



SCHOOL OF ENGINEERING
VANDERBILT UNIVERSITY

The Vanderbilt University Advanced Robotics and Mechanism Application Laboratory Research Experiences for Teachers (RET)

Who? Middle Tennessee High School STEM Teachers and pre-service STEM teachers. Computer science teachers encouraged to apply.

When? June 3 - July 12, 2013

Where? Vanderbilt University School of Engineering

Goals: Give teachers an engineering design experience, engage the teachers in research experiences, increase the participants' and their students' understanding of the nature of engineering, help teachers take their research and engineering design experiences back to their high school classrooms, disseminate instructional materials created by the RET participants, and create long-lasting relationships between the university and the participants.



What? For the summer of 2013, the participants will be given a three day overview of the program and overviews of engineering as a whole, engineering design in particular, and what it means to do research. Teachers will then be introduced to the How People Learn framework and the Legacy Cycle method of instruction. Teachers will be trained in one of the twelve modules that have already been developed and field-tested. This training will include doing the module just as a student in their classroom would and then reflecting back on how best to teach that material. Following this orientation, participants will spend twenty-three days working in the ARMA laboratory on one of two projects.

The first project will involve force control experiments using a prototype snake robot. This will include collection and processing of data and an introduction to hybrid force control in robotics. Assistance in robotic palpation experiments will also be part of this project. The second teacher will be involved with experiments on closed loop control using force sensing data to serve as a feedback parameter for updating the actuation compensation algorithms of a flexible snake-like robot. Training will include kinematics and statics of snake robots, solution of over-constrained linear systems of equations using least squares methods and fundamentals of calibration of robots.

Why? Teachers will have an opportunity to increase their own knowledge in their area of specialty as well as to learn more about the application of science, technology, and math through research in engineering. In accordance with new national and state standards, the engineering design process will be stressed throughout the program.

Cost: None to the teacher. In-service teachers will be paid a stipend of \$5800 for full participation in the project. Equipment and supplies funding are available to each teacher for their projects.

How to Apply: Complete the application and submit by March 15, 2013. Two teachers will be selected to participate in this program.

Questions? Contact program director, Dr. Nabil Simaan. He can be reached by e-mail at nabil.simaan@vanderbilt.edu. For more information see <http://arma.vuse.vanderbilt.edu>

