

## Table of Contents

[Home](#)

[Proceedings](#)

[Introduction](#)

[Technical Program](#)

[Full Day Workshops](#)

[Poster Presentations](#)

[Keynote Address](#)

*“Reinventing Computing”*

*Burton Smith, Microsoft Corporation*

[Invited Sessions](#)

*Session I: Heterogeneity*

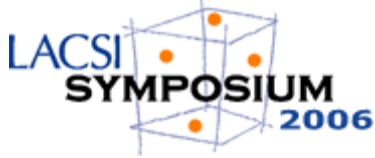
*Session II: Programming Models - Opportunities and  
Challenges in Partitioned Global Address Space  
Languages*

[Half Day Workshop](#)

[Panel Discussion](#)

*Future High Performance Computing Applications  
and Architectures*

[Supporting Cast](#)



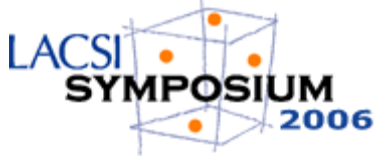
**PROCEEDINGS**  
**Seventh LACSI Symposium**  
**October 17-19, 2006**  
**Santa Fe, NM USA**

**INTRODUCTION**

The Seventh Symposium of the Los Alamos Computer Science Institute (LACSI) was held in Santa Fe, NM on October 17-19, 2006. This year's symposium addressed the coming "sea change" in scalable parallel computing driven by the end of Moore's Law for processor cycle times. LACSI was formed at Los Alamos National Laboratory (LANL) to conduct research in computer science issues relevant to DOE's Accelerated Strategic Computing Initiative (renamed ASC). The Institute focuses on research with a longer time frame than the operational requirements of ASC, and supports work both at LANL and at LACSI-associated universities.

The technical program for 2006 addressed the current and future state of high-performance computing in several ways:

- 5 posters were presented at the poster session
- The keynote address, "Reinventing Computing", was delivered by Burton J. Smith, Technical Fellow, Microsoft Corp.
- Two invited sessions addressed issues in heterogeneity and programming models
- A panel discussion was presented on future high performance computing applications and architectures
- Seven workshops were held, focusing on various technical areas of particular importance to the high-performance computing community.



## TECHNICAL PROGRAM

The Seventh Symposium offered participants a wide variety of opportunities to discuss and learn about technical and policy issues in high-performance computing.

### Tuesday, October 17: Workshop Sessions

**Full Day Workshops: 9:00am – 5:30pm**

***High Availability and Performance Computing Workshop (HAPCW2006)***

Contact person: Chokchai (Box) Leangsuksan, Louisiana Tech University  
(box@latech.edu)

Authors: Chokchai Leangsuksan, Louisiana Tech U.; Stephen Scott, Oak Ridge National Laboratory [\[abstract\]](#)

***Scalable Algorithms for Network Simulation and Analysis***

Contact person: Hristo Djidjev, Los Alamos National Laboratory  
(djidjev@lanl.gov) [\[abstract\]](#)

***Performance and Productivity of Extreme-Scale Parallel Systems***

Contact person: Adolfo Hoisie, Los Alamos National Laboratory  
(hoisie@lanl.gov)

Authors: Adolfo Hoisie; Darren Kerbyson, Los Alamos National Laboratory; Dan Reed, Renaissance Computing Institute [\[abstract\]](#)

***Automatic Tuning of Libraries and Applications***

Contact person: Ken Kennedy, Rice University (ken@rice.edu) [\[abstract\]](#)

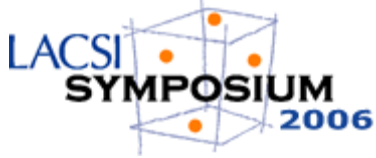
***Heterogeneous Computing: Architectures, Tools, Applications***

Contact person: Maya Gokhale, Los Alamos National Laboratory  
(maya@lanl.gov) [\[abstract\]](#)

***Scientific Application Development Using Eclipse and the Parallel Tools Platform***

Contact person: Greg Watson, Los Alamos National Laboratory  
(gwatson@lanl.gov)

Authors: Greg Watson; Beth Tibbitts, IBM Research; Craig Rasmussen, Los Alamos National Laboratory [\[abstract\]](#)



**Welcoming Reception and Poster Presentations: 6:00pm – 7:00pm**

**POSTER PRESENTATIONS**

***Improving Adaptive Compilation***

Jeff Sandoval, Rice University

***Implementation of a Finite Difference Shallow Water Model on the SRC-6  
MAPStation***

Rory Kelly, National Center for Atmospheric Research

***Spectral Turbulence Simulations with ClearSpeed Accelerator***

Massimiliano Fatica, ClearSpeed Technology

***Scalable Performance Analysis Using Statistical Clustering***

Adam Bordelon, Rice University

***Methods for Automatic Behavioral Stratification in Scientific Codes***

Todd Gamblin, University of North Carolina



## Wednesday, October 18: Keynote and Invited Sessions

9:00am Welcoming remarks

9:30am Keynote Address – “[Reinventing Computing](#)”  
**Burton Smith**, *Microsoft Corp.*

11:00 - 12:30 pm Invited Session - *Heterogeneity*  
[What does Heterogeneity bring?](#)  
**Ken Koch**, *Los Alamos National Laboratory*

**John Turner**, *Los Alamos National Laboratory*

[Obtaining Performance in Heterogeneous Systems](#)  
**Keith Cooper**, *Rice University*

[Strategies for High-Performance Heterogeneous Applications: A Compiler Perspective](#)  
**Mary Hall**, *USC, Information Sciences Institute*

2:00 - 3:30 pm Invited Session - *Programming Models: Opportunities and Challenges in Partitioned Global Address Space Languages*  
Moderated by **Kathy Yelick**, *University of California, Berkeley*

[X-10: a High-Productivity Approach to High Performance Programming](#)  
**Vivek Sarkar**, *IBM*

[Parallel Programming in Chapel](#)  
**Steve Deitz**, *Cray Inc.*

[Co-Array Fortran and High Performance Fortran](#)  
**John Mellor-Crummey**, *Rice University*

3:30 pm *Workshop: [Improving the Verification and Validation Process](#)*  
Contact person: Mike Fagan, *Rice University*  
Authors: Mike Fagan; Dave Higdon, *Los Alamos National Laboratory* [[abstract](#)]



## **Thursday, October 19: Poster Presentations and Panel Discussion**

8:30 - 10:00 am Poster presentations

*Finalists for poster awards will present their work*

10:00 - 11:30 pm Panel Discussion - *Future High Performance Computing Applications and Architectures*

**Burton Smith**, *Microsoft Corporation*

*Opportunities and Challenges for Petascale Computing*

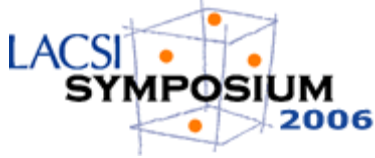
**Rajan Gupta**, *Los Alamos National Laboratory*

*Future Applications and Architectures — And Mapping One to the Other*

**Ken Kennedy**, *Rice University*

11:30 - 1:00 pm Closing Luncheon

1:00 pm Conclusion of LACSI Symposium 2006



## **SUPPORTING CAST**

The 2006 LACSI Symposium was successful because of the combined efforts of many people.

### **Organizing Committee**

Bill Feiereisen, General Chair, Los Alamos National Laboratory; Chuck Koelbel, Program Chair, Rice University; Barney Maccabe, Poster Chair, University of Minnesota; Rob Fowler (RENCI), Rod Oldehoeft (Krell Institute), John Ziebarth (Krell Institute)

### **Conference Arrangements**

Shelly Olsan, Communications Manager, Krell Institute;  
Michelle King, Meeting Coordinator, Krell Institute

### **Symposium Web Pages and LACSI CDROM**

Nazanin Imani, James Loghry, and Ron Winther, IT Department, Krell Institute

In addition, we thank Sarah Gonzales of Rice University for her assistance.