

SPARS 2019
Toulouse, July 1-4 2019

Oral sessions, plenaries and special talk

Monday, July 1st 2019

8:30-9:30 Registration + coffee

9:30-9:40 Introduction

9:40-10:40 Plenary 1

Are generative models the new sparsity?

Lenka Zdeborova

CNRS, France

9:40-11:10 Coffee Break

11:10-12:10 Oral session 1 (3 talks)

Sparsity of solutions for variational inverse problems with finite-dimensional data

Kristian BREDIES, Marcello CARIONI

Karl-Franzens-Universität Graz, Austria

Optimal Sampling Rates for Compressed Sensing Off-the-grid

Clarice POON¹, Nicolas KERIVEN², Gabriel PEYRE²

1: University of Bath, United Kingdom; 2: Ecole Normale Supérieure

Bias versus Convexity in Compressed Sensing

Marcus CARLSSON

Lund University, Sweden

12:10-14:30 Lunch + Poster session 1

14:30-15:30 Plenary 2

Timing is everything: Sparse sampling based on time-encoding machines

Pier Luigi Dragotti

Imperial College London, U.K.

15:30-16:10 Oral session 2 (2 talks)

Cluster-based Optimal Transport Alignment

John LEE, Eva DYER, Christopher J. ROZELL

Georgia Institute of Technology, United States of America

Optimal Transport of Measures in Frequency Domain

Laurent CONDAT

CNRS and Univ. Grenoble Alpes, France

16:10-16:40 Coffee Break

16:40-17:40 Oral session 3 (3 talks)

On the non-convex sparse spike estimation problem: explicit basins of attractions of global minimizers

Yann TRAONMILIN^{1,3}, Jean-François AUJOL^{2,3}

1: CNRS; 2: Université de Bordeaux; 3: Institut de mathématiques de Bordeaux

A Unified Framework for the Convergence Analysis of Optimization Algorithms via Sum-of-Squares

Sandra S. Y. TAN, Antonios VARVITSIOTIS, Vincent Y. F. TAN

National University of Singapore, Singapore

Eventual linear convergence rate of an exchange algorithm for superresolution.

Axel FLINTH¹, Frédéric DE GOURNAY¹, Pierre WEISS^{2,3}

1: Université de Toulouse, France; 2: CNRS; 3: Institut des Technologies Avancées du Vivant

19:30-21:30 Welcoming reception

Le Moaï restaurant

Tuesday, July 2nd 2019

9:00-10:00 **Plenary 3**

Subspaces and sparsity on the continuum

Mark Davenport

Georgia Institute of Technology, United States of America

10:00-10:40 **Oral session 4 (2 talks)**

Matrix Completion: Unlifted but Convex

Sohail BAHMANI¹, Kiryung LEE²

1: Georgia Institute of Technology, United States of America; 2: Ohio State University, United States of America

Matrix rigidity and the ill-posedness of Robust PCA and matrix completion

Jared TANNER^{1,3}, Andrew THOMPSON², Simon VARY¹

1: University of Oxford, United Kingdom; 2: National Physical Laboratory, United Kingdom; 3: The Alan Turing Institute, United Kingdom

10:40-11:10 **Coffee Break**

11:10-12:10 **Oral session 5 (3 talks)**

Universal sparsity of deep ReLU networks

Dennis ELBRÄCHTER¹, Helmut BÖLCSKEI², Philipp GROHS¹, Dmytro PEREKRESTENKO²

1: University of Vienna, Austria; 2: ETH Zurich, Switzerland

Error bounds for approximations with deep ReLU neural networks in Sobolev norms

Ingo GÜHRING¹, Gitta KUTYNIOK¹, Philipp PETERSEN²

1: Technische Universität Berlin, Germany; 2: University of Oxford, United Kingdom

Emergent Sparsity in Variational Autoencoder Models

Bin DAI¹, David WIPF²

1: Tsinghua University, China, People's Republic of; 2: Microsoft Research, China, People's Republic of

12:10-14:30 **Lunch + Poster session 2**

14:30-15:30 **Plenary 4**

Ultra-Sparse Representations in Neural Networks : Biological Inspiration for Artificial Intelligence?

Simon Thorpe

CNRS, France

15:30-16:10 **Oral session 6 - Student Contest (2 talks)**

Concomitant Lasso with Repetitions (CLaR): beyond averaging multiple realizations of heteroscedastic noise

Quentin BERTRAND¹, Mathurin MASSIAS¹, Alexandre GRAMFORT¹, Joseph SALMON²

1: INRIA Saclay, France; 2: IMAG, Univ Montpellier, CNRS, Montpellier, France

A Fast Holistic Algorithm for Complete Dictionary Learning via L^4 Norm Maximization

Yuexiang ZHAI^{1,2}, Zitong YANG¹, Zhenyu LIAO², John WRIGHT³, Yi MA¹

1: UC Berkeley; 2: ByteDance Research Lab; 3: Columbia University

16:10-16:40 **Coffee Break**

16:40-17:40 **Oral session 7 - Student Contest (3 talks)**

Generalized Conditional Gradient with Augmented Lagrangian for Composite Optimization

Antonio José SILVETI-FALLS, Cesare MOLINARI, Jalal FADILI

ENSICAEN, France

Low-rank matrix completion and denoising under Poisson noise

Andrew MCRAE, Mark DAVENPORT

Georgia Institute of Technology, United States of America

Subspace Tracking with Missing Data and Matrix Completion

Praneeth NARAYANAMURTHY, Vahid DANESHPAJOOH, Namrata VASWANI

Iowa State University, United States of America

Wednesday, July 3rd 2019

- 9:00-10:00 Plenary 5**
Sparse Bayesian Learning: A Beamforming and Toeplitz Approximation Perspective
Bhaskar Rao
UC San Diego, United States of America
- 10:00-10:40 Oral session 8 (2 talks)**
Self-supervised learning of inverse problem solvers in medical imaging
Ortal SENOUF¹, Sanketh VEDULA¹, Tomer WEISS¹, Alex BRONSTEIN¹, Oleg MICHAILOVICH², Michael ZIBULEVSKY¹
1: Technion, Israel; 2: University of Waterloo, Canada
Block-Gaussian-Mixture Priors for Hyperspectral Denoising
Afonso TEODORO, José BIOUCAS-DIAS, Mário FIGUEIREDO
Instituto de Telecomunicações and Instituto Superior Técnico, University of Lisbon, Portugal
- 10:40-11:10 Coffee Break**
- 11:10-12:10 Oral session 9 (3 talks)**
Multiple-Kernel Regression with Sparsity Constraints
Shayan AZIZNEJAD, Michael UNSER
Ecole Polytechnique Federale de Lausanne, Switzerland
Sketched Clustering via Hybrid GAMP
Evan BYRNE¹, Antoine CHATALIC², Remi GRIBONVAL², Philip SCHNITER¹
1: The Ohio State University, United States of America; 2: Univ. Rennes, Inria, CNRS, IRISA, France
SLOPE for Sparse Linear Regression: Exact Asymptotics and Optimal Sequence Designs
Hong HU, Yue M. LU
Harvard University
- 12:10-14:30 Lunch + Poster session 3**
- 14:30-15:30 Plenary 6**
Geometry and Regularization in Nonconvex Low-Rank Estimation
Yuejie Chi
Carnegie Mellon University, United States of America
- 15:30-16:10 Oral session 10 (2 talks)**
Phaseless PCA: Low-Rank Matrix Recovery from Column-wise Phaseless Measurements
Seyedehsara NAYER, Praneeth NARAYANAMURTHY, Namrata VASWANI
Iowa State University, United States of America
The Analysis of Spectral Initialization for Phase Retrieval with Random Orthogonal Matrices
Rishabh DUDEJA, Milad BAKHSHIZADEH, Junjie MA, Arian MALEKI
Columbia University, United States of America
- 16:10-16:40 Coffee break**
- 16:40-18:00 Special Talk**
Machine Learning: Dynamical, Statistical and Economic Perspectives
Michael I. Jordan
UC Berkeley, United States of America
- 20:00-23:00 SPARS Banquet**
Hôtel Dieu

Thursday, July 4th 2019

9:00-10:00 **Plenary 7**

Proximal approaches for matrix optimization problems

Emilie Chouzenoux

University Paris-Est, France

10:00-10:40 **Oral session 11 (2 talks)**

The fastest L1,00 prox in the west

Benjamin BEJAR¹, Ivan DOKMANIC², Rene VIDAL¹

1: The Johns Hopkins University, United States of America; 2: University of Illinois at Urbana Champaign, United States of America

Nonlinear matrix recovery

Florentin GOYENS¹, Coralia CARTIS¹, Armin EFTEKHARI², Greg ONGIE³

1: University of Oxford, United Kingdom; 2: EPFL, Lausanne; 3: University of Chicago

10:40-11:10 **Coffee Break**

11:10-12:10 **Oral session 12 (3 talks)**

A Spectral Method for Estimating Low-Rank Subspaces from Nonlinear Measurements

Wangyu LUO, Yue M. LU

Harvard University, United States of America

Iterative Hard Thresholding for Low-Rank Recovery from Rank-One Projections

Simon FOUCART, Srinivas SUBRAMANIAN

Texas A&M University, United States of America

High-dimensional change point localization from noisy linear projections

Daren WANG¹, Kevin LIN², Rebecca WILLETT³

1: Department of Statistics, University of Chicago; 2: Department of Statistics and Data Science, Carnegie Mellon University; 3: Department of Computer Science and Statistics, University of Chicago

12:10-14:30 **Lunch + Poster session 4**

14:30-15:30 **Plenary 8**

Pre-processing data for deep learning? The balance between discriminability and invariance

Monika Dörfler

University of Vienna, Austria

15:30-16:30 **Oral session 13 (3 talks)**

A good reason for using OMP: average case results

Karin SCHNASS

University of Innsbruck, Austria

Universal Sparse Representation

Rotem MULAYOFF, Tomer MICHAELI

Technion, Israel

Uniform k-step recovery with CMF dictionaries

Clément ELVIRA¹, Rémi GRIBONVAL¹, Charles SOUSSEN², Cédric HERZET¹

1: Univ Rennes, Inria, CNRS, IRISA; 2: L2S, CentraleSupélec-CNRS-Université Paris-Saclay

16:30-16:40 **Closing remarks**