



## College of Education and Human Development George Mason University

### **New Grant Award Alexandria City Public Schools**

CREST was awarded funding to conduct professional development training for elementary teachers at Jefferson Houston School for Arts and Academics (JHAA) in Alexandria City Public Schools. Directed by Donna Sterling (PI), Wendy Frazier (Co-PI) and Leslie Marcus (lead science teacher at JHAA), the program conducted a two-week workshop for teachers during Summer 2007 in ecology and geology content and methods. Additionally, elementary teachers from Cora Kelly School for Math, Science and Technology attended the training. Marty Lindemann (PWCS) and Rick Diecchio (GMU) assisted during the training, led fieldtrips, and provided intensive content support in geology. Wendy continues to support JHAA this fall through weekly visits and after school training sessions in collaboration with Leslie Marcus. Amy Bordeaux, a former doctoral student in science education leadership, is serving as the evaluator on the project.

### **New STEM Education Partnership**

SUNRISE (Schools, University 'N' (and) Resources In the Sciences and Engineering) is a new NSF GK-12 project aimed at partnering STEM (science, technology, engineering, and mathematics) graduate students with school teachers from three school divisions (Fairfax County, Manassas Park City, Alexandria City Public School). The objective is to build a unique model of collaboration among elementary and middle schools, school division administration, and Mason (IT&E and education) to foster systemic efforts in implementing Information Technology rich STEM content-knowledge into grades 4-6 by STEM graduate students.

### **New Doctoral Group Starts Science Education Leadership Program**

A new group of Virginia teachers and leaders started the science education leadership doctoral program this fall at George Mason University. Welcome to all!

### **CREST Welcomes Erin Peters**

This academic year we welcome Dr. Erin Peters to the science education faculty at Mason. Erin has been a public school science teacher for 15 years and has a National Board Certification in Early Adolescence Science. Erin's research agenda examines the possibilities in student understanding of both the body of knowledge of science and how scientific knowledge is constructed and verified. She utilizes her background in educational psychology in order to develop new ways for underserved students to have access to learning science. Erin's wealth of knowledge and skill is greatly appreciated – WELCOME, Erin!

### **Possible Science Specialist License**

The Virginia Mathematics and Science Coalition Science Specialist Task Force report advocates that a statewide licensure program for school-based science specialists be implemented in order to improve science teaching. According to the report, all learners will benefit from having access to a trained school-based science specialist who can help teachers to develop effective instruction, partner with the science and education communities, and translate research into practice. The report recommends two science specialist licenses, preK-6 and 6-12.

### **Summer Camp 2008 More Fun Science Learning to Come!**

CREST will offer two fun-filled sessions of camp in summer 2008 for students entering grades 5-7. Students will have fun as they act as scientists to solve real world problems. Camp will be taught by preservice master's degree teachers in Mason's PK-6 teacher licensure program under the direction of Dr. Wendy Frazier. Session one (June 23-July 3) focuses on space science and session two (July 7-18) will focus on oceanography. Space is limited to 24 children per session on a first-come, first-served basis. Information at <http://cehd.gmu.edu/crest/camp/>

### Teachers Assist in Mason Science Methods Courses

Dedicated to ensuring that its graduates are fully ready to meet the growing challenges of teaching science, Mason is the only science teacher preparation in the state that requires its future secondary science teachers to complete two science methods courses. In their advanced science methods training (EDCI 673) preservice teachers learn how to use technology to teach science by partnering with an inservice teacher in their science content area to learn about various content-specific technologies used in their classroom. Many thanks to the following inservice teachers from Fairfax County Public Schools for serving as technology specialists in EDCI 673 for Fall 2007: Jim Jarvis (Earth science) Thomas Jefferson HS, Donna West (chemistry) Woodson HS, Tony Rugari (physics) Edison HS, and Debbie Meinholdt (biology) Edison HS. We wish a fond farewell and heartfelt thanks to Jim Jarvis for sharing his technologic expertise with our teachers. Jim is now manager of the science and technology division at Thomas Jefferson High School for Science and Technology. Janet Soules from Mount Vernon Center will take his place in Spring 2008.

### Modeling Physics Instruction

For the last three years, Melissa Booker and Greg Matthes, teachers from Fairfax County Public Schools, have been leading modeling physics courses for middle and high school physical science and physics teachers. Modeling Instruction is a constructivist-based physics and physical science curriculum and pedagogical method. Each unit is based on the modeling cycle which involves model development via a paradigm lab and the deployment of the model in a variety of circumstances. During the paradigm lab, the physical model is articulated and validated through post-lab discussion using Socratic dialogue. The final model development consists of describing the phenomenon in multiple representations: graphical, mathematical, verbal and diagrammatical. The model is then deployed in new situations in order to free it from the context of the paradigm lab. Research indicates that student test scores increase each year for five years for teachers who implement modeling as a method of instruction for teaching physical science. Funds have been provided by the federal Improving Teacher Quality State Grants (Title II, Part A,) Professional Development Program administered by the State Council of Higher Education for Virginia. For more information:

<http://cehd.gmu.edu/assets/docs/crest/newsletters/physics.pdf>

### Career Paths and Degree Plans for PhD and Advanced Masters in Science Education

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 or researchers, or professional organizations leaders. **If interested in the doctoral program in science education, immediately contact Donna Sterling at [dsterlin@gmu.edu](mailto:dsterlin@gmu.edu) for information about joining our newly established cohort. Admission to the masters programs is open each semester.** For more information about our science education degrees, please see the flier at the end of this newsletter.

### Provisionally Licensed Science Teachers Receive Support

Data analysis continues for the New Science Teachers' Support Network (NSTSN). Findings were shared in Spring 2007 at the annual meeting of the National Association for Research in Science Teaching in New Orleans and will be further shared in Spring 2008 at the annual meeting of the American Educational Research Association. Funded by the National Science Foundation (NSF), the project examines how to best help beginning teachers succeed at teaching. Using a treatment and control group design, findings reveal that students of treatment teachers score significantly better than students of control teachers on science SOL tests. 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. For more information see <http://cehd.gmu.edu/crest/researchprograms/nstsn/>

### Doctoral Students Teach Mason Science Education Course

Dawn Renee Wilcox and Amos Simms-Smith are teaching our advanced science methods for elementary teaching (EDCI 634) this fall. Teachers enrolled in the class design and conduct action research to determine how to best meet the science learning needs of elementary students. Currently employed in local school divisions, Dawn and Amos work to ensure that training is consistent with current local needs among teachers.

## Elementary Science Education – We Are Now in Loudoun!

A cohort of preservice teachers is currently completing their coursework on our Loudoun campus. Our Fairfax programs have been reorganized as well. February 1 is the application deadline for summer, and March 1 is the deadline for fall. Information sessions on all of the elementary programs offered in Fairfax and Loudoun will be held on Dec 3 and January 10. For more information see <http://gse.gmu.edu/programs/elementaryed/> or contact Carol Ardon ([sardon@gmu.edu](mailto:sardon@gmu.edu)).

## CREST Research Assistant

*By Faye Huie*

I have worked as a GRA at CREST since September 2007. The CREST team offers a supportive work environment where the importance is placed on both developing the research as well as the researcher. For example, I was provided with a data set and was given freedom to run whatever analyses I saw fit and to begin writing a paper on the topic that interests me. Through these options I have grown significantly as a researcher. Additionally, CREST offers their assistants a variety of projects to engage in and develop. Through the NSTSN and CREST Science Camp projects, my skills in data compilation, analysis, and writing have improved extensively and I am now much more confident about my research abilities. Prior to working at CREST, I had developed my own research interests in the area of self-regulation and motivation. Through my experiences here, I now have developed an interest in examining these social cognitive factors in academic domain-specific topics such as science and math. CREST truly offers a unique opportunity for students to grow and I am grateful that I am able to be part of the CREST team.

## Awards

- Jeanne Bailey was awarded the Thank You “Beary” Much Award from Mason for obtaining all science supplies for all summer science education programs on time.
- Lisa Leno received the fall 2007 Fellowship Award for Science Education master’s degree students.
- Christine Krebs was selected to receive the Secondary Education award in science for the Fall 2007 semester.
- Amos Simms-Smith was selected to participate in Northrop Grumman’s weightless flights program. Teachers conducted experiments in a “vomit comet” that simulated gravity environments on Mars, the moon, and at zero G’s.

## Virginia Earth Science Collaborative Providing Stellar Training for Teachers

George Mason University is participating in the Virginia Earth Science Collaborative to support Virginia teachers in obtaining a teaching license in Earth Science. This collaboration of colleges and school divisions provides coursework designed to improve the quality of Earth Science instruction as well as meet licensure requirements for teaching. This past summer Dr. Harold Geller, with the assistance of Lee Ann Hennig (FCPS), taught a course in astronomy. Mason’s new space observatory provided an exciting locale for learning. Follow up sessions continued into the fall semester as teachers implemented new strategies in their classes. For more information: <http://VirginiaEarthScience.info>

## CREST Research Projects

The Center for Restructuring Education in Science and Technology (CREST) at Mason has been busy designing studies, gathering data, and working on analyses of teaching and learning. Current studies are investigating how pre-service teachers prepare for the awesome task of teaching science, how provisionally licensed teachers are best supported in the first few years in the classroom, how earth science teachers extend their teaching, and how physics teachers implement modeling physics instruction in their classroom. Upcoming studies include investigations into teacher effectiveness, creativity, and ways of knowing in science.

## Summer Camp 2007 Who Knew Science Could Be So Fun??

CREST offered two sessions of camp in summer 2007 for students entering grades 5-7. During our Dig It: Adventures in Archeology session students acted as archeologists and policy makers while finding and analyzing various archeological artifacts. During our Crime Solvers session, students used the techniques of forensic scientists as they examined evidence for clues to solve a special “Who Dunit?” mystery using biology, chemistry, and physics. Dr. Wendy Frazier was camp director and the staff members were preservice master’s degree teachers in Mason’s PK-6 teacher licensure program. Dr. Sterling served as resident scientist, and Mollianne Logerwell (FCPS teacher and GMU doctoral student) served as biotechnology content specialist. Speakers included Mason faculty and speakers from Mason Police and Smithsonian Naturalist Center.

## Student Funding

- Faye Huie received a 10-hour graduate research assistantship to assist with data analysis for CREST science camp and the NSTSN.
- Brad Rankin received a 10-hour graduate research assistantship to assist Erin Peters with her research on self-regulation strategies to teach the nature of science.
- Mollianne Logerwell received a 20-hour graduate research assistantship to assist with CREST activities and to conduct research on NSTSN.

## Student and Faculty Presentations and Publications

- Donna R. Sterling, Juanita Jo Matkins, Wendy M. Frazier, & Mollianne George Logerwell (2007). Science camp as a transformative experience for students, parents, and teachers in the urban setting. *School Science and Mathematics* 107(4) 134-148.
- Erin E. Peters (2007, April). *Assessing inquiry*. Presentation at the National Science Teachers' Association Conference, St. Louis, MO.
- Donna R. Sterling, Wendy M. Frazier, Mollianne G. Logerwell, & Karen D. Dunn (2007, April). Helping Uncertified Science Teachers Survive Teaching and Focus on Student Learning. Annual International Conference of the National Association for Research in Science Teaching, New Orleans, LA
- S. David Brazer & Erin E. Peters (2007). Deciding to Change: One District's Quest to Improve Overall Student Performance. *International Journal of Education Policy and Leadership* 2(5), 1-14.
- Anastasia P. Samaras, M. Adams-Legge, D. Breslin, K. Mittapalli, J. M. O'Looney, & Dawn Renee Wilcox (2007, April). *Building a plane while flying it: Course portfolio of teaching the self-study research methodology*. Paper presented at the Annual Conference of the American Educational Research Association, Chicago, IL.
- Anastasia P. Samaras, M. Adams-Legge, D. Breslin, K. Mittapalli, J. M. O'Looney, & Dawn Renee Wilcox (2007, April). *But what's it look like? Developing self-study exemplars in a research class*. Paper presented at the Annual Conference of the American Educational Research Association, Chicago, IL.
- Erin E. Peters, Brenda Bannan-Ritland, John Y. Baek (2007, April) *The Effect of Embedded Metacognitive Prompts based on the Nature of Science (4-Phase EMPNOS) on Metacognition*. Paper presentation at the National Association for

Research in Science Teaching Conference, New Orleans, LA.

- John Y. Baek, Quin Xia, Erin E. Peters, Patricia Martinez, Brenda Bannan-Ritland, Margret A. Hjalmarson (2007, April) *Design Research on the Means of Support for Teaching and Learning Geological Observation*. Paper presentation at the National Association for Research in Science Teaching Conference, New Orleans, LA.

## Program Information on the Web

Mason's College of Education and Human Development offers a variety of degree programs involving science education. Here are links to each of our programs:

- **Initial License** or Masters in Secondary Education <http://gse.gmu.edu/programs/secondaryed/>
- **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  
Assistant Director: Erin E. Peters

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

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