

4 Outreach and Interaction

4.1 Technical Outreach

Meetings with Rocket Industry

A number of critical and forward-looking interactions were pursued during the past year. Most significant among industrial/government laboratory meetings has been our continued participation in the Air Force-sponsored Integrated Product Team (IPT). The IPT is an outgrowth of a U.S. Air Force Research Laboratory program entitled Integrated High Payoff Rocket Propulsion Technology IX (IHRPT IX). CSAR staff serve on several IPT working groups, including Motor Performance and Environment, Thermal Ablation and Boundary Conditions, Validation Testing, and Software Engineering and Coupled Solutions. The IPT and IHRPT IX are leading to additional industry- and federally-sponsored projects (new funded projects this year include support from ATK/Thiokol and Boeing).

Our relationship with NASA, the Air Force, and the rocket industry continues to grow. Based on our Space Act Agreement with NASA (the NASA equivalent of a DOE CRADA), we have been able to acquire several solid rocket motor designs to use as validation tests for *Rocstar*. The SAA enables CSAR to receive sensitive, unclassified data from NASA, and other government agencies and their industrial contractors, that can be used for validation of our simulations. The SAA was renewed in May 2004.

NASA and ATK/Thiokol teamed to provide the Center with the *Design Data Book for Space Shuttle Reusable Solid Rocket Motor* in 1998. The document contains a detailed description and discussion of the components that comprise the reusable solid rocket motor.

External Advisory Board

The sixth annual meeting of the CSAR External Advisory Board (EAB) was held 13-14 October 2004. The EAB membership is drawn from the DOE DP laboratories and academia, as well as from the commercial rocket industry, the high-performance computer industry, and other relevant companies. The Board reviewed research studies, was invited to make research recommendations, and continues to provide expertise for translating research findings into practice. The purpose of the EAB is several-fold: assure that the CSAR research program remains aggressive and forward-thinking; gain commercial rocket industry perspective; accelerate high-level technical exchange; catalyze long-term visits; and explore other funding opportunities. Current members of the Board include:

EAB Member	Organization	Title
Michael Alkema	Aerojet (Sacramento)	Program Manager, Advanced Programs
David H. Bailey	Lawrence Berkeley National Laboratory	Chief Technologist, NERSC Division
Andy Baldi	Lockheed-Martin Missiles & Space	Director, FBM Propulsion and Controls
Merill Beckstead	Brigham Young University	Professor
Felix F. Chen	Aerojet (Sacramento)	Technical Principal, Engineering
Douglas Coats	Software and Engineering Associates	President
Fred Culick	Caltech	Professor of Mechanical Engineering and Jet Propulsion
Gary Flandro	University of Tennessee	Boling Chair Professor of Advanced

	Space Institute	Propulsion
Robert L. Glick		Consultant
Fred S. Blomshield	Naval Air Warfare Center, China Lake	Head, Propulsion Research Branch
I. Lee Davis	ATK/Thiokol	Senior Research Scientist
Robert Garcia	NASA Marshall Space Center	Group Lead, Applied Fluid Dynamics Analysis
Robert L. Geisler	Spiral Corporation	Senior Rocket Scientist Consultant
Kent Hennessey	Aerojet (Gainesville)	Manager, Thermal Design
Peter Huisveld	Air Force Research Laboratory	Technical Manager
Micheal Iverson	ATK/Thiokol	Scientific Programming
David Kassoy	University of Colorado	Associate Vice President for Technology
Gary Luke	Aerojet (Sacramento)	Technical Lead, Modeling and Simulation
David Mann	Army Research Office	Associate Director, Mechanics and Environmental Sciences Division
Robert Prozan	Colorado Engineering Analysis	President
Gregory A. Ruderman	Air Force Research Laboratory	Mechanical Engineer
Mark Salita	Northrup Grumman	Senior Staff Scientist
John F. Sparks	Aerojet (Gainesville)	Director of Engineering Research
Joseph Thompson	ATK/Thiokol	Director, Technical Services
Dave Wadiak	Lockheed-Martin Missiles & Space	Staff Scientist
Paul Yarrington	Sandia National Laboratory; TST Lead	Manager, Code Development and Applications Group

Technical Conferences

The Center provides travel funds to investigators to participate in conferences in core areas to enhance their technical expertise and to build global awareness of the ASC/ASAP simulation program. Especially important to the technical community has been CSAR's annual participation in the AIAA/ASME/SAE/ASEE Joint Propulsion Conferences (JPC) from 2000 to 2005. The 2005 JPC was held in Tucson and included two full sessions of CSAR papers.

4.2 NNSA/ASCI Interaction

Center personnel have traveled extensively and were involved in a large number of technical and informational meetings. These included meetings intended to explore rocket science and technology, identify technical collaborators, describe the ASC/ASAP program, and establish relationships among Center investigators, DOE lab scientists, and industry leaders. Individual CSAR senior investigators and technical staff have traveled to DOE/NNSA DP labs to serve on ASC/ASAP panels, to participate in ASAP-wide workshops (materials and computational environment), to offer research seminars and technical interaction, to receive training on the ACS computational resources, and to discuss ASC resource issues with the CRT. A special feature of 2002 was a visit by ten CSAR senior investigators to Lawrence Livermore and Sandia-Livermore to hold the Annual TST Meeting off site. In mid-February 2003, a group of nearly twenty CSAR faculty members, staff and students visited LANL and Sandia-Albuquerque to discuss research results in technical presentation and poster session formats. The 2004 TST meeting returned to UIUC.

4.3 CSAR Students and Staff Hired by DOE/NNSA DP Labs

CSAR has been very successful in encouraging student-lab interactions. Leading opportunities for UIUC graduate and undergraduate student interactions with the NNSA/DP laboratories include:

- Summer student interns at DOE Labs
- Joint research
- Undergrads hired in CSAR labs performing collaborative research with NNSA/DP scientists

Former CSAR/CSE Students Now at DOE/NNSA Labs

- Tyler Alumbaugh, LLNL (MS, Computer Science, 2005)
- Byounghak Lee, LBNL (PhD, Physics, 2005)
- Vanessa Lopez, LBNL (PhD, Computer Science, 2005)
- Michael Tonks, LANL (PhD, Mechanical and Industrial Engineering, 2005)
- Bradley Wescott, LANL (PhD, Theoretical and Applied Mechanics, 2005)
- Michael Bange, LANL (PhD, Mechanical Engineering, 2004)
- Jonghyun Lee, ANL (PhD, Computer Science, 2004)
- Xiaosong Ma, ORNL (PhD, Computer Science, 2004)
- Greg Mackey, SNL (PhD, Computer Science, 2004)
- Michael Parks, SNL (PhD, Computer Science, 2004)
- Jason Petti, SNL (PhD, Civil Engineering, 2004)
- Jason Weber, BNL (MS, Nuclear, Plasma and Radiological Engineering, 2004)
- Zhiquan Deng, PNNL (PhD, Theoretical and Applied Mechanics, 2003)
- Nathan Crane, SNL (PhD, Civil Engineering, 2002)
- Ali Pinar, LBNL (PhD, Computer Science, 2002)
- Thomas Hafenrichter, SNL (MS, Mechanical Engineering, 2002)
- Michelle Duesterhaus, SNL (MS, Mechanical and Industrial Engineering, 2001)
- Eric Draeger, LLNL (PhD, Physics, 2001)
- Jason Hales, SNL (PhD, Civil and Environmental Engineering, 2001)
- Jack Yoh, LLNL (PhD, Theoretical and Applied Mechanics, 2001)
- Benjamin T. Chorpening, SNL-L (PhD, Mechanical Engineering, 2000)
- Burkhard Militzer, LLNL (PhD, Physics, 2000)
- Christopher D. Tomkins, LANL (PhD, Theoretical and Applied Mechanics, 2000)
- Jeff J. Murphy, SNL-L (PhD, Mechanical Engineering, 1999)
- Jin Yao, LLNL (PhD, Theoretical and Applied Mechanics, 1999)
- Donald Siegel, SNL (PhD, Physics, 1999)
- Steven F. Wojtkiewicz, SNL (PhD, Aero and Astro Engineering, 1999)
- Boyana Norris, ANL (PhD, Computer Science, 1999)
- Jeffrey C. Grossman, LLNL (PhD, Physics, 1998)
- Arne Gullerud, SNL (PhD, Civil Engineering, 1998)
- Michael Ham, LANL (MS, Computer Science, 1998)

Former CSAR Employees Now at DP Labs

- Jeffrey Vetter, LLNL
- James Quirk, LANL
- Dennis Parsons, LLNL