

# ***Building a Faculty Community Using Learning Objects in Computational Science***

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**[www.edcenter.sdsu.edu](http://www.edcenter.sdsu.edu)**



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# ***Funding***

**NSF/CISE PACI to the National Partnership for  
Advanced Computational Infrastructure (NPACI)**

**California State University System Chancellors  
Office (24 campuses across state)**

**San Diego State University Academic Affairs**



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# ***What is Computational Science?***

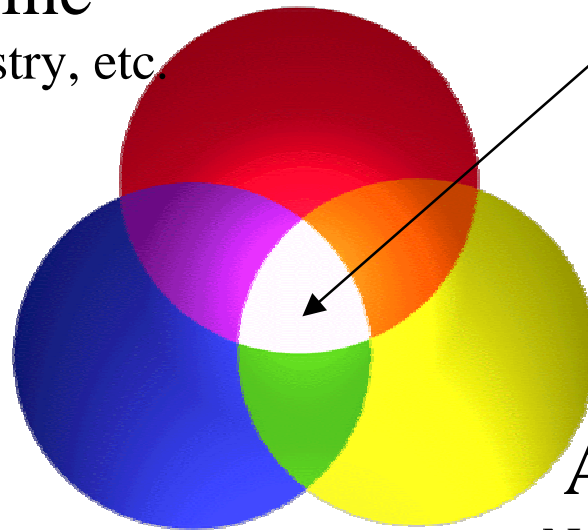
**Teamwork and Collaboration  
for Computational Science**

**Science Discipline**

Biology, Physics, Chemistry, etc.

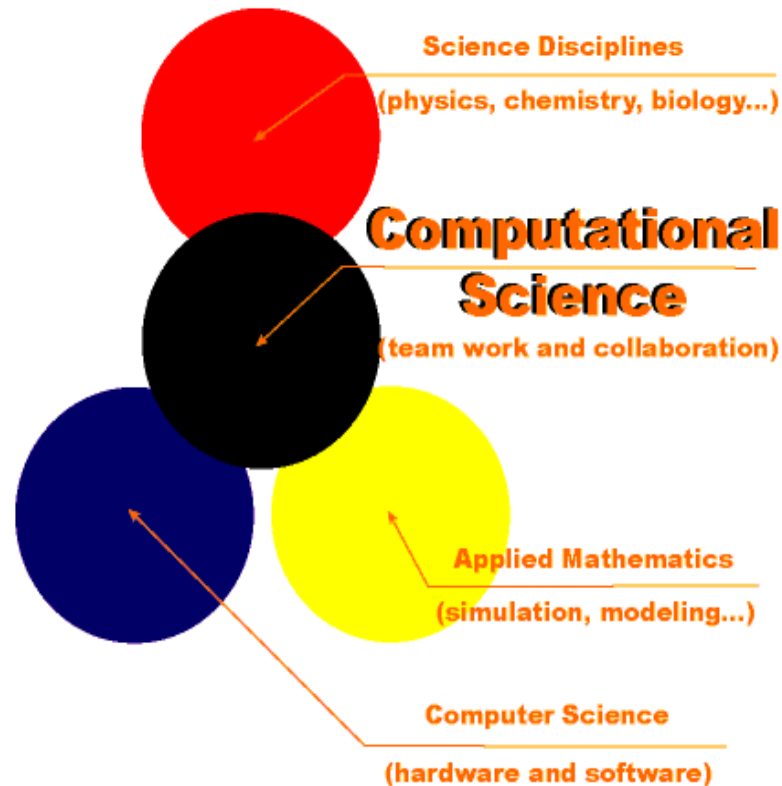
**Computer Science**

Hardware/Software



**Applied Mathematics**  
Numerical Analysis, Modeling,  
Simulation

# *Computational Science - Our Identity is Emerging*



Thanks to SIAM

Audience – are there others?

**Computational Science – it is not just black and white**

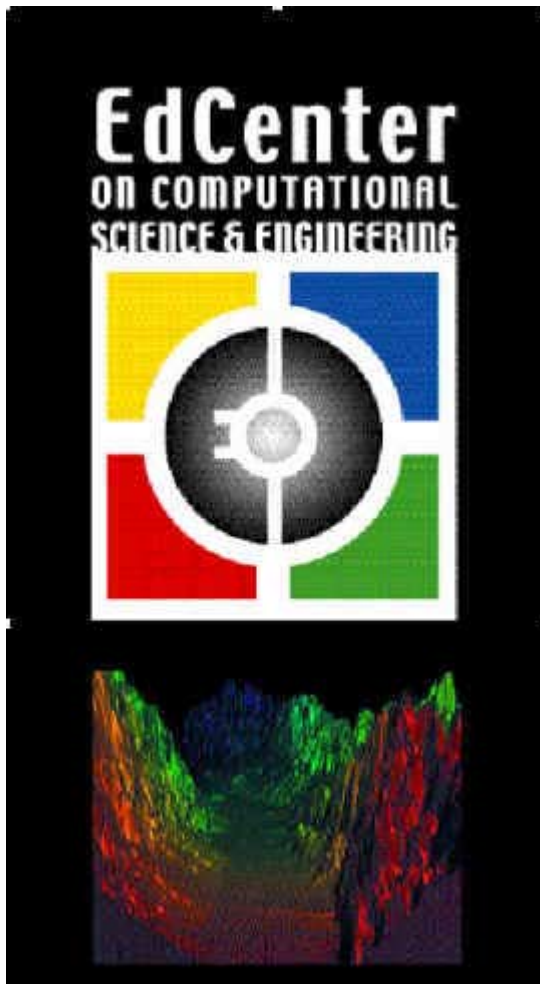


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## ***What the Ed Center is?***



**Please take a brochure providing details, examples and opportunities to participate with us.**

# ***Education Center on Computational Science & Engineering***

## **Mission:**

Foster the incorporation of high performance research tools for scientific investigation into the undergraduate curriculum to better prepare learners for post-Baccalaureate activities where:

- Collaborative, interdisciplinary teams,
- Sophisticated computer tools and
- Effective communication among the team members and with others

are used in research and problem solving.



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## ***EOT PACI***



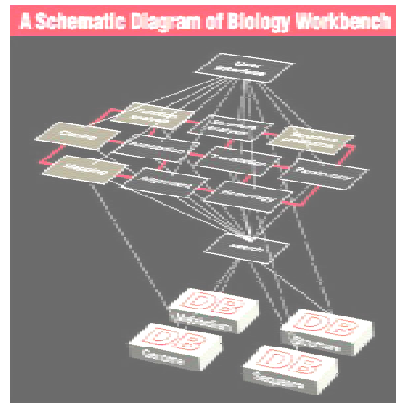
The mission of EOT-PACI is to develop human resources through the innovative use of emerging information technologies to understand and solve problems.

[www.eot.org](http://www.eot.org)

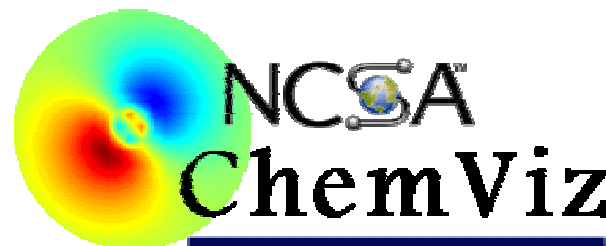
# Education

**Goal:** Support a national level systemic impact on CS&E education

(k-12, undergrad, grad/training, informal science)



[biology.ncsa.uiuc.edu](http://biology.ncsa.uiuc.edu)



[chemviz.ncsa.uiuc.edu/](http://chemviz.ncsa.uiuc.edu/)



UIUC  
Mike Heath

[www.cse.uiuc.edu/](http://www.cse.uiuc.edu/)



[www.krellinst.org](http://www.krellinst.org)

Research Rich  
Computational Physics

[www.physics.orst.edu/~rubin/CPUG](http://www.physics.orst.edu/~rubin/CPUG)



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# Access & Inclusion

**Goal:** Increase participation and success of women, minorities and people with disabilities in CS&E and in PACI



[trace.wisc.edu](http://trace.wisc.edu)

Universal design and disability access

## GirlTECH

[www.crpc.rice.edu/CRPC](http://www.crpc.rice.edu/CRPC)

*Spend a Summer with a Scientist*

## CDC

C R A  
W

Coalition to Diversify Computing  
[www.npaci.edu/Outreach/CDC](http://www.npaci.edu/Outreach/CDC)

Committee on the Status of  
Women in Computing Research

[www.cra.org/Activities/craw](http://www.cra.org/Activities/craw)

## AIHEC

American Indian  
Higher Education  
Consortium



[www.aihec.org](http://www.aihec.org)

## NPACI

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# ***EC/CSE Faculty Fellows***

## **Challenges and strategies**

- **building community of HPC users**
- **undergraduate faculty and students**
- **HSI hispanic-serving institution, exploration of faculty attitudes to computing in the classroom**

## **Powerpoint slides vs. Realtime Simulation**

- **NPACI naturally supports visualization and modeling - entry point for the curriculum**



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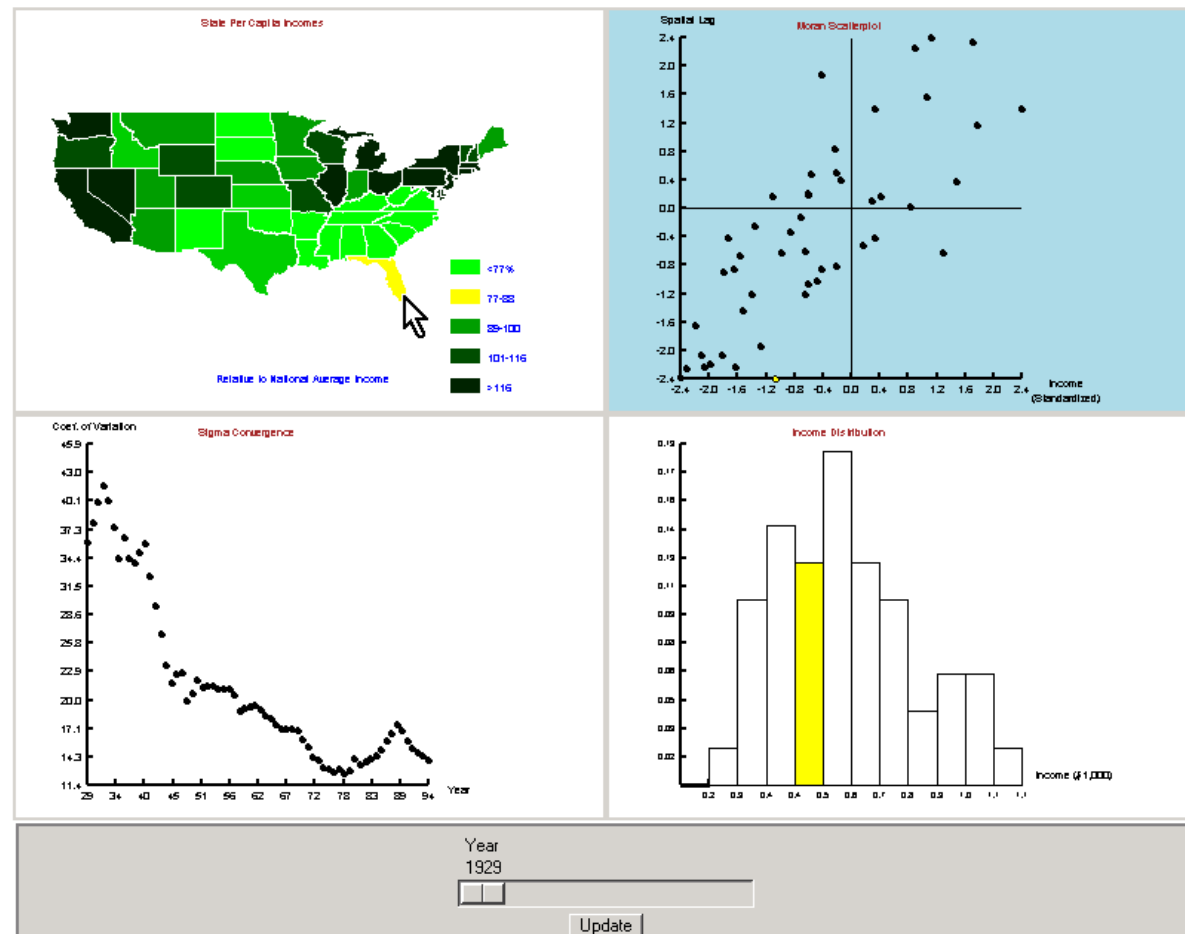


# Visualization of Spatial Data

## Serge Rey, Geography, College Art & Letters

"STARS Space Time Analysis of Regional Systems "

Clustering of  
wealth,  
state by  
state



# *The EdCenter Faculty Fellows Program*

Each semester we sponsor four to six Faculty Fellows representing departments from as many different colleges as possible

Bi-weekly “synergy sessions” at the Ed Center help nurture a bond based on a common pedagogical challenge

Faculty Fellows serve as “ambassadors” of computational science to their peers at meetings and conferences

**NPACI mandate to extend outreach to CSU faculty and beyond...**



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# ***Faculty Fellow Prof. Tom Impelluso***

***Mechanical Engineering  
SDSU College of Engineering***



**T. Impelluso  
Engineering**



Prof. Impelluso's goals as a Faculty Fellow include the integration of finite element software, dVISE, LabView, proEngineer and high-end computational hardware into the undergraduate Engineering ENGR296 Design Elements course. Thanks to Tom's vision and enthusiasm, students in his course gained valuable experience parallelizing their code and running it on the Cray T3E at the San Diego Supercomputer Center.



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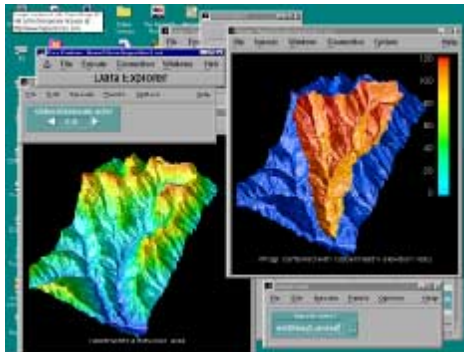
# ***Faculty Fellow Prof. Christina Tague***

***Department of Geography  
SDSU College of Arts and Letters***



**C. Tague  
Geography**

Prof. Tague's goal as a Faculty Fellow is to create a visualization "front-end" to serve an interactive exploratory interface for her ecological hydrology model, RHESSYS, for use by her students in the GEOG496 "Water at the Earth's Surface".



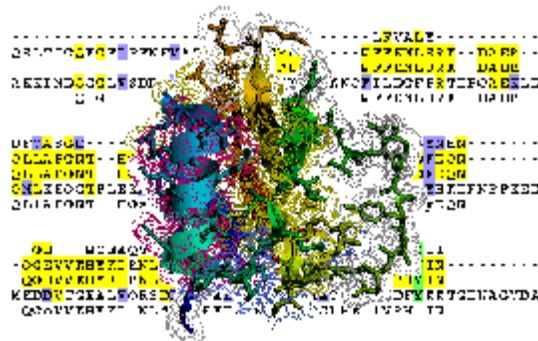
The EdCenter team and Prof. Tague are exploring AVS and OpenDX (the Open Source version of Data Explorer) as possible visualization solutions for this project.

# Faculty Fellow Prof. Kathy McGuire



K. McGuire  
Biology

*Department of Biology  
SDSU College of Sciences*



Prof. McGuire's goals as a Faculty Fellow include the development of application-specific online tutorials on the use of the Biology Student Workbench for the BIO585 course, Cell and Molecular Immunology. Kathy is the first to create a tutorial for the Biology Student Workbench specific to DNA sequence searching, which is a considerably greater challenge for students than protein sequence searching.



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# ***Faculty Fellow Prof. Fred Kohlhorst***

***Department of Exercise and Nutritional Science  
SDSU College of Professional Studies and Fine Arts***



**F. Kohlhorst**  
**Nutritional Sci.**

Prof. Kohlhorst's goals as a Faculty Fellow include implementing an online survey into the evaluation process for his ENS314 Exercise Physiology Laboratory, and to use the SWB as a part of the data analysis repertoire. The ENS314 was the first to use the SWB for student attitudes assessment, and has been the primary force behind recent development of the SWB's automated survey creation tool.



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## ***Rationale for the CSRC***

**Explosion of online computational science  
Resources of varying...**

Quality

Purpose

State of Development of Resource

**Online Support for Virtual Faculty Fellow Community**



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## *Yet More Rationale*

Difficult for faculty in the researcher/mentor model to manage it all without help

Faculty and their students need “learning on-demand” assistance with computational resources

“Just-in-time” learning requires 24-hour/day access



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## *Yet Even More Rationale*

Need to avoid duplication of effort by sharing  
Resources

Resource information must be online, searchable

Search results must be well-organized

Appropriateness of Resource must be readily  
identifiable

Community-based model must encourage alignment  
with existing professional communities



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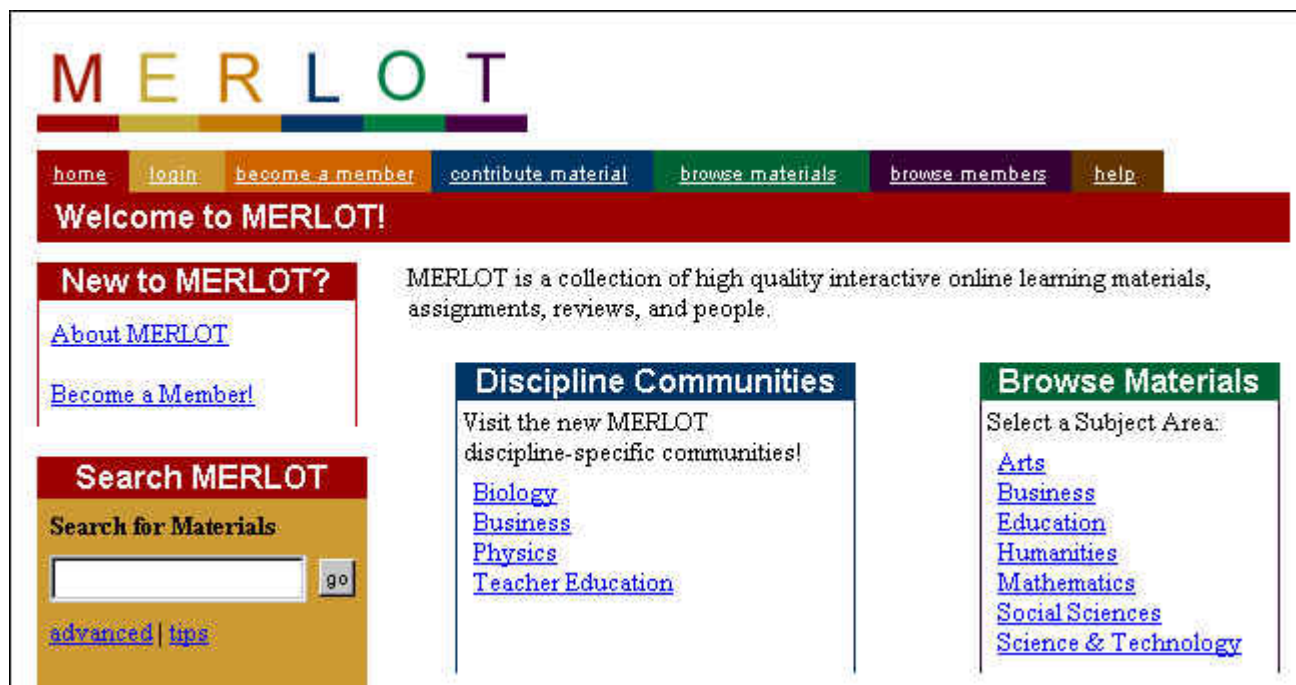
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# Partnership with the CSU

## California State University System

<http://www.merlot.org> Created the Oracle based Online Community Starter Kit (OCSK) software contributed to the Ed Center this year.



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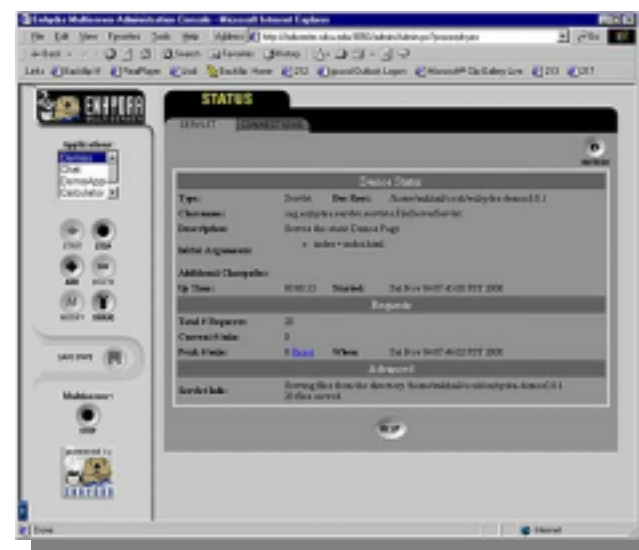
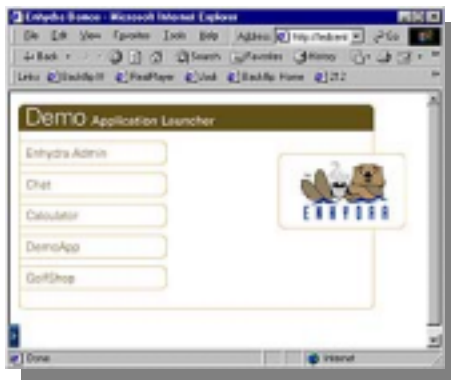
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# The Online Community Starter Kit (the “OCSK”)

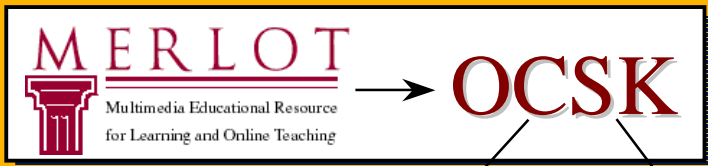


- Developed by the CSU Center for Distributed Learning using the Enhydra Open Source API
- Sits on top of Oracle Database



# The CSRC is a CSU/NPACI Collaboration

California State University



Discipline Communities  
(peer reviewed)



And many more...

**Computational Science  
Resource Community**



- National Partnership for Advanced Computational Infrastructure
- National Computational Science Alliance
- Education, Outreach and Training Partnership for Advanced Computational Infrastructure



eotPACI

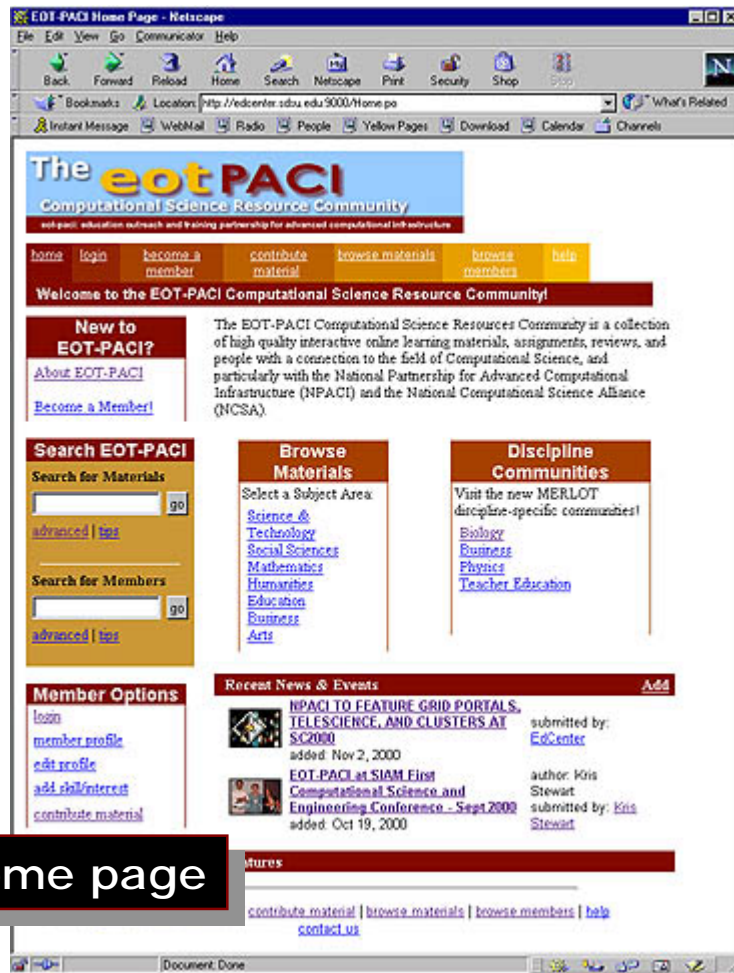


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# The CSRC Interface



Home page



Browse or Search

Member profile page



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# *CSRC Features and Functions*

Members and non-members may browse complete database of resources

Users must become Members to make contributions

Membership is fast and free

Supports User Comments about specific Resource

Members are encouraged to post Assignments created with a CSRC Resource

Resource descriptions include details about the resource as it is used in research or education



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# *CSRC Features and Functions*

Searchable web-based repository of computational science resources with usage characterizations

Characterizations include details about the resource as it is used in research or education

Community-oriented interface provides members with a personalized touch

**Enhydra Java servlet** interface to an **Oracle** database engine supports modularized component-based web page creation



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# ***NPACI Sources of Information***

**NPACI Partnership Report  
*enVision* quarterly science  
magazine, especially April  
2001, Fran Berman, Dir.  
“The Human Side of the  
Cyberinfrastructure”**

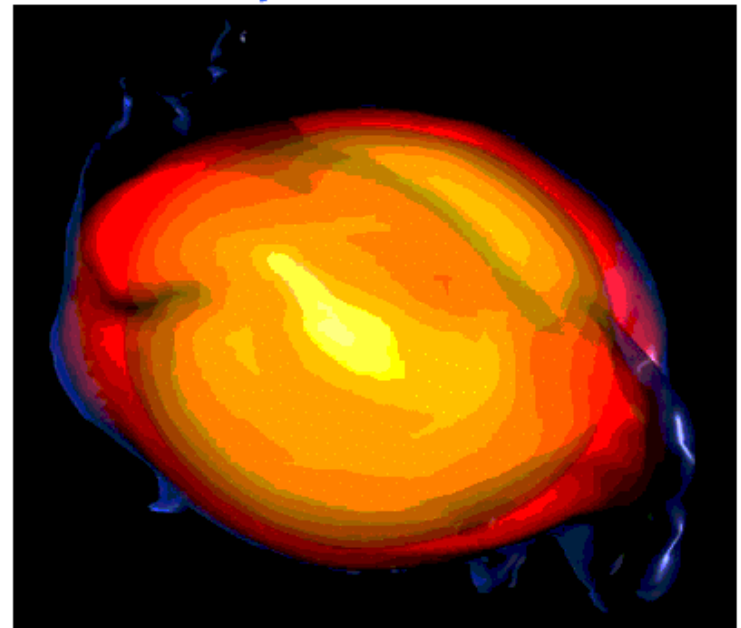
**[www.npaci.edu/enVision/v17.2/director.html](http://www.npaci.edu/enVision/v17.2/director.html)**

**“Online” biweekly electronic  
publication,**

**[www.npaci.edu/online/](http://www.npaci.edu/online/)**

**[www.npaci.edu](http://www.npaci.edu)**

NPACI & SDSC  
**ENVISION**  
VOL. 17 NO. 2  
QUARTERLY SCIENCE MAGAZINE  
APRIL-JUNE 2001



**ABOUT THIS IMAGE:** [Simulating Giant Waves on Neutron Stars](#)

**From the Director**  
[The Human Side of the Cyberinfrastructure](#)




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# ***Join the Computational Science Resource Community***

**[www.edcenter.sdsu.edu/csrf/](http://www.edcenter.sdsu.edu/csrf/)**

Contact us: [stewart@sdsu.edu](mailto:stewart@sdsu.edu)



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