

DOE ASCR Workshop on Software Productivity for eXtreme-scale Science (SWP4XS)

<http://www.ornl.gov/swproductivity2014/>

January 13-14, 2014

Hilton Washington DC/Rockville

Monday, January 13 (8:00 am - 5:15 pm)

- 8:00 am Continental Breakfast
- 8:20 - 8:30 Welcome and Introduction
- 8:30 - 8:50 DOE ASCR and Office of Science Context
Thomas Ndousse-Fetter (ASCR), Dorothy Koch (BER) and John Mandrekas (FES)
- 8:50 - 9:30 ***Scientific Software Productivity Challenges at Extreme Scale***
Hans Johansen (LBNL), Lois Curfman McInnes (ANL), Mike Heroux (SNL) and Phil Jones (LANL)
- 9:30 - 9:45 ***Results of Pre-Workshop Survey on Extreme-Scale Software Productivity***
Jeffrey Carver (Univ of Alabama)
- 9:45 - 10:00 Breakout Instructions, Q&A
- 10:00 - 10:30 Break
- 10:30 - 11:00 ***Transforming computational science software research for extreme-scale computing: Patterns and best practices***
- Introduce Topic 1 Questions, Lightning Presentations
- Charles Ferenbaugh (LANL), *Software Engineering Issues in Moving Legacy Codes to Future Architectures*
 - Ron Oldfield (SNL), with Nathan Fabian, Kenneth Moreland and David Rogers, *Productivity Challenges for Integrating Simulation and Analysis*
 - Lisa Childers (ANL), with Venkatram Vishwanath, Tom Uram, Hal Finkel, Jeff Hammond, Kalyan Kumaran, Paul Messina and Michael Papka, *Toward Improved Scientific Software Productivity on Leadership Facilities: An Argonne Leadership Computing Facility View*
 - Ivan Bermejo-Moreno (Stanford Univ), *Position Paper on Testing and V&V*
 - Anshu Dubey (LBNL), *Preparing Mature Codes for Generations of Heterogeneity*
- 11:00 - 12:15 Concurrent Breakout Sessions #1
- 12:15 - 1:30 Working Lunch
Speaker: Douglass Post (DoD High Performance Computing Modernization Program and the Carnegie Mellon Software Engineering Institute)
Addressing Application Software Productivity Challenges for Extreme-scale Computing
- 1:30 - 2:00 Outbrief 1; Q&A
- 2:00 - 2:30 ***Bridging the gap between domain science applications and computational science software: Research and development needs***
- Introduce Topic 2 Questions, Lightning Presentations
- Al Geist (ORNL), with David Bernholdt and Barney Maccabe, *Resilience is a Software Engineering Issue*
 - Roger Pawlowski (SNL), with Eric Cyr, *Challenges for Component-based Multiphysics PDE Codes on Multicore Architectures*

DOE ASCR Workshop on SWP4XS (continued)

- Paul Hovland (ANL), with Barry Smith, Marc Snir, Lois Curfman McInnes and Boyana Norris, *Exposing and Expanding Compiler Technologies to Improve Software Productivity in Developing Mathematical Libraries and Simulation Codes*
- John Mellor-Crummey (Rice Univ), *Improving Software Productivity for Extreme-scale Systems with DSLs*
- Samuel Williams (LBNL), with Brian Van Straalen and Leonid Oliker, *Productive Extreme-Scale Computing via Common Abstract Machine Models, Programming Models, and Integrated Performance Modeling*

2:30 - 3:45 Concurrent Breakout Sessions #2
3:45 - 4:15 Break
4:15 - 4:45 Outbrief 2; Q&A
4:45 - 5:15 Lightning Presentations: Software engineering and community issues

- Jeffrey Carver (Univ of Alabama), *Applying Appropriate Software Engineering to Exascale Software Development*
- Andy Terrel (Continuum Analytics), with Chris Kees, Aron Ahmadi, Dag Sverre Seljebotn and Ondrej Certik, *State of Scientific Software Stacks*; also Andy Terrel and Matthew Turk, *HPC Communities of Practice*
- Andrew Salinger (SNL), *Component-Based Application Development*; also *Software Engineering Best Practices*
- David Bernholdt (ORNL), *Software as "Instrumentation" for Computational Research*

5:15 pm Wrap-up, Adjourn for the day (dinner on your own)

Tuesday, January 14 (8:00 am - 1:00 pm)

8:00 am Continental Breakfast
8:30 - 8:45 Summary of Day 1, Review Agenda for Day 2
8:45 - 9:45 Panel Discussion and Q&A
Panelists: John Cary (Tech-X Corporation)
Bill Collins (LBNL)
Kevin Fall (Software Engineering Institute, Carnegie Mellon Univ)
Bill Gropp (Univ of Illinois at Urbana-Champaign)
Robert Harrison (Stonybrook Univ and BNL)
9:45 - 10:00 Break
10:00 - 11:30 Concurrent Breakout Sessions #3:
Computational science software productivity at extreme scale: Short-term/long-term priorities
11:30 - 12:00 Break
12:00 - 12:45 Outbrief 3; Q&A
12:45 - 1:00 Workshop wrap-up, review timeline, process and assignments for report
1:00 pm Workshop adjourns (box lunches to go)