

# *Template for Group Work in Undergraduate Supercomputing*

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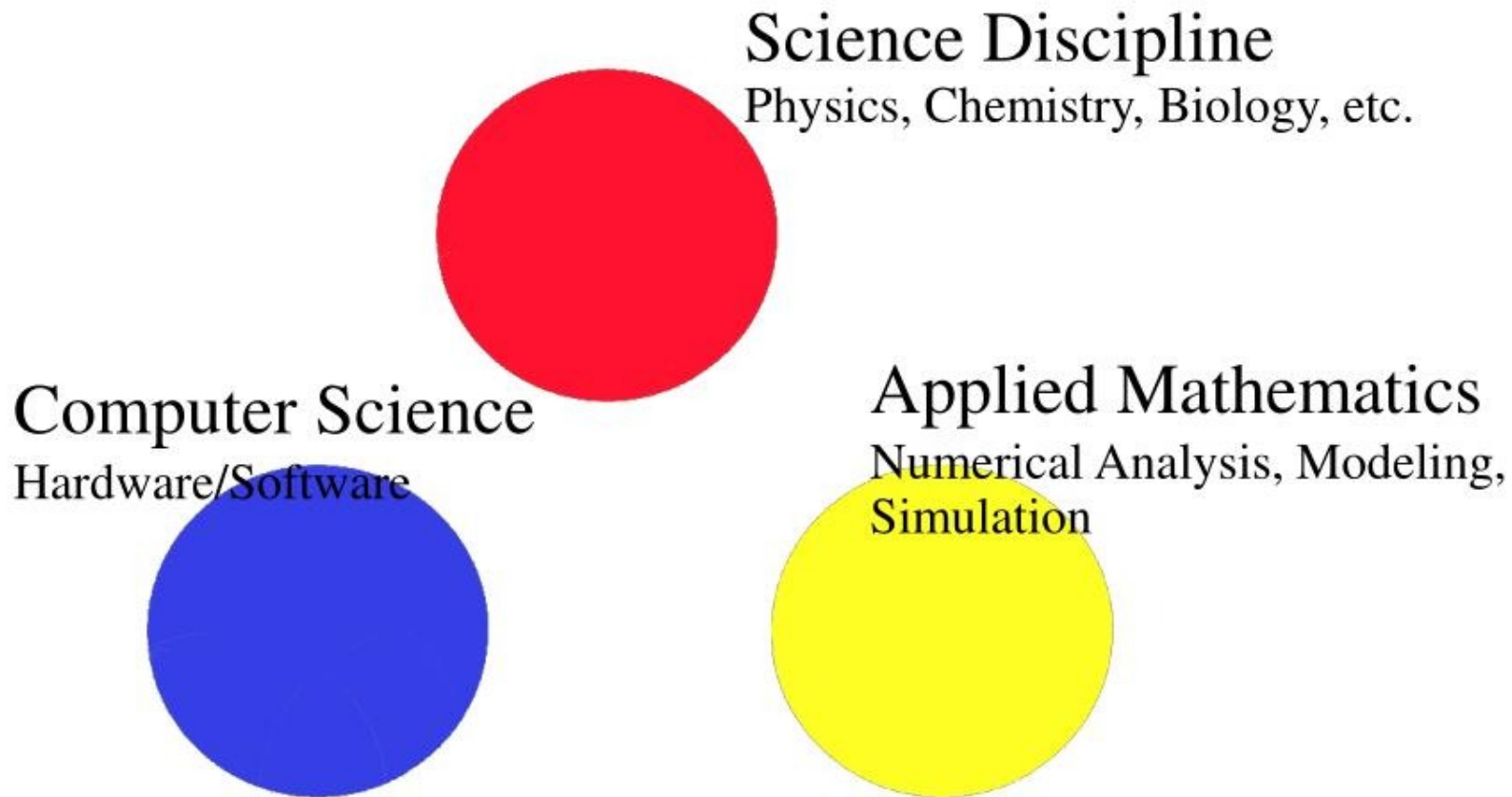


NATIONAL PARTNERSHIP FOR ADVANCED COMPUTATIONAL INFRASTRUCTURE

*HPC Users Group Meeting, SUNY Stonybrook, Aug. 17-21, 1999*



# *What is Computational Science?*



# What is Computational Science?

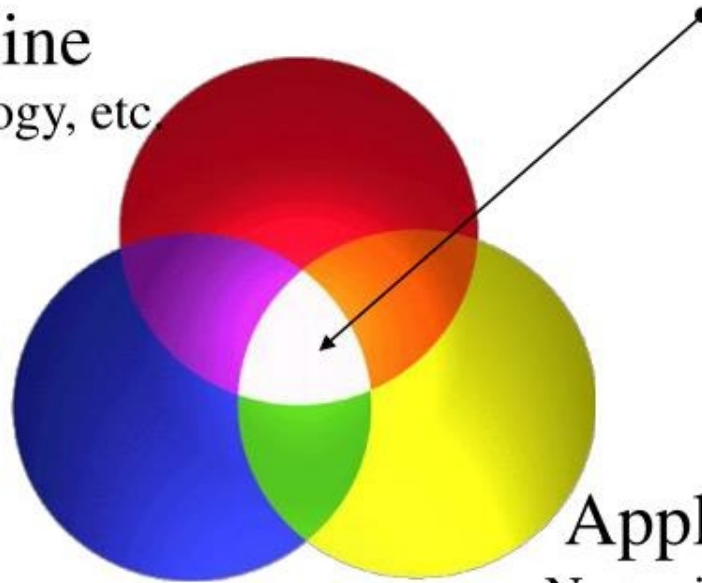
**Teamwork and Collaboration**

Science Discipline

Physics, Chemistry, Biology, etc

Computer Science

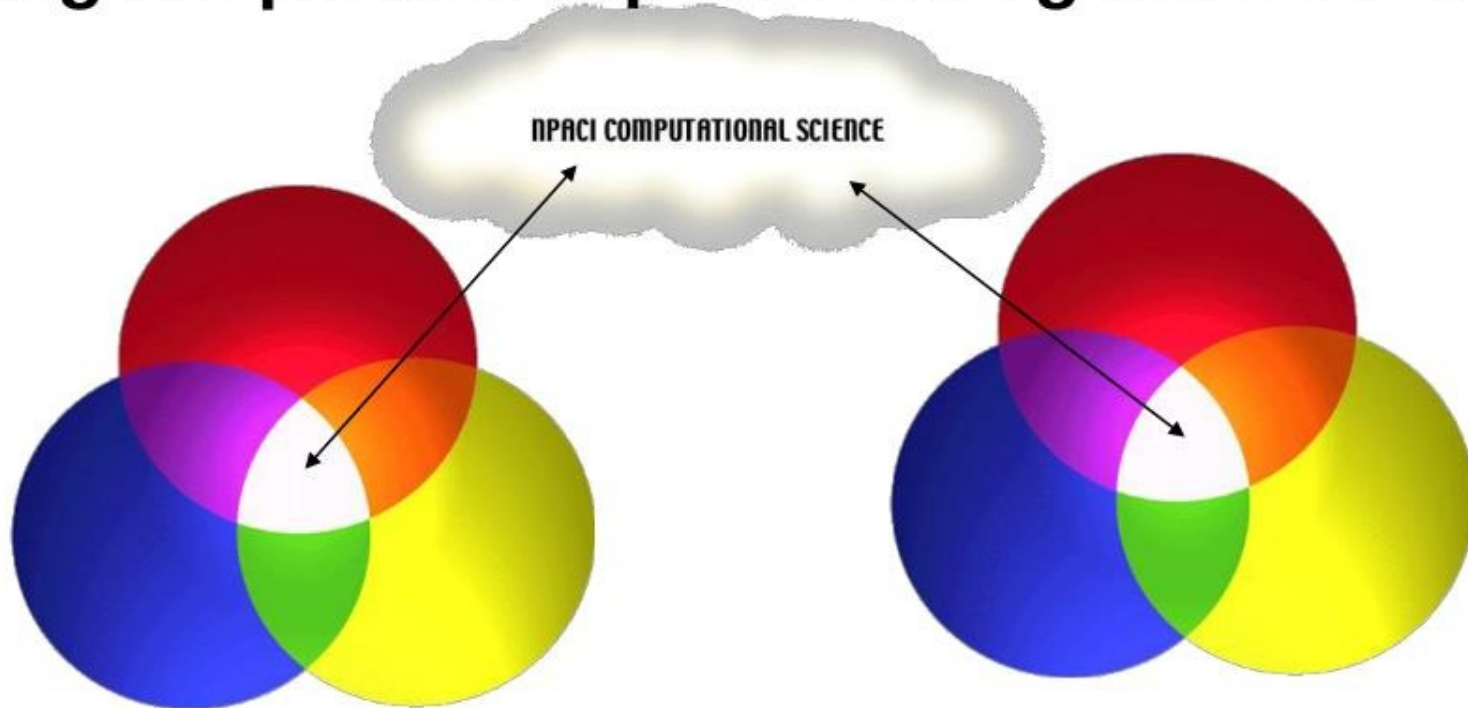
Hardware/Software



Applied Mathematics  
Numerical Analysis, Modeling,  
Simulation

# *What is computational science?*

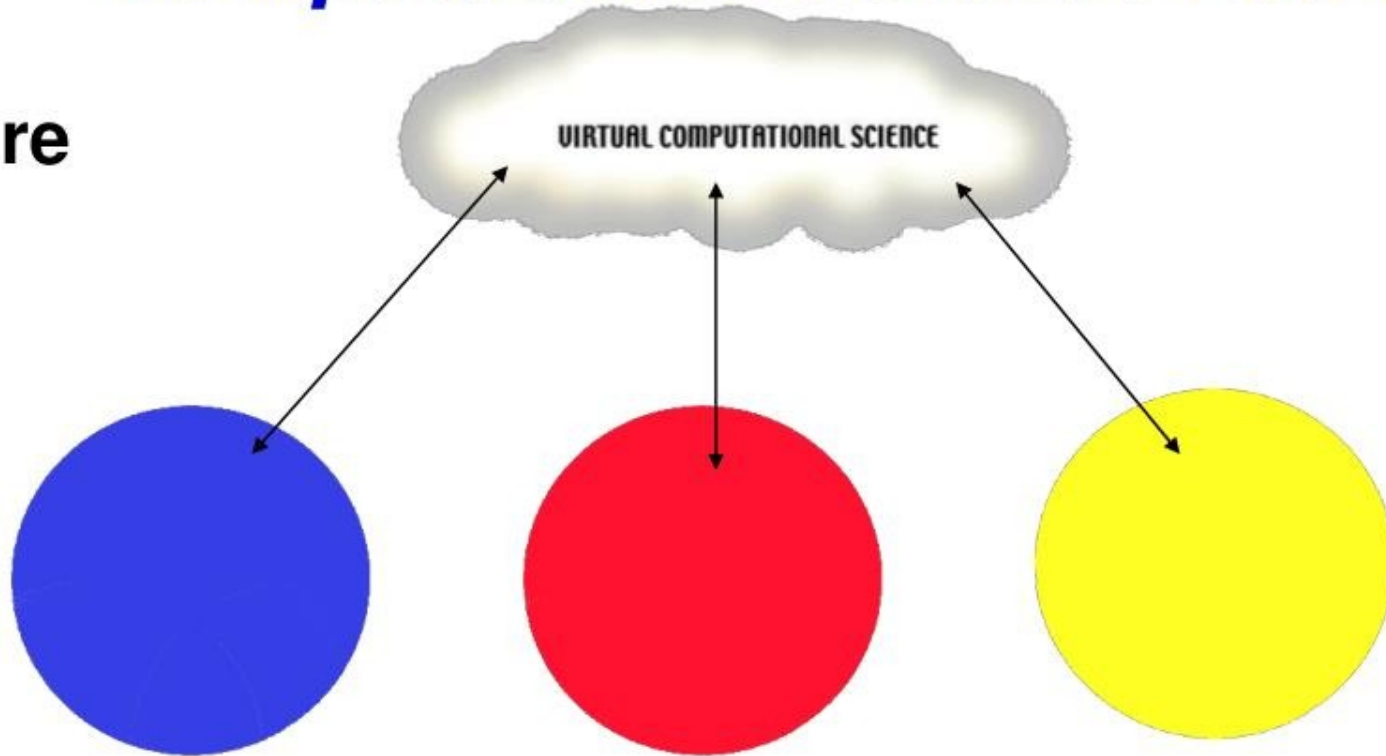
**NPACI unites teams of computational scientists among the partnership sites using the Internet**





# Computational Science 2001

Future



# ***Classroom Experience with Group Work in CS 575 Supercomputing***

**Group Dynamics**

**Group Evaluation**

**Group Presentations**

<http://www.stewart.cs.sdsu.edu/cs575/group-work>



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# ***Evaluation and Assessment of Classroom Practice***

**Student Surveys - Need a compatible tool for  
instructor to examine results with**

**Sociology WorkBench (SWB) developed by team  
of undergraduate computer science majors  
employed by the EC/CSE**

# ***Computational Science Curricula Evaluation and Assessment***

- User-Friendly Handbook for Project Evaluation: Science, Mathematics, Engineering and Technology Education, NSF 93-152

[www.ehr.nsf.gov/EHR/RED/EVAL/handbook/handbook.htm](http://www.ehr.nsf.gov/EHR/RED/EVAL/handbook/handbook.htm)

- Learning through Evaluation, Adaptation and Dissemination, U. Wisconsin NPACI partner

- “Template for a Group-Work Paradigm in an Undergraduate Supercomputing Course”,

[www.edcenter.sdsu.edu/projects/hpcu/kris\\_hpcu.pdf](http://www.edcenter.sdsu.edu/projects/hpcu/kris_hpcu.pdf)



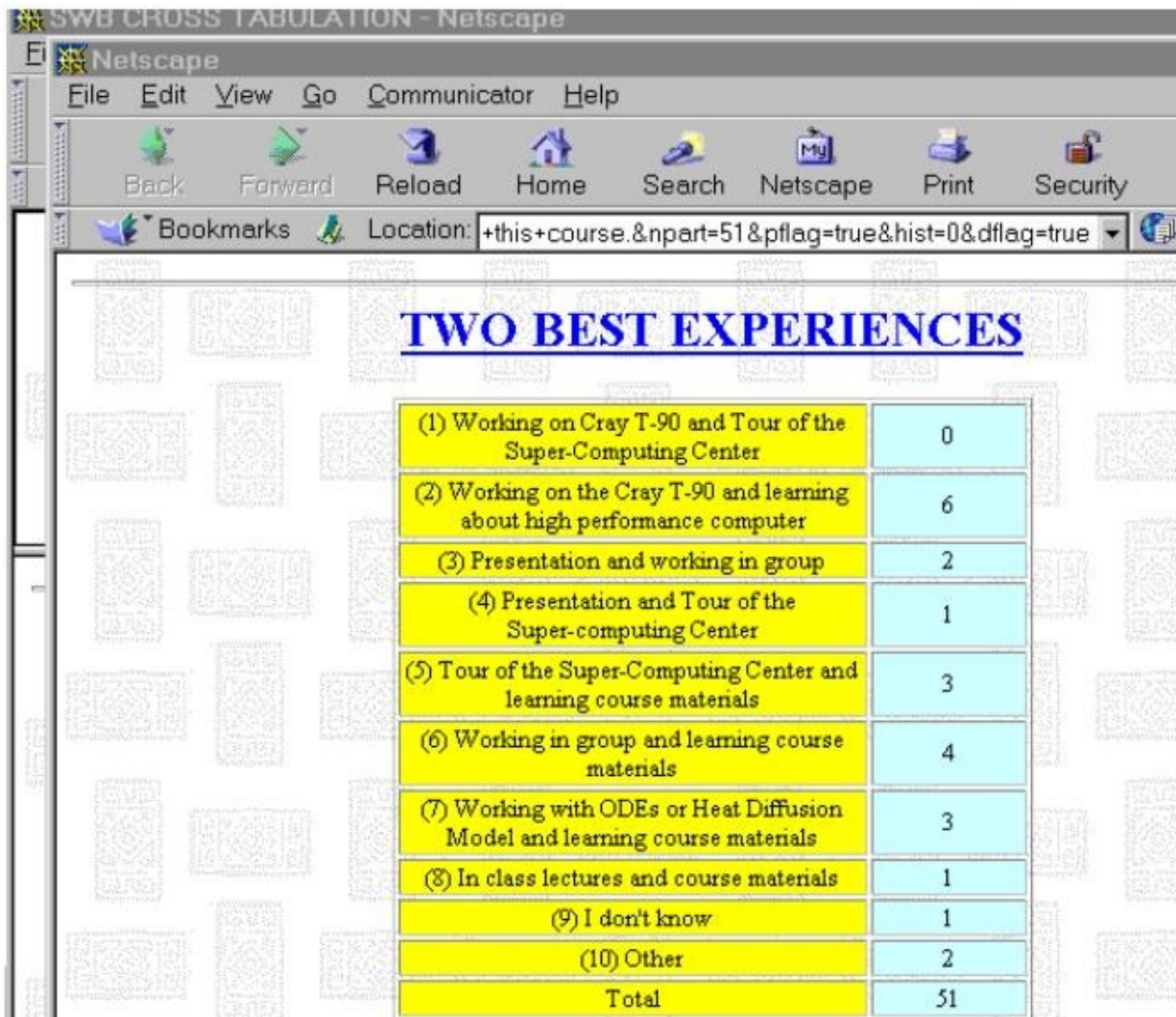
# ***SWB Convenient Tool to Learn from Student Survey Data***

Online tool for “standard public data sets” or your own data set <http://edcenter.sdsu.edu>

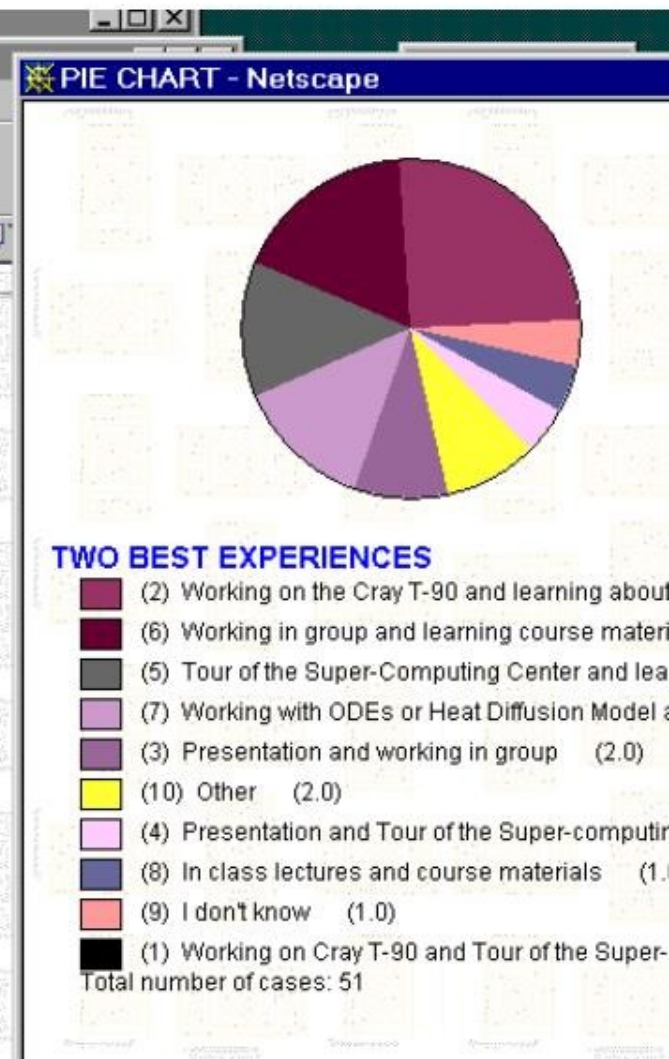
Small Sample, therefore only useful as feedback for the instructor

Can be used with “forms” interface directly into SWB format, as in June ‘99 CSU Faculty Workshop

# SWB as Analysis Tool



[Pie Chart](#)  
[Bar Chart](#)





# ***Surveys and Assignments (the Template)***

**Examine the overview of the course**

**<http://www.stewart.cs.sdsu.edu/cs575/>**

**Examine the overall organization from the class calendar**

**<http://www.stewart.cs.sdsu.edu/cs575/calendar.html>**

**Examine the record from the course and see if any of the assignments might be of use**

**<http://www.stewart.cs.sdsu.edu/cs575/assigns99.html>**

# ***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.

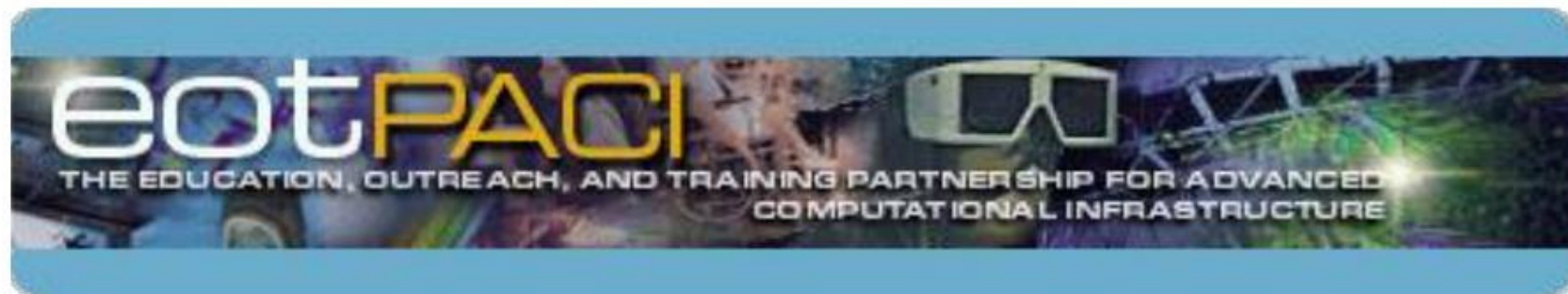


# ***Introduce the EC/CSE***

*(duplicate slide from earlier presentaion)*

- The mission of the Ed Center on Computational Science and Engineering? [www.edcenter.sdsu.edu](http://www.edcenter.sdsu.edu)
- Who are the people involved? [www.edcenter.sdsu.edu/staff](http://www.edcenter.sdsu.edu/staff)
- Some of our projects: [www.edcenter.sdsu.edu/projects/](http://www.edcenter.sdsu.edu/projects/)
- Some of our activities: [www.edcenter.sdsu.edu/news/](http://www.edcenter.sdsu.edu/news/)
- Some resources: [www.edcenter.sdsu.edu/repository](http://www.edcenter.sdsu.edu/repository)

Sid Karin: The Importance of Science Literacy in a Computing World (see enVision Science Magazine, V.15 No. 2)

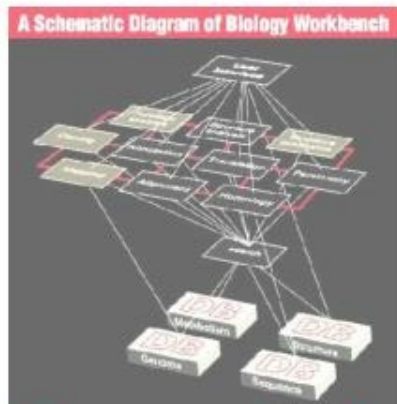


**The mission of EOT-PACI is to develop human resources through the innovative use of emerging information technologies in order to understand and solve problems in education, science, business, government, and society.**

# 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)



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



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# ***Education: some remarkable projects***

- **Chickscope**
  - students watch embryo maturing using magnetic resonance imaging (MRI) over the Web
- **Chemviz**
  - visualization tools and curriculum for computational chemistry (quantum chemistry computations, web crystallographic databases, etc.)
- **The WHY files**
  - explanation of science behind the news (NISE)
- **Biology Workbench**
  - collection of computational biology tools and databases
- **Maryland Virtual High School**
  - Core models in the K12 classroom
- **Sociology Workbench**
  - Online tools for survey data analysis, e.g. student evaluations



# Learning Technologies

**Goal:** Develop, apply, and assess computational tools that enhance learning



[trurl.npac.syr.edu/tango](http://trurl.npac.syr.edu/tango)

## TANGO Interactive

Java-based Web collaboratory for distributed learning

Environmental hydrology workbench,  
watershed mapping and modeling tools



<http://www.ncsa.uiuc.edu/Cyberia/RiverWeb>

**emerging technologies**

for science, education and business



Course broadcast over the Web

<http://www.ncsa.uiuc.edu/edu/courses/spring98/>

# Access & Inclusion

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

*Trace Research & Development Center*

*Making information technology more usable for everyone*

[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

Coalition to Diversify Computing

[www.npaci.edu/Outreach/CDC](http://www.npaci.edu/Outreach/CDC)

C R A  
W

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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EdCenter  
ON COMPUTATIONAL  
SCIENCE & ENGINEERING

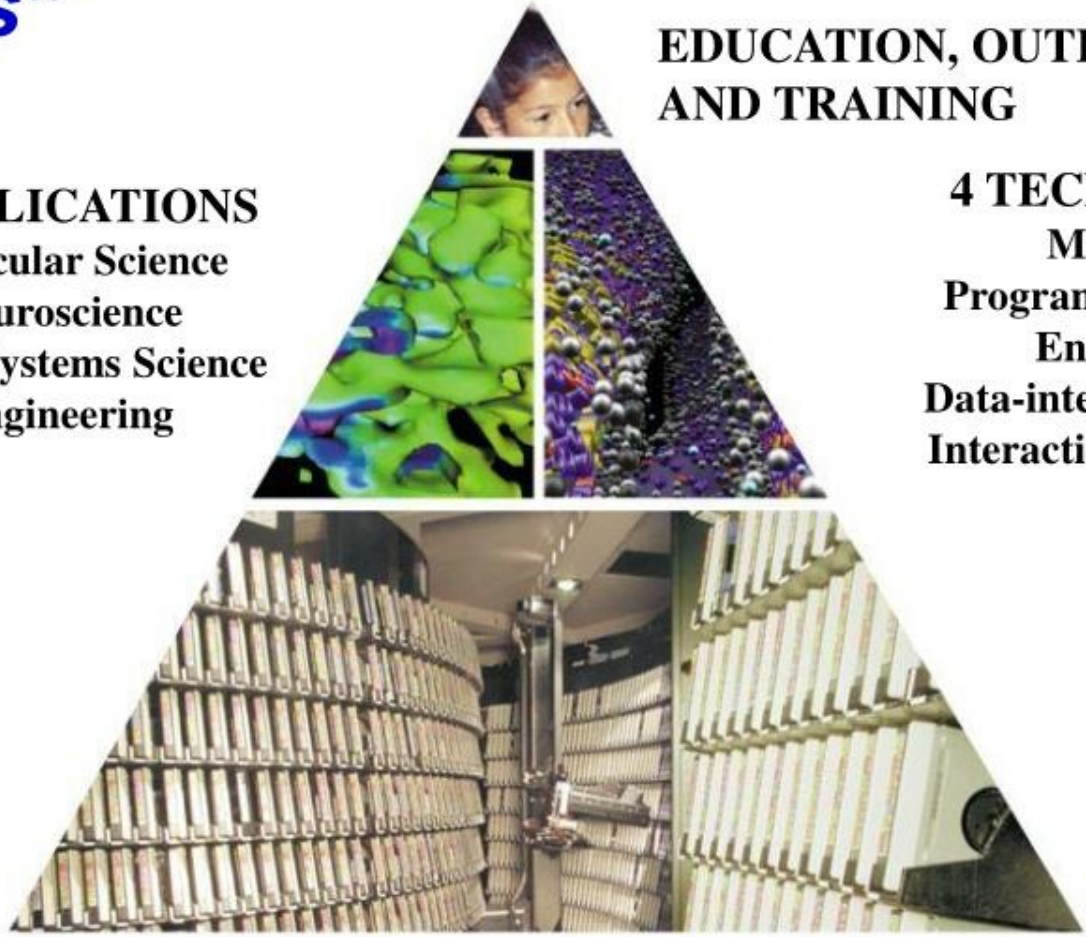


# NPACI Partnership Organizing Principle: “Thrusts”

**4 APPLICATIONS**  
Molecular Science  
Neuroscience  
Earth Systems Science  
Engineering

**EDUCATION, OUTREACH,  
AND TRAINING**

**4 TECHNOLOGIES**  
Metasystems  
Programming Tools and  
Environments  
Data-intensive Computing  
Interaction Environments



**RESOURCES**



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# Advancing the Computational Infrastructure

## Resources -- Today's Digital Laboratory

- High-performance computing available *today* to the academic community

## Develop and Deploy

- Technology and application collaborations to push the capabilities of tomorrow's digital laboratory

## Use and Apply

- Computational scientists applying enhanced capabilities to achieve new scientific results

## Disseminate and Incorporate

- Incorporating technologies into the digital laboratory and disseminating them for use in new communities



# Sources of Information

NPACI Partnership Report

Touch the Future

*enVision* quarterly science

magazine, especially June99

“The Importance of Science Literacy in a Computing World”, Sid Karin

[www.npaci.edu/envision/v15.2/director.html](http://www.npaci.edu/envision/v15.2/director.html)

“Online” biweekly electronic

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

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

