



College of Education and Human Development George Mason University

New Grant Award: Foundational Physics

Foundational Physics for Middle Level Science Teachers is a collaboration of George Mason University, Alexandria City, Arlington County, Fairfax County, and Manassas City Public Schools to prepare and train eighth grade physical science teachers, ninth or tenth grade Active Physics teachers, and middle/high school special education science teachers to use research-based teaching practices using “modeling” to teach physical science. The workshop will cover introductory mechanics, electricity and magnetism, and light and sound. Using course materials, participants will work through activities alternately in the roles of student or teacher as they practice techniques of guided inquiry and cooperative learning. Funds for this project are provided by a grant from the federal Improving Teacher Quality State Grants (Title II, Part A,) Professional Development Program administered by the State Council of Higher Education for Virginia.

Summer Dates: July 2 - July 20, 2007

Follow-up sessions: February 9 and April 5, 2008

Place: Robinson Secondary School, Fairfax, VA

Stipends: \$750 stipend for successful completion of course, approximately \$600 in equipment and materials, and lunch during the summer

Registration: Opens January 15, 2007. Space is limited to 20 teachers. For more information:

<http://gse.gmu.edu/centersoffices/crest/documents/newsletters/physics.pdf>

Summer Camp 2007

CREST will offer two fun-filled sessions of camp in summer 2007 for students entering grades 5-7. Each session will provide opportunities for students to have fun as they act as scientists to solve real world problems. Dr. Wendy Frazier will serve as camp director. Camp will be taught by preservice master's degree teachers in Mason's PK-6 teacher licensure program. Space is limited to 24 children per session on a first-come, first-served basis. For information:

<http://gse.gmu.edu/centersoffices/crest/camp>

Provisionally Licensed Science Teachers Receive Support

The New Science Teachers' Support Network (NSTSN) is an award-winning program that provides new teachers who have degrees in science but no education background with support as they begin teaching. It is in its fourth and final year of data collection. Funded by a National Science Foundation (NSF) grant, the NSTSN is a collaborative research project involving George Mason University, Fairfax County Public Schools, and Prince William County Public Schools. Its main goal is to investigate effective support systems that help beginning teachers succeed at teaching and remain in the profession. Teachers assigned to the treatment group received on-site coaching support from retired science teachers and free science methods courses. Dr. Donna R. Sterling is the principal investigator, and Dr. Wendy Frazier is the program manager. For more information please check online at:

<http://gse.gmu.edu/centersoffices/crest/researchprograms/nstsn.htm>

Virginia Earth Science Collaborative

George Mason University is participating in the Virginia Earth Science Collaborative to support Virginia teachers in obtaining a teaching license in Earth Science. Nine colleges and universities, two non profit organizations, and 71 school divisions have formed a partnership to develop coursework designed to improve the quality of Earth Science instruction as well as meet licensure requirements for teaching. At George Mason University Dr. Donna R. Sterling (CREST) and Dr. Rick Diecchio (Environmental Science and Policy) are the investigators on this project. Dr. Wendy Frazier (CREST) serves as the evaluator. This past summer, Dr. Rick Diecchio, with the assistance of Marty Lindemann (PWCS), taught the Geology of Virginia, and Dr. Harold Geller, with the assistance of Lee Ann Hennig (FCPS), taught astronomy. The project is being led by the Mathematics and Science Center in Richmond, VA. For more information: <http://VirginiaEarthScience.info>

Summer Camp 2006 A Success

CREST offered two sessions of camp in summer 2006 for students entering grades 5-7. During our Weather Tamers session students acted as meteorologists, construction engineers, and policy makers while exploring the mysteries of our weather and the impact of weather on the decisions we make. During our Crime Busters session, students used the techniques of forensic scientists as they solved a special "Who Dunit" mystery using biology, chemistry, and physics. Dr. Wendy Frazier was camp director and the staff were preservice master's degree teachers in Mason's PK-6 teacher licensure program. Dr. Sterling served as content advisor and resident scientist. Speakers included Mason faculty and doctoral students as well as speakers from Mason Police, Fairfax County Police, ABC 7 Weather (WJLA), Incorporated Research Institutions for Seismology (IRIS), U.S. Drug Enforcement Administration (DEA), U.S. Army, and Joint Military Intelligence College (JMIC).

Modeling Physics Instruction Produces Growth

Funded through the State Council of Higher Education for Virginia, high school physics teachers were taught how to implement Arizona State University research-based *Modeling Physics* curriculum. Data analysis revealed four areas of significant growth from the beginning to end of this course: (1) an increase in the teachers' content knowledge of physics, (2) an increase in the teachers' students' content knowledge of physics, (3) teachers felt they could better meet the needs of diverse learners, and (4) teachers were able to identify more strategies for reaching the needs of diverse learners. Melissa Booker and Greg Matthes were instructors. Dr. Donna R. Sterling was principal investigator.

Elementary Science Education

Seventeen inservice teachers are enrolled in Mason's EDCI 634 Advanced Science Methods for Elementary Teaching this fall. Teachers enrolled in the course have completed their initial licensure in elementary education and are completing this course as a part of their requirements for the M.Ed. in Curriculum and Instruction. Teachers in the course are at various experience levels and teach in different school divisions, which makes for a diverse community of learners learning together how to best teach children science concepts and skills. Wendy Frazier is the course instructor with the assistance of Amos Simms-Smith (FCPS) and Dawn Renee Wilcox (SCS).

Doctoral Students Teach Mason Science Methods Courses

Dawn Renee Wilcox and Amos Simms-Smith are assisting Dr. Wendy Frazier with EDCI 634: Advanced science methods for elementary teaching. The course focuses on inquiry and extensions of theoretical understanding of how children learn. In addition, students develop and incorporate a variety of skills to maximize the use of assessment and technology as well as awareness of gender/cultural issues via the nature of science.

Mollianne Logerwell is teaching EDCI 673 Advanced Methods of Teaching Science in Secondary School during Fall 2006. The two main projects in this course are conducting action research to investigate strategies for meeting the needs of diverse learners and learning effective ways to integrate technology into the classroom.

Teachers Assist in Mason Science Methods Courses

Many thanks to the following inservice teachers from Fairfax County Public Schools for serving as technology specialists in EDCI 673 during the fall 2006 semester: Debbie Meinholdt (biology) Edison HS, Jim Jarvis (Earth science) Thomas Jefferson HS, Tony Rugari (physics) Edison HS, and Donna West (chemistry) Woodson HS. Their expertise helps to make Mason's advanced science methods course for preservice teachers based on authentic practice.

Student and Faculty Presentations and Publications

- Erin E. Peters (2006, October). Building student mental constructs in particle theory. *Science Scope* 30(2), 53-55.
- Erin Sikes & Donna R. Sterling (2006, October). Assessment with pumpkins. *Science Scope* 30(2), 25-29.
- Donna R. Sterling (2006, October). Thinking metric. *Science and Children* 44(2), 48-51.
- Lorraine A. Smith, Donna R. Sterling, & Patricia S. Moyer (2006, October). Activities that really measure up. *Science and Children* 44(2), 30-33.
- Donna R. Sterling (2006, September). A change in seasons: Increasing student observation skills. *Science Scope* 30(1), 24-29.
- Sueanne E. McKinney, Charlene E. Fleener, Wendy M. Frazier, & Lyndon Abrams (2006, Summer). Responding to the needs of at-risk students in poverty. *Essays in Education* 17. Online: <http://www.usca.edu/essays/>

- Wendy M. Frazier (2006, Summer). Magnifying students' interest in science. *Science Scope* 29(8), 32-35.
- Dawn Renee Wilcox & Donna R. Sterling (2006, Summer). Twisters, tall tales, and science teaching. *Science Scope* 29(8), 36-41.
- Erin E. Peters (2006). Write it, Do it. *Science Scope* 29 (7), 11-13.
- Erin E. Peters (2006). Connecting inquiry and the nature of science. *The Science Education Review*, 5 (2), 37-44.
- Donna R. Sterling, Wendy M. Frazier, Mollianne G. Logerwell, & Anastasia Kitsantas (2006, May). *New Science Teachers' Support Network: How can we help provisionally licensed teachers succeed?* Paper presented at Science, Technology, Engineering and Math - Alternative Certification for Teachers (STEM-ACT) conference, Arlington, VA.
- Donna R. Sterling & Wendy M. Frazier (2006, April/May). Collaboration with community partners. *The Science Teacher* 73(4), 28-31.
- Donna R. Sterling, Anastasia Kitsantas, Wendy M. Frazier, Jennifer Hansen, & Mollianne G. Logerwell (2006, April). *Impact of the NSTSN program on new teachers' self-efficacy beliefs, instructional competence, and students' outcomes.* Paper presented at the annual conference of the American Education Research Association, San Francisco, CA.
- Donna R. Sterling, Wendy M. Frazier, & Mollianne George (2006, April). *Survival tips: How to succeed as a beginning science teacher.* National Science Teachers Association, Los Angeles, CA.
- Donna R. Sterling & Wendy M. Frazier (2006, April). *Problem-based learning: It really works!* National Science Teachers Association, Los Angeles, CA.
- Donna R. Sterling, Wendy M. Frazier, Anastasia Kitsantas, Mollianne G. Logerwell, & Jennifer Hansen (2006, April). *New science teachers: How can we help them succeed?* Paper presented at the annual international conference of the National Association for Research in Science Teaching, San Francisco, CA.

Student Funding

- Mollianne Logerwell received a 20-hour graduate research assistantship to assist with CREST activities and to conduct research on NSTSN.
- Karen Dunn received a 10-hour graduate research assistantship to conduct quantitative research.
- Amos Simms-Smith, received a graduate research assistantship to conduct qualitative research.
- Manish Thakur is assisting at CREST as Database Manager and Webmaster.

Alumni Accolades

- This summer, Erin Peters was an instructor for the Teacher Content Academy at James Madison University for the Physical Sciences. She is currently working at NASA headquarters as their Albert Einstein Distinguished Educator Fellow in the Exploration Systems Mission Directorate. She is also the NASA representative for Project Lead the Way, which works with the development of K-12 National Engineering Standards and a proposal reviewer for NASA Explorer Schools Microgravity K-12 Projects.
- Dawn Renee Wilcox is the new science coordinator for Spotsylvania County Schools.

Awards

- Alex Workman received the fall 2006 Science Education Leadership Master's Degree Fellowship Award for \$500.
- Karen Dunn received the Educational Psychology award for the Learning, Cognition, and Motivation program at the College of Education and Human Development Awards Dinner in May.
- Erin Peters was selected to be an Einstein Fellow for academic year 2006-2007. She will work in the NASA Exploration Systems Mission Directorate.
- Erin Peters received one of the Virginia Association of Teacher Educators (ATE-VA) Teacher Researcher Awards on April 6, 2006.

Student Assistant

Mansi Bhagdeo, master's student in Mason's secondary science teacher licensure program, is currently working with CREST staff on science camp research initiatives.

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

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