

Workshop IV: Multi-Modal Imaging with Deep Learning and Modeling

Monday November 28, 2022

- 8:00–8:55 *Check-In/Breakfast (Hosted by IPAM)*
- 8:55–9:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 9:00 *Session Chair: Peter Binev (University of South Carolina)*
- 9:00–9:50 **Naomi Ginsberg** (University of California, Berkeley (UC Berkeley))
Deep Learning for medical image reconstruction + feature learning via Gradient Descent
- 10:00–10:15 *Break*
- 10:15–11:05 **Anna Little** (University of Utah)
Unbiasing Procedures for Scale-invariant Multi-reference Alignment
- 11:15–11:30 *Break*
- 11:30–12:20 **Hanbaek Lyu** (University of Wisconsin-Madison)
Mesoscale reconstruction of images and networks using tensor decomposition
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *Session Chair: John Miao (UCLA)*
- 2:30–3:20 **Andrea Bertozzi** (University of California, Los Angeles (UCLA))
Fusing neural networks and graphical models in an active learning framework for image classification
- 3:30–3:50 *Break*
- 3:50–4:40 **Michael Lustig** (University of California, Berkeley (UC Berkeley))
Multi-modal Motion Imaging using Microwave tones in an MRI scanner
- 4:50–5:20 *Lightning Poster Session*
- 5:20–6:30 *Poster Session & Reception (Hosted by IPAM)*

Tuesday November 29, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Michael Wakin (Colorado School of Mines)*
- 9:00–9:50 **Daniel Cremers** (Technische Universität München)
Virtual Talk: Deep Learning - Challenges and Perspectives
- 10:00–10:15 *Break*

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- 10:15–11:05 **Piotr Indyk** (Massachusetts Institute of Technology)
Learning-Based Low-Rank Approximations
- 11:15–11:30 *Break*
- 11:30–12:20 **Rama Vasudevan** (Oak Ridge National Laboratory)
Advancing Microscopy with Machine Learning: Lessons and Insights from Scanning Probe Microscopy
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *Session Chair: Zineb Saghi (CEA)*
- 2:30–3:20 **Robert Wolkow** (University of Alberta)
Wiring-Up" Atom-Defined Device Elements: Ever Closer to Operational Ultra-Fast, Ultra-Low Power and Quantum Devices
- 3:30–3:50 *Break*
- 3:50–4:40 **Paul Hand** (Northeastern University)
Signal Recovery with Generative Priors

Wednesday November 30, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Stan Osher (UCLA)*
- 9:00–9:50 **Sarah Haigh** (University of Manchester)
Probing atomic behaviour in liquids with STEM : opportunities for machine learning
- 10:00–10:15 *Break*
- 10:15–11:05 **Rachel Ward** (University of Texas at Austin)
Virtual Talk: How Catastrophic can catastrophic forgetting be in linear regression?
- 11:15–11:30 *Break*
- 11:30–12:20 **Zineb Saghi** (Commissariat à l'Énergie Atomique (CEA))
Deep learning (and more conventional approaches) in 3D microscopy'
- 12:30–12:40 *Group Photo*
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *Session Chair: Toby Sanders (Arizona State University)*
- 2:30–3:20 **Ben Recht** (University of California, Berkeley (UC Berkeley))
Splitting the difference between deep and shallow solutions of inverse problems.
- 3:30–3:50 *Break*

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3:50–4:40 **Mahdi Soltanolkotabi** (University of Southern California (USC))
Medical image reconstruction via deep learning: new architectures, data reduction and robustness

Thursday December 1, 2022

8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*

9:00 *Session Chair: Paul Weiss (UCLA)*

9:00–9:50 **Mary Scott** (University of California, Berkeley (UC Berkeley))
Supervised and Unsupervised approaches for Electron Microscopy Data Analysis

10:00–10:15 *Break*

10:15–11:05 **Toby Sanders** (Arizona State University)
X-space image reconstruction in Magnetic Particle Imaging (MPI)

11:15–11:30 *Break*

11:30–12:20 **Elizaveta Rebrova** (Princeton University)
Low-rank tensor recovery from memory-efficient measurements

12:30–2:30 *Lunch (on your own)*

2:30 *Session Chair: Monika Ritsch-Marte (Medical University of Innsbruck)*

2:30–3:20 **Mark Iwen** (Michigan State University)
Provably Accurate Recovery of Compactly Supported Smooth Functions from Spectrogram Measurements

3:30–3:50 *Break*

3:50–4:40 **Reinhard Heckel** (Technical University of Munich)
The role of data and models for deep-learning based image reconstruction

Friday December 2, 2022

8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*

9:00 *Session Chair: Ivo Ihrke (University of Siegen)*

9:00–9:50 **Palina Salanevich** (Utrecht University)
Virtual Talk: STFT Phase retrieval: robustness and generative priors

10:00–10:15 *Break*

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- 10:15–11:05 **Kevin Kelly** (Rice University)
Virtual Talk: Machine Learning Enhanced Compressive Hyperspectral Imaging
- 11:15–11:30 *Break*
- 11:30–12:20 **Jamie Haddock** (Harvey Mudd College)
Hierarchical and neural nonnegative tensor factorizations
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *Session Chair: Paul Voyles (University of Wisconsin- Madison)*
- 2:30–3:20 *Discussion*
- 3:30–3:50 *Break*
- 3:50–4:40 *Discussion*

