



## College of Education and Human Development George Mason University

### Policy Report: Supporting New Science Teachers, What School Leaders Can Do

Dissemination of findings from the New Science Teachers' Support Network (NSTSN) is gaining momentum due to the impact of this program on increasing students' SOL science test scores. In a policy report shared with the Virginia Math and Science Coalition and a meeting of superintendents in Southwest Virginia held at the Southern Virginia Higher Education Center, policy recommendations were shared based on lessons learned working with teachers enrolled in the NSTSN. Data-driven policy recommendations from the report, *Supporting New Science Teachers: What School Leaders Can Do*, identify changes that must occur to better support new science teachers so they remain in the profession and succeed in teaching. NSTSN is a collaborative research project involving George Mason University, Fairfax County Public Schools, Prince William County Public Schools, and Arlington Public Schools. Dr. Donna R. Sterling is the principal investigator, and Dr. Wendy Frazier is the program manager. Using a treatment-control group design, the NSTSN has a proven record of success in supporting new science teachers with students of treatment teachers scoring significantly higher than the students of control teachers on SOL science tests. We encourage you to read this report and share it with your school and school division leaders. See <http://cehd.gmu.edu/crest/researchprograms/nstsn/>

### Science Explorers Training for Elementary Teachers in Alexandria City Public Schools

CREST worked with teachers from Jefferson Houston School for Arts and Academics and Cora Kelly School for Math, Science, and Technology in Alexandria City Public Schools to reach for the stars as science teachers. Program evaluation data shows that teachers who participated in training made significant gains in their science content knowledge and confidence for teaching science. "It was an amazing experience to work with the teachers to conduct

action research on how to help students learn best, and the results show that we really can make a difference in the classroom" said Wendy Frazier (Co-PI). Directed by Donna Sterling (PI), participating teachers attended Saturday training sessions for collaborative planning and action research and a summer two-week training on energy led by Frazier, Sandi Slaven (Alexandria), Marty Lindeman (Prince William), and Harold Geller (Physics Professor at GMU) with the guidance of Melissa Hamilton (Alexandria's Science Curriculum Specialist). Amy Bordeaux, a former doctoral student in science education leadership, is working with CREST on case study research about the experiences of science laboratory teachers in these two elementary schools.

### Motor Mania Summer Camp 2009

Get ready...get set...go!!! From June 22 to July 2, CREST will be offering a summer science camp to students entering 5<sup>th</sup>, 6<sup>th</sup>, or 7<sup>th</sup> grade. Through the "Motor Mania" theme, campers will investigate automotive engineering and safety; design, build, and test models; use multiple forms of technology; participate in a Grand Prix challenge; and, visit scientists in their labs. For complete information, including an application form, go to the camp website at <http://cehd.gmu.edu/crest/camp/>.

### Awards

- CREST received the Virginia Mathematics and Science Coalition's Programs That Work Award for Teacher Education Programs: CREST Science Camp for Students and Preservice Teachers 2008.
- Wendy Frazier received a George Mason University Summer Research Award for Tenure-Track Faculty Summer 2008.
- Wendy Frazier has been designated as a finalist for a GMU Teaching Excellence Award 2009.
- Kim Heddings received the fall 2008 Science Education Leadership Program Award for Science Education master's degree students.

### Science Graduate Students Assist in Elementary Schools

The second group of SUNRISE (Schools, University 'N' (and) Resources In the Sciences and Engineering) fellows started in July 2008 at Mason. These fellows are graduate students in science who are assisting in elementary school classrooms with science classes. This new NSF funded program is aimed at partnering STEM (science, technology, engineering, and mathematics) graduate students with school teachers. Eight schools in three school divisions (Fairfax County, Manassas Park City, and Alexandria City Public School) are partnering with Mason on this project. The need for SUNRISE project arises from the critical need to address the challenging issues in K-12 education and to contribute toward the national effort for improving our educational enterprise. The first year in the program, the science and engineering graduate students enhanced science lessons and shared their own graduate research with students in grades 4-6. For samples of these lessons, visit <http://sunrise.ite.gmu.edu>.

### Learning Through Problem Solving: Stars and Splash Summer Camp 2008

CREST offered two sessions of camp this past summer. During *Exploring Space*, students were tasked with determining where NASA's missing Patriot probe was located using intermittent data provided by the probe. In *Watershed Mysteries*, students worked to find out why the local duck population was experiencing a reduction in numbers and provide data-driven recommendations. With grant funding from SCHEV, 20 scholarships were offered to local elementary schools participating in Mason's Professional Development School program. Fieldtrips included visits to Mason's pond and observatory as well as Gunston Hall Plantation, Great Falls Park, and Udvar Hazy Air and Space Museum. Preservice master's degree teachers in Mason's PK-6 teacher licensure program planned and taught camp with the support of CREST's Wendy Frazier and Mollianne Logerwell. Donna Sterling served as resident scientist with science content faculty CREST associates Dr. Harold Geller (astronomy) and Dr. Randy McBride (oceanography). Preservice teachers shared their curricula and camp experiences at VAST PDI held in November, 2008.

### High School Teachers Serve as Technology Specialists in Science Methods Course

In their advanced science methods course (EDCI 673) preservice secondary science teachers learn how to use educational technology by partnering with

an inservice teacher in their science content area. Over the course of a month, they learn about various content-specific technologies used in science classrooms. Many thanks to the following inservice teachers from Fairfax County Public Schools for serving as technology specialists in EDCI 673 for Fall 2008: Janet Soules (Earth science) Mount Vernon HS Center, Tony Rugari (physics) Edison HS, Donna West (chemistry) Woodson HS, and Debbie Meinholdt (biology) Edison HS.

### Doctoral Students Teach Mason Science Education Courses

Mollianne George Logerwell is teaching the advanced science methods course for secondary education (EDCI 673) this fall. Teachers enrolled in the class design and conduct action research to determine how to best meet the science learning needs of students. As an institution dedicated to preparing doctoral students to be leaders in the science teacher education field, CREST recognizes the importance of providing adjunct opportunities to doctoral students. Please contact Donna R. Sterling ([dsterlin@gmu.edu](mailto:dsterlin@gmu.edu)) if you are at the doctoral or post-doctoral level and wish to co-teach and/or serve as an adjunct professor in science education.

### New CREST Business Manager Tristan Pierce

This academic year we welcome Tristan Pierce to CREST as our new Business Manager. Tristan came to us from WETA, where he was the Executive Assistant to the Vice President and General Manager of Radio. His budgetary and administrative experience will be valuable to CREST as he works on budget, procurement, grant proposal preparation, publication editing, and other tasks. He has previously worked at Mason as an Undergraduate Advisor for the Music Department in the College of Visual and Performing Arts, and graduated from Mason with a M.A. in Arts Management in 2008.

### CREST Research Projects

The Center for Restructuring Education in Science and Technology (CREST) at Mason is designing studies, gathering data, and working on analyses of teaching and learning. Current studies are investigating how pre-service teachers prepare for teaching science, how provisionally licensed teachers are best supported in the first few years in the classroom, how elementary teachers can increase student learning, teacher effectiveness, creativity, and ways of knowing in science.

## Student Funding

Mollianne Logerwell received a 20-hour graduate research assistantship to assist with CREST activities and to conduct research on science camp and NSTSN.

## Student and Faculty Presentations and Publications

- Donna R. Sterling (2008, September). *Science Test Scores Increase When New Teachers Receive Support*. Virginia Mathematics and Science Coalition, Richmond, VA.
- Donna R. Sterling, Wendy M. Frazier, Stephanie Roche, & Mollianne G. Logerwell (2008, September). *Final report for Stars & Splash: Science for preservice elementary teachers*. Richmond, VA: State Council of Higher Education.
- Donna R. Sterling & Wendy M. Frazier (2008) *Supporting New Science Teachers: What School Leaders Can Do*. Retrieved September 22, 2008 from [http://cehd.gmu.edu/assets/docs/crest/SupportingNewScienceTeachers9\\_17\\_08.pdf](http://cehd.gmu.edu/assets/docs/crest/SupportingNewScienceTeachers9_17_08.pdf)
- Donna R. Sterling & Wendy M. Frazier (2008) *Science Test Scores Increase When New Teachers Receive Support*. Retrieved September 11, 2008 from [http://cehd.gmu.edu/assets/docs/crest/ScienceTestScores%20Increase9\\_08.pdf](http://cehd.gmu.edu/assets/docs/crest/ScienceTestScores%20Increase9_08.pdf)
- Donna R. Sterling & Wendy M. Frazier (2008, July). *2008 NSF Annual Report for Award #0302050*. Washington, DC: National Science Foundation.
- Wendy M. Frazier, Donna R. Sterling, & Amy Bordeaux (2008, June). *Quarterly report for science explorers: Elementary science staff development*. Richmond, VA: Virginia Department of Education.
- Wendy M. Frazier & Donna R. Sterling (2008, Summer). Problem-based learning for science understanding. *Academic Exchange Quarterly* 12(2), 111-115.
- Dawn Rene Wilcox & Donna R. Sterling (2008, April/May). Bring the zoo to you! *Science and Children* 45(8), 42-45.
- Wendy M. Frazier, Donna R. Sterling, & Mollianne G. Logerwell (2008, April). An examination of the process of supporting uncertified science teacher: What new teachers need to succeed. [CD-ROM] *Proceedings of the Annual International Conference of the National Association for Research in Science Teaching*, Baltimore, MD.
- Donna R. Sterling (2008, April). *Real world connections: Climate change, microbes, and disease*. Invited feature presentation at the Koshland Science Museum of the National Academy of Sciences, Washington, DC.
- Wendy M. Frazier, Donna R. Sterling, & Mollianne G. Logerwell (2008, April). *An examination of the process of supporting uncertified science teacher: What new teachers need to succeed*. Paper presented at the annual International Conference of the National Association for Research in Science Teaching, Baltimore, MD.
- Wendy M. Frazier, Donna R. Sterling, & Mollianne G. Logerwell (2008, March). *What makes or breaks new teachers? Examining the process of supporting new, uncertified physics teachers through case study analysis*. Paper presented at the annual conference of the American Education Research Association, New York, NY.
- Rajesh Ganesan & Donna R. Sterling (2008, March) SUNRISE: Schools university 'n' (and) resources in the sciences and engineering, a NSF/GMU GK-12 fellows project. Retrieved July 30, 2008 from <http://sunrise.ite.gmu.edu/Poster%20SUNRISE%20Final%20Version%202.pdf>. Poster session presented at the GK-12 Annual Meeting, Washington DC.
- Rajesh Ganesan & Donna R. Sterling (2008, February) SUNRISE: Schools university 'n' (and) resources in the sciences and engineering. Paper presented at the annual conference of the American Association for the Advancement of Science, Boston.
- Erin E. Peters & Donna R. Sterling (2008). The periodic table as a tool for teaching the nature of science. *The Science Education Review Excerpts* 7(1), 1-2. Retrieved August 6, 2008 from [http://www.scienceeducationreview.com/ser\\_7\\_1\\_excerpts.pdf](http://www.scienceeducationreview.com/ser_7_1_excerpts.pdf)
- Erin E. Peters & Donna R. Sterling (2008). The periodic table as a tool for teaching the nature of science. *Science Education Review* 7(1), 1-8.
- S. E. McKinney & Wendy M. Frazier (2008). Embracing the principles and standards for school mathematics: An inquiry into the pedagogical and instructional practices of mathematics teachers in high-poverty, middle schools. *The Clearing House*, 81(5), 201-210.
- Wendy M. Frazier, Donna R. Sterling, Mollianne G. Logerwell, & Anastasia Kitsantas (2008, February). Report from the new science teachers' support network: What school leaders can do to support new teachers. Retrieved on February 7, 2008, from [http://cehd.gmu.edu/assets/docs/crest/NSTSN\\_report.pdf](http://cehd.gmu.edu/assets/docs/crest/NSTSN_report.pdf)

## Elementary Science Education

Please share with instructional assistants, parents, and others interested in obtaining licensure to become an elementary school teacher that "Think You Want to Be a Teacher" information sessions on our elementary programs offered in Fairfax will be held on January 12 and February 9. Registration for either of these information sessions is available by clicking the link on

<http://cehd.gmu.edu/admissions/infosessions/>

The deadline for admission to programs is Feb 1 each year, and the website for admissions information is <http://gse.gmu.edu/programs/elementaryed/admissions/> or contact Carol Ardon ([sardon@gmu.edu](mailto:sardon@gmu.edu)).

## PhD and Advanced Masters Degrees in Science Education for Experienced Teachers

Ever thought about going back to school to get an advanced masters or doctorate in science education, but you were not quite sure what you could potentially do with the degree? Mason offers two advanced masters degrees and a doctoral degree in science education. Graduates are prepared for careers as school or central office leaders, curriculum and instructional materials developers, state or national agency leaders, college or university faculty, college or university researchers, or professional organizations leaders. If interested in these programs in science education for experienced teachers, please read about these programs online (URLs are listed for these programs at the end of this newsletter) and contact Donna Sterling at [dsterlin@gmu.edu](mailto:dsterlin@gmu.edu) for more information. Admission to the masters programs is open each semester and the doctoral program every couple of years.

## Program Information on the Web Initial Teacher License

Mason's College of Education and Human Development offers a variety of degree programs involving science education. Here are links to the initial teacher licensure programs:

- **Initial License** with Masters in Elementary Education  
<http://gse.gmu.edu/programs/elementaryed/>
- **Initial License** or Masters in Secondary Education  
<http://gse.gmu.edu/programs/secondaryed/>

## Program Information on the Web For Experienced Teachers

Mason's College of Education and Human Development offers a variety of degree programs for experienced teachers to receive advance degrees in science education. Here are links to the advanced degree programs:

- **Masters** in Science Education Leadership (includes coursework toward administration and supervision license)  
<http://gse.gmu.edu/programs/science/>
- **Masters** in Advanced Studies in Teaching and Learning Science  
<http://gse.gmu.edu/programs/astl/>
- **Doctorate** in Science Education Leadership  
<http://gse.gmu.edu/programs/science/>

## Center for Restructuring Education in Science and Technology

The [\*Center for Restructuring Education in Science and Technology\*](#) (CREST) at [\*George Mason University\*](#), focuses on providing quality science, mathematics, and technology education from early childhood through adulthood.

Director: Donna R. Sterling  
Associate Director: Wendy M. Frazier

For information check online at:  
<http://cehd.gmu.edu/crest/>

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