



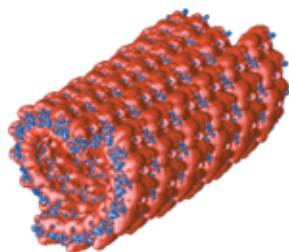
San Diego State University

“Working With Faculty Within the System to Support Change”

<http://www.edcenter.sdsu.edu/>

The ECCSE Mission

The mission of the Education Center on Computational Science and Engineering (ECCSE) is to support the incorporation of new computational tools into undergraduate teaching at SDSU and the California State



University (CSU), and assist faculty in developing their respective undergraduate curricula. The ECCSE team of faculty, students,

and staff accomplishes its mission through a variety of education outreach projects, presentations, and training. These changes in the undergraduate curriculum impact:

- Technical workforce preparation
- Pre-service preparation of teachers
- Future researchers

A Partnership of Partners

The ECCSE represents the CSU system within the National Partnership for Advanced Computational Infrastructure (NPACI), one of only two NSF-supported High Performance



Computing partnerships in the nation involving research centers from across the United States and the world. In addition to the University of California and the California State University systems, the

partners from our state include the California Institute of Technology, Salk Institute, Stanford University, The Scripps Research Institute, and several National Laboratories.



The main goal of NPACI, and the San Diego Supercomputer Center (SDSC) as its leading edge site, is the creation and maintenance of a national metacomputing environment for the 21st century.

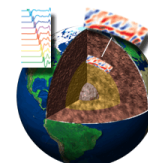


The San Diego Supercomputer Center operates the most powerful high-end computing resources available to the



national scientific community. For example, NPACI's Blue Horizon is a 1,152-processor IBM SP capable of 1.7 trillion

calculations per second, making it the first Teraflops computer available to the academic research community.



SDSC's mission is to develop and use technology to advance science, particularly in six key program areas:

- Integrative Biosciences
- Data and Knowledge Systems

- Environmental Sciences
- High-end Computing and Communications
- Grid and Cluster Computing
- Education, Outreach, and Training

Undergraduate Education Outreach

Education, outreach, and technology transfer play an important role in achieving this national goal of ensuring our leadership in advanced computing in the world. The NPACI/NCSA Alliance partnerships share a common interest in this effort, leading to the formation of the Education Outreach and Training Thrust (EOT-PACI). The ECCSE is the only partner within this EOT partnership with a focus on undergraduate curricula.

Educator-friendly Gateway to High-Performance Computing

The ECCSE serves as an educator-friendly gateway to high-end computing and communications technologies. We use a wide repertoire of strategies to help bridge the gap between researcher/mentors who are relatively new to computational science and the high-performance computing tools most useful to them.

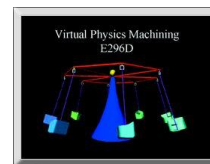
The ECCSE is most valuable to faculty with a strong interest in broadening their undergraduate students' exposure to modeling, simulation, visualization, and high-performance computing resources in their discipline, but who have limited time and limited resources to apply to their curriculum.

Through projects such as the ECCSE Faculty Fellows program, undergraduate faculty and their students gain valuable exposure to pioneering leading-edge technologies developed by the NPACI/NCSA Alliance partnerships.

ECCSE Projects

The Faculty Fellows Program

The Faculty Fellows is an innovative interdisciplinary program established in 1998 that provides release time and expert assistance to faculty members in an ongoing effort to foster the use of high-performance computing in the undergraduate curriculum. Fellows work in their particular academic discipline in collaboration with the ECCSE's team of educators and developers.



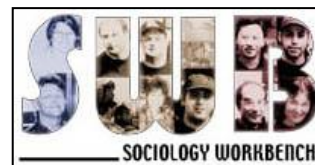
The ECCSE team holds biweekly meetings with the Fellows for an hour-long "synergy session" providing a chance for valuable interaction promoting and extending interdisciplinary curricular development beyond their own department or college.



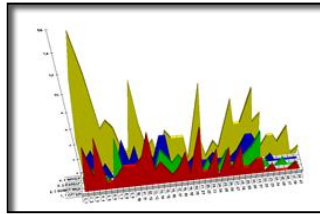
The Fellows share their classroom strategies, successes and challenges, helping to nurture a lasting bond based on a common pedagogical experience at the "front lines" of curricular change.

The Sociology WorkBench

The Sociology WorkBench (SWB) is an online analysis tool designed to manage categorical data such as surveys. The SWB joins a growing group of online workbenches and portals designed to provide discipline-specific tools in an integrated extensible interface with a community-oriented personalized look and feel. SWB users may create personalized accounts so



their work can be stored and tracked for future use by themselves or others. SWB users may select from one of several existing public datasets, or they may upload their own custom datasets. Users may upload private datasets and control access privileges using password protection. SWB



users may generate frequency distributions, cross-tabulations, and secondary variables, they may calculate basic statistics such as mean and standard deviation, and they may generate intuitive "rules" (if-then statements) about data using a quantitative approach called determinacy analysis. Users may also generate multi-variable rules and set thresholds for parameters such as accuracy and completeness.

The SWB also serves as a computer science research laboratory. Underlying the SWB's student-friendly interface is a powerful Oracle database driven by Java servlet technology that provides ECCSE undergraduate developers real world experience with tools they can expect to use extensively in their future professions. ECCSE students gain valuable experience using

cutting-edge tools such as Java/JDBC, SOAP, XML and XSLT as

they help support the SWB in its emerging role as a key node in the metadata-based digital government efforts being undertaken by the SDSC Data and Knowledge Systems Group (DAKS).

Automated Survey Creation Process

The Automated Survey Creation Process (ASCP) is an on-line survey creation tool that allows non-technical users to create,

administer and collect the results of on-line surveys by leveraging its seamless integration with the SWB.

In fact, ECCSE 2001 Fellow Professor Fred Kolkhorst has used the ASCP with the SWB for pre- and post-semester assessment of student attitudes towards inquiry-based learning in an undergraduate exercise physiology laboratory.



The ECCSE team is working with the Center for Aging to implement an online nationwide survey of injury control and prevention, a project funded by the Center for Disease Control and Prevention in Atlanta, GA. The SDSU Department of Psychology plans to administer - for the first time online - an extensive survey of their incoming freshman demographics. This survey has been traditionally administered on paper in the past. The department is one of the largest on campus, and it is in the process of obtaining approval from the campus human subjects committee.

Computational Science Resource Community

The EOT-PACI Computational Science Resource Community (CSRC) is a collection of high quality interactive online learning materials, assignments, reviews, and details of members with a connection to the field of Computational Science, particularly with the National Partnership for Advanced Computational Infrastructure (NPACI) and the National Computational Science Alliance (NCSA).



Through collaborative development efforts with the Center for Distributed Learning

(CDL) at Sonoma State University, the ECCSE development team is the first to implement the OCSK/Merlot type of repository outside of the CDL. We consider this a major feather in the cap of the ECCSE's team of undergraduate student developers. This collaboration positions the ECCSE well as an active contributor to the national digital library infrastructure.

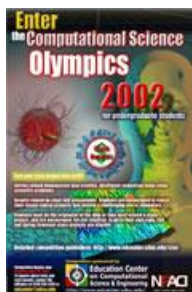
Merlot (<http://www.merlot.org/>), the first repository of its kind developed at the CDL, now has over 4000 members and more than 5000 resources. The National Science Foundation's National SMETE Digital Library project has included MERLOT as an official technology affiliate in 2001.

Computational Science Olympics



The ECCSE continues sponsorship of an exciting and challenging research competition for CSU undergraduate students.

The focus of the competition is computational science, in particular the use of advanced computing resources and Web applications for research in disciplines such as biology, chemistry, physics, geology, engineering, geography, social sciences, the humanities - just about any discipline!



Professional Community-building

ECCSE Director Dr. Kris Stewart brings over a decade of experience in education outreach to educators all over California, helping interested faculty gain experience with high-end computing and computational science.

Distributed Faculty Fellows

To extend and disseminate NPACI resources to a broader undergraduate audience, the ECCSE is beginning plans to establish a Distributed Faculty Fellows program throughout the CSU system. An important step towards this occurred recently when the ECCSE recently sponsored several CSU faculty to attend the NPACI annual All-Hands Meeting (AHM) in San Diego. Their enthusiastic response to the NPACI AHM program and their expressed appreciation for the support provided by the ECCSE suggests they may serve as the first group of potential Distributed Faculty Fellows

Digital Government

The ECCSE's close collaboration with SDSC's Data And Knowledge Systems group solidifies our position in the broader community of government agencies whose efforts to establish an integrated heterogeneous data management solution using XML mediation technologies are critical to the effective management of these huge quantities of public data.

Professional Outreach through Conference Participation

ECCSE staff participated in numerous professional society's annual symposia, seminars, and conferences, including Educause, SIAM, ACM SIGCSE, Supercomputing XY, NECC, CENIC, and CSUPERB.

ECCSE Affiliates

Our primary affiliates are:

CSU Chancellor's Office
 San Diego State University
 National Science Foundation
 NPACI/NCSA Alliance
 SDSC
 EOT-PACI