# Real World Applications of Math and Science

**2011 Annual Report: Transforming the System. Changing the Culture.**

Recognizing the critical role STEM (science, technology, engineering and math) education plays in better preparing students for postsecondary education and career success, Helios Education Foundation is investing over $1.4 million in new Tampa Bay initiatives that focus on teacher quality and content knowledge in STEM.

As part of that investment, $495,000 is being directed toward a Citrus County initiative that is offering all 6th through 8th grade math and science teachers the opportunity to increase their knowledge in integrating math, science and computing in the classroom.

The Foundation is working with the Florida Center for Research in Science, Technology, Engineering and Mathematics (FCR-STEM) at Florida State University, Citrus County Public Schools and the Southwest Florida Water Management District (SWFWMD).

Teachers participating in the program learn to use Microsoft Excel to generate and analyze mathematical models provided by SWFWMD. In applying this knowledge in the classroom, middle school math and science teachers help students examine water management issues directly relevant to their lives.

The project targets middle schoolers because they are choosing courses to take in high school that will influence their college and career paths. Students introduced to computational science early can develop new ways of thinking and problem-solving that are increasingly essential in the workforce.

"Blending STEM teaching and learning is strongly supported by research on how students learn but we know little about how to prepare teachers to do it," said Laura Lang, director of the Learning Systems Institute (LSI), which houses FCR-STEM.

"This project will develop and test a teacher professional development approach for students in the middle grades, a critical time for sparking interest in STEM and helping students understand first-hand what the work of scientists is all about," Lang added.

The program offers 120 hours of teacher professional development in integrating math and science instruction through real-world applications of water resource management, math modeling to deepen student understanding of math and science concepts and lesson study teams for STEM teachers.

Until recently, scientists had two ways to work: conduct physical experiments or construct theories. Today, computers offer a powerful, third way: mathematical modeling using computer simulations. In fact, computer-based modeling now allows scientists to model and analyze systems on a scale far greater than was previously possible, offering the potential to revolutionize nearly all science disciplines.

Harnessing the power of computers and mathematical modeling, scientists can, for example, conduct simulated experiments to test the effects of removing water from underground aquifers, study the effects of nitrogen on seagrass beds or identify optimal levels of fish harvesting.

"This project will open the eyes of teachers and students to the amazing power of math and science to improve their lives," said Robert Schoen, associate director of FCR-STEM and co-principal investigator on the project.

Also collaborating on the project are FSU's Office of Science Teaching Activities and Department of Earth, Ocean and Atmospheric Science.

"Studies show us that one of the most influential ways to improve student achievement in the classroom is to improve the quality and effectiveness of teachers in those classrooms," said Helios Education Foundation President and CEO Paul Luna. "We are equipping middle school teachers with a higher level of content knowledge and teaching skill in STEM, and that combined with ongoing school and classroom initiatives, works to increase student achievement."