Opportunities at Argonne National Laboratory

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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
  - 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