Third International Workshop on Parallel Programming Models and Systems Software for High-End Computing (P2S2 '10)

Organizing Committee

- Steering Committee

D. K. Panda
Ohio State University

William Gropp
University of Illinois,
Urbana Champaign

Vijay Saraswat
IBM Research

- Program Co-chairs

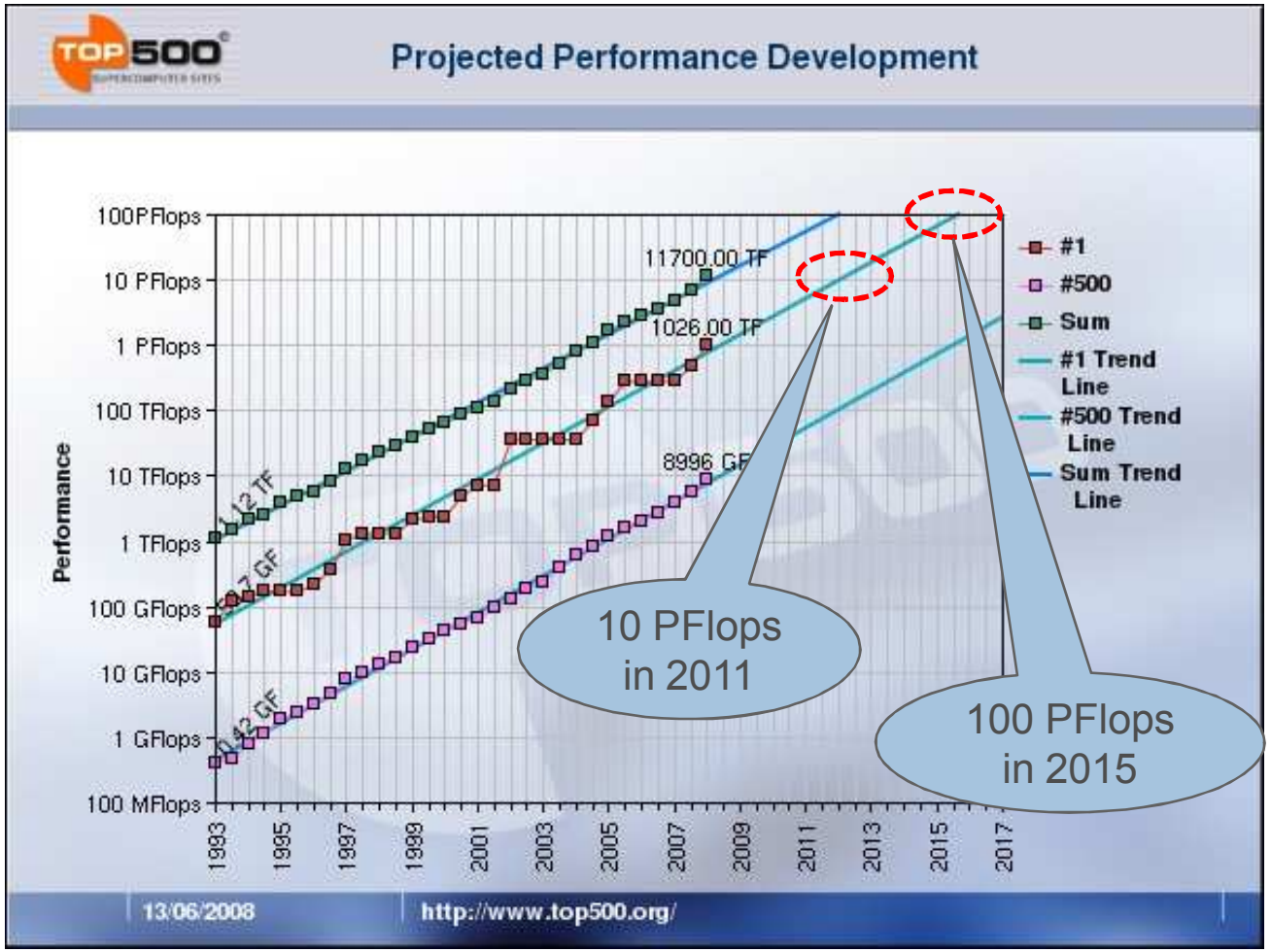
Pavan Balaji
Argonne National Laboratory

Abhinav Vishnu
Pacific Northwest National Laboratory

Workshop Goals

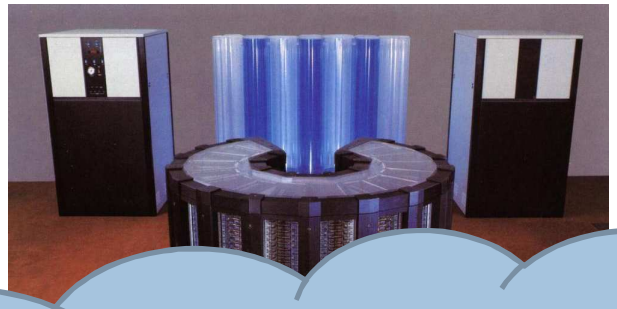
- Primary Goal: Consolidating ideas for programming and managing high-end computing systems
- Large machines almost always mean complex architectures
  - Sometimes it means a larger count of existing machines
  - Oftentimes it means disruptive changes to our current understanding of system architectures
- We hope to serve as a venue for researchers to exchange ideas in how the community can build and use the world's largest systems!

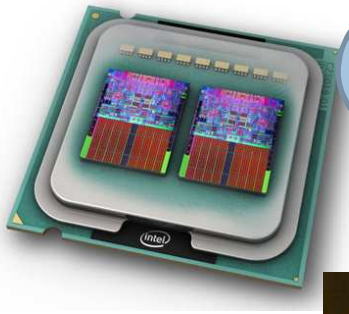
Ready or Not, Here it Comes!



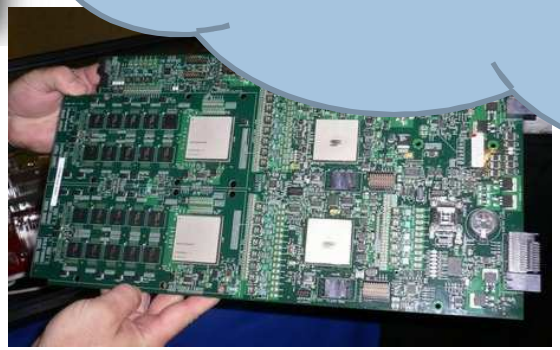
Expected to have an Exaflop system in 2018-2019 !

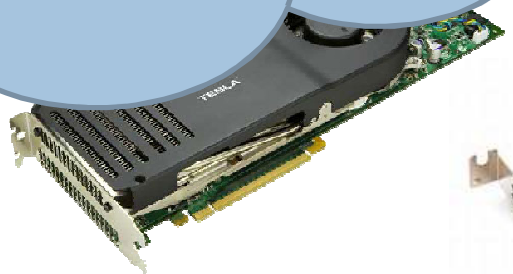
Systems Are Already Very Complex





Need to Convert
System Capacity
to
System Capability





Challenges for Massive Systems

- Scalability
  - Systems with hundreds of thousands of cores exist
    - We will have a million cores soon
  - Small performance problems can get brutal at scale !
- Ease of Use (The "Wizard Gap")
  - Not everyone is a parallel programming expert
  - … and yet, everyone wants the best performance
- We live in a heterogeneous jungle
  - Multicore processors, Integrated Accelerator cores, GPUs, FPGAs
- Reliability and Maintainability
  - Failure detection and transparency
  - Ease of administration

Workshop Areas of Interest

- Parallel Programming Models and their associated Systems Software as applicable to high-end computing systems
- Questions that we are pursuing:
  - How should the largest machines in the world be programmed?
  - What system software is necessary to program and manage these massive systems efficiently and productively?
  - What tools do we need to manage such massive systems?

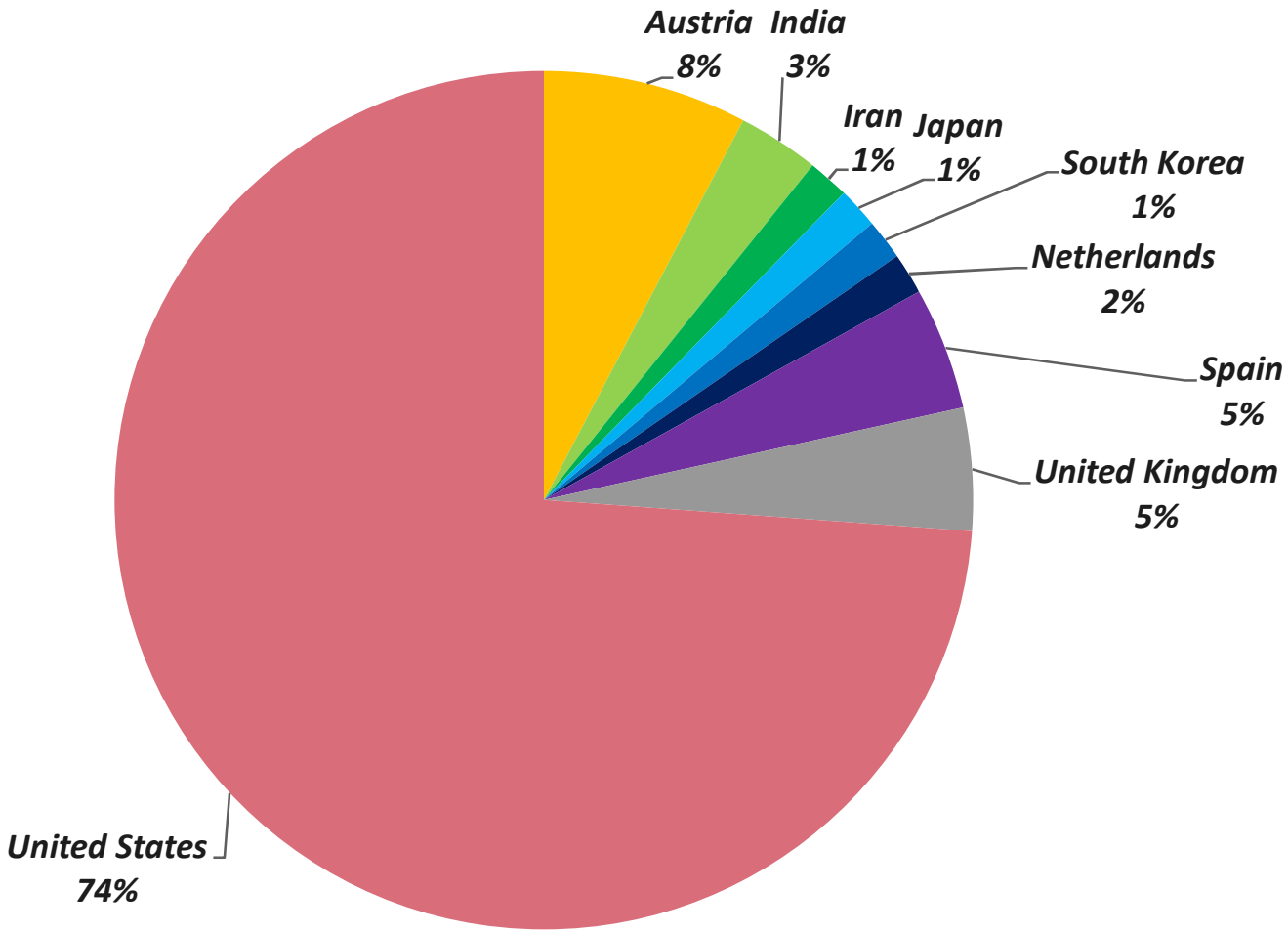
Program Committee: 23 members

- **Ahmad Afsahi**, Queen's University
- **George Almasi**, IBM Research
- **Taisuke Boku**, Tsukuba University
- **Ron Brightwell**, Sandia National Laboratory
- **Franck Cappello**, INRIA, France
- **Yong Chen**, Oak Ridge National Laboratory
- **Ada Gavrilovska**, Georgia Tech
- **Torsten Hoefler**, Indiana University
- **Zhiyi Huang**, University of Otago, New Zealand
- **Hyun-wook Jin**, Konkuk University, South Korea
- **Zhiling Lan**, Illinois Institute of Technology
- **Doug Lea**, State University of New York at Oswego
- **Heshan Lin**, Virginia Tech
- **Jiuxing Liu**, IBM Research
- **Guillaume Mercier**, INRIA, France
- **Scott Pakin**, Los Alamos National Laboratory
- **Fabrizio Petrini**, IBM Research
- **Bronis de Supinski**, Lawrence Livermore National Laboratory
- **Sayantan Sur**, Ohio State University
- **Rajeev Thakur**, Argonne National Laboratory
- **Vinod Tipparaju**, Oak Ridge National Laboratory
- **Jesper Traeff**, University of Vienna, Europe
- **Weikuan Yu**, Auburn University

Paper Reviews

- Totally 20 papers were submitted
  - 4-5 reviews per paper
  - Average of 4.75 reviews per paper
  - Program Committee telemeeting to finalize accepted papers
  - 10 papers were accepted
- Some of the accepted papers have been invited to submit to a special issue of the International Journal of High Performance Computing Applications (IJHPCA) on "Programming Models, Software and Tools for High-End Computing"

Author Attraction per Country



Logistics

- Four sessions:
  - Three sessions for regular technical paper presentations
  - One session for a technical panel discussion
- If you are a presenter:
  - Please meet your session chair before your session starts
  - Bios for each presenter needed
  - Session chairs might require presentations to be copied to a common presentation laptop before the session
- Wireless Connectivity
  - SSID: hhonor
  - Passcode: SDGO-5300 (first one is a ‘Oh’, last two are ‘zeroes’)

P2S2 Sessions

- Session1: Communication

[Time: 9:00 am to 10:30 am] **Session Chair: Vinod Tipparaju**

  - *"Efficient Zero-Copy Noncontiguous I/O for Globus on InfiniBand"*, Weikuan Yu and Jeffrey Vetter
  - *"Scaling Linear Algebra Kernels using Remote Memory Access"*, Manojkumar Krishnan, Robert Lewis and Abhinav Vishnu
  - *"High Performance Design and Implementation of Nemesis Communication Layer for Two-sided and One-Sided MPI Semantics in MVAPICH2"*, Miao Luo, Sreeram Potluri, Ping Lai, Emilio P. Mancini, Hari Subramoni, Krishna Kandalla, Sayantan Sur and Dhabaleswar K. Panda

- Session 2: Panel: "Is Hybrid Programming a Bad Idea Whose Time has Come?"

[Time: 11:00 am to 12:30 pm] **Moderator: Pavan Balaji**

  - *Taisuke Boku, Tsukuba University, Japan*
  - *Allen Maloney, University of Oregon*
  - *Bronis de Supinski, Lawrence Livermore National Laboratory*
  - *Vinod Tipparaju, Oak Ridge National Laboratory*

P2S2 Sessions (contd.)

- Session3: Programming Models and Performance Evaluation

[Time: 1:30 pm to 3:30 pm] **Session Chair: Hui Jin, Illinois Institute of Technology**

  - *"Performance Modeling for AMD GPUs", Ryan Taylor and Xiaoming Li*
  - *"A Hybrid Programming Model for Compressible Gas Dynamics using OpenCL", Ben Bergen, Marcus Daniels and Paul Weber*
  - *"Message Driven Programming with S-Net: Methodology and Performance", Frank Penczek, Sven-Bodo Scholz, Alex Shafarenko, Chun-Yi Chen, Nader Bagherzadeh, Clemens Grelck and JungSook Yang*
  - *"Implementation and Performance Evaluation of XcalableMP: A Parallel Programming Language for Distributed Memory Systems", Jinpil Lee and Mitsuhisa Sato*

- Session 4: Scheduling and Cache Management

[Time: 4:00 pm to 5:30 pm] **Moderator: Weikuan Yu, Auburn University**

  - *"Scheduling a ~100,000 core Supercomputer for maximum utilization and capability", Phil Andrews, Patricia Kovatch, Victor Hazlewood and Troy Baer*
  - *"Improving the Effectiveness of Context-based Prefetching with Multi-order Analysis", Yong Chen, Huaiyu Zhu, Hui Jin and Xian-He Sun*
  - *"Hierarchical Load Balancing for Large Scale Supercomputers", Gengbin Zheng, Esteban Meneses, Abhinav Bhatele and Laxmikant V. Kale*

Plans for P2S2 2011

- Steering Committee:
  - D. K. Panda (Ohio State University)
  - William Gropp (University of Illinois, Urbana Champaign)
  - Vijay Saraswat (IBM Research)
- Program Co-chairs:
  - Pavan Balaji (Argonne National Laboratory)
  - Abhinav Vishnu (Pacific Northwest National Laboratory)
  - Yong Chen (Oak Ridge National Laboratory)
- Host conference to be decided (maybe ICPP 2011)
- Like this year, we again plan to have special issue with a journal
  - Possibly the Journal of High Performance Computing Applications (JHPCA)
- Get Involved !
  - Paper submissions and workshop attendance
  - Advertizing