

Workshop IV: Efficient Tensor Representations for Learning and Computational Complexity

Monday May 17, 2021

- 7:55 *SESSION CHAIR: Rong Ge (Duke Univ.)*
- 7:55–8:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 8:00–8:30 **Anna Seigal** (University of Oxford)
Principal Components along Quiver Representations
- 8:40–8:55 *Break*
- 8:55–9:25 **Christian Ikenmeyer** (University of Liverpool)
Minrank: On the Complexity of Orbit Closures
- 9:35–9:50 *Break*
- 9:50–10:20 **Visu Makam** (Institute for Advanced Study)
Maximum Likelihood Estimation for Tensor Normal Models
- 10:30–10:45 *Break*
- 10:45–11:15 **Ketan Mulmuley** (University of Chicago)
TBA
- 11:30–12:00 *Poster Session: Kirandeep Kour, Deqing Wang and Eric Evert*

Tuesday May 18, 2021

- 8:00 *SESSION CHAIR: Michael Walter (Univ. Amsterdam)*
- 8:00–8:30 **Alessandra Bernardi** (Università di Trento)
On the Dimension of Tensor Network Varieties.
- 8:40–8:55 *Break*
- 8:55–9:25 **Shmuel Friedland** (University of Illinois at Chicago)
Complexity of Computation of Tensor Rank and Best Rank One Approximation
- 9:35–9:50 *Break*
- 9:50–10:20 **Furong Huang** (University of Maryland)
Understanding, Interpreting and Design Neural Network Models Through Tensor Representations
- 10:30–10:45 *Break*

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- 10:45–11:15 **Babak Hassibi** (California Institute of Technology)
Implicit and Explicit Regularization in Deep Neural Networks
- 11:25–11:40 *Break*
- 11:40–12:10 **Qing Qu** (University of Michigan)
Landscape Analysis for Overcomplete Tensor and Neural Collapse

Wednesday May 19, 2021

- 8:00 *SESSION CHAIR: David Gross (Univ. Cologne)*
- 8:00–8:30 **Jean Kossaifi** (Nvidia Corporation)
Efficient Tensor Representation for Deep Learning with TensorLy and PyTorch
- 8:40–8:55 *Break*
- 8:55–9:25 **Matthias Christandl** (University of Copenhagen)
Asymptotics of Ranks of Tensors
- 9:35–9:50 *Break*
- 9:50–10:20 **Yuxin Chen** (Princeton University)
The Effectiveness of Nonconvex Tensor Completion: Fast Convergence and Uncertainty Quantification.
- 10:30–10:45 *Break*
- 10:45–11:15 **Rose Yu** (University of California, San Diego (UCSD))
Multiresolution Tensor Learning for Efficient and Interpretable Spatial Analysis
- 11:25–11:40 *Break*
- 11:40–12:10 **Jeroen Zuiddam** (Courant Institute of Mathematical Sciences)
Subrank, partition rank and slice rank

Thursday May 20, 2021

- 8:00 *SESSION CHAIR: Matthias Christandl (Univ. Copenhagen)*
- 8:00–8:30 **Peter Burgisser** (Technische Universität Berlin)
Towards a Theory of Non-commutative Optimization: Geodesic First and Second Order Methods for Moment Maps and Polytopes.
- 8:40–8:55 *Break*
- 8:55–9:25 **Harm Derksen** (Northeastern University)
Invariant Tensors and Wheeled PROPs.
- 9:35–9:50 *Break*

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9:50–10:20 **Daniel Hsu** (Columbia University)
Computational Lower Bounds for Tensor PCA

10:30–10:45 *Break*

10:45–11:15 **Andrea Montanari** (Stanford University)
Simple Models for Noisy Tensors and Their Properties

Friday May 21, 2021

8:00 *SESSION CHAIR: Jianfeng Lu (Duke Univ.)*

8:00–8:30 **Dong Xia** (Hong Kong University of Science and Technology)
Community Detection on Mixture Multi-layer Networks via Regularized Tensor Decomposition

8:40–8:55 *Break*

8:55–9:25 **Richard Kueng** (Johannes Kepler University)
Predicting Many Properties of a Quantum System From Very Few Measurements

9:35–9:50 *Break*

9:50–10:20 **Holger Rauhut** (RWTH Aachen University)
Learning Deep Matrix Factorizations Via Gradient Descent: Implicit Bias Towards Low Rank

10:30–10:45 *Break*

10:45–11:15 **Hanie Sedghi** (Google AI)
Taming Deep Convolutional Networks

