

Supercomputing in Pennsylvania

With support from the Commonwealth of Pennsylvania, PSC provides education, consulting, advanced network access and computational resources to scientists and engineers in Pennsylvania. This program serves not only academic researchers but also corporations who use high-performance computing to enhance their competitiveness.

Workforce Development

PSC programs help to develop and retain a technology-ready workforce. Workshops provide industry researchers as well as university faculty and students with training in the most advanced techniques of computational science. They include extensive hands-on sessions, either in PSC's Computer Training Center or at corporate and academic sites around the state.

Faculty at Pennsylvania universities offer courses in aspects of computing and computational science using PSC facilities. During the past year, nine instructors at seven higher-learning institutions offered such courses to over 300 students.

PSC educational enrichment programs introduce advanced educational technologies in Pennsylvania high-school

classrooms. PSC learning tours and briefings also acquaint students with advanced computational technology. This past July, for instance, a group of 25 students from several Pittsburgh area high schools toured PSC as part of a "Legislator for a Day" program sponsored by Pa. Rep. Jane Clare Orie.

PSC also provides training to Pennsylvania students through undergraduate internships. Since 1986, over 400 students have interned at PSC, and many have gone on to find jobs in Pennsylvania. During the past year, PSC employed 43 students from Carnegie Mellon, the University of Pittsburgh, Indiana University of Pennsylvania, Penn State, St. Vincent College and the Community College of Allegheny County.

Economic Development

PSC provides high-performance computing and networking to boost competitiveness of Pennsylvania business and industry. Along with major corporations such as Alcoa and Westinghouse, PSC provides resources to smaller Pennsylvania businesses including Concurrent Technologies Corp., Form Soft, Knowledge Systems, Mine Safety Appliances and Tissue



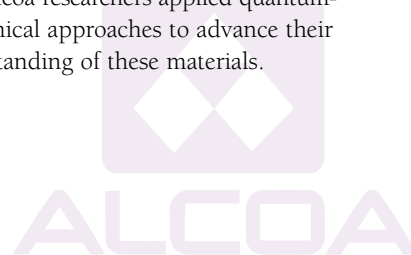
▲ Beverly Clayton, PSC executive director, coordinates PSC's program to provide advanced training and high-performance computing resources for researchers in Pennsylvania.

Informatics Inc. This year, for instance, the Pittsburgh office of Deloitte & Touche used the CRAY T3E to assess the potential gain from using a customized software package to calculate tax benefits for their clients.

Research in Pennsylvania

Lubricants in Aluminum Processing

We don't think about the processes that shape aluminum—like rolling, forging and extrusion—when, for instance, we wrap a leftover in aluminum foil and stuff it in the fridge. But an essential ingredient in forming aluminum products is the lubricant chemicals that coat aluminum sheets to protect them from friction and abrasion as they're shaped. Alcoa chemists over many years have built a fund of industrial know-how about these chemicals, but there's little understanding of the molecular details. Using the CRAY T3E, Alcoa researchers applied quantum-mechanical approaches to advance their understanding of these materials.



[A visible step in ensuring Pennsylvania's bright, high-technology future.]



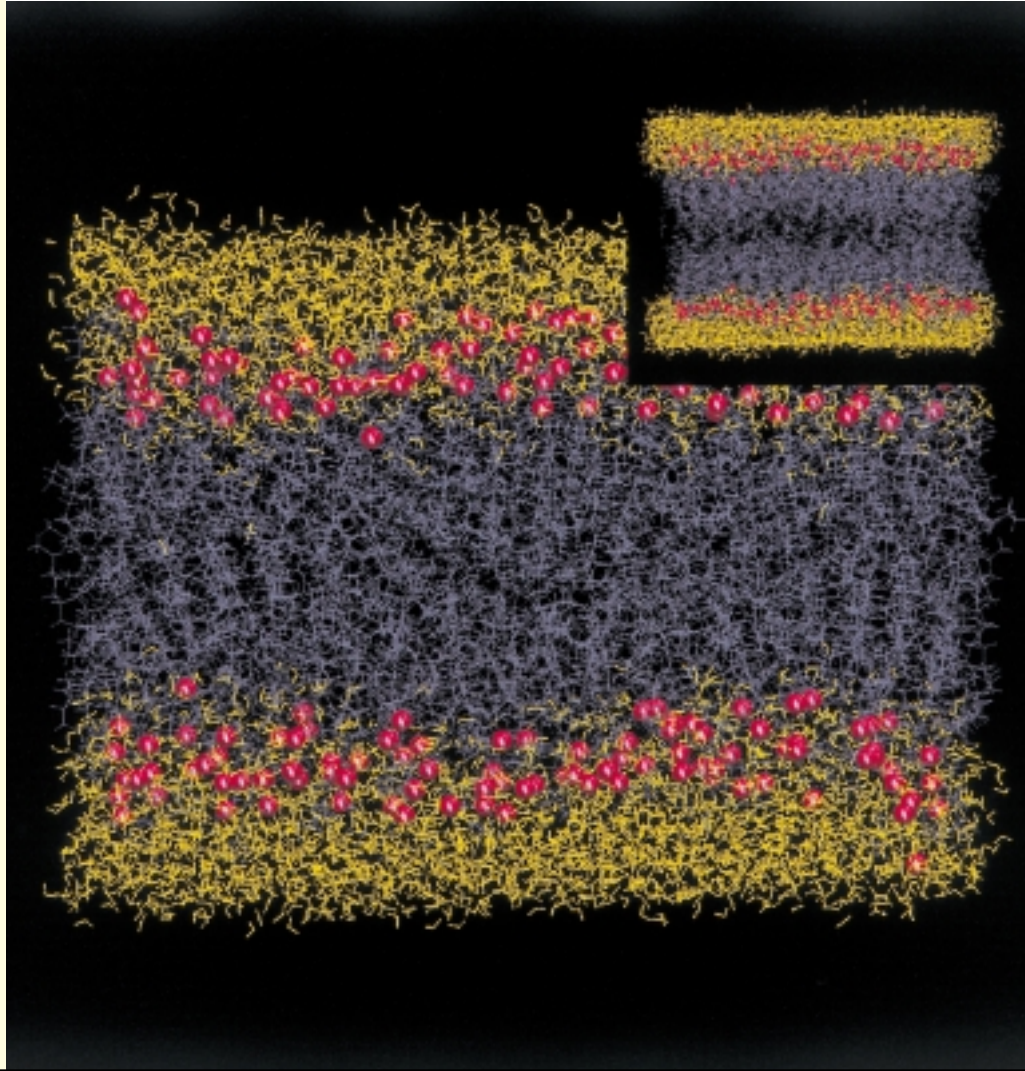
On August 2, third-place winners of the national High School Science Bowl, from North Hollywood High School in California, visited PSC as part of a week-long Pittsburgh visit hosted by the National Energy Technology Laboratory. David Deerfield, PSC assistant director, described features of the Visible Human project.

Research in Pennsylvania

Biological Membranes

The membranes of living cells are permeable barriers that control the flow of information between cells and their environment. Channels in these membranes, which operate like gates to allow the passage of ions such as calcium and potassium, regulate many biological processes, including heartbeat and nerve impulses. To help with understanding of how drugs interact with these channels, Dr. Pei Tang and colleagues at the University of Pittsburgh School of Medicine collaborated with PSC scientist Marcela Madrid on detailed simulations of a membrane called DMPC (right). Constructed of complex sheetlike assemblies called lipid bilayers, these membranes involve tens of thousands of atoms and can be simulated only with high-performance systems like the CRAY T3E.

Other Pennsylvania research is featured on pages 24-30.



Impact of the Terascale System

At an August news conference, sponsored by the Pittsburgh Regional Alliance and Greater Pittsburgh Chamber of Commerce, state and regional officials discussed the regional implications of PSC's Terascale Computing System (see pp. 4-7). Speakers included Congressmen Bill Coyne and Mike Doyle, Pennsylvania Secretary Sam McCullough, Allegheny County Executive Jim Roddey and University of Pittsburgh Chancellor Mark Nordenberg.

"This grant, of course, gives a tremendous boost to Western Pennsylvania," said Nordenberg in his remarks. "It brings to Pittsburgh the most powerful unclassified computer in the world. Put another way, the best scientific minds in this country, in a broad range of fields, will be looking to Pittsburgh for help in advancing their important work. On a daily basis, then, PSC will be raising Pittsburgh's image in the minds of the U.S. scientific and technical community. This is one important and very visible step in ensuring that western Pennsylvania more broadly is home to a very bright high-technology future."



◀ *Congressman Mike Doyle (left) talks with Pennsylvania Secretary McCullough while University of Pittsburgh Chancellor Nordenberg talks in the background.*

