SUPERCOMPUTING IN PENNSYLVANIA

With Commonwealth of Pennsylvania support, PSC provides education, consulting, advanced network access and computational resources to scientists and engineers across the state.

Cheryl Begandy, outreach manager, and **Pallavi Ishwad**, education outreach specialist, lead PSC's strong education and outreach programs.

K-12 SCIENCE EDUCATION

PSC's work to help prepare a more technology-ready workforce and science-literate populace thrived over the past year. In December 2006, the Heinz Endowments Education Program awarded $150,000 to support PSC's highly successful CAST (Computation and Science for Teachers) program. The award will support additional planning and a thorough program evaluation. CAST is a two-year program for teachers and school administrators that meets quarterly to introduce computational thinking and tools such as modeling and simulation into the high-school science curriculum. This year, 23 teachers from 14 school districts participated.

This year PSC initiated a second program, CMIST (Computational Modules in Science Teaching). Developed by PSC's National Resource for Biomedical Supercomputing, CMIST creates complete teaching modules in a subject area based on recent research at PSC. (More on CMIST, p. 14.) Together, CAST and CMIST offer an approach to teaching secondary science that includes both specific computational modules (CMIST) and a general framework for computational science disciplines (CAST).

PITTSBURGH STUDENTS ARE SCIENCE WINNERS AT TERAGRID '07

Pittsburgh ninth-graders Shivam Verma and Molly Joyce were winners in the TeraGrid '07 student science competition, June 4-7 in Madison, Wisconsin. From February to mid-March, a series of three "Jumpstart" seminars in computational science, spear-headed by PSC's Laura McGinnis, helped to spark the interest of these students. (l to r) Prabha Shanker Verma, Shivam's father; Shivam Verma; Pallavi Ishwad, PSC education outreach specialist; Molly Joyce; Edward Joyce, Molly's father.

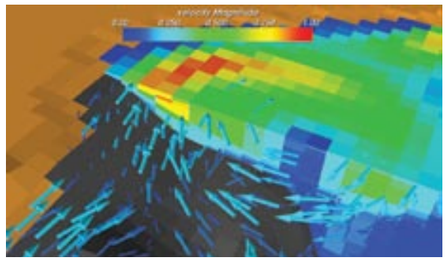
RESOURCES FOR PRIVATE-SECTOR RESEARCH

Through SC² (p. 8) and the PSC networking group, Evergreene Technology Park in Greene County provides companies with access to PSC resources, and a number of Pittsburgh-area corporations use PSC resources in product development efforts, including:

- **PPG Industries,** a global supplier of coatings, glass, fiberglass and chemicals, uses PSC systems for computational modeling of PPG compounds and in development of new products, including Transitions lenses, CeramiClear automotive clear coats and SunClean self-cleaning glass. "Our approach is to use modeling to reduce discovery and development cycle times," says Michael Makowski, who leads PPG's computational chemistry group, "and to gain fundamental understanding of our core technologies and competencies, gain a competitive advantage, and ultimately reduce costs."
- **Medrad, Inc.** of Indianola, Pennsylvania has collaborated with PSC and Carnegie Mellon to develop a novel method for safe and efficient removal of deep-vein blood clots. PSC and CMU expertise in computational fluid dynamics supported feasibility tests on the physics of Medrad's catheter device. "Using the PSC supercomputer," says John Kalafut, Medrad's senior research scientist, "we have been able to look at multiple iterations of different design parameters without building numerous, expensive prototypes."
- **NanoLambda, Inc.** of Pittsburgh, a spin-off from the University of Pittsburgh, is developing the Spectrum Sensor, a chip-scale Optical Spectrum Analyzer. Its high-resolution sensing capability enables not only mobile/wearable health monitors, such as a non-intrusive glucose monitor, but also high-standard RGB color sensors. NanoLambda has done feasibility studies with PSC systems and will use them for computationally intensive physical-optics simulations of its optically tailored devices.

CARNEGIE MUSEUM OF NATURAL HISTORY

For the three-day opening of the Carnegie Museum of Natural History's "Night of the Titanic" exhibit, PSC created a visualization of ocean currents in the North Atlantic mapped with the route of the Titanic. "Your support of Carnegie Museum of Natural History's Climate Change Weekend helped make it a success," said Kerry Handron, Earth Theater director. "The graphic depiction of the ship's path crossing the Gulf Stream emphasized one of the main points of the show." The PSC film screens regularly in CMNH's Earth Theater.



OUTREACH & TRAINING

PSC presented the sixth in a series of annual technology-briefings for **Bechtel Bettis Laboratory**, expanded this year to a two-day format. Presentations focused on managing and using a parallel distributed computing environment, including hardware, cluster architecture, visualization and grid computing. Twenty people from Bechtel Bettis participated in the two-day session with PSC staff and reported in evaluations that it was very valuable.

PSC participated in several community events to help the general public learn about supercomputing. At the **SciTech Spectacular** at the Carnegie Science Center in October 2006, which fosters understanding of science and technology among middle and high school students, PSC was one of over 30 exhibitors. PSC also participated in the **Spring Fling** held at the Pittsburgh Public School's Gifted Center in May 2007. At this interactive educational event for the district's grade two through eight gifted students, PSC presented, among other exhibits, a life-size BigBen model and a poster showing nano-scale problems.

RESEARCH AT PENNSYLVANIA COLLEGES & UNIVERSITIES, 2006-2007

From July 1, 2006 through June 30, 2007, 720 Pennsylvania researchers at these institutions used 5.5-million processor hours on PSC resources.

Bucknell University
Cabrini College
Carnegie Mellon University
Drexel University
Duquesne University
Edinboro University of Pennsylvania
Lehigh University
Pennsylvania State University, All Campuses
University of Pennsylvania
University of Pittsburgh, All Campuses
Ursinus College
Villanova University
Widener University