school. Strategies implemented to promote student success include classroom management, engaging students in math and science through subject month activities, and preparing students for high stakes testing. Successes, challenges and future directions will also be discussed.

#### 2.1B CSUTeach: Preparing a New Generation of Noyce Scholars

**Length of Session: 30 minutes**

Joanne Goodell, Cleveland State University

**Target Audience:** Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

The CSUTeach program has been successful in recruiting and retaining talented STEM students into teaching through a combination of innovative coursework and built in financial supports in addition to the full Noyce scholarships. In this session, I will present an overview of the program, an analysis of the impact of receiving a Noyce scholarship on recipients' GPA, a summary of qualitative data collected from the current recipients about the impact of the scholarship, and details of internship opportunities that serve not only as recruiting mechanisms, but also as resume builders while providing much needed financial assistance in the early years of the program. Sustaining the internship and scholarship opportunities beyond the life of the current funding sources will also be explored.
2.2 This session includes two 30-minute presentations.

2.2A Noyce Scholars as Leaders: Innovative Practices at the University of Houston

Length of Session: 30 minutes

Laveria F. Hutchison, University of Houston
Susan E. Williams, sewilliams@uh.edu, University of Houston
Robert Houston, rhouston@uh.edu, University of Houston

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The project at the University of Houston has prepared forty-five Noyce scholars to become STEM teachers in high-need school settings. This session will highlight instructional experiences that are designed to assist program participants in acquiring innovative and effective practices that will contribute to closing the achievement gap in STEM subjects in high-need secondary schools. We will focus on Noyce scholars' participation with the Bernard Harris Astronautics Summer Science STEM Camp for middle-level students and high school students, on the scholars' creative lesson designs for STEM classroom instruction and on the scholars' development and presentation of professional development sessions that demonstrate successful strategies used to teach STEM concepts to students in school settings. In addition, practices used to recruit scholars, to retain scholars and to mentor scholars during their induction year of teaching will be highlighted. A multimedia presentation will show video clips of scholars in authentic high-need classroom environments.

2.2B Promoting Professionalism in Preservice Teachers

Session Length: 30 minutes

Hope Marchionda, Western Kentucky University (WKU)
Stephanie Burba, stephanie.burba747@topper.wku.edu, WKU, Noyce Scholar
Kathryn Crawford, kathryn.crawford292@topper.wku.edu, WKU, Noyce Scholar
Tyler Ghee, tyler.ghee760@topper.wku.edu, WKU, Noyce Scholar
Shelby Overstreet, shelby.overstreet278@topper.wku.edu, WKU, Noyce Scholar

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Teaching is more than a job, it is a profession. Unfortunately, many teachers see teaching as an occupation rather than a career. This type of attitude contributes to high attrition rates as teachers become dissatisfied with their vocation. The Noyce Program at Western Kentucky University (WKU) seeks to decrease attrition rates of teachers in high needs areas by introducing preservice teachers to professionalism in teaching with the hope of fostering networks and a professional identity that will keep teachers in the field. In this session, we will discuss what professionalism means in the context of teaching and how the perceptions and expectations of students, teachers, administrators, and communities can affect teachers' perceptions of professionalism. How WKU's Noyce Program seeks to promote professionalism in its Scholars as well as other preservice teachers who plan to teach in one of the STEM fields will be discussed. We will also share some of the successes and obstacles we have encountered during our efforts to promote professionalism with our first two cohorts of Noyce Scholars. WKU Noyce Scholars will be on hand to share their experiences from the past year and to share how they believe these experiences will impact their future careers in teaching. Participants will be invited to share how their Noyce programs are promoting professionalism to prepare better STEM teachers.

2.3 Why I Remain Committed to Teaching in a High Need School: Perspectives of Three Scholars

Session Length: 60 minutes

Christine D. Thomas, Georgia State University
Marcellin Mutuyimana, mmmutuyimana@atlanta.k12.ga.us, Noyce Scholar and Teacher, Sutton Middle School, Atlanta Public Schools, GA
Rabia Shahbaz, rabia677@gmail.com, Noyce Scholar and Teacher, Meadow Creek High School, Gwinnett County, GA
Karen Tatum, ktatum@atlanta.k12.ga.us, Noyce Scholar and Teacher, Douglas High School, Atlanta Public Schools, GA

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators
Topic: Other: Teacher Retention

The Robert Noyce Urban Mathematics Educator Program (UMEP) at Georgia State University is currently in a Phase II project for monitoring and evaluation of 33 UMEP Noyce Scholars who are secondary mathematics teachers. The range in number of years in teaching for UMEP Scholars is six to two. In this pres-
entation, three of the UMEP Scholars will share their trajectories across: (a) classroom management, (b) delivery of a performance-based mathematics curriculum, and (c) evolution as teacher leaders all within the context of working in urban high need schools.

Over the duration of the project, the UMEP Scholars have remained within a professional learning community that has supported their growth as exemplars in the classroom. This growth has been documented with respect to challenges they have faced and approaches they have taken in working through challenges. The UMEP Scholars will share specific professional experiences with respect to explicit connections to sustaining unwavering commitments to teaching in urban high need schools.

2.4 Drawing to Learn: The Role that Visualization and Drawing Can Play in Teaching and Learning

Length of Session: 75 minutes

Paul D. Heideman, College of William and Mary

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Visualization and drawing of structures, events or concepts are useful in (a) learning, (b) fast, efficient development of memory, and (c) problem-solving in science and mathematics. In addition, simple sketches made by students can be a fast, effective way to diagnose individual student weaknesses and misunderstandings. Sketches can be especially helpful when students feel it is enough to memorize terms and definitions for a test, but they do not internalize the concepts and cannot use their content to solve new problems.

This presentation of materials from a Noyce add-on class (How Students Learn) includes a brief review of the literature on “Drawing to Learn” with examples of using simple student sketches effectively. The materials will include exercises in sketching, instructions for students, grading rubrics, and suggested uses for teaching in STEM disciplines. Unhappily, things can go wrong. In 15 years of experience using student sketches in teaching in most of his classes, the presenter has learned many ways to go wrong as well as ways to make sketching work. The presentation will include strategies to avoid or correct problems and apply these methods effectively.

2.5 The Math for America San Diego Noyce Program: Teaching the Mathematical Standards through Holistic Problems

Length of Session: 75 minutes

Jim Farrar, Math for America San Diego
Stacy Coakley, Math for America San Diego, stacycoakley@vusd.k12.ca.us, Noyce Teaching Fellow

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators

Topic: Resources for Teachers

The eight mathematical practices of the Common Core State Standards (CCSS) can be understood as an invitation to reorganize the mathematics curriculum around “ways of thinking” rather than content topics. Two Math for America San Diego Noyce Teaching Fellows will share several holistic problems, define holistic problems, and demonstrate how the CCSS mathematical practices can be taught through this kind of problem. In addition to solving several problems in the session, attendees will be given a set of holistic problems with pedagogical commentary to help enrich their understanding of holistic problems. Jim Farrar and Stacy Coakley are third year participants in a comprehensive program of professional support guided by the DNR theoretical framework. According to this perspective, the mathematical integrity of the content and the intellectual need of the student must be at the center of the instructional and curricular effort. The conceptual framework distinguishes between subject matter (e.g., definitions and theorems) and ways of thinking. The claim is that instructional objectives must be formulated not only in terms of subject matter, but also in terms of ways of thinking, which are similar to the mathematical practices in the CCSS.

2.6 Preparing Students for STEM Careers through Research

Length of Session: 60 minutes

John Keller, California Polytechnic State University

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Though partnerships with the Department of Energy and NASA, the STEM Teacher and Researcher (STAR) Program has provided
222 paid summer research experiences to 177 pre-service science and math teachers, including 93 research opportunities for 74 Noyce Scholars (www.STARteacherearacher.org). In summer 2012, the STAR Program will arrange an additional 75 research placements and expand to involve NOAA and the National Optical Astronomy Observatory. The premise behind STAR is that pre-service teachers immersed in the community of science research will develop classroom experiences that will both motivate and prepare their students to pursue STEM careers. In this interactive workshop, participants will learn more about research experiences for both pre-service and in-service teachers (www.retnetwork.org) and explore citizen science projects and project-based learning activities developed by STAR alumni and others that provide valuable opportunities for students to engage in authentic research. As an example, STAR Fellow Ariel Simmons is currently developing an innovative smart phone app to use cell phones as a distributed cosmic ray detector, an innovative citizen science project that was recently awarded an outreach grant from the American Physical Society (http://www.aps.org/publications/apsnews/201203/upload/march2012.pdf).

We will also describe a range of ways that STAR Fellows are currently integrating their summer research experiences into classroom lessons, from modeling professional use of lab notebooks to continuing to partner with their summer research mentor to involve their students in ongoing research throughout the school year.

### 2.7 All Hands on Deck: Pre-service STEM Teachers on a Co-generative Voyage that Examines Issues Surrounding Climate Change

**Length of Session: 60 minutes**

Steven Fletcher, St. Edward’s University
Paul Walter, paulw@stedwards.edu, SEU
Zach Carpenter, zcarpen@stedwards.edu, SEU, Noyce Scholar
Angie Lux, alux@stedwards.edu, SEU, Noyce Scholar
Veronica Lopez, vlopez2@stedwards.edu, SEU, Noyce Scholar
Margo Sabin, msabin@stedwards.edu, SEU, Noyce Scholar

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Project PIs, Co-Pis, Other Faculty/Staff

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

This presentation describes findings from a summer 2011 professional development institute that centered on preservice secondary science and mathematics teacher training and issues related to climate change. The Science, Technology, Engineering and Mathematics (STEM) Partnership Academy (SPA) camp had two parts. First, the 15 participants traveled to coastal Texas and spent two days alongside 50 local high school science students and their teachers to learn how to teach in informal settings. The theoretical frame during this time was the co-generative dialogue model. Co-generative dialogues are opportunities for stakeholders from different perspectives to meet and solve common problems together in science. The 'Co' in Co-generative is purposeful. It refers to the understanding that each player, (from high school student to university professor), brings a unique and valid perspective to the problem being solved. In our case, we created small teams that worked together to answer questions and examine issues related to environmental issues in the area.

The participants co-taught ecology and marine science lessons to the high school students, under the guidance of the mentor teaching staff, while at the same time grappled with new marine science content themselves. Upon returning to Austin, the undergraduates spent the remaining four days in a content-rich environment that explored issues related to local climate change. Participants went on field trips, completed inquiry-based science labs, and worked together to create curriculum useful for their own classrooms related to climate change.

### 2.8 Using Technology to Enhance Student Interest and Understanding of STEM Disciplines

**Length of Session: 60 minutes**

Bruce Bukiet, NJIT

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

In this workshop, presenters will provide an overview of several technologies, both software and hardware, that are easy to learn and have been used successfully to increase student interest in lessons in STEM disciplines. After an overview of several of these relatively inexpensive or even free resources, workshop participants could work in groups with several set-ups or computer stations provided and gain hands-on experience in the presence of “experts” who would be available to provide guidance and answer questions. Resources could include: Vernier, Algodoo, Prezi, Pixton, Geogebra among others.
2.9 Science NetLinks - An Incredible Resource for Teachers and Students....and It's Free!

Length of Session: 60 minutes

Sarah Ingraffea, AAAS
Kirstin Fearnley, AAAS

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators

Topic: Resources for Teachers

Did you know that AAAS provides FREE resources for K-12 educators and students? Did you know that you can go to one place and find lesson plans, podcasts, interactives, blog posts, mobile apps, and current science news? Science NetLinks, produced by AAAS, is in its 15th year of developing science resources for use in the classroom. The award-winning site was recently redesigned and provides an engaging, thoughtful, and dynamic website that will enhance instruction and provide support in all disciplines of science. Come learn the basics of this incredible site, try out some of its resources, and let Science NetLinks support your teaching and student learning.

2.10 A Classroom Experience Fostering Explanation Through Exploration

Length of Session: 75 minutes

Lisa S. Loop, Claremont Graduate University
Chris Brownell, Claremont Graduate University

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators

Topic: Resources for Teachers

We will take participants on a journey through a familiar world, where they will see unfamiliar mathematical ideas. Seeking all the while to encourage a spirit of inquiry into what we believe we know concretely, we will use abstraction to look at basics in new ways that can excite and refresh our vision of what it means to teach mathematics.

2.11 An Inquiry-Based Analysis of the Eno River Basin

Length of Session: 60 minutes

Mika J. Hunter, Duke University, Durham Public Schools

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators

Topic: Supporting New Teachers

Two Durham high schools with interdisciplinary classes at multiple sites investigated and analyzed water chemistry, biology and basin geology from the headwaters to the mouth along the Eno River. The presentation will discuss how to plan and implement an interdisciplinary field trip using the above trip as a case study.

2.12 This session includes two 30-minute presentations.

2.12A Fresno State Noyce Scholars Programs: Ten Years and Still Going

Length of Session: 30 minutes

David M. Andrews, Fresno State University
Jaime Arvizum, jaimea@csufresno.edu, Fresno State University

Target Audience: Project PIs, Co-Pis, Other Faculty/Staff, Higher Education Institution Administrators, Evaluators/ Evaluation Researchers

Topic: Research and Evaluation

The presentation will include a summary of practices, activities and outcomes of our 10 years of Noyce Scholar/Teacher/ Fellow programs at Fresno State. We will share information concerning total numbers of Noyce I/II teachers and scholars as well as numbers of Fellows. The presentation will also include demographics including gender, ethnicity; discipline major including second authorization/license area data; stipend vs scholarship support; years our Noyce Teachers have been in the classroom and how many years beyond the obligation period; leadership positions occupied by our Noyce Scholars/Teachers/Fellows; professional development including participation in our Western Regional Noyce Conferences, summer research through PST, STAR, or SRI; special summer programs, the impact of our Early Field Program; examples of presentations of Noyce Scholars and Teachers at professional meetings and other similar activities.
We may also be able to share early results from our Noyce Study whereby we are comparing Noyce vs non-Noyce science and math teachers at two major campuses in the CSU system.

### 2.12B  Reflective Pathways: The Impacts of an Urban Science Teaching Field Experience on Undergraduates’ Decisions to Teach Science in the New York City School System

**Length of Session:** 30 minutes

Paul Bischoff, SUNY-Oneonta
Paul French, SUNY-Oneonta
John Schaumloffe, SUNY-Oneonta and Co-PI Oneonta

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators

**Topic:** Research and Evaluation

SUNY College at Oneonta is an undergraduate institution located in rural upstate New York. All Noyce scholars in Science Education at SUNY-Oneonta (n = 24) come from either rural or suburban areas in New York. None of our Noyce Scholars come from urban areas, nor do they have any experience in urban schools. At the same time, the realities of current science teacher opportunities in New York State practically necessitate that new teachers are prepared to accept teaching positions in New York City (NYC).

The purpose of this research was to identify the effects of a one-week New York City teaching placement on Noyce Scholars’ dispositions regarding the acceptability of a New York City teaching position. As such, the Noyce Scholars were required to respond to the following essay prompt before, immediately after and one month after the NYC internship: “If you graduated college today with a science teaching license, would you apply for and accept a position as a science teacher in a high needs NYC school?” Common themes emerged in the essay analysis, and we were able to identify each statement in the essays as a positive (+) or negative (-) perception about that theme. Ultimately, we were able to use the essay analysis in distinguishing characteristics of the Noyce Scholars who became increasingly committed to NYC teaching, from those who became more reluctant to pursue a NYC teaching career. In this presentation we describe what was revealed in the essay analyses and implications this research has on identifying Noyce Scholars who are likely to respond affirmatively to New York City teaching opportunities.

### 2.13  The Nuts & Bolts of Implementing the MTSU Master Teaching Fellows Project: Perspectives on What We Have Learned in Three Years

**Length of Session:** 60 minutes

Kyle Butler, Middle Tennessee State University
Michaela Chappell, Middle Tennessee State University, Michaela.Chappell@mtsu.edu
Samantha Stevens, Math Teacher (Master Teaching Fellow), Grundy County High School, Tennessee, sstevens@k12tn.net

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers

**Topic:** Teacher Leadership

This presentation will highlight the successes and challenges of implementing one of the Master Teaching Fellows (MTF) projects funded in year 2009. The Middle Tennessee State University (MTSU) MTF project aims to transform STEM teaching and learning by redefining STEM education professional development and building the capacity to expand our mentorship model through developing master teachers in the field; building the professionalism of classroom practice; encouraging teachers to conduct critical inquiry; and providing them with necessary tools, and experiences to determine best practices in each of the various classroom, school, and district contexts.

The MTSU MTF project includes using a mentoring model with university faculty guiding fourteen teachers to develop teacher enhancement plans focused on content knowledge, pedagogy, and leadership competencies. Each year, teacher professional development has been supported through teacher-directed action research and a number of master teachers are extending themselves by leading, collaborating and mentoring other teachers/colleagues in teacher-directed action research.

At this point, teacher-directed research from this project has been disseminated across local, regional, national and international conferences. Through consistent and regular participation of teachers, administrators, and university faculty, it is anticipated that, over the next two years, schools will institutionalize teacher-directed action research as a sustained element within their districts-- state mandated school improvement and professional development programs. Finally, this presentation will also highlight reflections on learning experiences, successes, and potential barriers to facilitating teacher professional development through classroom research.
2.14 Understanding Teacher Research: Perspectives on Student Learning and Adaption of Curricular Materials During a Middle School Unit on Climate Change

Length of Session: 60 minutes

Melissa George, National Science Foundation

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

In this workshop, participants will explore some of the “best practices” of STEM education teachers who strive to become reflective practitioners in their classrooms. Participants will gain an understanding of how teachers achieve coherent learning goals for their students by continually assessing what students know about various climate change topics, adapting curriculum to build on this knowledge, and reflecting on the outcomes of these adaptations. The findings and the issues highlighted in this workshop are likely to foster discussion and encourage future teachers to explore the complexity of tailoring teaching to meet student needs.

Session III: Friday, May 25, 2012
9:10am - 10:25am

3.1 This session includes two 30-minute presentations.

3.1A Shared Classroom Experiences in Teacher Preparation

Length of Session: 30 minutes

Jeffrey Carpenter, Elon University

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

Elon University’s Secondary and K-12 Teacher Education programs have recently added shared field experiences (SCE) to our teacher preparation. In the semester before full student teaching, our fourth year students take a teaching methods course in their content areas (e.g., Methods of Teaching Secondary Mathematics). These courses include a traditional, 50-hour field placement in which each student is placed with his or her own mentor teacher for a mixture of observing and teaching.

For the additional SCE, however, each methods class as a whole links up with one local master teacher. The teacher candidates and professor together observe two lessons, and have the opportunity to debrief with the teacher. Students have particularly expressed their appreciation of the opportunity to “get in the master teacher’s mind,” as one student put it. The students then collaborate to design and deliver a lesson in the same master teacher’s classroom. This lesson is also debriefed with the master teacher.

In addition to their direct benefits, the SCE serve as a text that influences later university classroom discourse. With traditional individual field experiences, students encounter different schools, teachers, and curricula, and it can be difficult in the university classroom to have productive, whole-class conversations regarding such idiosyncratic experiences. The SCE provide a common set of experiences to which students and professors can refer when discussing course content. The SCE were first piloted in the Methods of Teaching Secondary Mathematics in Fall 2010 and were expanded to three additional methods courses in 2011.

3.1B Do Field Experiences Really Matter: Perspectives of Noyce Scholars

Length of Session: 30 minutes

Andre M. Green, University of South Alabama
Kelly Byrd, kbyrd@usouthal.edu, University of South Alabama
Tami May, Ashley Velazquez, Peter Kupfer, and L. Michael Vesoulis, Noyce Scholars

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

Topic: Innovative Noyce Program Practices and Teacher Preparation Models

The Noyce Pathway to Science and Mathematics programs at the University of South Alabama requires all candidates interested in becoming Noyce scholars to complete a ten-week (2 days per week) internship. The program pairs the interested candidates with a mentor teacher identified by the partner school district as being a great teacher in a high need school. Students are required to complete a set of activities designed by the mentor teachers during the internship experience. At the conclusion of the experience, candidates interview before a selection committee of school principals, the science and math supervisor of the district, and the principal investigators.
of the grant. The selection committee then selects the Noyce scholars. Once candidates are selected, they matriculate through the graduate program with at least three sets of fields experiences at the high school and middle school levels. These experiences will be discussed from the perspectives of the Noyce Scholars in this presentation.

### 3.2 Speed Networking: Who is Here? What Do They Know? Who Do They Know? Can We Work Together?

**Length of Session:** 60 minutes

Richard Weibl, AAAS

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers

**Topic:** Resources for Teachers

The first few hours of any professional conference or meeting are filled with anxiety as we look for people we know and seek out affirmation we are in the right place for what we need to learn and share. This highly interactive session will replicate the 'Speed Dating' model wherein participants will have a few moments to greet and meet one another, exchange essential information, and hopefully identify at least a couple of potential collaborators or like minded persons.

### 3.3 This session includes two 30-minute presentations.

#### 3.3A Stimulating STEM Teacher Growth through aggieTEACH: A Model for the Recruitment and Retention of Pre-service Mathematics and Science Teachers

**Length of Session:** 30 minutes

Timothy P. Scott, Texas A&M University

**Target Audience:** Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

The shortage of certified teachers in mathematics and science in Texas classrooms is a major concern and mirrors national trends. The Business-Higher Education Forum estimates a national shortage of 283,000 secondary math and science teachers by 2015 (BHEF 2005). Dramatic increases in shortages of teachers have stimulated the design of new certification programs, including alternative certification and post-baccalaureate programs that recruit and place teachers in classrooms as quickly as possible (TCER, 1999). Texas A&M University (TAMU) has learned that when it comes to teacher preparation, one size does not fit all, so they currently have four routes to STEM teacher certification. While all TAMU STEM teacher preparation routes to certification will be discussed in this workshop, we will spend most of the time showcasing aggieTEACH, the highest producer of secondary mathematics and science certified teachers at Texas A&M. aggieTEACH streamlines the certification process, offers financial support, provides quality mentoring, and focuses on field experiences. The Robert Noyce Scholarships serve as the crown jewels of theaggieTEACH program and provide the most lucrative scholarships of any offered in the College of Science. TAMU has used the scholarship program to create a Learning Community for participants to provide opportunities to join technology academies, work with at-risk students in local schools, as well as participate in professional development. Lessons learned are being applied to the teacher preparation programs in general.

#### 3.3B Working with High School Students in an Intense Science Research Environment

**Length of Session:** 30 minutes

Alice Yang, NYU

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Project PIs, Co-Pis, Other Faculty/Staff

**Topic:** Resources for Teachers

In my first summer as a Noyce Fellow, I interned at Brookhaven National Laboratory (BNL). I worked with two BNL Researchers and two high school students studying statistical pattern recognition (SPR). In this presentation, I will discuss the science underlying the study and the research process and conclusions as well as my observations about working with high school students in an intense scientific endeavor. I will share questionnaires completed by the high school students and generalize about how to engage students in science. Our goal was to apply SPR to scientific research at the National Synchrotron Light Source (NSLS) and A Toroidal Large Hadron Collider Apparatus (ATLAS). We started with smile and frown faces to understand how SPR based on the Komogorov-Smirnov (KS) works. The KS test compares a parameter from an unknown sample to the same parameter from several known samples. We applied SPR to align an x-ray beam at the NSLS and simulated particle showers. This program will help researchers at the NSLS adjust the beam to focus at the sample, saving time and increasing accuracy of x-ray crystallography. Different types of particles create unique scattering pat-
terns that the KS test could use to classify the particles. We created simulated particle showers based on normal Gaussian distributions and analyzed signal densities in different cells. We measured a parameter relating the densities and distances among each cell, and used the KS test to classify a variety of showers. Automatic decision-making based on SPR can be a powerful aid in processing large amounts of data.

Acknowledgments: Alex Mermelstein (Commack High School, Commack, NY), Janna Shaftan (Miller Place High School, Miller Place, NY), Helio Takai, Vivian Stojanoff (Brookhaven National Laboratory, Upton, NY).

### 3.4 Expanding Teacher Practice for Increased Student Learning

**Length of Session:** 75 minutes

Wil Parker, National Board for Professional Teaching Standards

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

As the National Board for Professional Teaching Standards (NBPTS) continues to place a premium on accomplished teaching to increase student learning, NBPTS programs provide a framework to develop and sustain a pipeline of STEM teachers and teacher leaders to support the implementation of national standards and research-based pedagogical professional development strategies. In its continued commitment to increase the numbers of National Board Certified Teacher (NBCTs), especially in underserved schools, the National Board offers the Take One! program to support teachers and teacher leaders’ professional development along the teaching continuum. Participants will see how many educational stakeholders are using Take One! as professional development and a vehicle for systemic growth in teacher practice. This presentation will also highlight partnership models between the NBPTS, higher education institutions and school districts as implemented in its current NSF-funded DRK12 grant (1119485).

### 3.5 Building a Community of Learners through the Noyce Fellowship Program

**Length of Session:** 60 minutes

Hugo Rossi, University of Utah
Lisa Friedman, lisafriedman39@gmail.com, East High School, Salt Lake City, Noyce Fellow
Carter Jensen, Carter.Jensen@slcschools.org, East High School, Salt Lake City, Mentor

**Target Audience:** Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

As a Math for America site, we follow the MfA guidelines for preparing teachers. In addition to being full-time graduate students taking licensure courses and student teaching, our fellows have mentors. A mentor is selected for each fellow, and the fellow spends at least two hours a day in the mentor’s classroom, gradually being more involved in teaching and assuming full responsibility for teaching in the second semester. In addition the mentors and fellows meet for at least two hours a week to discuss between themselves, and with other mentors and fellows, their observations and discoveries on the practice of teaching, as well as the transmission of content. This relationship continues formally through the first three years. Our MS program is in the Math department; the coursework consists of traditional graduate classes and others on advanced topics as they relate to teaching and the high school curriculum. In addition fellows and mentors attend regular academic year and summer workshops with teachers from our other professional development programs. Through these interactions, and other more social activities, the fellows, mentors and other teachers begin to form a community of scholars. Moving toward the Common Core has made this much more effective, as much time is spent gaining insight into the Common Core and sharing experiences in teaching without texts. In this way, our fellows and mentors are jump-started into positions of leadership in their districts.

### 3.6 Using Discourse as an Intentional Strategy to Elicit Student Thinking in Classroom Conversation

**Length of Session:** 75 minutes

Elizabeth Wright, University of Washington
Cara Allen, allencara@gmail.com, University of Washington

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff
3.7 Meaningful Mathematics: Maximizing Models

**Length of Session:** 60 minutes

Sherri Kennedy, Newberry College

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

**Topic:** Other: Problem-Based Mathematics

Participants in this session will experience problem-based mathematics teaching by exploring problems as students. A lesson format for teaching effective problem-based lessons will be modeled and explained through the explorations. Creating a classroom environment that promotes willingness and persistence will be discussed.

3.8 Lesson Study: Individual and Collaborative Inquiry and Performance Assessment

**Length of Session:** 60 minutes

Ruth Cossey, Mills College

Noyce Fellows:
- Gina Phone, ginaboccio@gmail.com
- Matt Chan, matt8498@berkeley.edu
- Kat Hall, kbeans88@gmail.com

Sasha Hin, sashajhin@gmail.com
Amanda Issa, issa.amanda@gmail.com
Sadia Mohammad, mohammad.sadia@gmail.com

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project Pls, Co-Pls, Other Faculty/Staff, School and District Administrators

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

Join a small crew of Noyce Fellows as we present an interactive workshop that looks at why and how to fully integrate Lesson Study as an activity for the Pre-Service STEM teacher. Lesson Study is the major form of professional development in Japan and is often credited for Japan’s steady, long-term improvement of mathematics and science instruction (Fernandez and Yoshida 2004). In lesson study, a group of teachers work together in a cycle of instructional improvement that includes curriculum study followed by implementation, observation and discussion of a research lesson designed to bring to life teachers’ ideas about teaching the topic and to increase the teachers’ capacity to understand students’ understandings in mathematics and science. We will examine the preservice teachers’ journey through this particular kind of Professional Learning Community as well as look at implications for teaching in urban schools following these experiences. At Mills we combine an individual research lesson component with a collaboratively planned learning sequence. While there are both affordances and constraints to our model, we think the benefits far outweigh the limitations.

3.9 Noyce Northeast Regional Conference

**Session Length:** 60 minutes

Sheila Vaidya, Drexel University
Gregory Phelan, SUNY at Cortland, Gregory.Phelan@Cortland.edu
Lisa Gonsalves, University of Massachusetts at Boston, lisa.gonsalves@umb.edu
Kerri Freese, SUNY at Cortland, Kerri.Freese@Cortland.edu

**Target Audience:** Project Pls, Co-Pls, Other Faculty/Staff, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators/Education Researchers

**Topic:** Supporting New Teachers

The first Noyce Northeast Regional conference was held in Philadelphia from October 13-15, 2011. This was a team effort, which included collaboration among three Noyce Project Pls and one project coordinator. In all, 175 participants attended the conference. In this presentation, we will share our experiences and lessons learned as well as the data and findings provided by the project’s external evaluator. Noyce conferences serve as the lynchpin to build community and maintain the spirit and vitality of Noyce programs. Such experiences likely sustain commitment
and energize participants. This presentation will be especially informative to those planning a Noyce conference or to those who wish to learn about the impact and value of a regional Noyce conference.

3.10 The Survival Guide for the First Year Teacher

**Length of Session: 60 minutes**

James Knuttila, University of Massachusetts, Dartmouth
Michelle Pounds, mvpabc@aol.com
Kathrynn McDermott, keight87@yahoo.com

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators
**Topic:** Supporting New Teachers

At last year’s Noyce conference, we had the amazing privilege of presenting “The Survival Guide for the First Year Teacher” where we were able to educate young teachers on how to reduce their anxiety leading up to their first year of teaching. This poster will allow us to once again present “The First Year Teacher Survival Guide”. The feedback we received has been refreshing, but it has also come with constructive criticism which we used to make an important change—to involve more communication between the audience and the presenters. We will do this by modifying the ice breakers in our workshop to include more open ended questions and allocate one third of the workshop to intimate, small group presentations at tables facilitated by the three presenters.

In rapidly changing times within our country, it is important to understand how to work with forever growing obstacles to becoming an effective teacher. We have made it our mission to reduce the attrition rate of teachers within the first five years and allow them to follow the path of becoming a master teacher. Our experience and heartfelt stories have impacted our presentation in ways that cannot be replicated. “The Survival Guide for the First Year Teacher” will allow participants to walk out reenergized like never before after seeing some of the most passionate young teachers in action.

3.11 Supporting New Teachers: The “Extra” in Teaching Culturally Diverse Learners

**Length of Session: 75 minutes**

Desha L. Williams, Kennesaw State University
Ian Frame, ianframe3@gmail.com, Kennesaw State University, Scholar
Santhi Prabahar, psanthi@hotmail.com, Kennesaw State University, Scholar
Bonnie Roydes, broydes@gmail.com, Kennesaw State University, Scholar

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars
**Topic:** Supporting New Teachers

The demographic composition of US students is becoming increasingly diverse in cultures and languages. When we speak of culture, we include, but are not limited to, aspects of ethnicity, race, socioeconomic backgrounds, gender, interests, ability, and sexual orientation. These aspects of culture and language do not remain outside the classroom. As students enter, these factors accompany them and impact teaching and learning. This means that having strong content knowledge and pedagogical skills are not enough. It is “the extra” in your teaching repertoire that can make the difference in meeting the needs of your students. Students’ cultural capital can be used to engage students and impact learning. In this presentation, scholars will engage the participants in examples/activities involving aspects of “the extra” which they have learned in regards to culturally relevant lessons, teaching English language learners, teaching students who are homeless, and creating safe spaces for LGBTQ students and ALL students. An overview of other supplementary program seminars will be provided, as well as time for question and answer.

3.12 Examining Teachers’ Efficacy in Mathematics Teaching: A Pilot Study

**Length of Session: 60 minutes**

Martin Bonsangue, California State University, Fullerton
Natalie Tran, natran@fullerton.edu, California State University, Fullerton

**Target Audience:** Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers
**Topic:** Research and Evaluation

This session presents research findings from the Noyce Fullerton Master Teacher and Teaching Fellows Project (MT2). Building on previous research in teacher efficacy and instructional practice using technology to enhance mathematics instruction, and in conjunction with input from district leaders from participating school districts, a survey questionnaire was created to collect baseline data for the MT2 project. The 74-item questionnaire probes different aspects of mathematics teaching and learning at the secondary level, including efficacy in teaching mathematics, attitudes toward integration of technology, use of technology, support provided by school and district, and job satisfaction.
This session will report results from the pilot study (N = 58), including construct validity and associations between various malleable factors pertinent to teachers’ attitudes, beliefs, and behaviors associated with mathematics teaching. Preliminary findings from this study support how research can be used in Noyce projects in terms of providing both formative and summative information, as well as expanding the knowledge base in mathematics education at large.

This session will strongly encourage feedback and discussion from both first-year and ongoing Noyce project leaders and evaluators. (Contributing authors: David Drew, Mark Ellis, Ruth Yopp-Edwards, and Mike Matsuda.)

### 3.13 Emerging National Science Teacher Leader: iGEM Pathway to Cultivating Future STEM Workforce Internationally

**Length of Session: 60 minutes**

Kim Nguyen, IUPUI
Rebecca Schini, rschini@gcs.k12.in.us, Greenfield Central High School, Science Teacher

**Target Audience:** Noyce Teaching Fellows, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel

**Topic:** Teacher Leadership

Building on the belief that “Improving the leadership abilities of teachers could lead to improving educational outcomes” (Rubenstein, H., Miles, F. M., & Bassi, L. J.: Leadership Development for Educators, 2009) the Noyce project team at IUPUI was approved for spending the remaining funds from DUE Award 0531598 for Noyce Teacher Fellowships. We offered three two-year salary supplement awards ($13,000 annually each) to Noyce in-service teachers to help them complete their master’s degree and to buy-out their teaching load for the individuals’ leadership development.

Rebecca Schini, Noyce Scholar 2007, a science teacher at Greenfield-Central High School received the fellowship award. In the last four years, Rebecca has been the leading force for the expansion of the iGEM high school division. She organizes annual team competitions in synthetic biology from local to national and international levels. She is also a Project Lead The Way (PLTW) - Biomedical Innovation (BI) Master Teacher who conducts annual summer training program for new BI teachers.

Rebecca will present the process of becoming a national leader while she passionately promotes the participation of high school student teams worldwide. Her program has successfully deepened student learning in synthetic biology and encouraged team innovations through biomedical engineering research.

### 3.14 From Solar Cars to Artificial Reefs: A Look at Two Case Studies that Highlight Unique Funding Opportunities for Classroom Teachers

**Length of Session: 60 minutes**

Allan Phipps, National Science Foundation, aphipps@nsf.gov

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

**Topic:** Resources for Teachers

Hear about two effective K-12 STEM education programs at South Plantation High School’s Everglades Restoration and Environmental Science Magnet Program in Ft Lauderdale, FL. Learn some tips on how to supplement funding for classroom activities through grants, awards and donations. Explore ways to form meaningful partnerships with community organizations. Engage students through authentic learning experiences that reach beyond the textbook and give real-world meaning to lessons learned in the classroom.

**Session IV: Friday, May 25, 2012**

10:35am - 11:50am

### 4.1 This session includes two 30-minute presentations.

#### 4.1A A Practice-Based Model for Preparing Noyce Candidates for Success in High-Needs Schools

**Length of Session: 30 minutes**

Kevin Carr, Pacific University
Chris Pokorny, poko3889@pacificu.edu, Pacific University, Noyce Scholar

**Target Audience:** Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

We share a practice-based model for preparing post-graduate STEM teacher candidates in a multilingual, economically challenged school district and community. Innovative features of
our one-year program include required mentor teacher professional development, a targeted candidate screening process, and extensive practice-based work in cultural proficiency, literacy, STEM project-based learning, and pre-service teacher action research. By focusing on the shared goal of improving student preparation for STEM careers, college, and citizenship, we are building an authentic community STEM partnership, providing a powerful pathway for Noyce scholars to become transformative STEM teachers.

4.1B Using a Practicum Experience for Selecting SMART (Science and Mathematics Achievement via Research and Teaching) Scholars at Georgia Southern University

Length of Session: 30 minutes

Marlynn M. Griffin, Georgia Southern University
Michelle Cawthorn, mcawthorn@georgiasouthern.edu, Georgia Southern University

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff
Topic: Innovative Noyce Program Practices and Teacher Preparation Models

All pre-education majors at Georgia Southern University complete the Pre-Professional Block (PPB), a set of three courses and a 51 hour school practicum in which entry level professionalism and written and oral communication are evaluated. A modified version of PPB is a prerequisite for admission to our program and professionalism and writing outcomes are used as screening tools for SMART Scholar selection. In its modified form, SMART Scholars take one PPB class and the practicum. Not only do these students have an opportunity to experience a school setting from “the teacher’s side,” but they also get to interact with middle and high school students on a regular basis.

In addition, SMART Scholars have an opportunity to critically evaluate teaching, the school setting, and their own desire and motivation to become teachers. To date, 46 students have enrolled in the modified PPB course as potential Noyce Scholars. Fourteen have applied for and been accepted to the Noyce Scholarship Program. Among those who did not apply for the scholarship, three of the potential scholars notified us that they would not apply to Noyce because of their practicum experience, two of whom stopped attending their practicum mid-semester because they were confident that teaching was not the field for them. Of the remaining 32 students, 18 were not finished with the PPB requirement as of the last Noyce application date while the other 14 did not notify the committee of their application intentions.

4.2 This session includes two 30-minute presentations.

4.2A Physics and Chemistry Offerings in New York State: Enrollment, Policy and Needs

Length of Session: 30 minutes

Keith Sheppard, Stony Brook University
Angela Kelly, angela.kelly@stonybrook.edu, Stony Brook University

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Non-Profit Organization Personnel, Evaluators
Topic: Research and Evaluation

This presentation details the enrollment and achievement patterns in physics and chemistry in the academic year 2010-2011 for secondary schools across the State of New York. The focus will be on the distributions of these subjects in rural, urban and suburban districts and high-needs, average-needs and low-needs school districts. Additionally, patterns of the various levels that the subjects are offered (e.g. Advanced Placement, Regents and Conceptual) will be outlined. The presentation will also include data about the distribution of physics and chemistry teachers across the state and will make some recommendations about potential policy changes to enhance the teaching of the physical sciences in New York.

4.2B Evaluating Teacher Candidates’ Readiness for Today’s Diverse Classrooms Using the Teacher Performance Assessment (TPA)

Length of Session: 30 minutes

Tyra Lopes-Mendes, University of Massachusetts, Dartmouth

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators, Evaluators/Education Researchers
Topic: Research and Evaluation

This session will present information about how last year’s Noyce Scholars used, and this year’s Noyce Teaching Fellows will be using, the Teacher Performance Assessment (TPA) tool during their practicum semester at University of Massachusetts Dartmouth. Designed by the TPA Consortium (TPAC - made up of Stanford University, the American Association of...
Colleges for Teacher Education [AACTE] and Pearson Education], the TPA is a subject area-specific, performance-based assessment for pre-service teacher candidates, centered on student learning. The TPA Consortium hopes to demonstrate, via research data presently being collected in a three-year nation-wide pilot and field test of the tool, that the development of a nationally accessible teaching performance assessment will allow states, school districts and teacher preparation programs (such as UMass Dartmouth) to share a common framework for defining and measuring a set of core teaching skills that form a valid and robust vision of teacher competence.

4.3 Science and Math Career Switchers Tell Their Stories: What Motivated the Decision to Switch Careers, and What Type of Support was Needed During the Transition?

Length of Session: 60 minutes

Michael E. Beeth, University of Wisconsin Oshkosh
Tammy Ladwig, tammy.ladwig@uwcm.edu, University of Wisconsin Fox Valley
Brandon Nielsen, bjin723@gmail.com, Alternative Careers in Teaching Program (act!), Noyce Scholar
Pamela Josifek, eplvt@yahoo.com, Alternative Careers in Teaching Program (act!), Noyce Scholar

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators
Topic: Recruitment and Marketing Strategies

This session highlights the personal stories, motivations, and support systems for career switchers who have been admitted to the Alternative Careers in Teaching program (act!), for those who are considering entering the program, and for those who decided not to enroll in the act! program. Act! is an alternative licensure program for individuals who must have at least 5 years of work experience as a scientist or mathematician to enter the program. They can receive credit for some prior learning if it is related to teaching and learning. More than 450 individuals wishing to switch careers have inquired about act! since 2005, and 120 individuals have enrolled in this license only program. Participants will hear from two current Noyce Scholars about why they chose to leave their careers as scientists and mathematicians to become professional educators, and from other act! students who have completed the program.

Additional Noyce Scholars will participate in this session via Internet conferencing or through written testimonials about their decisions to enter teaching. The range of personal, academic and financial supports needed to make this career change possible for act! students will be highlighted. A conceptual model will be presented for what non-traditional students need in order to obtain their goals of becoming licensed teachers. The act! program offers a flexible path for practicing scientists or mathematicians to become licensed secondary (grades 6-12) teachers in Wisconsin.

4.4 Master Teaching Fellows as Agents of Change: Reporting from the Trenches

Length of Session: 75 minutes

Suzy Fore, Math for America San Diego
Trang Vu, Math for America San Diego, tvu@sandi.net, Master Teaching Fellow

Target Audience: Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Evaluators/Education Researchers
Topic: Teacher Leadership

What does it mean to be an agent of change? What are the challenges and the joys of being part of the transformation of mathematics teaching and learning? In this session, two Math for America San Diego Noyce Master Teaching Fellows (MTFs) will report on their early experiences attempting to implement the values of the program's professional development in their instruction and their efforts to become agents of change in their departments, school districts, and beyond. MTFs Suzy Fore and Trang Vu are participating in a professional development program guided by the DNR theoretical perspective, a research-based conceptual framework. According to this perspective, the mathematical integrity of the content and the intellectual need of the student must be at the center of the instructional and curricular effort. Suzy and Trang will address the specific influences their participation in the professional development has had on their views of mathematics and instruction, their own instruction, and the response of their students. They will also discuss how they intend to use their next four years in this leadership development program as they grow into their role as change agents.

4.5 Culture of Care for Noyce Scholars

Length of Session: 60 minutes

Tom Siller, Colorado State University
Rachelle Gard, Colorado State University, rmgard@rams.colostate.edu, Noyce Scholar

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff
Topic: Innovative Noyce Program Practices and Teacher Preparation Models
This session will present an innovative project aimed at enhanc-
ing student teachers preparation for working with students from high-need school districts. During the first year of our Noyce project, we held a series of 3 weeklong summer STEM camps for middle and high school students from high-need schools. Several Noyce scholars, along with potential future scholars, served as teacher/mentors during these camps. To prepare them for working with the camp students, we implemented a program called: Culture of Care. This program is defined as combining the ideas of:

- Authentic caring, care for their ethnically diverse students as culturally located individuals, with an emphasis on reciprocal relationships and interactions, and
- Aesthetic caring, care for the learning of students, based on a commitment to ideas and practices that purportedly lead to improved minority student achievement.

The program consisted of professional development training of the teachers/mentors preceding the summer camps. Each participant was then observed while teaching in the camps. Finally, teachers/mentors participated in a feedback session to discuss the results. One mentor described the general attitude of the mentors coming into the camps: “How I was raised, I wouldn’t think about this culture.” As participation in the camps continued, the mentors became more aware of their race consciousness and were open to learning how people from other cultures thought and acted differently. Camp students talked frequently about how the mentors displayed authentic caring in their relationships and interactions with them during the camps.

### 4.6 Creating Accelerated Graduate Post-Baccalaureate Programs for Secondary STEM Educators

**Length of Session:** 75 minutes

Stephen A. Swidler, University of Nebraska-Lincoln
Jon Pedersen, jep@unl.edu, UNL Science Teacher Scholars Program, Professor, University of Nebraska-Lincoln
Greg Sand, Greg.Sand@ops.org, NebraskaMATH Noyce Master Teaching Fellow, Omaha Central High School
Molly Jensen, jensenmolly1@gmail.com, NebraskaMATH Noyce Teaching Fellow, University of Nebraska-Lincoln
Nathan Van Meter, nvanmeter1@gmail.com, UNL Science Teacher Scholar

**Target Audience:** Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Higher Education Institution Administrators

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

This workshop focuses on the principles and practices required for the creation of accelerated graduate post-baccalaureate STEM teacher certification programs (12-14 months). Drawing upon the experience at the University of Nebraska, the session first describes the creation of two new 14-month master’s degree programs, one in secondary mathematics and one in secondary science education, both of which lead to certification and meet the requirements for “highly qualified.” Both programs -- the Master of Arts in Mathematics Teaching (MAmt) and the Master of Arts in Science Teaching (MAst) -- are designed specifically to draw recent STEM graduates and STEM “career changers” into public school teaching. Each program is designed to be completed in 14 months (1 academic year plus summers) where Noyce teaching scholars can earn a master’s degree and achieve full certification in their respective endorsement areas.

The workshop then focuses on helping participants assess three interlocking elements in the creation of high quality and sustainable graduate post-baccalaureate education: (1) understanding state certification requirements in mathematics and science and how to meet them; (2) the organization of extant and new graduate coursework that integrates content, teaching methods and research; and (3) the creation of flexible and high quality clinical experiences and the requisite negotiation of strong partnerships with local school districts. The workshop offers an interactive panel with perspectives from Noyce teacher education faculty and Noyce Scholars in the MAmt and MAst. We will discuss the special contributions of Noyce Master Teaching Fellows to the MAmt program. Workshop participants are asked to bring their state’s current requirements for initial teaching certification, endorsement or licensure in mathematics and/or science.

### 4.7 Using Concept Maps as an Assessment Tool to Close the Achievement Gap

**Length of Session:** 60 minutes

Colleen M. Eddy, University of North Texas
Pamela Esprivalo Harrell, Pamm.Harrell@unt.edu, University of North Texas

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-Pis, Other Faculty/Staff, School and District Administrators, Evaluators/Education Researchers

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

Due to the enactment of NCLB, evaluation of student achievement has been a focus in every public school classroom. As a result, accountability is commonly measured via high-stakes, state-testing measures. Schools have responded by incorporating regular benchmark assessments and employing teach-to-the-test strategies. However, national (NAEP) and international (TIMSS) measures of student achievement in mathematics and science remain unchanged (National Center for Education Statistics, 2011). For this reason, teachers need day-to-day formative
assessments that will help students develop conceptual and procedural knowledge. This knowledge will prepare them for the 21st century workplace and help them develop critical thinking skills that allow them to make informed decisions about issues confronting them outside of school in everyday life. Assessment tools, such as concept maps, facilitate student achievement. Research shows the maps help students organize and structure concepts for eventual storage in long-term memory (Novak & Canas, 2008). Their use as formative assessment tools demonstrate large effect sizes between .4 and .7 with regard to student learning (Wiliam, 2010). Concept maps can be used to assess cognitive growth, diagnose student misconceptions, and ultimately provide an acceptable pathway of concept connections. This session will introduce the use of concept maps as an assessment tool and the different types of maps, described in the research literature. Reliability and validity of different types of concept maps will be discussed. Participants will have an opportunity to collaboratively construct either a mathematics or science concept map.

### 4.8 Teacher Development Cycle: A Cycle of Inquiry for Training Future Teachers to Collect, Manage, and Analyze Data for the Purposes of Improving Teaching, Learning, and Student Academic Achievement

**Length of Session:** 60 minutes

Lisa M. Gonsalves, University of Massachusetts, Boston
Laura Vanderberg, laura.vanderberg@umb.edu, University of Massachusetts at Boston

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PI’s, Co-PI’s, Other Faculty/Staff, School and District Administrators, Evaluators/Education Researchers

**Topic:** Innovative Noyce Program Practices and Teacher Preparation Models

In today’s educational climate, teachers must demonstrate the capacity to use formative and summative assessments to improve teaching and learning. Teacher preparation programs, in return, must familiarize future teachers with these expectations and provide comprehensive training and experiences for these teachers to work with student data to inform instruction. This interactive presentation describes the Teacher Development Cycle, a cycle of inquiry model for training resident teachers in the use of assessments and data in the classroom while also taking into account their growth as new teachers. Existing cycles of inquiry lack the consideration of new teacher beliefs and perceptions and assume that new teachers already know how to teach. The cycle of inquiry described here accounts for the developmental trajectory of new teachers, and the beliefs, perceptions and experiences that influence their teaching behaviors.

Field and Hoffman’s model of self-determination was used to understand the critical role of knowing and valuing oneself and others. While Field and Hoffman include self-awareness as a step in their cycle, the researchers chose to embed it throughout the cycle of actions and behaviors. The researchers also embedded the cycle of teaching actions in knowledge and have captured the movement of knowledge from external to internal sources. This interactive presentation analyzes how new teachers move through this enhanced cycle of inquiry and demonstrates how the decisions they make while teaching are impacted by their perceptions and experience of various aspects of teaching, i.e. the classroom, the students, the course work and the relationships they develop with their teaching colleagues.

### 4.9 Using the 5E Lesson Model to Promote Mathematical and Scientific Thought

**Length of Session:** 60 minutes

Stephanie Burba, Western Kentucky University
Hope Marchionda, hope.marchionda@wku.edu, WKU
Kathryn Crawford, kathryn.crawford292@topper.wku.edu, WKU, Noyce Scholar
Tyler Ghee, tyler.ghee760@topper.wku.edu, WKU, Noyce Scholar
Shelby Overstreet, shelby.overstreet278@topper.wku.edu, WKU, Noyce Scholar

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

**Topic:** Resources for Teachers

With the new Common Core Math Standards and evolving Science standards, teachers are expected to create lessons that engage their students in the process of being a scientist or mathematician while they learn the respective content. If all mathematics teachers work to implement one or more of the Standards for Mathematical Practice throughout their lessons, students can grow to become great mathematical problem solvers. Similarly, if all science teachers work to implement inquiry-based lessons, then more students can learn to become better problem solvers. This has far-reaching consequences in that these same students can apply these skills to the world around them. During this presentation, we will show the use of the 5E Model (Engage, Explore, Explain, Elaborate and Evaluate) to develop student-centered lessons that require students to implement the Standards for Mathematical Practice and inquiry-based science.

Participants will be actively engaged in learning what the 5E Model is and how to implement these lessons in secondary mathematics and science classes. This session will allow educators to leave with a deeper understanding of how to create a 5E
lesson and will provide them with different ideas for incorporating science or mathematics content into 5E lessons to promote a student-centered classroom, where students will develop deeper thinking and problem-solving skills.

**4.10 When Can You Use the 2012 Calendar Again?**

*Length of Session: 75 minutes*

Viji K. Sundar, California State University Stanislaus

**Target Audience:** Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

**Session Length:** 75 minutes

**Topic:** Resources for Teachers

The presentation will enlighten the audience about the evolution of the calendar and explore strategies to use calendars to teach number sense and algebra. The presenter will discuss the Mayan and Gregorian Calendars. The Mayan Calendar will bring out the richness of the positional number system. The Gregorian Calendar will be used to discover patterns, functions, and to study the periodicity and cyclic nature of the calendars. Activities will include computing the day of the week of any birthday or historical event with a simple calculation and the creation of the perpetual calendar.

**4.11 This session includes two 30-minute presentations.**

**4.11A Providing Support for First Year Noyce Teachers**

*Length of Session: 30 minutes*

Jacqueline T. McDonough, Virginia Commonwealth University
S. Joy Casad, casadsj@mymail.vcu.edu, Virginia Commonwealth University

**Target Audience:** Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators

**Topic:** Supporting New Teachers

A teacher’s first year typically results in lowered self-confidence as the teacher begins to realize personal weaknesses. Teachers who report robust support systems in the form of mentoring, however, show lower levels of workplace stress (Tynjál, 2011). In our model, first year teachers are assumed to share the same core beliefs about students, such as the desire to bridge subject and student knowledge, and students playing an active role in content learning (McLaughlin and Talbert, 2006, p.19). Protocols, such as the tuning protocol and the problem solving protocol were established to foster progression from novice to intermediate and advanced stages of evidenced based reform (McDonald, et. al, 2007; McLaughlin & Talbe.) The induction support program (PTLC) solves problems specific to the teachers which the learning community is serving. Success of the program will be determined by the quality of the interactions during the meeting and the translation of individual solutions formed within the learning community back to the home school of the teachers. Because of this, feedback and novice teacher participation are the critical elements of programmatic strength. The PTLC assists new teachers in integrating effective pedagogical methods with excellence in science content teaching. An aspect which may need to be explicitly part of the induction program is an exploration of the general and science specific issues pertaining to teaching in high needs schools. This workshop will introduce participants to our induction program, walk participants through examples of our protocols and share data of success and challenges experienced by our novice teachers.

**4.11B Providing Opportunities and Support for Beginning Teachers Through a University Supported Community**

*Length of Session: 30 minutes*

Emily Thrasher, North Carolina State University
Morgan Early, morgan_early@yahoo.com, Millbrook High School, Raleigh, NC, Noyce Scholar

**Target Audience:** Project PIs, Co-PIs, Other Faculty/Staff, Higher Education Institution Administrators

**Topic:** Supporting New Teachers

The Noyce Mathematics Education Teaching Scholars program at NC State University aims to develop highly qualified teachers that are supported by a community of scholars comprised of university faculty and staff, pre-service Noyce scholars, and in-service Noyce scholars. We will discuss how to continue to engage in-service scholars in professional development opportunities and research-based practices in an effort to retain highly qualified teachers. Presenters will include representation from the Noyce program staff and a beginning teacher to provide a complete picture of the opportunities and support systems that have been put in place and the effects of these opportunities. Finally, participants will generate ways to adopt or adapt this technique in their own institutions.
WORKSHOP ABSTRACTS

4.12 UTeach Observation Protocol and Measures of Effective Teaching

Length of Session: 60 minutes

Michael Marder, The University of Texas at Austin

Target Audience: Project PIs, Co-PIs, Other Faculty/Staff, School and District Administrators, Evaluators/Education Researchers

Topic: Research and Evaluation

The UTeach Observation Protocol was developed as part of a Phase II Noyce project, and responded to the need to evaluate the performance of our graduates. Over the past two years we have had the chance to apply this observational instrument as part of the Gates-funded Measures of Effective Teaching project. This workshop will provide an introduction to the UTeach Observation Protocol, present some of the findings from Measures of Effective Teaching that support its use, and explore a vision of professional development and evaluation in which trained observers play a key role.

4.13 Impacting the Learning and Motivation of Students of Various Ability Levels with Graphing Technology

Length of Session: 60 minutes

Samantha Stevens, Middle Tennessee State University

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers, School and District Administrators, Evaluators/Education Researchers

Topic: Teacher Leadership

Participants will learn how a teacher-directed action research project enriched and enhanced the instruction in an Algebra II curriculum while promoting student engagement and motivation through the use of graphing technology. In addition, this presentation will provide insight into how the TI-Nspire and the Navigator System encouraged student participation and increased academic achievement of a special education student taking a regular education mathematics course for the first time.

This presentation will:

1. Discuss how to incorporate technology into daily lessons;
2. Provide insight on learning strategies that engage students who are shy, unmotivated, and who struggle in the study of mathematics; and
3. Demonstrate the use of various instructional methodologies used to teach the Algebra II curriculum.

4.14 The 4 C’s of Highly Engaged Students

Length of Session: 60 minutes

Rhonda Brown, National Science Foundation

Target Audience: Undergraduate and/or Graduate Noyce Scholars, Noyce Teaching Fellows, Noyce Master Teachers

Topic: Resources for Teachers

In this workshop, learn how to engage your students by incorporating the 4 C’s in your lessons. With your Curriculum driving your instruction, make concepts more meaningful to students by making real world connections. Involve fellow teachers in collaboration by designing cross-curricular units that reinforce the concepts being taught. Round out the unit by adding a Community piece – community service, public awareness campaign, etc. Leave armed with ideas for converting any lesson into a 4 C’s unit and a planning guide for future lessons.
Title: Teachers of Mathematics Scholars: 1st Graduating Cohort and their Teaching and Learning Experiences
NSF Noyce Award Number: 0934756
Principal Investigator: Robert Bradley
Email: tawfeeq@adelphi.edu
Institution: Adelphi University
Co-PI(s): Dante A. Tawfeeq and Salvatore Petrilli
Presenter(s): Dante A. Tawfeeq

This 1st cohort of Teachers of Mathematics Scholarship (TOMS) scholars will graduate from Adelphi University during this spring of 2012. During the student teaching of this graduating cohort, the TOMS scholars used pedagogies that promoted the development of mathematical learning among Black and Latino/a students. The emphasis placed on pedagogies that promoted the learning of mathematics was motivated by concepts investigated in 4 courses that were designed specifically for the TOMS program: (1) Methods of Teaching College Placement Calculus; (2) Methods of Teaching Geometry; (3) Issues of Learning Mathematics in High-Needs Schools: Race, Gender, Equity, and Social Justice; and (4) Measurement and Evaluation of School-based Mathematics Learning Programs and Testing. Issues related to Black and Latino/a students’ performance on the AP Calculus exam, the SAT, as well as other mathematics based assessments propelled many of the discussions that occurred in the courses listed above. The TOMS scholars, as student teachers, confronted many of the issues that were discussed in the courses listed above.

This presentation will provide a snapshot of the teaching and learning experiences of this graduating cohort of TOMS scholars as well as descriptive information about the performances of Black and Latino/a students on the AP Calculus exam and how this cohort of TOMS scholars interpreted this information. The performance of Black and Latino/a students on the AP Calculus exam become an important point of discussion as it stimulated the interest of the TOMS scholars, relative to equity and cultural responsive pedagogies.

Title: Adelphi University Science Education Advancement (SEA) Program/NSF Robert Noyce Teacher Scholarship Program
NSF Noyce Award Number: 1136306
Principal Investigator: Maritza Macdonald
Email: mmacdonald@amnh.org
Institution: American Museum of Natural History
Co-PI(s): Ro Kinzler
Presenter(s): Maritza Macdonald, American Museum of Natural History, Department of Education, mmacdonald@amnh.org

The Adelphi University Science Education Advancement (SEA) Program is designed to encourage through scholarship support 25 individuals majoring in the sciences and those trained in STEM fields to consider a teaching career in science education and commit to teaching in a high needs public school to provide effective and engaging science instruction. It has the following goals: 1) enhancing and broadening strong partnerships between Long Island high needs school sites, University faculty and administration, and regional informal learning environments; 2) responding to the critical need for secondary science teachers by incentivizing, through scholarship support, the completion of a rigorous teaching credentialing program by Scholars; 3) mentoring support for the Scholars throughout the program and during their first three years of teaching; 4) candidate development of effective teaching practices and behaviors through participation of the National Board for Professional Teaching Standards (NBPTS) Take One Program; 5) Scholar engagement in two unique field-based marine science courses exploring both the marine environments of Long Island through shipboard experiences with a professional marine educator and a travel abroad program led by Adelphi University scientists; and 6) serve as an intern with Nassau Board Of Cooperative Education Services (BOCES) Summer Marine Biology Program working closely with naturalists in preparing and implementing science field experiences for students in grades 8-12.

It is a shared vision among the project stakeholders (including experts in school administration, science pedagogy, science content, and testing/measurement), that the 1) focus on marine sciences as a vehicle for the teaching and learning of all science disciplines and 2) preparing teachers to use marine environments in their own curriculum holds great promise for the improvement of science education in a region spanning from New York City to the far reaches of Long Island and potentially impacting the science learning experience of thousands of students, a region comprised of a mosaic of over 130 school districts on the edge of some of the most important yet over-used coastal environments found along the Atlantic seaboard.

Title: Masters Residency Program at the American Museum of Natural History
NSF Noyce Award Number: 1136306
Principal Investigator: Maritza Macdonald
Email: mmacdonald@amnh.org
Institution: American Museum of Natural History
Co-PI(s): Ro Kinzler
Presenter(s): Maritza Macdonald, American Museum of Natural History, Department of Education, mmacdonald@amnh.org

The poster explores the new Master of Arts in Teaching Program in Earth Science at the museum. The poster addresses topics of residency design, mentoring, program-wide TESOL capacity building, and required common and pedagogy knowledge. The MAT program employs extensive mentoring and extensive use of technology to provide candidates with a deep understanding of scientific content and of the importance of an inquiry-based approach to learning that demonstrates the relevance of science
to students' lives. In a section on TESOL capacity building, the poster will display the purpose of linguistic profiles at partner schools, cross-case analysis of commonalities of profiles, and a cross-case analysis of professional development needs.

4

Title: PhysTEC Noyce Program

NSF Noyce Award Number: 0833210
Principal Investigator: Monica Plisch
Email: blickenstaff@aps.org
Institution: American Physical Society
Co-PI(s): Beth Cunningham, Jacob Clark Blickenstaff, Laurie McNeil, and Robert Thorne
Presenter(s): Jacob Clark Blickenstaff, APS, Blickenstaff@aps.org and Monica Plisch, APS, Plisch@aps.org

The mission of Physics Teacher Education Coalition (PhysTEC, www.phystec.org) is to improve and promote the education of future physics and physical science teachers. Specifically, the project aims to: (1) Demonstrate successful models for increasing the number of highly qualified high school physics teachers and for improving the quality of K-8 physical science teacher education; (2) Spread best-practice ideas throughout the physics teacher preparation community; and (3) Transform physics departments to engage in preparing physics teachers.

PhysTEC is a partnership between the American Physical Society (APS) and the American Association of Physics Teachers (AAPT). Funded primarily by the National Science Foundation, it has also received significant funds from the APS 21st Century Campaign, as well as direct and in-kind support from each of its partner institutions.

PhysTEC Supported Sites are selected colleges and universities that are developing their physics teacher preparation programs into national models with substantial project support. Funded institutions have achieved a number of significant successes, including: (1) Increasing the number of physics and physical science teachers graduating from their programs; (2) Providing prospective teachers with early teaching experiences; (3) Disseminating results through publications and presentations at conferences and workshops; (4) Raising the profile of teacher preparation efforts in the physics community.

The project includes over 250 PhysTEC Member Institutions and organizes an annual national conference and smaller regional and topical workshops. In addition, the project has teamed up with CompADRE, the NSF-funded digital library, to produce a website (www.ptec.org) that houses a collection of electronic resources for teacher preparation. The goal of PhysTEC Noyce is to recruit more students into physics teacher education programs established by the PhysTEC project. Six PhysTEC Supported Sites are participating in the PhysTEC Noyce. They include Ball State University, Cornell University, Seattle Pacific University, University of Arkansas, University of North Carolina at Chapel Hill, and Western Michigan University. More information on the PhysTEC programs at each of these sites can be found at www.phystec.org.

5

Title: Math for America - DC: Fellows Become Teachers

NSF Noyce Award Number: 0934758
Principal Investigator: Sarah Irvine Belson
Email: sarah@american.edu
Institution: American University
Co-PI(s): John Nolan, Maxine Singer
Presenter(s): Sarah Irvine Belson, American University, sarah@american.edu

Math for America DC (MfA DC) is a collaborative project between American University's School of Education, Teaching, and Health and Department of Mathematics and Statistics, the District of Columbia Public Schools, a group of DC Public Charter Schools and the Carnegie Institution of Washington's Carnegie Academy for Science Education. The MfA DC project seeks to improve the teaching of mathematics in Washington, DC secondary public schools by developing new teachers with strong backgrounds in both mathematics and mathematics pedagogy. In our model, these teachers are committed to teach in the DC schools for at least four years after completing a one-year intensive Masters Teaching Program. The project, in its second year of implementation, is designed to build the pipeline of qualified mathematics teachers by recruiting highly qualified STEM professionals into teaching, providing a master's program that integrates mathematics content with sound pedagogy, and providing sustained support for these teachers. The overarching project goals are to increase the number of highly qualified mathematics teachers in high-needs schools in Washington, DC, through effective recruitment, a high-quality, intensive graduate program to prepare fellows for licensure, and retention through professional development and mentoring support, all of which is designed to increase the quality of instruction and student achievement in mathematics.

6

Title: Science Teachers for AZ - Recruitment and Retention (STARR)

NSF Noyce Award Number: 0833311
Principal Investigator: Julie A. Luft, Professor, School of Life Sciences
Email: suzanne.cassano@asu.edu
Institution: Arizona State University
Co-PI(s): Steven Semken, Professor, School of Earth and Space Exploration; Mari Koerner, Dean, Teachers College; Miles Orchinik, Associate Professor, School of Life Sciences
Presenter(s): Suzanne Cassano, Arizona State University, suzanne.cassano@asu.edu
Julie A. Luft, Arizona State University, julie.luft@asu.edu

In the Phoenix metropolitan area, the shortage of secondary science teachers is experienced by all districts. In high-need districts this shortage is compounded by an on-going migration of teachers in these schools to schools that are perceived to be less challenging. As a result, high-need schools often experience on-going vacancies in the teaching staff and a high turnover rate of qualified teachers. Science Teachers for Arizona - Recruitment and Retention (STARR) attempts to identify and support up to 60 qualified science teachers who will persist in high-need environments.

Using passive and active forms of recruitment, in conjunction with a marketing plan, science students are identified and recruited to participate in undergraduate or post-baccalaureate programs that have extensive field experiences with diverse students, strong content knowledge requirements, and on-going opportunities to develop their science as inquiry instruction. While students are completing their initial certification course work, field placements will be arranged in high-need settings with Native American, Latina/o, or African American students. Upon graduation, STARR Noyce teachers participate in science-focused induction programs, which specifically support their use of science as inquiry in diverse classrooms, their development as science teachers, and their socialization into the school community.

The intellectual merit of STARR Noyce project resides in its theoretical grounding, the attention to the continuum of development of a teacher, and the potential for the dissemination of knowledge pertaining to science teacher learning. The PI and co-PIs are well-grounded in the research in science and science teacher education, as well as prominent contributors to this domain. The dissemination of these findings will ultimately direct future recruitment endeavors in this area.

To date, 29 undergraduate and graduate STARR Noyce Scholars have been supported. There are 15 currently teaching in high-need school districts, and 11 are scheduled to graduate in 2012 or 2013. 13 STARR Noyce Paid Interns (at Arizona Science Center) have been supported.

7
Title: ASU Noyce Math Teacher Scholarship Program
NSF Noyce Award Number: 0630458
Principal Investigator: Patrick Thompson
Email: Linda.Knop@asu.edu
Institution: Arizona State University
Presenter(s): Linda Knop, Arizona State University, Linda.Knop@asu.edu

This poster will describe the following aspects of our Noyce project: (1) benefits to preservice teachers: mentored teacher training (College Algebra Reform: summer institute and shadowing, 1 semester) and teaching of College Algebra (1 semester), weekly teaching debriefs, tutoring; (2) benefits to the institution: Creation of two new mathematics courses, approved by the provost and due to be implemented Fall, 2012; and improvement to the program: Example of fill-able form scholar data tracking sheet.

8
Title: Investigating Sunscreen and It's Ability to Block UVA and UVA
NSF Noyce Award Number: 0934904
Principal Investigator: Anne Grippi
Email: mhall@astate.edu
Institution: Arkansas State University
Co-PI(s): Mike Hall and Tillman Kennon
Presenter(s): Mike Hall, Arkansas State University, mhall@astate.edu
Tillman Kennon-Arkansas State University, jkennon@astate.edu

As part of the ASU/NSF Noyce Scholarship program, our Try Out the Classroom (TOTC) workshop participants designed a classroom project that tested the effectiveness of sunscreen through a hands-on experiment testing the amount of UVA and UVB rays that was blocked by each level of sunscreen. After completing the design, participants in the TOTC workshop conducted trials of the experiment with high school students who were attending a math and science camp on the Arkansas State University campus. The seven Noyce TOTC participants, who registered for the workshop in order to decide whether they would like to become teachers in a STEM field, included undergraduates majoring in biology, and chemistry. Workshop participants researched sunscreens and, after reviewing Arkansas mid-level science and mathematics frameworks, wrote a six lesson plan for their activity based on SPF values and cost of sunscreens. The participants constructed a testing apparatus consisting of a cardboard box with six holes perforated along one side. The box was covered tightly with plastic wrap and sunscreens of varied SPF's and application types were applied to the plastic, one type covering each opening. One opening had no sunscreen, and served as a control. LabQuest devices fitted with UVA and UVB sensors were used to determine the amount of UVA and UVB radiation allowed through each opening by each sunscreen. Students calculated the % radiation blocked by each sunscreen, and compared their results to the control radiation as well as to advertised values for each SPF.

9
Title: The TEAM-Math Teacher Leader Academy: Fostering Mathematics Teacher Leadership through Multiple Venues
NSF Noyce Award Number: 0934821
Principal Investigator: W. Gary Martin
Email: strutme@auburn.edu
Institution: Auburn University
Co-PI(s): Marilyn Strutchens and Stephen Stuckwisch
Presenter(s): Marilyn E. Strutchens, Auburn University, strutme@auburn.edu
For nearly a decade, TEAM-Math (Transforming East Alabama Mathematics) -- a partnership of Auburn University, Tuskegee University, and 14 local school districts -- has worked to improve mathematics teaching and learning in east Alabama. A major systemic change effort -- supported with funding from the National Science Foundation (NSF) Math and Science Partnership (MSP) program and other sources -- included attention to professional development, curriculum alignment, teacher leader development, and stakeholder involvement. Over the years, the teacher leadership component was identified as a critical factor in supporting reform (cf. Authors, 2009), a finding supported by other research on teacher leadership (cf. Martinez, Firestone, & Polovsk, 2005). In the model used, the teacher leaders remained in the classroom and assumed, on top of their full-time teaching responsibilities, a role in promoting change (Lord & Miller, 2000). Duties included: (a) Work with individual teachers in classroom settings; (b) Work with groups of teachers in workshop or comparable professional development settings; (c) Work with teachers, administrators, community members or students on issues or programs that indirectly support classroom teaching/learning experiences; and (d) Work with various constituents on other emergent tasks (Lord & Miller, 2000).

As the partnership looked to sustain and extend its work, continuing teacher leadership development was identified as a priority. To meet this need, a “Teacher Leader Academy” was established. Funding from NSF’s Robert Noyce Scholarship Program allows support of 22 “master teacher fellows” at the elementary level. (Supplemental funding from the MSP supports a cadre of 14 secondary teacher leaders.) Teacher leaders already active in the partnership were selected to join the academy, allowing them to continue their duties as defined by the partnership, but with additional support, including development of advanced knowledge of mathematics and mathematics education throughout graduate coursework and development of leadership skills through quarterly meetings of the academy. Elementary fellows are completing graduate certification as an “elementary mathematics specialist” (AMTE, 2010); efforts are underway to establish this as a state teaching certification. Fellows receive a monthly stipend and support for tuition.

Participants maintain a journal documenting their growth as mathematics leaders and a log of their leadership activities to encourage their reflection on the experience and to help evaluate their progress. Initial analyses of these and other data sources suggest that they are finding creative ways in which to influence the progress of mathematics teaching and learning in their schools, districts, and the region.

Co-PI(s): Katherine McNeil and Vidya Madhavan
Presenter(s): Audrey A. Friedman, Lynch School of Education, Boston College, friedmaa@bc.edu

Science Educators for Urban Schools! (SEUS!) will fund 22-24 scholars candidates over a five-year period to receive Master’s Degrees in Science Education in the areas of Biology, Chemistry, Geo Science, and Physics, and will place, mentor, support, and track graduates in urban high schools for a minimum of two years.

S.E.U.S.! continues to recruit, prepare, graduate, and place science teachers in urban schools across the country. In May 2011, 6 more scholars completed licensure requirements for M.Ed. in Science Education, bringing the total number to 12. During summer 2011, 4 additional scholars began coursework towards licensure. All 18 are employed in large urban districts. All scholars have received a TELL (Teaching English Language Learners) Certificate, designating them “highly qualified” to teach English Language Learners in mainstream classrooms. Although the number of applicants for S.E.U.S.! has increased and the pool has become immensely competitive, job placement continues to be problematic, and many of our students are being hired by public charter schools. A new challenge is the looming Teacher Performance Assessment (TPA), which many Schools of Education are piloting, and which may evolve into the required national assessment. This semester, I am leading current SEUS Scholars in completing the TPA and developing inquiry-based reflective practice. Findings suggest that contextual variables have a greater impact on student teacher success than content knowledge.

11
Title: Boston University’s Noyce Scholars Program in Mathematics
NSF Noyce Award Number: 0733762
Principal Investigator: Suzanne Chapin, Boston University
Email: schapin@bu.edu
Institution: Boston University
Co-PI(s): Glenn Stevens, Boston University
Presenter(s): Steve Rosenberg, Boston University, srmathbu@gmail.com

Boston University’s Noyce Scholars Program in Mathematics is designed to respond to the critical demand for highly trained middle and high school mathematics teachers in high-need school districts in the state of Massachusetts. This program has been partnering with a number of high-need districts including Boston, Cambridge, Chelsea, Framingham, Lawrence, Waltham, and Watertown. It provides full scholarships to qualified students and is built around an established Master of Arts in Teaching (MAT) degree program. A unique feature is the emphasis on graduate-level mathematics. Students enroll in three courses as part of their degree program including a 6-week math immersion experience through the PROMYS for Teachers program.
Clinical experiences are provided along with coursework and workshops specifically designed to support reflective teaching focused on student reasoning. In order to help Scholars prepare for teaching in high-need schools, they enroll in the course, “Teaching Math in Urban Schools,” as part of their degree program.

There have been 32 Noyce scholars in Cohorts I–IV. Of the 32, 94% graduated with a MAT degree and licensure in secondary mathematics. Two scholars left the MAT program prior to the awarding of the degree. Currently all of the Cohort I scholars have completed their obligation to teach for two years in high-need districts; all are still teaching secondary mathematics with 83% of them in high-need schools. Cohorts II and III are in their first or second year of teaching. All are teaching with 92% in high-need schools. Ten Cohort IV scholars are graduating in May 2012 and are currently looking for jobs. We anticipate funding five Cohort V scholars who will enter the MAT program in summer 2012.

Scholars are connected to a robust and on-going mathematics community of teachers, mathematics educators, and mathematicians. They return to campus for the monthly Noyce Scholars Seminar Series which provides professional development activities such as exploring the teaching of slope, solving mathematics problems, investigating alternative assessments, or discussing the use of challenging tasks in teaching. Other professional development activities include attendance at NCTM conferences, special meetings for first-year teachers focused on classroom management, and activities during the MAT year specifically oriented toward working in high-need schools.

Title: Math for America Boston: Noyce Teaching Scholars Program
NSF Noyce Award Number: 0934851
Principal Investigator: Suzanne Chapin
Email: sr@math.bu.edu
Institution: Boston University
Co-PI(s): Glenn Stevens (Boston U.), Steve Rosenberg (Boston U.), Donna Chevaire (Lawrence Public Schools)
Presenter(s): Steven Rosenberg, Boston University, sr@math.bu.edu

The Math for America Boston: Noyce Teaching Scholars Program builds on our current program, Noyce Scholars Program in Mathematics, to recruit and support mathematics teachers for work in high-need districts. This program works with Teaching Fellows and Master Teachers. Teaching Fellows are outstanding STEM graduates or professionals who wish to change careers and become teachers of mathematics. Master Teachers are highly qualified and experienced secondary mathematics teachers in high-need Boston area school systems who would like to become instructional leaders. This six-year program is a collaboration of faculty in the School of Education and the College of Arts and Sciences, the Math for America program, and seven high-need school districts.

Teaching Fellows enroll in a one-year graduate program that leads to the Master of Arts in Teaching (MAT) degree and initial teacher licensure as either a middle school or high school mathematics teacher. Teaching Fellows receive full scholarships to the same program that our other Noyce Scholars join. Their coursework combines content and pedagogy. Following the awarding of the MAT degree, Noyce Teaching Fellows are required to teach mathematics in a high-needs district in the Boston area for four years. They receive stipends while teaching in these districts. There are three Teaching Fellows enrolled in the MAT degree program who will be graduating in May. We anticipate having 8 additional Teaching Fellows join our program in Summer 2012.

Master Teachers must have majored in math and hold a master’s degree in a related field. They enroll part-time in a graduate degree program at Boston University (BU) that supports their development as leaders through an immersion experience in math and coursework focused on mathematics curriculum and professional development. This program supports 5 Master Teachers. One Master Teacher is completing her third year, two Master Teachers are completing their second year, and two Master Teachers are finishing their first year. Master Teachers receive individual mentoring to support their work in their schools. They also return to campus for the monthly Noyce Scholars Seminar Series that they help facilitate. Two Master Teachers have been working with the BU teacher preparation program and mentoring Noyce student teachers. Master Teachers receive a stipend for five years while working as teacher leaders.

Title: California State Polytechnic University, Pomona Robert Noyce Scholarship Program: Building A Community of Learners
NSF Noyce Award Number: 0934964
Principal Investigator: Nicole Wickler
Email: nizwickler@cspomona.edu
Institution: Cal Poly, Pomona
Co-PI(s): Laurie Rign and Homeyra Sadaghiani
Presenter(s): Nicole Wickler, California State Polytechnic University, Pomona, nizwickler@cspomona.edu

The Cal Poly Pomona Robert Noyce Scholar Program began in the 2004/05 academic year. It has supported 53 math and science Scholars through financial assistance, monthly PLC seminars, travel to professional conferences, and summer research experiences. We have leveraged other grant funds to expand support to Scholars and connect with other Noyce projects in the western states. We are systematically tracking program activities and continue to track former Scholars after they exit the program.
program. Preliminary data suggest monthly seminars related to
math and science teaching provide Scholars with information
that is relevant and useful for teaching in the classroom, and
information that will help them to be better teachers. Seminars
include undergraduate students, graduate students, beginning
teachers, mentor teachers, and former Scholars. Evaluation data
indicate that financial support for Scholars helps them to focus
on their academic development, collaborate with others and
avoid seeking additional employment.

14
Title: Cal Poly Mathematics Noyce Scholarship Program
NSF Noyce Award Number: 0530419
Principal Investigator: Todd A. Grundmeier
Email: tgrundme@calpoly.edu
Institution: Cal Poly, San Luis Obispo
Co-PI(s): Elsa Medina
Presenter(s): Todd A. Grundmeier, Cal Poly, San Luis Obispo,
tgrundme@calpoly.edu

Our program was established in 2007, and we have awarded 27
scholarships to future mathematics teachers. In addition to pro-
viding scholarships, our program has a summer workshop com-
ponent for scholars to learn about the teaching and learning of
mathematics as well as issues of teaching in high need districts.
A supplemental NSF grant has allowed us to pay a $5000 stipend
for scholars from other universities to attend our summer work-
shops.

15
Title: Research Experiences for Noyce Scholars at National
Laboratory Facilities through the STEM Teacher and Researcher
Program (STAR)
NSF Noyce Award Number: 0952013
Principal Investigator: John Keller
Email: star@calpoly.edu
Institution: California Polytechnic State University
Co-PI(s): Bryan Rebar
Presenter(s): John Keller, California Polytechnic State Univer-
sity, jmkeller@calpoly.edu

The STEM Teacher and Researcher (STAR) Program provides
Noyce Scholars the opportunity to develop identity as both
teacher and researcher. Founded and implemented by the Cal
Poly Center for Excellence in Science and Mathematics Education
(CESAme) on behalf of the California State University (CSU) sys-
tem, STAR provides cutting edge research experiences and ca-
reer development for Noyce Scholars. Key experiences are one
to three summers of paid research experience at federal re-
search facilities associated with the Department of Energy, Na-
tional Aeronautics and Space Administration, National Oceanic
and Atmospheric Association, and the National Optical Astron-
omy Observatory. Anchoring Noyce Scholars in the research

community enhances participant understanding of what it
means to be both researchers and effective teachers. Since its
inception in 2007, the STAR Program has partnered with 15 na-
tional lab facilities to provide 222 research experiences to pre-
service teachers from across the 29-campus CSU system as well
as Noyce Scholar Programs across the nation. In summer 2011,
44 of the 86 program participants were Noyce Scholars. Through
continued partnership with the Noyce Scholar Program and con-
tributions from outside funding sources, CSU is committed to
sustaining the STAR Program as an opportunity for Noyce Schol-
ars to participate in research as part of their teacher prepara-
tion.

Evaluation results from the program continue to indicate its ef-
effectiveness in recruiting high quality science and math majors
into the teaching profession and impacting their attitudes and
beliefs towards the nature of science and teaching through in-
quiry. Additionally, through surveying and interviewing partici-
pants who are now teaching, the project has begun to research
the impact of the STAR Program on classroom practice. Prelimi-
inary analyses indicate that STAR fellows have maintained a
strong distributed community of support following their summer
experience, including continued contact with their research
mentors and other fellows. The STAR research experience has
also reinforced and strengthened many of the teachers’ commit-
tment to teaching. Additionally, teachers report how their STAR
experience contributed to specific practices they use in the class-
room to help students develop hypotheses, design experiments,
and report their findings to the class. Most teachers reported
that their STAR experience has made them better teachers. Visit
www.StarTeacherResearcher.org for more information on the
STAR Program.

16
Title: Cal Poly San Luis Obispo Science Noyce Scholars Program
NSF Noyce Award Number: 0833353
Principal Investigator: John Keller
Email: jmkeller@calpoly.edu
Institution: California Polytechnic State University
Co-PI(s): Seth Bush and Ed Hirnblau
Presenter(s): John Keller, California Polytechnic State University,
 jmkeller@calpoly.edu

The Cal Poly Science Noyce Scholars Program represents one of
campus efforts to recruit, prepare, and retain high qual-
ity STEM undergraduates from at Cal Poly San Luis Obispo into
teaching (www.cesame.calpoly.edu/noyce). We have success-
fully recruited three cohorts into the program over the past
two years, with 19 one-year scholars, 7 two-year scholars, and
5 three-year scholars. With 48 scholarships awarded to 31
scholars, our program is on course to reach our target of award-
ing 54 scholarships to at least 30 scholars. We will be selecting
our final cohort this spring 2012. During the 2011-12 academic
year, Scholars have been engaged in monthly Noyce Seminars

2012 NSF Robert Noyce Teacher Scholarship Program Conference
on topics including common science misconceptions, citizen science, gender in STEM, and English language learners. A large group also attended the 2011 California Science Teachers Association Conference in Fall 2011. The cohort has selected Jessica Potter, a recent Cal Poly Noyce Scholar graduate now teaching in San Bernardino, as the 2012 Cal Poly Noyce Distinguished New Teacher. Ms. Potter will provide the keynote address at the 4th Annual Noyce Narrative Event, which is intended to spread awareness of the Noyce Scholars Program and the importance of placing highly qualified science and math teachers in high need settings.

Our Scholars have also been involved in a number of professional development opportunities. During Summer 2011, nine participated in the STEM Teacher and Researcher (STAR) Program, conducting research at national research labs run by NASA and the Department of Energy. Two other Scholars participated in the 2011 NASA Noyce Summer Institute which brought 22 Noyce Scholars from around the country together for a week long professional development workshop featuring NASA educators and scientists. This winter and spring, several current Scholars are also involved in two professional development opportunities involving the use of technology in the classroom funded through the Google Faculty Institute.

Finally, our program has begun to coordinate with the Cal Poly Upward Bound Program to involve Scholars as tutors, summer instructors, and Saturday science workshop leaders for this program. The Cal Poly Science Noyce Scholars Program is housed in the Cal Poly Center for Excellence in Science and Mathematics Education (CESaME), which will continue to offer research opportunities to Noyce Scholars from throughout the California University System and beyond through the STAR Program (www.StarTeacherResearcher.org).

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Title: CSUB Robert Noyce Fellowship Program
NSF Noyce Award Number: 1136342
Principal Investigator: Carl Kloock
Email: rhughes@csub.edu
Institution: California State University, Bakersfield
Co-PI(s): Ron Hughes and Jacqueline Hughes

Highlights of the new CSUB Robert Noyce Fellowship Program are:
1. The Robert Noyce Fellowship Program at California State University, Bakersfield (CSUB) was funded on January 1, 2012.
2. We have not yet accepted any Fellows into the Program
3. We will be accepting our first cohort of students in Fall 2012.

We will describe the program and recruiting efforts to date.

18

Title: Mathematics California Coast Noyce Scholars Partnership
NSF Noyce Award Number: 0934703
Principal Investigator: Jeff White
Email: ivonagrze@csuci.edu
Institution: California State University, Channel Islands
Co-PI(s): Ivona Grzegorczyk, Hongde Hu; Oliver Dale
Presenter(s): Ivona Grzegorczyk, California State University, Channel Islands, ivonagrze@csuci.edu

The three campuses located in California Coastal region, Humboldt State University (HSU), CSU Channel Islands (CSUCI), and CSU Monterey Bay (CSUMB), are highly committed to the preparation of outstanding mathematics and science teachers and are collaborating in this effort as the California Coast Noyce Scholars (CCNS) Partnership. The goals of the partnership address the fact that HSU has many undergraduates in STEM majors interested in teaching careers, but is in the North Coast region with limited demand for new teachers. CSUCI, serving primarily Los Angeles and Santa Barbara area, and CSUMB, serving Monterey and South San Francisco area, are located in the highest growth regions in the state and are not able to meet the large demand for mathematics teachers. Our Noyce Scholars completing their STEM degrees at any of the three campuses transfer seamlessly to one of the other partner campuses for their teaching credential, and continue as a Noyce Scholar during their post-baccalaureate credential program. Students from the three campuses meet once a year to share their educational and research projects, visit schools and discuss pedagogy and resources, network, and collaborate.

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Title: TEMS II: Teaching Excellence in Math and Science Phase II A Noyce Math and Science Scholars Consortium
NSF Noyce Award Number: 1136431
Principal Investigator: David T. Kagan
Email: dkagan@csuchico.edu
Institution: California State University, Chico
Co-PI(s): Brandi L. Aranguren, Kelly McDonald, Jennifer Oloff-Lewis, and Deidre B. Sessoms
Presenter(s): David T. Kagan, California State University, Chico, dkagan@csuchico.edu
Brandi L. Aranguren, California State University, Chico, brandi@csuchico.edu
Kelly McDonald, California State University, Sacramento, mcDonald@csus.edu
Jennifer Oloff-Lewis, California State University

This Phase II project continues the Noyce Phase I TEMS work currently in progress. It continues as a joint effort from California State University (CSU), Chico and CSU Sacramento, in partnership with three area school districts: Chico Unified School District, Oroville Union High School District, and Sacramento City...
Unified School District. These two CSU campuses have long been leaders in providing highly qualified mathematics and science teachers for a service region larger than the size of Ohio that includes both rural remote regions as well as large urban areas with large populations of low income, culturally and linguistically diverse students. In conjunction with other existing programs, the Noyce Scholars program has assisted Chico and Sacramento in efforts to increase the number of mathematics and science teachers they produce each year as part of a larger statewide goal of the CSU system. To date, the Phase I grant has funded 43 scholars between the two campuses. The Phase II grant proposes to fund that same number.

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Title: TEMS I: Teaching Excellence in Math and Science Phase I Noyce Math and Science Scholars Consortium
NSF Noyce Award Number: 0733758
Principal Investigator: Brandi Aranguren
Email: baranguren@csuchico.edu
Institution: California State University, Chico
Co-PI(s): David Kagan, Deidre Sessoms, and Kelly McDonald
Presenter(s): Brandi Aranguren, CSU, Chico, baranguren@csuchico.edu
Deidre Sessoms, CSU, Sacramento, dsessoms@skymail.csus.edu

The TEMS consortium partners two culturally different universities, California State University, Chico and California State University, Sacramento, using the strengths of both in providing highly qualified mathematics and science teachers for a combined service region larger than the size of Ohio. Chico is primarily rural in nature, including large, remote, mountainous regions with high poverty rates; Sacramento serves an expanded urban area with large populations of low income, culturally and linguistically diverse students. One of the unique features of this partnership is to use the differences in the individual regions to help Noyce scholars to develop a stronger and more diverse understanding of educational challenges. TEMS conducts two joint seminars annually, one in each area that meet in area teacher classrooms and are co-facilitated by mentor teachers in the area. TEMS also provides opportunities for student teacher exchange programs between the two campuses allowing Noyce Scholars to visit and better understand the unique characteristics and needs of the students in the different regions.

Both campuses have incorporated TEMS into their efforts to double the number of math and science teachers they produce. Each campus has directed their efforts in different directions to again match their needs and strengths. Chico has integrated TEMS into expanding programs for undergraduates while Sacramento has used TEMS to help a large population of career changers. Activities at Chico have included expanding its unique Hands-On Lab science teaching experiences (elementary classes visiting a dedicated lab on the Chico campus), and increasing participation in Project M.A.T.H. (Mathematics And Teaching on the Horizon, a residential learning community model for future math teachers). Sacramento has developed new courses for STEM professionals allowing them to gain teaching credentials and meet NCLB highly qualified requirements and has expanded teacher recruitment activities and early field experiences.

TEMS efforts have been strengthened on both campuses through collaborations with existing campus programs, such as the Alliance for Minority Participation, the Mathematics and Science Teaching Initiative, California Postsecondary Education Commission grant programs for retaining new math and science teachers, and the Beginning Teacher Support and Assessment Induction programs.

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Title: Noyce Scholar and Fellow Programs at the California State University, East Bay
NSF Noyce Award Number: 0833348
Principal Investigator: Kathy Hann
Email: david.stronck@csueastbay.edu
Institution: California State University, East Bay
Co-PI(s): David Stronck
Presenter(s): David Stronck, California State University, East Bay, david.stronck@csueastbay.edu

Phase I Noyce Scholarships at California State University (CSU), East Bay attract academically successful community college transfers, senior mathematics and science majors and STEM professionals to become highly effective teachers in urban school districts. In 2011-2012, eleven credential students and one undergraduate have Noyce scholarships at $10,000 during this year. The program includes a professional support network and mentoring. In 2009, the Noyce Fellowship program was added. Now the College of Science and the College of Education and Allied Studies at CSU, East Bay, the Alameda County Office of Education, the Stephen D. Bechtel Jr. Foundation, and the Edward Teller Foundation collaborate on the goal of increasing the number of highly qualified science and math student who will obtain a teaching credential and the master's degree at CSU, East Bay. This program is providing scholarships for the first two credential/master's years and salary supplements for the subsequent three teaching years for two cohorts of eight Fellows. Each fellow will receive a total of $60,000 in support from the Noyce Program.

Recruits have come from some of the most prestigious universities in the country as well as from at least one foreign country. Some have come from community colleges, others through the CSU East Bay four-year undergraduate programs, and some have transferred into CSU East Bay upper-division programs from local community colleges. The Noyce Scholars are extraordinarily well prepared academically. Clearly they are either highly gifted intellectually or exceptionally hard working, or both. The mean GPA
of the group at the time of their recruitment was 3.56. Over the course of the past year they, as a group, have completed 108 courses, an average of over 4 classes each, attesting to the fact that they have been fully engaged in their coursework. Furthermore, they are very pleased with their classes. As a group they report an average of 4.1 on a 5 point satisfaction scale, with 5 indicating “highly satisfied”. The lowest of the scores reported was a 3. Our Noyce Scholars have demonstrated such positive attitudes and such diligence in their coursework that there has been no indication of unsatisfactory progress. This is not surprising, considering that several of the Noyce Scholars applied for the program at the suggestion of their professors, rather than in response to a widespread advertising program.

James Rudd, California State University Los Angeles, Department of Chemistry and Biochemistry, External Evaluator

California State University Fullerton (CSUF) in collaboration with Anaheim Union High School District, Mount San Antonio College, and University of California Los Angeles is implementing Teaching as a Primary Profession (TAPP) in Biology and Biochemistry. The TAPP program encourages talented biology and biochemistry undergraduates to become highly qualified secondary teachers of both biology and chemistry. Scholarships support those who are in the process or have completed a bachelor’s degree in biology or biochemistry and are enrolled in the CSUF secondary credential program with the intention of earning a teaching credential with authorization in California to teach both high school biology and chemistry.

The specific project goals for this Phase 1 Noyce Scholarship Program are: 1) Provide opportunities for students to enrich their understanding of the nature of scientific inquiry through research experiences in biology and biochemistry; 2) Develop pedagogical content knowledge with supported experiences in high school and college classrooms; and 3) Facilitate the use of information, communication, and educational technologies to improve teaching and learning. Our aim is to offer a potential model for a five-year credential program that involves preparing biology and biochemistry majors for service in public secondary schools who achieve highly qualified status in both biology and chemistry.

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Title: Fresno State Noyce Programs: Ten Years and Going Strong
NSF Noyce Award Number: 0733849
Principal Investigator: David M. Andrews
Email: davidan@csufresno.edu
Institution: California State University, Fresno
Presenter(s): David M. Andrews, California State University, Fresno, davidan@csufresno.edu

The poster presentation will include a summary of practices, activities and outcomes of our 10 years of Noyce Scholar/Teacher/Fellow programs at Fresno State. We will share information concerning total numbers of Noyce I/II teachers and scholars as well as numbers of Fellows. The poster will also include demographics including gender, ethnicity; discipline major including second authorization/license area data; years our Noyce Teachers have been in the classroom and percentage of those who have remained in their high need classroom beyond the obligation period; examples of leadership positions assumed by our Noyce Scholars/Teachers/Fellows; examples and descriptions of professional development including our Western Regional Noyce Conferences, Noyce sponsored summer research internships and special summer programs. The intent is to tell our success story as it continues to unfold.

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Title: The Fullerton Mathematics Teacher and Master Teacher Fellows Project: Year 2
NSF Noyce Award Number: 1035315
Principal Investigator: Marty Bonsangue
Email: mbonsangue@fullerton.edu
Institution: California State University, Fullerton
Co-PI(s): Mark Ellis and Ruth Yopp-Edwards
Presenter(s): Marty Bonsangue, Cal State Fullerton, mbonsangue@fullerton.edu

The Fullerton Mathematics Teacher and Master Teacher Fellows Project (MT2) aims to develop a cadre of mathematics teachers and mathematics teacher leaders who will work together to serve as master/student teachers, mentor/mentee teachers, current and future district and community leaders, and current and future college/university liaisons in high-need districts in the greater Orange County, CA area. During the first year, we identified ten Master Teaching Fellows (MTFs) from two high-need school districts, Norwalk-La Mirada Unified School District and Anaheim Joint Union High School District at the middle school and high school levels. We have also identified the first cohort of ten Teaching Fellows (TFs) in mathematics and six of the second cohort of ten TFs who will partner with the MTFs. The second
Title: Improving Mathematics, Physics, and Chemistry Teaching (IMPaCT) Project
NSF Noyce Award Number: 0630425
Principal Investigator: Margaret Kidd
Email: dpagni@fullerton.edu
Institution: California State University, Fullerton
Co-PI(s): David Pagni
Presenter(s): Margaret Kidd, mkidd@fullerton.edu
David Pagni, California State University, Fullerton, dpagni@fullerton.edu

The IMPaCT program is designed to support talented, low-income, prospective secondary school mathematics, physics, and chemistry teachers during the year they work towards their teaching credential. Each year, the program awards stipends to students who have earned a Bachelor's degree in mathematics, physics, or chemistry and who have been admitted to the teacher education program, intent on earning a secondary school teaching credential. During the four years of the grant, a total of 40 students will participate in the project. California State University, Fullerton (CSUF) houses the largest teacher-credentialing program in Orange County. IMPaCT operates within the current Secondary Credential program to actively recruit and fund minority candidates, especially Hispanics, to enter the fields of mathematics, physics, and chemistry teaching. In turn, these teachers will serve as role models to the large minority population in our public high schools and encourage more of these students to attend college and eventually enter the teaching field.

The IMPaCT program is coordinated with the school district partners within an ongoing NSF Mathematics and Science Partnership (MSP) program at CSU Fullerton, called TASEL-M (Teachers Assisting Students to Excel in Learning Mathematics) and its Phase II continuation, TASEL-M2, two state math/science partnerships, and a CPEC funded grant called CoAST (Continuum for the Advancement of Science Teaching). As a result, candidates who are awarded stipends are placed in schools where a strong working relationship exists between the CSUF mathematics, physics, and chemistry faculty members and their cohort teachers in the participating schools. Through existing professional development programs, the prospective teachers receive professional development in mathematics and physical science content and practice alongside practicing teachers (five days in the summer and five days during the academic year). Progress of stipend awardees will be followed over the five years of the IMPaCT grant to determine the effect of the program on new teachers and to assess their impact as role models in the schools where they are employed. So far, 37 students have been awarded the scholarships (see http://webcert.fullerton.edu/sa/impact/Testimonials.html) for testimonials and follow up information.

Title: CSULB Noyce II: Learning from the Past to Impact the Future
NSF Noyce Award Number: 0833349
Principal Investigator: Laura Henriques
Email: anna.brochet@csulb.edu
Institution: California State University, Long Beach
Co-PI(s): Xuhui Li, Karen Hakim-Butt
Presenter(s): Anna Brochet, CSULB, anna.brochet@csulb.edu
Jennifer Rodriguez, CSULB, jennifer_rodriguez625@yahoo.com

The California State University, Long Beach Noyce II project is continuing its third year with a dozen actively funded scholars during 2011-2012. Scholars participated in the service learning component of the program in our partner high need districts. Six scholars successfully completed their student teaching in the Fall semester, two more will finish in spring. Our last cohort of incoming Scholars will join four continuing Scholars in Fall 2012. Longitudinal evaluation of Noyce I continues with findings showing that alumni felt better prepared for their first year of teaching because of (1) the additional strategies and resources they received during professional development seminars and conferences, (2) the support they felt from being part of a small cohort of aspiring science and math teachers facing the same goals and challenges, and (3) the opportunity to network and have access to experienced mentors. Input from Noyce I alumni and employers have helped shape our programming choices.

Our goal is to provide tools and experiences which support students' preparation for teaching in high needs schools. We meet these goals via three different types of activities.

1. Scholars receive individualized mentoring, both career and academic.

2. Scholars participate in early field work experiences at our partner school districts: Long Beach Unified School District and Whittier Union High School District.

3. Scholars participate in our professional development seminar series and discussion board postings, both of which develop professional skills while contextualizing early field work experiences in our partner schools.

Through multiple professional development opportunities, we have seen growth in scholar confidence as teachers, their reflective abilities, and their emergence as young professionals. Most Scholars take advantage of additional professional development
opportunities. Eleven current scholars attended state math or science teaching conferences. Two are engaged in a Google sponsored flipped unit project (they led a seminar to teach their colleagues the process) and four have taught in the Young Scientists Camps at CSULB. Besides presenting to each other, Noyce Scholars and Alumni have presented at the annual conferences of the National Science Digital Library, National Science Teachers Association, California Science Teachers Association, and the Western Regional Noyce Conference (WRNC). Noyce I alumni continue to be involved, attending the WRNC, and presenting at Noyce seminars and serving as mentor teachers for Noyce Scholars during field work and student teaching.

Opportunities for continued partnerships include:

1. Young Scientists Camp and Clancy Foundation funded hands-on science teaching continue to hire Noyce Scholars
2. CSULB Scholars have participated in the STAR (Science Teacher As Researcher) program coordinated by Cal Poly SLO
3. CSULB has a PhysTEC grant which has developed physics PCK courses which Noyce Scholars have taken
4. We use MERLOT Voices as a communication and discussion board mechanism. Scholars have created e-portfolios via MERLOT’s Content Builder
5. We continue to participate in WRNC activities

27 Title: Learning in Context: Prospective Mathematics Teachers’ Journeys in Self-Assessment
NSF Noyce Award Number: 0934934
Principal Investigator: Debasure Raychaudhuri
Email: draycha@calstatela.edu
Institution: California State University, Los Angeles
Co-PIs: Derek Chang and Fred Uy
Presenter(s): Debasure Raychaudhuri, California State University of Los Angeles, draycha@calstatela.edu

Rigorous content background is the initial point, the pivotal foundation in the mathematics major’s journey as a teacher. It is not one dimension, however, and by itself cannot hold the structure together. To be able to face the content in context and the challenges of a high-need school we must equip our graduates with skills beyond rigor; the foresight of the context by establishing the relevance and insight of workplace and their students by gradual familiarization. We designed a dual-foci longitudinal study and a specific course to address each issue.

The course focuses on high school mathematics topics such as algebra, trigonometry, geometry, calculus, proof and their links with advanced mathematics, particularly focusing on multiple representations and inter-connections between these topics, allowing the scholars to take an in-depth look at their own mathematical knowledge.

The longitudinal study undertaken in a high-need school using specially designed research questions allows the scholar to learn about both mathematical as well as non-mathematical challenges that high-need school students and their teachers face. In this presentation we describe these activities and offer samples of student work as well as our own conclusions drawn from them.

28 Title: California State University, Northridge (CSUN) NSF Teaching Fellowship Program
NSF Noyce Award Number: 0934972
Principal Investigator: Kellie Evans
Email: kellie.m.evans@csun.edu
Institution: California State University, Northridge
Co-PI(s): Julie Gainsburg, Ivan Cheng
Presenter(s): Kellie Evans, California State University, Northridge, kellie.m.evans@csun.edu

The Teaching Fellowship Program at California State University, Northridge (CSUN) is in its third year and currently supporting nine Teaching Fellows (TFs). Two TFs completed their single subject teacher credential programs in Spring 2011 and immediately obtained secondary math teaching positions in high-need school districts. Four TFs will complete their single subject mathematics teaching credentials in Spring 2012 and three will finish in Fall 2012. Project directors are in the process of selecting the last cohort of TFs. Three Master Teaching Fellows (MTFs), all of whom are secondary mathematics teachers employed by the Los Angeles Unified School District, are also supported. MTF’s professional development has included work on master’s degrees in mathematics education and creating and implementing an annual Personal Leadership Service Plan. All MTFs are on track to complete their master’s degrees Spring 2012.

The first cohort of TFs has benefitted greatly during this first year of teaching from one-on-one and group mentoring funded by the grant. Throughout the year all Fellows participated in monthly meetings, which included featured speakers on such topics as (1) inquiry and logical thinking; (2) lesson design aimed at getting students to think conceptually; (3) using a variety of instructional strategies including manipulatives and technology to cover state standards; (4) innovative school structures; and (5) job search assistance. Fellows were also supported to attend the fall California Mathematics Council-South Conference in Palm Springs where they attended talks by Dan Meyer and Jo Boaler.

While the TF Program has experienced full retention and 100%
employment (in spite of the bleak job market), the MTF Program has experienced some attrition due to change of future plans and an untimely death.

29
Title: California State University, Northridge (CSUN) Robert Noyce Scholarship Program
NSF Noyce Award Number: 0630452
Principal Investigator: Kellie Evans
Email: magnhild.lien@csun.edu
Institution: California State University, Northridge
Co-PI(s): Magnhild Lien, Virginia Oberholzer-Vandergun, Matthew D’Alessio
Presenter(s): Magnhild Lien, magnhild.lien@csun.edu
Kellie Evans, kellie.m.evans@csun.edu

The Noyce Scholarship Program at California State University, Northridge (CSUN) is in its last year. To date, 37 scholars, 18 math and 19 science, have been supported. Approximately 10 additional scholars will be supported during the summer and fall 2012 terms. Seventeen scholars have earned preliminary single subject math or science teaching credentials and of those 11 are teaching secondary math or science in high-need school districts. Of the 6 not teaching, 3 are looking for positions and 3 have postponed their searches due to personal or economic reasons. Nine more scholars are expected to earn single subject math or science teaching credentials Spring 2012.

The main professional development activity for scholars has been the weekly seminar, which included the following:

1. Book reviews and discussions of books purchased through the project (e.g. Children Ideas in Science by Rosalind Driver; Classroom Management That Works: Research-Based Strategies for Every Teacher by Robert J. Marzano, et. al.; Ways to Think About Mathematics: Activities and Investigations for Grade 6-12 Teachers by Steve Benson et. al.)
2. Reading primary literature such as papers on English language learners in science and math classrooms and misconceptions in children’s understanding of science and math topics;
3. Designing and delivering short lessons to practice teaching and receiving feedback;
4. Using technology in the classroom, with an emphasis on the free dynamic mathematics software GeoGebra, use of Google and other systems and software for science learning;
5. Hosting invited guests and experienced teachers to lead the session, such as on inquiry-based lessons for math and science scholars;
6. Workshops on applying for the teaching credential program and on applying for jobs in the Los Angeles Unified School District; and
7. Visits to secondary science and mathematics classrooms.

Through this program, we have learned that prospective scholars may not apply for funding for various reasons, including not knowing how to ask for letters of recommendation and not thinking they qualify. We have also learned that scholars need additional support, especially in finding jobs and during the first years of teaching.

30
Title: Noyce Sac-MAST: Sacramento Math and Science Teaching Program Year 1
NSF Noyce Award Number: 1136419
Principal Investigator: Deidre B. Sessoms
Email: sessoms@csus.edu
Institution: California State University, Sacramento
Co-PI(s): Kelly K. McDonald, Gary Shannon
Presenter(s): Deidre B. Sessoms, California State University, Sacramento, sessoms@csus.edu
Kelly K. McDonald, California State University, Sacramento, mcdonald@csus.edu

This new Phase I Scholarship Program builds upon our highly successful collaborative Phase I Program with CSU Chico (on which Chico was the lead) to offer new scholarships and research-based professional development opportunities to 38 undergraduate or credential year math or science majors over a five year period. Graduates will be highly sought after for math and science teaching positions in our high needs service area. The Sacramento region is a highly diverse, urban area, with high unemployment and a predicted future need for teachers that outstrip almost every other city in the state of California. Unique project components include:

1. Partnership with the Parent/Teacher Home Visit Project, a nationally replicable non-profit program which trains and supports teachers in cultural competency and in connecting with their students’ families and communities. All Scholars will go through trainings and will accompany their cooperating teachers on home visits during their certification year. Research indicates that this project results in increased test scores and increased attendance.
2. Student teaching placements in urban high school Small Learning Communities that have adopted Linked Learning, a promising reform effort aimed at improving high schools by connecting strong academics, demanding technical education and real-world experience in a wide range of fields, such as engineering, arts and media, biomedicine and health.
3. Partnership with the Los Rios Community College District to support summer biotechnology workshops where Noyce Scholars will team up with community college science students to assist area Title 1 high school students in a summer enrichment program in the sciences. This will strengthen the high school to community college to university pipeline for under-represented students, and also strengthen the connections among faculty at our various institutions.

31
Title: CSUSB Noyce Teaching and Master Teaching Fellowships
NSF Noyce Award Number: 0934761
Principal Investigator: Davida Fischman
Email: carol_cronk@sbcss.k12.ca.us
Institution: California State University, San Bernardino
Co-Pi(s): Carol Cronk, Joseph Jesunathadas, and Sheree Jetterberg
Presenter(s): Carol Cronk, carol_cronk@sbcss.k12.ca.us

The CSUSB Noyce Teaching and Master Teaching Fellowships program addresses local challenges by developing, implementing and evaluating a comprehensive professional development program in mathematics education that will result in improving the quality of instruction, and ultimately increasing student achievement among secondary students in the SBCUSD.

The CSUSB Fellowship currently includes 5 Teaching and 11 Master Teaching Fellows. All Fellows will earn a Master of Arts in Teaching Mathematics at CSUSB. It is our experience that most Master’s degrees earned by teachers in our service area are not specifically content-related, but rather focus on general curriculum and instruction or on administration; thus this degree will significantly enhance the depth and breadth of mathematical content knowledge as well as content knowledge for teaching among the Fellows.

During the five-year Fellowship, Teaching Fellows and Master Teaching Fellows engage in lesson study as a team. There are currently two teams and each team has ten formal days to meet with a facilitator during the regular school day, to study mathematical concepts and prepare, teach, and debrief lessons. However, in addition to the designated lesson study time, the teachers frequently meet together on their own time to share strategies, do homework, and plan lessons for lesson study.

The first team of Fellows was so excited about the lesson study process that they requested to attend the Chicago Lesson Study Conference in May 2011, and the Noyce Fellowship program has supported them in doing so. They have also shared their lesson study expertise with the larger Noyce community in several presentations including the Western Regional Noyce Conference, the Annual Noyce Conference in July, and the California Math Council (CMC), South. In addition, one of the Master Fellows was instrumental in the planning of a lesson study conference held at her high school and CSUSB.

As a result of the parallel processes of engaging in study for a master’s degree and ongoing lesson study, the Fellows are becoming a supportive and productive community of teachers focused on enhancing all aspects of their teaching. The Professional Learning Community of Fellows is already expanding its influence in the district. Several have decided to apply for National Board Certification, and have included colleagues from their schools to join them in this effort. Others are bringing to their department meetings ideas and strategies they have learned in the lesson study sessions and in the MAT program.

32
Title: CSUSB Noyce Scholarship Program (Phase I and II)
NSF Noyce Award Number: 0630255
Principal Investigator: Davida Fischman
Email: fischman@csusb.edu
Institution: California State University, San Bernardino
Co-Pi(s): Carol Cronk and Joseph Jesunathadas
Presenter(s): Davida Fischman, CSU San Bernardino, fischman@csusb.edu, CSU San Bernardino Noyce Math and Science Scholarships Program

The major components of the CSU San Bernardino Noyce program are mentored classroom experiences (2 full weeks in the beginning of the academic year, and weekly thereafter), monthly seminars attended jointly by scholars and mentor teachers, supervision of Noyce scholars’ student teaching by subject-matter faculty, and academic advising by Natural Sciences as well as Education faculty. All of these are firmly grounded in a strong partnership between the CSUSB College of Natural Sciences, College of Education, the San Bernardino County Superintendent of Schools, and the San Bernardino City Unified School District.

Additionally, we encourage and support financially scholars’ attendance at local and regional meetings and conferences such as the Riverside San Bernardino Counties Math Teachers Association Dinner Meetings, the Western Regional Noyce Conference, and the California Math Council - South Annual Conference.

Structured mentoring experiences are at the core of our program; these are particularly valuable since our Noyce scholars are primarily undergraduates who have had little or no experience in the classroom. For this component, the program partners collaborate to identify lead teachers in the district who have outstanding skills both in teaching secondary students and in working with adults. The mentors and scholars are then matched, based on perceived needs of the scholars and skills of the teachers. During the three years of the Noyce program, the scholar progresses through a series of benchmarks: at first the scholar observes classroom activities with a specific focus and
records them, and then over time progresses from individual ad hoc tutoring to working with small groups, then co-planning and teaching portions of lessons, and eventually to independent planning and teaching of lessons under the supervision of the mentor teacher.

The Noyce seminars provide scholars and mentor teachers with additional opportunities to learn from university and district experts. Focus topics for 2011-12 are classroom management for scholars, mentoring skills for mentor teachers, and Common Core State Standards for mentor-scholar teams. Additional topics of particular interest have been a series of sessions on classroom management, formative and summative assessment, making good use of teaching resources to teach conceptually, and standards-aligned teaching with understanding.

Many scholars have said that without the Noyce-sponsored mentorship and structured classroom experiences, and the confidence they gain through them, they would not have made the decision to become a teacher. Noyce Graduates have said that their first year teaching is immeasurably more successful than it would otherwise have been after having learned so much about teaching in all its aspects from their mentor teachers and through the Noyce seminars and conferences they have attended. Feedback from district personnel indicates a high level of satisfaction with the work of the Noyce teachers.

33
Title: **California State University Stanislaus Future Teachers Make Some Noyce!**
NSF Noyce Award Number: 0934958
Principal Investigator: Viji K. Sundar
Email: vsundar@csustan.edu
Institution: California State University Stanislaus
Co-PI: Donna Andrews
Presenter(s): Jonathan Kamp, California State University Stanislaus, jkamp@csustan.edu
Viji K. Sundar, California State University Stanislaus, vsundar@csustan.edu

Under the theme “teachers from the valley for the valley”, 24 Stanislaus State University students have been accepted to participate in the Noyce Program in the past three years. Many of our Noyce undergraduate scholars and Noyce credential scholars have attended the regional, State and National mathematics and science conferences including the Western Regional Noyce scholarship Conference in November 2011. The undergraduate Noyce Scholars and those in the Credential Program receive support and training that is tailored to fit their needs. Credential students have monthly meetings with the Co-PI who is the high school math/science methods course instructor and the PI, who is a math faculty and leader of the undergraduate bimonthly meetings. Three of the Noyce scholars have participated for a total of five years in the STAR (Science Teacher and Researcher) program sponsored by the Department of Energy. Three more Noyce scholars will be STAR Fellows in Summer 2012.

34
Title: **The Reflective Triad: A Collaborative Model for Faculty, Teachers, and Scholars**
NSF Noyce Award Number: 0833093
Principal Investigator: Denise K. Davis
Email: denise.k.davis@case.edu
Institution: Case Western Reserve University
Co-PI(s): James Bader
Presenter(s): Denise K. Davis, Case Western Reserve University, denise.k.davis@case.edu

The Case Western Reserve University (CWRU) Noyce Program begins with the scholar’s junior year. During this academic year, scholars make weekly visits to an assigned high school teacher and attend a monthly seminar that is designed as a ‘reflective triad.’ The triad is composed of a CWRU faculty member in the discipline, a successful high school teacher who serves as the master teacher and mentor for weekly field experiences, and the scholar. The triad convenes at monthly seminars where readings and experiences are discussed. This opportunity enables Noyce scholars to interact with master teachers in an accessible and open collegial relationship that is outside the traditional student teaching assessment model. It also enables high school teachers and university faculty to interact and discuss topics and practices.

35
Title: **Central Washington University Robert Noyce Scholarship Program: Science and Mathematics Alliance for the Retention of Teachers (SMART)**
NSF Noyce Award Number: 1035514
Principal Investigator: Martha J. Kurtz
Email: kurtzm@cwu.edu
Institution: Central Washington University
Co-PI(s): Tim Sorey, Chris Black, Janet Shiver, and Jan Byers-Kirsch
Presenter(s): Martha J. Kurtz, Central Washington University, kurtzm@cwu.edu

In response to a regional and nationwide teacher shortage in secondary science and mathematics, Central Washington University (CWU) in partnership with five community colleges initiated a Phase I NSF Noyce Scholars Program to recruit and train STEM majors and STEM professionals to become science and mathematics teachers in high need schools. Over five years, 44 SMART Scholars will be prepared to teach science and mathematics and 70 SMART Affiliates will participate in teaching, research, or academic service learning experiences. High priority is placed on recruiting students underrepresented in STEM fields. By the end of second year of funding a total of 15 Affiliates will have partici-
participated in four types of experiences: academic year teaching or research, summer camp teaching, or a month-long summer research experience.

The Noyce Summer Research Program involves Noyce Affiliates in four weeks of intensive research in each of four different faculty research labs. The summer 2011 experience included research in computational mathematics, organic synthesis, brain function measurement, and marine biology. A total of nine Noyce Scholars participated in a three-day Noyce Summer Institute, four of whom will complete a year-long internship with a mentor teacher in a high-need school during the 2011-2012 academic year. Five of the two-year scholars initiated an action research project on teaching strategies that enhance learning for English Language Learners.

36
Title: Science Education Internships for the Professional Development of Noyce Scholars at Chicago State University: Affordances and Constraints
NSF Noyce Award Number: 0833251
Principal Investigator: Andrea Gay Van Duzor
Email: agay@csu.edu
Institution: Chicago State University
Co-PI(s): Karel Jacobs, Rita Koziarzki, and Mel Sabella
Presenter(s): Andrea Gay Van Duzor

The Chicago State University (CSU) Noyce Scholar Program expanded the internship component of the program to enable Scholars to engage in summer and school-year internships. These internships are in addition to those available for freshmen and sophomore who are considering teaching and are seeking science education experiences to make an informed decision about entering the teaching profession. Internships for Noyce Scholars are intended to serve retention and professional development functions. Internships are available through Informal Science Institutions in Chicago, particularly the Adler Planetarium, the Field Museum, and the Museum of Science and Industry, as well as with science education research faculty at CSU and the community ecological activist group, Southeast Environmental Task Force.

The internship program for pre-service professional development of Noyce Scholars was created for the following reasons: (a) to mitigate the need of Scholars to have outside jobs which detract rather than contribute to their professional education, (b) to provide diverse experiences in science education and introduce students to the vast ISI resources available, and (c) to further encourage a "sense of place" to develop not just science teachers, but Chicago science teachers who are attached to the challenges and affordances of science education in the city. Two years of the internship program have highlighted successes and difficulties associated with the management of a multi-site internship program. Scholars cite that the internships have broadened their understanding of science education in the city, but that logistical challenges compromise some of the educational benefits of the program. Implications and recommendations will be discussed.

37
Title: Claremont Colleges Collaborative for Math and Science Education: Measures of Success
NSF Noyce Award Number: 0532064
Principal Investigator: David Drew
Email: Lisa.Loop@cgu.edu
Institution: Claremont Graduate University
Co-PI(s): Darryl Yong
Presenter(s): Lisa S. Loop, Claremont Graduate University, lisa.loop@cgu.edu

The Claremont Colleges Noyce Collaborative has constructed a longitudinal database of application characteristics, program performance measures, and career success indicators to isolate key variables that impact teacher quality and retention. Seven years of data will be analyzed and findings presented.

38
Title: Robert Noyce Mathematics Scholars Program for Teachers (MSPT)
NSF Noyce Award Number: 0630339
Principal Investigator: Bettye M. Clark
Email: bclark@cau.edu
Institution: Clark Atlanta University
Co-PI(s): Alexander Fluellen and John King
Presenter(s): Bettye M. Clark, Clark Atlanta University, bclark@cau.edu
URL: www.robertnoycemspt.caau.edu

The Clark Atlanta University Mathematics Scholars Program for Teachers (MSPT) awarded in January 2007 is a Phase I project in collaboration with Atlanta Public Schools and Fulton County Schools. The MSPT provides scholarships to Senior STEM majors (Track I) and STEM Professionals (Track II) to complete the Master of Arts in Teaching (MAT) Degree Program for Secondary Teacher Certification in Mathematics. The MAT Degree allows STEM majors to enter the teaching profession at a higher pay scale than the traditional BA or alternative teacher preparation programs.

This Project addresses the critical need to increase the number of "New Era" teachers, especially minorities, with strong mathematics content knowledge and effective classroom management and pedagogical skills for diverse populations in high need schools. The integration of research and technology is a common theme of the MAT program. The MSPT will implement a follow-up strategy to provide assistance and support to beginning
Title: TigersTeach Noyce Scholarship Initiative
NSF Noyce Award Number: 1135293
Principal Investigator: Michael J. Padilla
Email: hattiwa@clemson.edu
Institution: Clemson University
Co-PI(s): Melanie Cooper, Michelle Cook, Megan Che, Lisa Benson, and Gautam Bhattacharyya
Presenter(s): Leigh Haltiwanger, Program Coordinator, Clemson University, hattiwa@clemson.edu

The TigersTeach Noyce Scholarship Initiative partners Clemson’s Eugene T. Moore School of Education, College of Engineering and Science, and College of Agriculture Forestry, and Life Sciences and school districts in South Carolina. The Initiative aims to recruit students presently majoring in engineering, the sciences, and mathematics (STEM) at Clemson and/or recent graduates with these degrees to become secondary science and mathematics teachers. Students in their first or second year of a science, mathematics or engineering degree program will enter already existing dual major STEM education programs and receive a scholarship during their junior and senior years. Students in their junior or senior year will finish their STEM degree and be admitted to the Master of Arts in Teaching (MAT) in secondary science and mathematics program. They will receive their Noyce scholarship during their senior undergraduate year and a Noyce stipend for the MAT program year.

In addition to didactic experiences, the TigersTeach Noyce Scholarship Initiative will provide co-curricular support mechanisms to create a vibrant learning community consisting of scholars, teachers in partner districts, as well as professors in STEM disciplines. Paid internships will provide relevant experience to students who are considering applying to the program, but have not yet fully committed to teaching as a career, and Immersion Activities are planned for TigersTeach Noyce Scholars.

Title: Computational Modeling: Phase-I: Internships and Scholarships to Promote Technological Pedagogical Content Knowledge
NSF Noyce Award Number: 1135332
Principal Investigator: Osman Yasar
Email: pverones@brockport.edu

Institution: College at Brockport
Co-PI(s): Jose Maliekal and Peter Veronesi
Presenter(s): Peter Veronesi, Co-PI, Associate Professor, Science Education, The College at Brockport, pverones@brockport.edu

Much has been learned about effective uses of technology to deepen teachers’ pedagogical content knowledge. Today, K-12 organizations promote simulations and interdisciplinary problem solving as part of scientific inquiry. Furthermore, computational thinking is now being considered as a fundamental skill that is needed by all students, not just computer science majors. We are now charged with the education of a new cadre of science teachers to prepare tomorrow’s generation.

Our project at The College at Brockport will use resources and computational math, science, and technology (C-MST) courses, developed under previous NSF grants, to improve teacher preparation programs at the College. The recent formulation by the educational community of a conceptual framework, namely technological pedagogical content knowledge (TPCK) has now put both science educators and computational scientists on the same path to utilize an interdisciplinary approach to STEM and science teacher education. There has been measurable success in recent years with software tools that hide the inner workings of a simulation and lessen the need for prerequisite knowledge, yet there still exist major limitations on how to integrate computational pedagogical content knowledge into teacher preparation programs and the K-12 curriculum.

Education and STEM faculties from physics, chemistry, earth sciences, biology, and computational sciences will carry out this project. Strong content knowledge (via a STEM degree), extensive field experience (150 hours), student teaching, dual certification (science and special education), computational pedagogy courses, monetary support, and a capstone summer institute will be included in a set of coherent strategies to attract, prepare, and retain STEM majors for teaching careers. STEM students will work along side science teacher candidates and experienced teachers to develop, test, and demonstrate science modeling examples and lesson plans for K-12 classrooms.

Within 4 years, it is expected the project will produce more than 40 science teachers and touch thousands of K-12 students. The curriculum framework and learning modules will be shared with national STEM digital library collections contributing to computational STEM programs nationwide. The project will disseminate its findings and resources through articles, conference papers, and project’s website.
41
Title: Teacher Honors Education Academy at College of Staten Island
NSF Noyce Award Number: 0934533
Principal Investigator: Jane Coffee
Email: irina.lyublinskaya@csi.cuny.edu
Institution: College of Staten Island
Co-PI(s): Irina Lyublinskaya, Susan Sullivan
Presenter(s): Irina Lyublinskaya, College of Staten Island, irina.lyublinskaya@csi.cuny.edu

The first cohort of 3 Scholars at the College of Staten Island completed their junior year with an overall average GPA of 3.4 and 100% retention. The first cohort of Noyce Teacher Academy Scholars has an average GPA of 3.4 at the end of their first semester and second semester in the program and an average GPA of 3.5 at the end of their third semester. Their responses on the Scholar evaluation survey have provided valuable insight into the host school experience. Cohort 2 of the Robert Noyce Academy joined the program in the summer of 2011. The overall GPA of cohort 2 is 3.6. 5 math majors, 2 biology majors, and 1 chemistry major were accepted into cohort 2. Although we will not formally accept students into the third cohort of the Noyce Teacher Academy until grades are available from the current spring 2012 semester, it appears that 6 of the originally projected 8 openings for 2 year Noyce Scholarships for fall 2012 are filled. June 1, 2012 is the deadline for applications for fall 2012. Students are very reluctant to consider the 3 year Noyce Scholarships because of the current freeze and the 6 year commitment to teach.

On February 22, 2012, the Alfred Harcourt Foundation awarded the Teacher Education Honors Academy scholarship funding of $7,000 for 3 students in their sophomore year. This funding will be renewed through August 2015 for 3 cohorts of Harcourt Scholars. This award will create a pipeline for students who will enter the Noyce Teacher Academy in their junior year in 2013. The Harcourt Foundation also supported 2 students to intern at the Tomas de Berlanga School in Santa Cruz, Galápagos, Ecuador in December 11-January 2012. Both students are Noyce Scholars in cohort 2. They spent a month teaching math and science in a bilingual program.

On May 4, 2011, the Teacher Education Honors Academy held its 5th Annual Conference, Continuing to Build the Bridge from Middle School to High School to College. In July 2011, a Co-PI attended the Noyce Conference in Washington, DC. On September 15, 2011, the PI made a presentation on the Robert Noyce Teacher Academy at the first Fall 2011 event of the NSF undergraduate STEAM (Science, Technology, Education, Applied Math) program. On October 13-15, 2011, a Co-PI and 2 Noyce Scholars, a chemistry major and a biology major, attended the Northeast Noyce Conference in Philadelphia where the Co-PI conducted a workshop. On November 10, 2011, a Co-PI presented a workshop on Smart Board Technology for Teacher Education Honors Academy students that included the Noyce Teacher Academy Scholars.

42
Title: Noyce Scholars Program at the College of William and Mary: Progress and Next Steps
NSF Noyce Award Number: 0833330
Principal Investigator: Paul D. Heideman
Email: pdheid@wm.edu
Institution: College of William and Mary
Co-PI(s): Juanita Jo Matkins, Margie Mason, Heather MacDonald, and Virginia McLaughlin
Presenter(s): Paul D. Heideman, College of William and Mary, pdheid@wm.edu

The College of William and Mary (W&M) has completed three years of a Phase I Noyce Scholars Program to produce 39 new science and mathematics teachers. Awards have been made to 28 Scholars (Years 1-3), and 8 new Scholars are entering for Year 4. Scholars have been in biology (30%), mathematics (25%), earth sciences (15%), chemistry (20%), and physics (10%), with three-fourths at the graduate level and one-fourth at the undergraduate level. Our Program includes (a) two special one-credit academic courses for Scholars (“How Students Learn” and a Practicum focused on high-need settings), (b) science and mathematics summer internship opportunities for research, curriculum, and professional development for scholars; and (c) follow-up mentoring and support for graduates. Recruitment of students into STEM teaching at our institution has nearly tripled during our Noyce project thus far, and visibility of STEM teaching careers has increased dramatically.

Important contributors for success of our program have been strong support from faculty in the sciences and mathematics for recruitment of academically-strong students, a designated recruiter and collaboration with the Career Center on campus, a new fifth-year program for science and mathematics majors in our School of Education, and a active management team with good interactions between faculty in the School of Education and science and mathematics departments.

Important challenges in our project have been (a) methods to select Scholars who have strong potential to be successful as teachers in high-need settings, (b) provision of useful experiences in high-need schools, and (c) retention of Scholars in teaching. Current procedures in our program will be presented and changes to address problems that arose will be discussed.
43
Title: Summer Camps for High School Students as a Recruitment and Training Program for Future NOYCE Scholars
NSF Noyce Award Number: 1035298
Principal Investigator: Donna Cooner
Email: thomas.siller@colostate.edu
Institution: Colorado State University
Co-PI(s): Paul A Kennedy, Janice L Nerger, Thomas J Siller, and Cerissa Stevenson
Presenter(s): Tom Siller, Colorado State University, thomas.siller@colostate.edu
Rachelle Gard, Colorado State University, NOYCE Scholar, rmgard@rams.colostate.edu

The Colorado State University (CSU) NOYCE scholarship program partnered with existing STEM summer camps to recruit potential scholars. Additionally, initial training of these future teachers was incorporated to prepare the students to better serve the student populations in high-need schools.

CSU has run a series of three one-week residential STEM camps for over 5 years. These camps are focused on bringing students from high-need schools in the state to a university campus for a week of exposure to STEM content through a partnership with the CSU Alliance Partnership program. The Alliance Partnership works with ten high-need schools to: unite students, families, high school personnel, and the CSU community in a common goal: to envision education beyond high school and send a greater number of Colorado students to college. By working together, we can elevate the expectation of students and their families regarding the importance, access and attainability of higher education.

These summer camps use potential NOYCE scholars who are recruited from our pre-service teacher programs to act as teacher/mentors. These teachers/mentors gain experience both in teaching STEM content and working with students from schools that can serve as their teacher placements to meet their future NOYCE in-service responsibilities. This has been an effective program to recruit an excellent pool of students to the project.

The final component of this program has been the addition of a training program titled: Culture of Care, which can be defined as combining the ideas of: 1.) Authentic caring, where future educators care for their students, particularly ethnically diverse students, as culturally located individuals, with an emphasis on reciprocal relationships and interactions between themselves and their teachers, and 2.) Aesthetic caring, where these educators care for the learning of these students, based on a commitment to ideas and practices that purportedly lead to improved minority student achievement.

Mentors at the 2011 CSU STEM camps used the Culture of Care. Of particular interest for this presentation were the relationships and interactions these mentors developed with ethnically diverse high school and middle school students attending the camps (60% of participants). The majority of these students (61%) self-identified as Hispanic and attended rural and urban middle and high schools throughout the state.

44
Title: CRAFT-STEM: A Brand New Program for Recruiting and Preparing Future STEM Teachers
NSF Noyce Award Number: 1135356
Principal Investigator: Tim Howard
Email: thoward@ColumbusState.edu
Institution: Columbus State University
Co-PI(s): Debbie Gober, Cindy Henning, and Kim Shaw
Presenter(s): Tim Howard, Columbus State University, Tim.Howard@ColumbusState.edu

Through the Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM), a Phase I Noyce Program, investigators at Columbus State University (CSU) combine internships and scholarships, an exciting summer STEM Honors Camp, a new Teaching Connections Seminar, and an impressive array of existing resources to recruit, prepare, and graduate an increasing number of STEM teachers committed to serving high need high schools.

Key project elements include:
1. Summer Internships for freshmen and sophomores. These paid experiences provide a two-pronged recruitment tool. First, they expose talented students to STEM at the university level. Since some students will start college in non-STEM fields, engagement in stimulating STEM experiences will entice some to change to a STEM major. Second, service learning encounters during the internship are designed to interest students in the teaching profession.

2. Summer STEM Honors Camp. This functions both as a recruiting tool to interest students in STEM fields and as a spark to ignite interest in teaching. Rising high school juniors and seniors, university freshmen and sophomores, and university personnel assemble for a two-week camp to engage in exciting hands-on activities that nurture and develop interest in STEM areas, and learn about connections between classroom lessons, real world applications, and potential STEM related careers. The camp’s culminating experience includes a student colloquium in which participants teach others about their own inquiries. This camp builds on a historically successful Future Teachers Academy hosted by CSU.

3. Scholarships for pre-service teachers. It is anticipated that the described recruiting mechanisms will heighten enthusiasm for the teaching profession. Students will then be enticed to commit to a teaching career via Noyce-funded scholarships. Eligible students include juniors and seniors in STEM-related secondary education fields and
post-baccalaureate students seeking teaching certification in a STEM area.
4. Teaching Connections Seminar. Working in concert with the Mathematics and Science Teaching Council, the Columbus Regional Mathematics Collaborative, and both discipline-based and teaching-based student organizations, investigators will develop a Teaching Connections Seminar. Through the seminar, pre-service teachers explore connections between coursework in their major and high school topics they expect to teach. The best Connections presentations will result in invitations to present at a future STEM Honors Camp.

45 Title: Dowling College Robert Noyce Scholarship Program
Phase II
NSF Noyce Award Number: 0934814
Principal Investigator: Lori Zaikowski
Email: perria@dowling.edu
Institution: Dowling College
Co-PI(s): Kevin McDonnell and Lou Siegal
Presenter(s): Arthur W. Perri, Jr., Dowling College, perria@dowling.edu

The Noyce Phase II Program at Dowling College provides funding for six juniors and seniors and 12 career-changers to obtain mathematics and/or science teacher certifications and additional professional development. Every scholar is paired with both a Principal Investigator as faculty mentor, who directs academic and personal interventions and advises students in selecting professional development, and a Phase I scholar who also provides mentoring and career-planning advice. Post-graduate activities include an annual four-session Noyce Seminar course, guest speakers, and workshops. Continuing professional development is at the heart of the program, and a fund provides money for all scholars to engage in a variety of valuable experiences.

The high standards for Noyce scholars in content and pedagogy, as well as continued professional development and support, enables them to have a major impact on the quality of K-12 science and mathematics instruction. The importance of integrating research and education is addressed by providing opportunities for scholars to gain research experience and serve as mentors to high school students conducting research. New initiatives in the Phase II project include the Noyce Summer Professional Development Workshops, the Noyce Summer Research Institute, and the Noyce Science and Math Academy for high school students. Each year the PIs and scholars organize a Noyce High School Science and Math Symposium. Students present their research at a poster contest and attend math and science workshops led by experts in their fields.

The 2012 Symposium was held on March 23 and was attended by approximately 300 high school students, teachers, and judges. Feedback provided by the teachers and students has been very positive.

46 Title: Drexel University Robert Noyce Program
NSF Noyce Award Number: 0934809
Principal Investigator: Sheila R. Vaidya
Email: vaidyasr@drexel.edu
Institution: Drexel University
Co-PI(s): Donald McEachron and Patricia Henry
Presenter(s): Sheila R. Vaidya and Donald McEachron

The poster will present the program developments of the Drexel University Noyce Scholarship program in Phase II. We will present program highlights, recruitment efforts, teacher retention of Phase I teachers, and our efforts at supporting teachers and motivating them in high needs classroom. We have provided teachers with professional development opportunities and continue to support them with mentoring and the opportunity to develop their content and pedagogical content knowledge as well as practices for students in high need schools.

47 Title: East Central University (ECU) Robert Noyce Teacher Scholarship Program (Phase-I)
NSF Noyce Award Number: 0934030
Principal Investigator: Robert Ferdinand
Email: r Ferdinand@ecok.edu
Institution: East Central University
Co-PI(s): Heather Hannah, John Bedford, Linda Braddy (former Co-PI), and Janet Wansick (former CO-PI)
Presenter(s): Robert Ferdinand, East Central University, r Ferdinand@ecok.edu

The Phase-I East Central University (ECU) Robert Noyce Teacher Scholarship Program provides $10,000 scholarships a year to students in the Mathematics Teacher Certification Degree Option. The scholarships can be renewed for up to a period of 3 years, resulting in a total of $30,000 scholarship money, for a total of 24 students. Each Noyce scholar commits to teach secondary level mathematics for two years, for each year of scholarship money received. This teaching has to be in a high-need school. Each Noyce scholar is required to work on one undergraduate research project with an ECU math faculty each year of their pre-service commitment and present their results at a conference. Noyce budget funds are used to cover travel of Noyce scholars and mentoring faculty to these conferences.
48  
**Title:** Eastern Washington University's Robert Noyce Scholarship Program  
NSF Noyce Award Number: 1035510  
Principal Investigator: Keith Adolphson  
Email: kpyatt@ewu.edu  
Institution: Eastern Washington University  
Eastern Washington University  
Co-PI(s): Kevin Pyatt, Heather McKean, Barbara Alvin, and Peggy O'Connell  
Presenter(s): Kevin Pyatt, Eastern Washington University

Eastern Washington University’s Robert Noyce Program is a multi-year project to increase the recruitment, placement and retention of highly qualified math and science teachers. This program is designed to also build the capacity of EWU to train and graduate highly effective math and science teachers. This will be done with increased collaboration among the Mathematics, Science, and Education Departments to more effectively prepare STEM teachers. Our first project year (2010-2011) was geared towards planning. Year two (2011-2012) was our first year with scholars. Nine were funded for the 2011-2012 year. These scholars are from historically underrepresented groups. All were successful in their placements and teacher-prep coursework. Their field experiences happen early in their program, where they are mentored by master STEM teachers and faculty. The master teachers will serve as their mentors for their student teaching experiences. The customized placement of our candidates is a major strength of this program. All but one of our first year scholars will be funded for year two. We expect to also fund approximately 6-8 new first year scholars for 2012-2013.

49  
**Title:** Elizabeth City State University Noyce Scholars Program-Year 2  
NSF Noyce Award Number: 1035454  
Principal Investigator: Farrah Chandler  
Email: fjchandler@mail.ecsu.edu  
Institution: Elizabeth City State University  
Co-PI(s): Adetayo Adedeji  
Presenter(s): Farrah Chandler, Elizabeth City State University, fjchandler@mail.ecsu.edu

The first cohort of Noyce Scholars began during the 2011-2012 academic year and consisted of a junior specializing in secondary biology education, a junior specializing in chemistry, and four scholars seeking licensure in secondary mathematics, one senior, one junior, one post baccalaureate, and one “career changer”. ECSUs first Noyce Scholar will graduate on May 5, 2012 and two additional scholars are scheduled to receive their license in December.

During the 2011-2012 academic year three of the six Noyce Scholars participated in the Preparation of Highly-qualified Advanced STEM Educators (PHASE) Program which included sessions on effective uses of technology in teaching, developing and teaching hands-on and inquiry based lessons, and research in STEM education. All three Scholars presented their research during the School of Mathematics, Science, and Technology’s Annual Research Week. Research Week also provided an opportunity for Scholars to interact with potential scholars during various panel sessions and an invitation only reception. In addition, an ECSU graduate and current mathematics educator presented a talk entitled “Becoming a STEM Educator in the 21st Century,” which was well received by students.

ECSU continues to employ a multi-pronged approach to recruiting Scholars during the second year of the program. Recruitment efforts have included participation in the annual Teacher Recruitment Fair, booths during the homecoming football game, presentations to mathematics and science classes, and announcements during majors’ meetings and faculty institutes. In addition, meetings with three local community colleges and an initial draft of a 2+2 partnership in secondary STEM education has been developed. Applications for the second cohort of Scholars are currently being reviewed by the Advisory Board.

This June, potential Scholars majoring in mathematics and science will participate in a three-week internship program for middle school students. The summer program is designed to provide meaningful experiences for STEM undergraduates in an attempt to spark their interest in STEM education thereby increasing the pool of Scholars. This year marks the second year of the Summer Internship Program which has proven to be a successful avenue for recruiting Scholars. To date, two Scholars have participated in the summer program, one as a freshman and one as a sophomore, and ECSU anticipates that this summer will be equally impactful for potential scholars.

50  
**Title:** Elon Noyce Scholars Program  
NSF Noyce Award Number: 1135399  
Principal Investigator: Jeffrey Carpenter  
Email: jcarpenter13@elon.edu  
Institution: Elon University  
Co-PI(s): Janice Richardson and Tony Crider  
Presenter(s): Jeffrey Carpenter, Elon University, jcarpenter13@elon.edu

The Elon University Phase I Noyce Program will recruit, prepare, and support during induction 18 secondary-level Mathematics, Biology, Chemistry, and Physics teachers. As a part of our recruitment strategy, we arrange paid, education-related internships for 50 first- or second-year students who express interest in STEM disciplines. Internships will provide experiences that strengthen participants’ STEM expertise and foster interest in education; the intention is that many interns will later apply for Noyce scholarships.
The internships include a variety of settings and experiences. Some interns will serve as teaching assistants for programs offered by the Elon Academy, a college-access program for local students with financial need and/or no family history of college. Other interns will serve as teaching assistants for summer introductory mathematics and science classes at Alamance Community College, and some will be placed in summer STEM programs run by the local, high-need Alamance Burlington School System. These three internships provide valuable experience working with students who attend schools in high-need districts. Because many of our students are from out-of-state, interns also have the option to arrange internships near their hometown. This summer, one intern will work with the Jump Start Math program run by Delaware County Community College, and another will support educational programming at the Brookside Nature Center in Wheaton, MD. To enhance the quality of the internship experience, a $180 stipend is provided to a STEM education mentor at each internship site.

Two-year scholarships encourage talented STEM majors to complete a Teacher Education program to earn licensure (grades 9–12) in addition to their Bachelor’s degree in Mathematics or one of the Sciences. Three cohorts (approximately 6 students per year) receive a $21,900 scholarship during both their junior and senior years. They will benefit from Elon’s close relationship with the Alamance-Burlington School System; field experiences in its high-need high schools will prepare them to fulfill their teaching obligations. Their program is supplemented with special experiences, including documented extra mentoring by university and secondary-school educators. Finally, our Scholars will be required to teach for four years in a high-need school district. During their induction into the teaching profession, they will receive face-to-face and virtual mentoring from secondary-school and Elon faculty, and financial support for professional development activities and purchase of classroom materials.

51 Title: Fayetteville State University’s Preparing Future Educators for Placement in K-12 Mathematics and Science Classrooms (PrEP) Program
NSF Noyce Award Number: 1136394
Principal Investigator: Shelton Ford
Email: sford2@uncfsu.edu
Institution: Fayetteville State University
Co-PI(s): Erin White, Kimberly Smith-Burton, and Perry Gillespie
Presenter(s): Shelton Ford, Fayetteville State University, sford2@uncfsu.edu

Fayetteville State University’s (FSU) ‘Preparing Future Educators for Placement in K-12 Mathematics and Science Classrooms’ (PrEP) Noyce Scholarship Program is organized into three components: The Internship Program, The Scholars Program, and the Fellows Program. The Internship Program encourages undergraduate freshman and sophomore STEM majors to consider teaching by participating in the university’s STEM learning community. Internships for the freshmen and sophomores are provided to assist with semester and summer teaching activities both at FSU and at partner community colleges.

The Scholars Program consists of Juniors and Seniors double majoring in a STEM field and education, who are scholarship recipients. The Scholars participate in workshops grounded in the TPACK (Technological, Pedagogical, and Content Knowledge) framework. To assist new teachers in the first two years of as active teachers in high-need school districts, the Fellows Program involves ongoing mentoring and continuing professional development that maintains the professional learning network developed during the scholarship training. From attracting young students to the teaching profession, through teacher training, to support of new mature professionals, this comprehensive program provides 66 new STEM teachers to a region in great need of STEM educators. FSU (PrEP) Noyce Scholarship Program involves collaboration among the Departments of Mathematics and Computer Science, Chemistry and Physics, Natural Sciences, the School of Education, and the Mathematics and Science Education Center to provide scholarships to future teachers. Candidates for these scholarships are undergraduates majoring in one of the sciences or mathematics at FSU and professionals with science degrees who are returning to school to become qualified secondary school teachers of their disciplines. As a Historically Black College or University, FSU serves large numbers of underrepresented minority students. The Noyce Scholars among them, 66 all told, will be leaders and role models for the students they teach.

52 Title: Learning To Teach for Equity in Science and Mathematics Classrooms: The Florida State University Noyce Scholarship Program
NSF Noyce Award Number: 0934702
Principal Investigator: Joseph Travis
Email: kr04@fsu.edu
Institution: Florida State University
Co-PI(s): D. Ellen Granger, Sherry Souterland, Kathleen Clark, and Victor D. Sampson
Presenter(s): Karen Rose, Florida State University, kr04@fsu.edu

The primary goals of Florida State University (FSU) Noyce program are to: 1. Increase the number of students interested in teaching secondary science or mathematics in high needs classrooms; and 2. Prepare Noyce Scholars to be effective teachers in high needs classrooms.

While the broader teacher education program, FSU-Teach does address learning to teach in high-needs settings, the Noyce Scholarship recipients have a particular focus in this regard—to best prepare them for successful work in similar schools after graduation. Throughout their teacher preparation these stu-
students get the kind of placements through their education coursework that allow the teacher candidates experience teaching science or mathematics to low income students, English language learners, and/or students of color; ensuring that the teacher candidates make sense of these experiences.

As of spring 2012, two of the Noyce graduates were in full-time teaching. Information on Noyce Scholars' preparation was gathered via the survey as well as an interview with program graduates, current students, program personnel, and mentor teachers. According to the supervising teachers of the Noyce Scholars, apprentices are highly skilled, given their stage of teacher preparation, and are getting a lot of support through FSU and their mentors. When asked, “Compared to other students (non Noyce), how well prepared are you to teach in a high needs classroom?” 23% of students said, “much more prepared,” 62% said, “more prepared,” and 15% (two individuals) said, “they had the same level of preparation.”

Their comments included:

- I have received information that the non-Noyce scholars haven’t received.
- Only because of my current teaching status with a high needs school do I feel that I will be more prepared.
- With all the discussions, I feel more open to talk about the hard times. I know how to voice my concerns to other teachers to let it be known I am trying and I care about the students, but have little knowledge on x,y,z. I also know who I can ask, now teaching, about more questions.
- I have never worked as hard as I worked for the 15 weeks I was in the classroom. I think I fully benefited from my apprentice teaching.

Results above provide preliminary evidence that students in the Noyce Scholars program are being adequately prepared to take on the challenges associated with high needs classrooms.

53
Title: Shifts in Pedagogy for Noyce Scholars as a Result of Assisting Pre-service Elementary & Middle School Teachers in Mathematics Performance Assessments

NSF Noyce Award Number: 0833265
Principal Investigator: Jim LoBue
Email: mcawthor@georgiasouthern.edu
Institution: Georgia Southern University
Co-PI(s): Michelle Cawthorn, Joy Darley, Marlynn Griffin, and Brian Koehler
Presenter(s): Michelle Cawthorn, Georgia Southern University, mcawthor@georgiasouthern.edu

One topic that proves to be problematic for many students is the conceptual understanding of integers and fractions. Since our Noyce scholars with mathematics degrees will be teaching algebra, it is important that they are fluent in the arithmetic to algebra connection. In addition, it is crucial that these mathematics majors become stakeholders in mathematics education at the elementary school level. At Georgia Southern University, elementary and middle school teachers participate in mathematics performance assessments in Joy Darley’s mathematics content courses. In these performance assessments, the pre-service teachers are required to connect concrete models with standard algorithms, and must explain these connections.

In Fall 2011, three Scholars (mathematics majors) completed a pre-test where they were given eight problems (operations with integers and fractions) with the following instructions: Briefly describe how you would teach each of the following concepts to students learning the concept for the first time. Include all visual representations, along with any methods you would use. After completing the pre-test, Darley met individually with each of the three Scholars and reviewed learning materials related to the given topics so that the students would be prepared to assist with the performance assessments by helping and evaluating the pre-service teachers. The next day, each Scholar helped facilitate one forty-five minute performance assessment, and then completed a post-test. Preliminary results from the comparison of pre- and post-test answers reveal major shifts in students’ perception of pedagogical methods and future in-practice applications.

54
Title: Robert Noyce Urban Mathematics Educator Program Phase II

NSF Noyce Award Number: 1136303
Principal Investigator: Christine D. Thomas
Email: cthomas11@gsu.edu
Institution: Georgia State University
Co-PI(s): Pier A. Junor Clarke, Draga Vidakovic, and Janice Fournillier
Presenter(s): Christine D. Thomas, Georgia State University, cthomas11@gsu.edu
Marcellin Mutuyimana, Sutton Middle School, Mmutuyimana@atlanta.k12.ga.us
Rabia Shahbaz, Meadow Creek High School, rabia677@gmail.com
Karen Tatum, Douglass High School

The Robert Noyce Urban Mathematics Educator Program (UMEP) Phase II is designed to monitor and evaluate the effectiveness of the UMEP that began as a Phase I Noyce program for career changers seeking teaching positions in secondary mathematics. The UMEP began with a plan to promote retention of the scholars during the induction years and subsequently developed and executed a retention plan to support scholars in urban high need schools beyond the induction years. The leadership team has worked closely with the scholars in monitoring their progress.
Title: Facing the Recruitment Challenges: Facebook for Recruitment
NSF Noyce Award Number: 0934795
Principal Investigator: Gwen Benson
Email: kadir@gsu.edu
Institution: Georgia State University
Co-PI(s): Kadir Demir, Lisa Martin-Hansen, Anton Puvirajah and Jennifer Leavy
Presenter(s): Kadir Demir, Georgia State University, kadir@gsu.edu
Lisa Martin-Hansen, Georgia State University, lmartinhan@gsu.edu
Tugce Gul, Georgia State University, tgul1@student.gsu.edu
Anton Puvirajah, Georgia State University, apuvirajah@gsu.edu

At Georgia State University, the Impact on Metro Atlanta Science Teaching Program (IMAST) began the process of recruiting secondary science teachers from two primary institutions - Georgia State University and Georgia Institute of Technology as well as graduates who are in current STEM professions. The potential candidates reside in a potential pool of STEM majors and careers including, but not limited to engineering, physics, biological science fields, chemistry and astronomy. When focusing on current undergraduates, we concentrated our efforts on college juniors and seniors as they have a greater potential for entering a teaching profession immediately from those fields.

In August 2010, the last cohort of teachers entered into teaching in high needs schools. The overall retention rate for the UMEP Scholars is 94% for those entering into teaching in high needs schools upon completion of the degree program. The UMEP operates as an active online Professional Learning Community composed of the Scholars, the Leadership team, and UMEP Noyce Scholars who have evolved as teacher leaders. In Phase II, we have extended and expanded our ongoing research on the online learning community as well as continued the research and evaluation on the effectiveness of the degree program, selection process, preparation, placement and retention of the Scholars. The UMEP has become prominent for the retention of exemplary teachers in high need schools.

In the first two years of recruitment, we used several strategies to locate and communicate with potential candidates (promoting through email and college websites, recruitment fairs, and visits to both campus fairs and other career events). Recruitment has risen from three scholars in year two to nine scholars in year three. However, as we have the possibility of funding 11 scholarships each year, we wanted to expand the recruitment efforts to meet that goal. Now, in year three, our team has added additional recruitment strategies including paper flyers and emails sent directly to science professors, a local online newspaper ad, visits to smaller nearby colleges, GSU's college campus radio and Facebook ads. In this proposal, we will outline our successes and challenges and feature our exploration of Facebook ads as a recruitment tool.
the interactive exhibits on health, energy, cutting edge technology and natural science. Another scholar worked at the NASA Langley LARSS Summer of Innovation (SoI) program. This program was proposed by President Obama in an effort to strengthen the future STEM workforce. The Scholar worked with NASA Office of Education specialists and educators at summer camps, youth organizations, charter schools and churches to engage the underrepresented and underserved Hampton Roads middle school students in STEM activities. This poster will highlight some of the summer internship program activities and some of the educational research investigations which the scholars are conducting. Additional information about recruitment strategies and student selection will also be shared.

57  
Title: Learning Mathematical Reasoning by Using Robot Vehicles  
NSF Noyce Award Number: 0833134  
Principal Investigator: Jeanne Weiler  
Email: drobb@hunter.cuny.edu  
Institution: Hunter College  
Co-PI(s): Pamela Mills, William Sweeney  
Presenter: Dennis Robbins, Hunter College, drobb@hunter.cuny.edu

We describe an ongoing project to use educational robotics to improve middle and high school students’ understanding of mathematical reasoning and to promote engagement in STEM fields. Hunter Noyce Scholars utilize LEGO Mindstorms robot vehicles with interfaced probes and an iconic programming to foster more interest in various STEM topics such as computer programming, scientific methods, open-ended problem solving, engineering principles, mathematical reasoning and other 21st Century innovative processes. Using LEGO building parts and NXT computer hardware, robot vehicles are designed to use a range of sensors: touch, sound, light, accelerometer, gyroscope and infrared. We have developed a series of lessons that uses robots to advance students’ understanding of fundamental mathematical concepts. Our school curriculum uses various “challenges” that allow students to engage in problem solving using combinations of programming and engineering redesign. Each challenge progresses in its complexity using concepts and skills developed in previous challenges.

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Title: The Hunter Noyce Scholars Program  
NSF Noyce Award Number: 0833134  
Principal Investigator: Jeanne Weiler  
Email: jweiler@hunter.cuny.edu  
Institution: Hunter College  
Co-PI(s): Pamela Mills and William Sweeney  
Presenter(s): Jeanne Weiler

The Hunter College Noyce Scholars Program provides scholarships, professional development, an educational robotics seminar and summer internships to 26 scholars. Two scholars are biology majors, two are chemistry and 23 are mathematics majors, all enrolled in BA/MA programs that lead to professional teacher certification in grades 7-12. Recruitment through the summer and fall 2012 with an emphasis on science majors is expected to increase the number of Noyce Scholars to 40.

In addition to receiving up to $5,000 a semester in scholarship support each semester for two years, Scholars have the opportunity to engage in STEM-education related research and experiences guided by STEM-education faculty. These include a robotics class where Scholars design math/physics lessons using the building and operating of robots, a mandatory bimonthly professional development series that focuses on pedagogical and technology content knowledge and career development. Scholars engage in subject area tutoring provided by program science, math, and writing tutors in order to maintain a 3.0 gpa. Scholars are also supported and encouraged to attend national and local conferences of their professional organizations.

Planning and recruitment are underway to place Noyce Scholars and Noyce Associates (freshmen and sophomores with an interest in teaching) in summer internships in New York City schools this summer. We have a number of commitments from middle and high school summer school programs to place 25 Scholars and up to 50 Associates.

To date, recruitment for the Noyce Scholars program has consisted of large banners set at strategic locations in the college, an advertisement that continually runs on the college’s flat screen monitors, tabling and handing out information, leafletting in front of key math and science courses, mass emails sent to undecided, mathematics and science majors, and approaching faculty to identify students. Scholars have visited targeted Biology and Chemistry classes to advertise the program. The Noyce program has a public Facebook page and website and a private group page for Students and staff. Our Scholars have been included in SciMon (funded by the NSF I-cubed award) that joins all mathematics and science professional development and research opportunities for Hunter College students under one umbrella to promote collaboration and broaden student participation in science programs.

59  
Title: Indiana Noyce Science Scholars: Teachers for a New Decade  
NSF Noyce Award Number: 1035234  
Principal Investigator: Robert D. Sherwood  
Email: rdsherwo@indiana.edu  
Institution: Indiana University Bloomington  
Co-PI(s): Caty Pilachowski
Presenter(s): Robert D. Sherwood, Indiana University Bloomington, rdsherwo@indiana.edu

Faculty from the Indiana University Bloomington School of Education and the College of Arts and Sciences have partnered with local school districts in the Indiana Noyce Science Scholars: Teachers for a New Decade project. Partner school corporations include Bartholomew Consolidated Schools, Monroe County Community Schools, North Daviess Community Schools, North Lawrence Community Schools and Paoli Community Schools; all in southern Indiana and considered “high-needs”.

The project offers three different avenues for students to pursue teacher licensure. The first is a joint BS/MS program where a student can complete a BS in a science area in the College of Arts and Sciences and an MS in Secondary Education in the School of Education in five years. A second is the Secondary Transition to Teaching program where post-baccalaureate students attend an intensive 11 month program that prepares them for teacher licensure and provides them with 18 graduate credit hours. The third is Community of Teachers, which has a strong clinical emphasis where a student will work intensively with a classroom teacher over a minimum of three semesters along with taking graduate coursework.

The project activities have focused on recruitment of students to apply for the Noyce Scholarships as well as collecting student and project data. They include:

- Updating the website with information and online application (http://education.indiana.edu/noyce).
- Preparing flyers for distribution to science departments on campus and mailed to all colleges/universities in the state.
- Processing applications for the 2012-2013 cohort of Scholars.
- Educating the first cohort of 9 Noyce Scholars who will complete their programs in May 2012.
- Collecting data on the characteristics of the first set of Scholars through both project personnel and the external evaluator.

Objectives for the next year include:

- Increase communication with minority serving undergraduate institutions to increase minority scholars.
- Continue communication with both internal and external audiences.
- Recruit with a scholarship goal of 14 students. Continue to work with the first cohort of Scholars as they enter their first year of teaching (2012-13).

Title: The Teach Science Robert Noyce Scholarship and Internship Program at IUPUI: Getting Young Scientists into the Science Teacher Pipeline
NSF Noyce Award Number: 0733788
Principal Investigator: Kathleen Marrs
Email: kmarrs@iupui.edu
Institution: IUPUI
Co-PI(s): Kim Nguyen, Dwight Schuster, and Mariah Judd (Postdoctoral Fellow)
Presenter(s): Kathleen A. Marrs, IUPUI, kmarrs@iupui.edu

The Robert Noyce Teach Science program at IUPUI seeks to encourage talented science majors to become K-12 teachers in high-need Indiana schools, in particular to prepare exemplary secondary teachers in Life Science/Biology, Chemistry, Earth Science, Physics, and Physical Science to serve diverse learners. Our poster will highlight two main activities: (1) The Noyce Teach Science Summer Internship program where freshmen and sophomore IUPUI science students spend eight weeks sharing their passion for science at places like The Children’s Museum of Indianapolis and the Diabetes Youth Foundation Camp, while exploring their interest and passion for a science education career. Information will be presented on development of curriculum, assessment of programmatic goals, and internship activities developed by the Noyce Interns. (2) A program option that encourages undergraduates to complete a content degree in 4 years and then complete an 18 credit hour post-baccalaureate certification through IUPUI’s Transition to Teaching program. Noyce funding can provide up to three years of support (two years of undergraduate and one year of post-baccalaureate certification), streamlining the completion of a BA or BS in Science and facilitating 18 hours of graduate coursework required for teacher certification.

Title: Urban Educators: Robert Noyce Scholarship for Mathematics and Science Teachers -Phase II
NSF Noyce Award Number: 0531598
Principal Investigator: Kim Nguyen
Email: knguyen@iupui.edu
Institution: IUPUI
Co-PI(s): Kathleen A. Marrs, Ph.D.in Biology, and Jeffrey X. Watt, Ph.D.in Mathematics
Presenter(s): Kim Nguyen, EdD, Indiana University-Purdue University Indianapolis, knguyen@iupui.edu

Noyce II Scholars at IUPUI are enrolled in the Transition to Teaching (T2T) program for STEM professionals. The scholars complete 18 graduate credits or one half of the MS requirements and two-semester field experiences for teacher licensures in the sciences or mathematics at secondary level (grades 6-12) in one calendar year. The T2T program builds on the established partnership between two schools: Science & Education in part-
nership with high-need school districts in Marion County, including Indianapolis Public Schools (IPS). The first Noyce Program has successfully prepared 34 highly-qualified science and math teachers for the urban high-need classrooms in Indiana since 2007.

Noyce Phase II has three objectives: (1) continue to increase the number of secondary science and mathematics teachers - 10 teachers each year, with an emphasis on the recruitment of individuals from ethnic minorities, (2) enhance retention of novice teachers by providing ongoing mentoring for the new teachers, and (3) implement a longitudinal evaluation plan to assess the effectiveness of the IUPUI Noyce program.

Noyce Phase II focuses on recruitment of diverse scholars who possess developed skills in inquiry-base teaching and commitment to serving in urban high-need schools. It aims to enhance teacher retention through instructional coaching provided to in-service Noyce teachers. This new feature of the program offers an additional mechanism for assessing the effectiveness of Noyce scholars’ teaching in high-need school districts. The broader impact of this project would be recognized by the higher percentage of teachers retained in STEM teaching at high-need urban classrooms beyond the required service periods and the enhanced diversity of math and science teachers who commit to increasing the quantity, quality, and diversity of students in urban schools who will enter STEM fields in the next decades.

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Title: K-State TEACH: The Robert Noyce Scholarship Program
NSF Noyce Award Number: 0934905
Principal Investigator: Christopher T. Culbertson
Email: culbert@ksu.edu
Institution: Kansas State University
Kansas State University, Co-PI(s): Sanjay Rebello, Carolyn Ferguson, and Matthew Bruseke
Presenter(s): Christopher T. Culbertson, Kansas State University, culbert@ksu.edu

The Phase I K-State Robert Noyce Scholarship Program is designed to increase the supply of highly qualified middle and high school teachers (Grades 6-12) in biology, chemistry, earth and space science, and physics.

The program seeks to:
1. Provide opportunities for 25 freshmen and sophomores to work in informal STEM education settings both on and off campus;
2. Increase by 17 the number of undergraduates in the targeted STEM disciplines receiving licensure; and
3. Enable 12 graduates in the targeted STEM disciplines to gain licensure through a newly established Graduate Certificate in Teaching and Learning.

High needs schools have been identified and recruited through three existing partnerships: the Professional Development School Partnership, the Center for Intercultural and Multilingual Advocacy, and the Center for Rural Education and Small Schools. These targets schools serve a high percentage of individuals from families with incomes below the poverty line, a high percentage of English language learners (ELLs), and/or rural populations. The program is managed by a leadership team with members from Education, Chemistry, Biology, Physics and Geology.

The evaluation plan includes the development of a database for maintaining demographic data; the Scholars’ academic progress and perceptions of the usefulness of the program elements; the effectiveness of program elements, especially new teacher support; and subsequent teaching challenges in high need schools.

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Title: Kennesaw State University’s IMPACT (The Initiative to Inspire and Mentor Physics and Chemistry Teachers) Noyce II Project
NSF Noyce Award Number: 1035451
Principal Investigator: Greg Rushton
Email: noverley@kennesaw.edu
Institution: Kennesaw State University
Co-PI(s): Taha Mzoughi, David Rosengrant, and Brett Criswell
Presenter(s): Greg Rushton, KSU, grushton@kennesaw.edu
Nancy Overley, KSU, noverley@kennesaw.edu

Kennesaw State University has been awarded two Noyce projects to recruit, prepare, and retain STEM majors and professionals into secondary K-12 teaching careers in chemistry and physics. Our poster focuses on the strategy behind our recruitment efforts for our Noyce II for career changers, how we developed our marketing plan, how and where we implemented the plan, the outcomes of year one, and why and how our recruitment plans will change and be implemented in year two as a result of our analysis. Profiles of our fellows will be included.

64
Title: Increase Mathematics Teachers for ALL Students
NSF Noyce Award Number: 0934791
Principal Investigator: Desha L. Williams
Email: dwill178@kennesaw.edu
Institution: Kennesaw State University
Co-PI(s): Belinda Edwards, Karen Kuhel, Adrian Epps, and Dana Hartley
Presenter(s): Desha Williams, Kennesaw State University, dwill178@kennesaw.edu, Ian Frame, Kennesaw State University, ianframe3@gmail.com
Santhi Prabahar, Kennesaw State University, psanthi@hotmail.com Bonnie Roydes, Kennesaw State University, broydes@gmail.com

The collaborative project between Kennesaw State University and the Georgia Institute of Technology encourages STEM students to become 6-12 mathematics teachers of culturally and linguistically diverse learners. The IMTAS program goes beyond the traditional MAT program by providing supplemental workshops focused on issues of social justice and opportunities for scholars to earn TESOL endorsements:

- Working with English Language Learners and Their Families
- Creating Safe Spaces for LGBTQ Youth
- Using Manipulatives in Secondary Classrooms
- Voices from Urban Principals
- Voices from Teachers of Ethnically Diverse Students Populations
- Teaching Mathematics for Social Justice
- Engaging Students in Culturally Responsive Mathematics
- Teaching Students who are Homeless
- Reinforcing Motivation Among Refugees

The research efforts of IMTAS have resulted in the following presentations:

- Kuhel, K., Williams, D., Edwards, B., & Grajeda, R. (2010, October). Teaching culturally and linguistically diverse students in the mathematics classroom: An collaborative view to program development. Presentation at the annual Georgia TESOL Conference, Atlanta, GA.

65
Title: Integrating Service Learning into Preservice Science and Mathematics Teacher Preparation: Forming Partnerships and Getting Started

NSF Noyce Award Number: 1136377
Principal Investigator: Lisa A. Borgerding
Email: Idonnell@kent.edu
Institution: Kent State University
Co-PI(s): Joanne Caniglia
Presenter(s): Lisa A. Borgerding, Kent State University, Idonnell@kent.edu
Joanne Caniglia, Kent State University, jcanig11@kent.edu

In this poster, we present the initial progress in developing Kent State University’s (KSU) Service-Learning Noyce Scholars Program. We discuss the rationale behind the integration of service learning into preservice teacher education including the immediate community impacts, the promotion of a service orientation, and the educative potential of informal science and mathematics education experiences for preservice teachers. We further outline the learning outcomes sought through the Noyce Scholars and Internship programs. We then describe the formation of various community partnerships that provide science and mathematics education service learning opportunities for KSU Noyce Scholar Master of Arts in Teaching students.

We next outline how these service learning experiences will be integrated into the first year of our eleven-month intensive program for mathematics and science teacher preparation. The project team members have encountered several challenges related to the development of this program including the formation of partnerships at informal science and mathematics education sites, communication of reasonable expectations for service learning experiences, and the recruitment of interested interns and scholars for our programs. We conclude by setting forth the future directions for our own program and make recommendations for other educators interested in integrating service learning into their preservice mathematics and science teacher education programs.

66
Title: Lehman College’s Noyce Peer Mentoring Project: Enhancing Noyce Scholars and Teachers’ Understanding of Teaching and Learning Mathematics and Science in High Need Urban Schools

NSF Noyce Award Number: 0833317
Principal Investigator: Gaoyin Qian
Email: Gaoyin.Qian@lehman.cuny.edu
Institution: Lehman College
Co-PI(s): Serigne Gningue, Liesl Jones, Wesley Pitts
Presenter(s): Gaoyin Qian, gaoyin.qian@lehman.cuny.edu
julisasoriano, j.soriano20@hotmail.com
Kasmira Torres, kasmira.torres@hotmail.com
The poster demonstrates Lehman College Noyce Scholars' professional growth in teaching and learning mathematics and science by participating in a Peer Mentoring Project that involves the second year Noyce Teachers in mentoring and supporting first year Noyce Teachers and non-teaching Noyce Scholars through various collaborative activities such as class observations, supervised teaching, lesson planning, Common Core Standard alignment, and so on. The poster will include artifacts and products of students' work, Noyce Scholars' and Teachers' own reflection on their learning from the mentors, and Noyce Teachers' enhanced understanding of their role as teacher leaders.

67
Title: STEM-Plus: Louisiana Tech University’s Noyce Scholarship Program
NSF Noyce Award Number: 0733825
Principal Investigator: Galen Turner
Email: dbasing@latech.edu
Institution: Louisiana Tech University
Co-PI(s): Dawn Basinger, Kelly Crittenden, James Nelson
Presenter(s): Dawn Basinger, Louisiana Tech University, dbasing@latech.edu
Kelly Crittenden, Louisiana Tech University, kellyc@latech.edu
Constance DeLaneay, Biology STEM Scholar, Louisiana Tech University, cad029@latech.edu;
Josh Coriell, Mathematics STEM Scholar

In this poster, Scholar/Practitioners and Program Directors will provide an overview of Louisiana Tech University’s Noyce Scholarship Program. Few partnerships exist to create the environment where teachers can learn to teach, teach well, and persevere (Zimpher & Howe, 2005); however, this program seeks to do just that. The program began in September 2008 and included two major pathways: undergraduate Science, Technology, Engineering, and Mathematics (STEM) majors or Master of Arts in Teaching (MAT) candidates who teach a STEM discipline in 6-12 schools. Both programs result in scholars earning an MAT. The objective of the program, which continues through August 2012, is to produce highly qualified teachers through a dual matriculation program resulting in teacher certification and a master’s degree with priority placements in partner schools in Louisiana. Scholars, who have recently completed their programs, will discuss their accomplishments.

68
Title: STEM Teacher Preparation and Recruitment: Summer Project-Based Learning Internships
NSF Noyce Award Number: 0934442
Principal Investigator: Barbara Silver-Thorn
Email: ellen.eckman@marquette.edu
Institution: Marquette University
Co-PI(s): Ellen W. Eckman

The Noyce Scholar Program at Marquette University is based on an adaptation of the cooperative education model that has successfully prepared Marquette University engineers for 90 years into a similar program of preparation for engineering and science students desiring to become STEM teachers. This uniquely adapted co-operative education model is based upon intensive field experiences in education (i.e., teaching co-ops) integrated with classroom instruction to meet the Wisconsin state standards for STEM teacher licensure. These teaching co-ops occur in middle and high school settings and involve extensive educational field experiences that allow students to meet teacher education standards, a unique standards-based approach to teacher education.

In addition to these teaching co-ops, we recently initiated summer project-based learning internships. These enrichment experiences provide further hands-on STEM opportunities for our scholars as well as providing additional collaborative opportunities with various local STEM sites. The eligibility for these summer internships was expanded beyond our Scholars to include STEM majors who had just completed their freshman year of study, providing a means of recruiting future Scholars. The STEM sites for the project-based learning internships included: Marquette University physics laboratories, the Upward Bound Math & Science pre-college outreach programs for Milwaukee area HS students, the Urban Ecology Center, Discovery World Museum, and Catholic Memorial High School’s pre-engineering outreach program for middle school students. Seven applicants were placed, and all applicants, their mentors, and several Noyce Scholar Board members attended a poster symposium at the end of the summer. The student posters are currently displayed at both the sites and in the College of Education, further promoting STEM teaching, these collaborations, and the Scholar program.

The program will be offered again this summer. Eleven students have applied. Host sites have been expanded to include math programs at Nicolet High School and Mother of Good Counsel Elementary School, as well as Marquette’s Engineering Outreach programs and biomedical sciences.

69
Title: Michigan Tech Noyce Scholars Program
NSF Noyce Award Number: 0934763
Principal Investigator: Bradley H. Baltensperger
Email: lori@mtu.edu
Institution: Michigan Technological University
Co-PI(s): Chris Anderson, Sarah Green, John Jaszcak, and Shari Stockero
Presenter(s): Brad Baltensperger, Michigan Tech University, brad@mtu.edu
Nicholle Stark, Michigan Tech University, nipierce@mtu.edu
The Michigan Tech Noyce Scholars program, now in its fourth year, has supported approximately 20 STEM majors and STEM graduates who are working toward teacher certification. Because the university is located in a rural region quite distant from major metropolitan areas and associated high need districts, the program established partnerships to better prepare Noyce Scholars for careers in urban school systems.

Michigan Tech is partnering with the public schools of Saginaw and Grand Rapids, and faculty from Saginaw Valley State University and Grand Valley State University. School districts have agreed to host scholars for the intensive field experiences and for student teaching; the partner universities provide much of the pre-service and in-service mentoring of scholars; Michigan Tech faculty provide pre-service instruction and overall program guidance.

The most successful aspect of the program has been a one-week field experience conducted in the Saginaw Public Schools. The PIs were concerned that the challenges of teaching in an urban school might either depress the scholars or discourage them from teaching. The scholars prepared extensively for their visit, and faculty arranged assignments for them to help structure their classroom observations and minimize any tendency to misinterpret what they observed. Faculty from Saginaw Valley State University arranged appropriate placements for the scholars, handled supervision, and led discussions during the weeklong clinical experience.

Upon their return, the scholars (at a high school one year and at a middle school in the second year) met with Noyce PIs and staff in teacher education to describe and analyze what they had learned. Uniformly, participating scholars were inspired by the experience, even as their eyes were opened to the difficulties that teachers face in dealing with such issues as high absenteeism, classroom crowding, and student motivation. Rather than feeling overwhelmed, they expressed a sense of inspiration mixed with caution.

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Title: Millersville University’s Noyce Scholars Program: A Collaboration for Mathematics and Education Faculty
NSF Noyce Award Number: 1136359
Principal Investigator: Janet White
Email: Janet.White@millersville.edu
Institution: Millersville University
Co-PI(s): Delray J. Schultz, John Ward, Jane Bray, and Robert T. Smith
Presenter(s): Janet A. White, Millersville University of PA, janet.white@millersville.edu

The Poster describes the initial progress of Millersville University’s Noyce Scholars Program. We outline the major features of our program, detailing the timeline, framework, and general activities that will highlight the scholars’ career paths. The poster presentation will provide initial data, first cohort member profiles, specific activities, and long range goals. In the first year, the co-PIs finalized the application process and advertised the program in courses and at a kick-off seminar meeting featuring a former Noyce Scholar from a nearby university as the guest.
Title: Noyce STEM Teachers Scholars Program at Mississippi State
NSF Noyce Award Number: 0934886
Principal Investigator: Linda T. Coats
Email: Lcoats@colled.msstate.edu
Institution: Mississippi State University
Co-PI(s): Tommy Stevenson, Burnette Hamil, Dana Franz, Debbie Beard, Svein Sebo, Bruce Ebanks, and Walter Diehl
Presenter(s): Linda T. Coats, Mississippi State University, Lcoats@colled.msstate.edu

The Noyce STEM Teachers Scholars Program at Mississippi State University (MSU) is a Phase 1 project that seeks to develop and prepare STEM teachers who have both a strong content knowledge and ample pedagogical skills to become highly effective and qualified middle and high school mathematics and science teachers. The program emphasizes the importance of building partnerships with teacher education, STEM disciplines, and school districts to provide Noyce Scholars with a comprehensive teacher preparation program. The poster presentation will highlight programmatic accomplishments and challenges, the success stories of Noyce Scholars and Noyce Teachers, insight from partnering school districts, and lessons learned from implementing the project’s goals.

Title: Nazareth College Robert Noyce Scholars Program
NSF Noyce Award Number: 0833254
Principal Investigator: Lynn M. O’Brien
Email: lobrien9@naz.edu
Institution: Nazareth College
Co-PI(s): Kathleen M. DaBoll-Lavoie
Presenter(s): Lynn M. O’Brien, Nazareth College, lobrien9@naz.edu

The Nazareth College Robert Noyce Scholars Program seeks to increase the number of undergraduate and graduate students enrolled in programs leading to certification in adolescence education Grades 7-12 in the areas of mathematics, biology, and chemistry and in childhood/middle childhood education Grades 1-9 (with majors in mathematics or the sciences) who are well prepared and committed to working in high need schools. Currently, fifteen scholars have been selected and have completed or will complete their certification programs. The program has sponsored a variety of professional development events and has given scholars opportunities to interact with in-service teachers and K-12 students in a variety of activities outside the traditional classroom setting.

In addition, the Noyce program has allowed mathematics, science, and education faculty members to collaboratively develop and implement research-based mathematics and science education curriculum and pedagogy. We will highlight some of these...
programs and discuss their effectiveness in preparing our pre-service teachers for placements in high need schools. The loss of school funding in New York State has presented a challenge to our recent graduates as many school districts in our region have experienced reductions in their work force that include teacher lay-offs and/or a freeze on new hiring.

75
Title: TECHS-NJ: A Focus on Technology to Enhance Student Learning and Motivation
NSF Noyce Award Number: 0630412
Principal Investigator: Bruce Bukiet
Email: bukiet@njit.edu
Institution: New Jersey Institute of Technology
Co-PI(s): Arthur B. Powell, Gayle Griffin, Ismael Calderon
Presenter(s): Bruce Bukiet, New Jersey Institute of Technology, bukiet@njit.edu
Joya Clark, Rutgers University-Newark, joya9900@msn.com

The Teacher Education Collaboration for High-Need Schools New Jersey (TECHS-NJ) Robert Noyce Scholarship Program is a collaborative project of New Jersey Institute of Technology, Rutgers University-Newark, the Newark Public Schools and the Newark Museum. Through the program, our goal has been to train 25 mathematics, science and engineering majors for careers as math and science teachers for the city of Newark and other high-need districts. Our recruitment has been slow, but steady, and since the 2011 annual meeting, we have enrolled 6 new scholars into our program for a total of 23. We have gone from two TECHS-NJ scholars with teaching jobs last year to 8 this year. Several others have completed their formal education, but are still seeking full time employment in teaching.

Since 2009, our key focus has been to work with NJIT’s C2PRISM GK-12 grant to provide Noyce scholars with the opportunity to learn to use digital tools, including probes, sensors and interfaces to present lessons and demonstrations to excite students about math and science. We have also purchased mobile interactive whiteboards and clickers. We have received funding from foundations to purchase this equipment and related materials as well as to run workshops and make visits to local schools. Several TECHS-NJ scholars have worked with our GK-12 Fellows during the annual GK-12 training workshops at NJIT, at Professional Development events, and at other events where they can interact with teachers and/or students. Another focus of this year’s professional development activities for our Noyce scholars has been discussions about working with students in the most difficult of schools and engaging them through use of technology. Further detail concerning these efforts, is presented in this poster.

76
Title: Recruit and Engage Mathematics and Science Teachers (RE-MAST) Year 3
NSF Noyce Award Number: 0934802
Principal Investigator: Cindy Johnson
Email: sheri.kennedy@newberry.edu
Institution: Newberry College
Co-PI(s): Christina McCartha, Renee Stubbs, Charles Horne, Randall Key
Presenter(s): Sherri Kennedy, Newberry College, sheri.kennedy@newberry.edu

Newberry College is dedicated to preparing high school math and science teachers through its Recruit and Engage Math And Science Teachers (RE-MAST) program, a collaboration between the biology and chemistry, math and education departments, and 3 high need SC school districts.In Year Three, a Master Teacher, strong in math content, worked specifically with the RE-MAST Program, using her own classroom experiences to provide support to RE-MAST mentors, teacher candidates and prospective students. The Master Teacher is in charge of science and math education recruitment with assistance from science, math and education faculty, organizing the scholar and summer intern recruitment activities and summer internship experiences, and serving as liaison to partner high need school districts for RE-MAST activities. Lastly, the Master Teacher will provide induction support to RE-MAST graduates in the field.

The RE-MAST program is working to recruit, prepare and mentor 25 math, biology and chemistry majors pursuing teaching in STEM content areas. In Year Two, nine interns participated in the summer internship and one of those is now pursuing secondary certification in a STEM content area. In Year Three, four interns will have completed the summer internship. In Year Three, five Noyce/RE-MAST scholars were selected and have completed one year of study in secondary education. Six Noyce Scholars have graduated. In Year Four, five scholars are returning to the program and five new scholars are joining.

RE-MAST selected 12 STEM teachers from the three high need school districts to participate in the Master Mentors program thereby enhancing the infrastructure for education. They received Foundations of Mentoring training in Year Two that counted towards professional development hours. Mentors also met on campus four times in year two to talk about the program and engage in professional development. Mentors work with RE-MAST interns, scholarship recipients and graduates for their two-year service obligation. The Master Mentor program promotes teaching, training, and learning by pairing RE-MAST students with highly trained mentors in their content area to help them develop their skills as teachers. In June 2011, mentors completed Learning-Focused Schools training, as part of RE-MAST, to enhance their ability to work with teacher candidates. In June 2012, mentors engaged in professional development activities to develop and strengthen skills as mentor/coaches.
During Year Three, interns, scholars, mentors and faculty attended several conferences. A scholar majoring in math attended the South Carolina Council for Teachers of Mathematics Conference (SCCTM) along with the Master Teacher. The scholar was awarded a grant for $1500 from SCCTM. The Master Teacher also attended the South Carolina Science Council Conference (SC2). All participants were invited to attend the Southeastern Regional Noyce Conference held in February 2012 and co-hosted by Clemson University and Newberry College. Poster session will provide an overview of progress made in Year Three.

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Title: Kenan Master Teaching Fellows: Linking Research Experiences and Curriculum Development with Leadership
NSF Noyce Award Number: 0934658
Principal Investigator: Ruben Carbonell
Email: valerie_schild@ncsu.edu
Institution: North Carolina State University
Co-PI(s): Valerie B. Brown-Schild
Presenter(s): Valerie B. Brown-Schild, North Carolina State University, Valerie_Brown-Schild@ncsu.edu

This five-year Noyce Program grant allows the Kenan Fellows Program to link 18 experienced teachers, Kenan Master Teaching Fellows (KMTF) with university, industry and community college researchers. Fellows work in cutting-edge research areas and become highly effective teacher-leaders, change agents, and mentors to pre-service teachers. KMTF prepare students to be “future ready” for the workforce and higher education with STEM-related experiences and opportunities by creating a real-world perspective through teacher experiences. As a result of this program, teachers have become more informed about important new scientific developments, built their leadership skills, and developed curricula that support economic development sectors unique to the region such as aerospace, sustainable energy/green technologies and advanced medical technologies.

The KMTF completed industry and academic research fellowships and subsequently continue to engage in a range of leadership activities in their home districts to benefit other teachers, administrators and pre-service teachers during their three years as Alumni Master Teachers. As Master Teachers, KMTF collaborate with local colleges of education to assist in the preparation of new teachers. Fellows model inquiry-based instructional activities at STEM summer camps, act as teacher mentors to pre-service teachers, and provide opportunities for co-teaching and co-presenting at local and regional conferences. Partnered with industry and academic leaders, KMTF work to improve student achievement and cultivate the next generation of teacher leaders in North Carolina.

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Title: NOYCE METS Program at NCSU
NSF Noyce Award Number: 0733794
Principal Investigator: Hollylynne N Lee
Email: karen_hollebrands@ncsu.edu
Institution: North Carolina State University
Co-PI(s): Karen Hollebrands, Roger Woodard, and Irina Kogan
Presenter(s): Karen Hollebrands, North Carolina State University, karen_hollebrands@ncsu.edu
Emily Thrasher, North Carolina State University, emily_thrasher@ncsu.edu

The Noyce Mathematics Education Teaching Scholars [Noyce METS] aims to increase the number of highly qualified mathematics teachers prepared at NC State University with a major in a mathematical science and a major in mathematics education and retain them in the field. We seek to prepare secondary mathematics teachers who are strong in both content and pedagogy and are committed to meeting the needs of students in high-needs schools. To cultivate a scholarly program, Noyce METS strives to create a sense of community among faculty and scholars. The program provides professional growth opportunities through guest speakers, professional development, field experience, participation in professional conferences, and round table discussions. Our preservice teachers volunteer at a local secondary high-needs school serving as math tutors and gaining additional field experiences. To support our in-service teachers, Noyce METS staff conduct classroom observations as well as a monthly Noyce webinars on topics ranging from classroom management to formative assessment.

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Title: Pipeline for Excellent Rural Teaching (PERT)
NSF Noyce Award Number: 1136406
Principal Investigator: Erika Offerdahl
Email: Erika.Offerdahl@ndsu.edu
Institution: North Dakota State University
Co-PI(s): Stacy Duffield, Lisa Montplaisir, Larry Napoleon
Presenter(s): Erika Offerdahl, North Dakota State University, erika.offerdahl@ndsu.edu
Co-authors: Linda Different Cloud, Stacy Duffield, William Martin, Lisa Montplaisir, Larry Napoleon Jr, Florin Salajan

The goal of the Pipeline for Excellent Rural Teachers (PERT) project at North Dakota State University (NDSU) is to extend and secure a pipeline to increase the quality and quantity of highly-trained secondary mathematics and science teachers in rural North Dakota. The rural nature of the state, coupled with vast distances between urban centers, presents a major obstacle to recruiting STEM professionals into degree programs leading to certification. College of Science and Mathematics and College of Human Development and Education faculties have created a one-year master's of education program (residential and online).
resulting in teacher certification. The project is recruiting 15
talented STEM professionals as PERT Teaching Fellows. A part-
nership with Sitting Bull College, one of six tribally-controlled
colleges in the region, provides both science coursework and
extensive mentorship to PERT Teaching Fellows in tribal commu-
nities.

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Title: PRIME: Preparing Regional Increases in Mathematics
Educators
NSF Noyce Award Number: 934709
Principal Investigator: Teri Murphy
Email: buckleyb1@nkudu
Institution: Northern Kentucky University
Co-PI(s): Gina Foletta, Beth Noblitt, and Brooke Buckley
Presenter(s): Brooke Buckley, Northern Kent-
cucky,buckleyb1@nkudu

Northern Kentucky University (NKU) and the Kentucky Center for
Mathematics (KCM) selects talented undergraduate students
interested in mathematics education and prepares them to be
fully qualified, well-prepared teachers who will teach secondary
mathematics in high-need schools. The university provides them
on-going support during their early teaching years. The project is
a collaboration between the KCM, NKU, and three school dis-
tricts: Covington Independent and Newport Independent
Schools in Kentucky and Cincinnati Public Schools in Ohio. It sup-
ports two-year scholarships for a minimum of 28 academically
talented students in their junior and senior years and summer
internships for up to 30 rising freshman and sophomores.

The program includes: an aggressive recruiting plan; opportuni-
ties for incoming freshmen and rising sophomores to engage in
summer experiences designed to stimulate their interest in be-
coming secondary mathematics teachers working in high-need
schools; two-year scholarships for carefully selected, academi-
cally talented students in their junior and senior years; an out-
standing teacher preparation program including valuable en-
hancements that foster a community of learners and expose
participants to contemporary literature on, and effective prac-
tices in the teaching and learning of secondary mathematics; and
mentoring and coaching support for program graduates.

Our first scholar cohort in spring 2010 consisted of five students,
two scholars in fall 2010; three students in spring 2011, four
students in the fourth cohort in fall 2011, and the fifth cohort in
spring 2012 had four students. Enhancements for these cohorts
have included a range of presentations and activities: a state
conference on “Implementing the New Mathematics Stan-
dards”; a teacher panel about “Teaching High School Mathe-
ematics in High-Need Schools”; a session presenting the impact
of KY Senate Bill 1 and the New Mathematics Standards on
Teaching High School Mathematics; the National Council of
Teachers of Mathematics 2011 Annual Meeting which focused on
“Geometry: Constructing and Transforming Perspectives.”
the Kentucky Center for Mathematics Conference which high-
lighted the Mathematical Practices as outlined in the Common
Core; and the National Council of Teachers of Mathematics 2012
Annual Meeting which centered on technology.

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Title: Northern New Mexico College Noyce NSF Scholars Pro-
gram (2nd Year)
NSF Noyce Award Number: 1035465
Principal Investigator: David Torres
Email: cathyb@nnmcd.edu
Institution: Northern New Mexico College
Co-PI(s): Cathy Berryhill, Pablo Gonzales, and Alfredo Perez
Presenter(s): Cathy Berryhill, Northern New Mexico College,
cathyb@nnmcd.edu

Our poster will present our recent activities at Northern New
Mexico College (NNMC) which include:
1. New students who have been accepted into the program.
2. Development of a Noyce NNMC webpage.
3. Noyce Scholar student involvement in Title V Summer
Bridge activities as tutors and instructors.
4. Melissa Salazar’s active participation in our Noyce Seminars.
Salazar is from the Los Alamos National Laboratory’s spon-
sored Math & Science Academy and has offered her wealth
of experience to enhance our seminars. She has given two
workshops on completion statistics and classroom manage-
ment strategies.
5. Content of our five Noyce Seminars.
6. Recruitment ads

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Title: OxyMS Teaching Scholars Project - Occidental College
NSF Noyce Award Number: 0934962
Principal Investigator: Adelina Alegria
Email: alegria@oxy.edu
Institution: Occidental College
Co-PI(s): Chris Craney
Presenter(s): Gregory Fryan and Michael Lopez
As part of our mission to support and serve our neighboring community schools, Occidental’s Education, Mathematics, and Chemistry departments developed the OxyMS Teaching Scholars Project with the goal of increasing the number of highly qualified math and science teachers in high-need urban high schools through recruitment and retention of fifth-year students and/or STEM professional committed to teaching. The recruitment practices include areas/places where underrepresented groups are clustered such as community colleges and minority professional associations.

Our third Year Noyce Credential Candidates (2011-2012) include a diverse group of students who will begin their credentialing programs in September, 2011. They represent a number of cultures, economic levels, and ethnic backgrounds: Alyssa Cuervom, Mathematics; Anna DeNeui, Biology; Gregory Fryan, Psychology/Kinesiology; Michael Lopez, Mathematics; Sylvana DeSantis, Geology.

Accomplishments for academic year 2011-2012 include:

1. Alegria and Kelly developed a new partnership with Semillas del Pueblo (Charter School in LAUSD) and with Partnerships to Uplift Communities (PUC Schools) Charter Schools.
2. Students attend the CTA Good Teaching Conference focusing on educational teaching leadership. It was an opportunity for the Noyce Scholars to network with other educators as well as to understand the politics of education in California.
3. Our Noyce Scholars facilitated the elementary science section of the annual Los Angeles Science Olympiad which takes place at Occidental College and involves more than 200 K-12 schools.
4. Our Noyce Scholars enrolled in our newly established credential EDU 541 Math and Science Pedagogies course, taught by Alegria, the OxyMS Teaching Scholars’ PI.
5. Our Noyce Scholars networked and interacted with the Occidental College Education Alumni group (ALOED) during a reception, a mini-conference, and a professional development. ALOED is responsible for providing scholarships, positions, and other supports.
6. Two Noyce Scholars applied and were accepted to the STAR program. This is a summer research internship for aspiring science and mathematics teachers, offered by the California State University in partnership with the US Department of Energy national research laboratories.

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Title: Building Bridges from STEM-Careers to Teaching Career: An Evolutionary Process
NSF Noyce Award Number: 0833295
Principal Investigator: Ralph Martin
Email: cote@ohio.edu
Institution: Ohio University / SEOCEMS
Co-PI(s): Jeff Connor
Presenter(s): Al Cote, SEOCEMS, Ohio University, cote@ohio.edu

The SouthEast Ohio Center for Excellence in Mathematics and Science, SEOCEMS, has used our Noyce Scholarship program to serve high needs schools and as a springboard to expand Ohio University’s commitment to recruit, train, and retain highly qualified educators for Ohio’s Appalachian School District. SEOCEMS’ poster illustrates the expansion of the Robert Noyce Scholarship program goal* initiated by the center in 2008 to include recruitment of pre-service teachers directly from Ohio Appalachian High Schools and to attract STEM Career Changers from across the Nation. Our poster session explains how SEOCEMS’ Noyce Scholarship program protocol and procedures are the foundations upon which Ohio University implemented Choose Appalachian Teaching Scholarship program, the SciMath pilot program, and Woodrow Wilson Teaching Fellowship Program.

*A goal of the program is to recruit individuals with strong STEM backgrounds who might otherwise not have considered a career in K-12 teaching. (http://nsfnoyce.org/)

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Title: Pacific STEM Teaching Pathways
NSF Noyce Award Number: 0934599
Principal Investigator: Kevin Carr
Email: kcarr@pacificu.edu
Institution: Pacific University
Co-PI(s): Juliet Brosing
Presenter(s): Kevin Carr, Pacific University, kcarr@pacificu.edu

Pacific STEM Teaching Pathways (PSTP) is a collaboration among the Pacific University Division of Natural Sciences, the College of Education, and several local Oregon high-needs K-12 school districts. Its purpose is to increase the number of exemplary K-12 STEM teachers by targeting two specific candidate pools: Pacific University undergraduate STEM majors and career-changing STEM professionals. Individuals with no secondary school experience, but interested in making teaching a career are strongly urged to complete a 30-hour volunteer internship with a mentor teacher. PSTP is providing up to two years of Noyce Scholarship support for 35 STEM teaching candidates, who are obligated for two years of service in a high needs school district for each year of support received. Teachers graduate with a Master of Arts in Teaching and are supported with an induction program for three
Title: Science Teaching Service Learning as a Means for Recruiting STEM Majors into Teaching: A Pilot Program

NSF Noyce Award Number: 0833298
Principal Investigator: Lynn A. Bryan
Email: labryan@purdue.edu
Institution: Purdue University
Co-PI(s): John R. Staver
Presenter(s): Lynn Bryan, Purdue University, labryan@purdue.edu

The Robert Noyce Scholars Program at Purdue University aims to attract the very best teacher education candidates to STEM education in high need schools, particularly schools in rural Indiana communities. One of the challenges of recruiting undergraduate STEM students into teaching is that while STEM students may have an interest in teaching, they often have had few, if any, well-structured and supported experiences in teaching. The central purpose of the Science Teaching Service Learning course was to provide students majoring in a STEM discipline who were interested in STEM education with an opportunity to experientially learn about science teaching and learning, while providing meaningful service to a community organization.

During the pilot version of this course, students worked in teams to complete a project that actively engaged them in meaningful and personally relevant science teaching activities while building and strengthening their relationship to the broader community. As a result of the course, several students decided to seek teaching certification through the Robert Noyce Scholars Program at Purdue. Findings from students’ experience in the course will be shared, and implications for science teaching service learning experiences as a means of recruiting STEM majors into teaching will be discussed.

Title: Rio Salado College’s Innovative Noyce Scholars Post Baccalaureate Teacher Preparation Program

NSF Noyce Award Number: 1136435
Principal Investigator: Janet Johnson
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Institution: Rio Salado College
Co-PI(s): Richard Vaughn and John Jenson
Presenter(s): Janet Johnson, Rio Salado College, Faculty Chair of Education, janet.johnson@riosalado.edu
Karen Nave, Rio Salado College, Noyce Scholars Program Manager, karen.nave@riosalado.edu

The Rio Salado College (RSC) Science and Math Innovative Learning Environments (SMILE) Program for Encore Careers in Education will support the recruitment and training of 40 STEM professionals to aid their transition into teaching careers in 7th-12th grade math and science classrooms in Arizona. Working with STEM-related industries in Arizona, we will identify STEM professionals who are interested in transitioning to teaching careers and assist them in meeting eligibility requirements and applying to the program. Successful applicants will complete a comprehensive 12-month teacher certification program (based on the college’s Post-Baccalaureate Teacher Preparation Program) with online course instruction and onsite student teaching experiences in conveniently located school districts. RSC will also provide mentoring and professional support to SMILE participants as they fulfill the required two-year teaching commitment in high-need schools.

SMILE’s primary goal is to increase the number and quality of math and science teachers available to high-need schools in Arizona. Over the next five years, the program will support an additional 40 new teachers recruited from a relatively untapped, but academically qualified pool of potential applicants. Each participant will receive a 12-month stipend of $16,500 approximately equal to the current in-state cost of attendance. The hybrid format of the SMILE program will allow some participants to continue working as they complete online coursework, minimizing the financial impact of participation and potentially limiting the period of unemployment to the time required for onsite student teaching. This approach, coupled with the demand for qualified math and science teachers in high need districts, will minimize the perceived financial risk of switching careers and thus increase the pool of potential applicants.
includes the university working to graduate highly qualified math and science teachers who will educate and mentor K-12 students in high-needs districts. National reports point to the critical need for highly qualified math and science, especially physics, teachers to prepare the next generation of STEM professionals. Consequently, NJ issued Core Content Standards for Technology and Engineering.

In response, high schools have started to offer engineering as part of their optional curricula and are seeking ways to infuse engineering into existing curricula. To expand the pool of recruits for the STEM teaching positions, the Rutgers Noyce program, Scientists, Technologists, Engineers, and Mathematicians for Education Scholarship Program (STEM-ESP), prepares engineering and physics undergraduates to become our nation’s leading educational change agents.

The goals of STEM-ESP are to recruit, retain, and graduate a community of engineers and physicists who are dedicated to teaching physics, mathematics and engineering in high-needs, K-12 school districts. With an overarching theme of “STEM for Humanity”, the project enhances Rutgers existing engineering and physics undergraduate programs, as well as the graduate programs in mathematics and physical science teacher certification program. Specifically, STEM-E blends the physics and engineering undergraduate programs with the existing graduate teacher preparation programs, strengthens the focus on teaching physics and mathematics to students in high-needs districts and infuses these programs with seminars that illustrate the great impact STEM has on society. Ultimately, the STEM-ESP Scholars will graduate ready to teach in high-needs K-12 math and science classrooms with strong pedagogical content knowledge and deep understanding of the importance of STEM professionals. Since we are in our first year, the proposed poster will describe STEM-ESP components with a focus on the STEM for Humanity theme.

Additionally, Undergraduate Noyce Fellows will (1) take the recommended coursework for preservice STEM teachers; and (2) serve in special internships during the academic year, collaborating intensively with SFUSD teachers in two nationally respected projects: the SERP San Francisco Field Site (a project creating collaborations between top-class education researchers and secondary science and math teachers), and the Algebra Project (Robert Moses’s initiative to build deep community partnerships to reform school teaching for success in algebra and beyond). Meanwhile, Credential Year Noyce Fellows will (1) take the normal credential year course work; and (2) be placed with specially -selected master teachers in their disciplines who will receive significant compensation for collaborating with them to plan and implement inquiry based instructional approaches for their classrooms and deliver professional development designed for current CSME Teacher Fellows. Unifying both tracks, the Noyce Seminar will bring together the Noyce Fellows twice a month in a vibrant forum for the sharing of experience and the development of an inquiry-based action research stance to better understand the teaching and learning of science and math.

San Francisco State University (SFSU) will be offering a unified Noyce Fellows program with two tracks: one for junior and senior undergraduate STEM majors, and another for post-baccalaureate students in SFSU’s year-long credential program. Both tracks will participate equally in the Shared Core Program: (1) A special Noyce Seminar to build a cohort support network, deepen perspectives on teaching and learning, and set the foundation for the development of educational leadership and reflective practice. (2) Full membership in the CSME Teacher Fellows Program, an existing pre-service teacher support network, recognized by the California State University Chancellor’s Office as a national model for engaging STEM majors in educational service projects. This will embed the Noyce Fellows within a rich, supportive learning community. (3) Paid summer internships in the STEM Summer Institute at City College of San Francisco, a program that cultivates interest in STEM fields among educationally disadvantaged community college freshmen. Noyce Fellows will serve as instructional assistants, tutors, mentors, and role models. They will also gain new insights into the challenges of middle and high school STEM teaching through their interactions with students who have been poorly served by existing methods of STEM instruction.
Our program is based on existing strengths of our college: an excellent secondary teacher preparation program, experience and partnerships with urban schools, a strong record of success with secondary mathematics preparation and placement, an emphasis on undergraduate research in science, outstanding academic programs in computer science and the natural sciences, and our college’s commitment to Franciscan values.

Our Noyce Fellows from the natural sciences will engage in collaborative undergraduate research and interdisciplinary learning with STEM faculty members. Fellows majoring in mathematics will be required to complete a minor in computer science that will prepare them to teach high school computer science, including Advanced Placement courses. This will address a specific need in New York State for more teachers educated in this field. Unlike many other states, New York has no computer science teaching certification, so we believe mathematics with a strong computer science background can fill this void. We are already seeing a significant increase in the number of our mathematics majors planning on completing a significant minor in computer science because of our Noyce program.

Our potential Noyce Scholars will receive support from a number of programs. In addition to faculty mentoring and peer tutoring, these potential Scholars will take a one-credit seminar on teaching in high-need schools. Also, a number of early awareness activities will help them become personally acquainted with students in high-need schools. These activities will include summer programs that give them experience in the classroom with veteran teachers and tutoring, experience helping students prepare for end-of-year exams. This exposure to students in high-need schools will continue as scholarship recipients fulfill their pre-service placements in high-need districts.

90
Title: California State University, Sonoma's Noyce Scholar Program
NSF Noyce Award Number: 0934503
Principal Investigator: Carlos Ayala
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Institution: Sonoma State University
Co-PI(s): Lynn Stauffer, Ben Ford, and Scott Severson
Presenter(s): Kirsten Searby, Coordinator, Sonoma State University, searby@sonoma.edu

The Sonoma State University's Noyce Scholar Program started with five scholars in 2009 and has now served a total of 32 scholars in mathematics and science. With 16 scholars in the teaching field of mathematics and science and 15 scholars just entering the credential program or completing their degrees, the program continues to evolve. It is a university-wide collaboration comprised of the School of Science and Technology, the Mathematics Department, the Astronomy and Physics Department, and School of Education.

The program recruits college juniors and seniors as well as fifth year college students. This year, six teaching assistants were recruited for professors in mathematics and science. Our objective is to increase the teaching experience for undergraduate scholars. The student assistants attended a training workshop to learn teaching practices and procedures within the classroom. Furthermore, mathematics tutors will be hired to assist in high-needs schools during the school day to teach and tutor struggling students. The program offers future teachers opportunities to learn about students in high-needs schools.

The Noyce Scholar Program has developed a Community where Scholars share their teaching processes and experiences and advise each other. At the same time, they bring up areas they want to explore as educators, for example, the students wanted to learn about writing proposals and where to apply for grants. Thus, an expert in the field informed them about how to write, where to look for, and how to get grants. Noyce Scholars are now collaborating on ideas, developing and presenting them at a mixer in the fall. Additionally, two scholars will be attending the Robert Noyce Teacher Scholarship Program Conference in Washington D.C. to make additional connections and to learn from other scholars. They will present their experiences with the other scholars at a future Scholar Community meeting.

91
Title: Evaluation of the REMAST Scholarship Program: What We Know and What We Believe
NSF Noyce Award Number: 0733691
Principal Investigator: Sharon Vestal
Email: bob.sd.burke@gmail.com
Institution: South Dakota State University
Co-PI(s): Larry Browning, Ken Emo, Matt Miller, Madhav Nepal
Presenter(s): Robert Burke, South Dakota State University, bob.sd.burke@gmail.com

Rural Enhancement of Mathematics and Science Teachers (REMAST) is a Robert Noyce Scholarship Program at South Dakota State University designed to increase the number of science and math teachers and enhance their abilities during preparation and their first years of teaching. The poster session will provide an overview of the project and describe evaluation data for the REMAST project. We will show comparative STEM graduation rates among public institutions in South Dakota, and describe evaluations of the impacts of the value-added elements of our program, including pre-service and in-service teacher mentoring, involvement in professional organizations, and participation in conferences.
92
Title: Research Activities and Problem-based Learning Experiences of Rural Teachers in Southern Illinois
NSF Noyce Award Number: 1136414
Principal Investigator: Karen Renzaglia
Email: renzaglia@cos.siu.edu
Institution: Southern Illinois University
Co-PI(s): Harvey Henson, Frackson Mumba, Lingguo Bu, Tim Bellamey
Presenter(s): Karen Renzaglia, Jennifer Janesie, Julie Wittenborn-Sikorski, Natalie Mountjoy, Harvey Henson

In our first year of the SIUC Noyce Master Teaching Fellowship Program we have recruited 10 stellar middle school Master Teaching Fellows (MTFs) and have begun coursework in preparation for a summer research experience. Our program centers around implementation of problem-based learning exercises that focus on a wide range of topics related to the Cache River Wetland (CRW), a local biodiversity hotspot of international importance. Each teacher designs and conducts individualized, mentored research throughout his/her five year tenure with the program.

This experience will be translated into learning activities in their low achieving rural school districts. MTFs are currently enrolled in two graduate courses. The first is an introduction to the CRW and provides the background and tools to confidently set up and run a research project that will ultimately be adjusted for classroom use. Teachers learn the history of human use and alteration in the watershed as well as the important ecosystem functions wetlands provide. Our presenters include research faculty and IGERT fellows who discuss the restoration challenges, diverse taxa, important ecosystem functions and geophysical properties of the CRW. The second course, Scientific Research Methods for Teachers, exposes the MTFs to the research process, concentrating on generating a scientific hypothesis and the fundamentals of experimental design. Our multidisciplinary presenters return for these sessions to describe specific methods they use in the CRW to answer their own research questions. The product of the courses is a research proposal that each MTF will conduct during the summer. The poster will focus on the research projects teachers have developed and will generally describe the place-based learning activities of our unique community of problem solvers.

93
Title: SEL Partnership: Southern University Baton Rouge (SUBR), the East Baton Rouge Parish School System (EBRPSS), and Louisiana State University (LSU)
NSF Noyce Award Number: 0733802
Principal Investigator: Joseph Meyinsse
Email: Lshaw8944@aol.com
Institution: Southern University and A&M College
Co-PI(s): Luria Young (SUBR), James Madden (LSU), Annie Henderson (SUBR), James Madden (LSU), and Brenda Nixon (LSU)
Presenter(s): Luria Young, Southern University Baton Rouge, Lshaw8944@aol.com
T’Era Hartfield, tera_hartfield@yahoo.com

This is a Phase I project, involving a partnership among Southern University Baton Rouge (SUBR), the lead institution, the East Baton Rouge Parish School System (EBRPSS) and Louisiana State University (LSU) [SEL Partnership]. Other organizations that contributed to the project included the Louisiana Resource Center for Educators and Teach Baton Rouge (non-profits that offer alternate teacher certification programs). The overall goal is to recruit strong STEM majors who are in or beyond their third year of study into programs that lead to secondary teacher certification. Most candidates came from SUBR, but the program was open to minority students from LSU in cases where this would enhance the overall goals of the project.

The LSU Geaux Teach program, developed with funding from NSF STEMTP and Noyce Scholars programs, provides resources and infrastructure such as customized courses, field experiences, and mentoring. EBRPSS vigorously supports graduates through teacher-induction, assistance, and support services. Students who choose teaching late in their undergraduate programs may not be able to fit all certification requirements into the time remaining before graduation. Therefore, alternative certification programs filled in where there was a need.

94
Title: Supporting St. Edward’s University Noyce Scholars in Year Four: An Array of Activities
NSF Noyce Award Number: 0833123
Principal Investigator: Steven Fletcher
Email: stevenf@stedwards.edu
Institution: St. Edward’s University
Co-PI(s): Bill Quinn, Cindy Naples, Alice Sessions
Presenter(s): Steven Fletcher

Noyce Scholars at St. Edward’s University have been provided with an array of support activities to prepare them for classroom teaching in high needs schools. In the fourth year of our grant, we have provided the following support mechanisms: a) A week-long summer professional development institute for the scholars, b) support through field-intensive clinical field experiences in the classroom, c) a series of evening professional development seminars with expert teachers on inquiry-based teaching strategies, d) trips to national conferences in math and science teaching, e) the addition of a strong technology component to the induction phase of the program with the use of iPads as a tool for mentoring support, professional reflection, Noyce community building, and teaching in the classroom.
Title: The Noyce Program at Saint Joseph’s University

NSF Noyce Award Number: 0934713
Principal Investigator: Sandra Fillebrown
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Institution: St. Joseph’s University
Co-PI(s): Tetyana Berezovski, Karen Snetselaar, Michael Clapper, Michael McCann.
Presenter(s): Tetyana Berezovski, St. Joseph’s University, tberezov@sju.edu

The Noyce Program at Saint Joseph’s University has three major components. First, freshmen and sophomore math and science majors can apply for our 6 week summer internship program. The third cohort of Noyce Interns are working with two charter schools in Philadelphia: Philadelphia Electric and Technology Charter High School and Maritime Academy Charter High School. The Noyce Interns work with teachers providing summer enrichment activities in math and science. Second, students enrolling in our 5-year BS/MS programs in math and science education are eligible for scholarships during their senior and fifth year. We currently have 7 scholars at various points in their program. And third, students are supported in their beginning teaching careers through the Urban Teacher Collaborative. These monthly meetings are led by Michael Clapper, and discussions focus on various issues of importance to the teachers.

Title: Preparing Teacher Leaders in Mathematics

NSF Noyce Award Number: 0934878
Principal Investigator: Kimberly Childs
Email: beverlyll@sfasu.edu
Institution: Stephen F. Austin State University
Co-PI(s): Lesa Beverly, Deborah Pace, and Betty Alford
Presenter(s): Lesa Beverly, Stephen F. Austin State University, beverlyll@sfasu.edu

The Texas Leadership Initiative: Mathematics Instruction Transformed (Texas LIMIT) project is focused on the development of mathematics teacher leaders in rural East Texas. Nearly all school districts surrounding Stephen F. Austin State University are high needs districts and professional development opportunities for teachers in these districts are limited as a result of location and financial constraints. The Texas LIMIT project is providing an opportunity for these districts to have their master teaching fellows receive training in leadership and coaching as well as in the design and delivery of professional development in mathematics. This poster provides examples of the methodologies used to accomplish this goal.

Title: Helping STEM Majors 'Test the Water' with Teaching

NSF Noyce Award Number: 1136416
Principal Investigator: Lesa Beverly
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Institution: Stephen F. Austin State University
Co-PI(s): Keith Hubbard, Dennis Gravatt, and Karen Embry-Jenlink
Presenter(s): Keith Hubbard, Stephen F. Austin State University, hubbardke@sfasu.edu

In our first year, Talented Teachers in Training for Texas (T4) set out to expand awareness of science and mathematics teaching throughout the classic STEM pipeline, and at the same time attempt to hook high school students into the STEM pipeline. Our strategy was to actively recruit college freshmen and sophomores to participate in three short term “feeder activities”. The first activity was a STEM day bringing roughly 250 high school freshmen, sophomores, and juniors to campus to do activities and hear talks about exciting areas in STEM. We recruited roughly 80 college students as co-presenters and campus guides. The goal was not only to welcome and present STEM possibilities to high school students, but to give college students a chance to interact with high school STEM teachers and students. We also recruited them heavily for other T4 activities.

Our second recruiting activity was a week long job shadow with a Noyce trained master math or science teacher. The college students had to apply for this program, but were given a stipend for their work, then asked to attend a debriefing session on processing what it would look like to be a teacher. Our third recruiting activity was a 5-day NASA summer experience where college students are teamed with a NASA engineer, a certified math or science teacher, and ten high school students to plan a mission at NASA’s Clear Lake facility. Both of these programs required slightly more commitment and screening than STEM Day participation. We had 35 students apply for programs with more commitment, however, all program activities ultimately serve to feed the Noyce scholarship program.

In the first year, the main challenge was to publicize our recruiting events and get students to signing up. We designed a website (t4.sfasu.edu), created fliers, held an information night, and planned great events, but really it was reaching out to STEM majors in the classroom that proved most effective. Getting faculty buy-in was key. Our single most effective approach was having a student’s instructor call them aside and suggest the program to them. The next most effective approach was our 16 classroom presentations (which also depended on faculty inviting us). Our poster will focus most specifically on our strategy for recruiting, replete with setbacks and successes from the first year.
Title: The Stony Brook University CESAME Robert Noyce Programs

NSF Noyce Award Number: 0531855
Principal Investigator: Keith Sheppard
Email: keith.shепpard@stonybrook.edu
Institution: Stony Brook University
Co-PI(s): Lisa Berger, Linda Padwa, and David Bynum
Presenter(s): Keith Sheppard, Stony Brook University, keith.shепpard@stonybrook.edu

The Robert Noyce Scholars Program at Stony Brook University is directed through the Center for Science and Mathematics Education (CESAME) which recruits, selects, educates and mentors outstanding science and mathematics majors to teach in high needs schools in the region. The Noyce scholars are educated in content and a process rich curriculum. They utilize age appropriate practical activities to enhance student learning.

Additionally newly appointed Noyce supplemental fellows, who are already working in high needs schools are involved in presenting workshops to the Scholars. These workshops include parent-teacher communication, English language learner strategies and modifying classroom culture. This represents a new phase in the development of a cadre of professional, highly qualified science and mathematics teachers committed to educating students in high needs schools.

Title: Western New York Noyce Scholars Partnership at Buffalo State College: Effectiveness Study of Phase I and II S&S STEM Teachers

NSF Noyce Award Number: 1035360
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Institution: SUNY College at Buffalo
Co-PI(s): Jane Cushman, Catherine Lange, Dan MacIsaac, and David Wilson
Presenter(s): Luanna Gomez, SUNY College at Buffalo, gomezls@buffalostate.edu; Jane Cushman, cushman@buffalostate.edu; Kathleen Falconer, falconer@buffalostate.edu; David Henry, henryd@buffalostate.edu; Catherine Lange, langel@buffalostate.edu; Dan MacIsaac, macisadel@buffalostate.edu; David Wilson, wilsondc@buffalostate.edu; Joseph Zawicki, zawickij@buffalostate.edu, SUNY College at Buffalo

The Western New York Noyce Scholars Partnership at Buffalo State College (BSC) has supported 47 individuals seeking initial New York State STEM teacher certification with scholarships and stipends totaling about $500,000 from two Noyce grants. The current grant, a phase II S&S project, includes a research study designed to document the extent to which BSC Noyce S&S recipients apply interactive engagement teaching methods in the precollege STEM classroom.

We have chosen to use the Reformed Teaching Observation Protocol (RTOP) as one method by which to characterize STEM teaching behaviors. RTOP was developed at Arizona State University as a classroom observational instrument with which a trained rater may quantify the relative amount of best teaching practice present in a STEM classroom. In our case, the protocol is being administered and analyzed by a team of master teachers led by Kathleen Falconer, project research consultant, on a regular basis throughout the school year.

We intend to extend this characterization by examining results from high-stakes NYS assessments, among others, of our teacher participant’ students. It is our objective to carry out this process with about 15 of our scholars during their first 2 to 5 years of teaching. The results will be used to identify project activities that may effectively monitor and support BSC Noyce scholars while students and during their initial years of teaching. This poster will describe the study and some of its preliminary results.

Title: Reflective Pathways: The Impacts of an Urban Science Teaching Field Experience on Undergraduates Decisions to Teach Science in a High-need New York City School

NSF Noyce Award Number: 0934857
Principal Investigator: Paul J. Bischoff
Email: paul.bischoff@oneonta.edu
Institution: SUNY College at Oneonta
Co-PI(s): Jim Ebert; Todd Ellis; Paul French and John Schaumloffel
Presenter(s): Paul J. Bischoff, SUNY-Oneonta, bischipj@oneonta.edu

The purpose of this research was to analyze the reflective considerations that distinguish pre-service science education majors committed to high-need urban teaching careers from those committed to high-need rural careers. Essays designed to expose their (n = 22) considerations of teaching in New York City (NYC) written before, immediately after, and 2-weeks following a one-week cultural, and science teaching internship experience were coded to reveal distinguishing reflective thought patterns. The results showed that those (15/22) whose final essay showed commitment to NYC teaching viewed themselves positively as urban teachers, and that increases in positive self-perceptions were paralleled by increases in affinity towards urban life and urban schools. Those not inclined to NYC teaching (6/22) expressed increasingly negative views of themselves as urban teachers, urban life, and urban education generally. The results have implications for scholarship programs designed to curtail the science teaching shortage in high-need rural and urban areas.
101
Title: SUNY Cortland Noyce Project
NSF Noyce Award Number: 0934777
Principal Investigator: Gregory Phelan
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Institution: SUNY Cortland
Co-PI(s): Rena Janke, Larry Klotz, and Mary Gfeller
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The SUNY Cortland Noyce Project proposes to award 50 scholarships totaling $670,000 to highly qualified science and math majors, or career changers, seeking to become K-12 teachers. Thirty-five scholarships (10 graduate and 25 undergraduate) have been awarded to 27 Noyce Scholars. The average GPA of undergraduate Noyce Scholars at time of application is 3.8. Sixty-nine applications were received by the end of the Project’s second year, May 31, 2011.

Primary recruitment methods include campus and community outreach. Campus outreach includes SUNY Cortland website articles and Scholar spotlights, campus and alumnae newsletters, posters, information sessions, and faculty education. Community outreach includes press releases, science fair participation, public service announcements, and rack card distribution at career centers and the local business showcase.

A second year of Noyce Scholar workshops, addressing issues related to successfully teaching in a high-need environment, were well-attended. Sixteen Scholars and teachers from local high-need districts participated in a two-hour “walk and talk” event at the local nature center. Thirty-Five Scholars, teachers and faculty attended a more formal workshop session at SUNY Cortland. The workshops have shown to be successful in building a solid Noyce community both within the campus and within the Central New York region, and strengthening the skill set of Noyce Scholars.

The specific goals of the project include: 1) Offering substantial scholarships to prepare 36 additional highly-qualified secondary mathematics and science teachers; 2) full 41% increase over the current capacity; 2) Creating a multimedia recruitment and advertising campaign to attract a diverse and academically gifted pool of applicants for the SU-Noyce Scholars Program; 3) Offering 24 paid summer internships (6 per year during years 2-5 of the project) for talented STEM undergraduates to participate in service learning programs working with students from high-needs schools; 4) Facilitating the supported transfer of diverse STEM majors from our community college partners into SU’s teacher education programs; 5) Providing a robust and sustained mentoring and professional development program for the SU-Noyce Scholars during their first three years of teaching in a high-needs school; and 6) Conducting a rigorous external project evaluation to measure the overall effectiveness of the SU Noyce Scholars program on an annual basis.

Our poster session will report on the outcomes of specialized professional development workshops for our first two cohorts of Noyce Scholars focused on strategies for success in teaching science and mathematics in high-needs urban and rural schools. We will also share the evaluation results from our first two years of offering summer internship opportunities in informal STEM centers, as well as some of the challenges we have faced in recruiting Noyce applicants.

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Title: The Syracuse University Noyce Scholars Program for Science and Mathematics Teachers: Preparing STEM Educators for High-Needs Rural and Urban Schools.
NSF Noyce Award Number: 0934841
Principal Investigator: John W. Tillotson
Email: jwttillot@syr.edu
Institution: Syracuse University
Co-PI(s): Sharon Dotger, Joanna Masingila, Jason Wiles, and Eileen Strempel
Presenter(s): John W. Tillotson, Syracuse University, jwttillot@syr.edu
Laura Stanley, Syracuse University, listanle@syr.edu

The Syracuse University Noyce Scholars Program for Science and Mathematics Teachers (SU-Noyce) is a multi-faceted project involving Syracuse University and the Upstate Louis Stokes Alliance for Minority Participation (LSAMP) consortium, partnering with area high-needs school districts and a network of informal STEM education centers from across central New York with the goal of increasing the number of highly-qualified science and mathematics teachers teaching in our nation’s neediest schools.

Our poster session will report on the outcomes of specialized professional development workshops for our first two cohorts of Noyce Scholars focused on strategies for success in teaching science and mathematics in high-needs urban and rural schools. We will also share the evaluation results from our first two years of offering summer internship opportunities in informal STEM centers, as well as some of the challenges we have faced in recruiting Noyce applicants.
life of the program. For the most part, it is expected that teaching license will be obtained via a combination of selected undergraduate courses and a one year post-baccalaureate program. We are partnering with several Upper Cumberland LEA's to facilitate teaching residency and job placement. Another significant partnership is with the Millard Oakley STEM Center on the TTU campus, through which we will offer exploratory early teaching experiences and mid-program internships. During the first 9 months of the program we have developed recruiting materials, set up a website, held informational meetings, and begun recruiting participants for an early teaching experience, as well as our first cohort of Noyce scholars.

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Title: TAMU aggieTEACH Robert Noyce Scholarship Program
NSF Noyce Award Number: 0934887
Principal Investigator: Timothy P. Scott
Email: tim@science.tamu.edu
Institution: Texas A&M University
Co-PI(s): Carolyn M. Schroder
Presenter(s): Timothy P. Scott, Texas A&M University, tim@science.tamu.edu
Jose Amaya, Texas A&M University, j.amaya401@gmail.com

The goal of the TAMU aggieTEACH Program is to provide scholarships to approximately 20 students junior/senior level undergraduate students majoring in science, technology, engineering, and mathematics (STEM) pursuing teaching careers in grades 8-12. For the third year, 15 scholarships have been awarded: 10 Scholars are female and 5 are male; 11 are mathematics major and 4 are science majors. Texas A&M University continues to lead the state in the production of university prepared science and mathematics teachers. The aggieTEACH Noyce Scholarship Program offers financial support to these students as they complete their teacher preparation program as well as programmatic activities focused on preparing exceptional science and mathematics teachers.

Our poster presentation will describe the components of the aggieTEACH Program and the aggieTEACH Noyce Scholarship Program. We will demonstrate that our aggieTEACH Noyce Scholars rank high among their peers and that our recruitment efforts in maintaining a high level of STEM majors pursuing teaching have been successful. We will present all program activities that our Scholars have participated in and will spotlight collaboration among districts and other funded programs of the Center of Mathematics and Science Education linked to the aggieTEACH Noyce Scholarship Program. We will highlight two new programs for this year, the aggieTEACH Tutor Program and the TAMU STEM Teacher Preparation Academy. Lastly, we will share preliminary evaluation of our project regarding students' perceived intent to teach beyond scholarship requirements.

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Title: Self-determination and Perceptions of Teaching in Noyce Scholars
NSF Noyce Award Number: 0833326
Principal Investigator: Jerry Dwyer
Email: jefrey.lee@ttu.edu
Institution: Texas Tech University
Co-PI(s): Dominick Casadonte, Jeffrey M. Lee, Lawrence Schovanec, and Tara Stevens
Presenter(s): Jeffrey M. Lee, Texas Tech University, jefrey.lee@ttu.edu

Noyce Scholars completed a series of measures to evaluate their self-determination, perceptions of autonomy support provided by their mentors, and perceptions of the field of teaching. Overall, the scholars had positive perceptions of teaching professions and reported low interpersonal qualities and controlling qualities, but high levels of autonomy. This suggests that scholars tended to not depend on rewards or other controls (e.g., emphasizing wealth, fame, or other extrinsic factors) and instead appeared to seek activities that are interesting and challenging. Although statistically significant changes were not observed between the second and third year project measures scores, participants receiving the Noyce summer stipends reported significantly lower levels of controlling qualities after engaging in their summer teaching assignments. The Noyce summer stipends are awarded to expose math and science majors to teaching.

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Title: The Tougaloo College Robert Noyce Teacher Scholarship Program
NSF Noyce Award Number: 1135765
Principal Investigator: Bettye Sue Hennington
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Institution: Tougaloo College
Co-PI(s): Pamela Russ
Presenter(s): Bettye Sue Hennington, Tougaloo College, bhennington@tougaloo.edu

Tougaloo College, a minority-serving institution, is awarding two-year scholarships to talented, upper-level students with a major in biology, chemistry, mathematics or physics who desire certification in secondary education and are committed to completing four years of teaching in grades 7-12 in high-need school districts in Mississippi. The substantial curriculum is being driven by clinical field-based experiences in formal and informal settings, seminars, and workshops in collaboration with established local school districts and community partners. The Noyce Program is being structured around undergraduate and post-graduate mentoring by STEM and Education Division faculty and master 7-12 teachers, professional development activities and networking. Scholars are being prepared to enter the 7-12 STEM classrooms as highly qualified, highly effective teachers and are provided...
resources and support to ensure teacher retention. Pre-NOYCE activities such as teaching in the college’s Summer Science Program are made available to freshmen and sophomores who wish to ultimately apply for NOYCE scholarships. Program objectives are to provide: 1) scholarships for junior and senior majors from Biology, chemistry, mathematics and computers, and physics, who have demonstrated an interest in obtaining teacher certification; 2) a substantial curriculum that includes extensive clinical experience in the classroom and professional development for preparation to enter the 7-12 science and mathematics classroom as a highly qualified and highly effective teacher; 3) resources and support to ensure teacher retention.

107
Title: Reflections on the Third Year of the Towson University Robert Noyce Teacher Scholarship Program
NSF Noyce Award Number: 0934751
Principal Investigator: David A. Vanko
Email: dvanko@towson.edu
Institution: Towson State University
Co-PI(s): Jeff Passe, Todd Kenreich, Donald A. Thomas, and Jane L. Wolfson
Presenter(s): Tissa Thomas (Project Administrator), TThomas@towson.edu

Towson University’s (TU) Noyce program awards scholarships to juniors and seniors and graduate stipends for those who are seeking certification to teach in the STEM disciplines through the Master of Arts in Teaching. The program features recruitment, summer activities, induction activities and a monitoring/evaluation program. It reflects a strong and long-standing collaboration of TU’s Jess and Mildred Fisher College of Science and Mathematics and the College of Education. The program was intentionally designed to attract high caliber students whose financial needs might otherwise prohibit their entry into teacher preparation. This is being accomplished through careful coordination with our NSF STEP grant involving TU, Baltimore City Community College and the Baltimore City Public School System currently in its third year, our Hackerman Academy outreach programs, our two NSF S-STEM grants, and several other existing programs that provide opportunities to identify and mentor a diverse pool of teacher preparation candidates.

In each of the first two years, five undergraduates and two graduate students were awarded scholarships or stipends, respectively. Recruiting efforts focus on TU STEM majors, particularly TU STEM-secondary education students, and the five or six community colleges that traditionally supply almost half of Towson’s undergraduate population via the transfer pathway.

In this third year of the program, we awarded 11 scholarships and 4 graduate student stipends. This is a doubling of new Noyce scholars relative to the last year. Much effort has been placed on providing opportunities for the Scholars to carry out hands-on activities with children during various outreach activities. For example, our Saturday Morning Science series, led by Hackerman Academy of Mathematics and Science Director, and former astronaut, Dr. Don Thomas, features an hour of hands-on activities tied to the topic of that Saturday’s presentation. Frequently, Scholars volunteer to develop and implement one of the hands-on science activities. Others volunteer as local science fair judges, or they work with students during classroom visits to the university arranged by their teachers or the Hackerman Academy. Feedback from the scholars suggests that these activities are highly valued.

Our program continues to hold its Annual Fall Banquet welcoming new scholars and introducing them to current ones, monthly meetings, scheduled and ad hoc peer mentoring/tutoring, and other social events for community development. The program maintains communication with all twenty-nine scholars, including the 8 that have graduated and are teaching (7) or continuing their education (1).

Graduates who are teaching report that one of their biggest challenges is classroom management, which has led to rich discussions about this topic at the monthly meetings. This is one example of the benefit of maintaining contact with graduates, something that can benefit both the graduates and the teachers in training.

108
Title: Recruiting and Supporting STEM Career Changers: The Noyce Teaching Fellows Program at Trinity University
NSF Noyce Award Number: 0934836
Principal Investigator: Shari Albright
Email: jnordine@trinity.edu
Institution: Trinity University
Co-PI(s): Patricia Norman and Jeffrey Nordine
Presenter(s): Jeffrey Nordine, Trinity University, jnordine@trinity.edu
Patricia Norman, Trinity University, Patricia.Norman@trinity.edu
Henrietta Freeman, hennifree@yahoo.com
Abigail Drake, adrake1@trinity.edu

The decision to change careers is typically a difficult one, and STEM professionals face a variety of challenges when deciding to transition into teaching. These challenges include family logistics as well as and financial concerns. In this poster, we present strategies utilized in Trinity University’s Noyce Teaching Fellows Program as we recruit and support career changers as they pursue a Master of Arts in Teaching degree and transition into their teaching career. Such strategies include individualized pre-enrollment preparation plans, interactions with previous Teaching Fellows, and coursework designed to encourage connections between theory and practice in STEM teaching. Our
Teaching Fellows are high achieving professionals who have reported a high level of satisfaction with the Trinity program and a strong sense of efficacy as they enter the teaching field.

109
Title: Recruiting Outstanding STEM Majors: The Noyce Summer Internship at Trinity University
NSF Noyce Award Number: 0934835
Principal Investigator: Shari Albright
Email: pnorman@trinity.edu
Institution: Trinity University
Co-PI(s): Patricia Norman and Jeffrey Nordine
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With a large number of STEM undergraduate majors, a superlative teacher education program, and a “minority-majority” city in need of highly qualified K-12 science and mathematics teachers, San Antonio’s Trinity University is ideally suited to implement a Phase II Noyce scholarship and stipend program. For many years, Trinity has enjoyed a 100% placement rate for certified teachers who have completed its Master of Arts in Teaching (M.A.T.) program.

Thus our problem is not how to place such prized graduates, but how to encourage the very best undergraduate STEM majors to become teachers in the first place.

After studying the shortage of math and science teachers carefully and learning from our past Noyce experience, Trinity’s Department of Education concluded that several specific issues must be addressed in our Phase II activities: recruitment, preparation, early-career support, and opportunities for life-long learning. This four-pronged agenda mirrors recommendations from the National Commission on Mathematics and Science Teaching for the 21st Century (2000). This poster focuses on an innovative recruitment strategy: the Noyce Summer Internship.

To support STEM majors to consider teaching early in their collegiate careers, the Noyce summer internship program targets four rising sophomores and juniors. Noyce summer interns complete a 10-week on-campus internship with two distinct components. First, interns serve as teaching assistants and peer mentors for local high school students taking math and science courses through Trinity’s Upward Bound program. Upward Bound is an academic enrichment program for aspiring first-generation and low-income college students.

Second, interns simultaneously complete a laboratory-based research project in cooperation with a faculty advisor in their academic major. Summer interns receive a stipend of $4,500, free on-campus housing, training and support for working with high school students in a classroom, an opportunity to collaborate with a faculty member on original research in their academic discipline, and faculty assistance preparing an end-of-summer research presentation and poster. We report results from the first two years of this recruitment program, 2010 and 2011, including findings from focus group interviews and survey data.

110
Title: The Urban Math and Science Teacher Collaborative
NSF Noyce Award Number: 105342
Principal Investigator: Eric Todd Quinto
Email: todd.quinto@tufts.edu
Institution: Tufts University
Co-PI(s): Linda Beardsley, Barbara Brizuela, Hugh Gallagher
Presenter(s): Eric Todd Quinto, Tufts University Mathematics Department, todd.quinto@tufts.edu

The Tufts University Robert Noyce Teacher Scholarship Program, the Urban Mathematics and Science Teacher Collaborative (UTTC), is a partnership between the Tufts Education, Mathematics, and Physics departments, the Center for Applied Special Technology (CAST), and three Boston public schools. UTTC was designed to address the critical demand for highly qualified mathematics and science teachers in high-need districts, especially those that serve urban communities.

In 2011, the program recruited its first cohort of 8 Master of Arts in Teaching (MAT) students; each had a bachelor’s degree in mathematics, physics, or engineering. Five are focusing on high school mathematics, 1 on middle school mathematics, and 2 in high school physics. The second cohort is being admitted now, and we have a 20% increase in applications in the past year. Applications to our mathematics and science teacher preparation program have more than doubled in the last 4 years. We think this is in no small part due to the Noyce Scholarship Program.

This Scholarship Program was built on the successes from many NSF-supported projects at Tufts, as well as the UTTC, a residency program in which interns work under the supervision of experienced mentor teachers who are leaders in their school communities. This mentoring relationship will continue, especially during the first four subsequent years of teaching. Teaching Fellows enroll in either of two graduate-level courses that integrate subject matter and pedagogical content knowledge in the areas of mathematics or physics. These courses have been developed expressly for this program by PIs in the Mathematics, Physics, and Education Departments, but other teachers and students are invited to enroll in them. The mathematics course is offered at the participating school sites and Master Teaching Fellows participate by discussing content and providing perspective. Additionally, Teaching Fellows work on a project with CAST that can lead to Special Education certification.
This project also has a research and evaluation component through which we document and describe the progress of the Noyce Fellows and assess the impact of the program. Data collection involves conceptual and epistemological surveys, videotaping of classroom teaching, and face-to-face interviews.

In our poster, we will report what has worked and what we need to improve. We will describe how we recruited Teaching Fellows and Master Teaching fellows, as well as our ongoing mentoring; how our courses combine pedagogy and subject matter knowledge; and how we have changed the courses using feedback from our students. Finally, we will reflect on what we have learned from our research and evaluation and what we need to work on.

111
Title: The Tuskegee University Robert Noyce Teaching Scholars in Mathematics and Science Education in the Alabama Black Belt
NSF Noyce Award Number: 0934545
Principal Investigator: Walter Hill
Email: cmorris@mytu.tuskegee.edu
Institution: Tuskegee University
Co-Pi(s): Carlton E. Morris, Melvin Gadson, Dennis Likens, and Mohammed A. Qazi
Presenter(s): Carlton E. Morris, Tuskegee University, cmorris@mytu.tuskegee.edu

This Noyce scholarship program partners Tuskegee University and seven school districts in the Alabama Black Belt to address shortages of science and mathematics teachers in these districts. The program responds to these shortages by encouraging juniors and seniors (Noyce Scholars) majoring in the fields of Animal Science, Biology and Mathematics at Tuskegee to concurrently pursue a second degree in general science education or in mathematics education. Once all the requirements for teaching certification are complete, for which a fifth year of study is needed, the graduates of the Tuskegee Noyce program assume teaching positions in one of the partnering schools. Equipped with a contemporary mathematics and science teacher education foundation and a solid formation in the STEM content areas, the Noyce program graduates are poised to make a positive impact in augmenting the quality and quantity of highly qualified teachers of science and mathematics in the Alabama Black Belt.

We anticipate recruiting a total of eighteen Noyce Scholars at Tuskegee during this five year project. In the three years since the project has been instituted, nine STEM majors have joined the Noyce program, two of which graduated in May 2011 and were subsequently placed in partner school districts. This poster describes key programmatic aspects of the Noyce Scholarship program at Tuskegee University and its accomplishments to date.

112
Title: Outcomes of and Lessons Learned in a Five-Year Noyce Scholarship Program at the University of Arkansas
NSF Noyce Award Number: 0733841
Principal Investigator: Gay Stewart
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Institution: University of Arkansas
Co-Pi(s): Po-Hao Huang, Mike Wavering, Dennis Brewer, Debby Korth
Presenter(s): John Stewart, University of Arkansas, johns@uark.edu

The University of Arkansas received a Noyce Scholarship Grant in the fall of 2007 and has since received two supplements to the original funding. The original goal of this Uark-Noyce program was to produce 36 new STEM teachers by granting Noyce Scholarships. These scholarships would provide support for STEM graduates who wish to enter the University of Arkansas (UA) Master of Arts in Teaching (MAT) program. The Noyce Program has been fully subscribed with all planned scholarships offered. The key to both funding and implementing the program has been a strong, well-planned, multi-faceted recruitment effort and building on capabilities and partnerships developed in other funded projects.

This poster presents a sample of the professional outcomes of our Noyce scholars. We will summarize our experience with a variety of recruiting strategies and experiences working with school districts in the placement and mentoring of scholars. We will also discuss features that grew out of the administration of the program and features we wish we had built in at the beginning.

113
Title: Robert Noyce Summer Internships and Scholarships Encourage Cal Teach Berkeley Undergraduates to Explore Teaching as a Career
NSF Noyce Award Number: 0934951
Principal Investigator: Deborah Nolan
Email: nolan@stat.berkeley.edu
Institution: University of California, Berkeley
Co-Pi(s): George Johnson, and Xiaoxia Newton
Presenter(s): Atalie Chan

Cal Teach Berkeley is an interdisciplinary teacher education program that allows undergraduate students to complete their degrees in math, science or engineering while simultaneously earning a single-subject teaching credential with a focus on teaching in urban schools. Students are offered internship and scholarship opportunities to encourage them to explore teaching as a career and/or commit to teaching. Cal Teach Berkeley awards paid summer internships to lower division students with local professional development, research and outreach institutions. In addition, the program awards Noyce Scholarships to upper division
students who commit to completing their disciplinary degree, to obtaining their teaching credential and to teaching math or science in a high-need school.

We present our preliminary findings about the effectiveness of the summer internships on recruiting the interns to participate in the Cal Teach Berkeley program in their subsequent undergraduate years. Furthermore, we present an update on our scholars’ future plans and commitment to teaching, and describe what we have learned about how our students prepare to become teachers. We are in the process of putting structures in place to increase recruitment and retention in the Cal Teach program, as well as to support the scholars’ beginning years in teaching.

114 Title: Developing Master Teachers: Math for America Berkeley
NSF Noyce Award Number: 1136432
Principal Investigator: Deborah Nolan
Email: emstone@berkeley.edu
Institution: University of California, Berkeley
Co-PI(s): George Johnson
Presenter(s): Elisa Stone, emstone@berkeley.edu

Math for America (MfA) Berkeley was launched in 2010 to support local math and science teachers to become Master Teachers and leaders. MfA Berkeley provides five years of professional development (PD) designed to strengthen teachers’ disciplinary effectiveness and gain important leadership training and experience. MfA Berkeley is built on a framework that involves three dimensions of master teaching: teaching expertise and classroom accomplishment, mentoring expertise and contributions to colleagues, and leadership and school improvement capacity. Based on recent research, the program addresses these dimensions and works to meet the needs of each teacher as they move through the program.

MfA Berkeley begins with a focus on teacher inquiry. Projects include examining students’ math understanding through an iterative writing process, and exploring student learning and engagement in lessons that utilize GeoGebra. Following this work, fellows enrich their content knowledge through a structured research lab experience, and receive support to translate this work into classroom lessons. Work from the first cohort includes lessons such as an exploration of ratios, proportions, and linear regression using census data, and an investigation of time-lapsed photographs to investigate key themes in evolution. In the second year, teachers pursue National Board Certification, a process that entails critical examination of and deep reflection on teaching and learning. The third year involves a teacher-in-residence program, which is designed to leverage the strength of opportunities that are offered at UC Berkeley all the while providing a tailored PD experience. In the last two years of the program, each fellow assumes a school leadership role all the while continuing to improve upon their practice through workshops, conferences, and the like.

MfA Berkeley is in its early stages of evaluation. There are four main questions guiding our evaluation: (1) How does MfA affect teaching/leadership of fellows? (2) Does MfA influence school culture in math and science teaching? (3) What is the impact of the MfA program beyond the individuals involved? (4) What role does having a cohort play for individuals or schools? To answer these questions, we are collecting background information from each fellow and baseline student achievement data, as well as surveys, interviews, and field notes from each of the PD experiences.

115 Title: UCI Cal Teach Noyce Summer Intern & Scholarships Program
NSF Noyce Award Number: 0934928
Principal Investigator: Brad Hughes
Email: bhughes@uci.edu
Institution: University of California, Irvine
Co-PI(s): Debra Mauzy-Melitz, Sue Marshall, Beth VanEs, and David Bader (James Wood)
Presenter(s): Brad Hughes, UCI, bhughes@uci.edu

The UCI Cal Teach Noyce Summer Intern & Scholarships Program has two primary components, including the Summer Internships for freshmen and sophomores along with the Scholarships for senior students involved in their student teaching. The summer internship program provides opportunities for early STEM majors to explore teaching in informal science centers (ISC), such as the Aquarium of the Pacific, Discovery Science Center, Crystal Cove Alliance, and UCI Sailing Summer Camps. The Noyce scholarships provide funding to offset tuition for STEM majors to concurrently pursue a bachelor’s degree and a teaching credential in a STEM field and complete both degrees in four academic years. During the 2010–11 academic year, twenty UC Irvine undergraduate students were recruited to participate in a summer internship at ISCs. In 2011–12, twenty more interns were accepted into the program, three of them are Advanced Interns, which was added to the program to create a leadership continuum among the undergraduates. Two scholarships have been granted in the 2011–12 academic year.

All of the interns have had previous teaching experience at the K-6 and/or 7-12 levels. The 2010–11 interns reported gaining strong collaboration and reflection skills after completing their internship. They are very excited about being part of this project. They report believing that it will be an excellent opportunity to improve their technology, teaching, communication, and lesson planning skills and will give them the chance to find out if they would enjoy a career in teaching. The majority of interns are female, which will provide additional female science and math teacher role models in the secondary schools. Because less than
half of the 2010-11 interns felt comfortable using video based learning and video cameras, changes were made to the 2012 internship design to expand this training. The 2011-12 interns were exposed earlier and at a more advance level to video based learning and video production and editing procedures with the PI offering a whole day of individualized video shooting in a classroom for each intern and also supervised editing training in the media lab. Additional changes were made in the program design to increase intern’s ability to understand and develop lesson plans.

Internships are designed to serve as a recruitment tool for finding new STEM teachers and as such 47% (2010), 27% (2011) and 53% (2012) of the interns are unsure about pursuing a career in teaching and with the coming years of data we will find how well this internship achieves as a recruitment tool. Interns learn skills of video production and editing to support them in Video Club analysis of developing pedagogical skills. Many videos will be shown along with the poster presentations. These videos will be edited into documentaries on our program and as a recruitment commercial tool for teaching. As these interns proceed to become Scholars, their Video Club skills will be applied in online learning communities, and they will also be trained in professional development facilitation skills to encourage them to become teacher leaders beyond their training at our university. Of the 2010-11 interns, 63% were Caucasian or Asian, which has increased to 71% for the 2011-12 Cohort. Of the 2011-12 cohort, 18% are identified as Hispanic. We believe this is partially due to the demographics of UC Irvine undergraduate population. After completion of the 2011 internships, 90% of the cohort would pursue teaching because they enjoy teaching information to others and working with children/teens. All three cohorts entering the program reported having weaker skills in some areas of technology, presentation techniques, and lesson planning. Taking this into consideration, additional support and training to address these issues has increased throughout the three years of this program.

Two female scholarship students have been accepted into the program. Their duties include attending professional development seminars, and creating and facilitating professional learning communities (PLCs) in STEM disciplines. As part of the scholarship, scholars are active in teaching in the K-12 environment and video-based learning. The scholars will continue to teach in high-needs schools for the following two years.

Co-PI(s): Arlene Russell, Jody Priselac, and Bruce Rothschild
Presenter(s): Arlene A. Russell, University of California, Los Angeles, russell@chem.ucla.edu

Grounded on the “Planned Happenstance” theory* that chance and unexpected opportunities play a significant role in most peoples’ career decisions, Tipping the Balance provides a one- week, paid summer internship for STEM students interested in teaching. The synergistic confluence of a late September start for the UCLA quarter system and the social-justice focus of the UCLA Teacher Education Program provides ideal Noyce-type environments for internships for our STEM students who are considering teaching careers. Thirty-six students completed the internship during the week prior to the beginning of UCLA classes in summer 2010; another fifty-six students participated in 2011! Others who applied, but could not be accommodated were deferred to summer 2012. Several from the original intern cohort who have applied to UCLA’s credential program this fall cite the Noyce summer internship as a pivotal event in their decision to teach in high-need schools. Results of a survey of both the 2010 and 2011 cohorts and a progress report on the sixteen 2011 Noyce scholars will be presented.


117
Title: University of California Riverside, Robert Noyce Scholarship for Excellence in STEM Teaching
NSF Noyce Award Number: 0934297
Principal Investigator: Pamela S. Clute
Email: paulbshirk@gmail.com
Institution: University of California, Riverside
Co-PI(s): Bradley C. Hyman
Presenter(s): Paul B. Shirk, paulbshirk@gmail.com

A unique infrastructure in place at the University of California Riverside (UCR), within which STEM Departments have formed robust collaborative alliances with our Graduate School of Education and the ALPHA Center for Academic Partnerships, offers a novel platform for delivering the UCR Noyce Scholarship Program. Our goal is to provide exceptional STEM undergraduate majors and credential year students, who are committed to secondary mathematics and science teaching careers, with innovative professional development opportunities available both on the UCR campus and within the classrooms of our neighboring, under-performing, Moreno Valley Unified School District.

The UCR Noyce Scholarship Program builds on innovative pre-credential curricular foundations established at UCR under the auspices of our CalTEACH Science Mathematics Initiative (SMI). UCR’s SMI and Noyce Scholarship Programs together create a pathway of teacher preparation that can extend from the fresh-
man year through the UCR Credential Program and teacher induction phase. Relying on strong recruitment strategies that focus on attracting students from underrepresented groups, our Noyce Scholar cohort now includes 15 students—5 undergraduates and 10 credential year students—35% of whom are non-Caucasian/non-White underrepresented minorities. Approximately 50% of our Noyce Scholars concurrently pursue the Master's in Education (M.Ed.) Program while completing the single-subject teaching credential certification program.

In addition to academic year placements in the Moreno Valley School District, professional development opportunities also include summertime apprenticeships in STEM enrichment programs held at local elementary and secondary schools under the sponsorship of UCR's California Mathematics Science Teachers Initiative, College University School Partnership, Girls Excelling in Mathematics with Success, and Mathematics Academy for Teaching Excellence programs, accompanied by enriched content and pedagogy training via UCR's Dynamic Genome and SMI's Scientific Teaching intensive summer institutes. By longitudinal surveillance of our Noyce Scholars via internal and external evaluations, we are asking relevant questions that address new teacher retention.

One specific research avenue investigates just how rapidly beginning in-service teachers are able to introgress deep content knowledge into their classrooms in the face of overwhelming challenges confronting young educators that may catalyze premature departures from teaching careers.

118
Title: Undergraduate Mathematics and Science Education Initiative (UMSEI) at UCSD
NSF Noyce Award Number: 0934223
Principal Investigator: Amanda Datnow
Email: christopher.halter@gmail.com
Institution: University of California, San Diego
Co-PI(s): Jeff Remmel, Christopher Halter
Presenter(s): Chris Halter, UCSD, chalter@ucsd.edu

Education Studies (EDS) and the Physical Sciences Division (PSD) at the University of California, San Diego (UCSD) are collaborating on an initiative to significantly increase the number of undergraduate STEM majors who pursue a career in public school teaching. The UCSD Undergraduate Mathematics and Science Education Initiative (UMSEI) is part of the University of California Systemwide California Teach Program. EDS and PSD implemented two undergraduate minors in mathematics education and science education in 2006-07. These minors engage lower-division STEM students in early field experiences and upper-division students in education foundations coursework, discipline-specific pedagogy and intensive apprenticeship experiences to prepare students to enter the UCSD graduate intern credential program. The focus of the minor is to support the development of content specific pedagogy, powerful teaching practices coupled with deep content knowledge, within perspective K-12 mathematics and science teachers. The work around the California Teach project has also supported deep and consistent collaboration between EDS and PSD about teacher knowledge and preparation. Noyce Scholarship funding is utilized to recruit 65 mathematics, chemistry, physics, geoscience and engineering majors into the undergraduate minors and graduate intern credential program.

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Title: Noyce Master Teacher Fellowship (MTF) @ UCSD
NSF Noyce Award Number: 1136369
Principal Investigator: Amanda Datnow
Email: christopher.halter@gmail.com
Institution: University of California, San Diego
Co-PI(s): Jeff Remmel, Christopher Halter
Presenter(s): Chris Halter, UCSD, chalter@ucsd.edu

The Education Studies Program and the Physical Sciences Division of the University of California San Diego have established a Master Teacher Fellowship (MTF) program as part of their California Teach (CalTeach) Noyce Teacher Scholarship Program. This effort is a partnership with local high-needs school districts, mentor teachers, and local community colleges.

The intellectual merit is realized through the professional development offered to 42 local STEM teachers to serve as mentors and education leaders in high-needs school districts. Throughout the academic school year, Fellows participate in targeted online courses to further develop specific content and pedagogical skills. During the summer, Fellows join UCSD faculty for institutes in either mathematics or science instructional topics. UCSD has also established a Master Teacher in Residence program that recruits an MTF to join the university faculty each year, engaging them in teaching university coursework and supervising Noyce Scholars.

Expectation for broader impacts result from the project's further understanding of the critical components of learning and expertise development for teachers: the importance of mentorship, expertise development through experience, social networks, and blended learning. Finally, by enhancing the quality of mentorship that UCSD prospective teachers in the STEM fields receive, the project helps support the recruitment of highly qualified teachers in high need schools.
Title: UCSC Robert Noyce Scholarship Program

NSF Noyce Award Number: 0934735

Principal Investigator: Jane Conoley
Email: ograin@math.ucsb.edu

Institution: University of California, Santa Barbara
Co-PI(s): Pierre Wiltzius, Julie Bianchini, Bill Jacob, and Petra van Koppen
Presenter(s): Christopher Ograin, University of California, Santa Barbara, ograin@math.ucsb.edu

The Gevirtz Graduate School of Education at the University of California, Santa Barbara (UCSB) is honored to be a participant in the Noyce Program. Our program provides scholarship opportunities for select graduate students in the Teacher Education Program (TEP) who are interested in teaching K-12 mathematics or science. These highly qualified students have backgrounds in a variety of STEM fields, and some enter the program after spending some time as engineers or scientists. The Noyce Scholars at UCSB are expected to participate in several extra-curricular activities throughout their time in the TEP. In particular, the leadership for the Noyce Program formed partnerships with the UCSB Office of Academic Preparation, which hosts the Summer Algebra Academies at local secondary schools, as well as partnerships with the UCSB Math Project and the South Coast Science Project, two professional development programs funded by the California Subject Matter Projects. Through these partnerships, Noyce Scholars participated in a two-week long program in the summer prior to entering the TEP.

In this program, students learned about inquiry-based approaches to learning, observed local classrooms in which lessons were taught through problem solving and experimentation, interacted with in-service teachers in a collaborative environment, and formed bonds with their fellow Scholars. This program greatly enhanced the professional preparation of the Noyce Scholars who participated. During the academic year the Scholars continued their professional development through activities that included talks from innovative teachers in the community, Performance Assessment for California Teachers, preparation support, job search techniques, and opportunities to network with UCSB faculty, Noyce alumni, and current Noyce Scholars. We take great pride in offering an immersive experience for our Scholars in which all aspects of the professional life of a mathematics or science teacher can be experienced and explored.

Title: UCSC Noyce Teacher Scholars: Next Steps for Research and Induction

NSF Noyce Award Number: 0833340

Principal Investigator: Gretchen Andreasen
Email: gha@ucsc.edu

Institution: University of California, Santa Cruz
Co-PI(s): Sheldon Kamieniecki and Michael Isaacson
Presenter(s): Alisun Thompson, Education Department, UCSC, alisun@earthlink.net

Gretchen Andreasen, Cal Teach, UCSC, gha@ucsc.edu, Scholars and Partner Districts

The Noyce Teacher Scholars Program at the University of California, Santa Cruz (UCSC) is funded to support 32 scholars in five cohorts to attend UCSC’s one-year MA/credential program. Applicants are recruited from UCSC’s undergraduate Cal Teach program which provides middle and high school science and math classroom internships and supporting seminars. Partner districts, Gonzales Unified, Pajaro Valley Unified, and Santa Cruz City, help select scholars. The fourth cohort of 10 scholars has been selected for 2012-13. Six scholarships remain to be awarded next year. All 10 scholars from the first- and second-year cohorts are employed in high-need districts, half in partner districts.

As hiring season begins for the third cohort of 7 scholars, the relationship with the partner districts continues to strengthen. One principal commented that her district did not need career fairs— they could contact their local Noyce Scholars program instead. Confidence in the collaboration has developed gradually, and it puts the partnership on strong footing for work with future cohorts.

In 2011-2012, the first- and second-year cohorts were interviewed about their beginning teaching experiences. Preliminary findings confirm the importance of school-level organizational conditions that support beginning teacher’s sense of efficacy and development of curricular expertise (i.e., pedagogical content knowledge). Findings suggest a crucial component of beginning teacher job satisfaction and retention is having an appropriate and manageable teaching assignment and the opportunity to collaborate with colleagues about curricular issues. Job satisfac-
tion and commitment were high in cases where the teacher had a manageable teaching load (i.e., fewer different classes to prepare), had a colleague who had taught their course(s) previously and could provide materials and support, and was given the opportunity to teach the same course(s) in subsequent years. Implementing an induction program has been challenging, with new teachers spread among partner and non-partner schools across the state and nation and busy with state-mandated teacher induction within their districts. However, research has revealed how and in what contexts teachers value professional development. These findings will shape the induction model for future Noyce scholars, which will include on-site, in-department mentoring and curricular support.

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Title: The University of Chicago Urban Teacher Education Program in Math or Biology: An Extended Residency-Induction Model  
NSF Noyce Award Number: 0934845  
Principal Investigator: Kavita Kapadia  
Email: dougoroark@uchicago.edu  
Institution: University of Chicago  
Co-PI(s): Paul Sally and Michael LaBarbera  
Presenter(s): Douglas O’Roark, University of Chicago, dougoroark@uchicago.edu

Students in the University of Chicago’s Urban Teacher Education Program in math or biology (UCHicago UTEP) prepare for two full years at the university before earning a master’s degree and teaching certification. In the program’s second year, these students are partly supported through the Noyce Teacher Scholarship Program. Preparation is explicitly geared towards teaching within the Chicago Public School system. Admission into UChicago UTEP requires a strong background in mathematics or biology, with further coursework in these subjects mandated throughout the two year program. At the same time, UChicago UTEP prepares its student to teach in urban schools in several ways, for example: A “Soul Strand” seminar that attends directly to issues of race, class, and culture; 10 to 15 structured field visits to a variety of urban middle and high schools; two semester long student teaching placements in Chicago Public Schools. For three years after receiving their degrees our graduates receive bi-weekly one-on-one coaching sessions and attend monthly induction sessions with members of their graduating cohort. In 2011, UChicago UTEP Secondary produced its first graduates, all of whom are teaching in underserved schools on Chicago’s south and west sides. Currently 25 students are enrolled in the first or second year of the program; our goal is to expand to 30 to 40 students per year within three years. UTEP’s elementary education program has an over 90% retention rate within the public school system in Chicago in its nine years of existence, and the secondary component seeks similar results.

124  
Title: The Noyce Program at the University of Cincinnati  
NSF Noyce Award Number: 1035323  
Principal Investigator: Helen Meyer  
Email: helen.meyer@uc.edu  
Institution: University of Cincinnati  
Presenter(s): Helen Meyer, University of Cincinnati, helen.meyer@uc.edu

On this poster we will share how the Noyce scholarship funds created a starting point for moving to a boutique program, running in parallel with the traditional secondary licensing programs, into a program integrated into several university programs.

Discussion points will include: a) contextual background; b) stacking grant and other externally funded programs; c) using small scale pilot activities to influence the established program; d) the power of exposure; and e) sticking points and challenges. The poster will include a descriptive case study of the convergence of activities at UC that created opportunities for change and reflective analysis of the potential and impact of the factors above in closing the gap between specialized program and traditional programs, as well as focusing on the structures, institutional, state policy, and budgetary issues that hinder institutionalization.

125  
Title: Colorado Noyce Phase II: Challenging Traditional Assumptions about Teacher Preparation  
NSF Noyce Award Number: 0833258  
Principal Investigator: Valerie K. Otero  
Email: noah.finkelstein@colorado.edu  
Institution: University of Colorado Boulder  
Co-PI(s): Laurie Langdon, Noah Finkelstein, David Webb, Mike Klymkowski  
Presenter(s): Noah Finkelstein and Valerie Otero

CU Boulder’s Noyce Phase II Fellows participate in research and development teams with teachers and university faculty members. Their experiences are closely tied to the Colorado Learning Assistant (LA) program and the CUTeach program. Noyce Fellows’ participation in research and development teams serves as a central activity in their preparation for teaching. Data has been collected that demonstrates that Noyce Fellows/LAs engage in more research-based teaching practices than their peers once they are hired and teaching in K-12 schools. We hypothesize that their experiences working closely on teams that value their thinking is responsible. The activities of Noyce Fellows at CU Boulder are not attempts to give prospective teachers knowledge about teaching, but instead to provide prospective teachers with experiences on teams of faculty, teachers, and prospective teachers designed to help all participants generate knowl-
edge through the collaborative contributions of "all" competent thinkers. Data supporting the effectiveness of this model will be presented.

126
Title: Colorado Streamline to Mastery: Challenging Traditional Assumptions about Professional Development
NSF Noyce Award Number: 934921
Principal Investigator: Valerie K. Otero
Email: Valerie.Otero@colorado.edu
Institution: University of Colorado Boulder
Co-PI(s): Laurie Landon, Noah Finkelstein
Presenter(s): Valerie Otero, University of Colorado Boulder, valerie.otero@colorado.edu

This project takes a progressive approach, starting with reframing the fundamental philosophy that guides traditional assumptions of how learning can happen in professional development environments' building on, rather than questioning, the abilities and wisdom of people who devote their lives to teaching. Teachers conduct classroom research and the goal of this centralizing activity is the critical examination of assumptions about teaching and learning. The mechanism by which such reflection occurs is scientific inquiry into one's own practice, the practices of others, and the practices of students. This design is much like that of any scientific laboratory -- knowledge generation is the goal and at its heart, all participants play critical, productive roles as knowledge producers as well as expert learners.

This program goes beyond the buzzwords of "inquiry-based" and "student-centered" and into the realm of fundamental reorganization of learning contexts for teachers. The Streamline to Mastery activities serve as mechanisms both for the professional growth of participants and as a model for how scientific inquiry into personally and professionally meaningful problems leads to knowledge generation. The model holds true to Vygotsky's intention for the term "Zone of Proximal Development," in that work with "a more knowledgeable other" is not a matter of the expert providing assistance to the newcomer/apprentice, but a matter of knowledge generation occurring through the collaborative contributions of all competent thinkers. Data supporting the effectiveness of this program will be presented.

The Hawaii Noyce Teacher Scholarship (HiNTS) Program is committed to increasing the number of qualified secondary math educators in Hawaii. Given the small size and insular nature of Hawaii, we are faced with two related issues: 1) attracting top students to pursue math education as a career, and 2) keeping the talented math teachers we already have. Hence, the first year of the HiNTS program has concentrated its efforts on recruitment and retention.

We addressed these issues by creating an activity meant to engage students with math in a fun and hands-on manner. Our activity -- "Math Day Murder Mystery" -- was structured around the mathematics involved in a crime-scene investigation. It targeted college freshmen and sophomores to get them interested in math education as a potential career. We then presented these same activities at the 2012 Big Island Math Summit, where elementary and secondary math educators met and discussed strategies for getting their students more excited about math.

Math Day and the Math Summit were both met with excitement as they allowed participants to think about learning math in non-traditional ways. Our goal for the future is to move towards more culture-based activities that reflect the unique location and culture of Hawaii.

128
Title: Robert Noyce Teacher Scholarship Program at the University of Houston
NSF Noyce Award Number: 0833342
Principal Investigator: Laveria F. Hutchison
Email: lhutchison@uh.edu
Institution: University of Houston
Co-PI(s): Jeff Morgan
Presenter(s): Laveria F. Hutchison, University of Houston, lhutchison@uh.edu
Maria Villegas, NOYCE Scholar (Biochemistry), University of Houston, mvillegas@uh.edu
Susan E. Williams, University of Houston, sewilliams@uh.edu
Robert Houston, University of Houston

The University of Houston poster will concentrate on the following areas of their Robert Noyce Teacher Scholarship Program:

- Recruiting and Marketing
- Summary of the description of purpose and goals of the teachHOUSTON program and how those goals support and blend with the Noyce program
- Selection process used to identify Noyce Scholars and statistical summaries about the scholars
- Growth/success of the teachHOUSTON Program and how the Noyce Program has contributed to this and to the success and achievement of the Noyce scholars
• A description of the summer leadership experiences for Noyce Scholars through the Bernard Harris Summer Science Camp (sponsored by teachHOUSTON)

• Impact of the teachHOUSTON program (with emphasis on Noyce Scholars) on the city of Houston. Statistical summaries of teachHOUSTON and Noyce Scholar graduates will be presented that show the high percentage who are now teaching secondary math and science in high needs districts and schools.

129
Title: Cross-Disciplinary Faculty Collaborations in Efforts to Recruit, Prepare, and Retain Secondary Mathematics Teachers
NSF Noyce Award Number: 1135222
Principal Investigator: Rebecca Judith Quander
Email: quanderr@uhd.edu
Institution: University of Houston-Downtown
Co-PI(s): Nancy Leveille, Tim Redi, and Jackie Sack
Presenter(s): R. Judith Quander, The University of Houston-Downtown, quanderr@uhd.edu

The UHD Noyce Mathematics Teacher Scholarship Program is the result of a multi-year collaboration between mathematics and mathematics education faculty in the department of Computer and Mathematical Sciences and mathematics education faculty in department of Urban Education. In 2010, we begin working on improving the elementary mathematics education program via a College and Career Readiness Initiative Faculty Collaborative Grant.

In 2011, we were awarded a NSF-Noyce Teacher Scholarship grant which has allowed us to focus on our secondary mathematics education program. Finally, a third Teacher Quality grant is allowing us to provide professional development for local teachers who will then serve as mentor teachers to our Noyce scholars. In this presentation, I will describe the various collaborative activities that we have engaged in and future activities directly related to the Noyce teacher scholarship program that we are currently planning. In addition, I will provide the qualitative characteristics of our collaboration and some artifacts of our work.

130
Title: UK-NOYCE: New Opportunities Yielding Classroom Excellence
NSF Noyce Award Number: 0733790
Principal Investigator: Margaret Mohr-Schroeder
Email: m.mohr@uky.edu
Institution: University of Kentucky
Co-PI(s): Jana Bouwma-Gearhart, Bruce Walcott, and Jeffrey Osborn
Presenter(s): Andy Jones, Grant County High School, andy.jones@grant.kyschools.us

Christy Williams, George Rogers Clark High School, christy.williams@clark.kyschools.us
Margaret J. Mohr-Schroeder, University of Kentucky, m.mohr@uky.edu

The purpose of the University of Kentucky New Opportunities Yielding Classroom Excellence (UK-NOYCE) Mathematics and Science Fellows Program is to attract senior class students and practicing professionals, especially in underrepresented populations, in science, mathematics, engineering, and technology to become credentialed secondary mathematics and science teachers through a collaborative effort by the College of Education, College of Engineering, and the College of Arts and Sciences at the University of Kentucky (UKY). UK-NOYCE Fellows are then expected to teach secondary mathematics and science in selected school districts, especially in the Appalachian Region where UKY has already established a positive working relationship with high poverty secondary schools over the past 15 years. To date, the UK-NOYCE project has funded 41 Fellows, 60% who are already teaching in high needs school districts.

131
Title: The La Verne Noyce Teacher Scholarship Program
NSF Noyce Award Number: 0934965
Principal Investigator: Christine Broussard
Email: cbroussard@laverne.edu
Institution: University of La Verne
Co-PI(s): Marga Madhuri, Vanessa Preisler, Yousef Daneshbod, and Donna Redman
Presenter(s): Christine Broussard

The La Verne Noyce Teacher Scholars (LVNTS) program is a collaborative effort between the University of La Verne’s College of Arts & Sciences (CAS), College of Education & Organizational Leadership (CEOL), and local high need school districts in Southern California. The University, a not-for-profit, private liberal arts college, established in 1891, serves a diverse socioeconomic student body including 54.6% students of color, 38% first-in-family to attend college, and 80% receiving financial aid. It is classified as a Hispanic-Serving Institution (HSI) due to the high proportion of Latina/Latino students (35.1%). The student body reflects the local community. Increasing the number, diversity, and quality of STEM teachers will substantially impact the success of students in the community, increase the number of well-trained employees to fill an expanding job market with a requirement for STEM training, and improve our ability to compete in a global society.

The six goals of the LVNTS program were to 1) strengthen the University of La Verne’s STEM teacher education program; 2) increase the number and diversity of STEM students who consider teaching career; 3) increase the number of STEM majors prepared for a career in STEM teaching; 4) enhance recruiting
and program content by providing internship opportunities for research, curriculum, and professional development in conjunction with the faculty; 5) provide a framework of support for new STEM teachers; and 6) provide a comprehensive assessment to evaluate effectiveness of the program. The LVNTS program proposed to accomplish these goals by: (1) coordinating the STEM teacher training efforts of CAS and CEOL, (2) recruiting from multiple institutions and with varied modalities (including enhancing financial aid literacy and early summer internship opportunities), (3) providing an undergraduate field experience for prospective teachers, (4) providing an exemplary credential program, and (5) continuously assessing LVNTS efforts at every level of the program. We present data collected thus far (two years in) on the effectiveness of financial aid literacy, inquiry-based learning, early field experiences, and new teacher support in recruiting, success, and retention of diverse STEM teachers.

132
Title: The Noyce Program for Early START STEM Students and Career Choices at the University of Louisville
NSF Noyce Award Number: 0934787
Principal Investigator: Nancy Caroline Martin
Email: nancymartin@louisville.edu
Institution: University of Louisville
Co-PI(s): Christine Rich, Thomas Riedel, Thomas Tretter, and William Bush
Presenter(s): Nancy Caroline Martin, University of Louisville, nancymartin@louisville.edu

Our Noyce Program, a partnership between the University of Louisville, the Jefferson County Public School System and TEACH Kentucky (TKy) currently has 12 scholars. There are two ways to enter the program. The first is through a University of Louisville Program called EARLY START STEM which allows undergraduates to complete up to nine credit hours of Masters in the Art of Teaching (MAT) courses concomitant with completion of their disciplinary degrees. The second is a ‘career changers’ pathway where science and math majors go directly into a four semester MAT program. Six scholars will be entering the classroom as teachers of record in fall 2012. Three will teach mathematics, two chemistry and one biology, all at the high school level. Two came through the EARLY START pathway and 4 via the direct MAT pathway. Four additional scholars, two in biology, one in chemistry and one in mathematics are mid way through their MAT and two new scholars will start their MAT this summer.

Recruiting remains a challenge. In addition to our previous strategies, we posted new information in all science and math departments, the College of Arts and Sciences posted Noyce information on their face book page and sent e-grams to all alumni, the College of Education and Human Development increased their efforts to let all students know of the Noyce opportunity and specifically reached out to those applicants who met our strict qualifications. TKy also helped with recruiting and two of their candidates interviewed for a Noyce and one accepted.

Finally, we have done some social programming for Noyce Scholars this year. They were included in two TKy events, two informal dinners with the grant PI and Co-PIs and a banquet with the Provost. One scholar attended the national meeting in 2011 and three will attend in 2012. We will be doing an evaluation to determine whether these activities are helpful to the scholars in building relationships among the scholars and between the scholars and faculty.

133
Title: UMBC Noyce Scholars Program: The Use of an Intensive Summer Inquiry-based Teaching Experience for Recruitment
NSF Noyce Award Number: 0833316
Principal Investigator: Neerchal Nagaraj
Email: jsinger@umbc.edu
Institution: University of Maryland, Baltimore County
Co-PI(s): Jonathan Singer, Susan Blunck, and Janice Zengel
Presenter(s): Jonathan Singer, University of Maryland, Baltimore County, jsinger@umbc.edu

This poster will address the ongoing work of a key component of the UMBC Noyce Scholars program: an intensive summer internship consisting of a 6-credit hour pedagogical experience that satisfies certification requirements associated with curriculum, instruction, and student learning.

The poster will describe:
- The core elements of the introductory summer experience
- The lessons learned
- Qualitative findings associated with the quality of this early teaching experience and
- The impact on recruiting summer participants into formally applying for NOYCE Scholarships.

This summer experience is marketed to STEM majors ideally during the sophomore spring semester. With no tuition cost and extensive opportunities to plan, construct and enact lessons for actual secondary students, it serves to entice STEM majors to consider a career in teaching. The summer courses are modeled after previously funded projects directed by Dr. Singer. Core components include the integration of 2 extended practice teaching sessions. The first utilizes a consecutive eight-day (90 minute per day) teaching opportunity led by the course instructor. During each lesson, Scholars work with small groups of middle school students to enact the instructional activities. The students leave after 90 minutes and the remaining 45-60 minutes are spent in discussion and reflection on the enacted lesson. The second session requires small groups of Scholars to adapt and enact an inquiry project consisting of 8 (90 minute lessons) to a
population of high school students, drawn from a residential Upward Bound program associated with UMBC.

Four critical outcomes from this summer experience include:
- Providing a highly engaging recruiting experience for STEM majors
- Interaction with high school students from high needs environments
- An in depth experience with integrating technology to support inquiry-based instruction
- The active participation of publicly sharing and critiquing examples of teaching.

134
Title: S2TLC: Supporting STEM Teaching and Learning through Communities
NSF Noyce Award Number: 1135392
Principal Investigator: Kathleen S. Davis
Email: kdavis@educ.umass.edu
Institution: University of Massachusetts, Amherst
Co-PI(s): Sandra Madden, Barbara Madeloni, Steve Schneider, Paula Rees
Presenter(s): Kathleen S. Davis, University of Massachusetts Amherst, kdavis@educ.umass.edu

S2TLC: Supporting STEM Teaching and Learning through Communities is a six-year, $4.5 million project funded by a $3 million NSF grant through the Robert Noyce Master Teacher (MTF) and Teacher Fellowship (TF) solicitation and $1.5 million in matching contributions from the University of Massachusetts and project partners. S2TLC is a collaboration among faculty in the UMass Department of Teacher Education and Curriculum Studies, the College of Natural Sciences, the College of Engineering and public schools in the Pioneer Valley of Massachusetts, including Springfield Public Schools, Holyoke Public Schools, Greenfield Public Schools, Mahar Regional School District, and the Hitchcock Center for the Environment in Amherst. The UMass research team consists of Drs. Kathleen Davis, Sandra Madden, Barbara Madeloni, Stephen Schneider, and Paula Rees.

A dynamic and interactive community of 20 inservice middle and high school mathematics and science teachers from partner school districts has been selected and 20 preservice teachers are currently being recruited to engage in the development of multiple levels of professional communities of practice, both face-to-face and virtual. S2TLC proposes to increase the number of highly effective STEM teachers who will strengthen student engagement and achievement. In particular, the funding will 1) provide in-service secondary mathematics and science teachers with professional development in effective inquiry, place-based, and culturally responsive instructional practices, leadership, and mentoring skills; 2) revise and implement an initial licensure teacher program for secondary mathematics and science teachers in order to better ensure their retention in the profession and successful instruction; 3) develop virtual and face-to-face communities of practice to provide teachers with support for effective instruction and to lessen the traditional isolation of classroom teachers; and 4) develop mathematics and science content courses that integrate the use of cognitive technological tools to facilitate learning.

135
Title: Noyce Scholars - Perfecting Induction and on-going New Teacher Supports
NSF Noyce Award Number: 1035247
Principal Investigator: Lisa M. Gonsalves
Email: lisa.gonsalves@umb.edu
Institution: University of Massachusetts, Boston
Co-PI(s): Brian White
Presenter(s): Lisa M. Gonsalves, University of Massachusetts at Boston, lisa.gonsalves@umb.edu

The University of Massachusetts Robert Noyce program continues to grow and enjoy the support of our partner districts. Most exciting is the news that our upcoming 2012-2013 class will support 21 STEM teachers, eleven of whom are candidates of color. This is our most diverse class yet. These future STEM teachers will be supported by our Noyce Phase II grant and a Teacher Quality Partnership grant that we received a few years ago.

We continue to conduct research through our Noyce Scholarship programs. This year our research has focused on STEM teachers' ability to design, use and analyze both formative and summative assessments for continuous student learning. As part of our assessment curriculum, we have designed a cycle of inquiry that accounts for the developmental trajectory of new STEM teachers and the beliefs, perceptions and experiences that influence their teaching behaviors. We hope to present these findings at this conference.

The UMass/Boston Noyce Scholars program, in partnership with the SUNY Cortland and the Drexel Noyce programs held our first North East Regional Conference last year in Philadelphia, and will host the second North East Regional Conference in Boston in 2012. A number of current and former Noyce Scholars participated on a panel on the experiences of STEM teaching.

Last, we have finally been able to provide induction support to our new STEM graduates in both our Boston and Randolph programs. Graduates of our Teach Next Year residency program now receive three years of induction support from both the district and the university; members from both organizations have worked as a team over the past year to build this new induction program for Noyce scholars.
The University of Massachusetts Dartmouth NSF TEACH! SouthCoast Program is in its first year. Our program partners include the Ocean Explorium at New Bedford Seaport and the New Teacher Center in Santa Cruz, CA. PI Karen O’Connor, is the Executive Director of the Center for University School & Community Partnerships in the University’s School of Education, Public Policy and Civic Engagement. Our co-PIs represent the University’s College of Engineering (Tesfay Meressi, Associate Dean) and our partnership with the Ocean Explorium (Mark Smith, Executive Director). School partners include three high need public school systems (Fall River, New Bedford & Wareham), two high need vocational technical high schools (Diman Vocational Technical High School and Greater New Bedford Vocational Technical High School) as well as a high need charter school (Global Learning Charter Public School). This poster will illustrate the program objectives, which include an endorsement from the Department of Elementary and Secondary Education for a new Technology/Engineering initial teaching license. It will also show the results of our recruitment efforts and selection processes. We are seeking 10 Master Teaching Fellows and 20 Teaching Fellows, and plan to begin their coursework in Summer 2012.

The University of Massachusetts Dartmouth NSF Robert Noyce Teaching Scholarship Program is now in its fourth year. Two of our cohorts have graduated, earning their teaching license, and are now working in local urban schools. This poster will share their thoughts on their “readiness” for teaching as a result of the Noyce program. This poster will also illustrate the new recruitment efforts and results for the past academic year, including classroom visits and a new and improved website, with comments from current and former Noyce Scholars.

Improving Mathematics, Physics and Chemistry Teaching (IMPACT) is designed to recruit, prepare, and retain highly qualified teachers of physical science and mathematics in high needs schools. IMPACT is a collaboration between the University of Minnesota’s College of Science and Engineering and the College of Education and Human Development with two local urban school districts: Anoka-Hennepin and St. Paul Public Schools. The focus of this poster is the retention component of our Noyce program. The Teacher induction Network (TIN) is an on-line mentoring program for license completers in secondary science and mathematics. TIN incorporates reflective journals, topical discussion threads and professional development inquiries that provide a space for beginning teachers to continue to develop as teachers. Until recently, developers of online mentoring programs have used lesson plans as a proxy for direct observations of classroom practice.

However, recent developments in video annotation methods and tools make the use of video for examining and improving reflective practices increasingly viable within online environments. Through the strategic development and use of video annotation tools within TIN, our beginning teachers’ reflections on their classroom teaching are linked directly to evidence through video as documentation. The integration of VideoAnt into TIN represents a promising practice that promotes the development of reflective practitioners and provides a free and user-friendly on-line platform for sharing and providing feedback on classroom teaching.
139  
**Title:** MU Noyce Scholars Program for Science and Mathematics Teachers  
**NSF Noyce Award Number:** 0832755  
**Principal Investigator:** Troy Sadler  
**Email:** souciema@missouri.edu  
**Institution:** University of Missouri  
**Co-PI(s):** Alan Whittington, John Adams, and Oscar Chavez  
**Presenter(s):** Marilyn Soucie, University of Missouri, souciema@missouri.edu

The goal of this Noyce-funded project is to recruit more highly qualified individuals into careers in mathematics and science teaching. In particular, we recruit individuals with undergraduate degrees (or higher) in mathematics or science who are planning to change career paths into the field of teaching. These students are prepared through SMAR2T: Science and Mathematics Academy for the Recruitment and Retention of Teachers, an alternate route to certification.

The Noyce program will provide 42 stipends of $10,000 each to qualified STEM professionals who hold a baccalaureate, masters, or doctoral degree in mathematics, science, or a related field. These students are obligated to teach mathematics or science for two years in a high need school district (preferably in Missouri), within 4 years of program completion. We will also create an online social network for SMAR2T/Noyce students and graduates to provide continuing emotional and pedagogical support.

140  
**Title:** Tomorrow’s Teachers with Dual Degrees in Mathematics and Mathematics Education  
**NSF Noyce Award Number:** 1035446  
**Principal Investigator:** James Tarr  
**Email:** tarrj@missouri.edu  
**Institution:** University of Missouri  
**Co-PI(s):** Barbara Reys and Carment Chicone  
**Presenter(s):** James Tarr, University of Missouri, tarrj@missouri.edu, Victor Soria, University of Missouri, soria@missouri.edu

Tomorrow’s Teachers with Dual Degrees in Mathematics and Mathematics Education is aggressively working to double the number of secondary mathematics teachers graduating from the University of Missouri’s (MU) undergraduate mathematics teacher education program through the recruitment of mathematics majors into mathematics teaching careers, preparation of these individuals to teach mathematics aligned with national standards, and support of mathematics teachers in their induction years. The project is providing summer mathematics teaching internships, dual degree programs (B.S. in Mathematics and B.S. Ed. in Mathematics Education), and $10,000 annual scholarships for those committed to teaching mathematics in high-needs school districts. To increase teacher retention, the project is developing a cadre of mentor teachers in partner schools and supporting Noyce Scholars’ participation in professional mathematics teacher conferences.

The intellectual merit of this project is based on the qualifications and commitment of project personnel to inform our understanding about recruiting, preparing, and retaining more highly qualified secondary mathematics teachers. The project team has a substantial record of scholarship, partner schools have a rich history of collaboration, and cross-college collaboration is highly valued at MU.

The project aims to: (1) improve the quality and quantity of mathematics teachers for Missouri schools; (2) build new sustainable models for the recruitment, preparation, and retention of mathematics teachers to meet the teacher shortage; (3) expand and deepen relationships between MU mathematicians, mathematics teacher educators, and K-12 teachers and administrators; and (4) disseminate findings from the external evaluation via conference presentations and publications.

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**Title:** MU Noyce Scholars Program for Science and Mathematics Teachers  
**NSF Noyce Award Number:** 0934839  
**Principal Investigator:** Patricia Friedrichsen  
**Email:** eb4nd@mail.missouri.edu  
**Institution:** University of Missouri, Columbia  
**Co-PI(s):** Mark Volkman, Marcelle Siegel, Dorina Kosztin, John Adams, and Alan Whittington  
**Presenter(s):** Ellen Barnett, University of Missouri, eb4nd@missouri.edu

The goal of the T2D2@MU project is to double the number of secondary science teachers graduating from the University of Missouri. To recruit science majors into our secondary science teacher education program, we designed new dual degree majors. This new program allows students to earn a degree in a science field (Biology, Chemistry, Environmental Geology or Physics) and a degree in Education.

To recruit students into the dual degree program, we are using a variety of strategies:

1. Through brochures, fliers, guest speakers in large-enrollment science courses and our website, we are informing students of the dual degree program.
2. We are teaching an additional revised section of Introduction to Science Teaching to help students explore the dual degree program.
3. To explore science teaching as a career option, we are offering a total of 30 paid summer internships in informal science settings (Years 1-3).
In addition, the Noyce program will provide a total of 50 1-year $11,000 scholarships to eligible juniors and seniors in the dual degree program.

**142**

**Title:** Internships in an Urban High School: How do prospective Noyce scholars’ perceptions change?

**NSF Noyce Award Number:** 0833185

**Principal Investigator:** Arthur Odom

**Email:** alodom@umkc.edu

**Institution:** University of Missouri, Kansas City

**Co-PI(s):** Clare Bell, Assistant Professor, School of Education

Charles J. Wurrey, Executive Associate Dean, College of Arts and Sciences

Lynda S. Plamann, Associate Professor and Director of Curriculum, School of Biological Sciences

David A. Ketchum, University of Missouri, Kansas City

**Presenter(s):** Arthur Louis Odom, University of Missouri-Kansas City, alodom@umkc.edu

Prospective Noyce Scholars participated in pre-scholarship internships in a high need urban high school. Interns wrote pre- and post-internship essays about high school math or science teaching. Essays were analyzed for evidence of changes in the ways that participation in pre-scholarship school internships influence participants’ perceptions of what it means to be a math or science teacher and to teach in high-need schools. The participants’ essays provide evidence of changes in beliefs. Expectations shifted from being relatively idealistic to being relatively pragmatic. Future research questions for math and science teacher education are suggested.

**143**

**Title:** The NebraskaSCIENCE New Teacher Network: Professional Development, Mentoring and Networking for Noyce Scholars

**NSF Noyce Award Number:** 1035358

**Principal Investigator:** Jon Pedersen

**Email:** jep@unl.edu

**Institution:** University of Nebraska

**Co-PI(s):** Tiffany Heng Moss, Dan Claes, and Elizabeth Lewis

**Presenter(s):** Jon Pedersen and Nathan Van Meter, University of Nebraska-Lincoln, jep@unl.edu, nvanmeter1@gmail.com

The NebraskaSCIENCE New Teacher Network: Professional Development, Mentoring and Networking for Noyce Scholars is a program to support UNL’s Noyce Scholars as they move into the classroom as practicing science teaching professionals. The NTN incorporates face-to-face workshops, classroom observations (in person or virtual) and networking opportunities through Member to Member to support Noyce Scholars in their first three years of teaching. These first three years are key according to research since up to 50% of all teachers leave the profession during this time period. A key component of the NTN is the Master Science Teacher who acts as a consultant to the Noyce scholars providing support through one-on-one consultations regarding classroom issues.

**144**

**Title:** NebraskaNOYCE: Robert Noyce Teacher Scholarship Program

**NSF Noyce Award Number:** 1035268

**Principal Investigator:** Jim Lewis

**Email:** jlewis@math.unl.edu

**Institution:** University of Nebraska-Lincoln

**Co-PI(s):** Steve Swidler, Wendy Smith, Doug Kauffman, Ira Papick, and David Fowler

**Presenter(s):** Jim Lewis, University of Nebraska-Lincoln, jlewis@math.unl.edu

In Year 2 of our TF/MTF Noyce project, our first cohort of TFs are about to graduate, and will be starting teaching jobs this fall. Our second cohort of TFs is recruited, and will begin courses this summer. Our MTF cohort began coursework and leadership activities in Summer 2011, and have been very active across the state, providing leadership in mathematics teaching and learning. Half of the MTFs have chosen to enter a doctoral program at UNL. Our poster outlines in more detail the TF’s Master of Arts with an emphasis on mathematics teaching degree program, and on the ongoing activities of the MTFs.

**145**

**Title:** Recruitment Strategies for Expanding STEM Opportunities Through Rural Education: The UNH Noyce Teacher Scholarship Program

**NSF Noyce Award Number:** 1035443

**Principal Investigator:** Sharon McCrone

**Email:** smccrone@unh.edu

**Institution:** University of New Hampshire

**Co-PI(s):** Neil Portnay, Sarah Stitzlein, Dawn Meredith, Tim Fukawa-Connelly

**Presenter(s):** Dawn Meredith, Physics Department, University of New Hampshire, dawn.meredith@unh.edu

Sharon McCrone, Mathematics and Statistics, University of New Hampshire, sharon.mccrone@unh.edu

The Noyce Scholarship Program at UNH is designed to attract highly talented individuals from a range of STEM disciplines. Like many states, New Hampshire has a critical shortage of science and mathematics teachers, particularly in rural areas, where recruitment and retention of qualified teachers has always been a struggle. To help alleviate the shortage, our program couples strong preparation in content area and pedagogy with clinical experiences in rural settings and provides mentoring and professional development during the novice teachers’ induction years. Our poster will focus on recruitment strategies and results over
the first two program years. We have explored a variety of recruitment and awareness avenues. Even so, awareness of the scholarship remains low on campus. More importantly, we are not meeting our goal of recruiting an additional 8 to 10 STEM teachers each year, as stated in our proposal.

We have seen success in recruitment through our Noyce Summer Fellowship. During Year 1, we supported four Noyce Summer Fellows who worked in two of UNHs programs for high school students. Two of the four fellows subsequently applied for and were awarded Noyce Scholarships. We hope to build on this success in coming summers.

Other recruitment strategies include:
- Designing and distributing posters and brochures across the STEM departments.
- Word of mouth through visits to introductory STEM classes to raise awareness among freshmen and sophomores, and advanced classes to attract juniors and seniors who have not yet made career decisions.
- Peer-Led-Team Learning and Learning Assistant programs that bring advanced undergraduates into introductory courses as facilitators of group work. This is coupled with a course on pedagogy (co-taught by a high school teacher) to heighten awareness of the complexity of teaching and learning.
- Exploring Teaching in Mathematics and Science event publicized across all STEM departments. A panel of area high and middle school STEM teachers shared stories and answered questions.
- Booths at Career and Internship Fairs as well as Graduate School Fairs, both on-campus and at local universities.

Business School Marketing Workshop students have been researching potential solutions for Noyce awareness and recruitment efforts on campus. Results and suggestions from their final report will be shared, as well as sample recruitment paraphernalia.

146
Title: Real-time Formative Assessment: Just A Click Away?
NSF Noyce Award Number: 0833280
Principal Investigator: Jerry Walsh
Email: vgwicker@ung.edu
Institution: University of North Carolina at Greensboro
Co-PI(s): Jerry Walsh and Catherine Matthews
Presenter(s): Valerie Vickers, UNCG, Program Coordinator, Noyce Project ExSEL, vgwicker@ung.edu

Resources and strategies comparing the use of clickers as instructional tools in college classrooms and in the high school teaching assignments of two Noyce Scholars will be shared. Pedagogy of “real-time formative assessment” used in a college physics classes and examples of effective practices in current high school chemistry/biology classes as demonstrated by two Noyce student teachers are highlighted. Challenges that the Noyce student teachers are facing in their public school classrooms will also be addressed, along with possible outcomes. In real-time formative assessment, instructors pose an open-format question to the class, and the students utilize the clicker to respond. Instructors obtain immediate feedback, and tailor the direction of instruction accordingly. This methodology engages students and allows them to play a significant role in the classroom learning.

147
Title: Building Teacher Leaders through STEM Partnerships
NSF Noyce Award Number: 0934380
Principal Investigator: Cathy Barlow
Email: sugerikm@uncw.edu
Institution: University of North Carolina, Wilmington
Co-PI(s): Karen Wetherill, Martin Posey, and Paul Hosier
Presenter(s): Marty Sugerk (STAR Scholarship Project Coordinator), UNC Wilmington, sugerikm@uncw.edu

Building teacher leaders through STEM partnerships has been the focus of our scholarship program from year 2 to 3. The Strategic Scholarship Team in Action to Recruit (STAR Scholarship) provides an excellent opportunity to extend our recruiting to partnerships that can support STEM in a variety of areas. Our focus this year has been to expand the classroom by creating partners to collaborate with and connect teaching STEM in real world applications. We have also aligned these partnerships with transition into Common Core State Standards and Practices to ensure STAR scholarship recipients can hit the ground running as teacher leaders.

We encourage our recipients to ‘pay it forward’ by taking their support and sharing it with others. STAR scholars are active in university, district, school, and community functions. They have opportunities to build their capacity in training, presenting, coaching, and collaboration. We encourage STAR Scholars to build these skills in addition to their specific content and grade level teaching.

Our partners over the last year have been extremely important in providing STAR scholars the avenues to connected and integrated learning. From the Business Department and Stock Market analysis to Kayaking Excursions trips to analyze math and science in the field, STAR Scholars are embracing the STEM and Common Core change. Additionally, we have partners to develop STAR scholars literacy skills, State Department policy and support programs and initiatives, interviewing and resume writing strategies, as well as technology skills with our Center for Science, Technology, Engineering, and Mathematics. We have partnered with local teachers and principals to provide support for transitioning into a classroom in high needs schools. As we move forward, our STAR scholars are planning and implementing our
goals for next year. They have already begun to reach out to future partners to expand our support into STEM in the community.

148

Title: A Growing Trend: University of North Texas Science and Mathematics Robert Noyce Scholarship

NSF Noyce Award Number: 1035312
Principal Investigator: Colleen McLean Eddy
Email: Colleen.Eddy@unt.edu
Institution: University of North Texas
Co-PI(s): Pamela Esprivalo Harrell, John Quintanilla, and Lee Hughes
Presenter(s): Colleen M. Eddy, University of North Texas, Colleen.Eddy@unt.edu

The University of North Texas began Phase II of the Science and Mathematics Robert Noyce Scholarship Program in 2010. As of December 2011, 12 undergraduate and four graduate students have been awarded scholarships. Among the 16 Phase II scholars, 69% are mathematics majors and the GPA mean is 3.55 (SD = 0.33). Phase II has seen an increase in the number of undergraduate candidates being awarded scholarships. This increase is primarily attributed to the undergraduate STEM education program called Teach North Texas, which currently has over 200 mathematics and science majors taking classes in the program. The implementation of this program has seen an increase from 10 to 20 undergraduate and graduate science and mathematics teachers produced per year. Next year, the trend is expected to show another increase as more students complete the Teach North Texas program.

149

Title: The Noyce Scholarship Program of the University of Northern Colorado

NSF Noyce Award Number: 1035333
Principal Investigator: Robert J. Reinsvold
Email: lori.reinsvold@unco.edu
Institution: University of Northern Colorado
Co-PI(s): Cathleen Cravio, Valerie Middleton, Lori Reinsvold
(Pogram Coordinator)
Presenter(s): Lori Reinsvold, University of Northern Colorado, lori.reinsvold@unco.edu

The Noyce Scholarship Program of the University of Northern Colorado (UNCO) began in September 2010 with five goals: 1) increase the number of STEM teachers graduating from UNCO; 2) increase the number of STEM professionals completing Colorado teaching licenses; 3) increase the number of early STEM education experiences; 4) provide mentoring and PD support of STEM teachers during their induction year at high-need schools; and 5) assess, disseminate, and sustain the best recruitment and retention practices. By the end of the 5 year project, we propose to provide 22 Noyce Scholarships for highly qualified juniors and seniors in STEM majors that also complete the teacher preparation program; 8 Noyce Post-Bac Stipends for highly qualified STEM professionals that return to complete their teacher licenses in science or mathematics; 80 Noyce Internships for freshmen and sophomores for early STEM education experiences; at least 4 professional development seminars for each Noyce Teacher in the high-need schools; and mentors for each of the Noyce Teachers to support the induction phase of the Noyce Teachers. In the end, an additional 30 Noyce Teachers will start their teaching careers in high-need schools.

To implement the program, UNCO has partnered with 25 school districts, 19 of which are in rural communities where the need for science and mathematics teachers is very high. Most of the school districts also meet the high-need classification by having a high proportion of the students in poverty status (as measured by eligibility for free or reduced lunches). Each school district is committed to collaborating with UNCO during the early field experiences, student teaching, and consideration for employment of the Noyce Teachers.

Since Fall 2010, we selected 20 Noyce Scholars and 4 Noyce Post-Bac Scholars. Three Scholars are now teaching science in high-need schools, and one of the three is teaching in a rural school district. We have selected 31 Noyce Interns; six subsequently became committed to teaching and became Scholars. By May 10, 2012 two more Scholars and two more Noyce Post-Bacs will have graduated and completed their teacher preparation programs. They are interviewing for full-time teaching positions in high need schools for Fall 2012. Finally, one of our Scholars participated with the Science Teacher and Researcher (STAR) Internship Program in Summer 2011.

Thus far, we have had great success in recruiting excellent candidates as Scholars and Post-Bacs. Our challenge has been meeting our annual target goals for the number of Interns. With the help of the university marketing division, we plan to expand our recruitment efforts for Interns in the coming years.

150

Title: Math and Science Teachers for Iowa

NSF Noyce Award Number: 0934866
Principal Investigator: Jeffrey Weld
Email: jeff.weld@uni.edu
Institution: University of Northern Iowa
Co-PI(s): Thomas Greenbowe, Professor of Chemistry, Iowa State University, Ted Neal, Clinical Instructor, Science Education, University of Iowa, Norbert Pianta, Professor of Chemistry, University of Iowa, Marc Armstrong,
Presenter(s): Jeffrey Weld, Associate Professor, Department of Biology, University of Northern Iowa, and Director, Iowa Mathematics & Science Education Partnership
Ted Neal, Clinical Instructor, Science Education, University of Iowa

The Iowa Noyce Scholars program is a value-added component of a major inter-university collaborative initiative to recruit, prepare, and retain exemplary secondary teachers of mathematics and science at the University of Iowa (UI), Iowa State University (ISU), and the University of Northern Iowa (UNI). The umbrella organization is called the Iowa Mathematics & Science Education Partnership (IMSEP), launched in fall 2008. The Robert Noyce Scholars award was earned for the beginning of the academic year 2009-2010, thus year 3 is nearing completion. This report spans the period of July, 2011 to March 19, 2012.

2011-2012 was an aggressive period for this program. Promotional activities were ratcheted up, tracking and evaluation were tightened and refined, a scholars community evolved, mentorships were improved, datasets and program documents were updated, and inter-university collaboration was enhanced.

These activities are due to three significant administrative developments: (1) an additional co-PI at UI; (2) the engagement of staff at the Center for Excellence in Science, Mathematics, and Engineering Education at ISU; and (3) the employment of a student-staffer at the Iowa Mathematics and Science Education Partnership at UNI. This student orchestrated recruitment activities, community-building, mentorships, document revision and update (e.g., the application, and eligible schools dataset), tracking, and communications. 15 scholarships were awarded in 2011-12, contributing to 38 scholarships since program launch in 2009-10, placing us beyond the halfway point toward our target of 75 scholarships by 2014.

Two 2011-2012 Noyce Scholars accompanied three project administrators to the 2011 Noyce conference in Washington D.C. Of the 15 scholarships granted for academic year 2011-2012; six were for UNI, six for UI, and three for ISU. Awards for year four are will be determined later this spring.

Nine Iowa Noyce Scholarship recipients have graduated or otherwise completed the program, and 8 are teaching in high need schools. One scholar is in a temporary position seeking full time employment as a teacher. One has opted to repay his scholarship. Eight scholars are student teaching. Thirteen scholars are still enrolled in coursework. Evaluators monitor graduates for indicators that include the following for years 1 through 3. Second year indicators include scholars' perceptions of being well-prepared, though feedback reinforced for us the importance of building a learning community, mentorship opportunities, and communication.

151
Title: Puerto Rico Master Math Teacher Program
NSF Noyce Award Number: 0934820
Principal Investigator: Michelle Borroto
Email: edwinmorera@yahoo.com
Institution: University of Puerto Rico at Rio Piedras
Co-PI(s): Edwin Morera and Jaime Alicea
Presenter(s): Edwin Morera, University of Puerto Rico- Cayey Campus, edwinmorera@yahoo.com

The University of Puerto Rico (UPR) in Rio Piedras (Faculty of Natural Sciences) is developing a Robert Noyce Master Teacher Fellowship initiative in collaboration with the Puerto Rico Department of Education (PRDE) to establish the first Puerto Rico Master Math Teacher Program (PRMMTP). This project will certify ten 7-12 grade mathematics teachers, who teach in high need school districts, as Master Math Teachers (MMT) through the UPR Rio Piedras Campus’ Division of Continuing Education. This MMT are being trained to offer professional development to math teachers at the Professional Math and Science Resource Centers (PMSRC) that have been established throughout the Island by the Puerto Rico Math and Science Partnership (PRMSP). The MMTs will serve as role models of exemplary mathematics teaching practices, content knowledge, and leaders among their peers to promote improvements in student academic achievement. All participants have completed or are in the process of completing a Master’s Degree, and have a professional track record of excellence in teaching. The PRMMTP consists of two phases.

During phase one they will participate in an intensive certification program that is designed by a period where the MMT serve as professional developers while they complete the five years of service required by this program. In the second phase the certified MMTs will assume leadership roles within high need school districts. Activities will include serving as mentors, participating in curriculum development projects, participating in pre-service teacher education, and assisting in the development and implementation of professional development for other teachers, particularly in the PMSRCs. MMTs will also participate as Cooperating Teacher during the practicum of 7-12th grade pre-service math teachers, and as mentors for beginning teachers. To evaluate the impact of the PRMMTP, achievement in mathematics attained by students of teachers in the Master Teachers project will be assessed through the standardized math tests which are administered in all schools by the PRDE. Also, MMT Fellows will be paired with comparable students taught by teachers from comparable high need schools using a matched-control group pre/post design. Results of these evaluation/research projects would be used to identify elements that enhance students’ academic achievement in math.
152
Title: University of Rochester Noyce Scholars Program: Preparing Highly Qualified Mathematics and Science Teachers for High Needs Schools
NSF Noyce Award Number: 1136212
Principal Investigator: Raffaella Borasi
Email: rborasi@warner.rochester.edu
Institution: University of Rochester
Co-PI(s): Jeffrey Choppin, Michael Gage, and April Luehmann
Presenter(s): Raffaella Borasi, University of Rochester, rborasi@warner.rochester.edu

The University of Rochester’s (UR) commitment to increasing high quality STEM teachers for high needs schools through the Warner Graduate School of Education initial teacher preparation programs has three key activities currently in progress. First, our Noyce Phase I scholarship recipients have graduated and received their teaching certificates; they are receiving support through Warner School mentoring and networking efforts. Second, the Noyce Scholars in science programs are receiving additional support through a Noyce Supplement grant. A new Warner School course, Implementing Reform-based Science Education, engages graduates from the science education programs in an opportunity to do action research in their classroom with the support of their colleagues and Warner faculty. The third activity is the recruiting of new Noyce Scholars for UR’s Phase II grant which started in January 2012. In this poster, we report on these efforts to support novice STEM teachers in their teaching, to continue the growth of Science teachers as they grapple more deeply with reform-based pedagogy and to recruit new cohorts of STEM teacher candidates.

153
Title: USD’s Noyce Project
NSF Noyce Award Number: 0934717
Principal Investigator: Lisa Baird
Email: janef@sandiego.edu
Institution: University of San Diego
Co-PI(s): Jane Friedman, Jeremy Kua, and Joi Spencer
Presenter(s): Jane Friedman and Krishelle Hardson-Hurley, University of San Diego, janef@sandiego.edu

We will present an overview of the Noyce Project at the University of San Diego, a comprehensive unaffiliated Catholic University. We will provide details of the progress of our first fellow, Hardson-Hurley.

154
Title: University of South Alabama Noyce Pathway to Science and Mathematics
NSF Noyce Award Number: 0934829
Principal Investigator: Andre M. Green
Email: green@usouthal.edu
Institution: University of South Alabama
Co-PI(s): Phillip Feldman, University of South Alabama (PTS and PTM), Justin Sanders, University of South Alabama (PTS), Madhuri Mulekar, University of South Alabama (PTM), and Katherine Malone, Bishop State Community College (PTM)
Presenter(s): Andre M. Green, University of South Alabama, green@usouthal.edu
Kelly Byrd, PTM project mentor, Tami May, Ashley Velazquez, Peter Kupfer, and L. Michael Vesoulis

Pathway to Science (PTS) and Pathway to Mathematics are Phase 1 projects involving the University of South Alabama College of Education, College of Arts and Sciences, Bishop State Community College, and the Mobile County Public School System (MCPSS), the largest school district in Alabama and the 39th largest in the nation. All entities involved have a vested interest in increasing the number of certified secondary science and math teachers.

Project goals include:
- PTS and PTM will prepare up to 22 science and 25 mathematics teachers over a five year period who are highly qualified to teach chemistry, physics, biology, general science, or mathematics. PTS and PTM seeks to double the size of the current education program and work toward creating a steady stream of future science and mathematics education majors, which will in turn increase the number of science and mathematics teachers.
- PTS and PTM will enhance student achievement by providing certified science and mathematics teachers in those classrooms that currently have no certified teachers.
- PTS and PTM will create a replicable model that will provide ongoing mentoring and professional development for novice science teachers to increase the probability that they will be retained and become career teachers.
- PTS and PTM will recruit science and mathematics majors into graduate science and mathematics education through a content rich alternative certification curriculum that will culminate in a master’s degree in secondary science or mathematics education.
Through the University of South Carolina Noyce Grant we seek to increase the number of qualified secondary STEM teachers in high-needs school districts. We provide up to $10,000 per year per scholar. Recipients of the scholarship have opportunities through our ESE 310/410 courses to work in our partner school districts for more hands-on experience in high-needs classrooms. Our fellows have opportunities to attend local, state, and national conferences in their field. We also hold monthly group meetings with guest speakers from the education field. Our close cohorts provide excellent support for our future teachers.

156
Title: USF Robert Noyce STEM Scholar Program
NSF Noyce Award Number: 1035273
Principal Investigator: Gladis Kersaint
Email: kersaint@usf.edu
Institution: University of South Florida
Co-PI(s): Allan Feldman, Mile Krajcevski, and Jeffrey Ryan
Presenter(s): Gladis Kersaint (PI) Kersaint@usf.edu, Athena White (Scholar) awhtwhite7@usf.edu, University of South Florida

The University of South Florida (USF) Robert Noyce Science, Technology, Engineering, and Mathematics (STEM) Scholars program provides $30,000 stipends to 31 graduating seniors, recent graduates, and career changers who are interested in earning their teaching credentials in mathematics or science by enrolling in a one-year accelerated Masters in Teaching (MAT) program as a full-time student. The stipend covers the cost of attendance (i.e., tuition and fees) and other expenses. In return, the Noyce STEM scholars commit to teach for at least two years in one of the following Tampa Bay area high needs school districts: Hernando, Highlands, Hillsborough, Manatee, Pasco, Pinellas, Polk, or Sarasota.

The first cohort (2011-2012) of eight scholars is a diverse group, including three males and five females with different ethnic backgrounds: 2 African American, 1 Hispanic, 1 Middle Eastern and 4 White. Three students will earn certification in Mathematics 6-12 and five will earn Certifications in Biology 6-12. This cohort of students will complete their coursework this summer and begin teaching fulltime in the fall, simultaneously completing their internship requirement for the program with support. As part of their program requirements, scholars completed two practicum experiences in urban settings: one at the middle school level and one at the high school level.

157
Title: The Development and Implementation of an Online Science Teacher Support Network
NSF Noyce Award Number: 1135442
Principal Investigator: Frederick Freking
Email: freking@usc.edu
Institution: University Of Southern California
Co-PI(s): Anthony B. Maddox, Douglas G. Capone, Gary Scott, and Michael F. Escalante
Presenter(s): Frederick W. Freking, University of Southern California, freking@usc.edu

The USC Robert Noyce Science Scholars Program has many levels of support. All USC Noyce Science Scholars are part of a cohort of science teachers that learn together and support one another through two pedagogy courses and two guided practice placements. To further support our USC Noyce Science Scholars, we have created an online Urban Science Teacher Network (USTN).

The USTN will provide additional support for our MAT@USC Noyce Scholars, their mentors, and eventually our Noyce Alumni. Synchronous online monthly meetings allow fellows to share lesson plans, literacy strategies, management ideas, or any other topic these teachers deem necessary. As Science Scholars participate in both synchronous and asynchronous teams, they receive and provide support, encouragement, and feedback as they analyze lesson plans, videos of instruction and student work. We also plan to use this network to connect scientists with our Noyce Scholars. In this poster session, we will share data from the online forum that is shaping how we structure the online USC Urban Science Teacher Network.

158
Title: Noyce Scholarship Program at the University of Southern Mississippi
NSF Noyce Award Number: 0630436
Principal Investigator: Deborah Booth
Email: Deborah.Booth@usm.edu
Institution: University of Southern Mississippi
Co-PI(s): Mary Peters, Chris Sirola, Sherry Herron
Presenter(s): Deborah Booth, University of Southern Mississippi, deborah.booth@usm.edu

The University of Southern Mississippi has funded twenty-four undergraduates in our Noyce Scholarship Program. Four have fulfilled their agreements, eleven are currently working in high need school districts and are in the process of fulfilling their agreements, one will graduate this May, and three students will graduate in May 2013. One student who graduated in December is currently looking for a job. Three students have dropped out, and the remaining three will graduate in May 2013. In the 2012/2013 year of our program, we hope to fund six full scholarships.

159
Title: Offering Future Teachers of STEM Training in the Skills Required to Successfully Engage High School Classes in Cross-Disciplinary Team Research on STEM Projects
NSF Noyce Award Number: 1135102
Principal Investigator: Susan E. Riechert
Email: riechert@utk.edu
Institution: University of Tennessee
Co-PI(s): Susan M Benner
Presenter(s): Susan E Riechert, University of Tennessee, riechert@utk.edu

We report on the implementation of a research methods course required of future teachers of STEM subjects at UTK. The course offers a thorough treatment of the scientific process through its technological application. Experience with literature search, modeling, experimental design, statistical and technical writing and reporting skills was offered as well as formal training in effective communication and group interaction skills. The research emphasis is on an integrated, multidisciplinary experience among STEM disciplines. During the course of the semester, student interns participated in two interrelated, team projects: one involving a model science system that is linked to their major (math majors join a quantitative project), and a second project that meets all of the elements of a STEM experience in that it is quantitative and also involves at least one science, an engineering principle, and a technological application.

The model system a team used in their respective projects must be one that does not require expensive equipment or skill levels beyond the math and science content required of high school students. We provide examples of the model systems student teams chose in this first offering of the course: auditory communication, behavioral trait variation in grain storage beetles, the physics of jumping, the aerodynamics of flight and biofuels.

160
Title: TEACH/Here: An Urban Teacher Residency for Secondary STEM Teachers
NSF Noyce Award Number: 1035455
Principal Investigator: Susan Benner
Email: sbenner@utk.edu
Institution: University of Tennessee, Knoxville
Co-PI(s): Stu Elston and Dan Challner
Presenter(s): Susan Benner, UTK, sbenner@utk.edu and Geri Landry, UTK, glandry@utk.edu

The TEACH/Here Urban Teacher Residency program is a partnership between the University of Tennessee, the Public Education Foundation, Hamilton County Schools, and Knox County Schools, designed to attract, prepare and retain high potential math/science teachers for high need, urban schools. The impact of the initiative is unfolding as our first cohort completes its first year of teaching and the second cohort is nearing the end of the residency year. Through this focused year-long residency program that provides tuition waivers, stipends, and supportive mentoring into the first years of teaching, we have created an effective new approach to pre-service teacher development.

Nine graduates from the first cohort successfully completed their first semester with support from the TEACH/Here Induction Coordinator. In addition to ongoing weekly planning meetings and classroom observations, the coordinator has begun collaborating with site-based instructional coaches to help graduates implement best practices as determined by school leadership. He communicates with principals about the graduates' progress in successfully using these classroom practices.

Graduates have also benefitted from monthly graduate seminars conducted across the two districts via video conferencing with a site supervisor in Knoxville to address questions and concerns specific to that district. Graduates are required to report back to the group on how they have implemented the lessons learned from these seminars in their classrooms. We anticipate that 100% of the members of cohort I who became secondary STEM teachers will remain in their placements in 2012-2013.

All fourteen members of Cohort 2 completed the first semester of the residency year and began eight weeks of full-time lead teaching in January. They also began the second semester of UTK coursework, a busy semester in which they will complete the Teacher Performance Assessment, Action Research, and additional coursework. The TEACH/Here team is close to completing the selection of a third cohort of six mathematics teaching fellows that will be split across the two districts. The poster will highlight our curriculum, selection processes, the Teacher Performance Assessment process, induction and mentoring support, and placement procedures.

161
Title: Mathematics, Chemistry, and Physics Teachers: Recruiting and Retaining the Best and Brightest in High Need Areas for High Need Schools
NSF Noyce Award Number: 0833343
Principal Investigator: Ann Cavallo
Email: cavallo@uta.edu
Institution: University of Texas at Arlington
Co-PI(s): Gregory Hale, Ramon Lopez, and James Epperson
Presenter(s): Ann Cavallo, UTA, cavallo@uta.edu; Gregory Hale, UTA, greghale@uta.edu; Ramon Lopez, UTA, relopez@uta.edu; Janis Mergele, UTA, mergele@uta.edu; Kelly Hoke, UTA, kelli.hoke@mavs.uta.edu; James Epperson, UTA, epperson@uta.edu; Caroline Robb, UTA, mavs.uta.edu

The Robert Noyce Scholarship Program for Science and Mathematics Teachers program (I) recruits and prepares high school mathematics, chemistry, and physics teachers highly qualified to teach in the Dallas, Arlington, and Fort Worth Independent School Districts. Our program is a collaborative effort among the University of Texas-Arlington’s (UTA) College of Education and Health Professions and College of Science and these surrounding urban school districts. Together, our leadership team provides a program of campus courses, online/hybrid courses, and classroom teaching experiences to certify 37 new mathematics and science teachers for the three school districts. The program also provides an extensive mentoring and induction program of
teachers throughout their program and into their first years of teaching.

The objectives are to: 1) recruit mathematics and science teacher candidates from baccalaureate programs and career changers from local industry, 2) provide a quality two-track teacher certification program for candidates, and 3) induct, monitor, and mentor teacher candidates through the program and their early years of teaching.

This project also actively recruits teacher candidates of underrepresented groups, and those in science and mathematics areas where there is greatest teaching need, specifically the physical sciences and higher-level mathematics. Our recruitment efforts for Noyce Scholars have been enhanced by a comprehensive STEM teacher candidate recruiting program already in place in our UT each Arlington program which has effectively recruited candidates primarily of underrepresented groups in science to pursue physics, chemistry or mathematics teacher certification, and has a highly successful summer internship program.

162
Title: High School Earth and Life Science, and Middle Level Science and Mathematics: Preparing Teachers to Teach the Next Generation

NSF Noyce Award Number: 1035483
Principal Investigator: Ann Cavallo
Email: greg Hale@uta.edu
Institution: University of Texas at Arlington
Co-PI(s): Greg Hale, Theresa Jorgensen, Laura Mydlarz, and Laura Gough
Presenter(s): Ann Cavallo, The University of Texas at Arlington, cavallo@uta.edu
Greg Hale, The University of Texas at Arlington, greg Hale@uta.edu
Ramon Lopez, The University of Texas at Arlington, relopez@uta.edu
Theresa Jorgensen, The University of Texas at Arlington

The Robert Noyce Scholarship Program for Science and Mathematics Teachers program (II) educates and prepares teachers who are highly qualified to teach in the Dallas, Arlington, Fort Worth, and Hurst-Euless Bedford Independent School Districts and is a collaborative effort among the University of Texas at Arlington’s (UTA) College of Education and Health Professions, College of Science, Tarrant County College, and these four surrounding urban school districts. Together, our leadership team provides a program of campus courses, online mentoring, and classroom teaching experiences to certify 54 secondary earth and life science teachers, and 54 secondary mathematics teachers for the four school districts.

Our objectives are to: 1) recruit mathematics and science teacher candidates from baccalaureate programs, community colleges, and career changers from local industry, 2) provide a quality two-track teacher certification program for candidates, and 3) induct, monitor, and mentor our teacher candidates through the program and their early years of teaching.

Recruitment efforts for Noyce Scholars have been enhanced by a comprehensive STEM teacher candidate recruiting program already in place in our UTeach Arlington program. Our Noyce Scholarship program expands efforts in recruiting and maintaining the influx of new STEM teacher candidates in the UTeach Arlington program from our student population, community colleges, and the local area, and provides a highly productive and successful summer internship program.

163
Title: UTeach Replication

NSF Noyce Award Number: 0630376
Principal Investigator: Michael Marder
Email: marder@mail.utexas.edu
Institution: University of Texas at Austin
Co-PI(s): Larry Abraham
Presenter(s): Michael Marder, UT Austin, marder@mail.utexas.edu

This poster will present some of the ideas behind the replication of UTeach across the US, why we took an approach to education reform different from many other organizations, and the lessons we are learning.

164
Title: Inquiry, Integration of Mathematics & Science, and Reflection: Components of the Robert Noyce Scholarships for Teaching Miners

NSF Noyce Award Number: 1035502
Principal Investigator: Eric A. Hagedorn
Email: ehagedorn@utep.edu
Institution: University of Texas at El Paso (UTEP)
Co-PI(s): Olga Kosheleva, Laura Serpa, Amy Wagler, and Ronald Wagler
Presenter(s): Eric A. Hagedorn, UTEP, ehagedorn@utep.edu
Wendy Chavez Aragones, UTEP, waragones@miner.utep.edu
Nancy Aguirre, UTEP, naguirre90@hotmail.com

Two themes are integral to the Robert Noyce Scholarships for Teaching Miners Program at the University of Texas at El Paso: inquiry-based pedagogy and the integration of mathematics and science. As such, our professional development workshops for Noyce Scholars always include inquiry-based activities that integrate mathematics and science. Reflection, a critical cognitive process for any teacher, is emphasized in our program through regular contributions to a Professional Development Portfolio. The earlier contributions to the portfolios have consisted of
work samples from classes (whether education or content) with a self-reflection. Later contributions include reflections on classroom observations and student teaching experiences.

In this poster we will summarize the inquiry/math-science integration activities of the past two years and how they relate to the Texas state standards for science and mathematics (TEKS: Texas Essential Knowledge and Skills). We will also summarize the types of work samples and reflections we have obtained to date and describe any emergent themes.

165
Title: Support for Noyce Interns and Scholars at the University of Texas at Tyler
NSF Noyce Award Number: 1035462
Principal Investigator: Bambi Bailey
Email: bbailey@uttyler.edu
Institution: University of Texas at Tyler
Co-PI(s): Fredericka Brown
Presenter(s): Bambi Bailey, The University of Texas at Tyler

The Noyce Interns and Scholars at the University of Texas at Tyler are part of UT each UT-Tyler, the secondary STEM education program which allows a student to “test drive” teaching early in his/her STEM major and provides flexibility in scheduling so that both the STEM courses and education courses can be completed in four years resulting in a degree and certification. Prior to implementing the UT each program at UT-Tyler, students chose to complete their STEM degrees, get a teaching position followed by alternative certification courses. There were no field experiences required other than on the job training and many individuals left teaching soon after completing their certification. The UT each model allows students to explore different grade levels of teaching early and, once a student decides to include certification as part of their degree, schedule field experiences with teachers who are exemplars in the field.

Noyce Interns and Scholars not only participate in the UT each program, but also have support for undergraduate research experiences (Interns and sometimes Scholars), university professional development with master teachers (Interns and Scholars) and travel to professional development outside the university (Scholars).

Noyce Scholars seeking certification in science content areas receive subscriptions to the NSTA Learning Center for additional help with lesson planning, assessment, and appropriate use of technology. The NSTA Learning Center is a professional development site where teachers may develop portfolios, libraries of resources, and collections of materials and resources by topic. There is also a community forum where teachers discuss curriculum, assessment, content issues, technology, policy, and professional development opportunities. Aspiring science teachers can either learn by lurking or by active participation. Most students indicate they intend to lurk, but get caught up in the discussion and find themselves interacting. Noyce Scholars seeking certification in mathematics receive a membership to the National Council for Teachers of Mathematics and access to all their resources. The website includes similar support as the NSTA Learning Center for young mathematics teachers.

166
Title: UT Permian Basin Noyce Scholars: Supporting Student Achievement in High Needs Schools through the Recruitment, Preparation and Induction of Highly Qualified STEM Teachers
NSF Noyce Award Number: 0833283
Principal Investigator: Roy Hurst
Email: hurst_r@utpb.edu
Institution: University of Texas of the Permian Basin
Co-PI(s): Doug Hale
Presenter(s): Roy Hurst, University of Texas of the Permian Basin, hurst_r@utpb.edu

The University of Texas of the Permian Basin’s (UTPB) Robert Noyce Scholars program is preparing highly qualified mathematics and science teachers to meet the needs of our partner school districts in southwest Texas. UTPB’s Noyce Scholars are recruited primarily from undergraduate majors, with a smaller contingent comprised of recent graduates or career changers with the desire to teach and effect change. Reflecting the demographics of western Texas and the university, more than 65% of the UTPB Noyce Scholars are female and ethnically Hispanic (Mexican-American). By reducing financial barriers and providing a supporting framework, the project is facilitating the recruitment, success, and retention of these students, who are historically underrepresented in the STEM teaching ranks.

167
Title: MFA Utah: Content-Driven Pedagogy in a Teacher Training Project
NSF Noyce Award Number: 0934894
Principal Investigator: Hugo Rossi
Email: rossi@math.utah.edu
Institution: University of Utah
Co-PI(s): Mary Burbank
Presenter(s): Hugo Rossi, Carter Jensen, and Lisa Friedman

MFA Utah (at the University of Utah and Utah State University) recruits candidates with strong mathematics/science background into a five-year induction program, with a view to producing teacher leaders in high need schools. In the first year the candidate is a full time graduate student, and is a full-time teacher for the remainder, receiving an MS and professional development in content, pedagogy and leadership. During the first two years, the fellow is paired with a mentor who guides the fellow through the induction period.
168
Title: The University of Vermont Robert Noyce Scholarship Program
NSF Noyce Award Number: 0934714
Principal Investigator: Regina Toolin
Email: Rtoolin@uvm.edu
Institution: University of Vermont
Co-PI(s): Lesley-Ann Dupigny-Giroix and Rory Waterman
Presenter(s): Regina Toolin, University of Vermont, Rtoolin@uvm.edu
Beth White, University of Vermont, Beth.white@uvm.edu

The Phase I Robert Noyce Scholarship Program at the University of Vermont (UVM) will award 12 undergraduate scholarships (three 2-year scholarships each year over a 4-year period) and 15 graduate stipends (three 1-year stipends each year over a 5-year period) through a competitive process to STEM majors enrolled in science teacher education in the College of Education and Social Services. In addition, the program will award 40 undergraduates (8 undergraduate students per year over a 5-year period) a stipend for their participation in a 10 week summer research internship. To date, 12 Noyce Scholarships and 16 summer research internships have been awarded. The UVM Noyce program, designed to attract, prepare and retain secondary school teachers with strong content and pedagogical expertise in the natural and environmental sciences, is being delivered through a collaborative partnership between UVM’s highly effective and nationally recognized College of Education and Social Services and College of Arts and Sciences and local high need high schools and will lead to strategies of recruitment in science education as well as in retention of undergraduate and graduate science students. This presentation will highlight some of the strategies that have been implemented in the marketing and recruitment phases of the program.

Here are several ways to make student thinking public:

- **Initial Whole-Class Models:** Initial Whole-Class Models are created by eliciting student ideas towards the explanation of a scientific phenomenon. They can incorporate think-pair-share during the co-construction of the initial model.

- **Small Group Models:** Like whole-class models, small group models are created by eliciting student ideas towards the explanation of a scientific phenomenon. Students are encouraged to build consensus and be prepared to share their ideas and rationale when finished.

- **Conflicting Hypotheses:** Throughout the course of the unit, gathered evidence can be assigned to the hypothesis/hypotheses that the evidence supports. This particular strategy can be useful if/when two or three hypotheses emerge from the students around a scientific phenomenon.

- **Evidence Buckets:** Evidence buckets are one way to aggregate evidence according to themes identified by students during whole-class/small group discussions in support of their explanations of a scientific phenomenon.

- **Post-it Note Evidence and Explanation:** As thinking changes, student models, hypotheses and explanations are also likely to change. Using different colored post-it notes to mark the progression of those emerging ideas can be a powerful tool for students to memorialize the progression of their thinking. They can also be used by students to offer feedback, critique and analysis.

- **Explanation Checklists:** As students gather evidence that confirms or disconfirms their thinking, components of a complete explanation will emerge. An explanation checklist is one way for students to create a public record of those components.

- **Summary Charts:** Summary charts are an organizational tool that provides an opportunity for students to collectively summarize the individual teaching/learning events of a unit, and then use the chart to make connections between and among those individual components.

This poster will present photo-documentation of student work, reflections of teachers about how these representations elicited student thinking and how that informed their instructional practice.

169
Title: Privileging Student Voice through Making Student Thinking Public
NSF Noyce Award Number: 0833012
Principal Investigator: Mark Windschitl
Email: eawright@uw.edu
Institution: University of Washington
Presenter(s): Elizabeth Wright, University of Washington, eawright@uw.edu
Cara Allen, University of Washington, allencara@gmail.com

Your students bring a wide range of interest, expertise and prior knowledge into the classroom every day. A critical part of your work as a teacher is to unveil their scientific thinking and use their ideas to inform your instructional practice. It can be overwhelming to figure out what to do with all of their ideas, especially as they emerge and change, in a way that honors all students equitably, makes sense to your students (and you!) and encourages meaningful scientific discourse.

This poster will present photo-documentation of student work, reflections of teachers about how these representations elicited student thinking and how that informed their instructional practice.

170
Title: Alternative Careers in Teaching: A Pathway to Math or Science Teaching for Non-Traditional Students
NSF Noyce Award Number: 0833324
Principal Investigator: Michael E. Beeth
Email: beeth@uwosh.edu
Institution: University of Wisconsin Oshkosh
Co-PI(s): Tammy Ladwig
171
Title: Math for America Los Angeles: Improving Student Achievement by Focusing on Teacher Quality, Preparation and Professional Development
NSF Noyce Award Number: 0934923
Principal Investigator: Karen Gallagher
Email: pam@mathforamerica.org
Institution: USC Math for America Los Angeles / USC Rossier School of Education
Co-PI(s): Darryl Yong, David Drew
Presenter(s): Pam Mason, USC Math for America Los Angeles, pam@mathforamerica.org

Math for America Los Angeles (MfA LA) is a non-profit organization formed by the partnership of University of Southern California (USC), Claremont Graduate University (CGU) and Harvey Mudd College (HMC). MfA LA’s main goal is to improve student achievement in mathematics by “developing transformational secondary school mathematics teachers.” MfA LA attracts individuals with talent and passion for mathematics and provides these individuals with the resources needed to become successful teachers that will make a difference in schools, districts, and the lives of the students.

172
Title: Utah Valley University and Noyce
NSF Noyce Award Number: 0934942
Principal Investigator: Richard Tolman
Email: faurotv@uvu.edu
Institution: Utah Valley University
Co-PI(s): Christine Walker
Presenter(s): Vivienne Faurot, Utah Valley University, faurotv@uvu.edu

At Utah Valley University, we have many nontraditional students. Through the Noyce Scholarship program two single mothers have been able to pursue their dreams of becoming biology and mathematics teachers.

173
Title: The Vassar College Noyce Teacher Scholarship Program
NSF Noyce Award Number: 1035409
Principal Investigator: Charles I. Steinhorn
Email: steinhorn@vassar.edu
Institution: Vassar College
Co-PI(s): Christopher B. Bjork, J. William Straus, and Cindy B. Schwarz
Presenter(s): Charles I. Steinhorn, Vassar College, steinhorn@vassar.edu and J. William Straus, Vassar College, straus@vassar.edu

The structure, goals, activities of the Vassar Noyce Teacher Scholarship Program are described. These are highlighted via Vassar’s Noyce scholars and interns.

174
Title: Virginia Tech to Virginia Teacher
NSF Noyce Award Number: 0832992
Principal Investigator: Anderson Norton
Email: norton3@vt.edu
Institution: Virginia Tech
Co-PI(s): Susan Hagen, Bettibel Kreye, Megan Wawro, and Jesse Wilkins
Presenter(s): Anderson Norton, Virginia Tech, norton3@vt.edu
Bridget Arvold, Project Evaluator, barvold@gmail.com
David Placco, Virginia Tech, dplacco@vt.edu

The Virginia Teach Noyce program has awarded 28 scholarships to promising mathematics teachers committed to teaching in high-needs schools. Ten scholars have begun their professional careers, with nine teaching in the Commonwealth of Virginia. These nine teachers completed Virginia Tech’s undergraduate degree in Mathematics with a combined average GPA of 3.54. They earned Master’s degrees in Mathematics Education and are now finishing their first (seven scholars) and second (two scholars) years of teaching.

The focus of project evaluation and project research has shifted to these nine teachers as we investigate the project’s impact on teaching and learning in the Commonwealth of Virginia. How well have Virginia Tech and the Virginia Teach project prepared Noyce Scholars as they begin their professional careers as secondary school mathematics teachers?

The project evaluator has completed the first of three rounds of classroom observations for three of the Scholars. On the basis of seven categories of “student look-fors” (Wray, 2011), which roughly align with NCTM’s six principles for school mathematics, early results indicate that Noyce scholars are well prepared for their new profession, with the possible exception of classroom management.

Responding to questions on preparedness of one scholar, her principal responded:
- She understands mathematics in ways to be able to teach it so students gain understanding.
- She is very reflective and is constantly adapting her strategies too.
- She is doing well.
- She has struggled a bit with classroom management, but she is getting better.
- Her struggles are particularly with the lower level students.
- Overall, her preparation was excellent.

Such responses seem to generalize to most scholars from the Virginia Teach project; they are especially well prepared in terms of mathematics and teaching strategies, but need continual reflection to grow in response to challenges related to classroom management in high-needs schools. Our poster presentation will share stories to support this theme and to consider possible solutions within our teacher education program.

175
Title: WINS Scholars Study Pedagogy in Action Research Projects

NSF Noyce Award Number: 0934693
Principal Investigator: Leah McCoy
Email: mccoy@wfu.edu
Institution: Wake Forest University
Co-PI(s): Angela King
Presenter(s): Leah McCoy, Wake Forest University, mccoy@wfu.edu
Samantha Freiberg, Wake Forest University, freisk11@wfu.edu
Anna Hester, Wake Forest University, walke27@wfu.edu
Joseph Hester, Wake Forest University, hestjm7@wfu.edu

The WINS (Wake Innovative Noyce Scholars) program at Wake Forest University serves preservice high school mathematics and science teachers at the master’s level. At the end of the one-year program, candidates receive the master’s degree and the teaching license.

WINS integrates action research as a key component. Each scholar is required to conceptualize, carry out and report on an action research study which occurs during the student teaching internship and involves exploration of pedagogy in the classroom. Nine studies from the current year will be described, and three scholars will be present to answer questions.

Study research questions include:

1. What is the impact a scientific module-formatted unit on student attitudes towards science?
2. How does incorporating and encouraging students’ creative expression through the arts affect their overall engagement and motivation in the math classroom?
3. How does writing “MathTweets” several times each week to summarize the material affect students’ perceptions about their level of engagement in math and their understanding of course material?
4. How can graphing calculators be used to support conceptual understanding in mathematics?
5. How does having students identify self-relevant future goals and form related sub-goals affect their perception of relevance, task instrumentality, and achievement in a math class?
6. How does use of humanistic, research-based science stories affect high school biology students’ identification with science?
7. Does implementation of a problem-based learning method lead to the creation of female scientific identity, increased learning and performance?
8. How does use of peer-teaching with group presentations improve the learning and understanding of new physics content material?
9. What is the impact of reflective journal writing on student engagement in a high school Biology class?
The action research process and outcomes is a key part of the WINS program. It facilitates development of both pedagogical and leadership skills in beginning STEM teachers.

176
Title: Underrepresented Engineers as Mathematics Teachers in their Home Communities
NSF Noyce Award Number: 0630417
Principal Investigator: Robert G. Olsen
Email: bgolsen@wsu.edu
Institution: Washington State University
Co-PI(s): Tariq Akmal
Presenter(s): Robert G. Olsen, Washington State University, bgolsen@wsu.edu

Washington State University (WSU) has offered Noyce scholarships to 1) engineering majors who agree to remain in school an additional year to earn a teaching certificate and 2) math education majors who agree to remain in school an additional year to complete a minor in engineering. The engineering background provides examples they can use in class to provide motivation for the study of mathematics. Middle and/or High School students benefit from more relevant education (because engineers use math on a daily basis and can provide a real context for lesson topics) and are exposed to professional opportunities that they may not have known about previously.

A significant number of WSU Noyce Scholars have returned to high need schools in their home communities as math teachers. These new teachers are well qualified to teach math, are mentored, serve as role models and are able to encourage more of their students to pursue professional careers in science and engineering. The project targets schools in several counties in south central Washington, where the average inhabitant has a substantially smaller income and is much less likely to hold a BS degree than the average Washington State resident. Students who live there are much more likely to be of Hispanic ethnicity than those in other geographic areas of the state and to attend high need schools. In 2012, ten Noyce Scholars are teaching either middle or high school mathematics, one is student teaching, one is working first before teaching, three are still in school and one dropped out of the program.

177
Title: Self-Perceptions of College Students’ Preparedness for Success in Chemistry: An Extension of a Noyce Scholar’s Action Research Project
NSF Noyce Award Number: 0833111
Principal Investigator: Kasi Jackson
Institution: West Virginia University
Co-PI(s): Jeffrey S. Carver, Johnna Bolyard, David Miller, Michelle Withers, Michelle Richards-Babb, and Earl Scime
Presenter(s): Jeffrey S. Carver, West Virginia University, Jeffrey.Carver@mail.wvu.edu

West Virginia University’s (WVU) Robert Noyce Scholars are all required to engage in a project that assists in the improvement of teaching and learning of undergraduate science or mathematics courses at WVU. One Noyce Scholar expanded upon his fifth year action research study to look at how college students perceive their own preparedness for success in college chemistry based on their academic skills. Several key areas were identified as being self-reported as strong skills for A and B students as compared to those students who did not view themselves as A and B students. This can have implications for helping teachers to make decisions related to the college readiness of their college bound students.

This poster will report on the findings of this Noyce Scholar’s report and the implications this has had on the Noyce Scholarship program at WVU.

178
Title: Western Kentucky University’s Noyce: Promoting Professionalism
NSF Noyce Award Number: 0934804
Principal Investigator: Hope Marchionda
Email: hope.marchionda@wku.edu
Institution: Western Kentucky University
Co-PI(s): Martha Day, Kerrie McDaniel, and Janet Tassell
Presenter(s): Hope Marchionda, Western Kentucky University, hope.marchionda@wku.edu

Western Kentucky University’s (WKU) Noyce Program seeks to increase the number of highly qualified STEM educators in high needs areas by increasing the numbers of mathematics and science majors who choose teaching as a career. Our program plans to support 39 new teachers. The $10,000 financial incentive is available for qualified juniors and seniors. WKU’s Noyce Program enhances the current SKYTeach program by including cyber-mentoring, cyber-networking, and sneak-peeks into professionalism by providing memberships to national mathematics and science teacher organizations and by funding travel to national meetings. Retention efforts will build on relationships and professional learning communities established while at WKU and will provide formal and informal opportunities for post-graduation mentoring by continuing the cyber component and holding meetings at professional conferences.

During the 2011-2012 academic year, we continued to focus on recruiting STEM majors into teaching in high needs districts. Between our first two cohorts of Noyce Scholars, we have funded 12 preservice teachers so far. Of the twelve Scholars, three are majoring in biology, three are majoring chemistry, and six are mathematics majors. All of them have been given opportunities
to enhance their education by developing professional learning communities and by focusing on what professionalism means. Our Scholars have attended and presented at state, regional and national meetings. They also participated in on-campus seminars designed to address topics that are important in the field of education.

Topics for this year’s seminars addressed classroom management, making your mark in the classroom from the beginning, increasing cognitive complexity on math and science assessments, insights into the teenage brain, and more. These seminars are open to all students, not just Noyce Scholars, and attendance this year has averaged around 40 students. Reaction to this year’s activities has been positive and second year Scholars are excited about the changes we made this year to improve on the seminars. External evaluation indicates that Noyce participation benefits are over and above the financial component.

179
Title: TeachWashington Noyce Teacher Scholarships/Stipends Program
NSF Noyce Award Number: 0934785
Principal Investigator: Bruce E. Larson
Email: bruce.larson@wwu.edu
Institution: Western Washington University
Co-PI(s): George Nelson
Presenter(s): Bruce Larson, Western Washington University, bruce.larson@wwu.edu

The goal of the TeachWashington Noyce Teacher Scholarships/Stipends Program is to contribute to a larger vision to permanently increase the number of secondary mathematics and science teachers prepared at Western Washington University (WWU) without sacrificing the proven quality of our graduates. We will award sixty-one Noyce Scholarships or Stipends to STEM majors in their junior and senior year and/or STEM graduates or professionals who are making a career change to become mathematics or science teachers.

To build demand for the scholarships, we will focus on three activities: 1) Prepare and support Freshmen and Sophomores who have declared a STEM major to receive summer internships teaching mathematics and science at local school districts. After completing the internship, these students will be eligible to apply for Noyce Teacher Scholarships should they decide to pursue a teaching certificate; 2) Recruit junior and senior STEM undergraduates. On campus, we will clearly advise current STEM majors who have not declared a teaching interest. We will work with local community colleges to recruit graduates pursuing a STEM major, and to identify candidates from under-represented groups. We will also work within our current recruitment efforts to identify future mathematics/science teachers who are facing financial obstacles that may prevent them from becoming teachers; 3) Recruit STEM professionals who are considering a career change or have been or may be laid off, to consider teaching as a second career. We will foster relationships with area companies’ human resources departments to attract professionals who have the interest and ability to become teachers.

Currently, nine WWU freshmen/sophomores have been funded to work in local high needs districts teaching summer school mathematics and science during summer 2011. Two school districts reported that they could not have offered summer school programs were it not for the Noyce Interns. Assisting local schools and helping children learn mathematics/science was not a part of the grant objectives, but it is a wonderful collateral benefit. We anticipate 15 summer interns for summer, 2012. Interns meet with PI Bruce Larson and co-PI George Nelson to prepare for the summer internship, keep journals on the experiences, and meet with the PI/co-PI afterwards to reflect on the experience. Participants in the summer internships during 2011 showed significant improvements in their understanding of teaching mathematics and science, and in their interest in becoming middle school/high school mathematics teachers.

As of Spring 2012, we will have awarded thirty-one awards to WWU students who are pursuing a teaching certificate to be middle school/high school mathematics and/or science teacher (grade 6-12). The awards total $310,000 of financial assistance. Recruitment of STEM professionals who are considering a career change will be an area of focus in 2012-2013.

180
Title: Recruitment and Marketing Strategies: Seeking Passionate and Qualified Math and Science Teachers
NSF Noyce Award Number: 0934540
Principal Investigator: Eileen Gardner
Email: hiljd@wpunj.edu
Institution: William Paterson University
Presenter(s): Djanna Hill, William Paterson University, hiljd@wpunj.edu

In order to meet the growing demands for passionate urban math and science teachers and to recruit and train highly qualified professionals, the NSF Robert Noyce Teacher Scholarship Program at William Paterson University has incorporated innovative recruitment and marketing strategies for the final two years of the program. For example, we have placed ads in online newspapers, created a Facebook page, and created marketing tools like brochures. In addition to placing information on our university web pages and in our university announcements, we have also sent information to university math and science advisors and have sent information to our graduating seniors with credits in math and science. In an increased effort to recruit undergraduate students, we have communicated with our community college liaisons across the state and university transfer admissions counselors. We also have STEM events at the university for students and
in-service teachers including forums on teaching math or science as a career and professional development in math and science methods.

181
Title: Meeting Policy Makers in the Middle: A Bottoms-up Approach to Meeting Top-down Mandates for Teaching in the 21st Century
NSF Noyce Award Number: 0934716
Principal Investigator: Leslie Keiler
Email: annabeldsouza00@gmail.com
Institution: York College, City University of New York
Presenter(s): Annabel D’Souza, Graduate Center, City University of New York, annabeldsouza00@gmail.com/adsouza@gc.cuny.edu

It can be challenging for educators, under current top-down Federal, State, City and District mandates for effective instruction, to meet the policies and standards that emphasize high-stakes testing while still exerting teacher agency in creating lessons that are meaningful to both teacher and students. Developing learning activities that integrate and balance these crucial facets of education is at the forefront for math and science teachers in the Robert Noyce Scholarship Program at York College, City University of New York. Scholars seek to empower students and reduce “learned helplessness” by implementing guided inquiry to encourage personal responsibility over learning.

This methodology also shifts the primary role of the educator from instructor to facilitator. With this in mind, Scholars explore, discuss and construct learning activities that amalgamate their teaching and learning styles with the critical tenets of constructivism. A sample guided inquiry learning activity is analyzed and its alignment with the Learning Cycle, types of questions, Bloom’s Taxonomy, and the 5E/7E instructional model is illustrated.
S/F1
Title: Amongst The STARRs: The Collective Experience of ASU's STARRE Noyce Scholars
Presenter(s): Zachary Kovach, Current Noyce Scholar
Email: zachary.kovach@asu.edu
Institution: Arizona State University
Project Discipline: Physics
URLs: www.education.asu.edu/Noyce /Facebook: ASU STARR Noyce

We are three undergraduate students in the Mary Lou Fulton Teachers College at Arizona State University (ASU) with diverse backgrounds and experience. Amanda Davis studies Secondary Education with emphasis on Earth and Space Sciences, Zachary Kovach studies Secondary Education with emphasis on Physics, and Olivia Baser studies Secondary Education with emphasis on Chemistry. Our poster will describe our collective experiences as ASU STARRE Noyce Scholars, how the program has benefited us, and our hopes for the future.

S/F2
Title: Teaching Special Relativity to High School Students
Presenter(s): Bernard David, Current Noyce Scholar
Email: david3bg@gmail.com
Institution: Boston College: Lynch School of Education
School Name & District Currently Teaching: Student teaching in Boston Public Schools
Project Discipline: Physics/Engineering

This poster will present a detailed plan, including materials, for teaching Special Relativity to high school students.

S/F3
Title: Teaching Science to English Language Learners
Presenter(s): Alison Crocker, Current Noyce Scholar
Email: alicrock@gmail.com
Institution: Boston College: Lynch School of Education
School Name & District Currently Teaching: Student Teacher: Quincy High School
Project Discipline: Biology

Two 16 year-old English Language Learners (ELLS), one a recent immigrant with limited English proficiency and one with almost no verbal skills in English, were interviewed to determine barriers to science understanding that each experienced. Both were mainstreamed for science instruction. Results indicated that the State of Massachusetts mainstreams ELLs too soon and that teachers must possess strategies for teaching bilingual learners to assure a modicum of success.

S/F4
Title: Earthquakes are Everywhere!
Presenter(s): Laura Dougherty, Current Noyce Scholar
Email: libdough@gmail.com
Institution: Boston College: Lynch School of Education
School Name & District Currently Teaching: Quincy High School
Project Discipline: Geosciences

Students may be unaware that many shallow, small to moderate earthquakes occur throughout the Northeastern U.S. and Southeastern Canada; however, their focal depth is frequently unknown because the seismic networks are sparsely distributed stations, increasing the difficulty of accurately determining the depth of local earthquakes using the arrival times of P waves and S waves. It is important for students to understand what an earthquake is, what causes an earthquake to occur and what hazards they pose to the populations they impact. Through various activities, such as modeling a scale size of the Earth, finding earthquake activity on seismograms and researching the activities and dangers of a specific earthquake, student gain knowledge of earthquakes and which regions are the most and least hazardous (including where we live).

S/F5
Title: Linguistic Self Esteem
Presenter(s): Michael Lavelle, Current Noyce Scholar
Email: michael.c.lavelle@gmail.com
Institution: Boston College: Lynch School of Education
School Name & District Currently Teaching: Student Teaching: Brighton High School, Boston Public School
Project Discipline: Linguistic Self-Esteem

This research compares the linguistic self-esteem of a selected group of elementary school children who attend an after school program with their overall self-esteem. One-to-one examinations of linguistic and overall self-esteem were administered. Results indicate no correlation, suggesting a unique dimension of self-esteem correlated with the value a student places on his/ her L1 (first language).

S/F6
Title: Noyce Scholar, Biology Teacher, and Science Researcher
Presenter(s): Michaela Brant, Current Noyce Scholar
Email: michaelabrant22@gmail.com
Institution: California Polytechnic State University
School Name & District Currently Teaching: Atascadero High School in Atascadero Unified School District
Project Discipline: Education, Biology, STEM (student teaching)

My status as a Noyce Scholar has enabled me to take advantage of two powerful research opportunities for pre-service teachers: the STEM Teacher and Researcher (STAR) Program and Space-
ward Bound Program. One of the most valuable assets a science teacher can have is research experience to draw from and integrate into the classroom. I have been able to incorporate these research experiences into my teacher credentialing experience this current academic year as part of my student teaching and will discuss them in this poster.

My STAR research experience in Summer 2011 with Dr. Michael Flynn at NASA Ames Research Center focused on forward osmosis as a passive method to purify urine into drinking water for astronauts during emergency situations in space. I performed ground-based research while astronauts on the last shuttle mission performed the space testing of the system. From this, I developed an inquiry-based lesson plan, and as part of the Teams Enacting Classroom Innovation Project funded by Google, I also developed a prezi presentation on osmosis to engage my students by involving them in real world research. The inquiry lesson is modeled after the procedure I used to determine the efficiency of drinking water production. Students experiment with and establish a concentration gradient and utilize the principles of osmosis to push water across a semi-permeable membrane. The prezi presentation allows me to share my research with my students, establish credibility in the field, and stimulate student questions.

Additionally, I spent a week in March 2012 doing research with pre-service teachers and NASA scientists in the Mojave Desert. We studied the composition, environment, and distribution patterns of extremophile biological soil crusts in hopes of using this data to extrapolate how to search for life on the microbial scale in harsh environments of other planets. I experimented with teaching from the field by posting pictures, videos, and blog summaries of the research experience to my students. This provided them with virtual involvement in current research in biotechnology and the opportunity to relate to the field experience to their ongoing unit on bacteria in the classroom. The webpage I set up also gave students the option to post questions to me and the other NASA researchers and get real-time responses. The information from the webpage has been incorporated into a PowerPoint presentation to share with future classes. I also designed a cross-disciplinary lesson with a future math teacher for my AP biology students based on planetary protection. Students learn about radiation environments and ways that NASA regulates biological contamination to other planets and analyze their results using statistical hypothesis testing.

As part of a grant associated with the Google Faculty Institute, Noyce Scholars from California Polytechnic State University in San Luis Obispo worked with a local classroom teacher to explore the use of technology to “flip the classroom.” The project was aimed at changing the traditional essentialist school structure to allow optimal time for students to work collaboratively during school hours. Teams of two pre-service teachers (Cal Poly Students) and one public school teacher from San Luis Obispo High School identified one science unit to flip. Both teams flipped a unit focusing on nomenclature in a chemistry classroom. Cal Poly Students worked with the classroom teacher to design the lesson and identify on-line resources and other technology to facilitate the flip. To demonstrate the effectiveness of the intervention, we compared the class average scores on the summative test to those of previous years to see if there was a significant difference in performance.

S/F8
Title: The Learn By Doing Lab
Presenter(s): Connor Drake, Current Noyce Scholar
Email: cdrake@calpoly.edu
Institution: California Polytechnic State University, San Luis Obispo
Project Discipline: Physics
URLs: http://www.cesame.calpoly.edu/programs-lbdl.html

The Learn By Doing Lab (LBDL), a class offered at the California Polytechnic State University San Luis Obispo (Cal Poly), is an educational opportunity for both local, visiting elementary/middle school students and Cal Poly enrolled undergrads. The LBDL is a laboratory experience modeled after the Hands-on Science Laboratory that was successfully implemented at California State University Chico. Every week, 4th-8th grade students from local schools travel to CalPoly to attend the LBDL program, gaining exposure to science in the real world using a standards-based, inquiry-driven science curriculum.

In addition to the opportunity for hands-on discovery of practical, real-world science, visiting students benefit from interaction with college students; they also get to see the university campus, hopefully impacting their expectations and hopes of attending college. The science content in the LBDL changes each quarter, but has included: Physical Science, Earth Science, Life Science and Engineering - a list that is continually growing. Each year, approximately 3,500 elementary/middle school students visit the LBDL and over 100 Cal Poly undergraduates have the opportunity to teach science through the program. All of the teachers in the LBDL are Cal Poly undergraduates who are planning or considering a career in teaching.

This is intended to improve the K-12 science teacher recruitment process by providing a professional development experience and an opportunity for undergrads to gain firsthand experience with inquiry-based instruction in the classroom. Approximately half of
the Noyce Scholars at Cal Poly participate in the LBDL prior to applying to Noyce, and they cite LBDL as an important influence on their decision to commit to science education. The LBDL is an extremely valuable experience both to the undergrad students who teach the lessons and to the younger students who attend and experience the lessons. For me personally, being a part of the LBDL at Cal Poly was my first step toward pursuing a career as a STEM teacher.

S/F9
Title: Patterns of cryptic and Aposematic Coloration in Costa Rican Moths: Introducing Inquiry into the Classroom
Presenter(s): Vicky Giese, Current Noyce Scholar
Email: vgiese@calpoly.edu
Institution: California Polytechnic University, San Luis Obispo
Project Discipline: Ecology

The Organization for Tropical Studies, an NSF-funded program housed at Duke University, coordinates the NAPIRE Program which provides a unique opportunity for field research in the tropics to undergraduate students from the United States and the Pacific Islands. I was one of 17 student interns chosen to conduct independent field research in Costa Rica during the summer of 2011. My research examined cryptic and aposematic coloration in moths at two locations within the Las Cruces Biological Research Station and one location at the Las Alturas Biological Research Station. A black light was attached to a white fabric to attract moths, which were then photographed and collected at each site. Images of moths were sorted into categories based on shape and color. Differences between the numbers of moth types in the categories and between collection sites were tested using chi square analysis and were statistically significant at P < 0.05. Some cryptic moth species were prepared for the Las Cruces Biological Research Station insect collection. As a Noyce Scholar, I hope to make an important contribution to the science education system by being involved in authentic research activities both before and after I begin teaching. As a future science teacher, I want to generate excitement that will lead students to pursue science careers. It is my desire to bring education and research together in the classroom, and I intend to engage students in authentic research by including more inquiry based activities. Students will have increased exposure to real world science and thus develop skills needed for careers in science and technology and post-secondary education.

S/F10
Title: The STEAM Advisory Board: A Win-Win-Win-Win Situation
Presenter(s): Joaquin Alvarado, Former Noyce Scholar
Email: joaquin.alvarado@sausd.us
Institution: California State University, Fresno
School Name & District Currently Teaching: Century High School, Santa Ana Unified School District
Project Discipline: Science, Technology, Engineering, Arts, Math
URLs: http://www.csufresno.edu/smc/
http://www.sausd.us/century

STEM education has been a hot topic for some time now. High needs schools have a difficult time providing to students who are interested in STEM related careers the opportunities for exposure to such jobs. California State University, Fresno has made STEM education a focal point and has trained its Noyce Scholars to embrace this push for technological integration. Coming out of this program, I sought to help my school site become a model for STEM education. I have been fortunate to work with a great team at Century High School in Santa Ana, and we have worked very hard to create an advisory board that works together to ensure that our students have the greatest chance of succeeding in STEM related fields.

The STEAM Advisory Board at Century has taken all of the goals of STEM education and has added Art. The board consists of students, teachers, administrators, parents, and business professionals who all have an interest in creating student access to engaging STEAM education. In its first year, the STEAM advisory board has received support from organizations such as Northrop Grumman, Ingram Micro, Rapid Tech, and the University of California, Irvine. We have created a new STEAM academy that will begin next year and will have all teachers tailor their curriculum to have a STEAM focus. Parents are spreading the word about our academy and have had an active part in designing our curriculum. Our business partners have graciously donated their time and provided us with internship and job shadowing opportunities to which our population would not otherwise have access.

The STEAM Advisory Board has allowed businesses and colleges to give their input as to which skills our students should leave with in order to achieve success in a STEM related field. It has allowed our teachers to place emphasis on these skills during their curriculum planning. It has given parents an opportunity to take an active role in their child’s education. Finally, it has provided our underrepresented, high needs students with opportunities to gain exposure to careers related to Science, Technology, Engineering, Art, and Math.

S/F11
Title: Project MT2 Three-Fold Impact at Anaheim High School
Presenter(s): Thomas Duarte, Master Teaching Fellow
Email: duarte_t@ahuisd.us
Institution: California State University, Fullerton
School Name & District Currently Teaching: Anaheim Union High School District
Project Discipline: Mathematics

Not far from Disneyland is Anaheim High School, an urban school where more than half of the students are English language learn-
ers and/or come from households living below the poverty level. Despite challenges, we have seen strong evidence of success. Our participation in the Noyce Project MT2 has had a three-fold impact: For the Master Teaching Fellow, Thomas Duarte: Through trainings/conferences/collaborations I have re-evaluated my teaching practice using what I have learned. National Board Certification has forced me to constantly reflect and dissect my strengths and weaknesses. The biggest change in my instruction is that I am a facilitator, not a lecturer. Susie, my teaching fellow, and I are a co-teaching team that has transformed the classroom from a traditional lecture based class to a collaborative and technical rich learning environment.

For the Teaching Fellow, Susie Mesa: I am fulfilling university requirements following the Co-Teacher model. Thomas and I are becoming proficient in multiple methods of curriculum delivery. Station Teaching has become a way for us to ensure student success. Some of the benefits include small groups, differentiated instruction, student mathematical discourse, skill development centers, activity centers, student engagement and student accountability. Co-teaching allows me to think out of the box and try out lessons that I might not implement due to the fear of classroom management problems. My creative ideas and Thomas’s experiences blend into instruction that allow students to enjoy mathematics.

For the students: Students are gaining mathematical confidence, clearing up their misconceptions with mathematics, building a strong mathematical vocabulary and finally taking an interest in mathematics. Students have expressed the benefits they have seen due to the co-teaching model. Our at-risk students have made huge gains and are beginning to believe they are not what they have been labeled. Year 2 of the project has been promising such far and students are reaping the rewards.

S/F12
Title: Discovery of an Apoptosis Inducing Ligand for Burkitt Lymphoma
Presenter(s): Carolyn Laymon, Current Noyce Scholar
Email: claymon04@yahoo.com
Institution: California State University, Sacramento
School Name & District Currently Teaching: Student Teaching: Elk Grove Unified School District
Project Discipline: Alternative and Complementary Medicine | Biochemistry | Biology | Medical Cell Biology
URLs: http://digitalcommons.calpoly.edu/star/75/

One-bead two-compound (OB2C) combinatorial chemistry libraries enable the discovery of novel synthetic compounds which can be used to evoke specific signaling response in cells. The library configuration is composed of a fixed known cell adhesion ligand and a random chemical library displayed on the surface of Tinytagg beads. The cell adhesion ligand binds to specific receptors located on the surface of cells enabling the random immobi-

ized chemical molecules on each bead resin bead to evoke specific cellular responses such as apoptosis or cell death. To validate this concept, a OB2C combinatorial library comprised of an ~4-1 integrin targeting ligand, LLP2A, and a novel self-folding tricyclic branched hexamer random library were screened against various hematological and epithelial cancer cell lines: Raji, Moi4, Jurkat, TK6, and PC3N. These cells were incubated with library beads for 48 hours in 6 well tissue culture plates. Propidium iodide, a DNA intercalating agent, is then added to each well to evaluate cell viability. When visualized under a fluorescent microscope, with wavelength excited at 488 nm, cells bound to the OB2C libraries will fluoresce red, indicating apoptosis. From the Raji cell line screening, one bead from the LDLA2A-LLP2A library was selected for invoking apoptosis. The morphological appearance of the cells bound to this bead were: blebbing, cell shrinkage, nuclear fragmentation, chromatin condensation, and chromosomal DNA fragmentation. Further sequencing via Edman degradation will be performed to identify the amino acid sequence. This chemical approach has the potential to target and kill Burkitt lymphoma.

S/F13
Title: What Makes Us Unique!
Presenter(s): Jesse Venegas, Current Noyce Scholar
Email: jessevenegas@hotmail.com
Institution: California State University, San Bernardino
Project Discipline: Math

The CSUSB Noyce Scholars poster will focus on the unique aspects of the CSUSB Noyce Scholarship program. These include: the mentor-tutor relationships, materials we receive to further our knowledge of teaching, and the monthly seminars we attend. We are required to meet and observe with our mentor teachers while they are working every week. We debrief with our mentors about our classroom observations to gain a deeper understanding of the teaching profession.

This has been rewarding since it gives us the opportunity to experience our future jobs early, and to learn what to expect once we start teaching and are responsible for our own classes. As students, we tend to focus on just learning and postpone considering teaching until after earning our B.A. and teaching credential, but it is not easy to teach and that is why I am grateful for this opportunity to grow intellectually and professionally through the Noyce program. We also receive books and articles that provide detailed information on teaching. These often provide answers to questions we might have never thought of until beginning instruction as classroom teachers.

These materials are also reviewed and discussed in the monthly Noyce seminars where Noyce Scholars, Noyce Fellows, mentor teachers, and even school district officials come together. We discuss lessons that have been taught by other Noyce scholars, go over new strategies that have been tried, converse about
what changes in teaching we should expect in the future, collaborate on projects and problems, and talk about materials that have been read and what it means to us.

S/F14
Title: California State University Stanislaus Robert Noyce Scholars: Connecting and Building Future STEM Teachers of California's Central Valley
Presenter(s): Jonathan Kamp, Current Noyce Scholar
Institution: California State University, Stanislaus
Email: jkamp@csustan.edu
Project Discipline: Physics

As the Robert Noyce Scholarship Program at California State University Stanislaus begins to grow and mature, we as Noyce Scholars are finding the value in surrounding ourselves with people who share similar goals and aspirations of becoming competent and successful STEM teachers. The power of networking and community has led us to sculpt and reinforce each other in art of pedagogy by challenging ourselves to pursue and create opportunities for students in California's Central Valley.

S/F15
Title: Isle Royale PBL
Presenter(s): Raia Contractor, Current Noyce Scholar
Email: rxc250@case.edu
Institution: Case Western Reserve University
Project Discipline: Biology

I have designed a Problem-Based Learning project for a high school biology class that incorporates the concepts of evolution, population dynamics, and environmental stewardship. In the project, the students will track the role of ecologists who are examining a problem at Isle Royale, a national park in Michigan. The park contains an isolated population of wolves and moose. For about fifty years, scientists have been studying this population in order to better understand predator-prey relationships and evolution. There has been no human intervention as of yet, making it an ideal population to study. However, the wolf population has been severely declining and has been reduced to one pack that includes only two adult females. Many people who have been involved with Isle Royale in one way or the other are debating whether park officials should break the long-standing tradition of not interfering with the park in order to prevent the extinction of this wolf population.

For their project, the students would work in groups and go through steps that followed the path of working on an ecological research project. They would have to do research and come up with a proposed solution for the problem in the park. In order to justify their solution, each group would make a presentation of their solution and reasoning, and every student would write a paper that acts as their proposal for the park's department outlining their suggestion as ecologists. Finally, each student would have to evaluate the other groups' solutions.

S/F16
Title: Noyce Summer Research Experience
Presenter(s): Joseph Le Beau, Current Noyce Scholar
Email: lebeauj@cwu.edu
Institution: Central Washington University
Other: Middle Level Mathematics and Science

The Central Washington University (CWU) Noyce Summer Research Experience provides a variety of research experiences for up to four freshman and sophomore mathematics and science students considering a career in teaching (Noyce Affiliates). Noyce Affiliates work with a faculty mentor for an intensive week of research each of the four weeks in July. A different professor engages the Affiliates each week in an aspect of his or her research and discussed the specific activities they completed to get their doctorate.

In summer 2011, two students participated; one a double major in Elementary Education and Middle Level Mathematics and Science Education and the other a Biology major. Four students are accepted into the program for summer 2012. The Noyce Summer Research Experience also includes weekly meetings with CWU Noyce Scholars and program faculty and an optional home stay with a CWU faculty member. The 2011 experience consisted of a week each with a neurologist, a mathematician, an organic chemist, and a marine biologist. During the first week, Affiliates worked to understand the history and the current uses of EEG scans. They learned how researchers have used this tool in order to derive meaning from the changing electromagnetic field surrounding the brain. The second week, Affiliates examined the Collatz Conjecture. They worked to understand the function as a phenomenon and then learned to use computer programming in mathematics research.

This research resulted in a research article in a peer reviewed journal with the Affiliates as co-authors. During the third week, Affiliates used computers to investigate model compounds for use in AIDS and Alzheimer's treatments. They hypothesized a novel drug based on their computer model. The final week involved the Foss Waterway Museum in Tacoma where Affiliates set up "touch tanks" including water testing, specimen gathering, and teaching students about the waterway. Both faculty and Affiliates were extremely positive about their experiences. The faculty were impressed with the work ethic and inquisitiveness of the Affiliates who were appreciative of the variety of experiences and could envision using their experiences to provide real world example to students in the future.
S/F17
Title: Southeastern Regional Noyce Conference 2012
Presenter(s): Helen Landmesser, Master Teaching Fellow
Email: helenlandmess@gmail.com
Institution: Clemson University
Project Discipline: Biology

This poster will provide a summary of the 2012 Southeastern Regional Noyce Scholars Conference held in Greenville, South Carolina in February 2012 hosted by Dr. Lienne Medford of Clemson University and Dr. Cindy Johnson of Newberry College. All Southeastern Noyce Scholars programs were invited to attend this event which was free for Noyce Scholars.

S/F18
Title: Collaborative Problem Solving: A New Paradigm for Teaching Students with Behavioral Challenges
Presenter(s): Justin Butterworth, Former Noyce Scholar
Email: justin.butterworth87@gmail.com
Institution: College of William & Mary
School Name & District Currently Teaching: Chinook West High School, Boulder Valley School District
Project Discipline: School Discipline/Behavioral Management
URLs: www.teensinc.org

Do students do well if they want to, or do they do well if they can? Are students with challenging behavior actually manipulative and do they lack motivation, or is it something else? Are you frustrated with feeling like consequences and punishments are not working to solve problems? In this poster session, learn about Collaborative Problem Solving (CPS), a method of working with challenging students that views their behavior as a product of unlearned skills and triggers, rather than a choice to misbehave and manipulate. As a result of identifying these unlearned skills and triggers, educators can then work collaboratively with the student to teach the missing skills and solve the triggering problems, once and for all. This poster will describe CPS, why it works, and how you can implement it in your classroom and school. Learn about what a school near Boulder, CO is doing to improve interactions with challenging students, create community, and radically shift our standard discipline system.

S/F19
Title: Observing electron transfer using Ultraviolet/Visible/IR Spectroscopy
Presenter(s): Carlington Simms, Former Noyce Scholar
Email: converge79@gmail.com
Institution: Dowling College
Project Discipline: Chemistry

The purpose of this research was to identify various methods of using electromagnetic energy to induce inter or intra electron transfer at various different wavelengths using organic (carbon based) as opposed to inorganic compounds (silicon based). We will be using an ultraviolet spectroscopy machine. First we observe baseline absorbency for the solvent used to dissolve the organic compounds in question (CLF, CCL4, and DDQ). We will then dissolve 1 of 2 compounds in a specified volume of the solvent. One of these compounds will be considered an electron donor; the other compound will be an electron acceptor. We then dissolve the other solvent in another specified volume of the same solvent. We will observe the manner in which light is absorbed for both solutions in the UV visibility machine at various wavelengths ranging from 3200 nanometers to 200 nanometers.

We will then combine these two solutions to make one solution and again use the UV visibility machine to see how the absorbance of the light changes relative to various mixtures all these compounds. We tend to increase the proportion of electron donor to electron acceptor in order to force the electron transfer from the electron donor to the electron acceptor. When the electron donor is excited by the electromagnetic radiation, a weak covalent bond between the molecules of the electron donor and the electron acceptor is created. A process similar to what we are creating in the lab happens everyday in nature in the process of photosynthesis. Through this research we are using lessons from nature to improve how we manage our energy resources.

S/F20
Title: Incorporating Motion in the Calculus Classroom
Presenter(s): Jeannette Cleveland, Current Noyce Scholar
Email: jeannette.cleveland@gmail.com
Institution: Duke University
School Name & District Currently Teaching: Riverside High School and Hillside New Tech High School
Durham Public Schools in Durham, North Carolina
Project Discipline: Mathematics

Calculus and motion go hand in hand. Yet traditional Calculus classes are stationary; students sit and watch. Over the course of the last year, I’ve worked with mentors in two different public high schools in Durham, NC on a quest to incorporate motion into the Calculus class. We’ve developed and implemented several lesson plans that have proven very effective with our students in both AP and non-AP courses. These lessons were created with three specific goals in mind: to make the class more student-centered and engaging, to get each student up and outside of the classroom and his or her comfort zone, and to help students gain a deeper understanding of Calculus.

This poster will include these detailed lesson plans, related data (including pictures, student work, etc), and also ways to effectively implement these into other Calculus classes. Activities include walking a motion graph (using position, velocity, and acceleration graphs), jumping rope to understand Rolle’s Theorem, using sidewalk chalk to practice graphing, having a picnic of...
Swiss Cake rolls to introduce revolving functions, and others. Each lesson plan uses either “writing to learn” or “classroom talk” strategies to have students reflect on these activities. This poster will also include possible ideas for adapting these activities to suite non-Calculus math courses.

S/F21
Title: Sparking Dialogue Between Industrial Arts and Science Disciplines
Presenter(s): Ashley Lui, Current Noyce Scholar
Email: aklo7c@my.fsu.edu
Institution: Florida State University
School Name & District Currently Teaching: Raa Middle School, Leon County, Florida
Project Discipline: Chemistry

Industrial Arts teachers are able to instruct students in building science applicable apparatuses using the tools already available on their campus while still covering their curriculum. Whereas the created product can be carried over to the science classroom and used to investigate complicated topics that can range from pressure to ionic solutions to electromagnetic waves. This idea was researched at Raa Middle School in Tallahassee, FL with industrial arts teacher, Craig Cramer, cooperating teacher, Teresa Callahan, and intern, Ashley Lui. A standing wave flame tube or Ruben’s tube was built by various 8th grade students and then will be used to introduce waves in their science course. The students will be encouraged to make sense of the apparatus by relating the height, length, and number of waves to the pitch the tube is exposed to. The students will be exposed to amplitude, wavelength, wave number, and frequency after deciding on their relationships. Pre-tests and post-tests will be used to gauge the effectiveness of such an apparatus.

S/F22
Title: A Statistical Investigation of Student Assessment in Mathematics
Presenter(s): LaTonia Kelley, Current Noyce Scholar
Email: kelley09@gmail.com
Institution: Hampton University
Project Discipline: Mathematics

Most of the STEM majors at Hampton University must successfully pass the MAT 151 Calculus I course. This is one of the gatekeeper courses for many STEM majors. In 2009, Hampton University was awarded an NSF grant to improve student performance in this course in an effort to increase student retention and progression in the STEM disciplines. Poor mastery of basic algebra skills is often a major challenge to most students in this course. Part of the focus of the grant was to assess student mastery of basic algebra skills at the beginning and end of each semester. A test was developed to measure student skill level in algebra. This test was administered to the Calculus I students at the beginning and the end of the semester. This research project was designed to investigate the test results for the various sections of the MAT 151 class during the three-year study period. In accordance with IRB guidelines, a Noyce Teacher Scholar participated in the study. The student will describe the study design and will describe the analysis of the test results. The pre- and post-test results from this study will be presented and discussed.

S/F23
Title: Leadership in Synthetic Biology
Presenter(s): Rebecca Schini, Current Noyce Scholar
Email: rschini@gcss.k12.in.us
Institution: Indiana University/Purdue University of Indianapolis
School Name & District Currently Teaching: Greenfield Central High School
Project Discipline: Leadership in high school environment using Synthetic Biology
URLs: http://www.gcss.k12.in.us/~gchs
http://igem.org/High_School_Division

This poster will describe the journey of a high school teacher who developed a high school competition that uses synthetic biology to design a biological machine. The teacher developed this competition to challenge her biomedical innovation students. The competition started in 2011 with five Indiana teams and now, in 2012, there are 38 teams in the competition. The teams consist of a high school student, an advisor, and a high school teacher. The advisors are industry leaders, college professors, or collegiate iGEM alumni. The 38 teams come from all over the globe. This all started because of one teacher and her desire to challenge high school student in genetics.

S/F24
Title: Who Teaches Chemistry in the U.S.: A National Demographics Study from 1999 to 2008
Presenter(s): Katy Misel, Current Noyce Scholar
Email: miselkm@gmail.com
Institution: Kennesaw State University
School Name & District Currently Teaching:
Project Discipline: Chemistry Education

The Schools and Staffing Survey (SASS) is a survey conducted among public and private schools throughout the United States by the National Center for Education Statistics. The past three data collections covered the time periods from 1999-2000, 2003-04, and 2007-08. The goal of this study is to perform a longitudinal analysis of these surveys’ data to determine the current state of chemistry teaching in the United States, including demographics, turnover rates, and factors that correlate with the turnover rates. This poster presents initial data from the 1999-2000 SASS, which includes statistics on chemistry teacher education and
certifications, teaching positions, and general demographic information. This data will serve as a starting point to which we will compare data from subsequent surveys to understand how chemistry departments nationwide can take an active role in producing a highly trained chemistry teaching workforce that persists in the career past five years.

S/F25
Title: STEM-Plus: Louisiana Tech University’s Noyce Scholarship Program
Presenter(s): Constance Xandy DeLaney, Current Noyce Scholar
Email: cad029@latech.edu
Institution: Louisiana Tech University
Project Discipline: Curriculum, Instruction, and Leadership (Basinger) /Biology (DeLaney)
URLs: http://www.latech.edu/coes/stem-plus.shtml
http://www.latech.edu/education/alternative_certification/

In this poster, Scholar/Practitioners and Program Directors will provide an overview of Louisiana Tech University’s Noyce Scholarship Program. Few partnerships exist to create the environment where teachers can learn to teach, teach well, and persevere (Zimpher & Howey, 2005); however, this program seeks to do just that. The program began in September 2008 and included two major pathways: undergraduate Science, Technology, Engineering, and Mathematics (STEM) majors or Master of Arts in Teaching (MAT) candidates who teach a STEM discipline in 6-12 schools. Both programs result in scholars earning an MAT. The objective of the program, which continues through August 2012, is to produce highly qualified teachers through a dual matriculation program resulting in teacher certification and a master’s degree with priority placements in partner schools in Louisiana. Scholars, who have recently completed their programs, will discuss their accomplishments.

S/F26
Title: Project-Based Learning Experience: Developing an Engineering Summer Camp
Presenter(s): Alexius Metten, Current Noyce Scholar
Email: alexius.metten@mu.edu
Institution: Marquette University
Project Discipline: Engineering
URLs: http://www.marquette.edu/engineering/coop_stem/

The Project-Based Learning (PBL) experiences offered through Marquette University’s Noyce Scholarship Program provide students with the opportunity to work in an educational setting. All experiences are designed to provide the student with insight into the work that is required to educate the next generation. Last summer, two Marquette students partnered with a faculty member of Catholic Memorial High School (CMHS) for a PBL Experience. The objective was to develop an engineering summer camp for 7th and 8th graders. This project required the development of activities, lesson plans, and a budget for the camp. Throughout the summer, the students, in conjunction with the CMH faculty member, designed and tested the activities. The final product was a week-long, 3 hour/day summer camp that included activities involving electrical and civil engineering, as well as aspects of physics. The camp was designed to accommodate 20 students and is to be implemented by its designers at CMHS this summer.

This PBL experience allowed the students to practice writing lesson plans and developing activities that incorporated science lessons in a hands-on manner.

S/F27
Title: Physics Education at MTSU: From Theory to Practice
Presenter(s): William Russell, Current Noyce Scholar
Email: wdr2j@mtmail.mtsu.edu
Institution: Middle Tennessee State University
Project Discipline: Physics and Astronomy

Modeling Instruction has served as an inspiration for the Introductory Physics courses at MTSU for 15 years. Working collaboratively, students are introduced to a new concept through an inquiry-based, problem-solving approach where they address an essential question, gathering the requisite knowledge and skills for a foundational understanding of the topic. Instructors model one approach to the problem, and students are then challenged to solve a related problem in a novel context. Students present their solution to their peers, and with the use of Socratic dialogue, stimulate conceptual understanding. Using this very student-centered approach as a springboard, the Physics teacher candidates at MTSU are attending workshops in Modeling Instruction (MI) and contributing to the critical mass of modelers in the state, as MTSU plans to begin a state-wide pilot to incorporate MI into the high school science curriculum.
Socratic dialogue stimulate conceptual understanding. Using this very student-centered approach as a springboard, the Physics teacher candidates at MTSU are attending workshops in MI and contributing to the critical mass of modelers in the state, as MTSU plans to begin a state-wide pilot to incorporate MI into the high school science curriculum.

S/F29
Title: Developing Mathematical Self-Concept in Algebra II, Advanced Algebra, and Trigonometry Students
Presenter(s): Kendrick Savage, Current Noyce Scholar
Email: savage.kendrick@yahoo.com
Institution: Mississippi State University
Mississippi State University
School Name & District Currently Teaching: Columbus High School
Project Discipline: Mathematics

Mathematics teachers receive their motivation for teaching from solving mathematics problems and inspiring students to conquer mathematics. Further, mathematics teachers are encouraged to push students farther once they see the instant confidence that students receive from solving “hard” math problems. This poster describes techniques and strategies that I have used to develop the mathematical self-concept of my Algebra II, Advanced Algebra, and Trigonometry students. These are students who represent different economic, racial, and academic backgrounds. Through action research, I offer conclusions about how an improved mathematical self-concept impacts students’ academic performance in high school and their interest in going to college.

S/F30
Title: On the Other Side of the Interview Table: Adventures of a Second Career Noyce Scholar in a Tight Job Market
Presenter(s): David Giacherio, Former Noyce Scholar
Email: dgiache1@naz.edu
Institution: Nazareth College
Project Discipline: General Interest

In his previous life as an R&D executive, the author interviewed (and hired) a large number of scientists, engineers, and technical people. Now, as a second career teacher and Noyce Scholar, he finds himself on the other side of the interview table, in a geographic area where few teaching jobs are to be had. This poster presentation will focus on anecdotes: ironic, touching, and a bit crazy, from the job seeking process. It will conclude with some personal reflections about maintaining hope, altruism, and self-esteem in difficult job hunting situations.

S/F31
Title: 21st Century Assessment in Science
Presenter(s): Patrick Clark, Current Noyce Scholar
Email: PPathfinder1@aol.com
Institution: Newberry College
School Name & District Currently Teaching: Student Teaching: Mid-Carolina High School / Newberry County School District
Project Discipline: Biology

This poster includes a variety of assessments that have been successfully implemented into the science classroom. These assessments use 21st Century skills and students’ natural inclination toward movement and technology to engage them in the learning process while assessing their progress in the subject matter taught.

S/F32
Title: Why Flip the Classroom?
Presenter(s): William Glace, Current Noyce Scholar
Email: william.glace@newberry.edu
Institution: Newberry College
School Name & District Currently Teaching: Dutch Fork High School, Lexington-Richland District 5
Project Discipline: Math

Too often students complain about being unable to understand their homework problems in high school mathematics courses. Many factors may contribute to this problem including how students learn, how well students take notes, the classroom environment, and more. Regardless of the situation, the Flipped Classroom may provide a solution. In a Flipped Classroom, students take notes at home using video instruction and other web-based resources. Then, during class, the teacher builds upon the skills learned from the videos, clarifies any misconceptions the students may have, and leads students through the correct solution processes. The Flipped Classroom creates a platform for both whole-class and student group discussions of the mathematical concepts. As a result, students are doing more during class which leads to an increase in student comprehension. This poster will present information on how one Noyce Scholar and Mentor worked to improve student learning through flipping the classroom.

Abstract by: Enevely Hyatt, Mathematics teacher, Dutch Fork High School and William Glace, Student Intern, Newberry College

S/F33
Title: From Music to Mathematics
Presenter(s): Adrienne Long, Current Noyce Scholar
Email: Adrienne.Long@newberry.edu
Institution: Newberry College
School Name & District Currently Teaching: Student Teaching
Project Discipline: Summer Internship
This poster session will describe the journey taken by a RE-MAST (Recruit & Engage Math and Science Teachers) Summer Intern from majoring in music to majoring in mathematics education. The experiences at EdVenture Children’s Museum in Columbia, SC allowed Adrienne Long to see the connection between music and mathematics through the construction of the Blue Man Group display at the museum in the summer of 2010. The internship and change of focus led her to the Noyce Teaching Scholarship and becoming a mathematics educator.

S/F34
Title: Oxy MS Teaching Scholars
Presenter(s): Michael Lopez, Current Noyce Scholar
Email: michael.estuardo@gmail.com
Institution: Occidental College
School Name & District Currently Teaching: Woodrow Wilson Middle School

Our poster features biographical and academic information of six Oxy Noyce scholars.

S/F35
Title: Being an Educator with Ohio Virtual Academy: A Glimpse of the Virtual World
Presenter(s): Lisa Gillespie, Current Noyce Scholar
Email: lgillespie88@yahoo.com
Institution: Ohio Virtual Academy
School Name & District Currently Teaching: Ohio Virtual Academy

Learn from a Noyce Scholar how Ohio Virtual Academy (OHVA) provides a rich educational experience to approximately 12,000 students in grades K-12 from across the state of Ohio. Students are educated outside the traditional classroom, using Internet technology and traditional teaching materials. OHVA’s extensive curriculum and school management tools includes lessons, mastery tests, lesson planning tools, attendance tools, and progress screens. As an OHVA teacher, the Noyce Scholar works with parents and students using a blend of traditional and technology-based teaching strategies; organizes outings; meets Ohio’s accountability requirements; and, provides support for learning coaches to better meet the educational needs of students. This presentation will dispel the myths commonly held about virtual schools. No school buses, no lunch money, no class disruptions, no dress code, no calamity days, OHVA just provides quality teaching and learning through Individual Learning Plans.

S/F36
Title: The Science Project: Preparing High School Students for a College Major in the Sciences
Presenter(s): Jacqueline Katz, Current Noyce Scholar
Email: jkatz1@ramapo.edu
Institution: Ramapo College of New Jersey
School Name & District Currently Teaching: McNair Academic High School

Many high school students enter college with the hopes of completing a major in the sciences. A large percentage of these students must switch majors due to a deficient ability to manage time, navigate the lab, and communicate findings. The Science Project is a course that was designed to eliminate these deficiencies and prepare students for a successful career in the science field. This course and accompanying interactive website utilizes problem-based learning to allow students to develop the skills necessary to succeed in the sciences. These skills include: time management, common laboratory procedures, lab reporting, presentation, technology.

S/F37
Title: Science Teaching Immersion Experience
Presenter(s): Amber Frazier, Current Noyce Scholar
Email: frazia1@spu.edu
Institution: Seattle Pacific University
Project Discipline: Lesson Planning and Implementation

This year, Seattle Pacific University’s Physics Department introduced a Science Teaching Immersion Experience (STIE) as an upper division practicum class. The purpose of this class is to help students prepare, implement, and assess a lesson in a high school science course. Initial classroom observations will be presented as well as the lesson topic and related reading research about relevant student ideas. A brief overview of the lesson, a personal reflection on its implementation, results of the assessment and an overall discussion of the experience will be discussed.

S/F38
Title: Progressive Approaches to Mathematics
Presenter(s): Adam Green, Former Noyce Scholar
Email: negativeseven@hotmail.com
Institution: Sonoma State University
School Name & District Currently Teaching: Rancho Cotate High School/ Cotati-Rohnert Park Unified School District
Project Discipline: Mathematics

Adam Green has taught mathematics in two different school districts with very different types of students. He has used three approaches to teaching math that have been successful for him.
Working with Visual Dictionaries has improved academic vocabulary, attacking math from a meta-cognitive angle; giving students challenge problems in groups teaches math communication in addition to the math concepts, and developing geometric postulates using the scientific method, reinforces and rewards students’ inquisitive minds.

**S/F39**  
**Title:** Professional Development: Teacher to Teacher  
**Presenter(s):** Stacia Prince, Master Teaching Fellow  
**Email:** sprince@nacisd.org  
**Institution:** Stephen F. Austin State University  
**School Name & District Currently Teaching:** Nacogdoches High School  
**Project Discipline:** Mathematics Professional Development

The Texas Leadership Initiative: Mathematics Instruction Transformed (Texas LIMIT) program is working with its participants to develop professional development by teachers for teachers. This poster will show the process that I as a Master Teaching Fellow have experienced in my training to design and deliver high quality, research-based, content driven professional development in mathematics.

**S/F40**  
**Title:** George W. Hunter: The Civic Monkey  
**Presenter(s):** Jessica DeSerio, Former Noyce Scholar  
**Email:** jdeserio27@gmail.com  
**Institution:** Stony Brook University  
**School Name & District Currently Teaching:** Bay Shore High School  
**Project Discipline:** Biology Education  
**URLs:** http://www.bayshoreschools.org/

George W. Hunter is one of the most influential, though overlooked, teachers in science education, particularly biology education. It is hard to imagine that one person could change the course of biological education, but it was Hunter that set the sequence, scope and topics covered in the biology classrooms throughout the United States. His textbook "A Civic Biology: Presented in Problems" became the best-selling textbook in the country and would later find itself in the middle of one of the most legendary trials our country has ever seen, The Scopes Monkey Trial. Even though Hunter had a positive impact on the study and teaching of biology, with popularity comes power. Hunter’s belief in the practice of eugenics, his white supremacist views and his aloofness for our nation’s disabled were all included in this text and many of his future writings. These books taught these ideas as “science” and were used to mold the minds of young Americans to believe the sterilization of the countries disabled was an acceptable practice through the 1960s.

**S/F41**  
**Title:** Weekly Seminars in the Texas Tech Noyce Scholars Program  
**Presenter(s):** Braden Courtney, Current Noyce Scholar  
**Email:** braden.courtney@ttu.edu  
**Institution:** Texas Tech University

This poster describes the uniqueness of the weekly Noyce Scholar Seminar at Texas Tech University. This is a meeting where Noyce mentors and scholars discuss different philosophies of teaching. The poster contains accounts of different student’s experiences with the seminar and the benefits of having such a seminar. The seminar is a great way to create a bond between the Noyce scholars and the Noyce mentors. Faculty members in the math and sciences departments interact with students in a small group and sometimes on a one-to-one basis. This kind of seminar is rare among Noyce programs, and it adds a valuable feature to the already beneficial and supportive mentoring system of the Texas Tech Noyce Scholars Program.

**S/F42**  
**Title:** Developing Critical Thinking Skills among Chemistry Students in a High-Needs School  
**Presenter(s):** Kelly Arganbright, Former Noyce Scholar  
**Email:** kelly.arganbright@tusd1.org  
**Institution:** University of Arizona  
**School Name & District Currently Teaching:** Tucson Magnet High School; Tucson Unified School District  
**Project Discipline:** Chemistry

In order to develop critical thinking skills in higher-level learning environments and in everyday lives, activities were designed to encourage metacognition through hands-on, student-centered problem solving. High school chemistry students were given real-life problems to solve by designing and conducting experiments. When assistance was needed, students were guided with written hints for solving the problem. The hints vary in the level of direction given for students to successfully solve the problem. Results show that providing students with varied levels of assistance for problem solving allows for all to achieve success with individualized scaffolding. This develops students’ critical thinking skills and problem solving ability while increasing student independence and confidence in science.
S/F43
Title: NetLogo: Quest for Stability Among Grass, Sheep & Wolves
Presenter(s): Carol Quach, Current Noyce Scholar
Email: q.carol.lee@gmail.com
Institution: University of California, Berkeley
School Name & District Currently Teaching: Martin Luther King, Jr. Middle School
Project Discipline: Biology

At the end of the program, each resident creates a portfolio of artifacts that represent growth in each of Danielson’s four domains. This poster showcases activities and assessments implemented by members of UChicago UTEP’s current cohort of secondary residents. The selected work reflects growth that residents saw in themselves in each of the four domains, as well as the spirit of split vision in which the work was conceived.

S/F44
Title: Split Vision: Modeling Best Teaching Practices for Schools in the University Classroom
Presenter(s): Caitlin Bonham, Current Noyce Scholar
Email: cbonham@uchicago.edu
Institution: University of Chicago
Project Discipline: Biology & Mathematics
URLs: http://utep.uchicago.edu/

Over the course of two years at the University of Chicago’s Urban Teacher Education Program (UTEPI), teaching residents progress through four teaching experiences: tutoring, instructing an academic summer camp, and student teaching two semesters in two public schools in Chicago. This progression facilitates teaching residents’ professional growth and autonomy, and allows for extensive support and evaluation by university faculty and experienced mentor teachers in host classrooms. Chicago UTEP’s lengthy practicum also gives residents time to reflect on their experiences and implement feedback they receive.

Charlotte Danielson’s Framework for Professional Teaching is used as a tool for evaluating residents over the course of the program. Residents are encouraged to practice “split vision,” that is, to recognize themselves as students and see themselves in the children they teach. Faculty within Chicago UTEP plan for, instruct, and form relationships with students in a manner that models good teaching practice at the school level. Residents are frequently asked to draw parallels between university classrooms and their practicum classrooms. In critiquing their university classroom, residents find new insight into their own teaching.

S/F45
Title: Engaging Children in a Hands-On Informal Science Program
Presenter(s): Rosemary Wulf, Current Noyce Scholar
Email: rosemary.wulf@colorado.edu
Institution: University of Colorado
Project Discipline: Physics Education Research

The Partnerships for Informal Science Education in the Community program (PISEC, part of JILA Physics Frontier Center) provides afterschool inquiry-based science learning opportunities for children typically underrepresented in science. University participants, including undergraduates and graduate students, benefit from opportunities to teach and interact with students in these settings. As a Noyce scholar, I have been working closely with the Director of PISEC to design, implement, and study the effects of a new curriculum and game, based on the Fifth Dimension Literacy program, in which middle school children explore an optics laboratory. The program features children making choices to move their characters around a game board to engage in hands-on experiments with colors, lenses, refraction, reflection, and more. We are developing coding schemes to analyze students’ lab notebooks in an effort to learn more about child agency/choice of path through the game and to characterize how much they write in their notebooks, the details of their drawings and diagrams, and the science content of their writings and drawings. This poster will describe the game as well as preliminary results of our coding.

S/F46
Title: Exploring Linguistically Diverse Education in Elementary School Classrooms and After-school Programs
Presenter(s): Kristine Johnson, Current Noyce Scholar
Email: Kristine.k.johnson@colorado.edu
Institution: University of Colorado-Boulder
Project Discipline: Elementary Mathematics, Science
URLs: http://noyce.colorado.edu/

Multiple forms of English language instruction are employed in teaching linguistically diverse elementary school children. Methods for addressing literacy (or in some cases, biliteracy) may impact the accessibility of mathematics and science, particularly at the elementary school level; while students are building language competency, they are also expected to establish funda-
mental competencies in numeracy and inquiry-based critical thinking skills.

Children whose first language is Spanish are the majority of English Language Learners in Colorado. These children may find themselves in Spanish/English biliteracy programs, in Spanish immersion/English transition programs, or in English only instruction with English as a Second Language pullout instruction. As a Noyce Scholar, I work with the Centro Latinoamericano para las Artes, Ciencias y Education (CLACE) program in Boulder, which takes a biliteracy approach. The CLACE after school science enrichment program emphasizes experiential education, STEM, literacy, and cultural sensitivity, with instruction available simultaneously in both English and Spanish. I have also worked with students in Denver and Boulder who experience the other types of English language instruction models; some first receive instruction (including math and science) in Spanish before moving to English with Spanish support, while others have only had English instruction with no Spanish support of math and science. This poster will explore the characteristics of language instruction and the impact it may have on access to math and science learning.

S/F47
Title: Developing Effective Educators for Science Education
Presenter(s): Kristen Chapman, Current Noyce Scholar
Email: kristenachapman@gmail.com
Institution: University of La Verne
Project Discipline: Science Education

In order to move towards a stronger STEM student community, we must have teachers who are capable of teaching science and mathematics successfully. This includes inspiring and motivating students, knowing and loving the subject matter they teach and being able to investigate various teaching modalities. Too many students come to the conclusion that STEM subjects are boring, difficult, or weird. This idea does not come naturally to them, children love exploring the natural world and problem solving, but students see the teacher apprehension and immediately believe that if their teacher cannot understand science, they will not be able to. While many educators approach science with a negative outlook and lackluster lesson plans, my research allows me to reach teachers and students in my community by teaching several lesson plans while simultaneously encouraging their interest in science and higher education opportunities. My research project involves creating fun, interactive lesson plans that allow students to learn about science in a hands-on way. Many of the students participating have had little to no exposure to science, averaging to about once every two months. 176 students took a pre- and post-survey and results show that student learning improved about 10% when using different learning modalities. Students were more than enthusiastic to be learning about science.

S/F48
Title: Poster Abstract: Multiple Representations for Algebra Afford Access to the Curriculum to All
Presenter(s): Linda Singer, Teaching Fellow
Email: sngrind@yahoo.com
Institution: University of Massachusetts Amherst
School Name & District Currently Teaching: Springfield Public Schools, Springfield MA
Project Discipline: Middle School Mathematics
Other: Special Education

I work in an alternative school that serves a population that is 100% special education; 89.8% of the students receive free lunch. To suggest that this is an at risk population is an understatement-yet they are doing rich mathematics, and learning and succeeding. Students do not always know their multiplication tables, and most do not read at grade level. My students have not always had access to the richer math problems that their non-disabled peers enjoy. Using multiple representations allow students who have disabilities access to the curriculum. Many of the students I work with have difficulty in processing and memory issues. These learners can struggle to learn and being difficult to work with at times, it is often forgotten that they can do well given the correct tools to assist them in assessing the curriculum. One of the tools I use and have success with is multiple representations or rule of four link sheet. This tool allows students to tackle a problem in different ways. Students have a verbal description of the problem, they use graphs and tables, and a written rule, this technique allows the students multiple starting points in problem solving.

S/F49
Title: The Effect of Post-Quiz Remediation on Student Understanding of Important Concepts in Biology
Presenter(s): Robert Welter, Current Noyce Scholar
Email: rjw269@gmail.com
Institution: University of Missouri, Columbia
University of Missouri
School Name & District Currently Teaching: David H. Hickman High School - Columbia Public Schools
Project Discipline: Assessment

The role of post-quiz remediation strategy was analyzed in a high school Biology course. Students who performed poorly on a daily quiz were offered the opportunity to earn points back by completing a short remediation sheet the night after the quiz. The effect of this remediation on student performance on a summative test was examined. In addition, the effectiveness of the “points back” system was analyzed.
S/F50
Title: Forensics in the Classroom
Presenter(s): Cristina D'Agostino, Current Noyce Scholar
Email: cedagost@uncg.edu
Institution: University of North Carolina at Greensboro
University of North Carolina at Greensboro

Noyce Scholars with UNCG's Project ExSEL seek to find opportunities that support the National Science Foundation's aim to encourage high school students to consider a career in science teaching. Forensics is a popular science topic that brings together many different science disciplines and is represented in CSI series in the media. The curriculum for forensics may be designed in a way that weaves together standard objectives from multiple science courses with real-life simulations. A class like forensics involves real-world applications of biology, chemistry, and physics in a modern, exciting way. One Noyce Scholar has been working with a high school forensics teacher to evaluate the effects that such a course has on the students' learning and their science interests. The purpose of this research poster is to determine if this type of science course truly helps students gain a better understanding of the different sciences and if students become more interested in science as a result.

S/F51
Title: Designing Equitable Lessons in Mathematics
Presenter(s): LaKeisha Leonard, Current Noyce Scholar
Email: lakeishaleonard@my.unt.edu
Institution: University of North Texas
School Name & District Currently Teaching: 
Project Discipline: Mathematics

The College of Education and Teach North Texas Program at the University of North Texas have introduced several tools that will help me become a more diverse educator. Through literature and various activities, I have learned how to better meet the needs of my future students. Through my Teach North Texas courses and Teaching Diverse Populations course, I was able to design and present (for peer feedback) an inequalities lesson, based on hypothetical classroom demographics. In this lesson, I was able to not only appeal to different learning preferences, but promote diversity within my hypothetical classroom. As a pre-service teacher, the creation of this lesson has opened my eyes to how equity and diversity fit in the classroom. It also taught me that the promotion of diversity and equity in the classroom can be a creative and rewarding experience for both the teacher and students. I found that in a mathematics classroom, the promotion of equity and diversity can be presented through real life. Not only will my students be learning how mathematics relates to the real world, but theirs as well.

S/F52
Title: Puerto Rico Master Math Teacher Program
Presenter(s): Tomas Diaz, Current Noyce Scholar
Email: tomas_mat301@hotmail.com
Institution: University of Puerto Rico at Rio Piedras
School Name & District Currently Teaching: Jose Rojas Cortes
School District: Orocovis, Puerto Rico
Project Discipline: Mathematics
URLs: http://alacima.uprrp.edu/MMT

The University of Puerto Rico (UPR) in Rio Piedras (Faculty of Natural Sciences) is developing a Robert Noyce Master Teacher Fellowship initiative in collaboration with the Puerto Rico Department of Education (PRDE) to establish the first Puerto Rico Master Math Teacher Program (PRMMTP). This project will certify ten 7-12 grade mathematics teachers, who teach in high-need school districts, as Master Math Teachers (MMT) through the PR Rio Piedras Campus’ Division of Continuing Education. Tomas Diaz is a 2009 Master Teacher Fellow of the Puerto Rico Master Math Teachers. He has a Master’s degree in Mathematics Education and currently teaches Elementary and Intermediate Algebra I & II, Geometry I & II, and Pre-calculus I & II at the Jose Rojas Cortes High School in Orocovis, PR.

In addition, since 2004, he is part time mathematics professor of Interamerican University at Barranquitas Campus, where he teaches core math courses. Also he was selected as a Math Teacher Liaison for the Orocovis and Morovis educational districts. As a Liaison he mentors other math teachers in math curriculum, designs items for the Puerto Rico national math test, and is a collaborator in Math Competitions. His poster is a description of his professional experiences with the project, his experience modifying and transferring activities to the classroom, and his expectations. As a MMT he will serve as role model of exemplary mathematics teaching practices, expert in content knowledge, integrating technology and use of manipulatives, and a leader among his peers to promote improvements in the student’s academic achievement. He is receiving an intensive professional development program, that includes inductive and deductive reasoning, mathematical models: linear, quadratic and exponential, and the integration of Math Education and Research.

S/F53
Title: Using Technology to Connect At-Risk Youth with Positive Role Models in Scientific Fields
Presenter(s): Ana Cristina Lee Escudero, Current Noyce Scholar
Email: A.C.LeeEscudero@gmail.com
Institution: University of Southern California
School Name & District Currently Teaching: Richard E. Byrd Middle School, Los Angeles Unified School District
Project Discipline: Life Science
Many youth who come from low socioeconomic backgrounds also have low social capital because they live in communities and homes that predominately have members of the working class. Thus, these youth do not have opportunities to get directly acquainted with professionals in scientific fields who can serve as positive role models in influencing these students’ future career paths. Many students from underprivileged neighborhoods believe that it is too hard to enter these career fields, have unrealistic perceptions of who science professionals are and what they do, and/or they simply do not know what educational steps to take to reach those fields. This activity proposes using new technologies like Skype and Google+ to bring these working professionals into the classroom through live video and allowing the students to interview them, learn about what they do, and hear about their educational and personal experiences that led them to where they are today. The selected science professionals will collaborate with the classroom teacher to “visit” the classroom on several occasions throughout the school year so that the students and professionals can develop familiarity and to give the students time to explore ideas and questions with these professionals.

S/FS4
Title: Parent Involvement: An Investigation of Perceptions and the Implementation of Strategies
Presenter(s): Michael Lawson, Current Noyce Scholar
Email: mlawso13@utk.edu
Institution: University of Tennessee, Knoxville
School Name & District Currently Teaching: Central High School, Knox County
Project Discipline: Secondary Teaching, Mathematics
Focus: Parent Involvement

Research has shown that parent involvement and communication between parents and teachers can provide many benefits for students, especially in mathematics. However, this parent involvement shows a decline as student’s progress from elementary to secondary schooling. Since student achievement and betterment is the goal for any educator, many secondary educators need to see parents as an untapped resource in helping raise their students’ achievement. Thus, the purpose of this study is to investigate the perceptions of parent involvement in a secondary school and implement parent involvement strategies to keep parents informed about the classroom, involved in student work and classroom activities.

The poster presentation will describe strategies and provide artifacts that were used to assess parent involvement and to involve parents at the high school, as part of an action research project. Participants of this study were high school teachers and administrators, and the parents and students of an Algebra II class. The strategies and artifacts include parent surveys, class newsletters, progress reports, interactive homework assignments, and a Family Math Night. Also included on the poster are lessons learned and implications for further research revolving around parent involvement.

S/F55
Title: The Noyce Grant and Pre-Service UTeach Students at the University of Texas at Dallas
Presenter(s): Georgia Stuart, Current Noyce Scholar
Email: gks090020@utdallas.edu
Institution: University of Texas at Dallas
Project Discipline: Math

At the University of Texas at Dallas, students in the UTeach science and mathematics teacher preparation program receive Noyce funds in the form of scholarships and internship support. This poster will demonstrate some of the ways Noyce funding helps our students become better science and math teachers.

S/F56
Title: Determination of Isomorphism Class Using Cayley Graphs
Presenter(s): Katherine Horn, Current Noyce Scholar
Email: khorn@patriots.uttyler.edu
Institution: University of Texas at Tyler
School Name & District Currently Teaching: 
Project Discipline: Mathematics - Abstract Algebra

When specific colors have been assigned to Cayley sets of a Cayley graph and the edges have been colored accordingly, we call this a complete colored Cayley graph. Once Cayley sets have been identified, we can construct two different multiplication tables: one of the group and the other of its opposite group. Ambiguous groups have complete colored Cayley graphs that cannot be distinguished from their opposite group. We establish the Subgroup Theorem and conclude that the complete colored Cayley graph does determine the isomorphism class for ambiguous groups.

In this paper we extensively detail the published work of Goldstone, McCabe, and Weld (2010).

Instead of looking at directed Cayley digraphs, we examine what knowledge can be gained from certain undirected Cayley graphs. In these graphs, each vertex represents an element of the group. The identity vertex is given and the edges connecting vertices are colored according to an associating Cayley set. Involutions and inverses are easily determined with this complete colored Cayley graph. Because the direction of the group operation is not given, the relationship between elements cannot be certain. We must list the possible relations for each element in both directions of multiplication. At this point we must choose one possibility for a specific element rather than the other. Through process of elimination and a technique similar to solving Sudoku puzzles, we are able to determine the full tables for most groups. But when the other option is chosen, the transpose of the original multiplication table is produced. This is the operation table for the group whose multiplication is opposite that of
the original group. Ambiguous groups are groups that cannot be differentiated from its opposite group. We find three conclusions to an edge being unknown, which then lead to the Subgroup Theorem. This says that ambiguous groups always have a subgroup that is isomorphic to the quaternion group. Ultimately, we find that the complete colored Cayley graph determines the isomorphism class for ambiguous groups.

S/F57
Title: A Forensic Case Analysis to Engage At-Risk Students in Science
Presenter(s): Kimberly Bigioni, Former Noyce Scholar
Email: kim.bigioni@phoenixtoledo.org
Institution: University of Toledo
School Name & District Currently Teaching: Phoenix Academy
Community School
Project Discipline: Science
URLs: http://www.cyberbee.com/whodunnit/crime.html

A forensic case analysis was developed as a science month activity at a drop-out recovery inner city high school (modified from http://www.cyberbee.com/whodunnit/crime.html). The goal of the activity was to engage students in science and to develop their metacognitive, measurement, analytical and written communication skills. The crime scene was staged in a teacher’s office based on the popular Ohio State University/University of Michigan football rivalry. Student detectives were given a suspect list (Buddy, Braxton, Felix and Fluffy) and the opportunity to examine the crime scene. In the activity, students predicted the identity of the perpetrator and analyzed pieces of evidence (track analysis, hair analysis, chemical analysis and forensic odontology) to narrow the suspect list. Students then explained their conclusion in written form. The reward for participating in the activity was a field trip to the local science museum to view the BODIES Revealed exhibit.

S/F58
Title: Why Do Plants Matter?
Presenter(s): Annie Davis, Current Noyce Scholar
Email: adavis8@uvm.edu
Institution: University of Vermont
School Name & District Currently Teaching: Montpelier High School - Student Teaching
Project Discipline: Biology
URLs: http://www.uvm.edu/~noyce/

This poster presentation will highlight a final unit project as part of a plant unit designed for an 11th and 12th grade Advanced Placement (AP) Biology class. The learning objective was for students to understand and articulate the significant role plants play in research, technology, culture, art and history by answering the question “Why do plants matter?” In order to construct this understanding, students chose plant related research topics that were of interest and significance to their own lives, engaged in research, developed a project in the format of their choice, and presented their project to the class during a final project showcase. Ultimately, the goal was for students to create a deeper understanding for themselves of the vital role plants play in each of their lives and to articulate that understanding to their peers in a creative, interesting and articulate way.

S/F59
Title: The University of Vermont Robert Noyce Scholarship Program
Presenter(s): Beth White, Teaching Fellow
Email: beth.white@uvm.edu
Institution: University of Vermont
Other: PhD Candidate in Educational Leadership and Policy
URLs: http://www.uvm.edu/~noyce/

The University of Vermont’s (UVM) Phase I Robert Noyce Scholarship Program will award 12 undergraduate scholarships (three 2-year scholarships each year over a 4-year period) and 15 graduate stipends (three 1-year stipends each year over a 5-year period) through a competitive process to STEM majors enrolled in science teacher education in the College of Education and Social Services. In addition, the program will award 40 undergraduates (8 undergraduate students per year over a 5-year period) a stipend for their participation in a 10-week summer research internship. To date, 12 Noyce Scholarships and 16 summer research internships have been awarded. The UVM Robert Noyce Scholarship program is designed to attract, prepare and retain secondary school teachers with strong content and pedagogical expertise in the natural and environmental sciences. The Noyce Program will be delivered through a collaborative partnership between UVM’s highly effective and nationally recognized College of Education and Social Services and College of Arts and Sciences and local high need high schools and will lead to strategies of recruitment in science education as well as retention of undergraduate and graduate science students. This presentation will highlight some of the strategies that have been implemented in the marketing and recruitment phases of the program.

S/F60
Title: Using the Khan Academy and Flipping the Mathematics Classroom
Presenter(s): Thomas Quinlan, Current Noyce Scholar
Email: quinlant2@winthrop.edu
Institution: Winthrop University
School Name & District Currently Teaching: Winthrop University
Project Discipline: Mathematics

The 2011, Horizon Report reported that in 2-3 years game-based learning and open content will transform the classroom and in 4-5 years self-directed learning will become mainstream. One
great tool helping teachers accomplish this is the Khan Academy (http://www.khanacademy.org). This free web site provides a library of over 3,000 instructional videos on topics such as mathematics, physics, finance, chemistry, biology and history. Other features include question and feedback blogs, classroom management reports, and interactive mathematics problems from algebra to calculus. The Khan Academy also allows educators to flip the classroom, or have students watch lectures and work through concepts at home and then arrive in class ready to work toward higher-order thinking and self-directed goals. This unconventional pedagogy has its critics, but early study results show how teachers can use free online videos and differentiated learning to inspire students.

S/F61
Title: The Winthrop Initiative for STEM Educators
Presenter(s): Matthew Ryan, Current Noyce Scholar
Email: ryanm4@winthrop.edu
Institution: Winthrop University
School Name & District Currently Teaching:
Project Discipline: Mathematics, Biology, and Chemistry
URLs: www.birdnest.org/wise

The Winthrop Initiative for STEM Educators (WISE) is a Noyce Scholarship Project housed at Winthrop University in Rock Hill, SC, located in the north central region of the state. The university is a public, comprehensive institution with a long tradition of quality teacher education programs. The WISE program supports students in three different degree options: a traditional undergraduate teacher certification route, a two-year traditional Master of Arts in Teaching degree that primarily serves career changers, and a new fifth-year MAT option designed to serve recent graduates who choose to pursue teacher education immediately after completing an undergraduate degree in the discipline. In addition, the program sponsors a three-week summer internship for freshmen and sophomore STEM majors as a way to introduce research possibilities in the chosen discipline as well as a career in teaching. Our poster will feature (a) recruitment efforts since Fall 2010, (b) data from the 2011 summer internship and 2010-2011 scholar cohort, and (c) next steps for the WISE program.

S/F62
Title: The Radiolysis of Water and the Dissolution of UO2
Presenter(s): Savannah Kiser, Current Noyce Scholar
Email: s12.skiser@wittenberg.edu
Institution: Wittenberg University
School Name & District Currently Teaching: Student Teaching
Project Discipline: Chemistry and Computer Science

The Used Fuel Disposition Project became a major focus of the Department of Energy when issues with the disposition of spent nuclear fuel (SNF) at Yucca Mountain raised questions about the long term stability of the fuel in that environment. Uraninite (UIVO2), a major component of SNF, is known to be stable in reducing, or anoxic, environments; however, it becomes unstable when exposed to water owing to the production of oxidants from radiolytic decomposition of water.

It is important to understand and be able to predict the role that radiolysis may play during long term disposal of SNF in a geologic repository under reducing conditions. To model this system, a computer program was developed at Pacific Northwest National Laboratory (PNNL) based on the initial studies of Christensen and Sunder (2000) and LaVerne and Tandon (2002). This model converts the nearly 200 chemical reactions that occur during the radiolysis of water and dissolution of UO2 into a system of ordinary differential equations (ODE) which can be solved analytically to provide information on concentration versus time for all species of interest. This model has verified that the oxidation of UO2 to UO22+ is an indirect process, and the time it takes the system to reach equilibrium is directly affected by the dose rate of the α/β/γ-radiation and the concentrations of the six radiolytic products that form at the fuel surface: OH and H radicals, H2, H2O2, and the aqueous electron, eaq. However, the amounts of all radiolytic products decrease due to reactions in the system in which these species are combined to form water. The FASIMILE kinetic modeling software, an industry standard for radiolysis modeling, has been used in order to test the PNNL model. The Reaction Wizard application provided in the FASIMILE program allowed us to model a simplified water/peroxide system, and the FASIMILE results coincided with the results obtained from the PNNL model. However, setbacks were encountered while using the FASIMILE program to model the full radiolysis system, and it was concluded that, in this case, the PNNL model is the best choice for this system. FASIMILE was then used as an example to begin the development of a new user friendly interface for using the PNNL model.
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