

Opportunities at Argonne National Laboratory

*William D. Gropp
Mathematics and Computer Science
www.mcs.anl.gov/~gropp*



About Argonne

- Founded in 1943, designated a national laboratory in 1946
- Managed by The University of Chicago for the Department of Energy
 - More than 2,900 employees and 5,000+ facility users
 - About \$475M budget
 - 1,500-acre, wooded site in DuPage County, Illinois (25 miles southwest of downtown Chicago)
- Broad R&D portfolio



- Organized into divisions
 - Many involved in computing
 - MCS – Mathematics and Computer Science
 - Part of Computing and Life Sciences “directorship”, led by Rick Stevens
 - DEP – Educational Programs



Division of Educational Programs

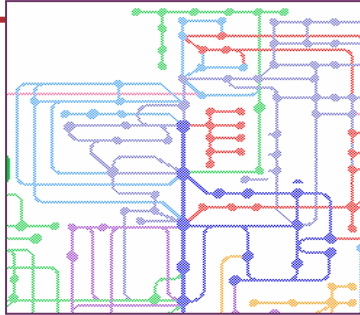
Largest educational program of any DOE-SC Laboratory

- More than 5,000 participants in DEP in 2005

Faculty	63
Graduate Students	319
Undergraduates	798
K-12	3,614
International Fellows and Trainees	240



High Performance Computing is Integral to Argonne Science and Technology Thrusts



■ Biology

- Identify functions of genes; model cellular processes

■ Nanoscience

- Experiment + theory for catalysts, sensors, electronics, photonics

■ Environment

- Understand atmospheric chemistry, aerosols, climate change

■ Transportation

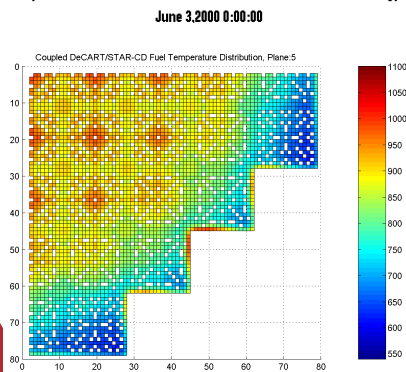
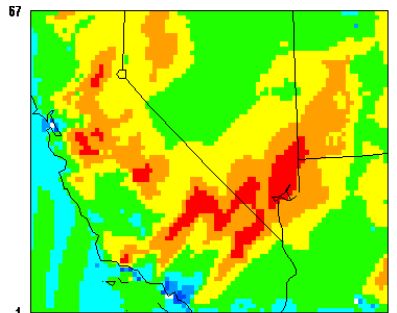
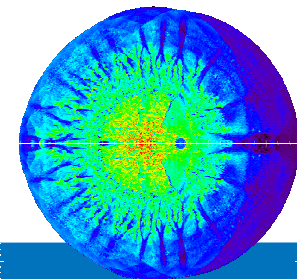
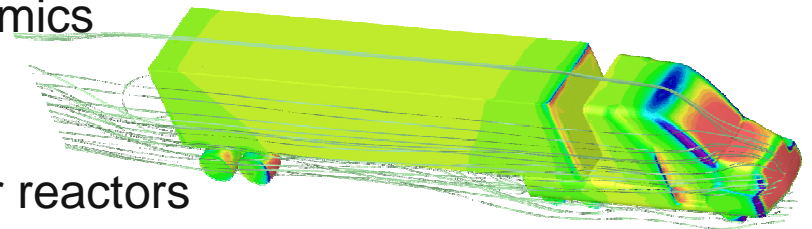
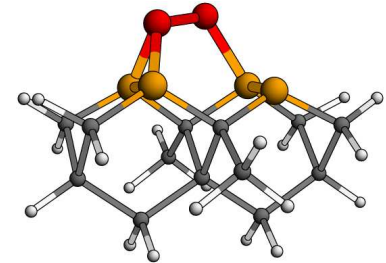
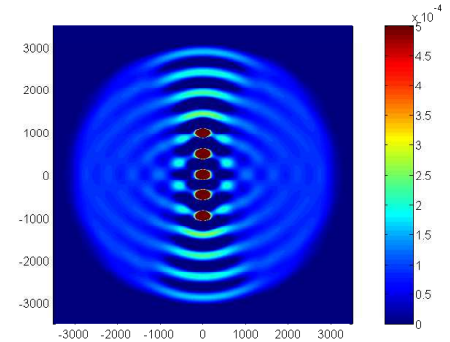
- Efficient truck aerodynamics and fuel injection

■ Energy

- Next generation nuclear reactors
- High performance batteries

■ Physics

- From nuclear structure to stellar explosions





Overview of MCS Research Areas

- Numerical Methods and Software Development
 - Applied Mathematics
 - Systems Software and Programming Tools
 - Distributed Systems Research
 - Collaboration and Visualization Environments
 - High-Performance Computing Systems
 - Scientific Computing Applications
 - Outreach, Training, and Research Partnerships
- New Thrusts in MCS
 - Computing at Petascale
 - Large scale computing resources (IBM Blue Gene)
 - Scalability in algorithms, tools, systems software, application software
 - *Climate*
 - *Biology*
 - *Other physical science simulations*
 - *Nuclear engineering*



Educational Opportunities at MCS

- MCS has traditionally focused on
 - Integrating research and praxis
 - Interdisciplinary research
 - Close collaboration with supervisors
- MCS offers
 - Research assistantships
 - Thesis supervision
 - Mentoring
 - Faculty positions
 - Opportunities for remote collaboration
- Givens Associates (10-12 week stipend)
 - Graduate students in numerical analysis or computational mathematics
- DOE Computational Science Graduate Fellowship (4 year fellowship)
 - 2nd year graduate students, physical/computer/math/life/engineering sciences
 - <http://www.krellinst.org/csgf/> US citizens or permanent resident aliens

See ANL Catalog of Research
Participation Projects
with 43 MCS topics
<http://www.dep.anl.gov/catalog/>



How to Collaborate

- Meet with MCS research scientists
 - You'll find them at the many of the same conferences and workshops that you attend
- Participate in Community Activities, such as
 - BlueGene Consortium ([www. bgconsortium.org/](http://www.bgconsortium.org/))
 - Global Grid Forum
- Send your students to MCS
 - Strong student program is an excellent way to develop collaborations
 - Great way to get up to speed on MCS tools and projects
- Write collaborative proposals
 - Many opportunities
 - DOE, NSF, NIH, DARPA, others

