

ASCR Computer Science Principal Investigators Meeting (CS PI Meeting): Resilience, SSIO, Design Space and SDMAV

March 14, 2017

7:00 – 8:00 Breakfast

8:00 – 8:05 **Introductions: Lucy Nowell and Scott Klasky**

8:05 – 8:20 **Welcome and ASCR Update – Barbara Helland, Director, Advanced Scientific Computing Research**

8:20 – 8:30 **Guidance for the Day – Lucy Nowell**

8:30 – 9:15 **Invited Talk: Exascale Computing Project (ECP) Applications' Needs – Doug Kothe**

9:15 – 10:20 Panel: **Reducing the time for data movement to and from storage**

Moderator: Lavanya Ramakrishnan

Panelists:

- **Han-Wei Shen**, Extreme-Scale Distribution-Based Data Analysis
- **Scott Klasky**, SIRIUS: Science-driven Data Management for Multi-tiered Storage
- **Surendra Byna**, In situ Indexing and Query Processing of AMR Data
- **Kwan-Liu Ma**, Supporting Co-Design of Extreme-Scale Systems with In Situ Visual Analysis of Event-Driven Simulations

10:20 – 10:50 **Break**

10:50 – 11:55 Panel: **Exploratory visualization tools and techniques**

Moderator: Adolfo Hoisie

Panelists:

- **Wes Bethel**, Towards Exascale: High Performance Visualization and Analytics
- **Kenneth Moreland**, XVis: Visualization for the Extreme-Scale Scientific-Computation Ecosystem
- **Hank Childs** (Early Career Research Program [ECRP]): Data Exploration at the Exascale
- **James Ahrens**, Exploration of Exascale In Situ Visualization and Analysis Approaches

11:55 – 1:15 **Working Lunch**, Invited Talk: Emerging Supercomputer Architectures – **Katherine Riley**

1:15 – 2:20 Panel **Understanding and managing resilience**

Moderator: Terry Jones

Panelists:

- **Mattan Erez** (ECRP), Validating Extreme-scale Resilience with Veracity
- **Christian Engelmann** (ECRP), Characterizing Faults, Errors, and Failures in Extreme-scale Systems
- **William Kramer**, Holistic Measurement Driven Resilience
- **Remzi Arpaci-Dusseau**, Modeling Impacts of Resilience Architectures for Extreme-Scale Storage Systems

2:20 – 3:00 **Invited Talk: ECP Software Technology Update and Discussion – Rajeev Thakur**

3:00 – 4:30 **Break and Posters**

4:30 – 5:30 **Breakouts**

1A: Ramakrishnan, Shen, Klasky, Byna, Ma

1B: Hoisie, Bethel, Moreland, Childs, Ahrens

1C: Jones, Erez, Engelmann, Kramer, Arpaci-Dusseau

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5:30 – 6:00 **Invited Talk: Introduction to DOE (Code) {} Repository – Jay Billings**

Dinner on your own

March 15, 2017

7:00 – 8:00 Breakfast

8:00 – 8:10 Regroup and guidance for the day – Lucy Nowell

8:10 – 9:10 **Invited Talk: Data Provenance – Kerstin Kleese van Dam**

9:10 – 10:00 **Invited Talk: The Future of Scientific Workflows Workshop – Tom Peterka**

10:00 – 10:30 **Break**

10:30 – 11:35 Panel: **Scientific Workflows**

Moderator: Galen Shipman

Panelists:

- **Lavanya Ramakrishnan**, Usable Data Abstractions for Next-Generation Scientific Workflows
- **Patrick McCormick**, A Unified Data-Driven Approach for Programming In Situ Analysis and Visualization
- **Tom Peterka**, High Performance Decoupling of Tightly-Coupled Data Flows
- **Sriram Krishnamoorthy** (ECRP), Whole-program Adaptive Error Detection and Mitigation

11:35 – 1:00 **Working Lunch, Invited Talk: Workshop on Management, Analysis and Visualization of Experimental and Observational Data – Wes Bethel**

1:00 – 2:05 Panel: **Understanding, Optimizing, and Programming for Power**

Moderator: Remzi Arpaci-Dusseau

Panelists:

- **David Rogers**, Optimizing the Energy Usage and Cognitive Value of Extreme Scale Data Analysis Approaches
- **Hank Childs** (ECRP), Optimizing Power Usage For Data-Intensive Workflows and Algorithms on Modern Computing Architectures
- **Adolfy Hoisie**, Beyond the Standard Model
- **Rami Melhem**, Lazy Shadowing - An Adaptive, Power-Aware Resiliency Framework for Exascale Computing

2:05-3:10 Panel: **Modeling and Understanding**

Moderator: Kenneth Moreland

Panelists:

- **Greg Eisenhauer**, Performance Understanding and Analysis for Exascale Data Management Workflows
- **Kevin Barker**, Evaluating Exascale Execution Models
- **Chris Carothers**, Co-Design of Exascale Storage and Science Data Facilities (CODES)
- **Nicholas Wright**, A Framework for Holistic I/O Workload Characterization

3:10 – 4:40 **Break and Posters**

4:40 – 5:40 **Breakout**

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2A: Shipman, Ramakrishnan, McCormick, Peterka, Krishnamoorthy

2B: Arpaci-Dusseau, Rogers, Childs, Hoisie, Melhem

2C: Moreland, Eisenhauer, Barker, Carothers, Wright

5:40 – 6:15 Program Management Expectations – Lucy Nowell

March 16, 2017

7:00 – 8:00 Breakfast

8:00 – 8:10 Regroup and guidance for the day – Lucy Nowell

8:10 – 9:15 Panel: **Data Analysis**

Moderator: Christian Engelmann

Panelists:

- **Surendra Byna**, Proactive Data Containers for Scientific Storage
- **Daniela Ushizima** (ECRP), Images Across Domains, Experiments, Algorithms and Learning
- **Chandrika Kamath**, IDEALS: Improving Data Exploration and Analysis at Large Scale
- **Alok Choudhary**, Scalable, In-situ Data Clustering Data Analysis for Extreme Scale Scientific Computing

9:15 – 9:45 **Break**

9:45 – 10:50 Panel: **In situ visualization and infrastructure**

Moderator: William Kramer

Panelists:

- **Patrick McCormick**, Domain-Specific Languages for in situ Data Analysis and Visualization on Emerging Architectures
- **Wes Bethel**, Scalable Analysis Methods and In Situ Infrastructure for Extreme Scale Knowledge Discovery
- **Florin Rusu** (ECRP), Scalable and Energy-Efficient Methods for Interactive Exploration of Scientific Data
- **Matthew Wolf**, RSVP: Runtime System for I/O staging in support of Voluminous in-situ Processing of extreme scale data

10:50 – 11:55 Panel: **Exascale storage challenges**

Moderator: Greg Eisenhauer

Panelists:

- **John Wu**, Scientific Data Services (SDS) – Autonomous Data Management on Exascale Infrastructure
- **Rob Ross**, A Software Defined Storage Approach to Exascale Storage Services
- **Elena Pourmal**, ExaHDF5: Advancing HPC I/O to Enable Scientific Discovery
- **Terry Jones**, UNITY: Unified Memory and Storage Space

11:55 – 1:30 **Working Lunch & Breakout 3**

3A: Engelmann, Byna, Ushizima, Kamath, Choudhary

3B: Kramer, McCormick, Bethel, Rusu, Wolf

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3C: Eisenhauer, Wu, Ross, Pourmal, Jones

1:30 – 3:00 Break and Posters

3:00 – 4:45 Moderators report back from breakouts

- 1A Ramakrishnan , 1B Hoisie, 1C Jones, 2A Shipman, 2B Arpaci-Dusseau, 2C: Moreland, 3A Engelmann, 3B Kramer, 3C Eisenhauer

4:45 – 5:00 Wrap-up and closing remarks – Lucy Nowell

Adjourned – Safe Travels!