



## **The Summer of CIESE**

### **Stevens News**

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The Summer of 2011 has been an exciting, busy and productive one for the Center for Innovation in Engineering and Science Education (CIESE) at Stevens. Between camps for middle school students, educational programs for teachers, and assorted grants and honors, CIESE has much to talk about.

Highlights of the Summer of CIESE include:

An engineering and innovation camp for 26 middle school students from Hoboken was held from June 27 through July 1. Students were challenged to create innovative solutions to an assortment of engineering activities, including building a jet toy, a wind turbine, pinball mechanism and tower and glider construction. This program was sponsored by a Presidential Award for Excellence in Science, Math and Engineering Mentoring awarded to CIESE and administered by the National Science Foundation (NSF).

Approximately 70 grades K-12 mathematics and science teachers participated in professional development from July 18 through July 29. C-TEAMS (Curriculum Topic Study to Enhance Achievement in Mathematics and Science) is a NJ Department of Education-sponsored Mathematics and Science Partnership program. The partnership includes Stevens Institute of Technology, St. Peter's College, and a regional network of 18 public and non-public local education agencies (LEA). The goal of the program is to increase the academic achievement of students in mathematics and science by enhancing the content knowledge, pedagogical content knowledge, and understanding and use of the NJ CCCS by classroom teachers. Partner schools/districts include: Bayonne, Clifton, Hackensack, Hawthorne, Jersey City, Keansburg, Morris, Paramus, Saddle Brook, Secaucus, Weehawken, West Milford, All Saints Academy and Marist High School in Bayonne; Rising Star Academy, St. Augustine's School, and St. Francis Academy in Union City and St. Nicholas School in Jersey City. This is the second year of a three-year program focusing on mathematical topics of algebra, functions and modeling and science topics of matter, energy, force and motion. Each teacher receives books and materials to bring back to their classroom and receives monthly visits by CIESE staff to assist in implementation in their classroom.

With support from the Mathematic & Science Partnership program of the National Science Foundation, CIESE, in collaboration with the Smithsonian Institution's National Science Resources Center, held a Science Education Institute for Leadership Development and Strategic Planning from July 25 through 29. The program is geared to

school district leadership/board members at partner schools in the PISA2 project which include: Bayonne, Camden, Jersey City, Hoboken, Lakewood, Margate Morristown, Princeton, Red Bank, Saddle Brook and West New York, as well as the Mustard Seed School in Hoboken. During the five days of interactive presentations and workshops, district leadership teams (1) developed a shared vision of effective science learning and teaching; (2) participated in a school system simulation about systems change theory; (3) learned about research on student cognitive development and motivation; (4) addressed five core components of an effective school system; (5) benchmarked best practices with other districts and states; and, (6) developed a five-year strategic plan for the district science program.

Beginning August 1 and concluding August 10, 76 New Jersey high school biology and chemistry teachers will be engaged in workshops that explore different approaches to teaching bonding and chemical reactions in chemistry and matter transformation and photosynthesis in biology. This is part of a three-year research program developed by CIESE with support from the National Science Foundation.

An Energy & Engineering Institute will be held August 4 and 5 for 30 New Jersey teachers. This program, geared to middle school science and engineering teachers and sponsored by PSEG is in its third year and has been expanded to accommodate the overwhelming demand by New Jersey teachers. Teachers at this Institute will explore key scientific and technological concepts needed to understand energy and will be engaged in hands-on, research-based activities to help plant the seeds for creative solutions to our energy needs in the next generation of scientists, engineers and energy consumers. Teachers receive classroom materials and school year support by CIESE.

From July 11 through 15 and again from August 8 through 10, 52 grade 3-8 science teachers participating in the PISA2 (Partnership to Improve Student Achievement in Physical Sciences: Integrating STEM Approaches) project will begin the third of five courses being provided by CIESE and Stevens faculty on Energy Production and Consumption. Sponsored by the National Science Foundation over five years, 400 in-service teachers, 50 STEM undergraduates (pre-service teachers) and 120 school and district administrators will benefit from PISA2 programming including:

- Five course graduate certificate program
- Intensive summer institutes leveraging graduate course content
- School-year PD and monthly classroom visits
- Pathways to Teaching Options for S&E undergraduates
- Leadership training/strategic planning/organizational capacity-building for district and IHE partners
- Science scope & sequence and curriculum workshops

School districts represented are: Bayonne, Camden, Jersey City, Hoboken, Lakewood, Margate Morristown, Princeton, Red Bank, Saddle Brook and West New York, as well as the Mustard Seed School in Hoboken. Teachers receive classroom materials and monthly visits by CIESE staff.

On August 11 and 12, New Jersey middle school teachers from Jersey City, Newark, West Windsor, Demarest, Kenilworth and New Brunswick will begin a program to Integrate Art into STEM through Engineering Design (STEAM). This program brings together teams of art and science teachers to explore connections and develop lessons that blend engineering design and artistry to engage students in creative and innovative pursuits. Teachers will receive relevant materials to bring back to their classrooms. Sponsored by the Geraldine R. Dodge Foundation, the program continues into the fall with additional professional development days and follow-up support from CIESE staff.

“There is a growing recognition at all levels – from parents and kids, to teachers and administrators, to our state’s and nation’s policymakers – that STEM and innovation are critical for our nation’s future,” said Beth McGrath, Executive Director of CIESE. “The interest and participation in CIESE’s programs for educators and for students, in both traditional classroom and out-of-school contexts, has skyrocketed in recent years. And while this is a very promising sign, we cannot be complacent in our efforts to aggressively promote STEM as fields of study and rewarding careers.”