

Workshop III: HPC for Computationally and Data-Intensive Problems

Monday November 5, 2018

- 8:00–8:55 *Check-In/Light Breakfast (Hosted by IPAM)*
- 8:55–9:00 *Welcome and Opening Remarks*
- 9:00–9:50 **Nadia Heninger** (University of Pennsylvania)
Computational challenges in applied cryptanalysis
- 10:00–10:15 *Break*
- 10:15–11:05 **Torsten Hoefler** (ETH Zurich)
High-Performance Communication for Machine Learning
- 11:15–11:30 *Break*
- 11:30–12:20 **Wendy Cho** (University of Illinois at Urbana-Champaign)
Massively Parallel Evolutionary Computation for Empowering Electoral Reform: Quantifying Gerrymandering via Multi-objective Optimization and Statistical Analysis
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Rajat Monga** (Google Inc.)
Challenges in Machine Learning Systems
- 3:30–4:00 *Break*
- 4:00–4:50 **Alex Pothén** (Purdue University)
A New Paradigm for Parallel Algorithm Design: Approximation
- 5:00–6:30 *Poster Session & Reception (Hosted by IPAM)*

Tuesday November 6, 2018

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:50 **Luke Olson** (University of Illinois at Urbana-Champaign)
Pushing The Scalability Limits in Sparse Matrix Operations
- 10:00–10:15 *Break*
- 10:15–11:05 **Vipin Kumar** (University of Minnesota, Twin Cities)
Physics Guided Machine Learning: A New Paradigm for Modeling Dynamical Systems
- 11:15–11:30 *Break*

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- 11:30–12:20 **Madhav Marathe** (University of Virginia)
Massively interacting bio-social systems: HPC-enable pervasive, personalized and precision analytics
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Paul Morrin** (University of Minnesota, Twin Cities)
The World Upside Down; NSF HPC produces the topography of the Earth
- 3:30–4:00 *Break*
- 4:00–4:50 **Joachim Buhmann** (ETH Zürich)
Robust algorithmics: a foundation for science?!

Wednesday November 7, 2018

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:50 **Karen Devine** (Sandia National Laboratories)
Exploiting Scientific Software to Solve Problems in Data Analytics
- 10:00–10:15 *Break*
- 10:15–11:05 **Ananth Grama** (Purdue University)
Sampled Higher Order Distributed Non-Convex Optimization Techniques for Machine Learning
- 11:15–11:30 *Break*
- 11:30–12:20 **Yann LeCun** (New York University)
Computational Infrastructure Requirements for Deep Learning
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Prabhat** (Lawrence Berkeley Laboratory)
Data Analytics in the Exascale Era
- 3:30–4:00 *Break*
- 4:00–4:50 **Allen Rush** (AMD)
High Performance Mapping for Deep Learning Algorithms

Thursday November 8, 2018

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:50 **Tandy Warnow** (University of Illinois at Urbana-Champaign)
Mathematical and Computational Challenges in Reconstructing Evolution
- 10:00–10:15 *Break*

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- 10:15–11:05 **Jennifer Listgarten** (University of California, Berkeley (UC Berkeley))
Machine learning: from genetics to gene editing to protein optimization
- 11:15–11:30 *Break*
- 11:30–12:20 **Petros Koumoutsakos** (ETH Zurich)
High Performance Computing and Data science interfaces to predict, control and understand Fluid Mechanics
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Siavash Mir arabbaygi** (University of California, San Diego (UCSD))
Species tree inference and update on very large datasets using randomization, parallelization, and vectorization
- 3:30–4:00 *Break*
- 4:00–5:00 *Contributed Talks*
- 4:00–4:15 **Erin Molloy** (University of Illinois at Urbana-Champaign)
Scaling species tree estimation methods to large datasets using NJMerge
- 4:15–4:30 **Anwasha Das** (North Carolina State University)
Aarohi: Making Real-time Node Failure Prediction Feasible
- 4:30–4:45 **Julija Zavadlav** (Swiss Federal Institute of Technology of Zurich)
Data driven modeling in molecular dynamics
- 4:45–5:00 **Torsten Hoefler** (ETH Zurich)
Twelve ways to fool the masses when reporting performance of deep learning workloads

Friday November 9, 2018

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:50 **Ribana Roscher** (University of Bonn)
Machine Learning for Earth Remote Sensing
- 10:00–10:15 *Break*
- 10:15–11:05 **Anuj Karpatne** (Virginia Polytechnic Institute and State University)
Theory-guided Data Science: A New Paradigm for Scientific Discovery from Data
- 11:15–11:30 *Break*
- 11:30–12:30 *Group Discussion*
- 12:30 *Conclusion*

