

## **AFOSR / UNLV 2010 Summer Laboratory Research Experience for High School Teachers (Application Deadline: Friday, June 4, 2010)**

The United States Air Force Office of Scientific Research (AFOSR) and the Energy Materials Interaction Technology Initiative of Nevada (EMITION) Center at UNLV are sponsoring a summer laboratory research experience for science teachers teaching physics and/or chemistry or mathematics teachers teaching applied mathematics and/or calculus directed towards physics. This is a half time summer position (20 hours per week for about eight weeks) with some vacation and start date flexibility and a summer scholarship stipend of roughly \$35 per hour (salary to be finalized at the time of acceptance) plus \$2,400 on completion of the final report. The teachers participating in the program will enroll in EDW 700 Special Problems in Workforce Education. It is anticipated that one teacher will be selected this summer. The successful completion of the summer laboratory research experience culminates with a detailed final report to be submitted to the AFOSR and UNLV EDW instructor. The final report addresses the complete summer research experience starting from hypotheses and theories, to designing, engineering, and building, to testing, and to data acquisition, analyses, and conclusion. A significant component to the final report is well-conceived lesson plans on how the experience will be integrated into the teacher's high school course curriculum(s). These lesson plans must consist of hands-on components with theory, experiment, modeling, engineering, and/or mathematics at its core. *Typically, the writing of the final draft of the report extends into the fall of the year.*

This year's summer experience will lead to the theory, mathematics, design, and the experimental study of *plasmas and possibly plasma acceleration*. The physical concepts involved in the experiment are: ideal gas law, pressure, temperature, conservation of energy and momentum for elastic and nonelastic binary and/or ternary collisions, equation of motion, current and voltage, capacitance and associated graphing techniques, electrostatics, electromagnetics, electricity, plasma physics, microwaves, gas breakdown and Paschen's law, and discharge physics. The teacher will learn to use vacuum equipment and to operate a high voltage source. If not already acquired, the teacher may develop some machining skills. Assuming that funds are available, the grant affords the teacher with some experimental equipment and materials to generate a *plasma and possibly accelerate the plasma*. These materials are to be the property of the school the teacher will be employed at in the fall of 2010 upon successful completion of the summer experience. During the summer experience with the assistance of laboratory staff, the teacher will develop a theory and mathematics in a language that his/her students can understand, engineer and design the experiment, analyze experimental results, and disseminate the results in the form of a detailed report.

The summer experience is also to enhance the teacher's background in his/her field (mathematics and/or science). Some time will be set aside for high school math and physics discussions. The teacher will also be exposed to other research initiatives conducted in the EMITION Center. The teacher will be asked to be a part of or listen to research discussions among engineers, scientists, and students. Safety is a concern over all areas of science and engineering. It is anticipated that the teacher will be trained in nuclear radiation safety, laser safety, and high voltage safety. Many projects conducted in the laboratory require the use of a vacuum system. The teacher may be introduced to vacuum technology.

To be considered for the summer research position, a well conceived, thoughtful, informed, one page interest paper is required addressing how the high school teacher will creatively implement the upcoming summer research experience into their high school course curriculum(s) for their students' benefit in the upcoming academic year. Outstanding awards and high school needs will NOT be consideration points in the review process. It is expected that the teacher has taken the time to examine the topic under investigation. This one page paper may be integrated into the final report to be presented to the Air Force Office of Scientific Research. Please email your interest papers to Dr. Schill at [schill@ee.unlv.edu](mailto:schill@ee.unlv.edu) by June 4, 2010. Address the subject title of your email *AFOSR / UNLV 2010 Summer Laboratory Research Experience*.

For more information, contact:

**Dr. Robert A. Schill, Jr., Professor**

Director of Energy Materials Interaction Technology Initiative of Nevada (EMITION) Center  
University of Nevada Las Vegas, Department of Electrical and Computer Engineering  
4505 Maryland Parkway, Las Vegas, Nevada 89154-4026 Phone: (702) 895-1526  
E-mail: [schill@ee.unlv.edu](mailto:schill@ee.unlv.edu) Lab URL: <http://EMandPPLabs.nscce.edu>