

July 7-9, 2010

A collage representing the interdisciplinary nature of environmental science. It features several key elements:

- Chemistry Lab:** In the upper left, students are shown in a laboratory setting. One student is pouring liquid from a beaker into a flask, while others observe. Chemical symbols like Nb (Niobium) and Te (Tellurium) are visible in the background.
- Mathematics:** A central image shows a woman pointing at a chalkboard filled with mathematical equations, including $x^2 + (25 - 20x + 4x^2) = 9$, $5x^2 - 20x + 2.5 = 9$, and $5x^2 - 20x + 16 = 0$. Other mathematical symbols like Re and $iodum$ are also present.
- Field Research:** In the bottom right, three individuals wearing waders and gloves are shown sampling water in a river or stream. One person is holding a container, while the others observe.
- Chemical Symbols and Formulas:** Various chemical symbols and formulas are scattered throughout the collage, including Bi (Bismuth), RO_2 , Na , $Na_3 + H_2$, $Na = \frac{[H_2O][N_2]}{[H_2]}$, $Na = \frac{P_1 + P_2}{2} \cdot h$, $S = \frac{(a+b)}{2}$, $C =$, $A \times B = 2$, and MAT .

The overall theme is the integration of chemistry, mathematics, and field research in environmental science.



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National Science Foundation (NSF) **Robert Noyce Teacher Scholarship Program** ***Increasing the Number of K-12 STEM Teachers in High-Need School Districts***

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) 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.

In addition, the program supports STEM professionals who enroll as NSF Teaching Fellows in master's degree programs leading to teacher certification by providing academic courses, professional development, and salary supplements while they are fulfilling a four-year teaching commitment in a high need school district. This new component also supports the development of NSF Master Teaching Fellows by providing professional development and salary supplements for exemplary math and science teachers to become Master Teachers in high need school districts.

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:

- Co-sponsoring and implementing the 2009 and 2010 NSF Robert Noyce Teacher Scholarship Program annual conferences.
- Producing a general publication that highlights the accomplishments of the NSF Noyce Teacher Scholarship Program.
- Developing and maintaining an NSF Noyce Teacher Scholarship Program Web site, <http://nsfnoyce.org>.
- 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 262 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 EurekaAlert!, www.eurekaalert.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/>.

Robert Noyce Teacher Scholarship Program Conference

Building Excellence in STEM Teaching

Co-Sponsored by NSF and AAAS

Grand Hyatt Washington, D.C.

July 7-9, 2010

Wednesday, July 7, 2010

4:30 pm - 5:30 pm **New Awardees Session with NSF Staff** (*Independence A*)

7:00 pm - 10:00 pm **Registration** (*Independence Foyer*)
Poster Setup (*Independence B,C,D,F,G,H,&I*)

Thursday, July 8, 2010

7:00 am - 8:00 am **Registration** (*Independence Foyer*)
Poster Setup (*Independence B,C,D,F,G,H,&I*)
Continental Breakfast (*Independence A*)

8:00 am - 9:00 am **Opening & Welcome:** (*Independence A*)
Joan Prival, Noyce Lead Program Director, National Science Foundation (NSF)
Alan I. Leshner, Chief Executive Officer, American Association for the Advancement of Science (AAAS) and Executive Publisher, *Science*

Remarks: Linda Slakey, Director, Division of Undergraduate Education, NSF
Joan Ferrini-Mundy, Acting Assistant Director, Directorate for Education and Human Resources, NSF

9:15 am - 10:45 am **Concurrent Workshops - Session 1** (*TBA*)

11:00am - 12:00 pm **Panel: Voices from the Field** (*Independence A*)
Moderator: Linnea Fletcher, Program Director, Division of Undergraduate Education, NSF

Panelists: (Former Noyce Scholars)
Fredericka Blackwell, Fulton County Tri-Cities HS (East Point, GA)
Garnett Coy, Menifee County HS (Frenchburg, KY)
Mika Hunter, Riverside HS (Durham, NC)
Karen Klein, Garner Magnet HS (Garner, NC)
Maria Ortiz, Hollenbeck MS (Los Angeles, CA)
Shelly Stachurski, Mapleton Public Schools (Denver, CO)

12:15 pm - 2:00 pm **Working Lunch and Keynote** (*Independence A*)
Jason Kamras, Director, Teacher Human Capital, District of Columbia Public Schools

2:15 pm - 3:45 pm **Concurrent Workshops - Session 2** (*TBA*)

AGENDA

- 4:00 pm - 4:45 pm **Plenary: *Teamwork to Produce Effective Noyce Scholars***
Walter Hill, Noyce PI, Tuskegee University (*Independence A*)
- 5:00 pm - 6:00 pm **Poster Session 1/Networking** (*Independence B,C,D,F,G,H,&I*)
- 6:00 pm - 7:00 pm **Poster Session 2/Networking** (*Independence B,C,D,F,G,H,&I*)

Friday, July 9, 2010

- 7:00 am - 8:00 am **Continental breakfast** (*Independence A*)
- 8:00 am - 9:00 am **Mini-Plenaries:**
A. *Developing a Conceptual Framework for New Science Education Standards*
Thomas E. Keller, National Research Council (*Independence A*)
B. *The Common Core State Standards for Mathematics: An Overview of the Standards, How They Were Developed, and their Potential Impacts on Teaching, Learning, Assessment and Professional Development*
Kaye Forgione and Jean Slattery, Achieve, Inc. (*Farragut/Lafayette*)
C. *Overview of Noyce Program Evaluation*
Frances Lawrenz, University of Minnesota
Ellen Bobronnikov, and Beth Gamse, Cristofer Price, and Radha Roy; Abt Associates
(*Franklin/McPherson*)
- 9:15 am - 10:45 am **Concurrent Workshops - Session 3** (*TBA*)
- 11:00 am - 11:45 am **Keynote: Perspectives on K-12 Science Education** (*Independence A*)
Introduction: Shirley Malcom, Head, Education and Human Resources Programs, AAAS
Speaker: Bruce Alberts, Editor-in-Chief, *Science*, AAAS
- 12:15 pm **Closing Remarks AAAS & NSF**
Conference Adjourns

Bruce Alberts

Bruce Alberts, professor of biochemistry and biophysics at the University of California, San Francisco (UCSF), and president emeritus of the U.S. National Academy of Sciences, became the 18th editor-in-chief of *Science* on 1 March 2008. A prominent cell biologist best known for his work on the protein complexes that allow chromosomes to be replicated, Alberts has focused in recent years on public issues, especially the improvement of science education.

Alberts earned a PhD from Harvard University in 1965, spent 10 years on the faculty of Princeton University, and moved to UCSF in 1976. He has published more than 150 research papers and is one of the original authors of a leading textbook, *Molecular Biology of the Cell*. He served two terms as president of the National Academy of Sciences, from 1993 to 2005. He returned to UCSF to continue working on issues he emphasized during his tenure at the academies: internationalizing science—especially building links to scientists in the developing world and strengthening scientific infrastructures—and improving science education.

Since 2000 and until 2009, Alberts will serve as co-chair of the InterAcademy Council, a new advisory institution in Amsterdam governed by the presidents of the science academies of 15 different nations. He also sits on the Board of Trustees of the Carnegie Corporation of New York as well as the Gordon and Betty Moore Foundation. His six-year term as an overseer of Harvard University ended in 2007.

Joan Ferrini-Mundy

Joan Ferrini-Mundy is the Acting Assistant Director of the National Science Foundation (NSF) Directorate for Education and Human Resources (EHR). In 2009 she served as Acting Executive Officer for the EHR Directorate, and from January 2007 through December 2009 was Director of EHR's Division of Research on Learning in Formal and Informal Settings (DRL). While at NSF, Dr. Ferrini-Mundy continues to hold appointments at Michigan State University (MSU) as a University Distinguished Professor of Mathematics Education in the Departments of Mathematics and Teacher Education. She served as Associate Dean for Science and Mathematics Education in the College of Natural Science at MSU from 1999-2006. Ferrini-Mundy was a Visiting Scientist in NSF's Teacher Enhancement Program from 1989-1991, and served as Director of the Mathematical Sciences Education Board and Associate Executive Director of the Center for Science, Mathematics, and Engineering Education at the National Research Council from 1995-1999.

She directed the Michigan Department of Education Teacher Preparation Policy Study Group (2006-2007) and chaired the MI Mathematics High School Content Expectations Development Committee. From 1983-1999 Ferrini-Mundy was a member of the Mathematics Department at the University of New Hampshire, and in 1982-1983 she was a mathematics faculty member at Mount Holyoke College, where she co-founded the SummerMath for Teachers Program. She has served on the Board of Directors of the National Council of Teachers of Mathematics (NCTM), chaired the Writing Group for NCTM's 2000 *Principles and Standards for School Mathematics*, and served on the Board of Governors of the Mathematical Association of America. In 2007-2008, representing NSF, she served as an ex officio member of the President's National Mathematics Advisory Panel, and co-chaired the Instructional Practices Task Group. Ferrini-Mundy holds a PhD in mathematics education from the University of New Hampshire; her research interests include calculus teaching and learning, the development and assessment of teachers' mathematical knowledge for teaching, and mathematics and science education policy.

BIOGRAPHIES

Yolanda S. George

Yolanda S. George, Deputy Director, AAAS, Education and Human Resources Programs, has served as Director of Development, Association of Science-Technology Centers (ASTC); Director, Professional Development Program, University of California, Berkeley; and as a research biologist at Lawrence Livermore Laboratory, Livermore, California. George conducts evaluations, project reviews, and workshops for both the National Institutes of Health and National Science Foundation, as well as proposal reviews for private foundations and public agencies, including Carnegie Corporation of New York, the Ford Foundation, and the European Commission. Over the last 25 years she has raised over \$80 million for a variety of SMT education initiatives for colleges and universities, associations, and community-based groups. George has authored or co-authored more than 50 papers, pamphlets, and hands-on science manuals. She received her BS and MS from Xavier University of Louisiana and Atlanta University in Georgia, respectively.

Walter A. Hill

Walter A. Hill is Professor and Dean, College of Agricultural, Environmental and Natural Sciences, and Director of the George Washington Carver Agricultural Experiment Station at Tuskegee University. His current research and education interests include: K-16-PhD science education of underrepresented minorities; plant-environmental and advanced life support systems; and sustainability of small farms and rural communities in the southern Black Belt. Walter is co-founder of the Integrative Biosciences PhD program at Tuskegee University, the Alabama Agricultural Land Grant Alliance and the Macon County Farmers Market. He has served as Chair of the Professional Agricultural Workers Conference, and Director of the NASA sponsored Center for Food and Environmental Systems for Human Exploration of Space; the W.K. Kellogg Foundation-sponsored Southern Food Systems Education Consortium, and the USDA-sponsored Strategic Alliance for Biotechnology Research and Sub-Saharan African Development. Board memberships have included: the Black Belt Community Foundation Board of Directors, Lake Forest College Board of Trustees, USAID Board on International Food and Agricultural Development, USDA National Research, Education and Extension Advisory Board, the American Distance Education Consortium (ADEC) Board of Directors, and Alabama Nature Conservancy Board of Directors. He also served on the NASA Life and Microgravity Sciences and Applications Advisory Committee.

Jason Kamras

Jason Kamras currently serves as the Director of Teacher Human Capital Strategy in the District of Columbia Public Schools (DCPS). In this role, he leads the district's efforts to ensure a highly effective teacher for every classroom. Prior to this appointment, Kamras served for eight years as a middle school math teacher at John Philip Sousa Middle School (DCPS). He began teaching in 1996 as a member of Teach For America and was named National Teacher of the Year in 2005. Kamras holds a bachelor's degree in public policy from Princeton University and a master's degree in education from the Harvard Graduate School of Education.

Alan I. Leshner

Alan I. Leshner has been Chief Executive Officer of the American Association for the Advancement of Science (AAAS) and Executive Publisher of the journal *Science* since December 2001. AAAS was founded in 1848 and is the world's largest, multi-disciplinary 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 (NIMH). He went to NIMH 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.

He received an undergraduate degree in psychology from Franklin and Marshall College, and M.S. and PhD 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. The U.S. President appointed Leshner to the National Science Board in 2004. He is also a member of the Advisory Committee to the Director of NIH.

Shirley M. Malcom

Shirley M. Malcom is Director, Education and Human Resources (EHR) Programs at AAAS. Malcom was head of the AAAS Office of Opportunities in Science from 1979 to 1989. Between 1977 and 1979, she served as a program officer in the Science Education Directorate of the National Science Foundation (NSF). Before this, she held the rank of assistant professor of biology, University of North Carolina, Wilmington. Malcom received her PhD 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 and Commission on Professionals in Science & Technology. She serves as a trustee of Caltech and as a Regent of Morgan State University. In addition, she has chaired a number of national committees addressing education reform and access to scientific and technical education, careers, and literacy. 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. In 2003, Malcom received the Public Welfare Medal of the National Academy of Science, the highest award granted by the Academy.

Linda L. Slakey

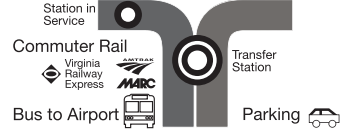
Slakey is a graduate of Siena Heights College (B.S. in Chemistry), and the University of Michigan (PhD in Biochemistry.) She did postdoctoral research at the University of Wisconsin. Dr. Slakey was appointed to the faculty of the Department of Biochemistry at the University of Massachusetts Amherst in 1973. Her scientific work focused on lipid metabolism and vascular biology, and was funded by the National Institutes of Health, the American Heart Association, and the National Science Foundation. She was Head of the Department of Biochemistry from 1986 until 1991, and Dean of the College of Natural Sciences and Mathematics (NSM) from 1993 until 2000. In September of 2000, she was appointed Dean of Commonwealth College, the honors college of the University of Massachusetts Amherst. As Dean of NSM and of Commonwealth College she was active in supporting teaching and learning initiatives throughout the University, with particular attention to engaging undergraduate students in research, to faculty development activities that promote the transition from lecturing to more engaged pedagogies, and to the support of research on how students learn. She joined the National Science Foundation in November of 2006 as Director of the Division of Undergraduate Education.

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SESSION 1: Thursday, July 8, 2010

9:15am - 10:45am

1.1 - This session includes two presentations.

1.1.A. From Billboards to Facebook: Recruitment Strategies for Undergraduate and Post-Baccalaureate Programs

Patricia Friedrichsen, University of Missouri, FriedrichsenP@missouri.edu, PI
Marilyn Soucie, University of Missouri, SoucieM@missouri.edu, Project Coordinator
Heather Worsham, hmworsham@mail.mizzou.edu, Graduate Assistant

Target Audience: Higher Education

Topic: Recruitment

The recruitment strategies used in our undergraduate and post-baccalaureate science teacher education programs will be shared. We will give an overview of the two programs and then focus on identifying and marketing to target audiences. Based on our work in recruiting majors, we will describe the different strategies used for each of our target audiences. These range from highway billboards to direct print mailings to the use of Facebook. This interactive session will include small and large group discussions, allowing participants to share their own effective recruiting strategies.

1.1.B. Know Your Audience: Marketing Strategies to Recruit Teachers

Monica Plisch, American Physical Society, plisch@aps.org
Chris Anderson, Grimwhimsy Communications, chris@grimwhimsy.com
Brett Westbrook, University of Texas at Austin, bwestbrook@austin.utexas.edu

Target Audience: Higher Education, Higher Education Administration, School District, Non-Profit, Research/Evaluation

Topic: Recruitment

PhysTEC and UTeach have been highly successful at recruiting STEM majors into teaching. The panel discussion will focus on strategies for getting students "in the door" and share new efforts borrowed from marketing.

1.2 Noyce Regional Conferences: 2009-2010 Regional Conference Reports

David Andrews, California State University, Fresno, davidan@csufresno.edu
Lienne Medford, Clemson University, Lienne@clemson.edu
Cindy Johnson-Taylor, Newberry College, cindy.johnson-taylor@newberry.edu
Carol Lund, Clemson University, clund@clemson.edu, Noyce Scholar
Joni Smith, Clemson University, jbsmith27@bellsouth.net, Noyce Scholar
Kim Nguyen, Indiana University Purdue University Indianapolis, knguyen@iupui.edu
John Staver, Purdue University, jstaver@purdue.edu
Davida Fischman, California State University, San Bernardino, fischman@csusb.edu
Laura Henriques, California State University, Long Beach, lhenriqu@csulb.edu

Target Audience: Higher Education, Higher Education Administration, School District, Non- Profit, Research/ Evaluation

Topic: Recruitment

This session will feature a panel of leaders of regional Noyce Conferences that have been completed this past academic year throughout the US. Each panelist will provide an overview of their region's conference, participating Noyce programs, and details of the plenary and breakout sessions as well as results from the conference evaluations. Panelists will also share important online links to resources provided through their regional conferences.

1.3 - This session includes two presentations.

1.3.A. Using a Residency Model to Prepare Teachers for High-need Schools

Jacqueline T. McDonnough, Virginia Commonwealth University, jtmcdonnough@vcu.edu

Target Audience: Higher Education, School District

Topic: Innovative Noyce program practices and teacher preparation models

High turnover of science teachers has lead to increasingly higher numbers of under qualified teachers especially in schools that serve historically disenfranchised students. Not only do unqualified teachers yield lower achievement from their students, they also tend to leave teaching before they can learn their craft and improve. This pattern exists in many US school districts, but is especially apparent in those with a large percentage of the population at or below the poverty level.

One approach to breaking this pattern is to recruit and retain teachers qualified both in science content and pedagogy. The VCU Noyce Initiative attempts to do this through an integrated collaborative project between the School of Education and College of Humanities and Sciences, in partnership with area school districts. VCU supports and prepares undergraduate and graduate students to be effective secondary science teachers in high need schools. Recruited in the junior year, undergraduates are initiated into teaching through an internship program at high-need secondary schools. Throughout their academic training, students are mentored by university faculty. The program prepares 16 master science teachers (Noyce Teaching Fellows) using the highly rated Santa Cruz method to work with Noyce Scholars during their one-year residency program and critical first years of teaching. Focused efforts are made to attract and support a diverse group. Long-term goals of our initiative are to decrease turnover and stabilize secondary science teaching faculties in high need schools, to facilitate partnerships between science and education faculty, and to enrich community partnerships.

1.3.B. Power of an Online Learning Community: By and For Noyce Scholars

Rabia Shahbaz, Meadowcreek High School, rabia677@gmail.com

Angelle Whittington, Peach County High School; Fort Valley, Georgia; Teacher and Former Noyce Scholar, Georgia State University, awhittington1@yahoo.com

Ariel McIntyre, Maynard H. Jackson High School, Atlanta, Georgia; Teacher and Former Noyce Scholar, ariellsmith@gmail.com

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, School District

Topic: Mentoring and teacher leadership

In this session, we will describe the design and implementation of our online learning community for the professional development of Noyce Scholars. This online learning community has the potential to impact and influence the retention of Noyce Scholars in high-need schools beyond the induction years. The learning community is led by Noyce Scholars from Georgia State and operated in Second Life, a web-based program. Session participants will learn about the rich exchange of resources and a peer-mentoring approach to professional development.

1.4 - This session includes two presentations.

1.4.A. Good Resources for Math Teaching

Davida Fischman, CSU San Bernardino, fischman@csusb.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, School District

Topic: Resources

Are you interested in spicing up your math lessons without losing the mathematical content? Learn about easy-to-obtain resources that are meant to help you teach conceptually, with a deep understanding of the subject, and in an engaging way. These resources will help you develop in your students the understanding of what a concept really means, where it appears and where not, and when procedures are appropriate and when not. We will focus primarily on print resources available from the National Council of Teachers of Mathematics.

1.4.B. Learning Mathematics in a Second Language

Elsa Medina, Cal Poly State University, emedina@calpoly.edu

Target Audience: Noyce Scholars

Topic: Resources

In this session, participants will hear about some of the difficulties English language learners have in learning mathematics. After a mathematics lesson in Spanish, we will discuss what techniques teachers can use to help students overcome these difficulties. Participants will be actively engaged in the mathematics lesson as well as in the discussion of language issues.

1.5 - This session includes two presentations.

1.5.A. Building Induction Programs for Content Specialists: Research on Beginning Teachers

Julie Luft, Arizona State University, Julie.Luft@asu.edu

Target Audience: Higher Education, Higher Education Administration, School District, Research/Evaluation

Topic: Research and Evaluation

While it is generally acknowledged that induction programs are important, little is known about the development of content specialists in these programs. To add to the knowledge in this area, this study follows 101 secondary science teachers as they participate in one of four different induction programs. The data collected consists of

observations of practice and interviews about beliefs and pedagogical content knowledge (PCK). From the analysis of the data, we suggest that induction is an important time in the career of a science teacher and that science teacher educators in higher education need to collaborate with school district staff to support new science teachers. We also make suggestions about how preservice programs may better support the development of beginning science teachers.

1.5.B. Using a Wiki to Support Noyce Scholar Development and to Serve as a Research and Evaluation Tool

Gail Richmond, Michigan State University, gailr@msu.edu

Angela Calabrese Barton, Michigan State University, PI, Noyce II project, acb@msu.edu

Amal Ibourk, Michigan State University, ibourkam@msu.edu

Target Audience: Noyce Teaching Fellows, Higher Education, Higher Education Administration, Research/Evaluation

Topic: Resources

Our workshop will present a model for how to design and use a wiki: (1) to support new teacher development, and (2) to conduct research on those factors that shape the development of effective teachers for high need settings. We are particularly encouraged by the power of this platform to inform us about the issues that teacher candidates face in their development and the role of context in shaping how they negotiate these issues. In addition, the multimodal (i.e., audio, video, textual, etc.) nature of the wiki environment allows the possibility for multiple ways of presenting and reflecting upon these issues and one's own developing teaching practice. This wiki is particularly helpful because it can accommodate and take advantage of the diversity of backgrounds and experiences of our scholars who represent different content backgrounds, field placements, and year in program.

We will:

- Present our design for our wiki, including the conceptual grounding for its design;
- Provide examples of how our Noyce Scholars have contributed in individual and co-constructed ways;
- Present an analytic scheme for making sense of the “data” that the wiki reflects in terms of: teacher learning, emergent issues, and contextual factors; and
- Facilitate a discussion about how the wiki can provide feedback for program design in an iterative way.

1.6 Making the Most of Digital Learning Resources for STEM with the National Science Digital Library (NSDL)

Eileen McIlvain, Laura Moin, University Corp for Atmospheric Research (UCAR), eileen@ucar.edu

Kim Lightle, klightle@msteacher.org, PI, Middle School Portal Math & Science Pathways, Ohio State University

Patricia Jacobs, pjacobs@shodor.org, Outreach & Professional Development Manager, Shodor

Lynn Diener, Imdiener@wisc.edu, Outreach Coordinator, ChemEd DL, University of Wisconsin

Target Audience: Noyce Scholars, Noyce Teaching Fellows

Topic: Resources

NSDL, an NSF program, provides high quality materials in support of STEM education at all levels. It enables educators and students to access rich collections of free educational resources that connect learners to real science

and help educators effectively incorporate use of digital resources in their classrooms. This workshop will demonstrate exemplary resources from NSDL, its partner Pathways projects, (disciplinary and audience-focused NSDL portals), and opportunities for teacher professional development.

Featured resources include:

- Middle School Portal: Math and Science Pathways (MSP2) - with science and math Resource Guides, a social network for middle school teachers; Beyond Penguins and Polar Bears, connecting science and literacy through literature and writing at the elementary level;
- Computational Science Education Reference Desk (CSERD) Pathway and Interactivate!, from Shodor - instructional materials and interactives designed to engage and help students learn about math and science through computational applications; and
- ChemEd DL Pathway, and its Periodic Table Live! - information about every known chemical element, 3-dimensional crystal structures, videos of reactions, comparison of elements by graphing and sorting their numeric properties, and more. A free resource pack offers ready-to-use worksheets, videos, tutorials.
- Presenters will provide an overview of selected NSDL resources and professional development opportunities, including:
- NSDL Science Literacy Maps - a browsable interface for discovery of resources associated with the AAAS Project 2061 Benchmarks for Science Literacy; and
- Preliminary results of a year-long field trial of the NSDL Curriculum Customization Service (CCS), an application adaptable to the diverse needs of school districts. CCS offers a promising model for embedding digital libraries into teaching practices and for supporting teachers to integrate customization into their curriculum planning.

1.7 - This session includes two presentations.

1.7.A. Understanding the Varied Perspectives of Stakeholders in a Collaborative Partnership for Mathematics Teacher Preparation

Margarita Cummings, Jordan School District/University of Utah, Maggie.cummings@jordan.k12.ut.us

Target Audience: All

Topic: Partnerships

Collaborative partnerships between colleges of science, colleges of education and school districts are essential for successful facilitation of teacher preparation and transition of individuals into teaching. However, differing perspectives of what good mathematics instruction is and how to prepare individuals to be successful practitioners can impede collaboration among stakeholders.

This presentation will examine current literature on the nature of mathematics, teacher quality, and school district/classroom challenges of novice teachers from the differing standpoints of mathematicians, education researchers, and secondary practitioners to understand how and why the perspectives of various stakeholders differ and how and why all these perspectives are essential for collaborative partnership. A structure for thinking about the different perspectives of stakeholders based on the notion of abstraction will be offered as a means of framing issues in secondary mathematics teacher preparation, improving communication, building trust, and seeking resolutions to policies around mathematics teacher preparation. To guide the discussion and illustrate

concepts from the framework offered, mathematics content from the varied perspectives, teacher interviews, and examples from the collaboration at the University of Utah will be examined.

1.7.B. Math for America San Diego: A Multi-Institutional Regional Approach to Improving Mathematics Education

Barbara Edwards, University of California San Diego, bedwards@ucsd.edu

Target Audience: Higher Education, Higher Education Administration, School District, Non Profit, Research/Evaluation

Topic: Partnerships

Math for America San Diego (MfA SD) is a non-profit organization that works with three universities and four school districts to improve mathematics teaching and learning in high-need high schools. With funds from NSF Noyce and other sources, MfA SD provides professional and financial support for five years to a select group of recent undergraduates and career changers as they enter a credential program at one of our partnership universities (CSU San Marcos, San Diego State, UC San Diego). Working across the unique cultures of these organizations is challenging, but we believe it yields broader and deeper investment in the work and is more likely to lead to real and sustainable change in student understanding of mathematics. We will discuss the lessons learned (and the ones we are still learning) about multi-institutional collaborations. Attendees are invited to share the challenges and benefits of their region's collaborations.

1.8 This session includes two presentations.

1.8.A. Building on a Baseline Survey to Strengthen Program Design

Victor Donnay, Bryn Mawr College, vdonnay@brynmawr.edu

Alice Lesnick, Bryn Mawr College, alesnick@brynmawr.edu

Joy Quill, C. J. Quill & Associates, Inc., quillassociates@aol.com, External Evaluator, Bryn Mawr - Haverford Noyce Program

Target Audience: Research/Evaluation

Topic: Research and Evaluation

In the first year of the Bryn Mawr-Haverford Noyce Teacher Scholarship program, we undertook a baseline survey of student and faculty at the colleges to gauge attitudes and beliefs, and experiences related to careers in secondary math and science teaching. We will share our survey instruments and preliminary findings, with a particular focus on clarifying the context within which our program operates so as to suggest pathways for program development.

We look forward to exploring with session participants how their Noyce projects are assessing campus culture around math and science teaching in high need districts, and the ways in which they use these assessment to strengthen their programs. We invite discussion and suggestions of future research questions around these topics.

1.8.B. Navigating the Socio-Cultural Web: Introducing a Theoretical Model for Evaluating Teacher Preparation Residency Programs

Lisa M. Gonsalves, University of Massachusetts/Boston, lisa.gonsalves@umb.edu

Tricia Kress, University of Massachusetts/Boston, tricia.kress@umb.edu

Target Audience: Higher Education, Higher Education Administration, School District, Non Profit, Research/Evaluation

Topic: Research and evaluation

We will introduce a theoretical model that can be used to evaluate teaching residency programs (TRPs) drawn from Bronfenbrenner's Ecological Systems Theory and Sewell's theory of social structure, particularly his structure|agency dialectic. Through an analysis of the implementation of the Teach Next Year program, which emerged out of a partnership between a school, university, and funding agency, the authors show how the model helps us understand TRPs in their development, implementation and replication. TRPs have emerged nationally as one response to the need for highly qualified teachers, but they have been marked by mixed results. We must evaluate and understand how these programs operate in various settings because what is expected to happen conceptually does not always occur when the programs are implemented and replicated, pointing toward the importance of the social context in the replication of such programs. Previous evaluations of TRPs fall into three categories: survey and interview data of teacher characteristics, satisfaction and outcomes; examinations of program components; and examinations of the major claims of residency programs. However, few evaluations are grounded in an overarching theoretical framework or examine the relationship between the university and the school that these partnerships depend upon. This model specifically examines the relational aspects necessary for the success of TRPs. It helps us demonstrate how the relational dynamics between the partners impact the lived experiences of the interns, teachers and faculty as they attempt to effect change at the classroom level.

1.9 New Eyes: Developing and Sustaining a Reform-minded Community Through Innovative Use of Whatcha Already Got

Michael S. Calzi, Warner Graduate School of Education, University of Rochester, csmith@warner.rochester.edu

Christopher Young, University of Rochester, christopher.ivan@gmail.com, Noyce Scholar in first year of teaching

Joe Henderson, University of Rochester, Get Real! Science Mentor, jhenderson11@gmail.com

Jo Ann Morreale, University of Rochester, Get Real! Science Mentor, joannmorreale@frontiernet.net

April Luehmann, University of Rochester, Co-PI

Target Audience: Noyce Scholar, Higher Education

Topic: Mentoring and teacher leadership

The need to actively pursue and maintain valuable connections with like-minded professionals is critical to a new teacher's success and satisfaction as a reform minded educator. In this presentation, two Noyce Scholars—a pre-service teacher finishing his field experiences and a first year teacher—share their personal profiles of the innovative and highly integrated support systems they developed as part of the Get Real! Science teacher preparation program at the University of Rochester.

We will engage participants in innovative practices for connection-making and community-building that Get Real! Science uses to involve and capitalize on three types of resources generally accessible to all teacher-preparation

programs: technology, program alumna/i, and the local professional science education community. Included in these innovative practices are mentoring through blogging, networking through mock-interviews, and capitalizing on expertise of alums to scaffold newcomers' participation. Through these experiences and conversations, participants will develop new eyes (and new skills) for connecting pre-service teachers with like-minded professionals in exciting ways that lead to win-wins for all, including long-lasting relationships that support ongoing development.

1.10 Partnerships and Resources for Secondary Pre-Service Teacher Preparation

Suzanne Thurston, AAAS, sthursto@aaas.org

Tim Gerber, University of Wisconsin-La Crosse, gerber.dani@uwlax.edu

Target Audience: Noyce Scholar, Noyce Teaching Fellows

Topic: Partnerships & Resources for Secondary Pre-Service Teacher Preparation

Science teachers may be expected to be knowledgeable about basic ideas and content from multiple academic disciplines, scientific inquiry, and pedagogical content knowledge.¹ Because their science knowledge and skills are diverse, partnerships among content and education faculty, scientists, practicing teachers, and others would provide the coordinated effort needed to best prepare secondary science teachers for the 6-12th grade classroom. We present a "core" partnerships model for science teacher preparation in both content knowledge and pedagogy. To aid in teacher preparation, we also present quality resources provided through AAAS' Science NetLinks, Science Books & Films, Project 2061, and other organizations. With this dual partnerships-resources approach, secondary science teacher preparation can be improved.

Reference: ¹Committee on the Study of Teacher Preparation Programs in the United States; National Research Council. 2010. Preparing Teachers: Building Evidence for Sound Policy.

1.11 Essential Components of Student-Centered Physics Curricula

Michelle Stachurski, Mapleton Public Schools, stachurs@colorado.edu

Valerie Otero, University of Colorado at Boulder; PI, Valerie.Otero@colorado.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, School District, Research/Evaluation

Topic: Other: Inquiry Physics Teaching

The NSF-funded Physics and Everyday Thinking (PET) curriculum is used in classrooms throughout the nation. Based on educational research, PET provides a context in which students can become producers rather than consumers of physics knowledge. PET is organized around the concepts of energy, systems, and interactions. It consists of carefully sequenced sets of activities intended to help students develop physics concepts and understandings of the nature of science through guided experimentation and questioning with extensive small group and whole class discussion.

Stachurski will highlight her experiences teaching high school physics using the inquiry-based PET curriculum. She will share observations of growth in students' attitudes toward science, critical thinking skills, problem solving, and participation in discussions about physics concepts. In small groups, workshop participants will engage in a PET lesson designed to construct student understanding of Newton's Second Law. We will then debrief the necessary components of constructivist, inquiry-based teaching and learning.

1.12 BioME: Making DNA Relevant and Exciting in the High School Classroom

Rachel Zenuk and Anna Heyer, University of Arizona

Target Audience: Noyce Scholars, Noyce Teaching Fellows

Topic: Resources

BioME (Biodiversity from Molecules to Ecosystems) is a project funded by the NSF GK-12 program designed to spark K-12 students' interest in the biological sciences while improving graduate students' abilities to communicate science. The program partners University of Arizona life sciences graduate students with K-12 teachers to develop and implement a set of unifying biological concepts encompassing ecology, evolution, genomics, biodiversity, and biocomplexity into the classroom. We will highlight the biotechnology, public health, and cancer units designed by the partnership at Flowing Wells High School in collaboration with university researchers and outreach programs. Engagement and classroom management techniques will be addressed. We will show how to "hook" students at the beginning of the year with an inexpensive cheek cell DNA extraction and making personalized DNA necklaces. Hands-on DNA techniques that can be used to incorporate research into a high school classroom will be demonstrated.

SESSION 2: Thursday, July 8, 2010

2:15pm - 3:45pm

2.1 - This session includes two presentations.

2.1.A. Recruiting Incoming Freshman Science Majors as Potential Noyce Scholars

Paul Bischoff, SUNY-Oneonta, bischojp@oneonta.edu

Target Audience: Higher Education, Higher Education Administration

Topic: Recruitment

This session will identify effective strategies for recruiting talented incoming freshman science majors who have not yet considered Science Teaching as a career to apply to Noyce programs. Participants will be asked to communicate their experiences with recruiting talented incoming freshman and identify successful processes. Participants may wish to bring examples of recruitment materials. Efforts at SUNY-Oneonta including: mass mailings of invitation letters to "all accepted science students"; presentations at College Open House Days; and follow-up phone calls have yielded few applicants. We have had much greater yields of applicants when we open the process to already declared science education majors who are on campus as freshman or sophomores.

2.1.B. Presentation: Recruitment of Robert Noyce Teacher Scholar Cohorts at East Central University, Ada, Oklahoma

Robert Ferdinand, East Central University, rferdand@ecok.edu

Target Audience: Noyce Scholars, Higher Education, Higher Education Administration, School District

Topic: Recruitment

This presentation will offer recruitment techniques of the Phase-I Robert Noyce Teacher Scholarship Program at East Central University (ECU) in Ada, OK used to competitively recruit cohorts of 8 Noyce Teacher Scholars from academically talented sophomore students. Special consideration will be given to students who are minorities, female or from financially needy backgrounds. Recruitment will be carried out each of the academic years 2010-2012 that ECU admits a new cohort to their Noyce program. Suggestions from other PIs regarding recruitment will be actively sought.

2.2 - This session includes two presentations.

2.2.A. The MERLOT Content Builder: Managing Teaching and Learning Resources with a Powerful Online Tool

Jaime Arvizu, California State University, Fresno, jaimea@csufresno.edu
Sara Meadows, Catherine Clendenin, Laura Henriques, and David Andrews, CSU

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education
Topic: Resources

The MERLOT Content Builder is a tool that allows Noyce Scholars, Noyce Teachers, and others to publish and share resources, experiences, and successful practices around rich STEM resources including teaching lessons and units. Content Builder's template-based "snapshots" can become part of a user's electronic portfolio (ePortfolio), serve as classroom material that meets state and/or national standards, or simply act as an organizing structure for teaching and learning materials. Participants will explore sample Content Builder areas created by Noyce Scholars, and then go through an accelerated process to adapt basic templates for their own use in current course work or anticipated K-12 classroom teaching.

2.2.B. The NSTA Learning Center: Online Content Building Resources for Teachers of Science

Edward Rock, National Science Teachers Association, erock@nsta.org
Flavio Mendez, NSTA, Senior Director - NSTA Learning Center

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, School District, Research/Evaluation
Topic: Research and evaluation

This highly interactive presentation will allow participants to:

- Reflect on their role as provider of various PD resources to their pre-service teachers;
- Become aware of an existing set of e-learning tools and resources available to their pre-service teachers;
- Explore the many tools and resources the NSTA Learning Center has to offer through a guided exploration;
- Recognize the value of the administrator's accountability and management tools for both student accountability and potential research data; and,
- Be prepared to share the NSTA Learning Center resources with their pre-service teachers and colleagues back at their worksite.

2.3 - This session includes two presentations.

2.3.A. Secondary School Teachers Think They Know Good Teaching: Do Their Students Agree?

Pamela Fraser-Abder, New York University, The Steinhardt School, pa1@nyu.edu

Elizabeth Espinal, New York University, eme237@nyu.edu

John Frisoli, New York University, rf310@nyu.edu

Deborah McLaughlin, New York University, dam414@nyu.edu

Brad Nakamura, New York University, bkn206@nyu.edu

Target Audience: Noyce Scholar, Noyce Teaching Fellows, Higher Education, Higher Education Administration

Topic: Mentoring and teacher leadership

Secondary school teachers, and the university faculty who prepare them, usually have strong ideas about what constitutes a good lesson, a good class, and a good teacher. But do their students agree with them? This workshop explores that question, using information gathered by four Noyce Scholars completing their Masters Degrees and Teacher Certification programs at NYU's Steinhardt School of Education. The scholars conducted a panel discussion with the high school students who they had taught as part of their teacher training. The Noyce Fellows and PI of the NYU Noyce Scholarship Program discussed their educational values and motivations for becoming science teachers, as well as their definitions of good teachers, good teaching and good lessons. They then asked the high school students for their views on these same topics.

At this workshop, we will discuss the ways and degrees to which our views, as education professionals, agree or disagree with the views and expectations of the students. The Noyce Scholars will assess how input from their students influences their view of what they learned in their teacher preparation classes and student teaching, and how well those experiences have prepared them to teach in an urban multicultural environment. It is hoped that the lessons learned from this activity can help inform the training of future science teachers.

2.3.B. Teachers Who Meet the Challenges of Teaching in High Need Schools

Sheila R. Vaidya, Ph.D., Drexel University, vaidyasr@drexel.edu

Cynthia Paul, Drexel University, Doctoral Student

Ryan Batkie, Academy at Palumbo, Noyce Teacher

Target Audience: All

Topic: Innovative Noyce program practices and teacher preparation models

Teaching in a high need school is a hallmark of the Noyce Program. Hence, it is important that teachers have a positive impact. Who are the successful teachers in these schools? What are the characteristics of these teachers? We will describe our research which suggests that a teacher's beliefs and an optimistic attitude that their effective teaching will enable students to learn successfully are of critical importance in teacher retention and student learning. A teacher who believes that only "smart" students can learn thinks differently from one who believes that all students can learn if they are taught well and motivated to put in an effort. Thus, a teacher's level of "academic optimism" (A.Hoy, W. Hoy & Kurz, 2007) is an indicative variable. Academic Optimism is defined as self-efficacy, the ability to bring about change, student engagement and learning because of the teacher belief that all students are capable of learning. Teacher beliefs and attitudes play out in how they teach and define expectations from students. These are the teachers who inquire about their students, ask them

questions and as one teacher described “do what needs to be done to enable them to learn.” They persist and find innovative ways for students to learn and be engaged, and to relate the subject matter using more than one approach.

Two Noyce teachers (one a former teacher and one currently teaching) will describe their teaching theory and classroom practice defined by academic optimism. Critical pedagogy as a framework will be presented to understand the vulnerabilities, hopes and wishes of children in high need schools, and the importance of developing academic optimism among those who teach in these institutions.

2.4 Instructional Strategies Using Posters in Mathematics

Adrienne G. Spina, California State Polytechnic University, agspina@csupomona.edu

Maria Ortiz, Middle School Mathematics Teacher ,L.A. Unified School District, Noyce Scholar, mxo4147@lausd.net

Target Audience: Noyce Scholar, Noyce Teaching Fellows

Topic: Other - Instructional Strategies

Learn the tricks of creating posters for teaching mathematics! Experience the effectiveness of using a poster to teach mathematics, and develop your own posters to use in your classroom. With this activity, you can engage your students in learning, have them explore topics in mathematics, and have them explain the mathematics. Posters are an innovative yet simple approach to teaching mathematical concepts, and allow teachers to reach varying student populations and learning levels, including ELL, gifted, etc. This strategy enables the teacher to address the mathematical concepts as well as any misconceptions of the students. Teaching with visual aids is a powerful tool and is not utilized enough in the classrooms.

2.5 Science Teacher and Researcher (STAR) Program: Developing “Teacher-Researchers” Through Paid Summer Research Experiences at National Laboratories

John Keller, California Polytechnic State University, jmkeller@calpoly.edu

Bonnie McClain, bonnie.mcclain-1@nasa.gov, NASA Goddard Space Flight Center, Lab Site Education Coordinator

Tissa Thomas, TThomas@towson.edu, Towson University, Anchor University Coordinator

James Ruff, indruff@gmail.com, Towson University, Noyce Scholar/STAR Fellow

Joseph Spekterman, sjoseph1@umbc.edu, University of Maryland, Baltimore County, Noyce Scholar/STAR Fellow

Robyn Williams, robyn4@umbc.edu, University of Maryland, Baltimore County, Noyce Scholar/STAR Fellow

Sue Elrod, Elrod@aacu.org, Association of American Colleges and Universities, Project Kaleidoscope Director

Target Audience: Noyce Scholars, Noyce Teacher Fellows, Higher Education, Higher Education Administration, Research/Evaluation

Topic: Innovative Noyce program practices and teacher preparation models

The STAR Program is an exciting opportunity for Noyce Scholars to create a dual “teacher-researcher” career path. Founded and implemented by the Cal Poly Center for Excellence in Science and Mathematics Education on behalf of the California State University system, STAR provides cutting edge research experiences and career development for Noyce Scholars. Key opportunities are one or more summers of paid research experience in Department of Energy or NASA research centers along with weekly science education workshops. By anchoring Scholars in the research community, they will better understand what it means to be both a researcher and an effective teacher of

science or mathematics. Since 2007, STAR has placed 85 Fellows from 18 different CSU campuses at 8 research facilities in CA. During Summer 2010, STAR expanded nationally with funding from the Noyce Program to place 60 Fellows in CA and 20 in new lab partnerships in CO, MD, NY, TN, and WA. Over 40 of these placements involve current or recent Noyce Scholars. Participants will hear from the current cohort of Noyce Scholars conducting research projects at NASA Goddard Space Flight Center. Mentors supporting the Scholars this summer will also present. Finally, the STAR Program Director will report on program evaluation findings and plans for continued growth of the program.

2.6 Improving Science Instruction Using the AAAS Atlas of Science Literacy and the National Science Digital Library

Ted Fowler, University of Cincinnati, ted.fowler@uc.edu

Kathie Maynard, University of Cincinnati, sundk@ucmail.uc.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows

Topic: Innovative Noyce program practices and teacher preparation models

New teachers often struggle to tie content together in a meaningful way that provides students with a strong conceptual roadmap. Science curricula and individual lessons can frequently be improved through better articulation of content to make explicit the connections among “big ideas” or principles. By keeping in mind these connections, teachers can address student misunderstandings or gaps in knowledge.

Additionally, the efficiency in the development and delivery of the science lessons can be improved. The AAAS Atlas of Scientific Literacy is a valuable resource for improving science instruction, and can be used to further develop science content coherence. The Atlas can help to enhance instruction through deeper inquiry, the use of engineering design, and the planning of project- or problem-based learning.

Furthermore, the Atlas can be used to access instructional resources via the National Science Digital Library (NSDL) website. Session participants will develop deeper understandings of the AAAS Atlas to improve curriculum content coherence, and learn how to use the Atlas and NSDL to manage and support coherent science content learning. Facilitated discussions will allow participants to develop new insights into the structure of content and the instructional process.

2.7 Productive Classroom Culture

Carol Cronk, San Bernardino County Superintendent of Schools, carol_cronk@sbcss.k12.ca.us

Target Audience: Noyce Scholars, Noyce Teaching Fellows

Topic: Mentoring and teacher leadership

The first step in having an effective math or science program is developing a Productive Classroom Culture. Discover how to have a terrific first school year. Based on the work of Fred Jones, a classroom management expert, learn to establish procedures and routines at the beginning of the school year, which will ensure appropriate student behavior for the rest of the year. Also included in this session is how to arrange a classroom for success, how to keep from becoming a nag, and how to use positive reinforcement to encourage students to think independently and responsibly.

2.8 - This session includes two presentations.**2.8.A. Purposeful School Partnerships within an Innovative Credential Program**

Christopher Halter, University of California San Diego, chalter@ucsd.edu

Tina Huang, University of California San Diego, t7huang@ucsd.edu

Target Audience: Higher Education, School District

Topic: Innovative Noyce program practices and teacher preparation models

The CalTeach program at UCSD is unique among comparable programs. The focus of the courses and fieldwork experiences is on blending deep content knowledge with strong pedagogical practices. Neither the academic departments nor Education Studies could accomplish this goal in isolation. It is only through ongoing collaboration that we can bring the strengths of multiple departments together to create a powerful learning experience for future science and mathematics teachers. The merging of pedagogy and content occurs at each level of the program and in every course. This consistent theme focuses the critical need for deep content knowledge coupled with the knowledge of learning within each discipline.

CalTeach is supported by purposeful fieldwork at each level of the student experience, beginning with sophomore coursework and continuing through the graduate credential year. These new STEM undergraduates in early field experiences engage in discipline-specific pedagogy and intensive teaching apprenticeship experiences to prepare them to enter the UCSD graduate intern teacher credential program—an intensive 15-month credential and Master of Education degree in which qualified candidates are the teachers of record in secondary classrooms and employed by the school districts on a 60% teaching contract. The partnerships and field experiences give the students specific, supported, and scaffolded interactions with veteran classroom teachers and adolescent learners. Faculty in the science and mathematics departments and EDS are in the fourth year of implementing lower-division SMI courses and field experiences.

2.8.B. Alternative Math and Science Teacher Licensure Partnership at the University of Wisconsin: Collective Experiences from a Noyce Co-PI, Noyce Student Scholars and Program Assistant

Tammy J. Ladwig, UW Fox, tammy.ladwig@uwc.edu

Kim Poli, Erika Ruedinger, and Tracey Starck

Target Audience: Higher Education, Higher Education Administration, School District, Non Profit

Topic: Partnerships

This interactive session will explain how Act!, an innovative alternative licensure teacher preparation program and partnership between UW Oshkosh and the UW Colleges, addresses a recognized demand for teachers in Wisconsin. The Act! program enables participating institutions to use inter-institutional relationships to maximize educational opportunities and resources for the people of Wisconsin. From their perspective and expertise, the Co-PI, Noyce student scholars and Act! Program assistant will share their experiences, lessons learned, and research related to the partnership and Noyce Scholarship opportunities. The following questions will be addressed:

- (1) What are the differences and similarities between an alternative licensure program and a traditional program?

- (2) Which curricular and administrative issues emerged at start-up, and after several students finished and sought employment, and have not been resolved over time?
- (3) What evidence do we have to substantiate the program's value in terms of teaching, student learning, or contributions to the profession?

2.9 - This session includes two presentations.

2.9.A. GEMS: Changing the Educational Paradigm at a Hispanic-Serving Institution in South Florida

Eric Brewe, Florida International University, edwardj@fiu.edu
Julian Edward, Florida International University, edwardj@fiu.edu
Laird Kramer, Florida International University, kramerl@fiu.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education
Topic: Innovative Noyce program practices and teacher preparation models

Participants will describe the GEMS (Get Educators in Mathematics and Science) project at Florida International University (FIU). GEMS is a critical component of the comprehensive transformation of FIU's mathematics and science education programs that now develop more and better-prepared mathematics and science teachers as well as mathematicians and scientists. Discipline-based teacher preparation programs, explicit recruitment of discipline majors into teaching careers, reform of introductory science and mathematics courses through the Learning Assistant model, and an underlying framework that includes students from all backgrounds are foundational aspects of the program. GEMS has extended the learning model from physics to mathematics, chemistry, and earth sciences as well as generating strong administrative support for teacher preparation at FIU, crucial for changing the educational paradigm. FIU is a minority-serving urban public research institution in Miami, serving over 39,000 students, of which 64% are Hispanic, 13% are Black, and 56% are women.

2.9.B. The Colorado Learning Assistant Model and Its Role in a Synergistic Program for Institutional Change

Valerie K. Otero, University of Colorado at Boulder, Valerie.Otero@colorado.edu
Michelle Stachurski, Welby New Technology, Mapleton School District, stachurs@colorado.edu

Target Audience: Higher Education, Higher Education Administration, Non Profit, Research/Evaluation
Topic: Innovative Noyce program practices and teacher preparation models

UC Boulder has established an integrated model of institutional change by leveraging funding from professional societies, national foundations, industry, and the University. We recruit teachers through an experiential learning model associated with the nationally emulated Colorado Learning Assistant program and through the STEP courses of the CU-Teach curriculum (part of the UTeach national replication effort). The Noyce program represents another form of recruitment and retention, and the Master Teacher track provides opportunities for career teachers to participate in the design and implementation of an induction program which serves as a means by which they develop mastery and leadership.

In this presentation, we will discuss various aspects of the Colorado Learning Assistant Model, including data to support claims about its effectiveness in transforming undergraduate courses, changing faculty attitudes about

the scholarship of teaching, recruiting and preparing effective STEM teachers, and serving as a model for institutional change. We will describe how we leverage funding sources toward the maintenance of excellence in undergraduate education and teacher preparation/retention.

2.10 Learning to Teach, Teaching to Learn: Negotiating the Labyrinth of Secondary Science Teaching

Angela Webb, University of North Carolina at Greensboro, awwebb@uncg.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education

Topic: Innovative Noyce program practices and teacher preparation models

Having been out of the high school science classroom for only three years, I feel that I am in a unique position to contribute to my institution's Noyce Scholarship Program. As project coordinator and secondary science methods instructor, I can draw upon my own classroom teaching experiences and induction experiences in my work with Noyce interns and scholars. I will share information about "Biology Boot Camp," a data-driven tutoring program focused on preparing students for my state's standardized end-of-course test; "Tutor the Tutors," a grant supported program aimed at creating professional learning communities among science teachers as a way to improve teacher retention and increase student achievement in biology; and Project ExSEL, our Noyce scholarship program. Discussions of "Biology Boot Camp" and "Tutor the Tutors" will provide ideas and materials centered on biology for pre-service and in-service teachers to use in their instruction. Discussions of Project ExSEL will focus on our recruitment ideas, internships, and cohort activities. Cohort activities included visits to Carolina Biological, The Greensboro Natural Science Center and selected teachers' science classes based on their strengths and contexts (for example, charter schools, high-need and magnet schools). If you are a pre-service or in-service teacher, especially in life science, come learn about strategies and materials to use with your students. If you are faculty or staff associated with a Noyce program, learn about the experiences we provide our interns and scholars.

2.11 Teaching Strategies for a Reasoning and Sense Making Approach to Student Learning in High School Mathematics Classrooms

Christine D. Thomas, Georgia State University, Cthomas11@gsu.edu

Fred Dillon, National Council of Teachers of Mathematics, Board Member, dillon314@sbcglobal.net

Target Audience: Noyce Scholars, Noyce Teaching Fellows

Topic: Innovative Noyce program practices and teacher preparation models

Engage in activities that employ teaching strategies for creating mathematics classrooms where students of varied backgrounds and abilities learn important mathematical ideas with understanding. We will involve participants in example lessons that promote student reasoning and sense making as an integral component of their existing curricula for high school mathematics. The strategies used draw upon "Focus in High School Mathematics Reasoning and Sense Making," the National Council of Teachers of Mathematics position statement that shares a vision of the high-quality mathematics teaching all students deserve and need. Let's take time to experience how a reasoning and sense-making classroom may differ from what students traditionally see and discuss how such an approach can foster classroom environments that are equitable, challenging, and supportive.

2.12 Let's Diffuse Our Way Through, Using Two-Step Equations

Daree Yancey, University of Texas at Arlington, dyancey@aisd.net
Minerva Cordero, University of Texas at Arlington, cordero@uta.edu
Justin Blackwell, University of Texas at Arlington, jblackwell@uta.edu

Target Audience: Noyce Scholars, Noyce Teacher Fellows

Topic: Resources

In order to relate to seventh grade math, two-step equations will be used to illustrate how mathematicians can quantify biological processes. In this workshop, we will demonstrate a lesson that was taught to the students in which we illustrated a vertical strand between a graduate student's research and the classroom curriculum. Participants will actively engage in the lesson by completing a diffusion lab and creating the manipulatives that the students made this year. This lesson is focused on the diffusion of a substance and the numerical solution of the diffusion equation. We illustrate how a mathematician might develop a numerical scheme to simulate diffusion by completing a mathematical exercise using two-step equations.

As a part of the NSF GK-12 Project, the graduate fellow was in a seventh grade classroom for ten hours a week. With assistance from his mentor teacher, six lesson plans were developed to teach throughout the year. The workshop will begin with a short presentation that will give an overview of the GK-12 program at the University of Texas at Arlington as well an introduction to the graduate fellow's research in applied mathematics with a focus in computational neuroscience. An overview of other lessons that the fellow-mentor pair created over the past year will be presented. The fellow mentor pair will also demonstrate some additional technology, provided by NSF funds, that was used to aid in teaching other lessons to the students.

2.13 Task Force on Teacher Education in Physics

Monica Plisch, American Physical Society, plisch@aps.org

Target Audience: Higher Education

Topic: Innovative Noyce program practices and teacher preparation models

The Task Force on Teacher Education in Physics found that, except for a handful of isolated pockets of excellence, the national system of preparing physics teachers is largely inefficient, mostly incoherent, and massively unprepared to deal with the current and future needs of the nation's students. We will discuss the findings and recommendations of the task force for improving physics teacher education and addressing the severe shortage of qualified physics teachers. The report serves as a case study and road map for improving STEM teacher education more broadly.

SESSION 3: Friday, July 9, 2010

9:15am - 10:45am

3.1 - *The session includes two presentations.*

3.1.A. Recruiting and Selecting High Caliber Mathematics and Science Students: Successes, Formative Changes and Lessons Learned

Laveria Hutchison, University of Houston, nlandrews@uh.edu

Nicole Andrews, Assistant Professor, University of Houston, nlandrews@uh.edu

Susan Williams, Associate Professor, University of Houston, swilliams@uh.edu

Bob Houston, Professor, rhouston@uh.edu

Target Audience: Higher Education

Topic: Recruitment

Recruiting and selecting candidates who meet our criteria for NOYCE scholars can be quite challenging. Our program has employed a variety of recruiting strategies to find high caliber students seeking mathematics and science teaching certification who can meet our standards at both the undergraduate and graduate levels. These strategies have ranged from recruitment websites to more direct forms through job fairs and presentations on our campus. Each semester, our programs evaluate the recruiting strategies used and modify our plan according to the data results. Intertwining our program admission criteria with our NOYCE selection criteria has allowed for focused recruitment plans further aiding our success at finding NOYCE scholars. Similar to our variety of recruiting strategies, we employ an array of selection and interviewing tools aimed at uncovering the strongest candidates for admission into our programs. We will share our successes recruiting and selecting candidates, the formative changes made, and the lessons learned along the way.

3.1.B. Harvesting the “Not-So-Low Hanging Fruit” into the Noyce Program: Strategies and Opportunities

Greg Rushton, Kennesaw State University, grushton@kennesaw.edu

Adrian Epps, Kennesaw State University, aepps6@kennesaw.edu

Taha Mzoughi, Kennesaw State University, tmzoughi@kennesaw.edu

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Adrian Epps, Kennesaw State University, aepps6@kennesaw.edu

Taha Mzoughi, Kennesaw State University, tmzoughi@kennesaw.edu

Target Audience: Higher Education, Research/Evaluation

Topic: Recruitment

Historically, the Noyce program has been much more successful at recruiting scholars in math and biology scholars than those in the physical and geological sciences (physics, chemistry, earth science). A recent report evaluating the Noyce program indicated that only 10% of the entire Noyce population (1500 scholars), during the years 2003-2007, pursued certification in these areas. In the first two years of our project, we have awarded 21 (9 physics, 12 chemistry) scholarships to students pursuing teaching careers in these high-need areas, and have

18 more applications for spring 2010. We will share our approach for attracting these students into the program, as well as challenges we are presently addressing to increase the number in the pipeline. Please plan on sharing your ideas and difficulties with other session participants to help increase participation of these underrepresented groups at your institution.

3.2 - This session includes two presentations.

3.2.A. Using Learning Progressions to Sequence and Assess Learning

Pamela E. Harrell, Ed.D., University of North Texas, pam.harrell@unt.edu

Colleen M. Eddy Ed.D., University of North Texas, colleen.eddy@unt.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, School District, Research/Evaluation

Topic: Innovative Noyce program practices and teacher preparation models

New teachers often struggle with selecting and sequencing instruction to help students learn core concepts. Additionally, while the teacher might know best practices for teaching a concept, many new teachers fail to track student progress until a quiz or test is given. Recently, researchers have constructed evidence-based approaches which provide insight about how students understand core scientific/mathematical concepts (big ideas) and how with appropriate sequential instruction these concepts can become more sophisticated over time. Simultaneously, assessments associated with the learning progression are employed to show what students know, understand, and are able to do, and to show common student misunderstandings and difficulties which continue in spite of instruction. Current learning progressions will be shared as well as our teachers' maps of sequential learning experiences onto established learning progressions. Finally, the use of teacher-driven formative assessment to gauge student progress through the learning progression will be shared.

3.2.B. Using a Teaching Goals Inventory to Analyze Noyce Scholars' Development of Teaching and Assessment Practices

Enrique Ortiz, University of Central Florida, ortiz@mail.ucf.edu

Target Audience: Noyce Scholar, Noyce Teaching Fellows, Higher Education, Higher Education Administration, Research/Evaluation

Topic: Research and evaluation

This workshop will present ideas related to the possible use of the Teaching Goals Inventory (TGI) (Angelo & Cross, 1993) to analyze Noyce Scholars' development of teaching skills, including lesson planning and assessment practices. Participants will have the opportunity to complete the TGI and analyze their own professional practices. We will discuss how to use the data collected from multiple administrations of the TGI and follow-up visits to help students grow as teachers. Examples from previous studies and implications of TGI results for research and teacher preparation programs will be included.

3.3 Noyce Scholars: Perceptions of Teaching as a Profession

Patricia Trina Crowley, University of MA Dartmouth, pcrowley@umassd.edu

Kym Welty, Noyce Scholars' Program Coordinator

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, Higher Education Administration, Research/Evaluation

Topic: Mentoring and teacher leadership

Recruiting STEM majors into the UMass Dartmouth program has presented challenges that have surfaced during the teacher preparation phase and may have implications regarding the support that candidates receive throughout their transition into teaching and first years in the profession. Noyce program undergraduates will share their perceptions of teaching before, during, and following completion of the formal program. This session will be an opportunity for colleagues to share their work related to recruiting candidates with high academic standing, preparing Scholars, and providing them with support as we all move forward. Topics include: Why do candidates enter the program? What are their perceptions of teaching as a profession upon entering the program, throughout coursework, program experiences, and current contexts? How did candidates formulate their mental models of what teaching entailed? What support structures do candidates identify as helpful throughout the transition into the teaching profession? What do candidates identify as the biggest challenge(s) in their transition? How do Scholars envision their future in the teaching profession? How do Scholars envision the future of the teaching profession? Participants will have an expanded and enhanced understanding of our Scholars' experiences. It is hoped that they will consider how their own Scholars' perceptions of teaching as a profession factor into the ways Scholars are recruited, prepared, and supported as they transition into their careers.

3.4 Preparing STEM Education Majors to Teach Using Inquiry-Based Instruction

Louis Nadelson, Boise State University, louisnadelson@boisestate.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, School District, Research/Evaluation

Topic: Innovative Noyce program practices and teacher preparation models

Inquiry is a method of engaging learners in scientific investigations by exposing them to the processes used by professional researchers, in order to increase comprehension of science content and methodology (Carlson, Humphrey, & Reinhardt, 2003; Echevarria, 2003; Llewellyn, 2002; Nadelson, 2009). The limited prior experience of teachers and common misconceptions as to the nature of science, however, may greatly limit the likelihood that teachers are prepared to provide the support and instruction to allow their students to benefit from inquiry activities. The potential for these barriers necessitates modifications and additions to inquiry instruction in teacher preparation programs to assure success in providing effective experiences. It is necessary to bear in mind that lower levels of inquiry are unlikely to teach students how authentic research is actually conducted (Nadelson et al., 2010). Both teachers and students need support in comprehending the inquiry processes: they should be guided through numerous examples before they can effectively and productively engage in exercises that will lead to the processes found in authentic scientific research.

This workshop will model methods effective for increasing preservice and inservice teachers' capacity for implementing inquiry-based methodologies. Students learn more about science through active participation in scientific practice (through higher levels of engagement) but, effective use of science practice activities requires that appropriate concessions be made to the needs, experience, and capabilities of the students and teachers involved.

3.5 Real and Virtual Physics Activities for the Secondary Classroom

Laura Henriques, California State University, Long Beach, lhenriqu@csulb.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows

Topic: Resources

Do you need some engaging labs and projects to help students get excited about physics? This session will showcase online physics simulations from PhET and other virtual physics activities along with live physics demonstrations, labs and projects to do in your own classroom. We will discuss effective strategies for incorporating virtual physics activities so that they enhance instruction and learning. The online simulations allow you to do good physics with students in schools that have no supplies or budget. You will get handouts for the activities, associated assignments and rubrics, and the URLs for all the sites shared.

3.6 Using Scientific Teaching with General Biology Students: Designing Lessons with the 5E Planning Format of Instruction

T. Lord, Indiana University of Pennsylvania

N. Bharathan, Indiana University of Pennsylvania, bharathn@iup.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, School District

Topic: Innovative Noyce program practices and teacher preparation models

Scientific Teaching, sometimes called inquiry teaching, is very different from the traditional forms of instruction seen in high schools and colleges. Instead of an instructor standing before a class describing what students need to know to pass an exam, lessons taught with inquiry are alive with student groups discovering what they need to know. Because the teaching methods are so different, the transformation from lecture to discovery may be awkward for teachers at first. Many instructors may find it strange to not be at the center of the classroom, and most have a difficult time at first rearranging didactic descriptions to imaginative revelations. Instructors who stick with it, however, are rewarded with student enthusiasm, confidence, and increased understanding. In this workshop, participants will engage in three different inquiry lessons on biology, designed around the 5E venue. The first will focus on how the peripheral and central nervous system in humans work together in a stimulus-response action. In the second, participants will be challenged to develop an activity in which 5 different human senses are stimulated by a single catalyst. The third lesson will ask participants to design an experiment to find if temperature affects the efficiency of muscle contraction. As a result of the workshop, participants will be comfortable utilizing the 5E model in designing inquiry-based activities for their classes.

3.7 - This session includes two presentations.

3.7.A. The Mathematics Studio Program: A Promising Context for Transforming Mathematics Learning, Teaching, Coaching, and Leadership

Linda Cooper Foreman, Teachers Development Group, linda.foreman@teachersdg.org

Melinda Knapp, melinda.knapp@bend.k12.or.us

Target Audience: Noyce Teaching Fellows, Higher Education, School District, Research/Evaluation

Topic: Mentoring and teacher leadership

Research from our pre-Noyce NSF project indicated that the degree to which schools implemented certain of our project's practices was a significant positive predictor of student performance above and beyond what could be explained by the socioeconomic factor as indicated by the percentage of students who qualify for the free and reduced lunch program. The Mathematics Studio Program embeds and expands on practices that our early work found to be significantly positive predictors of student performance. This session will describe the Mathematics Studio Program, the research that grounds its design, and the practices and tools that are surfacing as most promising for leveraging high-cognitive engagement and learning by K-12 mathematics students, teachers, coaches, and administrators alike. We will provide specific examples of Mathematically Productive Teaching Routines emphasized during classroom Studios, and illustrate the promise of the Mathematics Studio as context for the sustainable transformation of a school's mathematics learning, teaching, and leadership, and as a model and "greenhouse" environment for seeding the transformation of a school system.

3.7.B. NSF Robert Noyce Math for America Los Angeles Project

Karen Symms Gallagher, USC, pam@mathforamerica.org

Pam Mason, Math for America Los Angeles , pam@mathforamerica.org

Target Audience: Noyce Teaching Fellows, Higher Education, Higher Education Administration

Topic: Partnerships

Imagine a partnership where a child's education is the shared responsibility of the school, university and the business community. You would select the world's premier center for graduate study in urban education, and add in an award winning undergraduate college with mathematics professors who care deeply about their discipline and their students. Next, you would select schools with teachers and administrators who understand the importance for all students to achieve in mathematics, a program director whose job it is to identify, attract and nurture early teachers together with support from math coaches, national board certified teachers and veteran master teachers. Then, you would seek out entrepreneurs who understand that none of this happens by chance or for free. Finally, you search for math majors and minors who have a passion for math, want to teach, and believe that all students can succeed. This dream partnership is Math for America Los Angeles which joins the University of Southern California Rossier School of Education, Claremont Graduate University and Harvey Mudd College. The mission is clear and simple: to improve mathematics education in Los Angeles public secondary schools. This session describes how this partnership was established, as well as lessons learned and future directions. Specific topics include: communication within the alliance and with partnering school districts; support for schools and teachers in tough economic times.

3.8 - This session includes two presentations.

3.8.A. Using Public Representations of Students' Thinking to Drive Evidence-Based Reasoning

Christine Chew, University of Washington, cchew@u.washington.edu

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, Research/Evaluation

Topic: Innovative Noyce program practices and teacher preparation models

When teachers introduce new topics (even though they have a Big Idea and its ideal explanation in mind), they need to help students reason about this explanation with the ideas the students currently have. Otherwise, the students will merely learn to regurgitate an academic explanation without necessarily understanding it. One way

to begin working on students' ideas is to make on-going public representations of them. There are several ways to do this. Some representations can start on the first or second day of a unit. They are usually put on poster paper or on part of the board at the front or side of the room. These often remain up throughout the unit, and are periodically revised as teachers ask students how their thinking has changed. This is typically done in whole class discussion. Other public representations are best created after students have had some experiences with science activities and with ideas from readings. Other kinds of representations support a final conversation about evidence and explanation. It is important to use at least one type of public record early in the unit and to use a complementary type later in the unit. In our workshop, we will illustrate how public representations have been successfully applied to promote students' evidence-based reasoning about the big ideas that drive activities across a unit. We will describe challenges and provide ways to address students' partial understandings without reinforcing incorrect aspects.

3.8.B. Science in Action: Learning and Teaching Mathematics and Science by Using Community Resources

Gaoyin Qian, Lehman College, Gaoyin.Qian@lehman.cuny.edu
Angela Kelly, Lehman College, angela.kelly@lehman.cuny.edu
Julissa Soriano, j.soriano20@hotmail.co, Co-Presenter, Noyce Scholar
Michael Maras, bigblue1017@gmail.com, Co-Presenter, Noyce Scholar
Whitney Brown, whitney.brown@lc.cuny.ed, Co-Presenter, Noyce Scholar

Target Audience: Noyce Scholars, Noyce Teaching Fellows, Higher Education, Higher Education Administration, Research/Evaluation

Topic: Innovative Noyce program practices and teacher preparation models

This presentation will focus on teaching and learning of mathematics and science using community resources in urban settings. We will describe a 5-day long workshop (a total of 35 hours) in the Bronx Zoo that included conducting scientific field studies, guided by science education specialists and zoologists. The “scientists in action” learned how to turn a science class into a research center and how to take advantage of community resources when teaching urban students so that they can become “scientists” and actually do science in their own neighborhoods. Secondly, a 8 to 10-minute video and other visual artifacts will show how science education specialists modeled and how Noyce scholars experienced real examples of field research and science which were seamlessly woven into a mathematics and science curriculum. Scholars gained a better understanding of inquiry-based scientific investigations, project-based ecological studies, recording and interpreting observations in nature, and various scientific techniques.

Finally, we will report findings that suggest the summer field studies helped Scholars to develop more mature epistemological thinking about science and science learning (i.e., the nature of science and scientific research, ways of acquiring scientific knowledge, and understanding the community of scientists). Participating Noyce scholars' epistemological thinking as demonstrated by journal reflections during the summer field studies will be compared with post-interviews one year later. We will show how the Scholars' developing epistemological thinking may relate to their emerging pedagogical philosophies and the kinds of classroom activities they have designed in educational courses and seminars.

3.9 You Just Don't Understand: Discourse and Communication in a Fledgling Noyce Partnership

Steven Fletcher, St. Edward's University, stevenf@stedwards.edu
 Alice Sessions, Austin Community College, asesion@austincc.edu
 Cindy Naples, St. Edward's University, cynthian@stedwards.edu

Target Audience: Higher Education, Higher Education Administration

Topic: Partnerships

Current efforts in the recruitment and retention of STEM teachers often include partnerships made up of public and private universities, community colleges, and local school districts. It is our assumption that these partnerships are common within the Noyce program. We anticipate that participants will have some direct experience or role in a partnership, and we wish to draw upon their experiences and expertise to help inform a discussion concerning the potential barriers to effective partnerships and solutions that have been enacted. We will provide a brief overview of our partnership and three examples from our work that illustrate the main issues we face (communication, communication and communication). After each vignette, the audience will split into three groups for guided feedback and discussion.

The discussion will center on the issue presented, alternate solutions, or examples of similar frustrations. We will then lead a summary discussion. Session outcomes are designed to raise awareness of pitfalls and solutions within Noyce partnerships. At the end, participants will be able to: (1) identify main issues surrounding Noyce partnerships; (2) discuss possible solutions to said issues; (3) appreciate the situational nature of partnerships.

3.10 Engaging Aspiring Educators In Inquiry and Related Curriculum Development Through An Interdisciplinary Field Course

Jana Bouwma-Gearhart, University of Kentucky, jlbo226@uky.edu
 David Little, University of Kentucky, david.little@uky.edu
 Sarah Adumat, University of Wisconsin, sjadumat@wisc.edu
 Andrew Bouwma-Gearhart, University of Kentucky, ambo224@uky.edu

Target Audience: Higher Education, Research/Evaluation

Topic: Innovative Noyce program practices and teacher preparation models

The promises of modeling-based inquiry curricula and instruction have been well confirmed in terms of fostering students' understanding of STEM knowledge and practices. Of notable focus is how modeling, a form of guided inquiry, might help students to build accurate causal models to account for phenomena for which students may hold deep-seated misconceptions. This session will present research documenting the experiences of aspiring educators (including NOYCE fellows) engaged in a short, yet intensive, field-based course that attempted to unite best teaching practices with STEM knowledge and skills at the cornerstone of ecology through modeling-based inquiry.

We will discuss the potential of similar endeavors towards encouraging aspiring educators' revisions of their own scientific misconceptions, their conceptions of the nature of STEM disciplines, and the strengthening of their practice as inquiry facilitators. We offer insight into how to promote aspiring educators' movement from students engaged in inquiry to developers of novel and engaging modeling-based inquiry curriculum and instruction for use

with their future students. We also present recommendations for meeting the needs of students with a wide variety of future pedagogical interests and the co-development and teaching of courses by education and STEM faculty. Session leaders will facilitate a discussion about the relative costs and payoffs associated with endeavors meant to foster an understanding of inquiry via co-study of the fields of education and STEM. The session will move participants through some modeling-based activities of various scientific phenomena experienced by our aspiring educators as well as those developed by NOYCE scholars themselves.

3.11 Emerging Legal Issues in Education

Suzanne E. Eckes, Indiana University, seckes@indiana.edu

Target Audience: Noyce Scholar, Noyce Teaching Fellows

Topic: Other: Legal Knowledge

A recent national survey revealed that the vast majority of teachers have taken no course in school law in their pre- or inservice programs and that most teachers were uninformed or misinformed about the legal rights of students and teachers (Schimmel & Militello, 2007). Research also demonstrates that teachers consider the study of legal issues to be one of the most essential areas of teacher preparation. Teachers may not be aware that they function as state agents and are therefore limited by various constitutional and statutory provisions. As a result, teachers may unintentionally violate students' constitutional rights when they require them to stand for the Pledge of Allegiance, search their backpacks for possible contraband without reasonable suspicion, or punish them for statements in class or on T-shirts because they might offend someone. The purpose of this session is to examine emerging legal issues related to public schools.

3.12 Building Engineers for the Future: Changing Perceptions of Math and Science in Rural Washington

Courtney Bonuccelli, Washington State University, courtney_bonuccelli@hotmail.com

Jonathan Soule, Sunnyside High School, soulejd@gmail.com

Target Audience: Noyce Scholar, Noyce Teaching Fellows

Topic: Resources

This workshop will provide brief demonstrations of activity driven lessons associated with engineering design principles. We will be highlighting the development of a graduate student in the NSF GK-12 program as they immerse themselves in a high school classroom setting. We will describe how the Fellow learned to interact, relate with, and gain the trust of her students resulting in a personal "buy-in" value of science, math, and engineering from the students.

Topics will cover the process of development, implementation, and the successful cooperative teamwork between a high school science teacher and a GK-12 Fellow over two years. We will use hands on and interactive demonstrations to aid with a free-flowing discussion. Examples of classroom lessons will be utilized to demonstrate the topics to be discussed.

3.13 Ping-Pong Balls and Lipstick: Teaching Problem Solving Using Complex Estimation

Melanie Smith, The Urban Assembly School for Law and Justice, msmith@sljhs.org

Target Audience: Noyce Scholars, Noyce Teaching Fellows

Topic: Resources

How many ping-pong balls fit in a plane? How fast does hair grow? During the session, participants will be exposed to a valuable set of multi-step estimation problems that can be used to teach reasoning skills. The session will focus on how instructors can explicitly teach the critical thinking process required to solve seemingly impossible questions. Teachers will understand the connection between estimation and problem solving, and they will leave with a toolkit of classroom-ready strategies.

MINI-PLENARY PANELS

MINI-PLENARY PANELS A, B, and C: Friday, July 9, 2010

8:00am - 9:00am

Plenary Panel A: Developing a Conceptual Framework for New Science Education Standards

Thomas E. Keller, National Research Council, tkeller@nas.edu

With funding from the Carnegie Corporation, the National Research Council's Board on Science Education has initiated a study committee process to develop a conceptual framework with science educators, learning scientists, discipline scientists, and educational policy researchers. This effort, built on existing science education standards and framework documents and evidence-based reports such as *How People Learn*, *Taking Science to School*, and *Systems for State Science Assessment* provides an opportunity to draw on the latest research in learning and teaching science. Four design teams will complement the deliberations, creating drafts in life science, physical science, earth and space science, and engineering and technology. The final report will also identify research issues related to evaluation and implementation of the framework.

The conceptual framework will offer a vision of the form and structure of an education in science but not at the level of grade by grade standards. It is expected to identify core ideas, cross cutting concepts and scientific practices and provide examples of the articulation of these for specific grade-based touch points. In July, 2010, the draft framework will be made available for public comment. In addition to posting the draft framework on a website, there will be focus group feedback processes in partnership with AAAS, NSTA and the Council of State Science Supervisors. A final peer-reviewed report is expected in winter of 2010.

The conceptual framework will have many uses, one of which is to serve as the basis for development of science education standards. This work will be directed by Achieve. Their goal is to develop standards by winter of 2011. Other uses include providing guidance for development of curricula and assessments, building a foundation for discussion of alignment between K-12 and higher education, and serving as a mechanism for creating greater synergy between science learning in school and in informal environments.

At this session, Noyce participants will be informed about the committee's task, process, and timeline and will be given instructions for accessing the feedback website.

Plenary Panel B: The Common Core State Standards for Mathematics: An Overview of the Standards, How They Were Developed, and their Potential Impacts on Teaching, Learning, Assessment and Professional Development

Kaye Forgione, Achieve, Inc., krforgione@gmail.com
Jean Slattery, Achieve, Inc., jslattery@achieve.org

The Common Core State Standards (CCSS) for Mathematics were finalized in May 2010. Their development was a significant and historic opportunity for states to collectively develop and adopt a core set of academic standards. This state-led work began in spring 2009, with 48 states, 2 territories, and the District of Columbia committing to their development. If all of these states and territories were to adopt the CCSS, this initiative would affect upwards of 44.5 million students—about 88% of the student population. This presentation will discuss how and by whom the standards were developed, what the common core standards for grades K-12 look like and how they are organized, specific steps being taken to clarify what these standards might mean for high school mathematics and for college/career readiness, and the implications that these standards have for teaching, learning, assessment, and professional development. As part of the Race to the Top initiative, consortia of states have also been offered the opportunity to apply for funds to develop common assessments that align with the CCSS, and an overview of this work and its implications will also be discussed. As work proceeds to develop a K-12 science framework and standards, it is important that the CCSS for mathematics and their implication on science teaching and learning be taken into consideration. Points for consideration will be offered, and implications for the science work will be explored more fully during a question-and-answer period.

Plenary Panel C: Overview of Noyce Program Evaluation

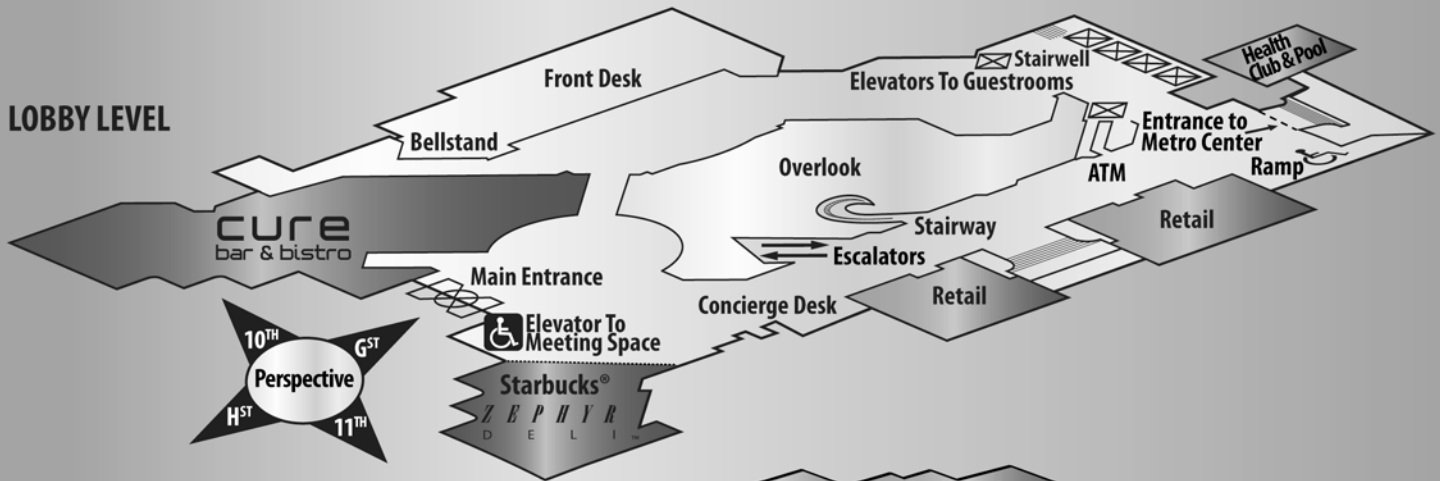
Frances Lawrenz
University of Minnesota

This presentation provides a brief look at some of the results obtained through the University of Minnesota (U of MN) evaluation of the Robert Noyce Teacher Scholarship Program. The U of MN evaluation was a collaborative effort between the U of MN evaluation team and the Noyce PIs. The evaluation questions, the main instances of collaboration and the resources available from the evaluation will be described. Findings from a comparative analysis of alternative and traditional approaches to teacher preparation, from interviews with scholars and STEM faculty and from an HLM analysis of scholar and program level data will be presented. Implications of the results of this evaluation for teacher preparation programs and for future evaluations will be provided.

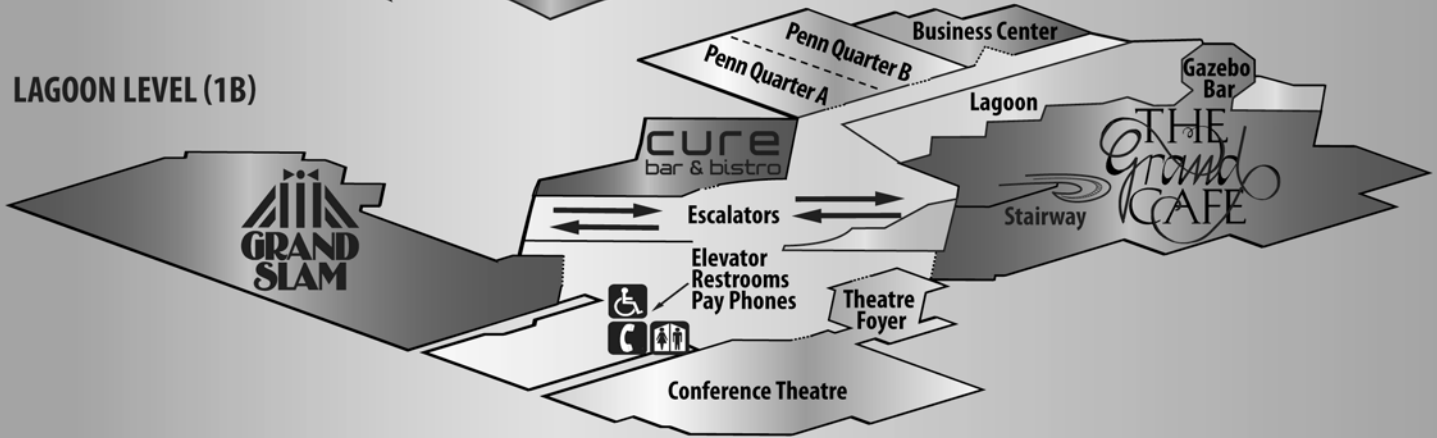
Ellen Bobronnikov, Beth Gamse, Cristofer Price, and Radha Roy
Abt Associates Inc.

Abt Associates is conducting a national study of NSF's Robert Noyce Teacher Scholarship Program. The study will document the activities, stakeholder perceptions, and outcomes for participants from all projects funded between 2003 and 2009 Noyce; it will also examine the impact of the Noyce Program on recruitment and retention in high-need districts and schools. As part of the evaluation of the Noyce Program, the Abt team will survey the census of Principal Investigators, STEM faculty, Noyce recipients, and K-12 school principals where Noyce recipients are teaching; the study will also interview a small subset of these same respondent groups. This presentation will discuss the goals and timeline of the study and will highlight the important roles that PIs and other project staff and participants will play in the study.

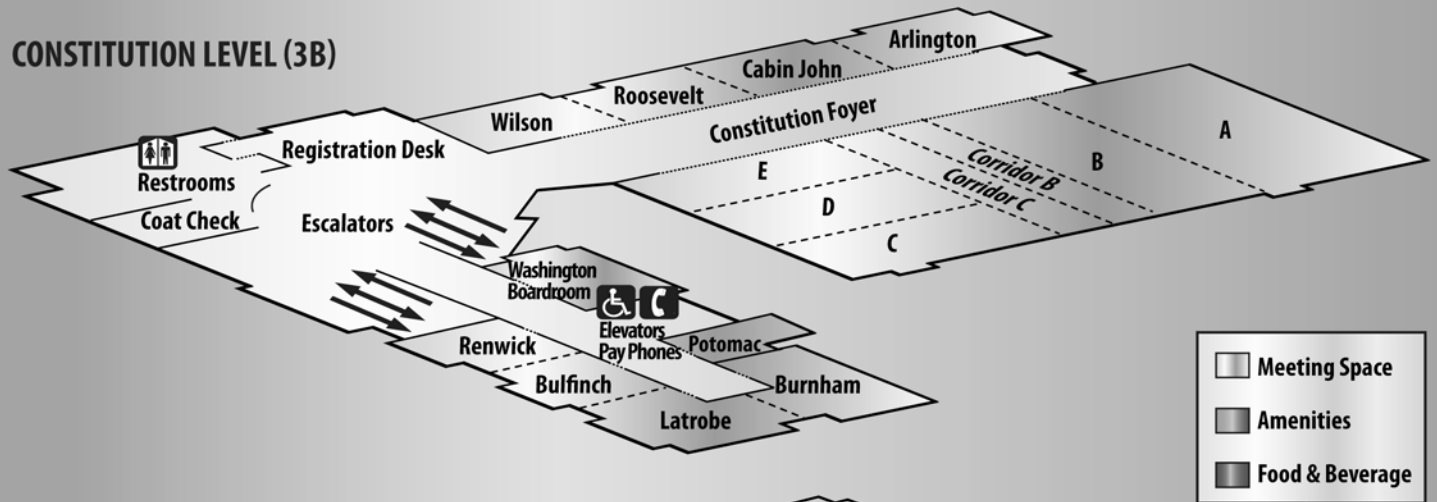
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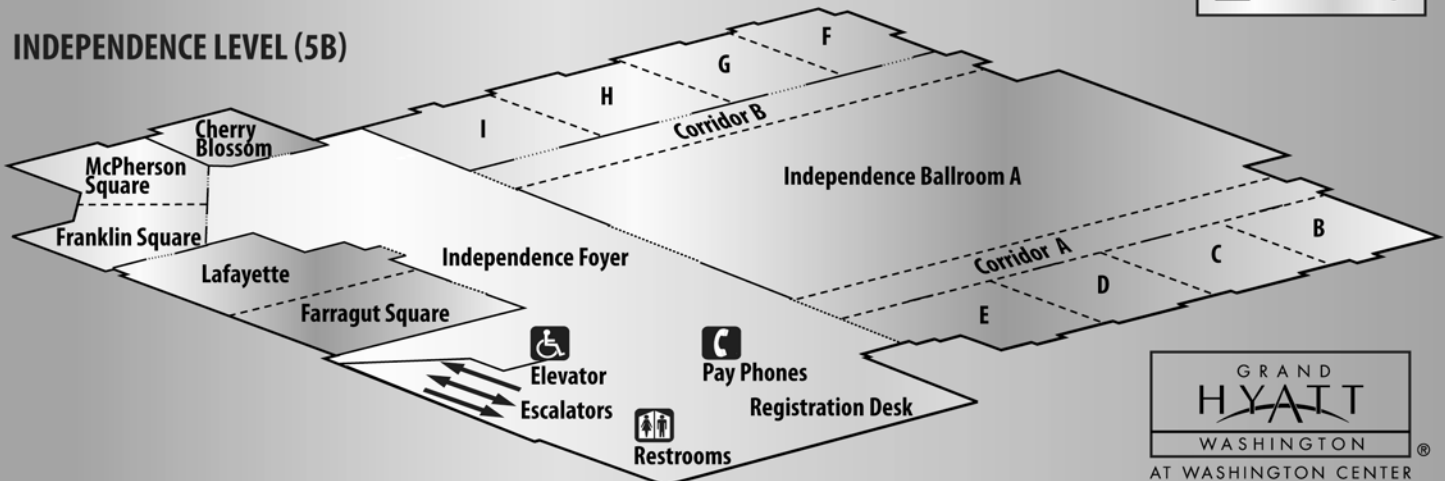
LAGOON LEVEL (1B)



CONSTITUTION LEVEL (3B)



INDEPENDENCE LEVEL (5B)



1

Title: Recruitment Efforts to Diversify Mathematics Education

NSF Noyce Award Number: 0934756

Principal Investigator: Robert Bradley

Email: bradley@adelphi.edu

Institution(s): Adelphi University

Co-PI(s): Dante Tawfeeq

Presenter(s): Robert Bradley, Adelphi University, bradley@adelphi.edu

Dante Tawfeeq, Adelphi University, tawfeeq@adelphi.edu

Project Discipline: Mathematics Education

While the potential systemic solutions to the racial and gender equity problems are complex, the issues that support these problems are fundamental in nature, like a lack of local and state funding in school districts with a high percentage of minority students, underqualified content-specific teachers (Education Trust document, 2003), and a marginalization of equity issues in mathematics education research (Martin, 2003). In an attempt to explicitly confront these issues, the TOMS program was designed to train pre-service teachers of mathematics to better engage the socially and/or educationally challenged students in high needs and low resourced schools. This presentation is a reflection on the initial recruitment of TOMS' candidates as well as the necessity to reevaluate and redirect our efforts towards a different and broader pool of candidates. We will also provide some rationale as to why we decided to offer the following special methods and foundations classes in the TOMS' curriculum that we feel promote the issues of diversity, multiculturalism, and a high level of content knowledge in mathematics education:

- Methods of Teaching College Placement Calculus;
- Methods of Teaching Geometry;
- Issues of Learning Mathematics in High Needs Schools: Race, Equity & Social Justice; and
- Measurement & Evaluation of School Based Mathematics Learning Programs and Testing.

2

Title: PhysTEC Noyce Scholars

NSF Noyce Award Number: 0833210

Principal Investigator: Monica Plisch

Email: plisch@aps.org

Institution(s): American Physical Society

Co-PI(s): Phillip W. Hammer, Robert Thorne, Laurie McNeil, and Alvin Rosenthal

Presenter(s): Monica Plisch, American Physical Society, plisch@aps.org

Phillip W. Hammer, American Association of Physics Teachers, pwhammer@aapt.org

Project Discipline: Physics

URLs: <http://www.phystec.org/noyce/>

The shortage of qualified physics teachers is very severe. Only 34% of all high school physics teachers have a degree in the subject. The Physics Teacher Education Coalition (PhysTEC) project has funded more than a dozen institutions to develop model physics teacher education programs. The PhysTEC Noyce Scholars program recruits physics students to teacher education programs at selected PhysTEC institutions. The PhysTEC project is led by the

American Physical Society (APS) and the American Association of Physics Teachers (AAPT), with funding from NSF and APS.

3

Title: Science Teachers for AZ - Recruitment & Retention

NSF Noyce Award Number: 0833311

Principal Investigator: Julie A. Luft, Professor, School of Life Science

Email: suzanne.cassano@asu.edu

Institution(s): Arizona State University

Co-PI(s): Steven Semken, Mari Koerner, and Sid Bacon

Presenter(s): Julie A. Luft, Arizona State University, julie.luft@asu.edu

Steve Semken, Arizona State University, semken@asu.edu

Suzanne Cassano, Arizona State University, Suzanne.cassano@asu.edu

Project Discipline: Earth & Space Science, Biology, Chemistry, Physics

STARR attempts to identify and support qualified science teachers who will persist in high-need environments. Using different recruitment tactics, 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 science as inquiry instruction. While students are completing their initial certification course work, field placements are arranged in high-need settings with students who are Native American, Latina/o, or African American. Upon graduation, STARR Noyce teachers participate in science-focused induction programs, which support their use of science as inquiry in diverse classrooms, their development as science teachers, and their socialization into the school community. Our poster will discuss our recruitment strategies, information about our teacher education programs, and the induction program. It will also share some data from our program that pertains to the Noyce Scholars and the STARR Noyce program.

4

Title: The TEAM-Math Teacher Leader Academy for Elementary

NSF Noyce Award Number: 0934821

Principal Investigator: W. Gary Martin

Email: strutme@auburn.edu

Institution(s): Auburn University

Co-PI(s): Marilyn E. Strutchens and Steven Stuckwisch

Presenter(s): Marilyn E. Strutchens, Auburn University, strutme@auburn.edu

Project Discipline: Mathematics

URLs: <http://team-math.net/>

<http://team-math.net/tlacademy/indexelementary.htm>

Our goal is to improve the fellows' mathematical content knowledge and pedagogical content knowledge, as well as their understanding of how to more effectively lead efforts to improve instruction in their school and district. To meet this goal, fellows (a) commit to continue teaching in a high-needs district; (b) complete an Ed.S. or Ph.D. degree in elementary education highlighting mathematics; (c) complete the requirements for an "elementary mathematics specialist university certificate;" (d) participate in professional development conducted by TEAM-Math on teacher leadership; (e) collaborate with university faculty to provide support to preservice teachers seeking initial certification; (f) work to improve mathematics instruction at their school; and (g) actively participate

POSTER ABSTRACTS

in the East Alabama Council of Teachers of Mathematics, as well as other state and national associations. In return, fellows: (a) receive an annual stipend of \$10,000 for 5 years; (b) have their tuition for graduate courses taken at Auburn waived; and (c) receive a small amount of additional support for materials that will be helpful as they work to improve instruction in their school and district.

Most fellows have taken two graduate courses toward their respective degrees and attended five teacher leader workshops. Baseline data for the schools at which the fellows work was collected in Spring 2009 as a part of the data collection for the TEAM-Math MSP, focusing on student attitudes towards mathematics and teacher beliefs and practices, as well as student performance on state-mandated achievement tests. Year one data collection is underway. Monthly, we are collecting data about fellows' activities through a mandatory log. Fellows maintain a personal journal reflecting on their journey as mathematics teacher leaders; these will be collected and analyzed. Finally, semester site visits will be conducted to better understand the impact the fellows are having in their school context.

5

Title: Teach Now and Beyond

NSF Noyce Award Number: 0629559

Principal Investigator: Louis Nadelson

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Institution(s): Boise State University

Co-PI(s): Margaret Kinzel

Presenter(s): Louis S. Nadelson, Assistant Professor, Curriculum, Instruction, Foundational Studies, College of Education, louisnadelson@boisestate.edu

URLs: <http://education.boisestate.edu/cifs/NationalScienceFoundation.htm>

This poster details our proposed Noyce II program that integrates summer internships for recruiting, scholarships for completion, and professional development for induction and retention. In addition, it highlights the success of our Noyce I program.

6

Title: Science Educators for Urban Schools! (S.E.U.S.!)

NSF Noyce Award Number: 0833278

Principal Investigator: Audrey A. Friedman

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Institution(s): Boston College

Co-PI(s): Katherine McNeill and Vidya Madhavan

Presenter(s): Audrey A. Friedman, Lynch School of Education, Boston College, friedmaa@bc.edu

Project Discipline: English and Zoology

URLs: www.bcseus.com

Last year, SEUS! successfully supported 3 Scholars toward completion of a Master's Degree in Science Education. This year, SEUS! will support 4 new Scholars. Despite what appears to have been a successful first year, several critical variables have emerged which continue to inform recruitment, support, and placement of Scholars: a) more creative recruitment measures are essential to maintain a viable pool of candidates; 2) extensive onsite support

and collaboration with mentor teachers is critical to developing a competent science practitioner; 3) knowledge of fiscal and political dynamics of urban contexts is necessary for not only navigating the culture of urban schools but also for finding placement of newly graduated science educators. The good news is that all three first round Scholars have found their niche as urban high school science teachers. These 3 committed and talented young people will make a difference in the lives of the pupils they will serve.

7

Title: Boston University's Noyce Scholars Program in Math
 NSF Noyce Award Number: 0733762
 Principal Investigator: Suzanne Chapin
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 Institution(s): Boston University
 Co-PI(s): Glenn Stevens
 Presenter(s): Suzanne Chapin, Boston University, schapin@bu.edu
 Project Discipline: Mathematics
 URLs: www.bu.edu/sed/noyce

Boston University's (BU) Noyce program partners with English High School in Boston and with 5 high-need school districts: Arlington, Chelsea, 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 4 courses as part of their degree program including a 6-week math immersion experience through the PROMYS for Teachers program. Clinical experiences with master teachers are provided along with coursework and workshops specifically designed to support reflective teaching focused on student reasoning. To help Scholars prepare for teaching, they enroll in the course, Teaching Math in Urban Schools.

The 7 Scholars in Cohort I taught in high-need districts during the 2009-10 academic year: 5 taught high school mathematics and 2 taught middle school mathematics. Scholars returned regularly to BU for professional development workshops and seminars and were connected to a community of math teachers, math educators, and mathematicians. Five Cohort II Scholars completed the MAT degree program in 2009-2010. Special activities included attending the NCTM Regional conference in Boston as well as weekly teaching seminars. Cohort III, consisting of 8 Scholars, will start the MAT program this summer.

8

Title: Math for America Boston: Noyce Teaching Scholars
 NSF Noyce Award Number: 0934851
 Principal Investigator: Suzanne Chapin
 Email: SuzanneHChapin@gmail.com
 Institution(s): Boston University
 Co-PI(s): Glenn Stevens and Steven Rosenberg, Boston University
 Donna Chevaire, Lawrence Public Schools
 Presenter(s): Suzanne Chapin, Boston University, SuzanneHChapin@gmail.com and schapin@bu.edu
 Project Discipline: Mathematics
 URLs: www.bu.edu/sed/noyce

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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 6-year program works with Teaching Fellows and Master Teachers and is a collaboration of faculty in the School of Education and College of Arts and Sciences, the Math for America program, and seven high-need school districts.

Teaching Fellows enroll in a 1-year graduate program leading to the Master of Arts in Teaching (MAT) degree and initial teacher licensure as either a middle school or high school mathematics teacher. Twelve Teaching Fellows will be supported with full scholarships to a program that integrates deep mathematical experience with thoughtful reflection about classroom practice. Clinical experiences with master teachers involved in the program or in partner school districts are provided along with coursework and workshops specifically designed to support reflective teaching focused on student reasoning. Follow-up activities include workshops and seminars to keep Teaching Fellows connected to a community of math teachers, math educators, and mathematicians. Following the awarding of the MAT degree, Teaching Fellows are required to teach mathematics in a high-needs district for 4 years. They receive stipends while teaching.

Master Teachers must have majored in mathematics and hold a master's degree in a related field. They enroll part-time in the Certificate of Advanced Graduate Study (CAGS) degree program or in a second master's degree program, the Master's in Mathematics for Teaching (MMT). Both programs share common features that support teachers' development as leaders: an immersion experience in mathematics and coursework focused on mathematics curriculum and professional development. Master Teachers receive a stipend for 5 years while working as teacher leaders. Four Master Teachers are involved in 2010-11.

9

Title: Teacher Academy @ Brooklyn College Noyce Scholars

NSF Noyce Award Number: 0934865

Principal Investigator: Edwina Branch-Smith

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Institution(s): Brooklyn College

Co-PI(s): Jeff Suzuki and Deborah Shanley

Presenter(s): Edwina Branch-Smith, Brooklyn College, ebranchsmith@brooklyn.cuny.edu

Project Discipline: Math and Science Education

URLs: <http://schooled.brooklyn.cuny.edu/TA/index.htm>

Our scholarship program is an extension of the established Teacher Academy @ Brooklyn College (TABC), but in this one students receive funding to support their learning as well as enrichment that helps undergraduate students learn how to teach science or mathematics using informal learning settings (museums, parks, nature, etc). Scholars also work towards completing their Masters degree by the end of their 3 years of funding.

TABC Noyce Scholars receive the following:

- Financial support for 3 years, 2 years undergraduate and 1 year graduate up to \$11000 per year including internship stipends,
- Internships in Host Middle and High Schools for 50 hours per semester;
- Two week Summer professional development on external learning;
- Periodic seminars to develop and enhance teaching skills;

- Place to study, meet and collaborate with colleagues with computer access;
- Faculty mentorship and support; and
- Eligibility for certification with completion of masters program in year 3 of the program.

10

Title: Bryn Mawr Haverford Colleges Noyce Teacher Scholarships

NSF Noyce Award Number: 0934831

Principal Investigator: Victor Donnay

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Institution(s): Bryn Mawr College

Co-PI(s): Alice Lesnick, Josh Sabloff, Peter Brodfuehrer, Robert Fairman

Presenter(s): Victor Donnay, Professor of Mathematics, Bryn Mawr College, vdonnay@brynmawr.edu

Project Discipline: Math and Science Education

URLs: <http://www.brynmawr.edu/noyce/>

Our Noyce program encourages math and science majors to explore opportunities in math and science education and offers generous scholarships to students who are committed to the challenging social justice work of teaching math and science in high-needs secondary schools. The scholarships provide support for students in their senior year to complete their math or science major and then additional support to gain secondary certification in a 5th year Post-Baccalaureate Teacher Education Program. The program provides freshmen and sophomore students with spring break internship opportunities in math and science education and brings alumni who are engaged in math and science education back to campus to speak with students.

The program aims to examine the potential for math and science teacher recruitment and preparation at a small liberal arts college. We undertook a baseline survey to gauge student and faculty attitudes, beliefs and experiences related to careers in secondary math and science teaching. Survey findings are helping to clarify the context within which our program operates and are suggesting pathways for program development. To strengthen teacher recruitment, we are working to build synergies between the wide array of existing programs on the two campuses that have a link to education such as tutoring programs on campus and in the community, TA programs in math and science, a Saturday science program for high school students, and a summer science education program.

11

Title: Noyce New Math and Science Teacher Preparation

NSF Noyce Award Number: 0434103

Principal Investigator: Daniel MacIsaac

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Institution(s): Buffalo State College

Co-PI(s): David Henry, Susan McMillen, David Wilson, and Joseph Zaeicki

Presenter(s): Luanna Gomez, Buffalo State College, gomezls@buffalostate.edu

Steven Wilser, Buffalo State College, swilser@hotmail.com

Project Discipline: Physics and Math

The NSF-Noyce New Math and Science Teacher Partnership of Western New York has successfully funded 42 STEM teacher candidates since 2004. We have prepared 14 graduated candidates, with another handful eligible to teach without having graduated for a total of seventeen active STEM classroom teachers as of Spring 2009. Eleven of these candidates are teaching in high need schools. By STEM discipline teacher licensure sought, approximately half (23 candidates or 55%) sought certification to teach mathematics, a third certified in physics (thirteen or 31%) with 2 each (5%) certified to teach biology and geology.

Finally, 1 candidate each (2%) certified to teach elementary science and technology education. We have been appropriate and responsible stewards of the taxpayers' funds and have impacted many STEM teachers, STEM teachers to be and STEM students' lives in a positive direction.

12

Title: STAR Program: Paid Summer Research Opportunities

NSF Noyce Award Number: 0952013

Principal Investigator: John Keller

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Institution(s): California Polytechnic State University

Presenter(s): John Keller

URLs: <http://www.cesame.calpoly.edu/programs-star.html>

The Science Teacher and Researcher (STAR) Program allows Noyce Scholars to create a dual “teacher-researcher” career path. Founded and implemented by the Cal Poly Center for Excellence in Science and Mathematics Education (CESaME) on behalf of the California State University (CSU) system, STAR provides cutting edge research experiences and career development for Scholars. Key experiences are one or more summers of paid research experience in Department of Energy or NASA research centers along with weekly science education workshops. By being anchored in the research community, Scholars will better understand what it means to be both researchers and effective teachers.

Since 2007, we have placed 85 STAR Fellows from 18 different CSU campuses at 8 research facilities in California. During Summer 2010, STAR expanded nationally with funding from the Noyce Scholars Program to place 60 Fellows in California and 14 in new lab partnerships in CO, MD, TN, and WA. Over half of these placements (38) involve current or recent Scholars. Through continued partnership with the Noyce Scholar Program and contributions from other funding sources, we are hopeful that the program will continue to grow.

Evaluation results from previous summers indicate program 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 inquiry. The program is planning to conduct a multiyear longitudinal study of alumni and their students to compare the effectiveness of this pre-service program with proven results from similar “teacher-researcher” programs for in-service teachers. Visit <http://www.cesame.calpoly.edu/programs-star.html> for more information about STAR.

13

Title: First Cohort of Cal Poly Science Noyce Scholars
 NSF Noyce Award Number: 0833353
 Principal Investigator: John Keller
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 Co-PI(s): Seth Bush and Ed Himelblau
 Presenter(s): John Keller, Cal Poly SLO, jmkeller@calpoly.edu
 Project Discipline: Science
 URLs: <http://cesame.calpoly.edu/noyce/>
<http://www.cesame.calpoly.edu/programs-star.html>

In March 2009, our program recruited its first cohort of 10 Scholars for the 2009-10 academic year—5 individuals pursuing teaching careers in biology, 2 in chemistry, and 3 in physics. Three Scholars in this first cohort were undergraduate students and the remaining were enrolled in their post-baccalaureate year as single subject credential candidates. We anticipate having up to 15 Noyce Scholars in the 2010-11 second cohort, with 3 returning as second year scholars. In total, the program will award 55 scholarships in 4 yearly cohorts. Our first cohort has engaged in enrichment experiences focused on teaching in a high need setting. At monthly seminars, they discuss English Language Learners, AVID teaching strategies, and finding teaching positions in high need school settings. Half of the Noyce cohort attended the Western Regional Noyce Conference in Fresno. Finally, Scholars from 2009-2010 will overlap with our 2010-2011 cohort in early June for a Saturday professional development workshop on the Modeling Science pedagogical approach developed at Arizona State.

Our Noyce cohort selected Meredith Ashbran as the 2010 Cal Poly Noyce Distinguished New Teacher. Meredith, a former Scholar from CSU Long Beach in her third year of teaching in Los Angeles, was the keynote speaker for our 2nd Annual Noyce Narrative Event. This recruitment event is intended to spread awareness of the Noyce Scholar Program and the need for highly qualified science and math teachers. Our webpage was revised to help recruitment efforts, <http://cesame.calpoly.edu/noyce/>.

Four of our 2009-2010 cohort will participate in the CSU-Noyce Science Teacher and Researcher (STAR) Program. This program places aspiring and early career science and math teachers in paid summer researcher internships at national research facilities and college campuses to provide and immersion experience in authentic research. The program is open to all Scholars at universities close to the program lab site partners. In summer 2010, STAR will place 27 Scholars in labs in California and 16 additional Scholars in CO, MD, NY, TN, and WA. Visit <http://www.cesame.calpoly.edu/programs-star.html> for information.

14

Title: Cal Poly Noyce Scholars Program
 NSF Noyce Award Number: 0630419
 Principal Investigator: Todd Grundmeier
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 Institution(s): California Polytechnic State University, San Luis Obispo
 Co-PI(s): Elsa Medina

POSTER ABSTRACTS

Presenter(s): Elsa Medina, Cal Poly State University, emedina@calpoly.edu
Project Discipline: Mathematics
URLs: <http://cesame.calpoly.edu/noyce/>

Our program, established in 2007, has awarded 20 scholarships to future mathematics teachers. In addition to providing scholarships, our program has a summer workshop component 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 \$500 stipend for scholars from other universities to attend our summer workshops.

15

Title: Robert Noyce Phase I Scholarship Program at CSUB
NSF Noyce Award Number: 0934944
Principal Investigator: Andreas Gebauer
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Co-PI(s): Dirk Baron, Kamel Haddad, Carl Kloock, and Natalie Tran
Presenter(s): Andreas Gebauer, California State University Bakersfield, agebauer@csub.edu
Project Discipline: Science and Mathematics
URLs: <http://www.csub.edu/noyce/>

Within the first year of the existence of the Robert Noyce Scholarship Program at CSUB, we have developed a website and a brochure advertising the program. The brochures are distributed in appropriate science and mathematics courses such as pre-calculus, calculus, general chemistry, organic chemistry, and introductory biology, geology and physics courses. This occurs both on our campus and the Bakersfield Community College campus to make interested students aware of the program. Additionally, fliers designed to draw the attention of students are displayed in all science buildings across campus. The Noyce Program has also established a close collaboration with the Math and Science Teacher Initiative (MSTI) as well as the School of Natural Sciences and Mathematics (NSM) Student Center.

Further collaborations have been established with the Research Experience Vitalizing Sciences University Program (REVS-UP). REVS-UP is funded by Chevron Corp. and brings high school students and K-12 teachers to the CSUB campus for a one month summer research experience with faculty in biology, chemistry, computer science, geology, mathematics, and physics.

16

Title: Teaching Excellence in Math & Science (TEMS)
NSF Noyce Award Number: 0733758
Principal Investigator: William Fisher
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Co-PI(s): Deidre Sessoms
Presenter(s): Brandi Aranguren, California State University, Chico; baranguren@csuchico.edu

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Project Discipline: Mathematics and Science

TEMS (Teaching Excellence in Math and Science) Noyce Math and Science Scholars Consortium partners 2 culturally different universities, CSU Chico and CSU Sacramento to provide 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. A unique features of this partnership is to use the regional differences to help Noyce scholars to develop a stronger and more diverse understanding of educational challenges. TEMS conducts 2 annual seminars, 1 in each area, held in teacher classrooms and co-facilitated by mentor teachers. TEMS provides opportunities for student teacher exchange programs between the 2 campuses allowing 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 ways 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 include expanding its Hands-On Lab science teaching experiences (elementary classes visit a dedicated lab on the 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: CSCSUEB Noyce Scholarship Program
NSF Noyce Award Number: 0833348
Principal Investigator: Katy Hann
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Institution(s): California State University, East Bay
Co-PI(s): David Stronck
Presenter(s): David R. Stronck, California State University, East Bay, david.stronck@csueastbay.edu
Project Discipline: Science and Math teaching

The CSUEB Noyce Scholarship Program is designed to increase the number of qualified math and science teachers obtaining their credential and going on to serve at high needs schools. Scholarships will be used to attract academically successful community college transfers, senior mathematics and science majors and STEM professionals to become highly effective teachers in urban school districts. Each scholar will be supported for \$10,000 per year for 1-2 years and will be required to teach at a high needs school 2 years for every year of support.

POSTER ABSTRACTS

The College of Science and the College of Education and Allied Studies at California State University, East Bay (CSUEB), the Alameda County Office of Education (ACOE), the Stephen D. Bechtel Jr. Foundation, and the Edward Teller Foundation collaborate on the CSUEB Noyce Teaching Fellowship program. The goal is to increase the number of highly qualified science and math students who obtain a teaching credential and master's degree at CSUEB. Scholarships are provided for the first credential/master's year and salary supplements for the subsequent four teaching years for two cohorts of eight Fellows. Each fellow will receive a total of \$60,000 in support from the Noyce program. Noyce Fellows will complete an innovative cohort-based teacher preparation program, acquire laboratory experience and take advantage of a professional support network and mentoring that help them succeed as teachers in high-need school districts.

Our poster will include samples of the following:

- Description of Recruitment Pools
- Description of the Master's Program for Teaching Fellows
- Recruitment Flyer
- Application Forms
- Diversity Workshop Flyer
- Examples of Professional Development Opportunities
- Sample Statements from Scholars
- Data Describing our Scholars and Fellows

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Title: Fresno State Teaching Fellows Program (FRETEF)

NSF Noyce Award Number: 0934967

Principal Investigator: David M. Andrews

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Institution(s): California State University, Fresno

Co-PI(s): Frederick Zechman, Lance Burger, and Carol Bohlin

Presenter(s): David Andrews, CSU Fresno, davidan@csufresno.edu

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Project Discipline: Sciences and Mathematics

URLs: www.csufresno.edu/smec

The Fresno State Teaching Fellows Program (FRETEF) builds upon the solid foundation of the CSU Fresno Robert C. Noyce Scholars Program I & II. The FRETEF program will increase the pool of highly qualified science and mathematics teachers in the Central Valley through a comprehensive design requiring Fellows to complete either a Master of Arts or Master of Science degree in the sciences or mathematics, in conjunction with completion of requirements for a secondary school teaching credential, thus creating excellent bridges between pedagogy and advanced STEM content. The program features extensive involvement of STEM faculty through instruction in graduate level programs, professional development workshops, and mentoring of Fellows. FRETEF builds upon the strong foundation of two successful Noyce programs through recruitment, retention, special programmatic support including seminars on teaching in high needs schools, summer research opportunities with established programs at

the U.S. Department of Energy Labs, and exemplary summer institutes which provide future and current science and mathematics teachers with high quality, research-based curricula.

FRESTEF Fellows will join a growing on-line learning community developed on behalf of the CSU Noyce Scholars programs and funded under a separate initiative through the National Science Digital Library and NSF.

The FRESTEF program includes a comprehensive evaluation plan, primarily an extension of the current Noyce II evaluation plan, to be conducted by the same Noyce II evaluation team. The leadership team includes STEM and education faculty and will involve school district experts who continue to contribute to Noyce projects. The FRESTEF Fellows program will support the preparation and placement of an additional 18 (2 cohorts including 9 in science and 9 in mathematics) highly trained science and mathematics teachers. Through extensive involvement of FRESTEF Fellows with the NSDL/Noyce Commons and emerging on-line community, the products of the Fellows program (including contributions in the form of on-line publications, lessons, and other teaching and learning resources) will be disseminated throughout the Noyce community in California. It is anticipated that this program will strengthen efforts at Fresno State to close a significant and growing achievement gap among learners in science and mathematics in our K-12 schools.

19

Title: Teaching as a Primary Profession (TAPP)

NSF Noyce Award Number: 0934910

Principal Investigator: Barbara L. Gonzalez

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Institution(s): California State University, Fullerton

Co-PI(s): Victoria B. Costa, Chandra Srinivasan, and Marcelo Tolmasky

Presenter(s): Barbara L. Gonzalez, California State University, Fullerton, Department of Chemistry and Biochemistry, bgonzalez@fullerton.edu

Project Discipline: Biochemistry and Biology

URLs: <http://tapp.fullerton.edu/>

California State University Fullerton 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 to offer a potential model for a fifth-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: Improving Mathematics, Physics, and Chemistry Teaching (IMPACT) Project

NSF Noyce Award Number: 0630425

Principal Investigator: Margaret Kidd

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Co-PI(s): David Pagni and Richard Lodyga

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Project Discipline: Mathematics, Chemistry, Physics

URLs: <http://math.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 4 years of the grant, a total of 40 students will participate. CSU 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 public high schools and encourage more of these students to attend college and eventually enter the teaching field. IMPACT is coordinated with the school district partners within an ongoing NSF Mathematics and Science Partnership program at CSUF, 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 pedagogy alongside practicing teachers (7 days in the summer and 5 days during the academic year). Progress of stipend awardees will be followed over the next 5 years 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.

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Title: Noyce-II @ Cal State Long Beach

NSF Noyce Award Number: 0833349

Principal Investigator: Laura Henriques

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Institution(s): California State University, Long Beach

Co-PI(s): Xuhui Li and Steve Turley

Presenter(s): Laura Henriques, Mark Katayama, and Guadaulpe De La O

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URLs: <http://www.cnsml.csulb.edu/centers/sas/noyce.asp>

The CSU Long Beach Noyce II project is finishing up its first year with 4 Math, 3 Biology and 2 physics Scholars. Each Noyce Scholar participated in a year-long bi-monthly seminar series for professional development and mentoring. Additionally, each of the 9 scholars participated in the service learning component of the program, which placed them into 1 of 2 high-needs school districts, Long Beach Unified and Whittier Union High School District. Next year, we will add 7 new scholars to our pool of 4 returning members who will continue with the seminar series, mentoring, professional development and service learning experiences.

Through these professional development opportunities, we have seen growth in the Scholars confidence as teachers, ability to critically analyze teaching and emergence as young professionals. One of our scholars won a campus-wide essay competition about her experiences with the Noyce program. Scholars are beginning to join professional organizations and are attending conferences in increasing numbers. All 5 science scholars participated in mentored science teaching experiences or internships beyond their credential program requirements. Additionally, Noyce I alumni have served as guest presenters and speakers at Noyce events on various CSU campuses and a Noyce I alumni is currently serving as the master teacher for a current Noyce II scholar. Some events and planned partnerships of note are:

- Western Regional Noyce Conference host for 2011;
- Continued linkages to Young Scientists Camp program and other mentored teaching experiences;
- CSU Long Beach was recently award a PhysTEC grant to recruit and support future Physics teachers and further solidify the foundation of the physics pipeline;
- Noyce Scholars will be eligible to participate in the PhysTEC outreach activities, courses and events;
- Continued participation in the Noyce National Digital Library project (Building Locally, Linking Globally); and
- Inclusion of the Merlot Voices in CSU Long Beach Noyce curriculum for social networking and support.

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Title: Rigor, Relevance and Retention: In Collaboration

NSF Noyce Award Number: 0934934

Principal Investigator: Debasree Raychaudhuri

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Institution(s): California State University, Los Angeles

Co-PI(s): Derek Chang and Fred Uy

Presenter(s): Derek Chang, California State University, Los Angeles, dchang5@calstatela.edu

Project Discipline: Mathematics

URLs: www.calstatela.edu/academic/math/moebius

The MOEBIUS project is combining an innovative curriculum with an effective support network to increase success of students interested in teaching careers resulting in an additional 40 mathematics teachers. Housed in the department of mathematics, MOEBIUS is implementing the Three R's framework (Rigor, Relevance and Retention) developed for this project with the help of partners from an on-campus Math & Science High School and the education department at CSU Los Angeles to improve the preparation and retention of students. In this poster we will present the framework, our experiences thus far, and early results.

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Title: California State University, Northridge (CSUN)

NSF Noyce Award Number: 0934972

Principal Investigator: Kellie Michele Evans

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Institution(s): California State University, Northridge

Co-PI(s): Silvia Fernandez, Julie Gainsburg, and Ivan Cheng

Presenter(s): Kellie Michele Evans, California State University, Northridge, kellie.m.evans@csun.edu

Project Discipline: Mathematics

URLs: <http://www.csun.edu/~kme52026/csunsf.html>

The Teaching Fellowship Program at CSU Northridge (CSUN) is in the midst of its first year. The program aims to prepare post-baccalaureate and STEM professionals with strong math backgrounds to become Teaching Fellows (TFs), and a group of mathematically talented teachers with excellent teaching records to become Master Teaching Fellows (MTFs). TFs will earn master's degrees in mathematics and single subject mathematics teaching credentials simultaneously, and participate in professional development activities while teaching in high-need school districts. MTFs will earn master's degrees in mathematics education and participate in professional development workshops to enhance their mentoring skills and develop their local leadership capacity. Five-year commitments will be made by both TFs and MTFs. During this period, they will earn stipends and/or salary supplements and work closely with a developing community of CSUN faculty, local teacher leaders, and preservice teachers. Recruitment efforts for TFs have been broad, starting from CSUN's own pool of STEM undergraduates and advertising in mathematics departments at area universities, the Section NExT listserv, the CSU Math Department Chair listserv, the Southern California Section of the Mathematics Association of America's electronic newsletter, and including presentations at local workforce centers and an advertisement (for TFs and MTFs) on Craigslist. For MTFs, e-mail messages went out to LAUSD and PUSD administrators and teachers. Interviews are underway.

24

Title: California State University, Northridge (CSUN)

NSF Noyce Award Number: 0630452

Principal Investigator: Gerry Simila

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Institution(s): California State University, Northridge

Co-PI(s): Kellie Evans, Magnhild Lien, and Virginia Oberholzer-Vandergon

Presenter(s): Kellie Evans, California State University, Northridge, kellie.m.evans@csun.edu

Virginia Oberholzer-Vandergon California State University, Northridge, virginia.vandergon@csun.edu

Project Discipline: Math and Science

URLs: <http://www.csun.edu/math/noyce>

The Noyce Program at CSU Northridge (CSUN) just completed its third year with the largest number of scholars yet. In math there were 4 new undergraduates, 3 of whom are in the Integrated math teaching credential programs, and 1 a math major in the secondary teaching option and 1 a 5th-year credential student. There were 5 new science scholars: 2 in biology, 2 in geology, and 1 in biochemistry. One is now teaching. Two are 5th year science credential students and 2 just graduated and are applying to the credential program.

All scholars participated in weekly seminars. The math seminar focused on middle and high school teaching. Discussions included looking at student thinking and motivation and how to teach content. Scholars focused on problems from *Ways to Think About Mathematics, Activities and Investigations for Grades 6 -12 Teachers* by S. Benson, S. Addington, N. Arshavsky, A. Cuoco, E. P. Goldenberg and E. Karnowski. They gave presentations and took turns explaining their views on the topics. Other chapters provided an “advanced perspective” on problems in secondary mathematics. In the spring, one scholar was student teaching and shared her good and bad experiences with the group.

Other highlights include a pi-day celebration and attendance at the UCLA Curtis Center Mathematics and Teaching Conference, featuring a keynote by Uri Treisman and breakout sessions on mathematics education. For the science seminar, scholars read research articles on inequality in science education. They picked the articles and led the discussions after which they put together a “mini-lesson” that incorporated some of these inequalities and included an “engage, explore, explain” content sequence. Scholars presented their lessons to each other and received feedback. The scholars read *Making Sense of Secondary Science* by R. Driver, A. Squires and P. Rushworth.

The scholars also organized an Earth Day event on campus with hands-on workshops for 7th-10th grade students. Other highlights included a visit to a low performing 9th grade class, followed by a discussion about classroom discipline, and a social for math and science scholars with Knot theory as a theme.

Recruitment efforts continue to develop, using such avenues as advertising directly through the Credential Office and personally inviting candidates to apply (our most successful effort). The biggest issues continue to be (1) many of CSUN’s students already have financial aid and thus do not qualify for Noyce funds and (2) a misconception among students that the Noyce program will place them in particular schools without consulting them.

25

Title: CSUSB Noyce Community

NSF Noyce Award Number: 0630255

Principal Investigator: Davida Fischman

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Institution(s): California State University, San Bernardino

Co-PI(s): Joseph Jesunathadas, Carol Cronk, and Stuart Sumida

Presenter(s): Davida Fischman, CSU San Bernardino, fischman@csusb.edu

Project Discipline: Math and Science

URLs: math.noyce.csusb.edu

The major components of the CSU San Bernardino Noyce program are mentored weekly classroom experiences, monthly seminars for 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, and the San Bernardino City Unified School District. Additionally, we support 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 scholars are primarily undergraduates who have had little or no classroom experience. 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 matched, based on perceived needs of the scholars and skills of the teachers. Each scholar spends the first week of the academic year, plus 4 hours/week throughout the year, in the mentor teacher's classroom. During the 2 years of the 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 seminars provide scholars and mentor teachers with additional opportunities to learn from university and district experts. 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 mentored and structured classroom experiences, and the confidence they gain through them, they would not have made the decision to be a teacher. Others 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.

26

Title: Teachers From the Valley for the Valley

NSF Noyce Award Number: 0934958

Principal Investigator: Juan Flores

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Institution(s): California State University, Stanislaus

Co-PI(s): Viji Sundar

Presenter(s): Juan Flores, CSU Stanislaus, jflores@csustan.edu

Project Discipline: Math and Science

The Robert Noyce Teacher Scholarship Program (RNTSP) at CSU Stanislaus (CSUS) will increase the number of university students preparing to teach science and mathematics in our 6 county service area including California's Northern San Joaquin Valley. Project goals are to increase the number of STEM students and professionals pursuing careers in 7th-12th grade mathematics and science education; to develop cohorts and directed experiences to better prepare them for these roles; and to provide them with resources and a cohort support system that increases retention and success in the workplace.

Noyce Scholars at CSUS will have an enhanced academic experience that will prepare them in both content understanding and pedagogy. They will gain the skills needed to teach effectively and to serve as teacher leaders. Our interdisciplinary team of faculty will bring with them a wealth of expertise and experience that will ensure our Scholars will be the best prepared new teachers in one of the fastest growing regions of California.

The Northern San Joaquin Valley region is characterized by limited economic attainment and low educational achievement. We have established several partnerships in the area, including the Stanislaus County Office of Education, the Lodi Unified, Merced City, Modesto City, and Stockton Unified school districts, as well as higher

learning institutions such as Merced College and the U of California Merced. Our service area is characterized by great cultural diversity. CSUS is a Title V Hispanic Serving Institution and was listed by Hispanic Outlook in Higher Education as a 'Publisher's Pick' for having a solid record in recruiting, enabling, and graduating Hispanic students.

The CSUS Teacher Credential Program recruits a high percentage of cultural minority students and focuses on preparing teachers to work with diverse student populations. This program also recruits more than 90% of its students from the local region and over 90% of them accept teaching jobs in the area, so our RNTSP will truly recruit the top future Teachers from the Valley, for the Valley.

27

Title: Math for America - DC

NSF Noyce Award Number: 0934758

Principal Investigator: Sarah Irvine Belson

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Institution(s): Carnegie Institute of Washington and American University

Co-PI(s): John Nolan and Maxine Singer

Presenter(s): Sarah Irvine Belson and Katherine Loyal Collins, American University

School of Education, Teaching & Health, sarah@american.edu or katherine.loyal.collins@gmail.com

Project Discipline: Mathematics, Education

URLs: <http://www.american.edu/cas/seth/grants/mfa.cfm>

Math for America DC (MfA DC) is a collaborative project between American University's (AU) School of Education, Teaching, and Health (SETH), Department of Mathematics and Statistics (M/S), the Carnegie Institution of Washington's (CIW) Carnegie Academy for Science Education (CASE), the District of Columbia Public Schools (DCPS), and a group of DC Public Charter Schools (DCPCS). MfA DC seeks to improve the teaching of secondary school mathematics in Washington, DC secondary public schools by providing teachers with strong backgrounds in both mathematics and mathematics pedagogy who will teach in the DC schools for at least 4 years after completing a one-year intensive Masters Teaching Program.

The proposed project will increase the number of qualified mathematics teachers in the pipeline by recruiting STEM professionals and providing a masters program that integrates mathematics content with sound pedagogy. This MfA DC poster will introduce the program, the fellows, and also share the experiences of education and mathematics faculty as we work together to build a program that builds on fellows strong mathematics background at the same time as preparing them for work in urban public schools.

28

Title: Emphasizing the Professional Nature of Teaching

NSF Noyce Award Number: 0833251

Principal Investigator: Andrea Gay Van Duzor

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Institution(s): Chicago State University

Co-PI(s): Mel Sabella, Karel Jacobs, and Rita Kosiarski

Presenter(s): Lila McKay, Chicago State University, lilalmckay@yahoo.com

POSTER ABSTRACTS

Michele Dillon, Sean Gallardo, Virginia Hayes, Natalie Robinson, John Rossi, Karel Jacobs, Rita Kosiarski, Mel Sabella, and Andrea Van Duzor

Project Discipline: Biology, Chemistry, and Physics

URLs: <http://webs.csu.edu/~noycesch/>

As Noyce Scholars at Chicago State University (CSU) and future science teachers, we are engaged in a diverse set of experiences including seminars on education and education research, conference attendance, journal clubs and science education internships that serve professional development functions. These experiences in contexts beyond the classroom, highlight the professional nature of science teaching, and introduce us to the diverse resources available for science teachers in Chicago. By partnering with institutions such as the Museum of Science and Industry, the Adler Planetarium, and the Southeast Environmental Task Force, we are able to ground ourselves in the intellectual and cultural resources of Chicago. Through these experiences we are building a network of support that will aid us in continuing to improve our craft as teachers in high needs areas. This poster will highlight how the professional nature of science teaching permeates through the CSU Noyce Program as well as present examples of the specific internships that we have been involved with as a result of the program.

29

Title: Research in Teacher Education: Methods with Promise

NSF Noyce Award Number: 0532064

Principal Investigator: David Drew

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Institution(s): Claremont Graduate University and Harvey Mudd College

Co-PI(s): Darryl Yong

Presenter(s): Lisa S. Loop, Claremont Graduate University, lisa.loop@cgu.edu

Project Discipline: Education and Mathematics

We do not know enough about teacher characteristics and strategies that lead to increased student performance, and therefore, the teacher education approaches that best develop these traits and skills in new and practicing teachers. Debates about the validity of various research methods abound. In this poster, researchers contend that by electronically capturing the quantifiable observational data collected by teacher education programs regarding student teacher performance and learning, critical research performed in context can significantly contribute to the field.

Additionally, by utilizing state and national competency rubrics along with rich statistical longitudinal data and clearly defined methods, we can begin to unravel what teacher characteristics and strategies best support increased student learning along with the most successful concomitant teacher education approaches. Researchers will present a self-study of the Claremont Graduate University Teacher Education Internship Program to model the potential of contextualized statistical analysis that provide evidence of factors that contribute to teacher retention and success.

The study will show that 1) teacher efficacy and retention are closely coupled variables; 2) teacher observations can be quantified through rubrics tied to common teaching standards; and 3) these quantitative performance data could revolutionize the study of teacher education.

30

Title: Robert Noyce Mathematics Scholars Program for Teachers (MSPT)
 NSF Noyce Award Number: 0630339
 Principal Investigator: Bettye Clark
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 Institution(s): Clark Atlanta University, Atlanta Public Schools, Fulton County Schools
 PIs and Co-PI(s): Bettye Clark, Clark Atlanta University, PI
 John D. King, Clark Atlanta University, Co-PI
 Alexander Fluellen, Clark Atlanta University, Co-PI
 Presenter(s): John D. King, Clark Atlanta University, jking1@cau.edu
 Project Discipline: Mathematics
 URLs: <http://www.robertnoycemspt.cau.edu>

The Clark Atlanta University NSF Robert Noyce Mathematics Scholars Program for Teachers (MSPT) is a 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 minority, 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 teachers in collaboration with the partnering schools. The project is guided by an advisory board charged to assist in the assessment of the effectiveness of the MAT program in recruiting and preparing teachers for high need school districts.

This poster presentation addresses the mission of the Project, various aspects of the recruitment process (including the application, brochure, flyers, and “Meet and Greet” sessions), the MAT program of study and the list of Scholars in the program.

31

Title: Hosting a Regional Conference
 NSF Noyce Award Number: 0733711
 Principal Investigator: Lienne Medford
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 Institution(s): Clemson University
 Co-PI(s): Barbara Speziale
 Presenter(s): Lienne Medford, Clemson, lienne@clemson.edu
 Carol Lund, Clemson University, clund@clemson.edu
 Joni Smith, Clemson University, jbsmith27@bellsouth.net
 Project Discipline: Middle School Math & Science

This poster will provide information about the March 2009 mini-regional Noyce conference held in Greenville, SC for Noyce programs in North Carolina, South Carolina, and Georgia.

32

Title: Noyce Scholars enrolled in CSUTeach

NSF Noyce Award Number: 0934842

Principal Investigator: Joanne E. Goodell

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Institution(s): Cleveland State University

Co-PI(s): Debbie K. Jackson, Miron Kaufman, and Gregory Lupton

Presenter(s): Debbie K. Jackson, Cleveland State University, d.jackson1@csuohio.edu

Project Discipline: Teacher Education, Mathematics, Science

URLs: <http://www.csuohio.edu/cehs/departments/te/noyce.html>

In 2005, concern over the declining position of the United States in technological enterprises prompted the National Academy of Sciences and National Academy of Engineering to commission the report "Rising Above the Gathering Storm" (Committee on Prospering in the Global Economy of the 21st Century: An Agenda for American Science and Technology, 2007). In this report, a teacher preparation program at the University of Texas at Austin (UTeach) was cited as one that should be scaled up across the nation to address the declining population of high school mathematics and science teachers.

Cleveland State University (CSU) is now one of 20 universities replicating this program and will accept its first students in August 2010. The Noyce scholars will all be enrolled in the CSUTeach program. In this poster, we will describe the components of the new CSUTeach mathematics and science teacher preparation programs, explain the processes of approval obtained by three colleges within the university and the state, and share our Noyce Scholars recruiting process.

33

Title: Robert Noyce Teacher Academy at the College of Staten Island (CUNY)

NSF Noyce Award Number: 0934533

Principal Investigator: Jane Coffee

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Institution(s): College of Staten Island (CUNY)

Co-PI(s): Susan Sullivan and Irina Lyublinskaya

Presenter(s): Jane Coffee, College of Staten Island, Jane.Coffee@csi.cuny.edu

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Project Discipline: Math, Biology, Chemistry, Education

URLs: www.csi.cuny.edu/teacheracademy

Year one of the Robert Noyce Teacher Academy at the College of Staten Island (CSI) focused on recruitment of 8 Scholars who must be biology, chemistry, or mathematics majors and require a maximum of 3 years to complete their major and the 24 credits of education courses required by New York State for initial certification. Specific goals are 5 students who require a maximum of 2 years and 3 students who require 3 years to complete all requirements. Recruitment tools for Scholars include:

- a website, www.csi.cuny.edu/noyce, that describes the Noyce Scholarship, Host School Assignments, requirements for eligibility, and includes application forms;

- A direct mailing to a targeted list of CSI students majoring in biology, chemistry, or mathematics; have a minimum gpa of 3.0; have completed the required premajor courses; have at least 60 college credits;
- Recommendations from the coordinator of the Teaching Scholars program in the CSI Discovery Institute;
- Presentation at the meeting of New York City Alliance for Minority Participation in STEM;
- Presentations at CSI Open Houses on November 15, 2009 and April 18, 2010;
- Invitations to attend the 4th Annual Teacher Education Honors Academy Conference;
- A direct mailing to recipients on NSF STEAM scholarships at CSI who are biology, chemistry or mathematics majors;
- The transformation of the CUNY Teacher Academy into the Teacher Education Honors Academy (TEHA) in September 2009. TEHA provides an administrative and advisement structure that will include Noyce Scholars;
- Students admitted to TEHA in 2009-2010 as freshmen and sophomores are potential candidates for Noyce scholarships in 2010-2011; and
- Large billboards on the Brooklyn-Queens Expressway and the Goethals Bridge that include the NSF logo, the TEHA logo, and contact information.

Although no candidates for Noyce scholarships will be accepted until grades are available for the current spring 2010 semester, it is anticipated that at least 6 of the allocated openings will be filled as a result of the recruiting efforts.

34

Title: Attracting Liberal Arts STEM Students to Teaching

NSF Noyce Award Number: 0934793

Principal Investigator: Danuta Bukatko

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Institution(s): College of the Holy Cross

Co-PI(s): Beverley Bell, Daniel Bitran, Catherine Roberts, and Janine Shertzer

Presenter(s): Danuta Bukatko, Beverley Bell, College of the Holy Cross, dbukatko@holycross.edu

Project Discipline: Biology, Chemistry, Mathematics, Physics

URLs: <http://academics.holycross.edu/education/noyce>

The goal of this project is to increase substantially the number of Holy Cross undergraduates who enter the teaching profession in STEM disciplines, including students from underrepresented groups.

This project consists of five elements: (1) aggressive marketing of the Holy Cross Teacher Education Program (TEP) and the Noyce Scholarship Program to first- and second-year students; (2) new opportunities for first- and second-year STEM majors to serve as paid tutors and mentors for local inner-city public and private school students learning concepts in mathematics and science; (3) restructuring of the practicum requirement in the Holy Cross TEP to remove scheduling barriers that uniquely affect STEM majors interested in teaching; (4) enhanced support and instruction specific to teaching science and mathematics for STEM majors enrolled in our TEP; and (5) implementation of induction and mentoring activities to support new STEM teachers once they begin their post-graduate teaching responsibilities.

POSTER ABSTRACTS

This poster reports on the successes and challenges the project team has encountered in implementing the first two goals. A summary of campus-wide publicity efforts for the program will be provided. In addition, the implementation of a Noyce tutoring program to entice highly qualified first- and second-year STEM students to teaching will be described. Data on changes in students' attitudes toward the teaching profession will be presented.

35

Title: Recruitment & Preparation of STEM Teachers at William and Mary
NSF Noyce Award Number: 0833330
Principal Investigator: Paul Heideman
Email: kdgoff@email.wm.edu
Institution(s): College of William and Mary
Co-PI(s): Juanita Jo Matkins, Margaret Mason, and Heather MacDonald
Presenter(s): Kevin Goff, The College of William & Mary, kdgoff@email.wm.edu
Project Discipline: Science and Mathematics
URLs: <http://www.wm.edu/as/sciencemathed>

The College of William and Mary (W&M) is in year two of a Phase I Program to produce 40 new science and mathematics teachers. Issues faced by W&M include recruitment of prospective teachers, effective interaction of faculty in the science and mathematics departments with faculty in the School of Education, and efficient methods to prepare post-baccalaureate students for teaching. While W&M enrolls excellent science and mathematics students, with 40-50% entering PhD, MD, or similar programs and another 30% earning at least a master's degree, few of these strong students in STEM disciplines have chosen to pursue high school teaching careers. Faculty in the science and mathematics departments are focused intensively on undergraduate teaching and research, most with little or no connections to the School of Education. Too few of these faculty understand and promote careers in high school STEM teaching to their advisees.

Our Noyce Program is addressing these issues by: (a) creating and deepening new collaborations among STEM departments and the School of Education; (b) developing more aggressive recruiting to attract strong and diverse students who have not been considering a teaching career; (c) providing Noyce stipends to cover tuition and fees; (d) creating special course offerings in science and mathematics related to teaching and learning, especially in high needs schools, (e) offering summer internship opportunities in research, curriculum development, and professional growth for Noyce scholars; (f) developing extensive follow-up mentoring and support for graduates, and (g) implementing a comprehensive evaluation schedule for our program.

36

Title: Dowling College Robert Noyce Scholarship Program Phase II
NSF Noyce Award Number: 0934814
Principal Investigator: Lori Zaikowski
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Institution(s): Dowling College
Co-PI(s): Kevin McDonnell and Daniel Ness
Presenter(s): Kevin McDonnell, Dowling College, mcdonnek@dowling.edu
Project Discipline: Biology, Chemistry, Earth Science, Mathematics
URLs: <http://www.dowling.edu/noyce/>

A shortage of science and mathematics teachers exists statewide in New York, and retention of teachers in high-need schools is low. To address this need, the Robert Noyce Scholarship Phase II Program at Dowling College provides funding for 6 juniors and seniors and 12 career-changers to obtain mathematics and/or science teacher certifications and additional professional development. Every Scholar is paired with a PI 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 4-session Noyce Seminar course, seminars, 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 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 mentor high school students conducting research. New initiatives in our 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 also host 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 2010 Symposium on April 26 was attended by approximately 200 high school students and teachers. Initial feedback from teachers has been very positive.

37

Title: Career Change Pathways into Teaching

NSF Noyce Award Number: 0934809

Principal Investigator: Sheila R. Vaidya

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Institution(s): Drexel University

Co-PI(s): Donald McEachron and Patricia Russell

Presenter(s): Sheila R. Vaidya, Drexel University, vaidyasr@drexel.edu

Project Discipline: Mathematics and Science Education

URLs: <http://mobile.goodwin.drexel.edu/Noyce/>

High quality classroom teaching results in a high level of student learning. This is one truth in educational research that we come upon in the research that is based on statistical as well as observational data (National Commission on Mathematics and Science, 2007). This poster will present the recruitment, retention strategies and target groups used to recruit Noyce scholars who are career changers. The current focus on their preparation and professional development will be presented, as they prepare to teach high need students.

38

Title: ECU Robert Noyce Teacher Scholarship Program

NSF Noyce Award Number: 0934030

Principal Investigator: Robert Ferdinand

Email: rferdand@ecok.edu

Institution(s): East Central University

Co-PI(s): John Bedford, Linda Braddy (former), Heather Hannah, and Janet Wansick

Presenter(s): Robert Ferdinand, East Central University, rferdand@ecok.edu

POSTER ABSTRACTS

Project Discipline: Mathematics

URLs: <http://cs6.ecok.edu/~rferd/noyce/home.pdf>

The Phase-I Robert Noyce Teacher Scholarship Program conducted by East Central University (ECU) and seven local high-need K-12 school districts (Ada, Allen, Byng, Latta, Sulphur, Seminole, Vanoss) will selectively recruit Noyce scholars from ECU students with strong academic background in mathematics. Noyce scholars will be selected in their sophomore year based on academic merit, with consideration given to financial need, diversity and physical disability, and will enter the program at the beginning of their junior year. Upon completing a mathematics (secondary teacher certification option) degree, they will teach secondary level (grades 7-12) mathematics for two years in one of the collaborating high-need schools, for each year of scholarship money received. Pre- and in-service Noyce teacher scholars will be provided with several support mechanisms, based on effective evidence-based strategies.

39

Title: GEMS: Changing the Educational Paradigm at a Hispanic-Serving Institution in South Florida

NSF Noyce Award Number: 0833300

Principal Investigator: Julian Edward

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Institution(s): Florida International University

Co-PI(s): Eric Brewe, Laird Kramer, Florentin Maurasse, and Phillipe Rukimbira

Presenter(s): Julian Edward, FIU, edwardj@fiu.edu

Laird Kramer, FIU, kramerl@fiu.edu

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Project Discipline: Math, Physics, Chemistry, Earth Sciences

URLs: <http://casgroup.fiu.edu/fiulearn/index.php>

We will present results from the second year of the GEMS (Get Educators in Mathematics and Science) project at Florida International University (FIU), a public, research-intensive Hispanic-serving institution in Miami. GEMS recruits top students in Chemistry, Earth Sciences, Mathematics, and Physics courses and provides new pathways into science and mathematics teaching. Discipline-based teacher preparation programs, explicit recruitment of discipline majors into teaching careers, reform of introductory science and mathematics courses through the Learning Assistant model, and an underlying framework that includes students from all backgrounds are foundational aspects of the program. Initial results will be provided, including program and curricular designs, as well as insights from the Learning Assistants and Noyce Scholars.

40

Title: Learning To Teach for Equity in Science and Math

NSF Noyce Award Number: 0934702

Principal Investigator: Joseph A. Travis

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Co-PI(s): D. Ellen M. Granger, Sherry A. Southerland, Kathleen Clark, and Victor D. Sampson

Presenter(s): Shelli Warburton, Florida State University, slw07f@fsu.edu

Kathleen Clark, Florida State University, kclark@fsu.edu
 Project Discipline: Science; Mathematics
 URLs: <http://fsu-teach.fsu.edu/noyce/>

Florida State University's (FSU) Noyce program is housed within the FSU-Teach program. FSU-Teach is modeled after UTeach at the U of Texas at Austin and designed to meet the need for qualified and skilled mathematics and science teaching professionals in secondary classrooms. This is done by actively recruiting students with deep content knowledge, providing them a coherent set of experiential and classroom based methods courses, and supporting them after graduation to facilitate retention in the profession. FSU-Teach represents a very different approach to mathematics and science teaching—one in which students concurrently build both deep content knowledge and pedagogical knowledge and skills, as called for by AAAS, NRC, and NCTM. While FSU-Teach addresses learning to teach in high-needs settings, the Noyce program emphasizes a particular focus in this regard—to best prepare recipients for successful work in similar settings after graduation. Toward that end, Noyce students are assigned experienced teachers conversant with working in high-needs settings as mentors.

These mentors are responsible for: (1) ensuring that teacher candidates get field work placements that allow them to experience teaching science or mathematics to low income students, English language learners, and/or students of color; ensuring that candidates make sense of these experiences (instead of reinforcing possible stereotypes) and learn what practices are most useful for various populations of learners; (2) serving as a community in which needs of diverse learners and efforts toward instructional congruence and equitable teaching practices are placed in the forefront; and (3) maintaining a community that includes program graduates through their first (and most difficult) year of teaching.

Although we are in our first year, a major hurdle is attracting applicants. Mass communication advertising the scholarships is insufficient to attract adequate numbers of applications. It is necessary to make a list of all qualified students in our program and contacting those students personally to invite them to participate. We intend to simultaneously contact parents of potential applicants with a letter about the program and the service component expectations. In addition, we anticipate that holding information sessions after invitations are sent out, but before applications are due, will help gain scholarship applicants. We plan to follow this sequence of events for the next year of funding.

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Title: Partner- Scholar- Intern-SHIP: A SMART Idea!
 NSF Noyce Award Number: 0833265
 Principal Investigator: Jim LoBue
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 Institution(s): Georgia Southern University
 Co-PI(s): Michelle Cawthorn, Joy Darley, Marlynn Griffin, and Brian Koehler
 Presenter(s): Joy W. Darley, Georgia Southern University, jdarley@georgiasouthern.edu
 Project Discipline: STEM
 URLs: <http://cost.georgiasouthern.edu/smartscholarship/>

How do we, as mathematics and science faculty, identify high quality, serious, professional NOYCE teacher candidates? The answer was found in the partnership between the Pre-Professional Block (PPB) and internships, ultimately resulting in scholarships for STEM majors. The Pre-Professional Block is a series of courses in the College

of Education (COE) at Georgia Southern University offering instruction in educational foundations and professional behavior in the context of a public school field experience involving public schools that are partners with the College of Education. The PPB is required for admission to the Teacher Education Program for students seeking a Bachelor of Science in Education degree. While PPB is not required in the normal degree of study for mathematics and science majors, we require potential NOYCE Scholars or interns to complete one PPB course and the 50-hour practicum. Internships are offered at local schools and educational facilities to provide opportunities for our interns to work directly with students in grades 6-12, the grades in which they will eventually be certified to teach. The combination of internship and PPB experience provides three broad benefits: first and foremost, our interns gain real-life teaching experience; secondly, the local educational community receives quality free assistance from highly-qualified math and science majors; and finally, our committee benefits from feedback on these students in order to make better-informed decisions about a candidate's professionalism and dedication to a career in the teaching profession.

42

Title: GSU - I MAST

NSF Noyce Award Number: 0934795

Principal Investigator: Gwen Benson

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Institution(s): Georgia State University

Co-PI(s): Jennifer Leavy, Kadir Demir, Miyoun Lim, Anton Puvirajah, Martin-Hansen, and Geeta Verma

Presenter(s): Lisa Martin-Hansen, GSU, lmartinhanen@gsu.edu

Geeta Verma, GSU, gverma@gsu.edu

Project Discipline: Science

URLs: <http://msit.gsu.edu/IMAST.htm>

The Phase I project, Impacting Metro Atlanta Science Teaching (I-MAST), is a collaborative effort involving the College of Education and the College of Arts and Sciences at Georgia State University, Georgia Institute of Technology, and four high-needs school districts including Atlanta Public Schools, Cobb County School District, DeKalb County School System, Gwinnett County Public Schools) in the Metro Atlanta area. This effort seeks to address the critical needs for high school science teachers by increasing the preparation of the number of high quality science teachers who are committed to teaching in metro Atlanta high-need school districts. I-MAST Robert Noyce Scholarships will be awarded to stem students and professionals interested in pursuing secondary science teacher certification program at Georgia State.

43

Title: Robert Noyce: Urban Mathematics Educator Program

NSF Noyce Award Number: 0434094

Principal Investigator: Christine D. Thomas

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Institution(s): Georgia State University

Co-PI(s): Pier A. Junor Clarke, Draga Vidakovic, and Janice Fourniller

Presenter(s): Rabia Shahbaz, Meadow Creek High School, Gwinnett County Public Schools, Rabia677@gmail.com

Angelle Whittington, Peach County High School, Awhittington1@yahoo.com

Ariel S. McIntyre, Maynard Holbrook Jackson High School, ariellsmith@gmail.com

Project Discipline: Mathematics
 URLs: education.gsu.edu/UMEP/index.html

The Robert Noyce Urban Mathematics Educator Program (UMEP) is positioned to place 37 secondary mathematics teachers in high need schools over the duration of the project. As a result, we will attain 92.5% of our goal for placing scholars in high need schools. Currently, we have placed 27 students in secondary mathematics teaching in our partner school districts and have 10 students in the UMEP pipeline. UMEP has an active Professional Learning Community (PLC) composed of the scholars, the UMEP leadership team, secondary mathematics teachers including mentor teachers, and school administrators. This component has been in place since the inception of the program and serves to support the scholars through their third year of teaching. We are now in the initial stages of using Second Life as a virtual learning environment for engaging in situated contexts designed to support best practices for teaching mathematics in high need schools. Within Second Life, Noyce Scholar teachers convene as a community of scholars to examine a broad range of classroom situations. The purpose of the online learning community is to foster longevity of highly-qualified mathematics teacher in high need schools, specifically our UMEP Scholars.

44

Title: The Robert Noyce Scholarship Program for Mathematics
 NSF Noyce Award Number: 0934766
 Principal Investigator: Blidi Stemn
 Email: catbss@hofstra.edu
 Institution(s): Hofstra University
 Co-PI(s): Behailu Mammo
 Presenter(s): Blidi Stemn and Behailu Mammo
 Project Discipline: Mathematics

This poster session will provide an overview of the Noyce Scholarship Program for Mathematics Teaching at Hofstra University. The program, established on January 1, 2010, focuses on recruiting and supporting junior and senior undergraduate mathematics teacher candidates. Some of the key features of this program is deepening Scholars' pedagogical content knowledge, engaging them in reflective practices including observing one another teach, observing effective teachers from diverse background teach via videoconference, and having them present their action research. The poster session will highlight the strategies used in recruiting students and the challenges encountered in the process. We will also outline specific academic program(s) offered to support the Noyce Scholars, the mathematics education related activities including the content of the summer institutes, photos, and both formative and summative evaluation processes. The poster will show case each of the partner schools involved in the Noyce Scholars Program at Hofstra University.

45

Title: Science and Mathematics for All
 NSF Noyce Award Number: 0433819
 Principal Investigator: Marilyn M. Irving
 Email: mirving@howard.edu
 Institution(s): Howard University
 Co-PI(s): Leon A. Dickson, Jr.

POSTER ABSTRACTS

Presenter(s): Marilyn M. Irving mirving@howard.edu

Leon A. Dickson ldickson@howard.edu

Project Discipline: Science and Mathematics

URLs: <http://www.howard.edu/schooleducation/Scholarships/index.html>

Howard University's Noyce Scholarship Program currently has 15 students employed in various high need middle and high schools throughout the District of Columbia and Prince George's County in Maryland. Two of the scholars who have completed the program have relocated to other urban areas. Four of the scholars did not fulfill the requirements of the program. Two of the scholars are completing course work and one scholar will be employed in the school system in Fall 2010. Four prospective scholars will enroll in the program in Fall 2010.

The poster will highlight Howard University's Noyce Scholars taking charge in the classroom. It will show them teaching in their respective schools, working with their students to perform various science or mathematics activities. Noyce Scholars work with diverse groups of students, including those with various skill levels and from different countries and backgrounds. The poster will present a general overview of the difference that Howard University's Noyce Scholars are making in the classroom.

46

Title: Illinois State University Robert Noyce Scholarship

NSF Noyce Award Number: 0833322

Principal Investigator: William Hunter

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Institution(s): Illinois State University; Chicago Public Schools

Co-PI(s): Elisa Palmer, Robert Lee, and Nerida Ellerton

Presenter(s): Sara McCubbins, Illinois State University, CeMaST, samccub@ilstu.edu

David Herbst, Illinois State University, Noyce Scholar, dcherbs@ilstu.edu

Project Discipline: Math and Science

URLs: <http://www.teachereducation.ilstu.edu/noycescholarship/index.shtml>

Illinois State University (ISU) and Chicago Public Schools will cooperatively recruit, train, employ and induct 52 new math, science and technology teachers for the school system. ISU partners include the Department of Chemistry, Biological Sciences, Mathematics, and Physics; the College of Education, the Center for Mathematics Science and Technology. They are joined by the Little Village School Partnership of Chicago, and the City Colleges of Chicago. This program will significantly increase the number of preK-12 teachers by recruiting and fostering new STEM teacher candidates, and financing their attendance for up to two years in existing high quality NCATE-accredited certification programs for teacher preparation in the largest teacher preparation institution in Illinois. This project will make particular efforts to recruit and support under-represented and minority populations into the teaching professions.

47

Title: IUPUI Teach Science Noyce Summer Internships

NSF Noyce Award Number: 0733788

Principal Investigator: Kathleen A. Marrs

Email: kmarrs@iupui.edu
 Institution(s): Indiana Univ. Purdue Univ. Indianapolis (IUPUI)
 Co-PI(s): Kim Nguyen, Dwight Schuster
 Presenter(s): Kathleen A. Marrs, IUPUI, kmarrs@iupui.edu
 Kim Nguyen, IUPUI, knguyen@iupui.edu
 Project Discipline: Science (Biology, Chem, Physics, Earth Science)
 URLs: <http://www.iupui.edu/ucase/scholarships/teachscience/internship.html>
<http://www.iupui.edu/ucase/scholarships/teachscience/>

IUPUI currently directs two Robert Noyce Teacher Scholarship Programs for both graduate students (Noyce Urban Educators) and undergraduate students (Noyce Teach Science). The collective aim of our programs is to increase the quality, quantity, and diversity of STEM secondary teachers in the urban classrooms of Indianapolis school districts and across Indiana.

To enhance the results of the Noyce scholarship program for undergraduates, we have just begun the Summer Internship program for freshmen and sophomores to introduce our talented science majors to early experiences in STEM education, and as a new strategy to help us overcome the two biggest challenges related to the STEM teacher pipeline issues at IUPUI.

Challenges are: (1) Insufficient numbers of STEM undergraduate majors pursuing interests in STEM teaching, even with the knowledge of the Scholarship as a way to allow them to complete the last 2 years of their education; and (2) Disappointingly low numbers of minority students represented in the STEM fields who apply for either of our Noyce Programs.

Eight interns were selected in spring 2010, half of whom are under-represented minority students. Internship partners include:

- The Children's Museum of Indianapolis, the largest children's museum in the world, with interns placed at The Biotechnology Learning Center and SciencePort;
- The Diabetes Youth Foundation Camp;
- The Minority Engineering Advancement Program; and
- The Bepko Learning Center.

Service Learning is one of IUPUI's key Principles of Undergraduate Learning. A goal of the Noyce Summer Internship program is to increase experiential, service learning opportunities for our students to promote personal growth and academic achievement. A second important goal of the Noyce Summer Internship program is to increase the likelihood for successful matriculation into the secondary teacher education program that ultimately increases the pool Scholarship applicants.

48

Title: Urban Educators: Robert Noyce Scholarship for Mathematics and Science Teachers : Phase II
 NSF Noyce Award Number: 0934555
 Principal Investigator: Kim S. Nguyen
 Email: knguyen@iupui.edu
 Institution(s): Indiana Univ. Purdue Univ. Indianapolis

POSTER ABSTRACTS

Co-PI(s): Signe Kastberg, Kathleen Marrs, and Jefferey X. Watt
Presenter(s): Kim S. Nguyen, Ed.D.
Indiana Univ. Purdue Univ. Indianapolis, knguyen@iupui.edu
Project Discipline: Math Science Education
URLs: <http://www.iupui.edu/ucase/scholarships/t2t/>

The Noyce Stipend Scholars at IUPUI are enrolled in the Transition to Teaching (T2T) program that allows both STEM graduates and STEM professionals to complete the requirements and field experiences for teacher preparation in the sciences and mathematics at secondary level (grades 6-12) over the course of one calendar year. The T2T program is field-based strengthened by a co-teach model with inquiry as an instructional focus and builds on the established partnership between School of Education and high-need school districts in Marion County, including Indianapolis Public Schools. The current Noyce Program has successfully prepared 26 highly-qualified science and math teachers for the Indiana high-need classrooms.

The Noyce Scholarship Phase II has 3 objectives: (1) continue to increase the number of secondary science and mathematics teachers—10 each year or a total of 40 with an emphasis on the recruitment of individuals from ethnic minorities, (2) enhance retention of novice teachers by providing ongoing mentoring for them, and (3) initiate longitudinal research to assess the effectiveness of the program since 2006.

49

Title: Midwest Noyce Regional Conference in 2010 and 2011
NSF Noyce Award Number: 1002638
Principal Investigator: Kim S. Nguyen
Email: ucase@iupui.edu
Institution(s): Indiana University
Co-PI(s): Kathleen Marrs, Signe Kastberg, and John Staver
Presenter(s): Kim S. Nguyen, IUPUI, knguyen@iupui.edu
Project Discipline: STEM Education
URLs: <http://www.noyceconferenceindy.org/>

Conference Site: University Place Conference Center and Hotel, Indianapolis, IN
Conference Dates: April 8-9, 2010 and April 7-8, 2011

Conference Themes: 2010 - Preparing Excellent STEM Teachers for Urban and Rural High-Need Schools ; and 2011 - Developing Noyce Scholars for Excellent STEM Teaching in Urban and Rural High-Need Classrooms.

The conference will provide a network of peer support to Noyce Teacher Scholarship project personnel and Scholars to improve the program effectiveness throughout fifteen states in the Midwest. Each year, the conferences at IUPUI bring together 150 Noyce Investigators, current Noyce Scholars, practicing Noyce Scholar Teachers and school district personnel, as well as project evaluation and assessment experts from 48 active Noyce projects in the Midwest. The conferences also provide Noyce Scholars a platform to elevate professional identity and to develop networks of professional support. It also offers Noyce project personnel a comfortable forum for sharing best practices in program management and effective pathways to attract, prepare and develop excellent STEM teacher scholars in the Midwest.

The impact of the conferences can be seen in the improvement of Noyce program effectiveness and sustaining peer networks of support within Scholars and among project personnel in the Midwest. Creating a sustainable network of peers among Noyce Scholars during their professional growth as beginning STEM teachers in high-need classrooms at urban and rural schools may be an important factor in their overall career satisfaction and thus enhance their desire to stay in STEM teaching profession.

50

Title: K-State TEACH Program

NSF Noyce Award Number: 0934905

Principal Investigator: Lawrence C. Scharmann

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Institution(s): Kansas State University

Co-PI(s): Christopher T. Culbertson, Carolyn J. Ferguson, Iris Moreno Totten, and N. Sanjay Rebello

Presenter(s): Christopher T. Culbertson, Department of Chemistry, Kansas State University, culbert@ksu.edu

Project Discipline: Biology, Chemistry, Geology and Physics

URLs: <http://www.coe.k-state.edu/grants/teach/>

The K-State Robert Noyce Scholarship Program is a Phase I program 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 will (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 will be identified and recruited through 3 existing partnerships: the Professional Development School Partnership, the Center for Intercultural and Multilingual Advocacy, and the Center for Rural Education and Small Schools. Within the definition of high need local educational agency, the K-State program will target schools serving 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 project is managed by a Leadership Team consisting of the Chair of Secondary Education and faculty members from each of the targeted disciplines. 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.

51

Title: Increasing Mathematics Teachers for ALL Students

NSF Noyce Award Number: 0934791

Principal Investigator: Desha Williams

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Institution(s): Kennesaw State University

Co-PI(s): Belinda Edwards, Adrian Epps, Dana Hartley, and Karen Kuhel

Presenter(s): Desha L. Williams, Kennesaw State University, dwill178@kennesaw.edu

Project Discipline: Mathematics

URLs: www.ganoycescholars.org

There is a need for all teachers to be prepared to educate all students effectively in mathematics, including those who have limited English proficiency (Thomas & Collier, 2001). However, a national study found that a minority of teacher preparation programs actually prepares mainstream teachers to teach English language learners (ELLs) (Menken, Antunez, Dilworth, & Yasin, 2001). Frequently, ELLs are placed in mathematics classrooms while still in the early stages of learning English (Abedi, Courtney, Leon, Kao, & Azzam, 2006). The rationale has been that mathematics is a universal language, however, this rationale is not valid. Mathematics in K-12 classrooms is not focused on only numbers and equations; it also requires significant literacy skills (Short & Fitzsimmons, 2007).

The Increasing Mathematics Teachers for ALL Students (IMTAS) project is a Kennesaw State and Georgia Tech collaboration designed to encourage and enable students with strong mathematical backgrounds to pursue careers in high school mathematics teaching while at the same time focusing on innovative pedagogical techniques that combine best practices with social justice, culturally relevant pedagogy, and language support for non-native speakers of English. After completing IMTAS, participants will be certified to teach secondary mathematics and have an opportunity to earn an endorsement to teach ELLs. IMTAS' goals are to:

1. Recruit and provide financial support for academically strong mathematics students committed to establishing grade 6-12 mathematics teaching careers in high needs areas;
2. Provide skills and knowledge to meet the language needs of ELLs and engage diverse students on in cognitive demanding mathematics.

The project just completed its first year with 8 students. Data collection and analysis is on-going. Data has been collected from the workshop surveys, interviews, application information, and an attitudinal survey. Further data and analysis is needed to determine if goal 2 is being accomplished.

52

Title: Math and Science Project: Teachers of Excellence (MaST Excel) Program

NSF Noyce Award Number: 0630435

Principal Investigator: Pamela S. Carswell

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Institution(s): Lake City Community College

Co-PI(s): Paula Cifuentes

Presenter(s): Pamela S. Carswell, Lake City Community College, carswellp@lakecitycc.edu

Project Discipline: Education

The Lake City Community College Math and Science Project: Teachers of Excellence (MaST Excel) is a stipend program, delivering alternative certification preparation for STEM professionals from rural, north-central Florida. The training program is offered in partnership with school districts in Baker, Columbia, Dixie, Gilchrist, and Union Counties, although students from other counties in north Florida and South Georgia will be eligible to attend. MaST Excel will recruit a diverse pool of participants, encouraging the participation of underrepresented populations.

MaST Excel combines a competency-based alternative certification model of teacher preparation with the proven, research-based pedagogy of the Lake City Community College Math and Science Teacher (MaST) Project. Alternative certification, a promising way to meet national demand for the rapid production of qualified educators, is delivered in a community college setting, using a flexible and relatively inexpensive approach. MaST Project

pedagogy integrates hands on, inquiry-based math and science skills within teaching methodology, reducing anxiety for students and grounding technical skills in “real world” activities.

MaST Excel seeks to advance knowledge regarding the fast, efficient, and effective production of K-12 math and science educators and has had 13 participants. Seven have received their Florida Professional Teaching Certificate and entered the workforce. More importantly for the residents of this rural, financially disadvantaged region, MaST Excel has increased the quantity of math and science teachers and the quality of these programs in high need schools in the region. Stipend recipients are required to teach three years in high need settings.

53

Title: Mathematics and Science Education Teacher Renewal

NSF Noyce Award Number: 0833317

Principal Investigator: Gaoyin Qian

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Institution(s): Lehman College

Co-PI(s): Serigne M. Gningue and Angela Kelly

Presenter(s): Serigne M. Gningue and Kaitlin Hanson, Lehman College

Project Discipline: Mathematics and Science

The purpose of the Noyce Scholarship program at Lehman College is to prepare 24 New York State Initially Certified science and mathematics teachers for high need inner-city middle schools (i.e., Grades 5-9) within a 4-year period (2009-2013). The first Cohort consists of 8 students from a group of culturally and linguistically diverse undergraduate mathematics and science seniors. In the first year, these Scholars (1) completed their undergraduate STEM disciplines; (2) took 3 graduate courses in educational psychology, differentiated instruction, and a newly-designed methods course of teaching mathematics, science and technology; (3) served as pre-service interns in high-need middle NYC public schools; (4) observed master mathematics or science teachers in middle and high schools; (5) co-taught groups of students as well as whole classes; and (6) attended weekly seminars that engaged them in discussions of teaching and learning issues that arose from classes they observed.

As they prepare to attend the summer internship, 8 Noyce scholars have already completed the minimum requirements and will be recommended for New York State Transitional B Teaching Certification as soon as the graduation requirements are met. Four Noyce scholars have had multiple offers for teaching positions in a very competitive environment and despite NYC's partial freeze in hiring new teachers.

In the summer internship, Noyce scholars will spend a day co-teaching summer classes before taking a methods course on teaching mathematics or science. They will also attend a 5-day seminar in August where they will take a Smartboard certification course with the Mathematics and Science Co-PIs, be trained on how to use Taskstream for lesson planning and EZ Grade Pro for keeping an electronic gradebook, and attend an ecological trip at the Botanical Garden.

The Noyce Scholarship program has been examining the effect of these internship experiences on scholars' learning of the content knowledge, epistemological beliefs about teaching and learning in science and mathematics, use of effective instructional practices, and their students' learning.

54

Title: Engineering/Science Teacher Education Scholars

NSF Noyce Award Number: 0934442

Principal Investigator(s): M. Barbara Silver-Thorn

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Institution(s): Marquette University

Co-PI(s): Kathleen Cepelka, College of Education, Marquette University

Presenter(s): M. Barbara Silver-Thorn, Marquette University, barbara.silver-thorn@marquette.edu

URLs: <http://www.marquette.edu/engineering/pages/AllYouNeed/stemcoop.html>

The Marquette Noyce Scholar Program partners 3 colleges (Education, Engineering, and Arts and Sciences) and 8 public/private, urban/suburban schools (Brown Deer High School, Dominican High School, Messmer High School, Milwaukee High School of the Arts, Rufus King High School, and South Milwaukee High School; Fritsche Middle School and South Milwaukee Middle School).

Our program is an adaptation of the cooperative education model that has successfully prepared Marquette engineers for 90 years. Through this uniquely adapted co-operative education model, a new curriculum is being developed in which intensive field experiences in education (i.e., teaching co-ops) will be integrated with classroom instruction to meet the Wisconsin state standards for STEM teacher licensure. These teaching co-ops in middle and high school settings will include extensive educational field experiences that allow students to meet teacher education standards, a unique standards-based approach to teacher education.

The program is open to all undergraduate STEM majors, increasing the potential STEM teacher pool from 20-80 science and mathematics majors to a more extensive pool of 240-310 science, mathematics and engineering majors. Engineering students can complete their engineering degree and STEM teaching certification in 5 years, dramatically reducing the 6 to 6.5 years currently required to complete all degree requirements in the traditional course/credit mode. First year activities included the development of recruitment materials, program dissemination to current and prospective undergraduates, and the recruitment of our first cohort. Curriculum development focused on coordination of service learning activities involving math and science tutoring at a local high school in our introductory education class, coordination of the first of 3 teaching co-operative experiences, and preliminary planning of our summer project-based learning experiences. Our Future STEM Teacher Seminar series was also launched, featuring a middle school mathematics teacher (and mechanical engineer), a high school physics teacher (and theater major), and a local STEM education advocate (and civil engineer).

55

Title: Physics and Math Scholarships at MTSU

NSF Noyce Award Number: 0934855

Principal Investigator: Robert Carlton

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Institution(s): Middle Tennessee State University

Co-PI(s): Ron Henderson, Mary Enderson, and Diane Miller

Presenter(s): Ron Henderson, Middle Tennessee State University, rhenders@mtsu.edu

Project Discipline: Physics and Mathematics

Among the STEM disciplines that have a deficit of qualified high school teachers, the need is greatest in Physics and Mathematics. The MTSU Physics-Mathematics Noyce Scholarship program was developed to address both of these areas in a state where the need for all STEM teachers is acute. Our program will develop a cadre of teachers who are knowledgeable and passionate about their content material at a depth that will enable them to not just instruct, but also inspire high school students toward STEM careers. At MTSU, we have developed a culture that places a high priority on STEM education. In fact, our president has articulated the goal of graduating the largest number of secondary STEM teachers in our state. The Physics and Astronomy, and Mathematics departments have worked closely to develop a curriculum that will allow students to graduate with endorsements to teach both subjects, and that works within the structure of our university's new UTeach replication program.

56

Title: The MTSU/TMSTEC NSF Master Teaching Fellows (MTF)

NSF Noyce Award Number: 0934731

Principal Investigator: Rick Vanosdall

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Institution(s): Middle Tennessee State University

Co-PI(s): Michael Chappell and Kyle Butler

Presenter(s): Rick Vanosdall, Middle Tennessee State University, vanosdal@mtsu.edu

Project Discipline: STEM Education

The Middle Tennessee State Master Teaching Fellowship Program has NSF and MTSU funding to support 14 MTFs. Each MTF will receive 1) an annual \$10,000 salary supplement (\$50,000 over five years), 2) fully funded graduate tuition for an additional 15 credits in the first 3 years of the program (\$5460 over five years), and 3) a Year one allowance of \$1500, and years 2-5 an allowance of \$2500 for institute/conference travel (\$11,500 over five years).

The Program aligns, coordinates, and integrates resources across the College of Education, College of Basic and Applied Sciences, STEM industry partners through our collaborative relationship with Mind2Marketplace and the Rutherford County Chamber of Commerce, and 6 P-12 school districts with high needs P-12 (DeKalb, Grundy, Lewis, Lawrence, Rutherford counties, and Tullahoma City) to select and support 14 master teachers' development to become Master Teaching Fellows. The project works with exemplary high school math and science teachers (our Fellows) to become practitioner-researchers, designing and completing annual cycles of classroom-based action research to inform school, district, and state policy makers regarding research-based reforms to improve STEM Education at the high school level. Additionally, each Fellow participates in the development of an individual teacher enhancement plan that utilizes data from content, pedagogy, and leadership assessments to guide the customized professional development plan. In years 3 and following, the Fellows mentor a colleague in the action research cycle, as they develop a core of practitioner-researchers improving STEM Education in their schools and districts, and strengthen the body of field-based research for improving STEM Education at the high school level.

57

Title: Noyce STEM Teachers Scholars Program

NSF Noyce Award Number: 0934886

Principal Investigator: Linda T. Coats

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POSTER ABSTRACTS

Institution(s): Mississippi State University

Co-PI(s): Burnette Hamil, Dana Franz, Tommy Stevenson, and Svein Saebo

Presenter(s): Linda T. Coats, Mississippi State University, LCoats@colled.msstate.edu

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Project Discipline: Science and Mathematics

URLs: www.Noyce.MsState.edu

The Noyce STEM Teachers Scholars program is a collaborative venture of the College of Education, the Bagley College of Engineering, and the College of Arts and Sciences at Mississippi State University. Our Phase I program has these objectives:

- To provide scholarships for juniors and seniors majoring in chemistry, biology, physics, mathematics, and engineering and who have demonstrated an interest in pursuing a dual degree (double major) in mathematics education or science education;
- To provide stipends for STEM professionals who have an interest in becoming certified secondary mathematics or science teachers for grades 7-12; and
- To provide resources and support that will contribute to student and teacher retention.
- Targeted high-need school districts are: Starkville School District, West Point School District; Oktibbeha County School District, and Noxubee County School District. The project began in September 2009; this presentation will discuss the achievements during its first nine months.

58

Title: Developing Sustainable Online Learning at Scale

Presenter(s): Albert Byers, National Science Teachers Association, abyers@nsta.org

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Institution(s): National Science Teachers Association

Project Discipline: K-12 Science Education, online e-PD

URLs: <http://learningcenter.nsta.org>

The National Science Teachers Association (NSTA) recently launched a comprehensive electronic professional development (e-PD) online portal, the NSTA Learning Center. This support site for educators and preservice teachers currently includes over 4,300 e-PD resources and opportunities available on-demand, as well as various tools designed to help educators maximize the effectiveness of using NSTA resources.

One tool, the PD Indexer or Pre/PostAssessment instrument, helps teachers identify their own areas of content strengths and weaknesses by selecting content-specific assessments. Individual NSTA resources are recommended based on assessment outcomes. When used as part of a formal district deployment, the pre/postassessment data, as well as frequency of use and percentage of completion data regarding self-directed professional development modules, inform district staff and university professors as to teacher learning. Currently NSTA has deployed the Learning Center with over 60 state or district departments of education across the country including several universities. This poster presents a detailed description of growth of the Learning Center and the data captured via this e-PD system. Early results from third party evaluation studies, such as the Houston Independent School District and results from peer-reviewed publications will be highlighted.

59

Title: TECHS-NJ: Integrating Probes and Sensors into Math

NSF Noyce Award Number: 0630412

Principal Investigator: Bruce Bukiet

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Institution(s): New Jersey Institute of Technology and Rutgers-New Jersey

Co-PI(s): Arthur Powel, Ismal Calderon, and Gayle Griffin

Presenter(s): Bruce Bukiet, New Jersey Institute of Technology, bukiet@m.njit.edu

Project Discipline: All STEM

URLs: techsnj.njit.edu

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 is to train 26 mathematics, science and engineering majors for careers as math and science teachers for the city of Newark and other high-need districts.

We have thus far recruited 12 undergraduates at NJIT and Rutgers-Newark and 1 graduate student at Rutgers-Newark. Several more students have been groomed for participation in the program and are expected to be admitted during the 2010-11 or 2011-12 academic years. To this point, 1 our scholars is now teaching while several others have completed the teacher education program and are seeking employment.

A focus during 2009-10 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 received funding from foundations to purchase equipment and materials for this purpose and also to start a program to bring these demonstrations into local schools without cost to the schools. Several TECHS-NJ scholars have worked with our GK-12 Fellows in developing presentations for a Professional Development event held at NJIT in May. We expect to grow these efforts during the 2010-11 academic year to provide more useful experiences for our scholars. Further detail concerning these efforts, is presented in this poster.

60

Title: Teaching Math and Science in an Urban Setting

NSF Noyce Award Number: 0733805

Principal Investigator: Pamela Fraser-Abder

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Institution(s): New York University

Co-PI(s): Karen King, Jalal Shatah, Joseph McDonald, and Allen Mincer

Presenter(s): Elizabeth Espinal, NYU, eme237@nyu.edu

John Frisoli, NYU, jrf310@nyu.edu

Deborah McLaughlin, NYU, dam414@nyu.edu

Brad Nakamura, NYU, bkn206@nyu.edu

Project Discipline: Biology, Chemistry and Mathematics

The New York University (NYU) Noyce Scholarship Program advertises among NYU and NYU-Poly STEM-major undergraduates to recruit them into secondary school math and science teaching. The Program prepares them for

careers as teachers in high-needs schools by providing: (1) early familiarity with effective secondary school teaching; (2) a sense of secondary school teaching as a good career path for scientists and mathematicians; and (3) accelerated preparation for full professional certification as secondary school teachers.

The Program assists with job placement in high needs secondary schools and supports early career teachers. Thus far, we have: (1) admitted 5 students to the masters program as Scholars who expect to complete their degrees and teacher certification in June 2010 and to begin teaching in high-needs middle and secondary schools in September, 4 with a 2-year teaching commitment, one with a 1-year commitment; (2) recruited 5 new students to enter the masters program in June 2010, completion expected in June 2011; (3) directed senior students to other teacher preparation programs in math and science secondary education; 4) continued to recruit NYU STEM-major undergraduates to prepare for the program in subsequent years.

In addition, 4 current Scholars helped plan a conference at NYU attended by more than 200 public school science teachers, school district personnel and University students and faculty to discuss math and science teaching in urban schools. The Scholars explored the perspectives of urban students on math and science education by holding a panel discussion with students from New York City public schools. The students described their cultural backgrounds and educational experiences and expectations. The Scholars discussed with these students their own experiences teaching diverse student populations. The discussions were videotaped and will be presented, with analysis, at the annual Noyce Conference.

61

Title: Recruit and Engage Math and Science Teachers

NSF Noyce Award Number: 0934802

Principal Investigator: Cindy Johnson-Taylor

Email: cindy.johnson-taylor@newberry.edu

Institution(s): Newberry College

Co-PI(s): Randall Key, Charles Horn, Christina McCarthy, and Renee Stubbs

Presenter(s): Cindy Johnson-Taylor, Newberry College, cindy.johnson-taylor@newberry.edu

Christina McCarthy, Newberry College, christina.mccartha@newberry.edu

Project Discipline: Math and Science Education

URLs: www.newberry.edu

Newberry College's Recruit and Engage Math And Science Teachers (RE-MAST) program, is a collaboration between the biology and chemistry, math and education departments, and 3 high need SC school districts. In year one, a Master Teacher (MT), strong in math content, has been hired to work with the RE-MAST Program. The MT uses her own classroom experiences to provide support to our teacher candidates and prospective students. She 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, organizing summer internship experiences, and serving as liaison to partner high need school districts for RE-MAST activities. Additional duties include working with education, math, and science faculty to recruit teacher mentors for the Master Mentors program and matching the Mentors with summer interns. Lastly, the MT will provide induction support to graduates in the field.

RE-MAST will recruit, prepare and mentor 26 math, biology and chemistry majors pursuing teaching in STEM content areas. In addition, we will recruit 34 freshmen and sophomore STEM majors to participate in 6-week, paid

summer internships to investigate teaching through field experiences and 2 education courses for credit. Interns will be encouraged to apply for the 26 scholarships available during their junior, senior, or 5th years. The program will actively recruit and encourage STEM career changers interested in teacher certification to apply as well.

RE-MAST has selected 12 STEM teachers from the 3 high need school districts to participate in the Master Mentors program. They will receive mentor training that will count towards professional development hours. Mentors will work with RE-MAST interns, scholarship recipients and graduates for their 2-year service obligation. The Master Mentor program promotes teaching, training, and learning by pairing RE-MAST students with mentors in their content area to help them develop their teaching skills. The poster session will provide an overview of our progress.

62

Title: Developing a Community of Scholars

NSF Noyce Award Number: 0733794

Principal Investigator: Hollylynne Lee

Email: hollylynne@ncsu.edu

Institution(s): North Carolina State University

Co-PI(s): Karen Hollebrands, Irina Kogan, and Pam Arroway

Presenter(s): Hollylynne Lee, NC State University, hollylynne@ncsu.edu

Karen Klein, Garner Magnet High School, kklein@wcpss.net

Nick Pylypiw, NC State University, njpylypi@ncsu.edu

Project Discipline: Mathematics

URLs: <http://ced.ncsu.edu/2/noyce>

We will present our efforts to develop a community of scholars who are prepared to meet the needs of students in high needs schools, and to use research-based teaching strategies in their mathematics classrooms. Strategies will be discussed as well as results from evaluation.

63

Title: Kenan Master Teaching Fellows

NSF Noyce Award Number: 0934658

Principal Investigator: Ruben Carbonell

Email: jen_annetta@ncsu.edu

Institution(s): North Carolina State University, KIETS, Kenan Fellows Program

Co-PI(s): Valerie Brown-Schild

Presenter(s): Ruben Carbonell, Kenan Institute for Engineering, Technology and Science; Biomanufacturing Training and Education Center, NC State University, ruben@ncsu.edu

Valerie Brown-Schild, Kenan Fellows Program for Curriculum and Instruction, NC State University

Project Discipline: Science, Technology, Engineering and Math

URLs: <http://www.KenanFellows.org>

The Kenan Fellows Program (KFP) for Curriculum and Leadership Development, an initiative of the Kenan Institute for Engineering, Technology and Science at North Carolina State will establish fellowships for K-12 teachers in an

eleven county region of South Central North Carolina. The five-year grant allows the Kenan Master Teaching Fellows Program (KMTF) to link experienced teachers with university, industry and community college researchers and join with local stakeholders to build a sustainable initiative. As a result, teachers will become more informed about important new scientific developments, build their leadership skills and develop curricula that support economic development sectors unique to the region, such as sustainable energy/green technologies and advanced medical technologies. During the first 2 summers of the fellowship, teachers from the South Central NC region participate in a 7-week summer institute. Two weeks are dedicated to professional and curriculum development, while the remaining weeks are dedicated to a research experience for teachers in collaboration with a university faculty or business Mentor. Fellows continue this collaboration during the academic year through developing and piloting materials and participating in KFP activities, such as fireside chats, Fellow focus groups, poster sessions, and conference presentations. During years 3-5 KMTF will engage in leadership activities in their home districts including assisting in the preparation of new teachers. High-quality instructional materials that translate STEM research into middle and high school curricula are freely distributed, with project benefits further extended through exemplary leadership and mentorship skills that Fellows bring back to their schools. Twelve KMTF were selected in April 2010 through a competitive application and interview process. They began their fellowships in June 2010.

64

Title: PRIME: Preparing Regional Increases in Mathematics Educators

NSF Noyce Award Number: 0934709

Principal Investigator: Kirsten Fleming

Email: foletta@nku.edu

Institution(s): Northern Kentucky University

Co-PI(s): Sara Eisenhardt and Gina Foletta

Presenter(s): Gina Foletta, Northern Kentucky University, Department Mathematics/Statistics, foletta@nku.edu

Project Discipline: Mathematics

URLs: <http://prime.nku.edu/>

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 collaboration between the KCM, NKU, and three school districts: Covington Independent and Newport Independent Schools in Kentucky and Cincinnati Public Schools in Ohio.

The program includes: an aggressive recruiting plan; opportunities for incoming freshmen and rising sophomores to engage in summer experiences designed to stimulate their interest in becoming secondary mathematics teachers working in high-need schools; two-year scholarships for carefully selected, academically talented students in their junior and senior years; an outstanding teacher preparation program including valuable enhancements that foster a community of learners and expose participants to contemporary literature on, and effective practices in the teaching and learning of secondary mathematics; and mentoring and coaching support for program graduates.

Our first cohort of 5 students joined in spring 2010. During the semester we provided the following enhancements for this cohort: a state conference focusing on "Implementing the New Mathematics Standards," a 5-teacher panel

discussion about “Teaching High School Mathematics in High-Need Schools,” and a session presenting the impact of KY Senate Bill 1 and the New Mathematics Standards on Teaching High School Mathematics. We will have our first group of incoming freshmen and rising sophomores during summer 2010. These students will work as undergraduate researchers under the mentorship of faculty members or will assist with summer camps sponsored by NKU’s Center for Integrative Natural Sciences and Mathematics.

65

Title: OU-Noyce Teaching Scholars
 NSF Noyce Award Number: 0934724
 Principal Investigator: Mark Olson
 Email: reed@oakland.edu
 Institution(s): Oakland University
 Co-PI(s): Christine Abbott and Jerry Grossman
 Presenter(s): Holly Reed, Oakland University, reed@oakland.edu
 Project Discipline: Mathematics, Physics, Chemistry

The Oakland University-Noyce Teaching Scholars Program is a 13-month Masters of Arts In Teaching program leading to initial secondary certification in mathematics, physics and chemistry. An initial cohort of 8 Teaching Scholars began coursework in May, 2010.

The program aims to actively engage the question: What does it mean to prepare secondary mathematics and science teachers for high needs schools? We present our conceptualization of how teacher education for high needs schools places explicit emphases on building connections between students, content and teachers. Further, we engage directly how diversity of experience is a strength to be built upon across program courses and experiences and into work with pupils. We discuss the intent of our program to be greater than a series of courses and field experiences through efforts to improve communication across program instructors with learning goals for everyone involved in the program: teaching scholars, course instructors, school-based mentors and university-based mentors.

66

Title: Building a Noyce Scholar’s Learning Community
 NSF Noyce Award Number: 0833295
 Principal Investigator: Ralph Martin
 Email: cote@ohio.edu
 Institution(s): Ohio University / SEOCEMS
 Co-PI(s): Jeff Connor
 Presenter(s): Ralph Martin, Ohio University/SEOCEMS, martin@ohio.edu
 Jeff Connor, Ohio University/SEOCEMS, connorj@ohio.edu
 Al Cote, Ohio University/SEOCEMS, cote@ohio.edu
 Project Discipline: Mathematics and Science
 URLs: www.seocems.org

SEOCEMS Noyce Scholar's program is developing a Noyce Learning Community as a means of support for Scholars during their induction years. The Learning Community is supported through a variety of systems: on-line learning

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network, an annual conference, and scholar mentors during Noyce teaching requirements and classroom observations. SEOCEMS Noyce Learning Community has just piloted its first electronic Noyce Learning Network. Our poster session will discuss the preliminary findings of this pilot study. We will discuss the successes and pitfalls encountered along the way.

67

Title: Mathematics Studio Fellowship Program

NSF Noyce Award Number: 0934953

Principal Investigator: Tom Dick

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Institution(s): Oregon State University & Teachers Development Group

Co-PI(s): Linda Foreman and Rebekah Elliott

Presenter(s): Linda Foreman, Teachers Development Group, linda.foreman@teachersdg.org

Melinda Knapp, Bend-LaPine School District, mknapp@bend.k12.or.us

Project Discipline: Mathematics

URLs: www.teachersdg.org

The Mathematics Studio Fellowship Program (MSFP) partners are the Teachers Development Group, Oregon State, and 4 high needs districts. The Studio model builds on work piloted during the NSF-funded Oregon Mathematics Leadership Institute (OMLI) Partnership. OMLI research found that the degree to which schools implemented specific school-based practices was a significant positive predictor of student performance beyond what could be explained by socioeconomic factors. MSFP embeds and expands on those practices and provides rich context for developing Master Teaching Fellows (MTFs) and Teaching Fellows (TFs) through: two 5-year professional development cycles for 8 MTFs in 2 cohorts, and one 5-year M.S. degree/professional development program for 4 TFs.

The following Logic Model summarizes the project's theory of action: ANNUAL PROJECT ACTIVITIES (Summer Math Institutes in partner districts, 5 Math Studio Cycles in MTF classrooms, and Online Math Collaboratives to support between-cycle applications of studio learning lead to the following OUTCOMES OF PROJECT ACTIVITIES:

- Increased Professional Development Capacity
- Increased Specialized Content Knowledge
- Established Studio Classrooms
- Professional Learning Communities
- Improved Teaching for Learning
- Increased Mathematical Discourse
- Improved Conceptual Understanding & Computational Fluency

PROJECT IMPACTS are: (1) sustainable Infrastructure for Professional Learning, (2) Increased Student Achievement, and (3) Decreased Achievement Gap.

MSFP applies elements of Japanese lesson study in that the Studio teacher and about a dozen colleagues ("Residents") collaboratively plan, observe/enact, and analyze a lesson during each Studio cycle. However, unlike

lesson study, Studio work focuses on public work with students as a way to rehearse and refine evidence-based, mathematically productive, teaching routines. Hence, work during the 5 annual Studio cycles in a Studio classroom emphasizes the “polishing” of specific teaching practices vs. polishing an entire lesson. Each Studio day always ends with generalizations regarding participants’ individual and collective between-cycle work (supported through Online Math Collaboratives). The Studio classroom encourages and nurtures a culture of professional inquiry, reflection, collaboration, and action related to effective teaching.

68

Title: Highlights

NSF Noyce Award Number: 0531956

Principal Investigator: Isabel Ball

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Institution(s): Our Lady of the Lake University

Co-PI(s): Peggy Carnahan

Presenter(s): Isabel Ball, Our Lady of the Lake University, iball@ollusa.edu

Project Discipline: Science and Mathematics

The Noyce Project at Our Lady of the Lake University (OLLU) provides funding to other-career graduate students who seek secondary teaching certificates in science and mathematics. The certification program that serves them is OLLU’s Master of Education with Teacher Certification program. This is a weekend-evening program designed to be completed in 2 years. In the second year students do their internship with a one-year Probationary Teaching Certificate as employees of a school district. In addition to courses in professional Education, the program includes courses in the student’s discipline and pedagogy in that discipline. It permits them to continue their career work until they begin their internship year.

Throughout the program, as well as after completion, Noyce students are invited to participate in professional development workshops and presentations which are regularly offered by the Center for Science and Mathematics Education. These activities not only provide new classroom activities and strategies, but present updates on State policies, curriculum alignment, certification in laboratory safety, and demonstrations of new laboratory equipment, mathematics materials, etc. The students also prize the networking sessions, affording them the opportunity to learn from and enjoy the enthusiasm of the more experienced teachers. The poster display will provide information about some of these workshops and presentations and student comments about the program. As of Fall 2009 there are 22 certified teachers, 11 scheduled for certification by August 2011, and 7 have officially discontinued.

69

Title: Pacific STEM Teaching Pathways

NSF Noyce Award Number: 0934599

Principal Investigator: Kevin Carr

Email: kcarr@pacificu.edu

Institution(s): Pacific University-Oregon

Co-PI(s): Juliet Brosing

Presenter(s): Kevin Carr

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Project Discipline: Physics, Chemistry, Biology, Mathematics

URLs: <http://www.pacificu.edu/coe/stem/index.cfm>

Pacific STEM Teaching Pathways (PSTP) is an innovative partnership project including the Pacific University Division of Natural Sciences, College of Education and a consortium of 5 local high-needs K-12 school districts, working to increase the number of exemplary K-12 STEM teachers equipped to serve in these schools. PSTP provides academically inspiring, financially manageable, and seamlessly supported pathways into K-12 STEM teaching careers, targeting 2 candidate pools: a) Pacific University undergraduate STEM majors and b) career-changing STEM professionals. PSTP, a comprehensive STEM teacher education recruitment, training, and induction program, will provide up to 2 years of Scholarship support for 35 exemplary STEM teaching candidates, obligating recipients to 2 years of service in a high needs school district for each year of support received. PSTP will develop and disseminate over the 5-year project period a transformative model for attracting, recruiting, equipping, and inducting successful and talented STEM majors and professionals into K-12 teaching careers, impacting the education of diverse students in Oregon's high needs schools and communities.

Founded in 1849 as a place to provide schooling to children who had been orphaned along the Oregon Trail, Pacific University lies at a geographic nexus connecting rural, isolated coastal Oregon, the agricultural Willamette Valley, and the high-tech industrial center of the east Portland suburbs. The deep relationships built over many decades of service to local school districts have become part of the Pacific University culture. PSTP seeks to further serve our region by providing a newly energized pool of K-12 STEM teachers equipped for success.

70

Title: Collaborative for Excellence in Teacher Preparation

NSF Noyce Award Number: 0531960

Principal Investigator: N. Bharathan

Email: bharathn@iup.edu

Institution(s): Pennsylvania State System of Higher Education

Co-PI(s): Peter Garland

Presenter(s): N. Bharathan, Indiana University of Pennsylvania, bharathn@iup.edu

Project Discipline: Biology/Biochemistry

URLs: www.thepafoundation.org/scholarships/

www.iup.edu/natsciandmath

Science and math teacher preparation programs of the PA State System of Higher Education (PASSHE) have been undergoing systemic reform since August 2000 under the aegis of the NSF-supported Collaborative for Excellence in Teacher Preparation in PA (CETP-PA). As CETP-PA pursues its original mission of science and math education reform and support to pre-service and in-service teachers, its progress has it poised to reach out to STEM students and professionals who desire an education degree and/or teaching certification. CETP-PA works closely with the PASSHE System Office and the PA State System of Higher Education Foundation to provide scholarships and stipends to STEM majors and professionals who seek teaching certification at a State System University. PASSHE is committed to addressing the critical shortage of science and math teachers and the Noyce scholarships are an extension of the services provided by the Math and Science Centers established in the CETP-PA project.

These Centers are a focus of the 12 CETP-PA universities. The State Foundation monitors teacher progress in meeting their obligation to teach in a high need school/district. It contacts the awardee and the awardee's

employer, distributing surveys to be completed, certified and returned to the Foundation. Project activities involve the Scholarship committee working to create the application forms, establish specific criteria and procedures for awards; prepare term sheets, information releases and loan documents for awardees; and prepare public information (brochures, webpage information).

Recruitment is done by distribution of program information, including scholarship/stipend applications, to University Math & Science Centers, faculty advisors, admission officers, distance learning administrators, and to CareerLink Centers. Since spring 2006 the Noyce Program in PA has given over \$123, 000 in scholarships (12) and stipends (5). The College of Education at Indiana U of PA is evaluating the cohort of students receiving awards. The Evaluation and Monitoring phase should be completed 5-6 years from project start, BUT could continue for at least 8 years for the last cohort of awardees.

71

Title: SJU Noyce Scholar and Intern Program

NSF Noyce Award Number: 0934713

Principal Investigator: Sandra Fillebrown

Email: sfillebr@sju.edu

Institution(s): Saint Joseph's University

Co-PI(s): Karen Snetselaar, Michael Clapper, Tetyana Berezovski, and Michael McCann

Presenter(s): Sandra Fillebrown, Saint Joseph's University, sfillebr@sju.edu

Project Discipline: Mathematics and Sciences

URLs: www.sju.edu/5yrmsed

Saint Joseph's University has several 5-year programs in mathematics and the natural sciences leading to a BS in math, biology, chemistry or physics and an MS in Education (or MS in Secondary Mathematics Education). Students are accepted into the program beginning in their senior year and may apply for Noyce Scholarships to help cover tuition in their senior and fifth years. Noyce Scholars participate in the Urban Teacher Collaborative, a group of practicing teachers in the School District of Philadelphia who meet once a month to discuss issues of urban education. Noyce Scholars also take a summer course in the summer of their fifth year on interdisciplinary math and science. We have 1 Noyce Scholar who has graduated, 2 current Noyce Scholars and several who have expressed interest for next year.

To attract students to the 5-year programs and the Noyce program, we also have several 6-week summer internships available for freshmen and sophomores majoring in math or one of the natural sciences. Students are placed with local summer programs in Philadelphia and work in math and science classrooms; this summer we have 7 interns participating in 2 programs.

72

Title: Making Progress: Recruiting Undergraduate Scholars

NSF Noyce Award Number: 0434150

Principal Investigator: Kathy S. Williams/Kathleen Fisher

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POSTER ABSTRACTS

Institution(s): San Diego State University

Co-PI(s): Meredith Houle and Alexander Chizhik

Presenter(s): Kathy S. Williams, Department of Biology, San Diego State University, kwilliams@sciences.sdsu.edu

Project Discipline: Biology/Teacher Education

To help deal with the staggering need of science and mathematics teachers in the San Diego region, a total of 30 students have been accepted into the San Diego State U (SDSU) Noyce Scholar program over the past 5 years. Twelve are biology majors, 1 chemistry, 15 mathematics, and 2 physics majors. Of that number, 19 have gone on to teach in middle and high school math and science programs. Eight biology students have entered our Noyce program since Spring 2009.

Based on questionnaire data, Scholars reported that the Noyce Scholarships provided time to learn about various assessment and instructional techniques, plan intricate lessons, and experiment with new pedagogies. Likewise, they valued connections with experts in their field and professional development workshops that would focus on content-specific instructional strategies as well as facilitating collaborative learning in their classrooms.

An evaluation indicated that recruiting undergraduates into the Noyce program was very challenging until recently. In the first 4 years, despite various strategies, only 2 of the scholars were supported by the program as juniors or seniors. However, since Spring 2009, we have accepted 6 undergraduates, and all have applied to or are now in the credential program. We were able to attract prospective teachers by taking making presentations to large numbers of students in select biology courses and working with academic advisors. At SDSU, our students first complete a discipline major and then enter into a one-year post-baccalaureate teaching-credential program. Continuing and augmenting this strategy, we seek to improve our program by engaging and recruiting even more potential science and mathematics teachers early and throughout their undergraduate programs, thereby developing their motivation to become teachers.

73

Title: Seattle Pacific University Noyce Scholarship Program

NSF Noyce Award Number: 0630460

Principal Investigator: John Lindberg

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Institution(s): Seattle Pacific University

Co-PI(s): Robbin O'Leary, Frank Kline, Greg Phelan, and Elaine Woo

Presenter(s): Robbin O'Leary, Seattle Pacific University, roleary@spu.edu

Hannah F. Azevedo, Seattle Pacific University, hannah@spu.edu

Project Discipline: Mathematics, Physics, Education, Chemistry, Science

URLs: www.spu.edu/noycescholarship

The Noyce Scholarship program at Seattle Pacific University (SPU) was originally designed to provide \$10,000 scholarships to 5 junior or senior undergraduate STEM teaching candidates pursuing certification; and 3 \$10,000 stipends to STEM professionals holding a degree in the sciences and pursuing a graduate degree in teaching mathematics, science, or physics curriculum. In this last year, the committee shifted the number of scholarships awarded to graduate students in response to the great number of qualified STEM career-changers who had been accepted either to SPU's Alternate Route to Certification or Master of Arts in Teaching program, and were now applying for Noyce scholarships.

The committee selected the first cohort of Scholars in fall 2006 and a total of 39 scholars have been supported in the past 4 years, 11 of whom have graduated and are currently teaching in high needs school districts. In 2008, Noyce Co-PI Greg Phelan was awarded a supplemental grant to create a national Noyce Scholars Facebook group and Wiki, thereby establishing a virtual peer networks using a platform on which the students were already actively engaged. Mentor teachers were recruited to monitor the site, provide resources and answer questions. The site has 142 members consisting mostly of Noyce scholars from around the nation.

One of the most significant contributions that the Noyce Scholarship program has made at SPU was laying the foundation for the Planning Grant received in 2009. This grant was utilized to further the collaboration between departments necessary to develop a new Master of Teaching Mathematics and Science degree program. Our poster will give an overview of the structure of our program, the obstacles faced and the best practices that have made it a successful foundation for increased preparation of qualified STEM teachers.

74

Title: SMTRI Noyce Project

NSF Noyce Award Number: 0934503

Principal Investigator: Carlos Ayala

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Institution(s): Sonoma State University

Co-PI(s): Ben Ford and Mary Gendernalik-Cooper

Presenter(s): Carlos Ayala, Sonoma State, carlos.ayala@sonoma.edu

Project Discipline: STEM

URLs: <http://www.sonoma.edu/education/grants/noyce/index.shtml>

The project is based in the Science and Mathematics Teacher Recruitment and Retention Initiative (SMTRI) program at Sonoma State University. SMTRI project brings together science and mathematics education stakeholders in the northern San Francisco Bay Area—the Sonoma State University School of Education and School of Science and Technology, Beginning Teacher Support and Assessment (BTSA) programs, and several local high-need school districts. This project capitalizes on the strengths, opportunities and existing connections between the university and the K-12 schools and on the existing supports for science and mathematics teacher recruitment. SMTRI addresses the need for highly qualified science and mathematics teachers by proactive recruiting and supporting of pre-teacher candidates at the undergraduate and reentry levels and then by retaining these new mathematics and science teachers in our local area underserved school districts.

The program will provide (a) scholarships to undergraduates who are part of mathematics undergraduate teacher program and/or science students intent on becoming teachers; (b) provide scholarships to math or science teacher candidates in their credential programs and (c) provide Noyce Scholars internship opportunities to work with master teachers in high-need K-12 schools. The NSF Noyce funds will be used to supplement the funds that we currently use for complimentary endeavors. This project is important because it brings together many players who work on these endeavors individually into a collaborative of like minded mathematics and science education advocates.

75

Title: REMAST: Reactions From the First Cohort

NSF Noyce Award Number: 0733691

Principal Investigator: Sharon Vestal

Email: Matt.Miller@sdstate.edu

Institution(s): South Dakota State University

Co-PI(s): Kenneth Emo, Jerome Krueger, Larry Browning, and Matthew Miller

Presenter(s): Matthew Miller, South Dakota State University, Matt.Miller@sdstate.edu

Project Discipline: Biology, Chemistry, Mathematics, Physics

URLs: <http://teach.sdstate.edu/users/vestals/REMAST.htm>

Rural Enhancement of Mathematics and Science Teachers (REMAST) at South Dakota State University is designed to increase the number and enhance the abilities of STEM teachers during preparation and first years of service. The first cohort of Robert Noyce Scholars are completing their first year as science teachers. These teachers have maintained contact with the REMAST program through a mentoring program and initial data has been collected regarding their experiences. REMAST Scholars have been asked to reflect on their first year of teaching and comment on the issues which have made the first year exciting (and difficult). This presentation has drawn on these reflections and will highlight the described issues from this first cohort. Additionally, the analysis of this feedback will be discussed and how this data will determine the direction of the REMAST program during the coming year.

76

Title: SEL Partnership

NSF Noyce Award Number: 6683845

Principal Investigator: Joseph Meynsse, SUBR

Email: Lshaw8944@aol.com

Institution(s): Southern University Baton Rouge/ East Baton Rouge Parish School System, Louisiana State University

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 and A&M College, Lshaw8944@aol.com

Project Discipline: STEM Education

This Phase I project is a partnership among Southern University Baton Rouge (SU-BR), the lead institution, the East Baton Rouge Parish School System (EBRPSS) and Louisiana State University (LSU) [SEL Partnership]. Other organizations that contribute to the project include 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 come from SU-BR, but the program is open to minority students from LSU in cases where this will 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. Because students who choose teaching late in their undergraduate programs may not be able to fit all certification requirements into the time remaining before graduation, alternative certification programs step in where there is a need.

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Title: SEU/ACC Noyce Year Two: Recruitment Details

NSF Noyce Award Number: 0833123

Principal Investigator: Steven Fletcher

Email: stevenf@stedwards.edu

Institution(s): St. Edward's University / Austin Community College

Co-PI(s): Alice Sessions, Cindy Naples, and William Quinn

Presenter(s): Steven Fletcher, St. Edward's University

Alice Sessions, Austin Community College

Cindy Naples, St. Edward's University

Project Discipline: Science / Mathematics

URLs: www.stedwards.edu/noyce

We will highlight a unique recruitment strategy for introducing students to the Noyce Scholarship Program at an urban, catholic university in the south central part of the US that is also a master's granting and Hispanic serving institution that serves over 5000 graduate and undergraduate students. The Noyce program is a partnership between this institution and a neighboring community college as well as a local urban school district to recruit and train 18 undergraduates for careers in math or science teaching over the next 4 years.

Recruitment is targeted to high performing underrepresented and first generation math and science students enrolled at the partner community college and host university. A unique recruitment feature centers on a summer science camp that brings together faculty and students from the local school district, community college, and university for a week of environmental science instruction. Camp goals are to (a) recruit future Noyce scholars from the undergraduate science and mathematics degree seeking students who attend; (b) introduce both current and potential Noyce scholars to teaching science and mathematics to high school students; (c) build content knowledge for all participants; and (d) provide an opportunity for the university to collaborate with a wide range of partners.

Evaluation data indicate that the students chose the camp for the field-based nature of the science instruction and curiosity about the Noyce program in general. The stipend was also an important factor. Students enjoyed the interactive nature of the camp (100% strongly agree), felt that the camp gave them more insight into teaching as a career (82% agreed or strongly agreed) and that the overnight camp was important (100%) strongly agree. When asked if the camp helped them think about teaching as a career, the results were more mixed with 36% choosing neutral, 24% agreeing, and 36% strongly agreeing.

A 5-year longitudinal study has been designed to track the participant's beliefs and practices from recruitment through the induction period to have a better sense of early career science teacher development. The preliminary results from this work will also be shared at the session.

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Title: SUNY-Oneonta Noyce Scholars
NSF Noyce Award Number: 0934857
Principal Investigator: Paul Bischoff
Email: bischojp@oneonta.edu
Institution(s): State University of New York-College at Oneonta
Co-PI(s): Jim Ebert, Todd Ellis, Paul French, and John Schaumloffel
Presenter(s): Paul Bischoff, SUNY-Oneonta, bischojp@oneonta.edu
Project Discipline: Biology, Earth Science, Chemistry and Physics
URLs: <http://www.oneonta.edu/academics/noyce/>

The SUNY College at Oneonta Noyce Program identifies talented high school students and first year undergraduates majoring in the sciences and moves them towards majoring in science education. At SUNY-Oneonta, we provide teacher licensure in four sciences: Biology, Chemistry, Earth Science and Physics, and are working towards increasing the numbers of graduates from each of these programs. Recruitment and general organization have been our major efforts thus far. In terms of recruitment, we have: Mailed invitation letters to 300 top caliber accepted students; attended both fall "Open House Saturdays" to get the word out to potential students and scholars; participated in spring "Open House Saturday" for students who are coming to this college; and have spoken in the freshman undergraduate chemistry and physics courses in an effort to attract freshman science majors already in-house. Materials produced include a brochure and webpage, invitation letters and an online application, and acceptance letters. Our recruitment efforts have paid off as we have about 25 applicants. We are making acceptances daily. Our general organization efforts have been focused on coordinating the Noyce scholarship program within our Financial Aid Director to assure a smooth scholarship award process. We begin offering our first cohort courses in fall 2010.

79

Title: The Texas LIMIT - Expanding the Boundaries
NSF Noyce Award Number: 0934878
Principal Investigator: Kimberly M. Childs
Email: kchilds@sfasu.edu
Institution(s): Stephen F. Austin State University
Co-PI(s): Deborah A. Pace and Lesa L. Beverly
Presenter(s): Kimberly M. Childs, Stephen F. Austin State University, kchilds@sfasu.edu
Lesla L. Beverly, Stephen F. Austin State University, beverlyll@sfasu.edu
Project Discipline: Mathematics

The primary goal of the Texas LIMIT is to produce teacher leaders in mathematics within high needs districts across East Texas. To accomplish this goal, master teaching fellows will:

- participate in leadership training programs of coherent and rigorous content that provide in-depth study in mathematics and educational leadership;
- provide leadership across elementary, middle and secondary grade levels within their respective districts through mentoring of inservice teachers ;
- provide leadership within respective districts through delivery of quality professional development;

- function within districts as secondary content specialists in geometry, calculus, and probability/statistics and elementary/middle content specialists in algebra, geometry and probability/statistics, facilitating high school and college readiness within districts; and
- provide instruction in content methodology and mentoring within the Stephen F. Austin State U teacher preparation programs for preservice teachers within STEM disciplines.

80

Title: Recruitment Activities Engage Students and Faculty

NSF Noyce Award Number: 0934777

Principal Investigator: Gregory Phelan

Email: kerrifreese@yahoo.com

Institution(s): SUNY Cortland

Co-PI(s): Rena Janke, Larry Klotz, Mary Gfeller, and Anne Burns Thomas

Presenter(s): Mary Gfeller, SUNY Cortland, mary.gfeller@cortland.edu

Kerri Freese, SUNY Cortland, kerri.freese@cortland.edu

URLs: www.cortland.edu/noyce

The SUNY Cortland Noyce Project proposes to award 50 scholarships for secondary school teacher candidates in STEM areas. The phase one grant began its second year in June 2010. During year one of the grant, 11 applications were received and 5 scholarships awarded (4 undergraduate and 1 graduate) across 4 math and science departments. A Noyce project coordinator was hired to manage the day-to-day activities of the grant. For year two, 29 applications were received, a 164% increase over year one, and 14 scholarships were awarded (9 undergraduate and 5 graduate) across 5 math and science departments. Recruitment and promotion activities engaged students, STEM faculty, and campus leaders. Activities included information sessions, campus-wide emails, flyers, press releases, and the development of a SUNY Cortland Noyce Project website. Targeted communications to faculty and campus leaders included emails, meetings, and newsletter announcements asking to pinpoint and encourage exceptional STEM students and graduates to apply for the Noyce Scholarship. An inaugural reception honoring scholars drew 45 people including SUNY Cortland's President, Provost, the Dean of the School of Arts and Sciences, along with faculty Chairs and others who wrote scholar letters of recommendation. An overview of the scholarship and its benefits was given and the round-two application deadline was announced.

81

Title: Robert Noyce Scholarship Program

NSF Noyce Award Number: 0532022

Principal Investigator: Joseph Straight

Email: joseph.straight@fredonia.edu

Institution(s): SUNY Fredonia

Co-PI(s): Michael Jabot, Holly Lawson, and Jamar Pickreign

Presenter(s): Joseph Straight, SUNY Fredonia, joseph.straight@fredonia.edu

Project Discipline: Mathematics, Science

URLs: www.fredonia.edu/org/noyce

The goal of our program is to increase the number of students who enter and complete our rigorous programs leading to initial certification in Biology/Adolescence Education (grades 7-12), Chemistry/Adolescence Education,

Earth Science/Adolescence Education, Physics/Adolescence Education, Mathematics/Adolescence Education, and Mathematics/Middle Childhood Education (grades 5-9), and who then teach in high-need schools. Specifically, we aim to support 14 scholarships annually, at \$7500 per scholarship, over the 4-year period covering the 2006-2007 through 2009-2010 academic years. The overall objectives of the SUNY Fredonia Noyce Scholarship Program include:

- Increase the number of students graduating with initial certification in STEM fields by 50%;
- Increase the number of STEM certification graduates who teach in high-need schools;
- Promote greater diversity among our STEM certification majors;
- Provide more systematic mentoring for our STEM certification majors;
- Provide better support and professional development for our STEM certification graduates during their induction period, i.e., during the critical first few years of their teaching careers; and
- Use results from the program to advance knowledge of best practices for recruiting, developing, supporting, and retaining teachers for high-need schools.

Recently, SUNY Fredonia began a new Master of Arts in Teaching Science program, and 3 students in this program were supported as Noyce Scholars this past year. Four Noyce Scholars have completed the MAT program.

82

Title: Syracuse University Noyce Scholars Program

NSF Noyce Award Number: 0934841

Principal Investigator: John W. Tillotson

Email: jwtillot@syr.edu

Institution(s): Syracuse University

Co-PI(s): Joanna Masingila, Jason Wiles, Eileen Strempe, and Sharon Dotger

Presenter(s): John W. Tillotson, Syracuse University, jwtillot@syr.edu

Project Discipline: 7-12 Science and Mathematics

URLs: <http://noyce.syr.edu>

The Syracuse University (SU) Noyce Scholars Program seeks to: 1) recruit highly-qualified STEM majors and STEM career professionals into science and mathematics teaching; 2) prepare them through participation in SU's NCATE-accredited science and mathematics teacher education programs leading to certification in grades 7-12; 3) offer a robust mentoring and professional development program for graduates of these programs teaching in high-needs school districts; 4) provide stipends for an early field internship experience to recruit first- and second-year undergraduate students into science and mathematics teaching; and 5) evaluate the Program in terms of its success in recruiting, preparing and retaining science and mathematics teachers. We plan to offer 1-year stipends of \$20,000 to STEM professionals with degrees in science, mathematics or a related field and scholarships of \$10,000 per year for up to 3 years to undergraduate STEM majors who enroll in the SU science or mathematics teacher certification program. These awards will be based on academic merit and financial need. Recipients must teach for 2 years in a high-needs school district for each year of funding, preferably in the extensive network of high-needs schools that have established partnerships with SU.

We anticipate offering 6-8 stipends/scholarships per year in both science and mathematics increasing our capacity by approximately 50% in each of these programs. Following graduation, these highly-qualified teachers will

participate in a sustained mentoring and professional development program during the early induction stage of their career provided by SU STEM and STEM Education faculty. The mentoring program will utilize online communication technology to support professional networking among Noyce Scholars and SU faculty, provide summer professional development workshops focused on the central tasks of learning to teach and lesson study, and offer a series of 1-day workshops throughout the academic year that provide opportunities for professional development in STEM content and pedagogy.

83

Title: TAMU aggieTEACH: Robert Noyce Scholarship Program
 NSF Noyce Award Number: 0934887
 Principal Investigator: Timothy P. Scott
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 Institution(s): Texas A&M University
 Co-PI(s): Carolyn M. Schroder
 Presenter(s): Timothy P. Scott, Texas A&M University, tim@science.tamu.edu
 Adrienne Bentz, Texas A&M University, abentz@science.tamu.edu
 Kenric Davies, Texas A&M University, kdavies2010@neo.tamu.edu
 Project Discipline: Science and Mathematics

The goal of the TAMU aggieTEACH Program is to provide Scholarships to approximately 30 students—junior/senior level undergraduate students majoring in science, technology, engineering, and mathematics (STEM) pursuing teaching careers in Grades 8-12. For the first year, 10 Scholarships have been awarded—8 Scholars are female and 2 are male; 5 are mathematics majors and 5 are science majors (biology and physics). Applications have just been collected as we move forward into the second year of the project. Scholarship recipients should be selected by the conference in July and will be reported. The aggieTEACH Program continues to grow each year producing greater numbers of highly-qualified mathematics and science 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 Noyce Scholarship Program. We will demonstrate that our aggieTEACH Noyce Scholars rank high among their peers and that our recruitment efforts in increasing the number of STEM majors pursuing teaching has been highly successful. We will also showcase program activities that our Scholars have participated in and will spotlight program collaboration among districts and other funded programs of the Center for Mathematics and Science Education linked to the aggieTEACH Noyce Scholarship Program.

84

Title: Texas Tech Noyce Scholars: Building Self-Determination
 NSF Noyce Award Number: 0833326
 Principal Investigator: Jerry Dwyer
 Email: lawrence.schovanec@ttu.edu
 Institution(s): Texas Tech University
 Co-PI(s): Dominick Casadonte, Jeffrey Lee, Lawrence Schovanec, and Tara Stevens

POSTER ABSTRACTS

Presenter(s): Lawrence Schovanec

Project Discipline: Mathematics and Chemistry

URLs: <http://www.webpages.ttu.edu/jedwyer/Noyce.htm>

The Texas Tech Noyce Scholars (TTNS) program was established in 2009 to recruit upper level undergraduate students with declared majors in Mathematics and Chemistry for a 2-year training program to prepare them as secondary teachers, and was extended in 2010 to include majors from other sciences. In an effort to attract high quality, diverse mathematics and science undergraduate majors to the teaching profession, the project also provides summer stipends to students in the first 2 years of their academic programs who will mentor and tutor public school students enrolled in Texas Tech summer mathematics programs. To encourage teacher retention in high needs schools, the program purposely selected students with self-determination, which is defined as high levels of autonomy, competence, and relatedness that are associated with motivation and well-being. The TTNS evaluation plan will assess whether the self-determined Noyce graduates will be less likely to leave the profession and if their public school students will enjoy academic benefits. Baseline data suggest that more organized recruitment in the second year was associated with higher levels of student competence. Preliminary qualitative results indicate that participants who have completed 1 year of the project have had opportunities for the development of relatedness and autonomy, but require additional support to improve competence beyond skills offered through coursework. Future project recommendations are summarized.

85

Title: Towson University Robert Noyce Teacher Scholarship

NSF Noyce Award Number: 0934751

Principal Investigator: David A. Vanko

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Institution(s): Towson University

Co-PI(s): Katherine J. Denniston, Todd Kenreich, Donald A. Thomas, and Jane L. Wolfson

Presenter(s): David Vanko, dvanko@towson.edu

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Project Discipline: STEM secondary education

URLs: <http://www.towson.edu/FCSM/Noyce/>

Towson University's (TU) Noyce program awards scholarships to juniors and seniors majoring in STEM fields who intend to become teachers, and awards graduate stipends for STEM professionals who are seeking certification to teach in the STEM disciplines via the Master of Arts in Teaching program. The program will feature special recruitment activities, summer activities, induction activities and a monitoring/evaluation program. Our program is 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 (that includes Baltimore City Community College and the Baltimore City Public School System), 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.

Five undergraduates and 2 MAT students were awarded scholarships or stipends in our first year. For the second (upcoming) year, intensive recruiting efforts have focused on TU STEM majors, particularly STEM-secondary

education students, and the 5 or 6 community colleges that traditionally supply almost half of TU's undergraduate population via the transfer pathway.

In this first year, we focused on building our Scholar community through monthly events, social networking, and one-on-one interactions initiated by our Noyce program administrator. An added and unanticipated feature was an invitation to serve as the anchor institution in the Noyce STAR (Science Teachers as Researchers) national-expansion NSF grant. In Maryland, STAR partners Scholars with researchers at the NASA-Goddard Space Flight Center for summer internships. Scholars may come from Noyce programs at Towson, UMBC, Howard U or American U. Added to the research experience are workshops led by a TU science education professor and a local master teacher who has experienced the teacher-as-researcher model.

86

Title: Supporting Noyce Scholars Through PDS Partnerships

NSF Noyce Award Number: 0934835

Principal Investigator: Paul Kelleher

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Co-PI(s): Nancy Mills, Jeffrey Nordine, and Patricia Norman

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URLs: www.trinity.edu/noyce

The teacher education program at Trinity University (TU) is designed to support students in attainment of a Bachelor's degree in a content field (e.g., physics, history) and the completion of a year-long internship that culminates in the MAT degree. Central to the success of our program are the long-term relationships we have built with local schools that serve as a professional development school (PDS). To foster these relationships, TU has 1 faculty liaison who spends a great deal of time at each PDS supporting MAT interns, holding practicum courses for undergraduates, and participating in school-based professional development for teachers. TU faculty are regarded as de facto members of the PDS faculty; likewise, mentor teachers from PDS campuses are recognized as clinical faculty members at TU. Our PDS relationships have facilitated the recruitment and preparation of Noyce Scholars, and as our Noyce program has matured, we see a productive feedback loop that continues to improve both our teacher education program and math/science instruction at our PDS partners.

Our PDS relationships have yielded results for our teacher education candidates and for the PDS campuses. At the undergraduate level, the practicum course is a valuable recruitment tool for Scholars, because it enables STEM majors and to "try on teaching" without making a major commitment. At our high school PDS, practicum students tutor high school students who have struggled on the statewide math exam. While designed for undergraduates, this course has enabled potential Noyce-supported career changers to explore teaching as well. At the graduate level, MAT interns are placed at our elementary, middle, or high school PDS campus. Because they share

experiences, interns are able to reflect on school-wide issues together and provide substantive contributions to campus goal-setting discussions among teachers.

Noyce scholars benefit from directly reflecting on how math & science instruction is related to other fields and to broader school-wide issues. After graduating with their MAT, many Noyce scholars have been placed in PDS schools. These scholars have been supported by induction programs at TU, such as our summer curriculum writing workshops. Further, our first classes of Noyce Scholars are beginning to serve as mentor teachers, forming a productive feedback loop that exemplifies the symbiotic relationship that a PDS can promote.

87

Title: Trinity University Mathematics/Science Partnership

NSF Noyce Award Number: 0934836

Principal Investigator: Paul Kelleher

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Co-PI(s): Pat Norman, Jeff Nordine, and David Ribble

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Project Discipline: Education

The initial Noyce program at Trinity University (TU) enabled us to secure additional resources from a local foundation to further support teacher candidates. We launched a professional development initiative at 2 schools in a large urban district in south central Texas. Bowman Elementary is a new partner. Faculty are relatively young. The school has a 40 percent mobility rate and slowly improving state achievement scores. Henley Academy is a long-time partner with an experienced faculty and strong state achievement scores. In addition, Henley is a Professional Development School. TU candidates complete year-long internships there.

TU developed a formal partnership with the urban district to provide job-embedded, on-site, sustained professional development in math and science at the two schools. Last fall, TU's math and science educators began working with 3rd-5th grade teachers to improve student learning and strengthen teacher practice by providing individualized support in classrooms and through facilitated group learning, including weekly/monthly planning sessions with grade-level teams.

In this pilot year, we administered teacher efficacy and student attitudinal surveys, held focus group interviews with teachers and administrators, gathered state achievement data, and designed and piloted new performance-based assessments to supplement state achievement data. We continue to collect student-level data. Participating teachers report feeling more comfortable teaching math and science and have identified changes they have made in their practice. TU teacher candidates, including a Noyce Scholar and pilot "Career Changer" benefited from support received from faculty. Finally, our experience at the 2 school sites differed markedly in terms of teacher buy-in and administrative support. These differences led 1 school to decide to end their participation after the pilot year.

In year two, our focus will be on aligning instruction and assessment. We will develop alternative assessments, beyond state standardized tests, to inform teachers about what their students know and can do, while engaging students in meaningful, substantive work. We seek to provide assessment opportunities that allow students to do math and science, not to test concepts.

88

Title: Tuskegee University Noyce Scholars Program

NSF Noyce Award Number: 0934545

Principal Investigator: Walter Hill

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Institution(s): Tuskegee University

Co-PI(s): Carlton Morris, Mohammed Qazi, and Dennis Likens

Presenter(s): Carlton E. Morris, Tuskegee University, cmorris@tuskegee.edu

Walter Hill, Tuskegee University, hillwa@tuskegee.edu

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Project Discipline: Education

The Tuskegee University Noyce Team is a partnership of university STEM and Education faculty, staff and administrators; and school district teachers, administrators and staff. The goal of the program is to place well trained science and mathematics teachers in rural school systems in the Alabama Black Belt. Mutually beneficial activities by Tuskegee University and the targeted school systems in seven counties include pre-clinical observations and teaching internships; school system recruitment and placement of new teachers; university support of schools through training and providing of resources; joint school, community and university support networks for new teachers; and university recruitment of students from school systems.

The Tuskegee University curricula include general core competencies, STEM major courses and education professional courses. Required proficiencies include meeting State of Alabama Standards, NCATE Standards, NCTM Standards and NRC Standards. In the first year of the project presentations about the Tuskegee University Noyce Program were made to university STEM classes and specific meetings of students. Information was posted in the science, education and common-use buildings on campus and publicized on the campus web site. Five students were selected as Noyce Scholars (four in science and one in mathematics). All of the students selected are pursuing dual degrees (e.g, mathematics and mathematics education or biology and science education).

89

Title: Robert Noyce Scholars Program at UALR

NSF Noyce Award Number: 0434082

Principal Investigator: Sally Robison

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Institution(s): University of Arkansas at Little Rock

Co-PI(s): Alois Adams, Marion Douglas, and Thomas McMillan

Presenter(s): Sally A. Robison and Mrs. Mandy Porter

Project Discipline: Mathematics & Science

URLs: www.ualr.edu/noyce

The University of Arkansas at Little Rock (UALR) Noyce Program is designed to promote highly qualified math and science majors into the field of secondary teaching within Arkansas. Program goals are : (1) to increase the number of science and mathematics graduates earning a license to teach at the secondary level (7-12), (2) to maintain a record of and increase the number of licensed science and mathematics graduates accepting positions in high-need schools, (3) to provide support for professionals with science and mathematics degrees to accomplish a career change into teaching, and (4) to sustain this program after NSF funding.

Each grant year is designed to fund undergraduate scholarships and graduate stipends with the intention of funding 4 undergraduate scholarships and one graduate stipend per semester. Undergraduates receive \$7500 their first year (or typically their Junior year) and receive \$8500 in their second year (or Senior year) in the form of a scholarship. Graduate recipients receive \$10,000 for a single year disseminated over two semesters. The scholarships and stipends pay the student's tuition each semester with the remainder partitioned out to the student's account for books, materials, or other educational expenses with half of the funds dispersed each semester. For each year the candidate receives funding, they commit to two years of teaching in a state identified high needs school district. NSF funds have sponsored a total of 15 undergraduates and 12 graduate students at UALR with the last call for applications being held for the 2010 summer and fall semesters.

90

Title: Robert Noyce Scholarship Program

NSF Noyce Award Number: 0733841

Principal Investigator: Gay Stewart

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Institution(s): University of Arkansas, Fayetteville

Co-PI(s): Michael Wavering, Department of Curriculum and Instruction

Deborah Korth, Department of Mathematics

Po-Hao (Adam) Huang, Department of Mechanical Engineering

Dennis Brewer, Graduate School

Presenter(s): Michael Wavering, University of Arkansas, Fayetteville, wavering@uark.edu

Project Discipline: Physics, Mathematics, Engineering, and Education

URLs: <http://physinfo.uark.edu/Noyce>

The U of Arkansas Noyce Scholarship Program just graduated its second cohort (11 members). They are currently looking for positions as secondary science and mathematics teachers in high needs schools. The first cohort (12 members, 2009 graduates) have just finished their first year of employment. All were employed in secondary science or mathematics classrooms. The first year has been challenging with some reporting more success and satisfaction with their work than others. Two are seeking new positions in high needs districts. One was named Rural Teacher of the Year through the Troops to Teachers Program for the state of Missouri.

The third cohort begins their MAT (Master of Arts in Teaching) program in July 2010. There will be 16: 6 life/earth science licensure, 3 physical/earth science licensure, and 7 mathematics licensure. Besides graduate course work, Scholars will attend an enrichment workshop taught by one of the coPIs on new technologies that teachers can use to inspire future students in STEM as well as have the opportunity to interact with previous Scholars who are invited to campus to share their experiences as first year teachers in high needs schools.

After completing their undergraduate degree in mathematics, science, or engineering, students who receive Noyce Scholarships start the MAT program in the second half of summer taking 6 graduate hours of coursework, including a science or mathematics methods course and a general course about the law, ethics, psychology, and philosophy of teaching in secondary schools. In the fall and spring semesters, Scholars complete 27 hours of graduate level coursework and complete internships in 3 different schools across grade levels 7-12 with at least one placement in a high needs school. In these internships the Scholars plan lessons, provide instruction, and evaluate student achievement. Scholars also plan and execute an action research project which focuses on instruction and the effects on their students. Two Noyce scholars focused on issues impacting high needs students last year for these projects.

91

Title: Cal Teach Berkeley Robert Noyce Teacher Scholarship Program

NSF Noyce Award Number: 0934951

Principal Investigator: Deborah Nolan

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Institution(s): University of California, Berkeley

Co-PI(s): George Johnson and Xiaoxia Newton

Presenter(s): Nicole Nunes, UC Berkeley, nunesn@berkeley.edu

Project Discipline: Math and Science

URLs: <http://calteach.berkeley.edu/>

The Cal Teach Berkeley Robert Noyce Teacher Scholarship Program began in Summer 2009. The program works in partnership with the Cal Teach program to encourage students to pursue careers in math and science teaching. The program provides (1) paid summer internships for undergraduates to work in science education at the Berkeley Center for Cosmological Physics, Chabot Space and Science Center, Emery STEM Academy, and Lawrence Hall of Science; and (2) scholarships for seniors who commit to teaching.

92

Title: University of California Riverside, Robert Noyce Scholarship Program

NSF Noyce Award Number: 0934297

Principal Investigator: Pamela S. Clute

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Institution(s): University of California, Riverside

Co-PI(s): Maria C. Simani and Bradley Hyman

Presenter(s): Maria C. Simani, University of California, Riverside, maria.simani@ucr.edu

Project Discipline: Mathematics and Science

The College of Natural and Agricultural Sciences, Graduate School of Education and ALPHA Center for Academic Partnerships at UC Riverside, (UCR) have formed an alliance with the fast-growing, low-performing, Moreno Valley Unified School District (MVUSD), to prepare exceptional science and mathematics undergraduate majors for secondary school teaching. The UCR Noyce Program builds on the unique pre-credential curricular and training infrastructure established at UCR by the Science Mathematics Initiative, the CA Mathematics and Science Teacher

Initiative, and the ALPHA Center, to create a pathway of teacher preparation and development services continuing towards the UCR Credential Program and the Induction phase.

Noyce Scholars commit to science and mathematics student-teaching positions in MVUSD. Over the 5-year funding period, the UCR Noyce Program will award approximately 70 one-year scholarships. Eligible junior and senior students are awarded scholarships for more than 1 year, producing approximately 43 new teachers credentialed and qualified to teach MVUSD's secondary mathematics or science classrooms.

Strong recruitment strategies are embedded into the selection process so as to attract students from underserved populations who have demonstrated content expertise, success in early education coursework and field experiences, and have a documented history of commitment to teaching by participating in established UCR teacher-preparation and outreach programs.

Progress of the Noyce Scholars will be followed longitudinally to determine the impact of the program on performance as a teacher, commitment to serving the district, impact as a role model in the school, and longevity to the profession.

In 2009-10, 9 Scholars were selected: 4 entered their senior undergraduate year and 5 entered the UCR Teacher Preparation Program. For 2010-11, we awarded 4 scholarships to returning scholars entering the Teacher Preparation Program and 3 new scholars.

93

Title: Strong Partnerships for Better Teaching

NSF Noyce Award Number: 0934223

Principal Investigator: Amanda Datnow

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Institution(s): University of California, San Diego

Co-PI(s): Jeff Rummel

Presenter(s): Christopher Halter, University of California San Diego, chalter@ucsd.edu

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Project Discipline: Education Studies

URLs: <http://eds.ucsd.edu/undergraduate/minors.shtml> and http://physicalsciences.ucsd.edu/academic/science_math.ed/about.htm

Courses and fieldwork experiences in the UCSD CalTeach program focus on blending deep content knowledge with strong pedagogical practices. Neither the science and mathematics departments nor Education Studies could accomplish this goal in isolation. It is only through ongoing collaboration and partnership that we can bring the strengths of multiple departments together to create a powerful learning experience for our future science and mathematics teachers. The merging of pedagogy and content occurs at each level of the program and in every course. This consistent theme of the program brings into focus the critical need for deep content knowledge as well as the knowledge of learning within each discipline.

The program is supported by purposeful fieldwork with local districts, high-needs schools, and carefully selected mentor teachers. These STEM students in early field experiences engage in discipline-specific pedagogy and intensive teaching apprenticeship experiences to prepare them to enter the UCSD graduate intern teacher credential program. This intern teacher program is an intensive 15-month credential and Master of Education

degree in which qualified teacher candidates are the teacher of record in secondary classrooms employed by the school districts on a 60% teaching contract. The partnerships and field experiences are designed to give the students specific, supported, and scaffolded interactions with veteran classroom teachers and adolescent learners. Faculty in the science departments, mathematics and EDS are in the fourth year of implementing lower-division SMI courses and field experiences.

Through the partnership between Education Studies Program and the Physical Sciences Division, the courses and experiences of future teachers has been planned and scaffolded to provide them with the tools to make informed and effective classroom decisions. With the school partnerships our STEM majors are able to learn about the work of effective urban teachers as well as provide important mentoring and tutoring to local K-12 students creating far reaching impacts on our community.

94

Title: Math for America San Diego: A Regional Approach to Improving Mathematics Education

NSF Noyce Award Number: 0934695

Principal Investigator: Guershon Harel

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Institution(s): University of California, San Diego; San Diego State; and CSU San Marcos

Co-PI(s): Barbara Edwards

Presenter(s): Barbara Edwards (Co-PI) and Aaron Basch (Fellow), Math for America San Diego, bedwards@ucsd.edu

Project Discipline: Mathematics

URLs: www.mathforamerica.org/sandiego

Math for America San Diego (MfA SD) is a non-profit organization which works with 3 local universities and 4 school districts in order to improve mathematics teaching and learning in high-need high schools. With support from NSF Noyce and other funds, MfA SD provides professional and financial support for 5 years to a select group of recent undergraduates and career changers as they enter a credential program at one of our partnership universities (CSU San Marcos, San Diego State, UC San Diego). Working across the unique cultures of these organizations is challenging, but we believe it yields broader and deeper investment in the work and is more likely to lead to real and sustainable change in student understanding of mathematics. Our poster depicts the organizational structure, the goals of MfA SD, the evaluation plan, and key activities of the fellows' professional development program.

95

Title: Growing Future Noyce Scholars

NSF Noyce Award Number: 0934735

Principal Investigator: Jane Close Conoley

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Institution(s): University of California, Santa Barbara

Co-PI(s): Pierre Wiltzius, Julie Bianchini, William Jacob, and Petra VanKoppen

Presenter(s): Susan Johnson (Program Administration), University of California, Santa Barbara, sjohnson@education.ucsb.edu

Mandi Gascoigne (Noyce Fellow), University of California, Santa Barbara

Project Discipline: Education

URLs: Gevirtz Graduate School of Education: <http://education.ucsb.edu/home.html>

POSTER ABSTRACTS

Teacher Education Program: <http://education.ucsb.edu/Graduate-Studies/Teacher-Education-Program>
Noyce Scholarship: <http://education.ucsb.edu/Graduate-Studies/Teacher-Education>

Noyce scholarships at UC Santa Barbara (UCSB) are awarded to a select group of secondary science and mathematics teacher candidates in the Gevirtz Graduate School of Education Teacher Education Program. Many come through the undergraduate program, UCSB Cal Teach. This year, for example, of the 26 Noyce scholarship applications received, 16 were from students who earned degrees from UCSB, and 9 of those 16 had been part of UCSB Cal Teach.

CalTeach partners the State of California and UC System to improve the teaching of science and mathematics for all of California's students. It has also become a key program through which to recruit and mentor future UCSB Noyce Scholars. UCSB CalTeach consists of 2 foundational courses (California Teach 1 and 2) and a newly launched Minor in Science and Mathematics Education. Minor courses were selected or created to provide STEM undergraduates with a deep and coherent foundation for understanding science and mathematics education.

Three of the 5 courses in the minor provide undergraduates with knowledge from education considered crucial for the teaching and learning of mathematics or science to diverse learners. Two disciplinary courses are designed to deepen undergraduates' conceptual understanding of mathematics and/or science in ways useful to teachers and their students; they provide STEM undergraduates a novel opportunity to explore science and mathematics disciplinary knowledge in innovative and thought-provoking ways.

Undergraduates select these 2 disciplinary courses from a menu of courses offered by STEM faculty. Examples include Mock Environmental Summit; Physics of CA Waves, Weather, Quakes and Fires; and Advanced Problem Solving in Mathematical, Historical and Pedagogical Contexts. CalTeach has created strong ties and close collaborations across education, the sciences, and mathematics: The Deans of Education and of Mathematical, Life, and Physical Sciences work with a faculty director, a program director, and an interdisciplinary committee of STEM and education faculty to grow future Noyce Scholars.

96

Title: UCSC Robert Noyce Teacher Scholars Program

NSF Noyce Award Number: 0833340

Principal Investigator: Stephen Thorsett

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Institution(s): University of California, Santa Cruz

Co-PI(s): Sheldon Kamieniecki and Art Ramirez

Presenter(s): Gretchen Andreasen, Cal Teach, University of California, Santa Cruz, gha@ucsc.edu

Dena Sexton, Education Department, University of California, Santa Cruz, dmsexton@ucsc.edu

Project Discipline: physical science and math teacher education

The Noyce Scholars program at UC Santa Cruz (UCSC) has accepted its second cohort of 4 scholars (3 math, 1 physics) who will enter UCSC's 12-month combined M.A./teaching credential program in July. The first cohort of 6 scholars (5 math, 1 chemistry) will graduate in July. Of these, 2 have accepted jobs in regional high-need schools, though not in the partner school districts. The rest are seeking employment.

The 2009-10 cohort were periodically interviewed and observed in their student teaching classrooms in order to explore their developing professional identities as math and science teachers and their evolving commitment to

teaching and to teaching in high need schools. Early analysis demonstrated a relationship between their reasons for entering teaching and long-term career plans. The poster will report on these findings and present implications for further research on recruitment in these high need areas and financial incentives to enter teaching.

97

Title: T-MAST Scholars

NSF Noyce Award Number: 0434103

Principal Investigator: Enrique Ortiz

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Institution(s): University of Central Florida

Presenter(s): Enrique Ortiz, University of Central Florida, ortiz@mail.ucf.edu

Project Discipline: Mathematics and Science Education

The Transition into Mathematics and Science Teaching (T-MAST) is a Master's degree and teacher's certification program in the area of middle school mathematics and science. It is an innovative, fast track, 4 semester graduate program for professionals who wish to transition into middle grade teaching that features: a master's degree with embedded certificate designed for completion in 4 semesters; accelerated, innovative classroom placement; cohort design to promote the development of a professional community; 1-year paid internship; active, multi-layered mentoring; and ongoing mentoring after graduation.

The students in this program opt to pursue a degree and certification in mathematics or science. A portion of the students who participate in the Master of Arts in middle school mathematics or science program are also T-MAST Scholars. The main roles of the T-MAST Scholars program are to offer a stipend to support students' financial needs during the program, and mentor them as they transition into the classroom and after graduation.

These students would have a hard time completing the program without this financial assistance and mentoring. Only students who do not have any teaching experience and are part of 1 of the STEM areas qualify to receive this financial assistance.

The program supports mentoring and supervision efforts during the program through other sources. We have had 24 T-MAST Scholars since the summer 2005 semester. Eighteen of scholars are still working at high-need schools with 5 of them with 4 years of experience, 3 with 3 years, and 11 with 2 years. Teacher retention in the classroom at high-need schools has been very positive. Recruitment of new students has intensified, and we are working on increasing students' enrollment in this program.

98

Title: Chicago UTEP Sec. Math & Science

NSF Noyce Award Number: 0934845

Principal Investigator: Kavita Kapadia

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Institution(s): University of Chicago

Co-PI(s): Michael LaBarbera and Paul Sally

Presenter(s): Kavita Kapadia, University of Chicago, Urban Education Institute, kkapadia@uchicago.edu

POSTER ABSTRACTS

Project Discipline: Math and Biology

URLs: utep.uchicago.edu

The University of Chicago Urban Education Institute's Urban Teacher Education Program (Chicago UTEP) has expanded its Urban Teacher Education Program (UTEP) to include mathematics and science certification (grades 6-12). The new certification program builds upon UTEP's 6 years preparing teacher-leaders for urban schools. Based on the program's success with effectively training elementary educators, Chicago UTEP has been approved by the Illinois State Board of Education to apply its teacher education model to prepare middle and high school teachers in the areas of mathematics and science.

The Noyce Scholarship Program is designed to attract and support qualified STEM majors from applicants currently enrolled in their third year of baccalaureate studies at the University of Chicago (UC) (the program will expand to other institutions by 2011) into their new science and math preparation program. The scholarship is offered to every student accepted into the program and who plans to teach in Chicago Public Schools for a minimum of 2 years. The awards provide tuition assistance to promising STEM majors committed to teaching in disadvantaged, urban schools.

Chicago UTEP and UC are uniquely qualified to prepare 72 highly trained teachers (over the course of the grant) to address the shortage of well-qualified educators in mathematics and science in urban schools. Chicago UTEP has a strong track record of retaining teachers at rates far beyond those reported for urban schools generally. The program is proud of its rigorous program components: a 2-year plus program, which includes 15 months of intensive clinical experience; a tight weave of clinical and academic work; a commitment to portraying teaching as intellectual work; careful selection and support of clinical instructors to mentor students during their internships.

The program has a unique focus on the context of urban education, including exploration of issues of race, class and culture; a two-year induction support program; a rigorous admissions process and assessment system that follows students through clearly defined check points; a well established relationship with Chicago public schools that provides institutional and financial support; and a commitment to recruiting minority candidates. The program draws heavily from the expertise of faculty at the University of Chicago.

99

Title: Colorado LA Model and CU-Teach

NSF Noyce Award Number: 0833258

Principal Investigator: Valerie Otero

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Institution(s): University of Colorado Boulder

Co-PI(s): Michael Klymkowsky, Steven Polock, Noah Finkelstein, and David Webb

Presenter(s): Valerie K. Otero

Project Discipline: STEM

URLs: <http://stem.colorado.edu/Scholarships/noyce-fellows-program/noyce-fellow-program>

The University of Colorado, Boulder (UC Boulder) has established an integrated model of institutional change by leveraging funding from professional societies, national foundations, industry, and the University. UC Boulder recruits teachers through the Colorado Learning Assistant model, a nationally emulated experiential learning program, and through the STEP I and STEP II courses of the CU-Teach curriculum (part of the UTeach national

replication effort). The Noyce Fellowship program is another form of recruitment, which taps into the Colorado LA and CU-Teach programs.

Finally, the Master Teacher track of the Noyce program provides salary supplements for career teachers to participate in the design and implementation of professional development communities for teachers as a means by which to develop mastery and leadership. I will discuss various aspects of the Colorado experiential learning model for institutional change and how we leverage various funding efforts.

I will present data from several STEM departments as well as from former teachers now teaching in school districts to support claims about the efficacy of the program.

100

Title: Capitalizing on Talent: The Noyce Fellows Program at the University of Georgia

NSF Noyce Award Number: 0833276

Principal Investigator: Denise Mewborn

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Institution(s): University of Georgia

Co-PI(s): J. Steve Oliver

Presenter(s): J. Steve Oliver, The University of Georgia, soliver@uga.edu

URLs: http://www.coe.uga.edu/mse/nsf_info.html

Georgia's population has grown at a rate nearly double the rate for the US as a whole—increasing by more than 20% in the last 10 years. In accordance with this statistic, the growth in the need for science and mathematics teachers increased dramatically during this period. In FY 07 there were 21.7% more science teachers hired in Georgia than in the previous year. These newly hired teachers have entered the profession mostly from sites other than higher education institutions. Georgia institutions of higher education accounted for only 13.7% of the new science teachers in FY 07. At the same time, there is evidence that teacher attrition rates are increasing in Georgia. This increase is not related to increased rates of retirement attrition.

The preparation that new mathematics and science teachers receive as a component of the UGA Noyce program will prepare them for the rigors of classroom teaching in the state and thus prepare them to persist in the career. In Year One, Seven prospective teachers of mathematics and seven prospective teachers of science became Cohort 1. Matriculating in the summer and fall of 2010, an additional 14 prospective teachers of math and science will become Cohort 2. A graduate assistant will coordinate the activities for these cohorts as they move from the experiences and courses required for certification into their careers as classroom teachers.

To identify a diverse population of Noyce Fellows, a recruitment effort was made at the Fernbank Science Center, a component of the Dekalb County School district in Atlanta. This district identifies 66% of their students as economically disadvantaged and not achieving AYP in 2009. The Fernbank Science Center employs science educators who give special programs to students at all grade levels.

Recently, policy changes in the district have required these individuals to attain science certification and in fact, many are moving into positions as regular classroom teachers now that they are accepted into a path that will promote their attainment of certification. To date four of these science educators have become Noyce Scholars at the UGA program with more individuals planning to apply in the future.

101

Title: UHD Noyce Science Teacher Scholarship Program

NSF Noyce Award Number: 0934913

Principal Investigator: Larry Spears

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Institution(s): University of Houston-Downtown

Co-PI(s): Jon Aoki, Brad Hoge, and Anjoo Sikka

Presenter(s): Larry Spears, University of Houston-Downtown, spearsl@uhd.edu

Project Discipline: Science

Our Noyce Teacher Scholarship Program in Science partners the University of Houston-Downtown (UHD) with the Aldine independent School District (AISD). UDI, a Hispanic Serving and Minority Serving Institution, is located adjacent to the largest Hispanic neighborhood in the US. Project staff are basic science and science education faculty in the Department of Natural Sciences (NS) and faculty from the Department of Urban Education (UE) responsible for their field-based science education activities at the secondary level. UE graduates have exhibited an retention rate of 82% after teaching 4 years in local minority dominant schools. AISD enrolls over 62,000 students of which 67% are Hispanic and 28% are African American. In 2009, AISD was named the national winner of the Broad Prize for Urban Education.

Our goal is to produce 26 science baccalaureate graduates who have satisfied the Texas science teaching certification requirements and accepted employment as secondary science teachers in Houston area minority schools. These graduates will also be members of the College of Science and Technology Scholars Academy (SA), which means they have good academic records and many outside of the classroom experiences in science to enhance their teaching potential. The SA membership has demographics similar to those of UHD. SA emphasizes mentoring, group activities, participation in STEM research, outreach activities, and participation in major professional meetings as attendees and presenters. This year, the annual Student Research Conference (sponsored by SA) featured over 100 individual and team research projects.

Program activities began in June at the Summer Workshop for the Noyce Program. Participants included the first cohort of 5 Noyce Scholars, their assigned master teachers in science and other invited teachers from AISD. Part of this program was focused on how HUNSTEM (Houston Urban Network for Science, Technology, Engineering and Mathematics) will support this program. HUNSTEM is an interactive web-based network, housed in NS, which links thousands of students, parents, teachers, STEM faculty and area STEM organizations and Informal Science Education centers. This fall the Noyce scholars will begin taking education courses and Block One of their field-based science education activities at assigned high schools.

102

Title: UKNOYCE: New Opportunities Yielding Classroom Excellence

NSF Noyce Award Number: 0733790

Principal Investigator: Margaret Mohr-Schroeder

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Co-PI(s): Bruce Walcott, Jeffrey Osborn, and Jana Bouwma-Gearhart

Presenter(s): David Little, University of Kentucky, dlittle@ms.uky.edu

Patrick Thomas, University of Kentucky, patrick.thomas@uky.edu
 Garnett Coy, Menifee County Public Schools, garnett.coy@uky.edu
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 Jana Bouwma-Gearhart, University of Kentucky, jana.bouwma-gearhart@uky.edu
 Project Discipline: Mathematics and Science
 URLs: <http://www.uky.edu/pimser/programs/NOYCE/>

For the past 3 years, UK-NOYCE has funded over 28 students, with fellows currently teaching in over 10 different high needs districts across the state of Kentucky. UK NOYCE Fellows are STEM students and practicing STEM professionals trained as educators to integrate the knowledge and skills of their corresponding content disciplines with mathematics and science standards-based curriculum.

In turn, they develop K-12 learners as inquirers and problem-solvers who can alter environments through effective planning and assessment. In addition to their education training, UK NOYCE fellows are immersed in seminars on modeling based inquiry, engineering education, classroom management, etc. Successful recruiting strategies and best practices will be shared by representative NOYCE fellows, the PI, and one of the Co-PIs.

103

Title: Recruiting, Preparing, and Retaining Diverse Science
 NSF Noyce Award Number: 0934965
 Principal Investigator: Christine Broussard
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 Institution(s): University of La Verne
 Co-PI(s): Marga Madhuri, Donna Nasmyth, Vanessa Preisler, and Yousef Daneshbod
 Presenter(s): Christine Broussard, Ph.D., University of La Verne, cbroussard@laverne.edu
 Project Discipline: Biology, Chemistry, Physics, and Mathematics
 URLs: <http://laverne.edu/academics/arts-sciences/natural-science/noyce.php>

The La Verne Noyce Teacher Scholars (LVNTS) program is a collaborative effort between the University of La Verne's College of Arts & Sciences, College of Education & Organizational Leadership, and local high need school districts in Southern California. The LVNTS provides 2 scholarship options. The first option is for undergraduate transfer or in-house Biology, Mathematics, Chemistry, and Physics majors interested in teaching. The undergraduate scholarship provides tuition support for the junior and senior years, and credential year one.

The second option is for STEM graduates from other institutions who desire to become teachers in STEM disciplines. The graduate scholarship provides tuition support for the first year of the credential program. In addition, the LVNTS program provides summer internship opportunities for undergraduates, after their first and second year, focusing on STEM disciplines and teaching. These opportunities serve to expose undergraduates to STEM disciplines and teaching as a career.

104

Title: The University of Louisville Noyce Early Start Program
 NSF Noyce Award Number: 0934787
 Principal Investigator: Nancy Caroline Martin

POSTER ABSTRACTS

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Co-PI(s): William S. Bush, Christine L. Rich, Thomas Riedel, and Thomas R. Tretter

Presenter(s): Nancy Caroline Martin, University of Louisville, nancymartin@louisville.edu

Project Discipline: Science and Math

URLs: louisville.edu/education/ssa/noyce

The Early Start STEM Program combines efforts of the University of Louisville (UofL), the Jefferson County Public School System (JCPS) and Teach Kentucky to recruit and retain a highly qualified, diverse cohort of STEM majors to enter mathematics and science teaching. The UofL Early Start STEM program allows junior and senior level undergraduates to complete up to 9 credit hours of graduate coursework in education concomitant with completion of their disciplinary degrees. These “double-counted” credits also apply toward a Masters of Arts in Teaching (MAT) degree program. Early Start students can enter the classroom not only with certification, but also with a more desirable MAT degree, and higher compensation, just 1 year after their baccalaureate.

The Early Start program is approved by Arts and Sciences Departments of Physics, Mathematics, Chemistry and Biology. An incentive for entering Early Start is that JCPS will offer employment to Early Start teachers and commit to school placements that will enable them to meet their scholarship requirements. Teach Kentucky is a not-for-profit organization with the mission to recruit and retain highly qualified college graduates from outside Kentucky to teach and reside in the Commonwealth. Teach Kentucky will extend its efforts to include Kentuckians by providing established support programs for Early Start STEM Scholarship recipients including workshops, mentors and community immersion activities that support and encourage young teachers to remain in the profession.

Teach Kentucky STEM teachers will serve as role models and resources as the Early Start STEM graduates begin their teaching careers. The hypothesis is that the number of STEM majors entering middle school and high school education careers can be increased by communicating the advantages of the Early Start STEM track to college freshmen and sophomores. This communication includes providing clear information on how to enter Early Start STEM, giving hands-on education internships and research experiences, and positioning the Noyce Scholarships as a premier recognition for students who choose this career path. The goal of the project is to prepare up to 18 high quality STEM teachers for employment in JCPS over the next 5 years. We projected we would have 10 students in the program by fall 2010, but have only recruited 3 scholars to date.

105

Title: UMBC Noyce Scholars Program: A Year One Summary

NSF Noyce Award Number: 0833316

Principal Investigator: Nagaraj Neerchal

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Co-PI(s): Jonathan Singer, Janice Zengel, and Susan Blunck

Presenter(s): Jonathan Singer, University of Maryland, Baltimore County, Jsinger@umbc.edu

Project Discipline: Secondary Mathematics and Science Education

URLs: www.umbc.edu/NOYCE

The first set of NOYCE experiences at the U of Maryland, Baltimore County are associated with recruiting our first cohort. A key component is an intensive summer internship consisting of a 6-credit hour pedagogical experience that

satisfies certification requirements associated with curriculum, instruction, and student learning. This 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 during the sophomore spring semester. With no tuition cost and extensive opportunities to plan, construct and enact lessons for actual secondary students, the activity 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, Noyce 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 minute of the day is spent in discussion and reflection on the enacted lesson. The second session requires small groups of NOYCE Scholars to adapt and enact an inquiry project consisting of 8 (90 minute lessons) also to a population of high school students. One member from each teaching group videotapes the lesson and prepares a series of short video clips (1-2 minutes each) illustrating critical points (positive examples and “missed opportunities”) in the lesson. The high school students in the practice teaching sessions were 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.

106

Title: NoyceScholars' Perceptions of Teaching Profession

NSF Noyce Award Number: 0833266

Principal Investigator: Patricia Trina Crowley

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Institution(s): University of Massachusetts, Dartmouth

Co-PI(s): Tessfay Meressi, Frank Scarano, and Stephen Hegedus

Presenter(s): Patricia Trina Crowley, pcrowley@umassd.edu

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Project Discipline: Science, Technology, Engineering, & Math

URLs: www.umassd.edu/cusp/noyce

Our poster presents recent Noyce Scholars' perceptions of teaching as a profession. Topics include: Why do candidates enter the program? What are their perceptions of teaching as a profession upon entering the program, throughout coursework, program experiences, and current contexts? How did candidates formulate their mental models of what teaching entailed? What support structures do candidates identify as helpful throughout the transition into the teaching profession? What do candidates identify as the biggest challenge(s) in their transition? How do Noyce Scholars envision their future in the teaching profession? How do Noyce Scholars envision the future of the teaching profession? Three Noyce Scholars will be present to answer any questions.

107

Title: UNITE and INSPIRE at the University of Michigan
NSF Noyce Award Number: 0934678
Principal Investigator: Brian P. Coppola
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Co-PI(s): Mary A Starr and Donald Freeman
Presenter(s): Brian P Coppola, University of Michigan, bcoppola@umich.edu
Mary A Starr, University of Michigan, mastarr@umich.edu
Project Discipline: STEM
URLs: <http://ideainstitute.umich.edu/>

Our work was motivated by our application to the Noyce Fellowship program, and built on the work of the University of Michigan's IDEA Institute, a new collaborative enterprise between STEM and STEM education. The UNITE program is a developmental, five-year BS/MA dual degree program in which intervention activities begin as early as the first term of undergraduate enrollment and then ramps toward 2 years of Noyce Fellowship support. The INSPIRE program is a 2-phase program of undergraduate research in Beijing, China specifically for Noyce Fellows, starting with a summer as a pre-service undergraduate, and followed, 2 years later, by a second experience in that same group as an early career in-service teacher. Explicit activities are included for Fellows to consider building connections between their international experiences and their research experiences as the basis for high school instructional design.

108

Title: MU Noyce Scholars Program for Science and Mathematics
NSF Noyce Award Number: 0832765
Principal Investigator: Sandra Abell
Email: souciema@missouri.edu
Institution(s): University of Missouri
Co-PI(s): Fran Arbaugh, Mark Volkmann, Oscar Chavez, John Adams, and Alan Whittington
Presenter(s): Marilyn Soucie, University of Missouri, souciema@missouri.edu
Project Discipline: Science and Mathematics
URLs: www.smar2t.missouri.edu

The goal of this 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 2 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.

109

Title: Top-Notch Teachers with Dual Degrees at MU

NSF Noyce Award Number: 0934839

Principal Investigator: Patricia Friedrichsen

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Institution(s): University of Missouri

Co-PI(s): Mark Volkmann, Marcelle Siegal, Allan Whittington, and John Adams

Presenter(s): Patricia Friedrichsen, University of Missouri, FriedrichsenP@missouri.edu

Heather Worsham, University of Missouri, hmworsham@mail.mizzou.edu

Project Discipline: Science

URLs: <http://t2d2.missouri.edu/internships/overview.html>

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 degree 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 an introductory teacher education course 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). The internships take place at our partner institutions: St. Louis Science Center, Science City in Kansas City, and Missouri Department of Conservation Nature Centers.

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. These students will be obligated to teach science for 2 years in a high need school district for each year they receive a scholarship.

110

Title: Pre-Scholarship Internships: Does Interest Wane?

NSF Noyce Award Number: 0833185

Principal Investigator: Arthur Louis Odom

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Institution(s): University of Missouri-Kansas City

Co-PI(s): Lynda Plamann, Charles Wurrey, David Ketchum, and Clare Bell

POSTER ABSTRACTS

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

Project Discipline: Science Education

URLs: <http://education.umkc.edu/kc-teach/>

The purpose of this research report is to examine the association of scaled items for 8 interns subsequent to completing 30 hours of fieldwork designed to provide realistic and positive experiences in an urban science classroom prior to applying for a Noyce scholarship. The host science teacher assessed the Intern's potential to continue in the teacher education program using a 5 item assessment concerning punctuality, professional behavior, interaction with high school science students, willingness to learn, and potential for success as a high school science teacher, and written comments about the strengths and weaknesses of the Intern. Interns also wrote pre- and post-internship essays about high school science teaching. The essays provide evidence of changes in attitudes and a shift toward pragmatic expectations.

111

Title: UNCG Project Excellence in Science Education Learn

NSF Noyce Award Number: 0833280

Principal Investigator: Jerry L. Walsh

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Institution(s): University of North Carolina at Greensboro

Co-PI(s): Betty Epanchin and Catherine E. Matthews

Presenter(s): Jerry L. Walsh, University of North Carolina at Greensboro, jlwalsh@uncg.edu

Angela Webb, University of North Carolina at Greensboro, awwebb@uncg.edu

Project Discipline: Science

URLs: <http://www.uncg.edu/soe/ExSEL/index.html>

UNC Greensboro has concluded its first year of Noyce scholarships with a program called Project ExSEL (Excellence in Science Education Learning). Project ExSEL has and will continue to recruit Noyce Scholars by providing teaching and educational experiences for freshmen and sophomores to work with university science and science education faculty. These pre-Noyce Scholars were provided with summer internships where they worked with faculty in professional development programs for teachers or summer science experiences for high school students.

For example, chemistry, biology, and physics pre-Noyce Scholars worked with content area professors to develop inquiry activities for the high school classroom; they then shared these activities with science teachers at a local high school. Other biology pre-Noyce Scholars worked with a science education professor at a week-long summer herpetology camp for high school students. Such experiences piqued students' interest in science teaching as a career, leading several students to apply for Noyce scholarships. Through Project ExSEL, the Scholars engaged in cohort educational activities as well as teaching experiences during their junior and senior years. These cohort activities consisted of learning about local education resources, making classroom visits and attending professional conferences, among other things.

This poster will describe the past and current internship experiences available to pre-Noyce Scholars through Project ExSEL, and also discuss the cohort activities for Noyce Scholars.

112

Title: University of North Carolina at Pembroke Robert Noyce Teacher Scholarship Program

NSF Noyce Award Number: 0531994

Principal Investigator: Rachel McBroom

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Institution(s): The University of North Carolina at Pembroke

Co-PI(s): Velinda Worix , UNC Pembroke, velinda.worix@uncp.edu and Mary Klinikowski

Presenter(s): Rachel McBroom, UNC Pembroke, rachel.mcbroom@uncp.edu

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Project Discipline: Mathematics and Science Education

The main goal of the UNC Pembroke (UNCP) Robert Noyce Scholarship Program is to increase the number of highly qualified math and science teachers entering the profession. UNCP, a historically Native American institution and one of the most culturally diverse campuses in the southeastern US, also seeks to increase the numbers of math and science teachers from underrepresented groups. UNCP plans to produce 30 math and science teachers who will hopefully remain in rural southeastern North Carolina to fulfill their teaching requirement in the region's high needs schools. UNCP Noyce Scholars complete their teacher licensure requirements through either the undergraduate teacher education program (while completing a STEM major) or through the Masters of Arts in Teaching (MAT) program. In addition to recruiting strong STEM majors into the education profession, the program provides support for Scholars as they complete their licensure requirements and into their initial years as classroom teachers. Fourteen of the 31 UNCP Noyce Scholars have graduated and are employed by or seeking employment in high needs schools in North Carolina. Four of the current Noyce Scholars will complete their licensure and/or degree requirements by December 2010.

113

Title: STAR - 'Scholarship Team in Action to Recruit

NSF Noyce Award Number: 0934380

Principal Investigator: Cathy L. Barlow

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Institution(s): University of North Carolina at Wilmington

Co-PI(s): Karen S. Wetherill, Paul E. Hosier, and Martin H. Posey

Presenter(s): Karen S. Wetherill, University of North Carolina Wilmington, wetherillk@uncw.edu

Project Discipline: Biology, Chemistry, Engineering, Geosciences, Math

URLs: <http://www.uncw.edu/> and <http://www.edu/ed/star/>

Six high-need school districts in Southeastern North Carolina, an educational business, and the UNC Wilmington (UNCW) form the STAR (Scholarship Team in Action to Recruit) Program for the purpose of producing more highly qualified STEM teachers for those school districts.

The STAR team from UNCW consists of 6 STEM faculty, 6 education faculty, and 1 faculty member on a joint appointment between Marine Science and the School of Education. In an effort to accommodate the busy and demanding lifestyles of their student population, both in class and online instruction is included in the teacher training programs. The goal is to recruit, retain, and induct at least 25 STEM majors and 40 career changers into the

teaching profession. Twenty-two students have joined the program since 2009 with an average of 3.5 GPA. Twelve are undergraduate and 10 are graduate students. The career changers come from Engineering, Biotechnology, Pharmacy, Surgical Technology, Marine Biology, Arboriculture, and Accounting professions. STAR recipients consistently express their gratitude for the opportunity to develop the knowledge and skills to be the very best math and science teachers for the students in Southeastern North Carolina!

114

Title: UNT Robert Noyce Scholarship Program

NSF Noyce Award Number: 0833280

Principal Investigator: Pamela Esprivalo Harrell

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Institution(s): University of North Texas

Co-PI(s): Colleen Eddy, Lee Hughes, Kay Littler, and Diana Mason

Presenter(s): Pamela Esprivalo Harrell, University of North Texas, pam.harrell@unt.edu

Project Discipline: Science and Mathematics

URLs: <http://www.unt.edu/noyce>

The Science and Mathematics Robert Noyce Scholarship Program began at the University of North Texas in fall 2005. As of April 2010, a total of 49 undergraduate and graduate candidates have been admitted to the program; and 33 are teaching mathematics or science in middle or secondary schools (67%). Twenty-nine candidates (59%) have obtained teacher certification in science or mathematics (Grades 8-12). Fifty-four percent of candidates hold or are seeking degrees in science, while 46% hold a degree in mathematics. We continue to work with Noyce undergraduates to complete their degree and receive initial certification. We are also mentoring existing candidates and providing content specific professional development which is assignment specific in an effort to improve teacher effectiveness and student achievement. Presently, we are investigating the induction, classroom environment, teacher efficacy, and technology proficiency among program participants.

115

Title: Mathematics and Science Teachers for Iowa

NSF Noyce Award Number: 0934866

Principal Investigator: Jeffrey Weld

Email: jeff.weld@uni.edu

Institution(s): University of Northern Iowa, University of Iowa, and Iowa State

Co-PI(s): Thomas Greenbowe, Norbert Pienta, and Marc Armstrong

Presenter(s): Jeffrey Weld, University of Northern Iowa, jeff.weld@uni.edu

Ted Neal, University of Iowa, Ted-Neal@uiowa.edu

Project Discipline: Math and Science

URLs: <http://www.iowamathscience.org/noyce/>

A consortium consisting of Iowa's three public universities, led by the Iowa Mathematics and Science Education Partnership located at the University of Northern Iowa was awarded a five year Robert Noyce Scholars grant. In year one, the administrative team has developed an inter-university mechanism for grant funds distribution, a central administrative structure, promotion and advertisement methods, selection criteria, application review

mechanisms, undergraduate and graduate award parameters, working relationships interconnecting 3 offices of sponsored programs and 3 student services/financial aid operations, an evaluation structure with an objective agency, AND awarded 13 scholarships to undergraduate STEM majors and to STEM degreed post-baccalaureate license seekers. As the program enters its second year, focus is on evolving the recruitment, tracking, and evaluation aspects of the Iowa Noyce Scholars project.

116

Title: Puerto Rico Master Math Teacher Program

NSF Noyce Award Number: 0934820

Principal Investigator: Josefina Arce

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Institution(s): University of Puerto Rico @ Rio Piedras

Co-PI(s): Edwin Morera and Pedro Villafane

Presenter(s): Marta Fortis, University of PR- Rio Piedras Campus, fortismarta@gmail.com

Edwin Morera, University of PR- Cayey Campus, edwinmorera@yahoo.com

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 as the single Island wide school district to establish the first Puerto Rico Master Math Teacher Program (PRMMTP). This project will certify ten 7-12th grade mathematics teachers, teaching in high-need school districts, as Master Math Teachers (MMT) through the UPR Rio Piedras Campus' Division of Continuing Education, and they will teach in high need school districts for a total of 5 years. They 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.

The MMTs will serve as role models of exemplary mathematics teaching practices, experts in content knowledge, and leaders among their peers to promote improvements in student academic achievement. Participant teachers have completed or are in the process of completing a Master Degree, and have a professional track record of excellence in teaching. The PRMMTP consists of 2 phases: an intensive certification program followed by a period where the MMT serve as professional developer to complete the 5 years of service required by this program. In the second phase of the PRMMTP, 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 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. NSF 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.

117

Title: University of Rochester Noyce Scholars Program

NSF Noyce Award Number: 0733817

Principal Investigator: Raffaella Borasi

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Institution(s): University of Rochester

Co-PI(s): Jeffrey M. Choppin, Michael E. Gage, Jack A. Kampmeier, and April L. Luehmann

Presenter(s): Raffaella Borasi, University of Rochester, rborasi@warner.rochester.edu

URLs: <http://www.rochester.edu> - The Warner School

This project will prepare 30 Noyce Scholars through the University of Rochester's rigorous 15-month teacher preparation program that includes, in addition to course work, extensive fieldwork with students from the Rochester City School District (RCSD), an urban system with high poverty rates, low state test scores, and a shortage of qualified teachers in mathematics and science.

Eleven Noyce Scholars graduated in October 2009 (7 science; 4 math); of these, six have science teaching positions in the RCSD, one teaches science in a rural high need school, and one is teaching math in an urban high need school in the Albany area. One of these Noyce Scholars, Sean Coffey, was honored by RCSD with a New Teacher of the Year Award. Eleven more Noyce Scholars (6 science; 5 math) will be ready to teach as of Fall 2010. The last eight Noyce Scholars (5 science; 3 math) started their program in May 2010.

118

Title: USD Noyce Scholarship Program

NSF Noyce Award Number: 0934717

Principal Investigator: Eric J. Page

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Institution(s): University of San Diego

Co-PI(s): Jane Friedman, Jeremy Kua, Joi Spencer, and Lisa Baird

Presenter(s): Eric Page, University of San Diego, epage@sandiego.edu

Project Discipline: Mathematics, Chemistry, Biology, Physics

URLs: <http://www.sandiego.edu/cas/hallmarks/research/noyce/>

The USD Noyce Scholars program includes the University of San Diego's College of Arts and Sciences and School of Leadership and Education Sciences (SOLES) as well as San Diego County school districts. The goal of the program is to produce 12 highly-qualified secondary science and mathematics teachers for regional, high-need school systems in California. We will recruit science and math majors who are interested in teaching and willing to obtain the Master of Arts in Teaching or Masters of Education degree. We have developed an aggressive marketing presence in the San Diego County Community College Districts and on the USD campus not only to recruit high quality applicants but also to raise the level of awareness and respect for the teaching profession. Deliberate, constructive, and compassionate contact made with USD Noyce Scholars through the advising process continues through to the first years of teaching, a best practice for teacher retention.

Scholars will participate in inquiry-based learning both as students and as peer leaders and engage in service leadership opportunities in science and mathematics education all designed to prepare them for the classroom.

Once our scholars begin teaching we will support them through SOLES Induction Mentoring Partnership Program, or another research-based induction program in which new teachers are mentored by content specialists and by Nationally Board Certified Teachers. USD's Noyce program was funded in summer 2009 and recruited 1 scholar for the 2009-10 academic year, as well as an incoming cohort of 5 new scholars for 201-11. USD's first Noyce scholar recently received the Alcala Award, the highest undergraduate award given at USD.

119

Title: Pathway to Science

NSF Noyce Award Number: 0934829

Principal Investigator: Andre Green

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Institution(s): University of South Alabama

Co-PI(s): Justin Sanders and Phillip Feldman

Presenter(s): Andre Green and Phillip Feldman, University of South Alabama, green@usouthal.edu and pfeldman@jaguar1.usouthal.edu

Pathway to Science (PTS) is an innovative Phase 1 project involving the U of South Alabama College of Education, College of Arts and Sciences, and the Mobile County Public School System (MCPSS), the largest school district in Alabama and the 39th largest in the US. All involved have a vested interest in increasing the number of certified secondary science teachers. Goals are:

1. PTS will prepare a total of up to 24 science teachers over a 5-year period (current average of 4 graduates per year) who are highly qualified to teach chemistry, physics, biology, or general science. In short, PTS seeks to double the size of the current education program and work toward creating a steady stream of future science education majors, which will in turn increase the number of science teachers;
2. PTS will enhance student achievement by providing certified science teachers in those classrooms that currently have no certified teachers;
3. PTS 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;
4. PTS will recruit science majors into graduate science education through a content rich alternative certification curriculum that will culminate in a master's degree in secondary science education.

120

Title: Math for America Los Angeles

NSF Noyce Award Number: 0934923

Principal Investigator: Karen Gallagher

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Institution(s): University of Southern California

Co-PI(s): Darryl Yong and David E Drew

Presenter(s): Karen Gallagher, USC RSOE, rossier.dean@usc.edu

Meoshe Williams, USC RSOE, meoshe.williams@usc.edu

Project Discipline: Mathematics

URLs: <http://rossier.usc.edu/>

www.mathforamerica.org/la

Math for America Los Angeles (MfA LA) was launched in 2008 with the goal of raising student mathematics achievement by recruiting and supporting highly skilled secondary mathematics teachers in the greater Los Angeles area. MfA LA partners 3 universities: the U of Southern California, Claremont Graduate University and Harvey Mudd College, and is supported by private foundations and NSF. MfA LA offers talented and passionate recent college graduates and mid-career professionals a comprehensive package of training, professional development and financial support over a 5-year period. MfA LA provides substantial, targeted professional development opportunities for its Fellows as well as experienced teacher mentors.

Three notable program strengths were identified in our annual evaluation review. First, there is a commitment to recruiting a diverse Fellows and placing them in highly diverse settings. We began with 11 fellows and have grown to 40. More than half of the Fellows are from ethnic or disability minority groups, while nine-tenths of the students taught by the Fellows were from underrepresented minority groups, including Hispanic (84.9%) and African American (7.8%). The 90+% proportion of underrepresented minority students was consistent across all grade and course levels, including the more advanced mathematics courses.

Second, there is a commitment to robust program evaluation, including impact on teacher effectiveness and student achievement, together with project dissemination. School principals/directors have agreed to make available for analysis and reporting aggregate student achievement data, including course grades, CST scores, and subsequent mathematics course-taking choices. Two articles have been published: 'Closing the Mathematics Gap One Teacher At A Time' (CGU Flame, 2009) and 'Imagine That' (USC Futures in Urban Education, Winter 2010). And third, all Fellows will work towards National Board for Professional Teaching Standards certification. The path towards certification will ensure that teachers grow substantially in their teaching practice according to nationally recognized standards. Furthermore, National Board certification is the highest symbol of professional teaching excellence in the US, so it will put MfA LA Teaching Fellows in a position to be leaders in their communities.

121

Title: Southern Maine

NSF Noyce Award Number: 0833291

Principal Investigator: Jim Ford

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Institution(s): University of Southern Maine

Co-PI(s): Robert Kuech and Kelly McCormick

Presenter(s): Robert Kuech, University of Southern Maine, rkuech@usm.maine.edu

Project Discipline: Science and Math Education

The University of Southern Maine (USM) Noyce program makes annual awards to undergraduate and graduate students pursuing STEM Education. At \$10,000 each, undergraduate scholarships cover 100% of tuition and 50% of the annual cost of attendance. Capped at \$15,000, stipends for career changers assist with living expenses during an intensive year of graduate study, during which employment is not an option.

NOYCE Scholars serve as Peer Lead Team Learning leaders. In this program, the scholars serve as facilitators and not content experts or tutors. The scholars are trained in small group dynamics and learning, and lead voluntary sessions of 1.5-2 hours per week. These sessions help to promote questioning, analysis, and discussion (critical thinking skills). To expand the diversity of opportunities, some scholars work as math and science tutors for

disadvantaged high school students enrolled in Upward Bound, a federal TRIO program that seeks to help students achieve college readiness and attainment.

Scholars also can help with the Regional Science Bowl held at USM, participating as science or rules judges, or moderators, and contribute alongside USM professors during the actual competition to promote increased learning through friendly competition. The Scholars attend professional development conferences/workshops including the Environmental Education Conference, Project Learning Tree, Gulf of Maine Research Institute and year wrap up/greet new Scholars.

122

Title: Science and Math at Southern Mississippi

NSF Noyce Award Number: 0630436

Principal Investigator: Deborah Booth

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Institution(s): University of Southern Mississippi

Co-PI(s): Mary Peters, Christopher Sirola, and Sherry Herron

Presenter(s): Deborah Booth, University of Southern Mississippi, deborah.booth@usm.edu

Project Discipline: Science & Math Licensure

URLs: www.usm.edu/noyce

Science and Math at Southern Miss. seeks to increase the number of secondary teacher licensure graduates from the College of Science and Technology in response to the nationwide shortage of high school science and math teachers. Students pursue an undergraduate degree in their major and earn secondary teaching licensure by declaring the licensure emphasis and completing a series of required teacher education courses (27 hours for sciences; 35 hours for math). The degree can be completed in 4 years.

123

Title: Promoting STEM Teaching Through the Noyce Program

NSF Noyce Award Number: 0833343

Principal Investigator: Ann Cavallo

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Institution(s): University of Texas at Arlington

Co-PI(s): Gregory Hale, Ramon Lopez, and James Epperson

Presenter(s): Ann Cavallo, The University of Texas at Arlington, cavallo@uta.edu

Gregory Hale, The University of Texas at Arlington, greg@hale.uta.edu

Ramon Lopez, The University of Texas at Arlington, relopez@uta.edu

James Epperson, The University of Texas at Arlington, epperson@uta.edu

Project Discipline: Chemistry, Physics, and Mathematics

URLs: <http://www.uta.edu/cos/noyce/>

The University of Texas Arlington's (UTA) Noyce Scholarship Program prepares qualified science and mathematics teachers for our partner school districts in Dallas, Arlington, and Fort Worth. Program objectives are to: 1) recruit mathematics and science teacher candidates from baccalaureate programs and career changers from local industry, 2) provide a quality 2-track teacher certification program for them, and 3) induct, monitor, and mentor teacher

candidates through the program and in their early years of teaching. We recruit from underrepresented groups, and in science and mathematics areas of greatest teaching need, specifically secondary physical sciences and mathematics. Our research explores and implements findings on best practices relative to these aspects of our program:

- Recruiting candidates from UTA and community college STEM programs and from industry. Recruitment of undergraduates includes a summer internship at area nature centers and science museums;
- Implementing a 2-track program using our NCATE approved teacher education program;
- Utilizing a website to provide resources and help candidates become members of a community of learners;
- Supporting cohort groups led by UTA Education and Science faculty, along with Mentor Teachers to guide induction;
- Engaging candidates in inquiry and problem-based teaching/learning, action research, reflective practice, and sharing of findings, curricula, and reflections via electronic and on-campus interactions and experiences;
- Introducing candidates to teaching by placing them in classrooms with Mentor Teachers; and
- Extending candidates faculty positions upon completion toward fulfillment of the scholarship/stipend program requirements.

Since fall 2009, recruitment has resulted in 9 total Scholars and 8 Summer Interns to date. Teacher candidate demographics are: 5 undergraduates, 4 post-baccalaureates; 6 female, 3 male; 3 Hispanic/Latino, 3 African American, 2 Asian, and 1 Caucasian. Certification areas include: 6 mathematics, 2 chemistry, 1 physics. Of the 8 summer interns, 4 are female and 4 are male, with 1 Hispanic/Latino, 1 African American, 2 Asian, 3 Caucasian, and 1 non-reported. Recruitment for 2010-11 is underway.

124

Title: Noyce scholarships at UTeach Dallas

NSF Noyce Award Number: 0833229

Principal Investigator: Robert Hilborn

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Institution(s): University of Texas at Dallas

Co-PI(s): Homer Montgomery, Mary Urquhart, and John Sibert

Presenter(s): Homer Montgomery, University of Texas at Dallas, mont@utdallas.edu

Project Discipline: Science Education

URLs: <http://www.utdallas.edu/uteach/>

The Noyce Scholarship has been instrumental in providing the critical and necessary financial support for many of the U Texas at Dallas' (UTD) UTeach students through annual scholarships and paid internships. Because the UTeach program at UTD was in its early stages in 09/10, only 6 scholarships of \$10,000 were awarded. With more upper level students who meet the criteria for the Noyce scholarships continuing this fall, it is anticipated that the number will more than double.

Participation in paid internships has been much higher since participation can start as early as the second course of the UTeach sequence and depends upon continued enrollment in the UTeach program. Whereas approximately 20

students were recipients of Noyce internship stipends, there are sufficient intern opportunities to keep 35-40 students working 10-39 hours during the summer. Supporting institutions include the Dallas Museum of Nature and Science, SciTech Discovery Center Museum, Dallas Zoo, Garland Independent School District, Richardson Independent School District, Science and Engineering Education Center, Science and Math Education Department, and the RISD Environmental Education Center. Other formal and informal educational entities are requesting participation in the internship program. These internship opportunities provide quality experiences for our UTeach students that enhance their qualifications for their future teaching careers.

125

Title: UTSA's Noyce Scholars Program

NSF Noyce Award Number: 0433667

Principal Investigator: Joseph Lazor

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Institution(s): University of Texas at San Antonio; Edgewood

Co-PI(s): Richard Diem, Betty Travis, Stuart Birnbaum, and Amir Karimi

Presenter(s): Joseph Lazor, UTSA, Joseph.Lazor@UTSA.edu

Atlee Hutchison, Northside ISD, Atlee.Hutchison@nisd.net

Jennifer Castro, South San Antonio ISD Jen_Castro21@yahoo.com

Project Discipline: Mathematics, Biology, Multidisciplinary Science

URLs: http://www.utsa.edu/gems/Page_noyce.htm

U of Texas San Antonio's (UTSA) Noyce scholars Program supports undergraduate students in the GE2MS Teaching Program as well as post-bac students in the Accelerated Teacher Education Program (A-TEP). Since the beginning of the Noyce awards in October 2004, a total of 42 students have received scholarships or stipends, 23 at the undergraduate level and 19 post-baccalaureates. The three objectives for UTSA's Noyce Scholarship Program are:

- Provide scholarships for STEM Juniors and Seniors and stipends for STEM post-baccalaureates willing to teach science and/or mathematics in high-need schools;
- Provide a focused teacher certification program through collaboration among the College of Education and Human Development, College of Sciences, College of Engineering, and the Honors College; and
- Provide a support system for new teachers in the high-need school districts through a partnership between UTSA and collaborating high-need districts.

During the 2009-10 academic year UTSA awarded the last of the 8 stipends provided through supplemental funds. This will be the last year of the current Noyce Scholarship program at UTSA. The College of Education and Human Development and the College of Sciences have been working together to streamline the teacher certification process. The newly revised College of Sciences degree plans to have a maximum of 120 credits, including the 21 (reduced from 33) credit hours of teacher certification courses.

UTSA continues to collaborate with other universities in San Antonio that have received Noyce awards, along with other colleges and universities involved in teacher preparation. For the past 3 years through business partnerships, awards and recognition have been given to novice math and science teachers each year; a Noyce scholar was one of the honorees during the 2009-10 academic year.

126

Title: UT Permian Basin Noyce Scholars

NSF Noyce Award Number: 0833283

Principal Investigator: Roy Hurst

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Institution(s): University of Texas of the Permian Basin

Co-PI(s): Doug Hale

Presenter(s): Roy Hurst, The University of Texas of the Permian Basin, hurst_r@utpb.edu

Project Discipline: Math and Science

In response to the critical need for K-12 teachers of mathematics and science in Southwest Texas, the U of Texas of the Permian Basin (UTPB) is recruiting and preparing at least 40 highly qualified STEM majors and STEM professionals over a 4-year period to become effective teachers in high-need school districts. UTPB serves a geographically remote area with a large Hispanic population; females and Hispanics comprise more than 60% of the university's enrollment. By reducing the financial barriers and fostering a supportive infrastructure, the project is facilitating the success and retention of teachers of science and mathematics, especially those who are historically underrepresented in STEM fields. The first cohort of UTPB Noyce Scholars were admitted in August 2009. The project is examining factors that motivate STEM majors and professionals to pursue teaching careers, barriers that interfere with the pursuit of a teaching career, and factors that facilitate the success and retention of new math and science teachers.

127

Title: Supporting UT3 Noyce Scholars & Educators

NSF Noyce Award Number: 0733767

Principal Investigator: Charlene M. Czerniak

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Institution(s): University of Toledo

Co-PI(s): Brian Ashburner

Presenter(s): Janice Kusowski and Frederick Saunders, The University of Toledo, janice.kusowski@utoledo.edu

Project Discipline: Science & Mathematics

URLs: <http://www.teachut3.utoledo.edu/noyce/index.aspx>

The UT3 Noyce Scholarship Program provides stipends to professionals with a minimum of a B.S. degree in engineering, mathematics, or sciences. The Program recruits career changers for the Ohio Alternative License. Most students have not been in a University setting for many years and some have not been in a high school or a school setting for over 20 years.

Candidates have the opportunity to enroll in the Exploring Urban Math & Science course where the students explore what it means to teach, learn and know mathematics and science through university classroom experiences and field or school-based visits. Potential candidates also have an opportunity to acquaint themselves with teaching topics that are presented as part of our Cultivating Urban Teachers series, housed on our UT3 Website. Since many of our students have not taken a content test in years, a lending library of PRAXIS books is available.

UT3 Noyce recipients enroll in graduate level coursework that will make them eligible after 5 months for the Ohio Alternative Educator License. The scholars attend all courses together and build a cohort learning community. This year, we will hire an urban science teacher to give an urban school perspective to the Best Practices and Adolescent Psychology courses. The students will be invited to attend the Cultivating Urban Teacher seminars and also participate in an UT3 sponsored Urban Seminar on Behavior, Classroom and Time Management.

The program will provide our scholar educators with induction support to ensure retention not only in the field of teaching, but also in the high needs schools environment and to motivate and engage students in learning. We will use both electronic interactions through the Logitech camera and NING and UT3 Websites and face-to-face interactions. Integration of practice and theory will be available through 2 additional support courses required for the Provisional License. Harry Wong's The Effective Teacher DVD Series will provide an inservice workshop to help the teachers become more effective. In addition, a 1-year salary supplement stipend will be available to UT3 Noyce teachers who complete 1 year of their service obligation. The UT3 office has an open door policy that assists the students through all phases of the process and communicates with them regularly.

128

Title: MfA Utah, SMART Program

NSF Noyce Award Number: 0934894

Principal Investigator: Hugo Rossi

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Institution(s): University of Utah, Utah State University

Co-PI(s): Mary Burbank

Presenter(s): Hugo Rossi, University of Utah, rossi@math.utah.edu

Maggie Cummings, Jordan School District, UT, maggie.cummings@jordan.k12.ut.us

Project Discipline: Mathematics

URLs: www.csme.utah.edu

<http://www.mathforamerica.org>

The poster will include a description of the program with timelines, the selection process, brief bios of our staff members and our current fellows. We will elaborate on our objectives, which include: A corps of highly qualified teacher-leaders that will set up learning communities in their schools. These teacher-leaders will have a Mathematics of Science degree in Mathematics Teaching and national board certification.

129

Title: University of Vermont Noyce Scholarship Program

NSF Noyce Award Number: 0934714

Principal Investigator: Regina Toolin

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Institution(s): University of Vermont

Co-PI(s): Lesley-Ann Dupigny-Giroux and Rory Waterman

Presenter(s): Regina Toolin, University of Vermont, Rtoolin@uvm.edu

Project Discipline: Science

URLs: <http://www.uvm.edu/~noyce/>

The goal of the Noyce Program at the U of Vermont (UVM), in collaboration with Burlington and Milton High schools, is to address the serious deficiency of highly qualified science teachers in the nation's high need schools by identifying and cultivating a total of 67 STEM undergraduate students and professionals who are interested in pursuing a secondary science teaching career. The program is based on innovative and culturally responsive science pedagogy combined with expertise in up-to-date scientific research and is being implemented in 3 parts. First, the program is providing 40 undergraduate freshman and sophomore STEM students with opportunities to conduct scientific research and explore science teaching as a career alongside scientists and science teachers through a 10-week summer science program.

Second, the UVM Noyce Program is providing 12 junior and senior STEM undergraduates who are pursuing science teaching as a career with scholarships and opportunities to engage in professional internship and peer mentorship programs.

Third, the UVM Noyce Program is supporting 15 STEM professionals to pursue coursework at UVM toward an MAT degree and secondary science teacher licensure. A competitive pool of STEM undergraduates and professionals is being recruited through marketing and advertising that is enticed by Noyce stipend and scholarship support. UVM's Noyce Program is seeking to develop and disseminate innovative pedagogical and mentorship practices that effectively recruit, educate and retain highly qualified and committed future science teachers.

130

Title: VCU Noyce Science Teaching Initiative

NSF Noyce Award Number: 0934552

Principal Investigator: Jacqueline T. McDonnough

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Institution(s): Virginia Commonwealth University

Co-PI(s): Alison Baski & Sally Hunnicutt

Presenter(s): Jacqueline T. McDonnough, Virginia Commonwealth University, jtmcdonnough@vcu.edu

Project Discipline: Science

URLs: <http://www.soe.vcu.edu/departments/tl/noyce.html>

VCU's School of Education and College of Humanities and Sciences, in partnership with area school districts including Richmond City, Henrico County, Chesterfield County, and Hopewell City, offer the opportunity for VCU science majors to become secondary science teachers. Undergraduate students were recruited in their junior year and 5 students were selected to participate in the program. These students will observe a high need environment during summer 2010. Three of the students are biology majors, 1 is an environmental studies major and the other is majoring in chemistry. Seven students enrolled in the Masters of Teaching (MT) program were also awarded scholarships. Their content areas are as follows: 2 each in biology, chemistry, and earth science and 1 in physics. We are in the process of recruiting 12 master science teachers, Noyce Teaching Fellows (NTF), using the highly rated Santa Cruz method to work with Noyce Scholars during their 1-year modified residency program. The MT students will be placed in the NTF classrooms starting in late August and lasting through their student teaching experience in spring 2011. The science methods course has been modified to increase the pre-service teachers' cultural competency. The modifications include readings, speakers and community interactions.

131

Title: Virginia Teach Spring-Break Internships
 NSF Noyce Award Number: 0832992
 Principal Investigator: Anderson Norton
 Email: norton3@vt.edu
 Institution(s): Virginia Tech
 Co-PI(s): Jesse Wilkins and Vanessa Pitts Bannister
 Presenter(s): Anderson Norton, Virginia Tech, norton3@vt.edu
 Project Discipline: Secondary Mathematics
 URLs: http://www.mathed.soe.vt.edu/Virginia_Teach/virginia_teach-home.html

Virginia Teach is a partnership between Virginia Tech's (VT) Department of Mathematics, School of Education, and the Montgomery County Public School System. The purpose of the project is to recruit, prepare, and retain more and better secondary school math teachers. The Virginia Teach internship program is perhaps the most innovative, successful, and efficient component. It provides an alternative spring break opportunity for VT sophomores considering careers as math teachers. Interns spend a week working with mentor teachers in 2 of Montgomery County's highest-needs schools. Intern/mentor clusters are formed at each school to foster a dynamic and supportive community that offers opportunities for interns to work in multiple classrooms with multiple teaching styles, and to subsequently discuss their daily experiences with multiple mentors and each other.

Two cohorts of interns have completed the program: 5 in the spring of 2009, and 7 in the spring of 2010. Interest from applicants in 2009 prompted an increase in the number of interns selected in 2010. Project personnel selected the 5 interns from 11 applicants, and the GPAs of selected students averaged 3.88. In 2010, those numbers were 7 out of 18, with an average GPA of 3.70. Several interns have had majors other than mathematics, including Chemistry, Physics, Engineering, and Finance. Exit surveys indicate the program's impact:

- 100% of interns expressed that the experience had a positive impact on their desire to teach secondary school mathematics.
- 55% of interns expressed that the experience had a positive impact on their desire to teach in a high-needs school.

Our success thus far indicates that the Virginia Teach internships provide an effective and efficient means to recruit more and better math teachers for Virginia's schools, especially its high-needs schools. During our poster session, we will share details of the internship design and results.

132

Title: WINS - Wake Innovative Noyce Scholars
 NSF Noyce Award Number: 0934693
 Principal Investigator: Leah McCoy
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 Institution(s): Wake Forest University
 Co-PI(s): Angela King
 Presenter(s): Leah McCoy, Wake Forest University, mcco@wfu.edu
 Angela King, Wake Forest University, kingag@wfu.edu
 Project Discipline: Mathematics and Science
 URLs: <http://www.wfu.edu/education/WINS/>

WINS is a graduate teacher education program in science and mathematics at Wake Forest University (WFU). It is a part of the Master Teacher Fellows (MTF) program at WFU. In the 13-month program, participants earn the teaching license and the Master of Arts in Education. The program recruits, trains, and mentors high school science and mathematics teachers for high need schools. It includes coursework, field experiences, and pedagogical research. Candidates will be mentored through the first 2 years of teaching in professional development and support communities.

This project expands the current program by adding several innovative features so that we can produce more and better STEM high school teachers and support their initial years of teaching to enhance their retention. Our program will initiate a unique combination of training in both STEM content areas and educational practices, including 4 key components: content, pedagogy, diversity, and leadership. The strategies and refinements of the innovative recruitment, training, and induction activities will be analyzed to determine their effect on teacher outcomes as well as 9-12 student outcomes.

The Advisory Board includes 5 WFU STEM faculty: Susan Fahrback in Biology, Rebecca Alexander in Chemistry, Ellen Kirkman and Stephen Robinson in Mathematics, and Dany Kim-Shapiro in Physics. Michelle Klosterman is a science educator in the Department of Education. Jacquelyn Fetrow is Dean of the College of Arts and Sciences and also faculty member in Computer Science and Physics. The final 2 members of the board are high school teachers: Wendy Bartlett teaches math at Parkland High School, and Nicole Guilliams teaches Chemistry at Trinity High School.

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Title: Underrepresented Engineers as Mathematics Teachers

NSF Noyce Award Number: 0630417

Principal Investigator: Robert Olsen

Email: takmal@wsu.edu

Institution(s): Washington State University

Co-PI(s): Tariq Akmal

Presenter(s): Tariq Akmal, Washington State University, takmal@wsu.edu

Project Discipline: Mathematics/Education

Washington State University (WSU) is offering 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 will provide examples they can use in class to provide motivation for the study of mathematics. Middle and/or High School students will benefit from more relevant education (because engineers use math on a daily basis and can provide a real context for lesson topics) and be exposed to professional opportunities that they may not have known about previously. The plan is that the WSU Noyce Scholars will return to their home communities as math teachers.

These new teachers will be well qualified to teach math, will be mentored, will serve as role models and be able to encourage more of their students to pursue professional careers in science and engineering. Recruiting efforts are targeted on WSU students from several counties in south central Washington. 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 2008, the first students completed the program and began their teaching careers. Four Noyce Scholars are now employed in three high need schools in the districts where they student taught, another is in a different high need district in the Midwest. Four Noyce Scholars completed their student teaching in high need schools in 2009-2010 and 4 more will student teach in 2010-11.

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Title: Recruiting Teachers in West Virginia: Opportunities

NSF Noyce Award Number: 0833111

Principal Investigator: J. Kasi Jackson

Email: kasi.jackson@mail.wvu.edu

Institution(s): West Virginia University

Co-PI(s): Johnna Bolyard, Jeffrey Carver, David Miller, Michelle Withers, Michelle Richards Babb, Paul Miller, Jim Rye, and Sarah Steele

Presenter(s): J. Kasi Jackson, WVU Center for Women's Studies, kasi.jackson@mail.wvu.edu

Project Discipline: Women's Studies, Math, Biology, Chemistry, Physics

URLs: http://wmst.wvu.edu/current_students/scholarships_and_awards/teach_wv

WVU's Noyce program aims to recruit 20 students to complete the Benedum Collaborative 5 year teacher-training program. Scholars earn a STEM bachelor's degree in math, physics, biology or chemistry, as well as a master's degree in education upon completing the program. In exchange for 3 years of support (\$10,000 per year), the students will teach for 6 years in high need schools. The first cohort (2009) included 7 students: 5 in math, 1 in chemistry, and 1 in biology. Applications for the second cohort (2010) are currently under review. Recruitment strategies include having current Noyce Scholars visit freshman and sophomore science and math classes to talk about the program and about teaching as a career.

Many current scholars and applicants are West Virginia natives with a strong commitment to returning to their home communities to serve the needs of students. For them, the funding provides needed support to complete their studies without the stress of taking out loans or working to get through school. The program also recognizes the value of their future teaching careers. Further, salaries for West Virginia teachers are well below those of neighboring states and the scholarship thus provides an incentive for the new teachers to remain in West Virginia instead of working across the border. Some of the barriers that we have encountered in our first 2 years of recruitment include fitting the coursework and intensive in-school placements required by the 5-year teacher-training program with the requirements for science majors. Previously, science pre-service teachers had graduated with a multidisciplinary studies degree in general science, instead of a biology, chemistry or physics major.

The project team has been working with education and science advisors to address how to meld these requirements. Many students have opted to take summer classes or extend their studies by an additional year. Additionally, we have received inquiries from other students, generally non-West Virginia natives, who want to teach but who are hesitant to commit to remaining in the state for 6 years after graduation. The project team is currently engaged in strategizing to attract these students to the program and to provide the support they need for a successful teaching career.

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Title: Western Kentucky University Science and Mathematic
NSF Noyce Award Number: 0934804
Principal Investigator: Hope Marchionda
Email: hope.marchionda@wku.edu
Institution(s): Western Kentucky Univeristy
Co-PI(s): Kerrie McDaniel, Janet Tassell, and Vicki Metzgar
Presenter(s): Hope Marchionda, Western Kentucky University, hope.marchionda@wku.edu
Kerrie McDaniel, Western Kentucky University, kerrie.mcdaniel@wku.edu
Project Discipline: Science and Mathematics
URLs: <http://www.wku.edu/noyce/>

Western Kentucky University's Science and Mathematics Alliance for Recruitment and Retention of Teachers (WKU SMARRT) recruiting plan includes a Summer Internship Program designed to help steer undergraduate STEM students toward teaching. Required Educational service hours are meant to solidify a student's desire to choose teaching as a career. The \$10,000 financial incentive is available for qualified juniors and seniors. Preparation for Noyce scholars focuses on augmentations of the current SKyTeach program and will include cyber-mentoring, cyber-networking, and sneak-peeks into professionalism by providing memberships to national math and science teacher organizations and 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 meetings.

During 2009-10, WKU SMARRT implemented the proposed plan and recruited both internship and scholarship applicants. A brochure and website were developed to use in recruitment efforts both on main campus and extended campuses. Visits were made to local high schools and WKU classes to advertise the opportunities that the Noyce Program offered. Relationships with the Minority Teacher Recruitment Center and the Office of Disability Services were established so that we can also focus on recruiting students from underrepresented groups.

The results of the inaugural year were mixed due in part because the number of internship and scholarship applicants was disappointing. For various reasons, there was little interest in the internships. Scholarship application numbers were lower than expected, but we were able to award 4 scholarships to exceptional students. The reasons for low application rates of internships and scholarships will be examined by the PIs and leadership team to determine how these aspects can be improved. On-going evaluation is being conducted by Dr. Terry Lashley and Mr. Chuck English, who worked with the leadership team to identify important factors to be addressed through questionnaires and surveys administered to all participants.

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Title: Noyce Teacher Scholarships
NSF Noyce Award Number: 0934785
Principal Investigator: Bruce E. Larson
Email: blarson@wwu.edu
Institution(s): Western Washington University
Co-PI(s): George 'Pinky' Nelson
Presenter(s): Bruce E. Larson, Western Washington University, blarson@wwu.edu

Project Discipline: Secondary Education/Mathematics & Science Education
 URLs: <http://www.wce.wvu.edu/Resources/Scholarships/Noyce/>

Noyce Teacher Scholarships will be used to recruit additional secondary mathematics and science teacher candidates from the ranks of current STEM majors and career-changing STEM professionals into our existing science education and mathematics education programs. The prospect of a significant scholarship to complete disciplinary studies and the teacher preparation program, combined with an aggressive recruiting plan, will help us get the best students to consider teaching as a career, and draw career changing STEM professionals to Western Washington U (WWU). The primary goal of the TeachWashington Noyce Program is to increase the number of mathematics and science teachers prepared at WWU without sacrificing the proven quality of our graduates. We will award 61 Scholarships to recruit 41 additional 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.

In addition to these scholarships, we will support 59 students to receive summer internships teaching mathematics and science at 2 local school districts. Both districts have an agreement with WWU to place qualified freshman and sophomores interested in STEM majors in their summer school system, primarily to assist students needing science and mathematics remediation. We will select the interns through an active recruitment/application process and prepare them in a 2-day pre-summer workshop introducing ideas about teaching, learning and effective instruction. These workshops will be coordinated by the PI and Co-PI, and will focus on key scientific and mathematics principles students will learn during the summer school sessions. These summer internships will be an important recruitment tool. Many participants who have not considered teaching to be a career choice may do so as a result.

The internships will provide an early opportunity for STEM majors to teach students in a structured academic setting. Both school districts have large numbers of students from low-income families, speak English as their non-native language, and/or are not achieving in the regular-year middle school/high school mathematics or science classes. The 59 summer internships will be spread out over the 5 years, and provide recruitment opportunities beyond the life of the grant.

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Title: Noyce Scholars at WPI and Clark University with Worcester Public Schools (2008-11)

NSF Noyce Award Number: 0733809

Principal Investigator: Robert Traver

Email: rtraver@wpi.edu

Institution(s): Worcester Polytechnic Institute, Clark University

Co-PI(s): John Goulet, Steve Jasperson, Dan Gibson, and Kristin Wobbe

Presenter(s): Robert Traver, WPI, rtraver@wpi.edu

Project Discipline: Math/Sci Education

WPI, an engineering, mathematics and science university and Clark, a neighboring liberal arts university, will together increase the supply of high-quality STEM teachers at the middle and high school level for inner-city districts. With 5 Noyce undergraduate scholarships and graduate stipends per year, 25 high-quality STEM majors will be recruited to, prepared for, and employed in a high-need city school district, Worcester, MA. The broad impact can be shown by the reasonable assumption that each of these 25 scholars, whether they stay in Worcester or complete their service elsewhere, will teach 110 students per year over the duration of the project. Thus, about

NOYCE SCHOLAR/FELLOW POSTER ABSTRACTS

11,000 high-need middle and high school students will be taught. To date, the program has awarded 6 scholarships, 2 in 2008-09 and 4 in 2009-2010. The first 2 scholars begin teaching this fall, 2010.

At WPI, recruitment takes place among sophomore and junior classes, about 1600 students. All are enrolled in STEM majors. A GPA minimum of 3.2, along with other indications of intellectual merit will be required. A diverse pool will be sought and the majority will likely be women, given the demographics of the WPI Teacher Preparation Program. At Clark, recruitment takes place among the mathematics and science candidates for the MAT program. These scholars will have earned undergraduate degrees in mathematics or science and a minimum GPA of 3.2. The Clark program will give priority to members of underrepresented student populations.

At WPI, pedagogical preparation takes place in its state-accredited teacher education program with its research-based psychology and teaching methods courses. Student-teaching practica will occur in the Worcester Public Schools (WPS) and be supervised directly by the teacher preparation program director, a member of the math department. At Clark, the MAT program has an emphasis on intermixing theory and practice in a dynamic, but controlled progression. Students have an 8 month internship which includes mentor teachers working in small teams, acting as reflective practice groups, with support from faculty from the University and partner schools. These internships take place in the same district where the Scholars will be employed.

The new teachers will be supported by WPS through its comprehensive Mentor/Induction Program. The Mentor/Induction Program provides 1) an in-depth orientation, 2) a trained mentor, and 3) a 16 week, 40 hour beginning teacher institute for both years 1 and 2. Noyce scholars will provide 2 years of teaching for each year that they receive a Noyce scholarship. The director of the WPS Mentor/Induction Program is a member of the governance team of the project and serves on the scholar selection committee for the WPI portion.

NOYCE SCHOLAR/FELLOW POSTER ABSTRACTS

S/F1

Title: On-site Collaborative Planning, Observation, Reflection, and Critique: Fodder for Effective Instruction and Pupil Achievement in Chemistry

Presenter(s): Philip Pietrangelo

Email: pietranp@gmail.com

Current Noyce Scholar

Institution: Boston College

School Name & District Currently Teaching: Brighton High School/Boston Public Schools

Project Discipline: Chemistry

In order to improve one's pedagogy, there must be constant and recursive revision of instructional techniques and strategies. Current literature points to strategies of peer observation and collaborative self-study that play an important role in the revision process, but little is said of the impact on teacher effectiveness regarding student learning. In fact, most studies use teachers' opinions and self-reflections as evidence of effective improvement. Little research shows a correlation between observation-based revisions and student learning. Due to the unique nature of my teaching situation, I have been able to immediately revise and rethink my pedagogy based on on-site

observations. These opportunities, along with continual reflection and critique, have proven to be a system of success for developing comprehensive instruction and curriculum that promotes student learning. This study takes a direct approach at measuring the impact of observation and reflective judgment on student learning and the benefits it has for teacher learning and practice.

S/F2

Title: A Community of Noyce Scholars at Cal Poly Pomona

Presenter(s): Steven Brooks

Email: brooks@csupomona.edu

Current Noyce Scholar

Institution: California State Polytechnic University, Pomona

Project Discipline: Math

Cal Poly Pomona has sponsored 5 future mathematics and 2 science teachers as Noyce Scholars during academic year 2008-09. Six were supported the previous year and the seventh is an undergraduate mathematics major. All scholars with the exception of one are from underrepresented groups.

This project has sponsored a total of 36 Scholars, 24 of whom are from underrepresented groups, and 26 who are female. As of June 2010, 21 Scholars have earned preliminary credentials—10 in mathematics and 11 in the sciences. Of the 4 who have completed their teaching obligations, 3 are still teaching in high need schools. Nine Scholars either had/have earned, or are currently working on advanced degrees within STEM fields.

Our scholars meet in monthly seminars to provide a sense of community as well as opportunities for networking, advising, and learning. This year's seminar topics included: "Classroom Management," "English Learners and Literacy for Academic Success," "Credentialing in CA, from Cal Poly through BTSA," "Panel Discussion with Early Career Science Teacher," "Extra Money and Extra Connections with Students: Getting Involved at Your School," "Addressing Special Needs in the Math and Science Classroom," "Making Math & Science Relevant: An Industry-Education Partnership," "Resume Workshop," "Reading and Using Graphs," "Interviewing for Teaching Jobs," and "Technology for Powerful Thinking in the Math/Science Classroom." Many of our new applicants cited becoming a part of the Noyce Scholars' community as one of the reasons for applying.

In April 2010, 6 scholars and both PIs attended the Western Regional Noyce Conference held at CSU Fresno as a way to network with scholars and staff from the other projects. Three scholars will attend the Noyce workshop at CSU San Luis Obispo in June. The scholars find that the workshops are very valuable as they help to prepare them for their own classrooms.

We have an ongoing partnership with International-Polytechnic High School (I-Poly) located on the Cal Poly Pomona campus. Some of our Noyce Scholars visited I-Poly to observe and assist with mathematics and science instruction. This partnership maintains a connection between Noyce Scholars and teachers in the field.

Honor sashes have been presented to the Cal Poly Pomona Noyce Scholars who will wear them at graduation ceremonies now and in the future as part of their academic regalia.

S/F3

Title: NOYCE : Nurturing Opportunities for a Young Committed Educator

Presenter(s): Guadalupe De La O

Email: gdelao525@yahoo.com

Current Noyce Scholar

Institution: California State University Long Beach

Project Discipline: Biology

My experiences as a CSULB Noyce Scholar, including being a teaching associate for CSULB's Young Scientists Camp, attending many professional development workshops, and most importantly, tutoring at Long Beach Polytechnic High School, have contributed to my professional growth. The workshops have increased my knowledge about classroom management, building relationships with students, and the vast amount of resources available to science teachers via content builders such as MERLOT, NSTA, and NSDL. The tutoring hours allowed me to apply what I learned in the workshops.

Poly High is a culturally and academically diverse high need school in the Long Beach Unified School District, with 60.1% of students receiving free or reduced lunch. I have had the privilege to work with honors students, at-risk youth, and English language learners who have taught me that a teacher does not simply convey lessons to students, but rather is a jack-of-all-trades—engaging, motivating, counseling, and challenging students—so they may succeed in a positive environment. I have begun to develop my pedagogy which revolves around assisting high need students, ensuring that they are given the opportunities they deserve to excel and break free from debilitating social pressures. The Noyce program has increased my confidence as a pre-service teacher and has provided me with tools that will be forever useful in the classroom. Also, the financial support provided by the scholarship will help me finish my teaching credential. I now feel better prepared to do my student teaching and to survive my first few years of teaching.

S/F4

Title: Inquiry Based Lab Activity to Universally Access English Learners and Special Populations

Presenter(s): Sehel Khan

Email: skhan@hawthorne.k12.ca.us

Noyce Teaching Fellow

Institution: Claremont Graduate University

School Name & District Currently Teaching: Hawthorne Math and Science Academy

Hawthorne School District

Project Discipline: Biology

To allow students from diverse backgrounds, low academic levels, and low English proficiency levels the opportunity to become more involved in Biological science experiments, I took a lab that followed the basic protocol of DNA Extraction and turned it into a inquiry-based lab activity that asked students to research various methods of DNA extraction, formulate their own hypothesis about DNA extraction from organisms of their own choosing, and design and carry out an experiment to test their hypothesis. As a result, they were more involved in the scientific process and felt more vested in the results of their experimentation. In addition, I found that these students took a greater interest in the study of Molecular Biology, and their proficiency level in this area on the California Standards increase dramatically.

S/F5

Title: Investigating the Teaching of Higher Order Application Problems: The Procedural Method vs. The Conceptual Method

Presenter(s): Fredericka Blackwell

Email: Co_blackwell@yahoo.com

Current Noyce Scholar

Institution: Clark Atlanta University

School Name & District Currently Teaching: Fulton County

Project Discipline: Math

Students in America have difficulty solving higher application word problems and do not do well in the TIMSS (Trends In Math and Science Study) compared to students in other countries. I believe that there are three main reasons that US students have difficulty answering higher order application/word problems: (1) Reading—students do not seem to follow directions and students do not understand where to start; (2) Structure—students do not know how to structure their word problems, and do not understand who, what, when, where, or how to solve the problems; and (3) Critical Thinking—students do not understand what method would help solve which problems.

S/F6

Title: Manipulatives: Helpful or Not?

Presenter(s): Courtney Greene

Email: courtneyvgreene@gmail.com

Current Noyce Scholar

Institution: Clark Atlanta University

Project Discipline: Math

This research will investigate the role of manipulatives in the mathematics classroom. My research on using manipulatives with students will compare two classes that will be given the same lesson plan, but one will be using manipulatives and other will not be using these materials. There is a debate in math education over the use of manipulatives. There is a need to assess whether teachers are using too much or too little today in order to help their students comprehend and recall their knowledge. I will be researching to see if the manipulatives are helping or hindering the students. Manipulatives such as Algebra tiles or Algebra Blocks will be used in this research and any other handmade manipulatives that are appropriate for the lesson. There is a right and wrong, correct and incorrect way of using and introducing the manipulatives.

With a Mixed method methodology, comparing two classes with the same basic achievement level, I will use formative and summative assessments to see which class is better off with manipulatives or without. Do they make a difference? Are they overused or not used enough in the classroom. As often debated, it may all depend on how the teacher uses the manipulatives.

S/F7

Title: Hosting a Regional Noyce Conference
Presenter(s): Carol Lund and Jonie Smith
Email: clund@clemson.edu, jbsmith27@bellsouth.net
Current Noyce Scholar
Institution: Clemson University
Project Discipline: Math

This poster will be about the mini-regional Noyce conference held in March in Greenville, SC for NC, SC, and GA projects.

S/F8

Title: Life as a Science Problem: Collaborating toward a Common Goal in the Classroom
Presenter(s): Bradley Stylman
Email: bsstyl@gmail.com
Current Noyce Scholar
Institution: College of William and Mary
Project Discipline: Biology

I spent the past year as a Noyce scholar, with the intention of teaching for two years in a high need school and implementing techniques that I learned at the College of William and Mary School of Education. I also spent time in Indonesia studying coral reefs, took a class entitled "How Students Learn," and worked as an AVID tutor.

During my student teaching, I was able to implement strategies that helped students understand their schoolwork, grasp new ideas, and see the same concept in different ways.

The approaches that I applied could be useful in a high need setting, and can be implemented in a variety of ways. Concepts that can be difficult to understand or problems that need solving can be approached in a collaborative environment, using specific strategies that can help students chunk ideas together and see them differently.

Working in collaborative environments can help students internalize overarching concepts in science. The collaborations can aid them in transferring those concepts to real-world situations, where students can engage in problem solving. Those real situations can be everyday, environmental, or ecological issues. For example, families who practice subsistence fishing or farming slowly degrade the environments in which they live, however, these practices are vital for their personal livelihoods. These problems can be transferred to an urban area when a family changes their personal habits in order to protect the environment, only to watch their neighbors engage in wasteful practices detrimental to a clean and safe neighborhood, which shows how students can relate to their everyday lives.

Problem solving in Biology can help students relate to their real world problems. Together, the students can develop potential solutions. As I move into my first teaching position, I look forward to answering the question of how well can I make these strategies work in a high needs school, and eagerly anticipate the challenges that these strategies will bring.

S/F9

Title: Duke MAT Program: Building Authentic Experiences and 21st Century Skills in New Teachers

Presenter(s): Suzanne Sikes

Email: suzanne.sikes@duke.edu

Current Noyce Scholar

Institution: Duke University

Project Discipline: General Science

The Duke University MAT program provides students with a minimum of 800 hours of classroom teaching as a student intern and access to a wide variety of professional experiences. Each student may choose unique coursework in their discipline to complement both experience and interest in science. The coursework can be completed in one year and culminates in comprehensive licensure in the sciences. Cohorts are selectively small (12-15) to foster camaraderie and collaboration among the participants and across disciplines. Although students are grouped by discipline for their subject area methods course and elective coursework, there is a concerted effort to collectively discuss and reflect on current topics in education as an interdisciplinary approach to professional development. Examples of such interactive reflection include but are not limited to participation in book studies, blogs that address topics in education, and preparation of digital stories. Duke coursework also promotes training in 21st century skills for their graduate students and awareness of those skills for transfer to high school students in their classes. Noyce fellows collaborate with teachers and scientists to design laboratory and field science activities, build a toolbox of literacy strategies, and practice technologies that facilitate personalized learning experiences for students

S/F10

Title: A STUDENT TEACHING EXPERIENCE: Using Student-centered Teaching Methods to Improve Student Learning in the Science Classroom

Presenter(s): Vicki McCloskey

Email: v.s.mccloskey@iup.edu

Current Noyce Scholar

Institution: Indiana University of Pennsylvania

Project Discipline: Biology

This study shows the pre- and post-test evaluations from the Cellular Structures and Functions unit for students in a 9th grade Honors Biology in a central Pennsylvania urban school whereby the district is ranked 146th out of 576 schools. By utilizing different methods of student-centered teaching and various assessment tools, students showed a significant improvement in their critical thinking skills over the course of a nine week marking period, with an increase in retention and recovery.

Several different assessment strategies were used throughout the marking period to evaluate student learning. In one instance, students were given a scenario along with five objectives to be met in accordance with the Pennsylvania Standards. The introductory portion of this unit was microscope handling and use. Students used a website for the first two days to learn microscope history and part familiarization. Several laboratory assignments were used for assessing knowledge of microscope as well as use and proper techniques. At the end of this first portion, the students took a test on proper handling, history, knowledge, and cell structure using Cells Alive.

The objective for the first part was to have students become familiar with the microscope and cells. The second part of this unit had the students working in groups of three or four to create a story, complete with a model, to teach fourth grade students about cells. The groups used the computer, their books and class resources to create their own story with a model that followed one of the two types of cells. They were to present their story along with the model to class.

During the project, the students had to turn in a word bank, a step-by-step outline of their story, take a scenario quiz, give a presentation and take a final unit exam. These were used to assess the students' learning and recall. By enabling the students to be responsible for their individual learning, the post-test summative assessment scores increased significantly. The pre-test indicated that only 15% of the students recalled the basic cell terminology of structure and function from the 7th grade.

After the post-test evaluation, which included parts one and two of the unit, the students showed an 88% increase in their scores, indicating that their overall recovery of prior knowledge and new knowledge improved significantly.

S/F11

Title: Building a Scientific Community Within the Physics Classroom Through the Use of Interactive Discourse

Presenter(s): Rebecca Hoover

Email: trieste13@gmail.com

Current Noyce Scholar

Institution: Kennesaw State University

Gwinnett County Public Schools

Project Discipline: Physics

A science teacher's primary job is to teach her students science. Including her secondary, tertiary, etc. tasks, she must balance several goals at once in order to accomplish the teaching of science. Embedded within the primary task is a variety of considerations including, but not limited to, teaching state- and national-prescribed curriculum objectives, following school- and district-determined learning goals, providing historical and relevant contexts, instilling a scientific mindset, preparing students for future science classes, and equipping students with lab skills. It is within any science teacher's interest to develop a form of instruction that will most effectively incorporate all of these teaching objectives which fit into the overarching goal of preparing students for life after high school. Through my own research and experience, the method I believe is most effective is in building a scientific community within my high school Physics classes through the use of interactive discourse, inquiry-based lessons, and scaffolding of Physics knowledge. This paper focuses mainly on interactive discourse as this method has relatively little research and use in the modern classroom. Through action research, I hope to develop a reliable set of guidelines for effectively implementing interactive discourse in the science classroom, and more specifically in the high school Physics classroom.

List of science teaching methods as taught by KSU MAT professors with key pedagogical features discussed:

- Radiometer Activity
- Changes Lesson (framing)
- Adiabatic Expansion/Compression Discussion
- History of Science Lesson Plan

- Hand-Warmer Experiment and Predictions

Outline my capstone project and how the above methods influenced my research design:

- Building a Scientific Community Within the Physics Classroom Through the Use of Interactive Discourse
- Overall implementation design for my first year of teaching

S/F12

Title: The Controversy of Teaching Evolution in the Science Classroom: Social vs. Scientific Disagreements

Presenter(s): Robert Feissner

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Current Noyce Scholar

Institution: Nazareth College

Project Discipline: Biology

Controversies in science education often grow out of non-scientific beliefs. The theory of evolution, for instance, is almost universally accepted by scientists and is not generally considered controversial despite disagreements on some elements of the theory. The controversy of teaching evolution, however, is hotly debated by scholars, students, clergy, and society, many of whom have a limited understanding of the nature of scientific inquiry. Controversies that involve the teaching of scientific principles that challenge or undermine moral or spiritual beliefs are among the most fiercely polarizing. In this critical analysis, the ideological values informing the theories of evolution and Intelligent Design are analyzed to understand the basis for the conflicting viewpoints. Additionally, pedagogical approaches to teaching evolution are evaluated to guide educators towards a scientifically rigorous, democratic and culturally relevant biology classroom.

S/F13

Title: How Teachers' Instructional Choices Affect Students' Perceptions of a Science Center Field Trip: Five Cases

Presenter(s): Meghan Briggs

Email: briggs.meghan@gmail.com

Current Noyce Scholar

Institution: Portland State University

School Name & District Currently Teaching: Springfield Public School District 19

Project Discipline: Elementary Science

Teachers use field trips to science centers for a variety of reasons. Research has shown that a moderate level of structure on visits to science centers leads to the most positive learning outcomes, but little is known about how structure and instructional choices relate to their effects on students' science attitudes and other affective outcomes.

This study looks at the one-day field trips of two fourth-grade and three fifth-grade classes to a free-choice science center in the Northwest. These classes were selected from a pool of classes that had registered to visit the science center in the fall of 2008. Interviews were conducted with the five teachers and with two boys and two girls from

each class. Pre- and post-field trip questionnaires were completed by 98 students. Field notes and interview data were analyzed using grounded theory open coding.

The results are presented in the form of five case studies. Qualitative data collected on the questionnaires about students' attitudes toward science was found to be statistically insignificant. The results from the case studies suggest four major themes. First, students' understanding of the purpose of their field trip and the ties to the curriculum come from the clarity of communication of goals and objectives given by the classroom teacher. Second, worksheet assignments can be used on field trips to enhance student learning without negatively affecting the students' attitudes toward their trip. Third, orientation activities and field trip follow-ups strongly influence students' perceptions of the field trip. Finally, the use of chaperones is diverse, and the different ways that teachers choose to use them can affect the students' perceptions of their trip.

This study's findings suggest that teachers should set and communicate clear field trip goals and expectations to their students, carefully consider the use of worksheets and other instructional-aids, take time to do orientation activities and follow-ups and, finally, prepare chaperones to help them meet their field trip goals. For science centers, these results suggest that any help that can be given to assist teachers in completing the aforementioned tasks will help improve the students' opinions of their trip.

S/F14

Title: Solar System in Your Hands

Presenter(s): Brittany Hinyard

Email: Brittanyshinyard@alumni.lsu.edu

Current Noyce Scholar

Institution: Southern University and A&M College

School Name & District Currently Teaching: Baker Middle School

City of Baker School System

Project Discipline: Biology

This inquiry-based activity created a forum for middle school science students to learn about the solar system. Students were placed in groups and asked to predict the actual relative size of the planets. Their content knowledge about the solar system was assessed using an inquiry-based tool to determine how much knowledge was gained from this activity.

S/F15

Title: Opportunities Which Develop Future Science Educators at Texas Tech University

Presenter(s): Sean Lee

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Current Noyce Scholar

Institution: Texas Tech University

Project Discipline: Science Education

A student at Texas Tech University (TTU) has many paths to take for an academic career. For an individual attending the university with the intent to enter the field of science education, several programs exist which elevate the quality of the experiences, give valuable opportunities and develop mastery of the science content and pedagogy of a future educator.

The TTU Noyce Scholars Program is one such program which awarding Scholars with stipends, pairs them with a mentor in the chosen field of science or math, engages them in summer K-12 teaching experiences, funds travel to regional and national education conferences with opportunities to present, and encourage interaction with members of the TTU scientific community through departmental seminars.

The TTU/HHMI Science Education Scholar Program in the Center for the Integration of Science Education and Research (CISER), funded by the Howard Hughes Medical Institute, recruits undergraduates with goals of teaching in STEM content areas and provides scholarships and travel funds for professional opportunities. This outreach program builds pedagogy and content foundation for scholars through mentoring provided by successful clinical educators. Each scholar is supported to develop pre-college teaching materials and design, organize and deliver in-service workshops for teachers at local, state and national levels. Scholars also plan and deliver a variety of precollege camps and special events in the community. An unique component in scholar preparation is a summer research experience in the content area with a university professor.

The TTU College of Education Secondary Education Program designs a path for pre-service teachers with the goal to prepare creative, innovative, and professional educators who view themselves as agents of change, committed to the welfare of children and who have the understanding, attitudes and skills necessary for effective teaching in the secondary classroom. TTU students learn with clinical educators in university classes and engage in field-experiences in local schools to gain valuable classroom exposure and experience.

All three programs build and collaborate with one another, allowing for professionally trained, highly qualified, prepared individuals ready to excel in classroom teaching.

S/F16

Title: Trinity University Mathematics/Science Partnership

Presenter(s): Kristen Miceli

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Former Noyce Scholar

Institution: Trinity University

School Name & District Currently Teaching: Salado Intermediate School, East Central ISD

Project Discipline: Education

The initial Noyce Scholarship program enabled us to secure additional resources from a local foundation to further support teacher candidates. An innovative professional development initiative at two schools, Bowman Elementary and Henley Academy, in a large urban district in south central Texas was launched. Bowman has a relatively young faculty, a 40% mobility rate, and slowly improving state achievement scores. Henley, a long-time Trinity partner, has experienced faculty and strong state achievement scores. In addition, it is a Professional Development School where Trinity candidates conduct year-long internships.

The formal partnership with the urban school district provides job-embedded, on-site, sustained professional development in math and science at the two schools. Last fall, Trinity's math and science educators began working with 3rd - 5th grade teachers to improve student learning and strengthen teacher practice by providing individualized support in teachers' classrooms and through facilitated group learning, including weekly/monthly planning sessions with grade-level teams.

In this pilot year, we administered teacher efficacy and student attitudinal surveys, held focus group interviews with teachers and administrators, gathered state achievement data, and designed and piloted new performance-based assessments to supplement state achievement data. We continue to collect student-level data.

Participating teachers report feel more comfortable teaching math and science in their classrooms and have identified changes they have made in their practice. Trinity teacher candidates, including a Noyce Scholar and pilot “Career Changer” benefited from support received from Trinity faculty. Finally, our experience at the two school sites differed markedly in terms of teacher buy-in and administrative support. These differences led one school to decide to terminate their participation in the project after the pilot year.

In year two, our focus will be on the alignment between instruction and assessment. We will develop alternative assessments, beyond state standardized tests, that will inform teachers about what their students know and can do, while engaging students in meaningful, substantive work. We seek to provide assessment opportunities that allow students to do math and science, not to test concepts.

S/F17

Title: A Comparison of Junior High and High School Student’s Conceptual Understanding of Newtonian Mechanics

Presenter(s): Christopher Sharp

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Current Noyce Scholar

Institution: University of Arkansas

Project Discipline: Physics Education

Secondary teachers, particularly in high school settings, may expect students to have a clear and accurate understanding of basic physical science topics in mechanics upon which to build more complicated subjects. Since much of an elementary or middle school student’s understanding and misunderstandings of mechanical physics derives from personal experience, it is worthwhile to consider the effect that more experience and age will have on a student’s conceptual understanding of Newtonian mechanics. A correct conceptual understanding of Newtonian mechanics requires a student to be able to describe motion in terms of forces and the effects that forces have on motion, especially through Newton’s laws of motion. This project sought to learn if and how student misconceptions in situations involving forces evolve between middle school and high school with the added years of experience and physical science instruction.

The results of this study indicate that there is little difference in the performance of junior high and high school students that are not enrolled in a physics class. It is clear that students hold misconceptions about Newtonian mechanics, and these misconceptions are well-entrenched by the junior high stage. High school physics classes do have an effect on students’ qualitative understanding of forces and Newtonian mechanics, but even the polled physics students do not show a firm understanding of the content and its application.

S/F18

Title: Measuring the Age of the Universe from Your Own Classroom

Presenter(s): Stephanie Morgado

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Current Noyce Scholar

Institution: University of California, Berkeley

Project Discipline: Astrophysics

With progress being made on how people learn and experience science, it is becoming clear how crucial it is that science and math education take a metacognitive approach to classroom instruction. Few examples of such learning exist in the Department of Energy astrophysics, and research and development is needed to test and bring these ideas to practice. This project delves deep into science education research, and asks if students are able to grasp fundamental scientific elements by using inquiry based instruction to engage students to think critically about scientific questions (as opposed to the traditional approach of lecture based fact memorization). The developed curriculum will demonstrate how students outperform those whom were taught traditionally. Additionally, with such achievements in pedagogy and content, this project aims to show remarkable improvements across lower-achieving students.

A hands-on lesson was developed to teach students how to measure the age of the universe by looking at Type Ia supernovae images along with data collected from the Sloan Digital Sky Survey. This lesson will show students how to measure the distance of objects by measuring their brightness, simple kinematics and then to use these as tools to explore how the Hubble Law is a natural result of the expansion of the universe. This lesson plan was tested by middle and high school science teachers in two workshops, aiding in the restructuring of the lessons. Present conclusions are that the audience has very primitive theories about the birth and expansion of the universe and this unit in its early stage already is succeeding at helping change their ideas about fundamental physics. Nonetheless, the reception from the audience has been extraordinarily positive, with much anecdotal evidence showing educational gain.

The next step for this curriculum is to test it out with groups of middle school students and develop some pre-post assessments to demonstrate educational gain. This unit will be translated into Spanish, to further make this unit global as well as making it available to English Language learners in U.S. classrooms. Ultimately, this project will contribute to further developing curricula that will foster students' interest and inquiry in the sciences.

S/F19

Title: Got Inquiry?

Presenter(s): Deauna Mansfield

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Current Noyce Scholar

Institution: University of California, Santa Cruz

School Name & District Currently Teaching: San Benito High School

San Benito High School District

Project Discipline: Chemistry

It has become a common vision in science education that all students would be taught using inquiry methods. It is a challenging goal, however, given that many students are unaccustomed to asking questions and seeking answers. How then, do we begin leading students down the path of inquiry? I outline a week-long investigation activity designed to promote inquiry in a middle school classroom with novice investigators.

S/F20

Title: Inquiry for Everyone

Presenter(s): Michael Ralph

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Former Noyce Scholar

Institution: University of Kansas

School Name & District Currently Teaching: Olathe School District, USD 233

Project Discipline: Biology

In fall 2009, two teachers applied a new curriculum in general biology classrooms with a researcher's approach. Two classes were chosen at random. Those classes used a set of course materials heavy in labs and activities (approximately 60% of all days contained a lab or activity), while the rest of the school's biology classes remained unchanged. The labs ranged from observations of organisms as their life cycles intersect to testing commercial food products for their constituent macromolecules to ecological biomonitoring and field work. The students also used many hands-on models and activities, including simulations and manipulatives. They had access to computers on a daily basis, used a class website, and had a classroom response system (clickers). Finally, they did not use a chosen classroom textbook. Instead the students became proficient in note taking skills and used their science notebooks as a vital resource for success.

Data was then obtained from the new classes. Standardized test scores were compared between classes. In addition, student opinions and feedback were obtained through written documents, class interviews with the principal, and a video interview. The results were overwhelmingly positive. Each class contained "typical" students, including those who are not usually considered for activities and labs due to behavioral problems and poor academic history. In addition to subjective increases in the students' opinion of science, achievement on standardized tests, both district and state tests, increased significantly. Their success in this setting prompted the staff to expand this approach to more biology classrooms. I hope that sharing the results from this on-going project can prompt teachers to take a more hands-on approach in their classrooms.

S/F21

Title: Learning Stations: Exploring Concepts, Speed-Dating Style

Presenter(s): Michael Calzi

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Current Noyce Scholar

Institution: University of Rochester

Project Discipline: Earth Science

Engaging a diverse group of students in their own learning by grounding them in personal exploration of core science concepts is a daunting task. Research highlights the need to explore phenomena before using formal

scientific language. We also learn better by doing, but how can we, as teachers, facilitate such investigations within the tight constraints of a classroom given the diverse student interests, backgrounds, and needs? This poster describes how I used learning stations in my student teaching placements. Like any instructional strategy, all uses of learning stations are not created equal.

I will highlight best practices by:

- Sharing my assumptions about learning and teaching that ground my decisions with this method;
- Highlighting the nuanced aspects of implementation that make the use of learning stations unique and effective; and
- Offering you a template/tool that represents the key aspects of implementation.

I will do this work in the context of two real examples from my implementation of learning stations. First, “explore and jigsaw learning stations” were used to introduce an energy unit by exposing students to the equipment and engaging them in predicting, diagramming and describing related concepts, and becoming an expert at one station and teaching this concept to the class. Second, “authentic assessment preparation learning stations” gave practice with a variety of real-world techniques that led to an experience of conducting an actual archeological dig. Explicitly giving students the roles of investigator and teacher inspires students to go further and deeper in constructing an understanding of a concept

S/F22

Title: Let's Diffuse Our Way Through, Using Two-Step Equations

Presenter(s): Daree Yancey

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Noyce Teaching Fellow

Institution: University of Texas at Arlington

School Name & District Currently Teaching: Carter Junior High, Arlington, Texas

Project Discipline: Math

In order to relate to seventh grade math, two-step equations will be used to illustrate how mathematicians can quantify biological processes. In this workshop we will demonstrate a lesson that was taught to the students in which we illustrated a vertical strand between the fellow's research and the classroom curriculum. Participants will actively engage in lesson by completing a diffusion lab and creating the manipulatives that the students made this year. This lesson is focused on the diffusion of a substance and the numerical solution of the diffusion equation. We illustrate how a mathematician might develop a numerical scheme to simulate diffusion by completing a mathematical exercise using two-step equations.

As a part of the NSF GK-12 Project, the graduate fellow was in a seventh grade classroom for ten hours a week. With assistance from his mentor teacher, six lesson plans were developed to teach throughout the year. The workshop will begin with a short presentation that will give an overview of the GK-12 program at The University of Texas at Arlington as well an introduction to the graduate fellow's research in applied mathematics with a focus in computational neuroscience. An overview other lessons that the fellow mentor pair created over the past year will also be presented. In addition to the diffusion lab lesson, the fellow mentor pair will demonstrate some additional technology, provided by NSF funds, that was used to aid in teaching other lessons to the students.

S/F23

Title: PBI with Robotics
Presenter(s): Cyrille Chiari
Email: cxc078300@utdallas.edu
Current Noyce Scholar
Institution: University of Texas at Dallas
Project Discipline: Physics

This poster will be about how, with the SEEC, we have managed to teach and combine science, mathematics and language arts in a way that was engaging and made sense to the students

S/F24

Title: Individualized Remediation Using Math Apps
Presenter(s): Tina Eagar
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Teaching Fellow
Institution: Utah State University
School Name & District Currently Teaching: Catalyst Preparatory Academy
Box Elder County School District
Project Discipline: Mathematics

Math abilities can vary widely within a single class. This forces teachers to waste valuable time bringing underperforming students up to speed. To help students catch up (and keep up), teachers need aids that can be tailored to a specific student. Here we present the Math App, a novel teaching aid that can be easily customized and deployed. This fun and entertaining aid can be used in an individual or laboratory setting. We have found that these aids enhance student mastery, as well as provide an effective means for individual tutoring and remediation

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