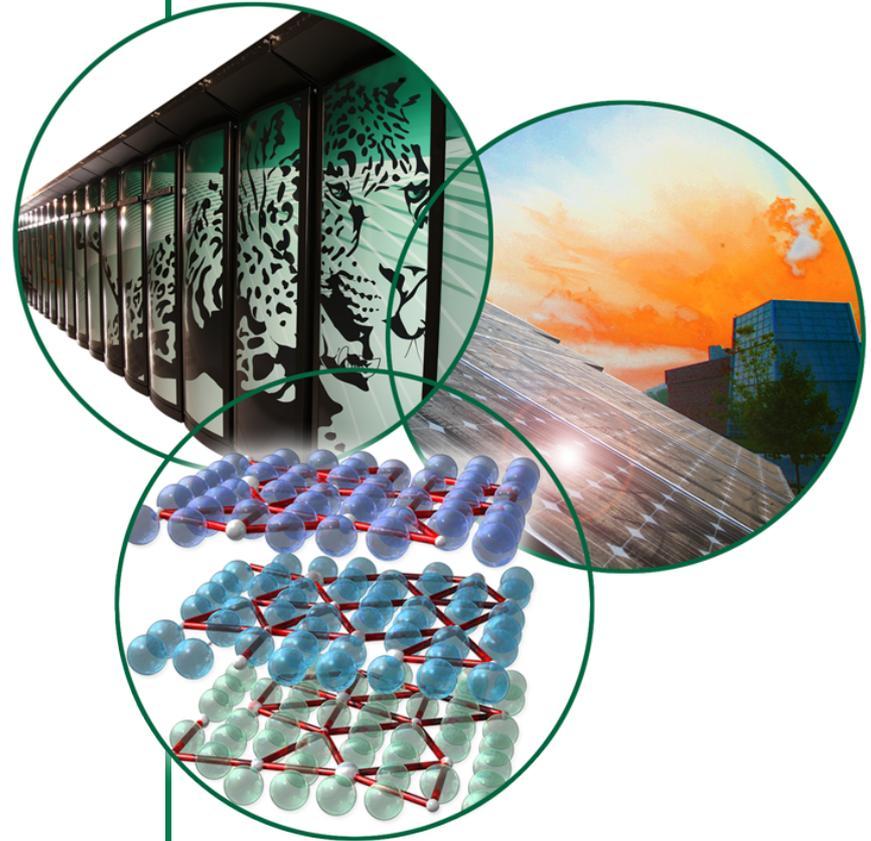


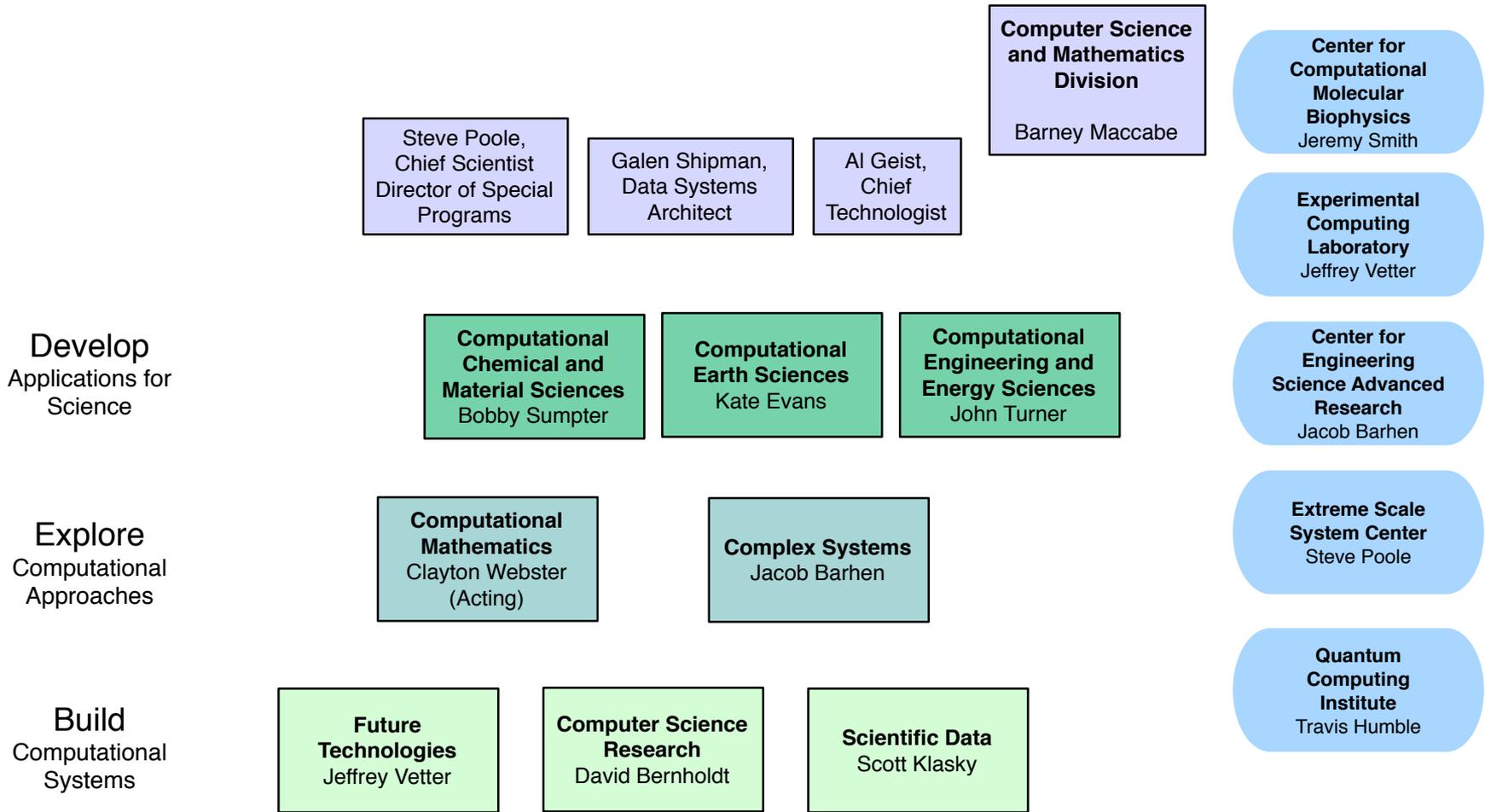
CSMD Division All Hands Meeting

Barney Maccabe

December 11, 2013



Computer Science and Mathematics Division



Centers and Institutes

Groups



New Projects

EPA Development of Indicators for Changing Sustainability and Resilience through the Analysis of Global High Resolution Climate Change Simulations

ORNL Team Members: Abigail Gaddis and Kate Evans

EASIR - Extreme-scale Algorithms & Solver Resilience

ORNL Team Members: Al Geist, Jack Dongarra, Bobby Philip, Miroslav Stoyanov, and Clayton Webster

MCREX - Monte Carlo Resilient Exascale Solvers

ORNL Team Members: Thomas Evans, Steven Hamilton, Wayne Joubert, and Christian Engelmann

CSC110

ORNL Team Member: Terry Jones

EQUINOX- Environment for Quantifying Uncertainty: Integrated and Optimized at the eXtreme scale

ORNL Team Members: Clayton Webster

TASMANIAN- Toolkit for Adaptive Stochastic Modeling and Non-Intrusive Approximation

ORNL Team Members: Miroslav Stoyanov, Guannan Zhang, Clayton Webster, Nicholas Dexter, and Diego Galindo

Hobbes: OS and Runtime Support for Application Composition DOE Exascale Operating and Runtime Systems

ORNL Team Members: David E. Bernholdt (ORNL PI), Hasan Abbasi, Christian Engelmann, Terry Jones, Scott Klasky, A.B. Maccabe, Philip C. Roth, Geoffroy Vallee, and Jeffrey Vetter



New Projects (continued)

Technologies and Tools for Synthesis of Source-to-Sink High-Performance Flows

ORNL Team Member: N.S.V. Rao, Josh Lothian, and Brad Settlemeier

Computational Catalytic Pyrolysis Consortium

ORNL Team Members: Stuart Daw and Sreekanth Pannala

Mechanistic Modeling Framework for Predicting Extreme Battery Response: Coupled Hierarchical Models for Thermal, Mechanical, Electrical and (Electro)chemical Processes

ORNL Team Members: Srikanth Allu, Sreekanth Pannala, and John Turner

Application of High Performance Computing for Simulating Cycle to Cycle Variation in Dual Fuel Engine

ORNL Team Members: Sreekanth Pannala and Miroslav Stoyanov

ARPA-E RANGE Project (0869-1617) Safe Impact Resistant Electrolyte (SAFIRE)

ORNL Team Members: Sergiy Kalnaus and Gabriel Veith

ARPA-E RANGE Project (#0869-1707) Lithium Ion Batteries with Integrated Fireproof Electrode Safety Features

ORNL Team Members: Srikanth Allu , Srdjan Simunovic, and Nancy Dudney

Isotope Business Office Business Systems Upgrade (IBOBSU) Project

ORNL Team Members: Mitch Ferren, Eric Lingerfelt, Patricia Winter, Donna Ault, Russell Langley, Monty Middlebrook, Justin Rogers, and Michael Smith



Software

Computational Infrastructure for Nuclear Astrophysics (CINA) 2.1

Contact: Eric Lingerfelt

URL: www.nucastrodata.org/infrastructure

SystemBurn

Contact: Josh Lothian

URL: <https://github.com/jlothian/systemburn>

SystemConfidence

Contact: Josh Lothian

URL: <https://github.com/jlothian/sysconfidence>

Unstructurally Banded Nonlinear Eigenvalue Software

Contact: Charles K Garrett

Gleipnir

Contact Tomislav Janjusic

URL: <http://csrl.unt.edu/gleipnir>

HERCULES 2.3

Contact: Christos Kartsaklis

TASMANIAN

Contact: Miroslav Stoyanov

URL: <http://tasmanian.ornl.gov>

INDDGO

Contact: inddgo-info@googlegroups.com

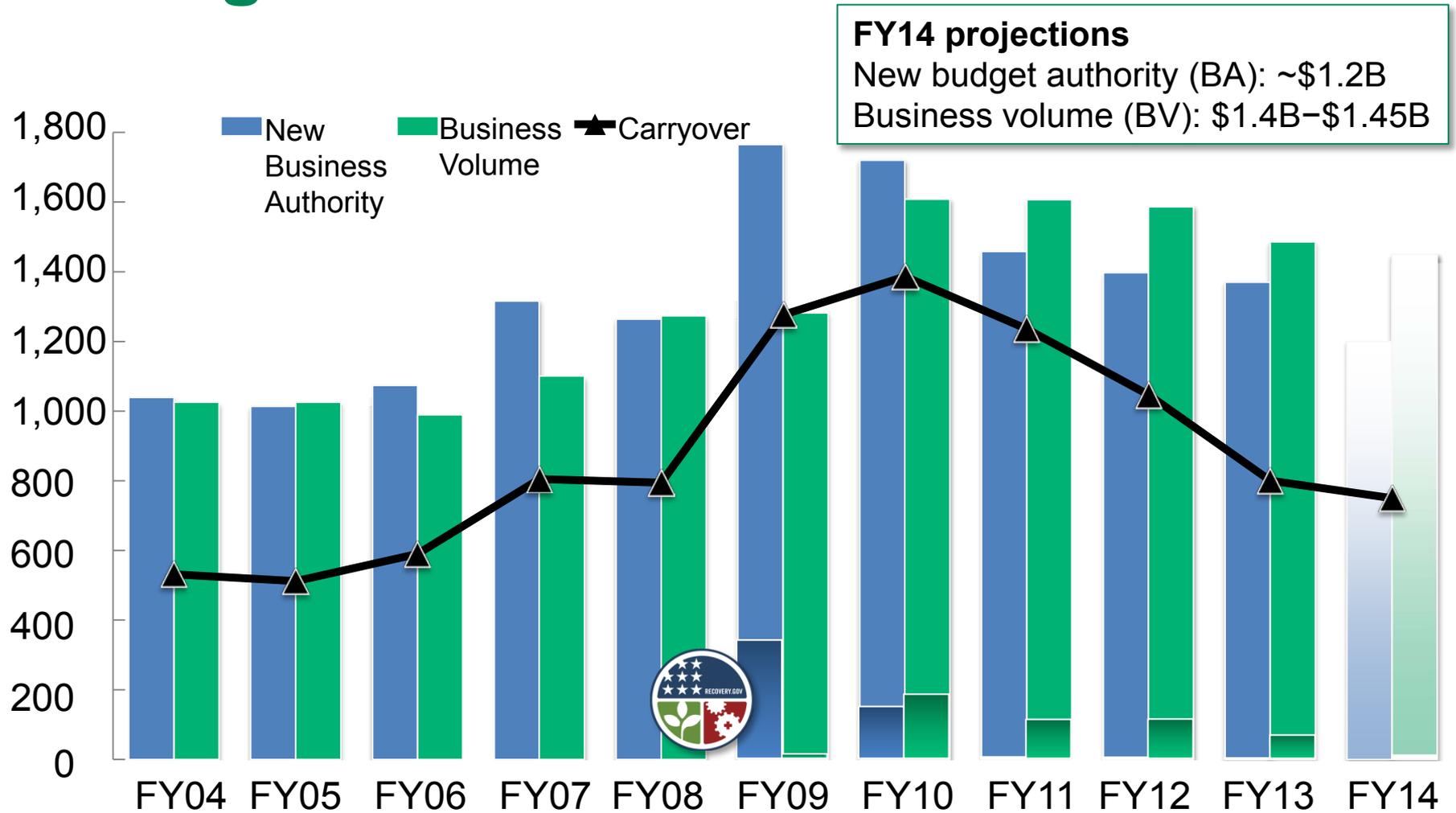
URL: <https://github.com/bdsullivan/INDDGO>

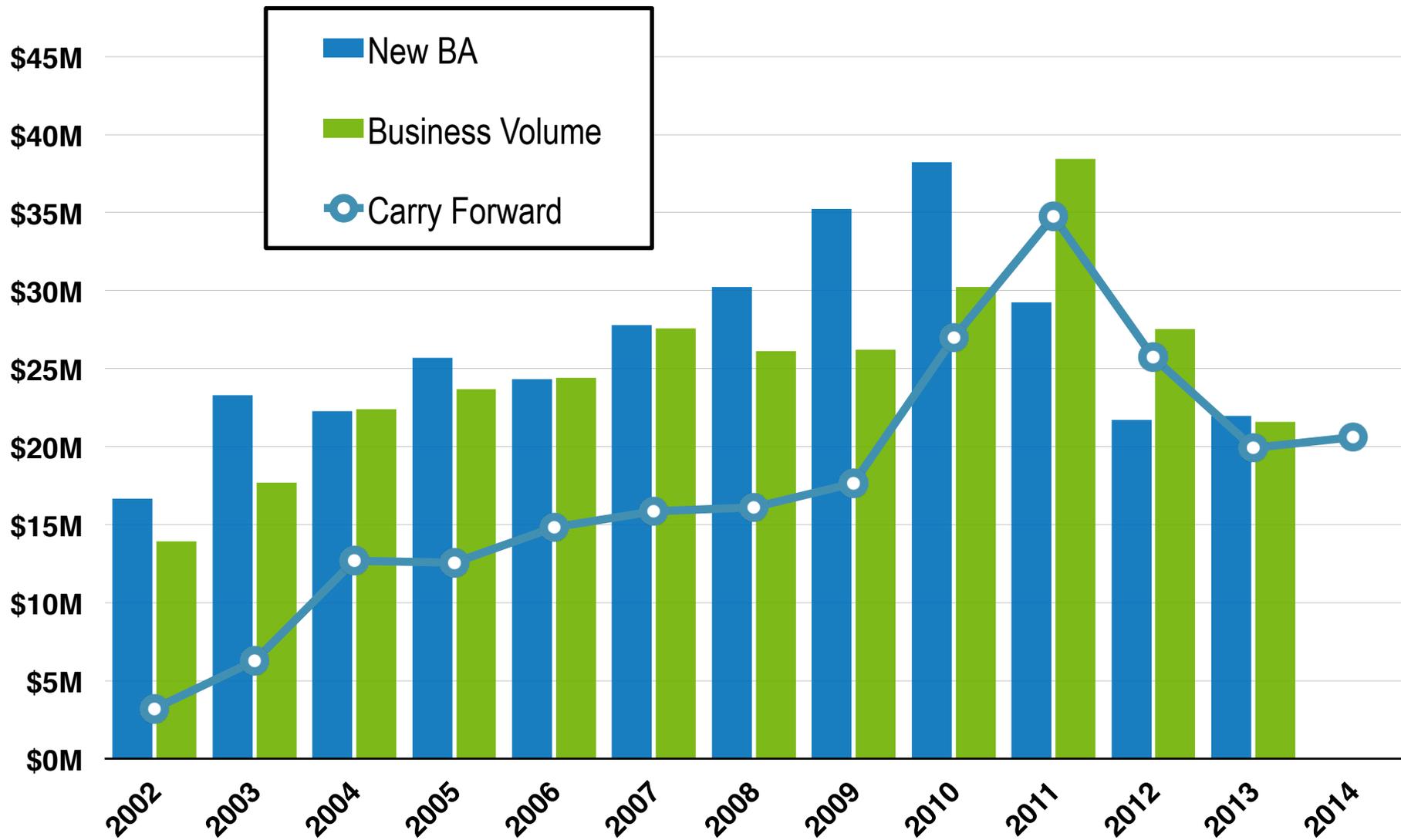


Financial



ORNL is planning for a reduced funding level





Personnel



CSMD

Service Anniversaries

Name	Years
Al Geist	30
George Ostrouchov	30
Forrest Hoffman	20
Nagi Rao	20
Sarma Gorti	15
Marcia Branstetter	10
Thomas Maier	10
Jeff Vetter	10

Name	Years
Xiaolin Cheng	5
Terry Jones	5
Greg Koenig	5
John Turner	5



New Hires

Predictive Methods Team

Miroslav Stoyanov	01/28/2013
Charles Garrett	05/20/2013
Hoang Tran	06/17/2013

Complex Systems

Charlotte Kotas	01/07/2013
John Polcari	08/05/2013

Computational Chemical and Materials Sciences

Tom Berlijn	08/05/2013
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Computational Earth Sciences

Tianyu Jiang	08/19/2013
Abigail Gaddis	09/09/2013
Dan Lu	12/02/2013

Computer Science Research

Jonathan Schrock	01/28/2013
Tomislav Janjusic	07/15/2013
Tiffany Mintz	09/23/2013

Computational Engineering and Energy Sciences

Stuart Slattery	10/07/2013
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New Hires (continued)

Future Technologies	
Sreerama Satya Sreepathi	06/24/2013
Sparsh Mittal	09/23/2013
Megan Cason	10/07/2013

Scientific Data	
Cynthia Gu	07/29/2013
Kimmy Mu	09/09/2013
Yuan Tian	10/0/2013

Transfer

Scientific Data	
David Pugmire	06/01/2013



Highlights



CSMD

2013 UT-Battelle Corporate Fellow



Bobby G. Sumpter

2013
UT-Battelle
Corporate Fellow

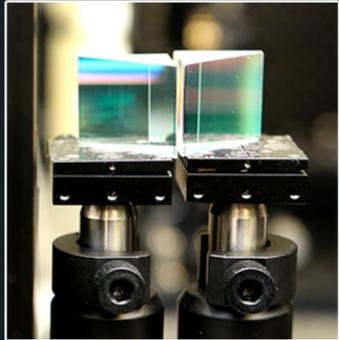
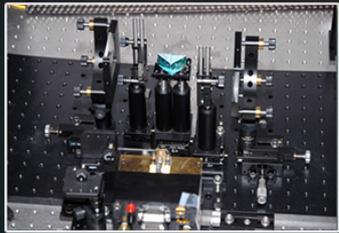
R&D 100 Award

- **V-shaped External Cavity Laser Diode Array**, was developed by ORNL's **Bo Liu, Yun Liu and Yehuda Braiman**. By using a V-shaped external Talbot cavity and strategically placed micro-prism mirrors, ORNL researchers have created an efficient method to extract a high-quality laser beam from a broad-area laser array, resulting in a laser source with high brightness and wavelength tunability that has applications in spectroscopy, laser radar, material surface processing and optical communications, sensing and metrology.
- **Adaptable I/O System for Big Data**, or ADIOS, was developed by ORNL, Georgia Institute of Technology, Rutgers University, and North Carolina State University. The ORNL team consists of **Scott Klasky, Qing Liu, Norbert Podhorszki, Hasan Abbasi, Jeremy Logan, Roselyne Tchoua, Jong Youl Choi and Yuan Tian**. ADIOS significantly reduces the input or output complexities encountered by scientists running on high performance computers, along with reducing their time to solution, which allows researchers to spend more time achieving scientific insight and less time managing data.





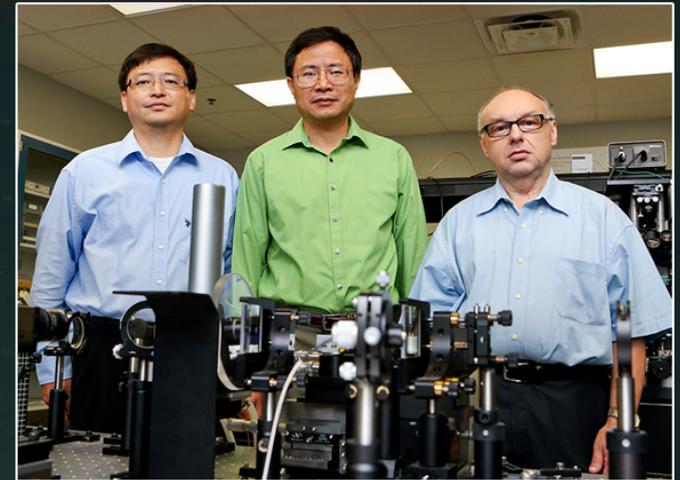
Award Winner



V-shaped External Cavity Laser Diode Array

By using a V-shaped external Talbot cavity, ORNL researchers have created an efficient method to extract a high-quality laser beam from a broad-area laser array. The V-shaped external cavity laser diode array provides a coherent light source with impressive beam quality, narrow spectral bandwidth, high power, low cost, and scalability to larger arrays. The result is a laser source with high brightness and wavelength tunability that has applications in spectroscopy; laser radar; material surface processing; and optical communications, sensing, and metrology.

This research was funded by the Office of Naval Research, the Laboratory Directed Research and Development program at ORNL, DOE's Office of Basic Energy Sciences, and the National Science Foundation.



The ORNL team members are Bo Liu, Yun Liu, and Yehuda Braiman.

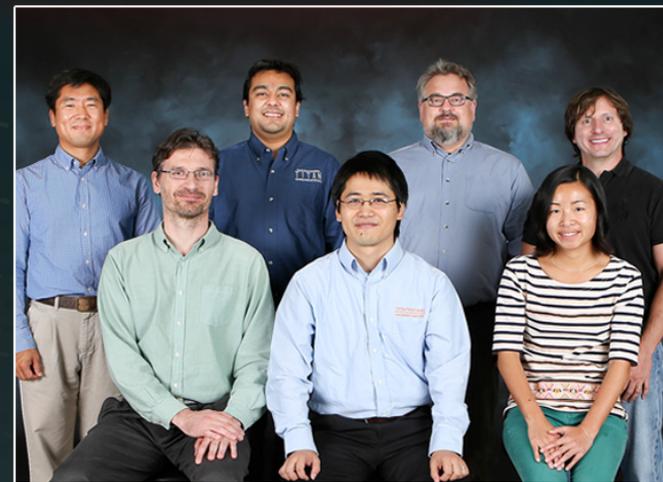


Award Winner

Adaptable I/O System for Big Data (ADIOS)

ADIOS is a portable, scalable, easy-to-use software framework conceived to solve "big data" problems. For scientists making use of high performance computers, ADIOS significantly reduces the input or output complexities typically encountered and reduces the time to solution, so researchers spend less time managing data. The software streamlines workflows and lays the foundation for exascale supercomputers to be able to run multiple tasks simultaneously.

The research was funded by DOE's Oak Ridge Leadership Computing Facility, the Office of Advanced Scientific Computing Research, the Office of Fusion Energy Science, and the National Science Foundation.



The ORNL team consisted of (seated) Norbert Podhorszki, Gary Liu, Yuan Tian; (standing) John Youl Choi, Hasan Abbasi, Jeremy Logan, Scott Klasky; and (not pictured) Roselyne Tchoua. Also not pictured are Karsten Schwan and Matthew Wolf (Georgia Institute of Technology), Manish Parashar (Rutgers University), Nagiza Samatova (North Carolina State University), and Jay Lofstead (Sandia National Laboratories).



SEA Winners

- V-shaped External Cavity Laser Diode Array: Bo Liu, Yun Liu, and Yehuda Braiman
- Adaptable Input/Output (I/O) System (ADIOS):
 - Gary Liu, Norbert Podhorszki, and Scott Klasky
- Public Release Version 1.0 of the Toolkit for Adaptive Stochastic Modeling & Non-Intrusive Approximation (TASMANIAN):
 - Miroslav Stoyanov, Guannan Zhang and Clayton Webster
- Center for Accelerated Application Readiness (CAAR) Team Achievement: Efficient Exploitation of Hybrid CPU-GPU Architectures:
 - Bronson Messer II, Wayne Joubert, Markus Eisenbach, Matt Norman, **Rick Archibald**, Valentine Anantharaj, Ramanan Sankaran, Mike Brown, Arnold Tharrington, and **Bobby Philip**
- Deployment of the First “Computational Test Stand” for CASL:
 - Mark Baird, **Roscoe Bartlett**, Andrew Godfrey, and **John Turner**
- Programming the Big Data Scalable Analytics (pbdR):
 - **George Ostrouchov**, **Wei-Chen Chen**, Drew Schmidt, and Pragneshkumar Patel



CSMD Awards

- CSMD Most Distinguished Scientific Paper:
 - Thomas Maier
- CSMD Most Distinguished Software:
 - Jeff Vetter, Anthony Danalis, Gabriel Marin, Collin McCurdy, Jeremy Meredith, Philip Roth, Kyle Spafford, Vinod Tipparaju, Lukasz Wesolowski, and Aditya Sarwade
- CSMD Most Significant Technical Contribution:
 - Eric Lingerfelt
- CSMD Special Category:
 - Rick Archibald

Other Recognition

ACM Distinguished Engineer

Pat Worley

Most Cited Article Award, Atmospheric Environment, Elsevier Limited

Joshua Fu

Research Fellow Award, College of Engineering, The University of Tennessee

Joshua Fu

Scholar Recognition Award, Department of Civil and Environmental Engineering, The University of Tennessee

Joshua Fu

NASA Group Achievement Award

Jitendra Kumar, Richard Mills, and Forrest Hoffman

Federal Laboratory Consortium (FLC) 2013 Interagency Partnership Award Recognition

Jitendra Kumar, Richard Mills, and Forrest Hoffman

Missile Defense Agency Recognition

Chuck Glover

Ken Kennedy Award

Jack Dongarra

LDRD Poster Session Winner

Matt Reuter

Kavli Frontiers of Science Fellow

Clayton Webster

Gauss Award

Chung-Hsing Hsu, Stephen W. Poole and Don E. Maxwell

OpenACC Director of Developer Adoption

Oscar Hernandez

Missile Defense Agency Certificate of Appreciation

Chuck Glover

Patent - Identification and Modification of Dynamical Regions in Proteins for Alteration of Enzyme Catalytic Effect

Pratul Agarwal

Illinois Institute of Technology's (IIT) Professional Achievement Award

Jack Dongarra



Other Recognition (cont.)

Howes Scholar in Computational Science

Matt Reuter

Fellow of the American Physical Society

Xiaoguang Zhang

Editor of SIAM J. on Uncertainty Quantification

Clayton Webster

Editor SIAM J. on Numerical Analysis (SINUM)

Clayton Webster

Patent -"Method and Systems for Bandwidth Scheduling and Path Computation for Connection-Oriented Networks"

Nagi Rao

Director's Research & Development Award

Galen Shipman

LDRD Poster Session Seed Award

Blair Sullivan

ACM Distinguished Scientist Member

Jeff Vetter



Safety





Have a

FIRE SAFE Holiday Season

The use of holiday decorations such as Christmas trees, garlands, electric lights and candles can increase the incidence of holiday fires.

Following a few simple fire safety tips can help ensure that you and your loved ones have a fire-safe holiday season:

Holiday Lighting:

Inspect holiday lights each year for frayed wires, bare spots and excessive kinking or wear before putting them up. Connect strings of lights to an extension cord before plugging the cord into the outlet.

Candle Care:

Consider using battery-operated flameless candles, which can look, smell and feel like real candles. If you do use lit candles, make sure they are in stable holders, and place them where they cannot be knocked down easily.



Facts about home holiday fires

- One of every three home Christmas tree fires are caused by electrical problems.
- Although Christmas tree fires are not common, when they do occur, they are more likely to be serious. On average, one of every 40 reported home structure Christmas tree fires results in a death compared to an average of one death per 142 total reported home structure fires.
- A heat source too close to the tree causes roughly one in every six of Christmas tree fires.
- More than half (56%) of home candle fires occur when something that can catch on fire is too close to the candle.
- December is the peak time of year for home candle fires. In December, 11% of home candle fires began with decorations compared to 4% the rest of the year.

The Project Summaries one more time



Thanks