5. Education and University Integration

The Center has had a major impact on the university 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 25 new professional staff and postdoctoral associates, 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 (Table 5.1).

The Center spans twelve departments, 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 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. By virtue of this experience, the students we train are already attuned to the needs of interdisciplinary collaboration. The level of involvement by undergraduates has been limited, but we are beginning to involve undergraduates, especially in laboratory environments.

The Center has generally 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 houses the Center administratively. The computationally-oriented, interdisciplinary educational program provided by CSE fits perfectly with the needs of the Center, 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.
Table 5.1

1998-99 CSAR Seminars


Huajian Gao, Stanford University, “Cohesive Elasticity Models of Fracture,” MIE Seminar, 4:00 P.M., Tuesday, September 14, 1999, 218 MEB.

Jay Hoeflinger, UIUC/CSAR, “A Performance Comparison of Fortran 90 with MPI and OpenMP on the Origin 2000,” NCSA Seminar, 1:30 PM, Tuesday, September 7, 4169 BI.

Luigi Martinelli, Princeton University, “Viscous Flow Solvers for Aerodynamic Analysis and Design,” MIE Seminar, 4:00 P.M., Tuesday, August 31, 1999, 218 MEB.


Video Presentation, “Challenger: Disaster and Investigation,” CSAR Noon Seminar, 12:00, Wednesday, August 18, 1999, 2240 DCL.

Vipin Kumar, University of Minnesota, “Graph Partitioning for Dynamic, Adaptive and Multi-phase Computations,” CPSD/CSAR Seminar, 11:00 A.M., Monday, August 9, 1999, 2240 DCL.

Video Presentation, “Opening New Frontiers/We Deliver,” CSAR Noon Seminar, 12:00, Wednesday, August 4, 1999, 2240 DCL.


Achi Brandt, Weizmann Institute, “Multiscale Molecular Dynamics,” 3:00 P.M., Wednesday, July 21, 1999, 2269 BI.

Video Presentation, “The Eagle Has Landed/Houston We've Got a Problem,” CSAR Noon Seminar, 12:00, Wednesday, July 21, 1999, 2240 DCL.

Achi Brandt, Weizmann Institute, “Review of Multiscale Scientific Computation Methods,” 3:00 P.M., Tuesday, July 20, 1999, 2269 BI.


Video Presentation, “Four Days of Gemini/This Is Houston Flight,” CSAR Noon Seminar, 12:00, Wednesday, July 7, 1999, 2240 DCL.

Andreas Stathopoulos, “A Parallel Block Jacobi-Davidson Implementation for Solving Large Eigenproblems on Coarse Grain Environments,” CSAR Seminar, 3:00 P.M., Tuesday, July 6, 1999, 2240 DCL.

Video Presentation, “Freedom 7/Voyage of Friendship 7,” CSAR Noon Seminar, 12:00, Wednesday, June 23, 1999, 2240 DCL.
Video Presentation, “Space Shuttle,” CSAR Noon Seminar, 12:00, Wednesday, June 9, 1999, 2240 DCL.


Dirk Meinkoehn, German Aerospace Center, “Modeling Metal Combustion in Reactive Atmospheres,” CSAR Noon Seminar, 12:00, Wednesday, May 12, 1999, 2240 DCL.


Mary F. Wheeler, UT-Austin, “Synthetic Environments for Modeling Subsurface Flows,” CSE Research Symposium, 2:00 P.M., Friday, April 23, 1999, B02 CSRL.

Marsha Berger, NYU/Courant Institute, “Automatic High Performance Fluid Computations in Complex Geometry,” CSE Research Symposium, 9:00 A.M., Friday, April 23, 1999, B02 CSRL.

Eric de Sturler, UIUC/CSAR, “Krylov Subspace Methods and the Influence of the Projection Space,” CS Colloquium, 4:00 P.M., Wednesday, April 21, 1999, 2240 DCL.


John Lee, McGill University, “Recent Results on the Direct Initiation of Detonation Waves,” TAM Seminar, 4:00 P.M., Thursday, April 15, 1999, 103 Talbot Lab.

Armand Beaudoin, UIUC/MIE, “Prediction of the Plastic Deformation of Metals Using Polycrystal Plasticity Theory,” CSAR Noon Seminar, 12:00, Wednesday, April 14, 1999, 2240 DCL.

Herman Krier, UIUC/MIE, “Transient Burning of Solid Propellants,” Nuclear Engineering Seminar, 4:00 P.M., Tuesday, April 13, 1999, 103 Transportation Bldg.

Russell Skocypec, Sandia National Laboratories, “A Concept Called Surety,” MIE Seminar, 11:00 A.M., Thursday, April 8, 1999, 253 MEB.

Philippe Geubelle, UIUC/AAE, “Numerical Simulation of Dynamic Fracture Events,” CSAR Noon Seminar, 12:00, Wednesday, April 7, 1999, 2240 DCL.

Rod Burton, UIUC/AAE, “When Will We Have Warp Drive?,” CSAR Noon Seminar, 12:00, Wednesday, March 31, 1999, 2240 DCL.

James Taft, Sierra Software, NASA Ames Research Center, “Lessons Learned on Large CPU Count Origin Systems,” NCSA Workshop, 9:00 A.M.-12:00 noon, Monday, March 29, 1999, 5602 BI.

Paul Feautrier, University of Versailles, France, “Compiling for Massively Parallel Architectures: A Perspective,” CSAR Noon Seminar, 12:00, Wednesday, March 24, 1999, 2240 DCL.
Eliot Fried, UIUC/TAM, “Supplemental Relations at a Phase Interface Across Which the Velocity and Temperature Jump,” CSAR Noon Seminar, 12:00, Wednesday, March 10, 1999, 2240 DCL.


Lee Taylor, Sandia National Laboratories, “An Overview of the SIERRA Project,” CSAR Noon Seminar, 12:00, Wednesday, February 24, 1999, 2240 DCL.


Keshav Pingali, Cornell University, “Data-Centric Compilation: A New Approach to Program Restructuring,” CS Colloquium, 4:00 P.M., Monday, February 15, 1999, 1320 DCL.


Robert Fiedler, UIUC/CSAR, “GEN1 Rocket Simulation Update,” CSAR Noon Seminar, 12:00, Wednesday, February 3, 1999, 2240 DCL.


Mark Seager and Jean Shuler, Lawrence Livermore National Laboratory, “An Update on ASCI Blue-Pacific: A Primer for CSAR Users,” CSAR Seminar, 10:00 A.M., Friday, December 4, 1998. B02 CSRL.


Martin Heinstein, Sandia National Laboratories, “Contact-Impact Modeling in Explicit Transient Dynamics,” CSAR Noon Seminar, 12:00, Wednesday, December 2, 1998, 2240 DCL.

Paul Dawson, Cornell University, “Residual Stresses in Metal Polycrystals: Comparisons of Experiments and Simulations,” CSE/TAM Seminar, 4:00 P.M., Thursday, November 19, 1998, 103 Talbot Lab.


Richard Martin, UIUC/Physics, “Simulations of Materials from the Fundamental Equations for the Electrons,” CSAR Noon Seminar, 12:00, Wednesday, November 11, 1998, 2240 DCL.


Wing Kam Liu, Northwestern University, “Multiple Scale Meshfree Methods for Computational Mechanics,” Beckman Institute Seminar, 12:00, Wednesday, November 4, 1998, 3269 BI.


James Quirk, Caltech, “AMRITA -- Adaptive Mesh Refinement Interactive Teaching Aid,” CSAR Seminar, 1:00 P.M., Friday, October 30, 1998, 2240 DCL.

Farid Abraham, IBM Almaden Research Center, “Concurrent Spanning of the Continuum to Quantum Length Scales in Dynamic Simulation: Brittle Fracture of Silicon,” CSE/Physics Colloquium, 4:00 P.M., Thursday, October 29, 141 Loomis Lab.

Alla Sheffer, Hebrew University, “Hexahedral Mesh Generation Using the Embedded Voronoi Graph,” CSAR Seminar, 3:00 P.M., Thursday, October 29, 1998, 2240 DCL.


Dinshaw Balsara, UIUC/NCSA, “Monotonicity-Preserving, Weighted, Essentially Non-Oscillatory Schemes” CSAR Noon Seminar, 12:00, Wednesday, October 28, 1998, 2240 DCL.

Robert Haber, UIUC/TAM, “Simulation and Optimization of Casting and Extrusion Processes,” CSAR Noon Seminar, 12:00, Wednesday, October 14, 1998, 2240 DCL.

Video Presentation, “Trinity and Beyond,” CSAR Noon Seminar, 12:00, Wednesday, October 7, 1998, 2240 DCL.

Sanjay Kale, UIUC/CS, “Parallel Molecular Dynamics: A Success Story of Application-Oriented Computer Science Research,” CS Colloquium, 4:00 P.M., Monday, October 5, 1998, 1320 DCL.