

5 Education and University Integration

The Center has had a major impact on the University of Illinois in a variety of ways. Above all, it has engendered an unprecedented level of collaboration across disciplines and departments. Even within single disciplines, such as fluid dynamics or structural analysis, faculty collaboration across departmental lines has been enhanced enormously. As a result, the Center has become a model for other interdisciplinary, interdepartmental research initiatives. In addition, because of the broad applicability of the technologies it represents, CSAR has also provided leverage to, and benefited greatly from, many other separately funded programs on our campus, both individual faculty research grants and other large centers such as NCSA.

By hiring more than 60 new professional staff and postdoctoral associates during the first five years of the program, the Center has significantly enlarged the local technical talent pool, providing a whole new set of collaborators for existing faculty and staff. The Center has also hosted a number of visitors, both long-term and short-term, and has organized a very popular seminar series that is designed specifically to reach out across disciplinary boundaries to enhance collaboration.

The Center spans ten academic units (Figure 5.1.1), and its recognition and influence are pervasive throughout the College of Engineering and beyond. We work very closely with NCSA, which contributes both research personnel and computer time toward our effort. Several key members of our research team are also research scientists at

NCSA. It has been especially convenient to do initial code development locally on parallel systems at NCSA preceding full implementation on the remote ASCI platforms.

Another major impact of the Center has been on graduate education and training. CSAR is playing a major role in educating a new generation of scientists and engineers prepared to work in computational simulation of complex systems by supporting more than forty graduate students at any given time. By virtue of this experience, the students we train are already attuned to the needs of interdisciplinary collaboration. The level of involvement by undergraduate students has been growing, especially in laboratory environments.

The Center has enhanced the awareness on our campus of computational simulation, and it has substantially increased the visibility and influence of our interdisciplinary Computational Science and Engineering (CSE) Program, which administratively houses the Center. The computationally-oriented, interdisciplinary educational program provided by CSE fits perfectly with the needs of CSAR, and the students in this program are ideally trained to participate in the research activities of the Center. CSE courses are specially designed to lower the usual barriers to interdisciplinary course work and enable students to master both applied and computational disciplines.

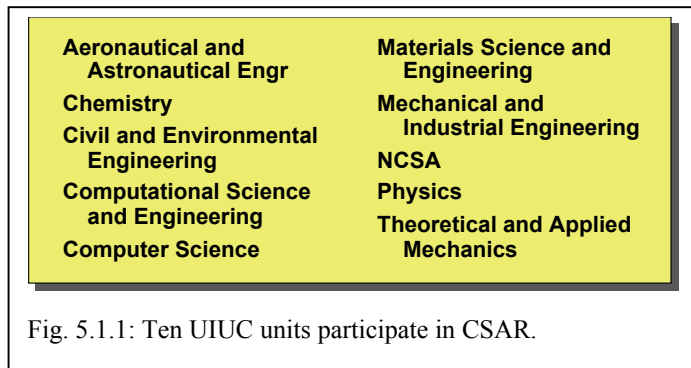


Fig. 5.1.1: Ten UIUC units participate in CSAR.

Table 5.1
2001-02 CSAR Seminars

- Michael Klein, University of Pennsylvania, “Computer Simulation Studies of Biomolecules at Soft Interfaces: The Continuing Challenge of Bridging Length and Time Scales”, Theoretical Biophysics Seminar, 3:00 P.M., Monday, September 23, 2002, 3269 Beckman Institute.
- Alan Calder, University of Chicago Flash Center, “Validating an Astrophysical Simulation Showing You the ‘Kitchen’ of Numerical Modeling”, Astrophysics Colloquium, 3:45 P.M., Tuesday, September 10, 2002, 134 Astronomy.
- Calvin Lin, University of Texas at Austin, “Compiler Support for Analyzing and Optimizing Software Libraries”, CS Seminar, 3:00 P.M., Monday, July 1, 2002, 2240 DCL.
- William Nellis, Lawrence Livermore National Laboratory, “Dynamic Compression of Hydrogen and Other Small Molecular Fluids at High Pressure, Issues in the Combustion of Heterogeneous Solid Propellants”, Physical Chemistry Seminar, 4:00 P.M., Thursday, May 30, 2002, 112 Chem Annex.
- Karl Meerbergen, Katholieke Universiteit Leuven, Belgium, “Theory and Software for Krylov Methods for the Computation of the Frequency Response of Large Structures and Acoustic Finite Element Models “, CS Colloquium, 4:00, Wednesday, May 1, 2002, 2240 DCL.
- Blaine Asay, Los Alamos National Laboratory, “Experimental Studies on Thermal Damage and Convective Combustion of Explosives”, CSAR Noon Seminar, 12:00, Wednesday, May 1, 2002, 2240 DCL.
- George Whitesides, Harvard University, “Nanoscience and Technology: Why is this area now attracting so much attention, and what is it all about? “, Center for Nanoscale Science and Technology Seminar, 3:00, Tuesday, April 30, 2002, B02 CSL.
- Dimitri Mavriplis, ICASE, NASA Langley Research Center, “The Development of Unstructured Grid Methods for Computational Aerodynamics”, AAE Seminar, 4:00, Monday, April 29, 2002, 103 Talbot Lab.
- Peter Fritzon, Linkoping University, “Modelica - A General Object-Oriented Language for Continuous and Discrete-Event System Modeling and Simulation”, CSE/CSAR Noon Seminar, 12:00, Monday, April 22, 2002, 2501 DCL.
- Jennifer Proft, University of Texas at Austin, “Coupled Continuous/Discontinuous Galerkin Methods for Shallow Water Flow”, CSE/CPSD Seminar, 2:00 P.M., Friday, April 19, 2002, 2240 DCL.
- Tom Bowman, Stanford University, “NewParadigms for Combustion in Aircraft Gas Turbines”, MIE Seminar, 4:00 P.M., Tuesday, April 16, 2002, 218 MEB.
- Omar Ghattas, Carnegie Mellon University, “Dynamic Meshes, Dynamic Interfaces, and Hemodynamics”, CSE Symposium Keynote, 3:00 P.M., Tuesday, April 16, 2002, 1005 BI.

- David Keyes, Old Dominion University, “Domain Decomposition Methods in Computational Science and Engineering”, CSE Symposium Keynote, 10:00 A.M., Tuesday, April 16, 2002, 1005 BI.
- Yinon Ashkenazy, UIUC/CSAR/MATSE, “Properties of Amorphous and Mutiphase Materials Using Molecular Dynamics”, CSAR Noon Seminar, 12:00, Wednesday, April 10, 2002, 2240 DCL.
- Adrian Sandu, Michigan Technological University, “Computational Aspects of Air Quality Modeling”, CS Seminar, 4:00, P.M., Monday, April 1, 2002, 1320 DCL.
- Joseph Majdalani, Marquette University, “Core Flow Models in Injection-Driven Combustion Chambers”, CSAR Noon Seminar, 12:00, Friday, March 29, 2002, 2240 DCL.
- Narayan Aluru, UIUC/GE, “Tiny Machines and Large Computations”, Beckman Institute Seminar, 3:00 P.M., Thursday, March 28, 2002, 5602 BI.
- Howard Baum, National Institute of Standards and Technology, “Mathematical Modeling of Fire Plume Dynamics”, TAM Seminar, 4:00 P.M., Thursday, March 7, 2002, 103 Talbot Lab.
- Thomas Quinn, University of Washington, “Cosmological N-body Simulations”, CSE/CSAR Noon Seminar, 12:00, Wednesday, February 20, 2002, 2240 DCL.
- Scott Stewart, UIUC/TAM, “Wave Tracking in Complex Geometries, with Applications to Moving Interface Problems”, CSAR Noon Seminar, 12:00, Wednesday, December 5, 2001, 2240 DCL.
- David Noble, Sandia National Laboratories, “Phase Field and Level Set Methods for Embedded Interfacial Physics”, MIE Seminar, 2:00 P.M., Friday, November 30, 2001, 300 Lincoln Hall.
- Joerg Liesen, UIUC/CS, “Indefinite Preconditioning and Applications in Surface Parameterization”, CSAR Noon Seminar, 12:00, Wednesday, November 28, 2001, 2240 DCL.
- Anath Grama, Purdue University, “Computational Aspects of Multipole Methods”, Electromagnetics Seminar, 4:00 P.M., Tuesday, November 27, 2001, 165 Everitt Lab.
- Xiangmin Jiao, UIUC/CS, “Data Transfer and Interface Propagation in Multicomponent Simulations”, CSAR Seminar, 10:00 A.M., Tuesday, November 27, 2001, 2240 DCL.
- Chris Johnson, University of Utah, “BioPSE: A Biomedical Problem Solving Environment”, Beckman Institute Seminar, 3:00 P.M., Monday, November 19, 2001, 3269 BI.
- William C. Reynolds, Stanford University, “Structure-Based Turbulence Modeling”, TAM Seminar, 4:00 P.M., Thursday, October 25, 2001, 103 Talbot Lab.
- Prosenjit Bagchi, UIUC/TAM, “Direct Numerical Simulation of Particle-Turbulence Interaction”, TAM Seminar, 4:00 P.M., Thursday, October 18, 2001, 103 Talbot Lab.
- Thomas Beck, University of Cincinnati, “Real-Space Multiscale Methods in Density-Functional Theory”, MCC Seminar, 2:00, P.M., Friday, October 12, 2001, 280 MRL.
- Sanjay Kale, UIUC/CS, “Component Frameworks Simplify Parallel Programming for Structured and Unstructured Grids”, CSAR Noon Seminar, 12:00, Wednesday, October 10, 2001, 2240 DCL.

Donald Miller, Lawrence Livermore National Laboratory, “Irreversible Thermodynamics Basis for Diffusion in Multicomponent Systems”, MIE Seminar, 4:00 P.M., Tuesday, October 2, 2001, 218 MEB.