

## Workshop IV: New Architectures and Algorithms

### Monday November 26, 2018

- 8:00–8:55 *Check-In/Light Breakfast (Hosted by IPAM)*
- 8:55–9:00 *Welcome and Opening Remarks*
- 9:00–9:50 **Alan Lee** (AMD)  
*Big Compute: Architectures and Algorithms*
- 10:00–10:15 *Break*
- 10:15–11:05 **Matthias Troyer** (Microsoft Research)  
*A quantum future of computation*
- 11:15–11:30 *Break*
- 11:30–12:20 **Gavin Jones** (IBM Research - Almaden )  
*Quantum Computing and IBM Q: An Introduction*
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Jack Raymond** (D-Wave Systems)  
*Quantum simulation of condensed matter in programmable qubit lattices*
- 3:30–4:00 *Break*
- 4:00–4:50 **Maya Gokhale** (Lawrence Livermore National Laboratory)  
*System software and architecture assist for application-directed data views*
- 5:00–6:30 *Poster Session & Reception (Hosted by IPAM)*

### Tuesday November 27, 2018

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–9:50 **Hatem Ltaief** (King Abdullah Univ. of Science and Technology (KAUST))  
*Leveraging Computational Astronomy Applications on Massively Parallel Hardware Systems*
- 10:00–10:15 *Break*
- 10:15–11:05 **Ameet Talwalkar** (Carnegie Mellon University)  
*Massively Parallel Hyperparameter Tuning*
- 11:15–11:30 *Break*

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- 11:30–12:20 **James Demmel** (University of California, Berkeley (UC Berkeley))  
*Architectural Implications of Communication-Avoiding Algorithms*
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Amir Gholaminejad** (University of California, Berkeley (UC Berkeley))  
*Scalable Neural Network Training Using Second Order Stochastic Training*
- 3:30–4:00 *Break*
- 4:00–4:50 **Yingyu Liang** (University of Wisconsin-Madison)  
*Learning Overparameterized Neural Networks on Structured Data*

### Wednesday November 28, 2018

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–9:50 **William Gropp** (University of Illinois at Urbana-Champaign)  
*Challenges in Programming Extreme Scale Systems*
- 10:00–10:15 *Break*
- 10:15–11:05 **Aydin Buluc** (Lawrence Berkeley National Laboratory)  
*Communication-Avoiding Sparse Matrix Algorithms for Large Graph and Machine Learning Problems*
- 11:15–11:30 *Break*
- 11:30–12:20 **Tobias Weinzierl** (Durham University)  
*Stop talking to me - some communication-avoiding programming patterns*
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Michael Schulte** (AMD)  
*Architectures and Technologies for Extreme-Scale Computing*
- 3:30–4:00 *Break*
- 4:00–4:50 **James Sexton** (IBM Research)  
*Architecture Challenges and Opportunities for Exascale Systems*

### Thursday November 29, 2018

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–9:50 **John Shalf** (Lawrence Berkeley Laboratory)  
*Computing Beyond Moore's Law*
- 10:00–10:15 *Break*

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- 10:15–11:05 **Shang-Hua Teng** (University of Southern California (USC))  
*Scalable Algorithms in the Age of Big Data and Network Sciences*
- 11:15–11:30 *Break*
- 11:30–12:20 **Stefano Ambrogio** (IBM Research - Almaden )  
*Novel Technologies for Artificial Intelligence: prospects and challenges*
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Nina Balcan** (Carnegie Mellon University)  
*Data Driven Algorithm Design*
- 3:30–4:00 *Break*
- 4:00–4:50 **Yaron Singer** (Harvard University)  
*Maximizing Submodular Functions Exponentially Faster*

## Friday November 30, 2018

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00–9:50 **Chris Anderson** (University of California, Los Angeles (UCLA))  
*Generalized Aggregate Descriptor Approximations*
- 10:00–10:15 *Break*
- 10:15–11:05 **Petter Bjoerstad** (University of Bergen)  
*Domain Decomposition and Computer Architecture - a stable relationship?*
- 11:15–11:30 *Break*
- 11:30–12:20 **Edmond Chow** (Georgia Institute of Technology)  
*Asynchronous Iterative Methods*
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Andreas Krause** (ETH Zurich)  
*Deep Learning Architectures with Discrete Decisions via Submodularity*
- 3:30–4:00 *Break*
- 4:00–4:50 **Jeffrey Hittinger** (Lawrence Livermore National Laboratory)  
*Rethinking Finite Precision*

