



College of Education and Human Development  
George Mason University

### Research Findings: Pay Attention to Working Conditions

Effective school leaders create school environments that nurture new teachers to succeed at teaching and reach their potential. The research report, *Supporting New Science Teachers: What School Leaders Can Do*, from George Mason University with funding from the National Science Foundation identifies changes that can occur to better support new science teachers as they start teaching. The research suggests the following policies and practices for establishing supportive working conditions

- Hire early and assign classes so that the new teacher can start planning to teach before they have to start school.

- Assign new teachers only one class preparation so they have time to reflect and revise lessons between class periods to perfect their teaching skills.

- Provide new science teachers their own room in which to teach instead of having them float between classrooms with a cart.

- Protect new teachers from additional school duties beyond those directly related to teaching their own classes.

Nationally, there is a growing shortage of science teachers. As a result, many school districts are forced to hire teachers with science degrees but little training or experience in teaching. These ill-prepared, new science teachers face the extra challenge of discovering how to teach on their own. Without effective support, research shows that 66 percent of these new teachers will quit the profession within three years (Darling-Hammond, 2000, 2003).

The research was conducted at George Mason University by Drs. Donna R. Sterling and Wendy Frazier. A copy of the report can be found at:

<http://cehd.gmu.edu/crest/researchprograms/nstsn/>

### Virginia Science Standards Under Review

In 2009, the *Science Standards of Learning for Virginia Public Schools* are undergoing review. The comments from the initial comment period were reviewed during the summer. As a part of CREST's on-going service to the state and local community, CREST faculty associate Harold Geller (Mason's College of Science) and Wendy Frazier participated in a content review of the standards in August. In the fall, the revised science standards will be open for public comment.

### International Grant

Congratulations to co-PI's Wendy Frazier (CREST) and Rebecca Fox for their newly awarded U.S.-Russia Teacher Professional Development Project (USRPD) for Language, Science, Technology, and Mathematics teachers from the Bureau of Education and Cultural Affairs, Department of State. With funding from August 2009 to December 2011, Russian secondary school teachers will receive four weeks of professional development in Fall 2010 in the United States, and American secondary school teachers for two weeks in Russia in Spring 2011. Follow-on includes an alumni awards program to support on-going collaboration and a workshop conducted by Russian participants for colleagues in Summer 2011. Additional CEHD faculty participating in the creation and implementation of this grant are: Sheryl Cozart, Debra Sprague, Margaret Hjalmarson and Bev Shaklee. A special thank you goes to Jim Jarvis and Betsy Sandstrom from Thomas Jefferson High School for Science and Technology for their collaboration on this project.

### Research Celebration

The New Science Teachers' Support Network is in its final year of funding from National Science Foundation. Science teachers, retired science teachers, Mason faculty, and Mason's President Merten celebrated the successes of the project with an evening of jazz, wonderful food, and conversation. Ms. Shernita Rochelle Parker welcomed the honorees, Alan Merten gave the opening address, and Dr. Donna Sterling presented significant findings from the project along with policy guidelines for how to best support new science teachers. The event was enhanced with the attendance of school division administrative staff from Fairfax, Arlington, and Prince William. Superintendent Jack Dale (FCPS) and Superintendent Steve Waltz (PWCS) provided commentary on the research and posed new challenges. Ms. Donna Johnson (Falls Church High School, FCPS) won a free registration to the upcoming conference of the Virginia Association of Science Teachers (VAST), and Ms. Edna Patterson (Robinson High School, FCPS) won a membership to the National Science Teachers Association. A special thank you goes to ExxonMobil Corporation, which was represented by Mr. Patrick Dexter, for sponsoring the celebration.

### Student Funding

Liz Baynard received a 20-hour graduate research assistantship to assist with CREST activities and to conduct research on the New Science Teachers' Support Network.

### Science Graduate Students Work in Elementary Schools

We welcome three new graduate students and celebrate the return of five graduate students in the SUNRISE program (Schools, University 'N' (and) Resources In the Sciences and Engineering). These students are working on their doctoral degrees in science or mathematics. This NSF GK-12 program is aimed at partnering STEM (science, technology, engineering, and mathematics) graduate students with elementary school teachers to assist them with science lessons. Eight schools in three school divisions (Fairfax County, Manassas Park City, and Alexandria City Public School) are partnering with Mason on this project. For more information on this program, visit <http://sunrise.ite.gmu.edu>.

### Motor Mania Summer Camp 2009

This past summer, twelve upper-elementary students participated in the "A'Mason' Race", a science camp taught by preservice teachers enrolled in Mason's Science Methods for the Elementary Classroom (EDCI 553). Over two weeks, students worked both individually and in groups to build a variety of cars to meet the challenge of the day, which included aerodynamics, safety, energy sources, terrain, and weather conditions. As a culminating experience, each team built an "ultimate" vehicle that they raced on an obstacle course which incorporated all of the daily challenges.

### CREST Science Camps Summer 2010

Planning is in progress for science camps for children entering grades 5-7. CREST actively utilizes camp experiences to provide science enrichment experiences for our community's youth while providing an authentic context for training teachers in how to effectively use problem-based learning to teach science. Stay tuned for information on camp offerings for this coming summer, which will be posted on the CREST website in early 2010. If you have interest in working or volunteering time with CREST camps this summer, please email Wendy Frazier at [wfrazier@gmu.edu](mailto:wfrazier@gmu.edu) for further information.

### Science Teachers Assist with Teaching about Technology in Science Methods Course

One of the main topics of Mason's advanced methods course for secondary science teachers (EDCI 673) is learning how to use educational technology in teaching. Many thanks to the following inservice teachers from Fairfax County Public Schools for teaching preservice teachers about various content-specific technologies used in science classrooms during Fall 2009: Dick Gongaware (Earth science) Madison HS, Tony Rugari (physics) Edison HS, Donna West (chemistry) Woodson HS, and Julie Grunwald (biology) Robinson HS.

### Science Education Courses at Mason Taught by Doctoral Students

As an institution dedicated to preparing doctoral students to be leaders in science teacher education, CREST recognizes the importance of providing adjunct teaching opportunities to doctoral students. This summer, Liz Baynard co-taught science methods

for the elementary classroom (EDCI 553) with Dr. Wendy Frazier. The opportunity to work with current faculty not only enables doctoral students to gain experiences and develop their abilities, but also to observe high-level teaching first hand. Please contact Donna R. Sterling (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.

### Awards

- Christie Wolfgang received the Fall 2009 Science Education Leadership Program Award for Science Education master's degree students.
- CREST received a Partners in Education Award. The 2009 District-wide Partner in Education Award presented on May 26, 2009 by Superintendent Dr. Morton Sherman is in appreciation for outstanding service and extraordinary commitment to all students of the Alexandria City Public Schools.

### Student and Faculty Presentations and Publications

- Wendy M. Frazier (2009). Easy riders. In C. Baine (Ed.), *Adventures in engineering education: A compilation of winning engineering education activities (E-book)*, pp. 131-141. Springfield, OR: Engineering Education Service Center. Retrieved on September 23, 2009, from <http://www.engineeredu.com/contest/curriccontestfinalists.pdf>
- Kimberly S. Heddings and Wendy Frazier (2009). Shrinking our footprints: An environmental chemistry unit to measure and reflect on students' ecological impact. *The Science Teacher*, 76(6), 25-28.
- Wendy M. Frazier & Donna R. Sterling (2009, Summer). Helping new science teachers: A how-to guide for experienced teachers. *The Science Teacher* 76(6), 34-39.
- Donna R. Sterling (2009, Summer). Classroom management: Setting up the classroom for learning. *Science Scope* 32(8), 29-33.
- Kelly J. Anthony & Wendy M. Frazier (2009). Teaching students to create undiscovered ideas. *Science Scope*, 33(1), 20-27.
- Donna R. Sterling & Wendy M. Frazier (2009, May). *2009 NSF Annual Report for Award #0302050*. Washington, DC: National Science Foundation. Retrieved June 17, 2009 from <https://www.fastlane-beta.nsf.gov/researchadmin/servlet/gov.nsf.apps.fastlane.util.DisplayPDFServlet?reportNum=3477535>
- Wendy M. Frazier (2009). *The effect of a science work experience program for teachers: A qualitative program evaluation*. Saarbrücken, Germany: Verlag Dr. Müller Aktiengesellschaft & Co. KG Publishers.
- Wendy M. Frazier (2009, Spring). Feature editor's editorial on problem-based learning. *Academic Exchange Quarterly*, 13(1), 4.
- Donna R. Sterling, Wendy M. Frazier., & Mollianne G. Logerwell (2009, April). *Increasing the Efficacy, Instructional Skills, and Effectiveness of New Science Teachers: What the Data Tell Us Works*. Paper presented at the annual International Conference of the National Association for Research in Science Teaching, Garden Grove, CA.
- Donna R. Sterling, Wendy M. Frazier, Myra Thayer, & Jason Calhoun (2009, April). *How can we plug the hole in the bucket? Addressing beginning science teacher retention issues before it's too late*. Workshop presented at the annual International Conference of the National Association for Research in Science Teaching, Garden Grove, CA.
- Wendy M. Frazier (2009, April). *Appreciating the Intelligence Community as a resource in preservice teacher education to support responsive, responsible, and effective science teaching*. *Symposium on the War on Terror*. Paper presented at the annual International Conference of the National Association for Research in Science Teaching, Garden Grove, CA.
- Donna R. Sterling, Wendy M. Frazier., & Mollianne G. Logerwell (2009, April). *Spiraling Support Needed by New Science Teachers to Succeed at Teaching*. Paper presented at the annual conference of the American Education Research Association, San Diego, CA.

### Elementary Science Education

If you are interested in initial teacher licensure you should attend a "Think You Want to be a Teacher" information session. An information session on our elementary programs offered in Fairfax and Loudoun will be held on November 3 on the Fairfax campus. Registration for information sessions is available at <http://cehd.gmu.edu/admissions/infosessions/> The next deadline for admission is Feb 1, and the website for admissions information is <http://gse.gmu.edu/programs/elementaryed/admission/> or contact Carol Ardon ([sardon@gmu.edu](mailto:sardon@gmu.edu)).

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

Mason offers two advanced masters degrees for experienced teachers 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 specific 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.

### 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.

### 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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