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 POON[1], Nicolas KERIVEN[2], Gabriel PEYRE[2]
1: University of Bath, United Kingdom; 2: Ecole Normale Superieure

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 FLINTH[1], Fréderic DE GOURNAY[1], 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 BAHMANI[1], Kiryung LEE[2]
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 THOMPSON[2], Simon VARY[1]
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 ELBRÄCHTER[1], Helmut BÖLCSKEI[2], Philipp GROHS[1], Dmytro PEREKRESTENKO[2]
1: University of Vienna, Austria; 2: ETH Zurich, Switzerland

Error bounds for approximations with deep ReLU neural networks in Sobolev norms
Ingo GÜHRING[1], Gitta KUTYNIOK[1], Philipp PETERSEN[2]
1: Technische Universität Berlin, Germany; 2: University of Oxford, United Kingdom

Emergent Sparsity in Variational Autoencoder Models
Bin DAI[1], David WIPF[2]
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 BERTRAND[1], Mathurin MASSIAS[1], Alexandre GRAMFORT[1], Joseph SALMON[2]
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 YANG[1], Zhenyu LIAO[2], John WRIGHT[3], Yi MA[1]
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 SENOUF[1], Sanketh VEDULA[1], Tomer WEISS[1], Alex BRONSTEIN[1], Oleg MICHAILOVICH[2], Michael ZIBULEVSKY[1]
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 BYRNE[1], Antoine CHATALIC[2], Remi GRIBONVAL[2], Philip SCHNITER[1]
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,oo prox in the west

Benjamin BEJAR[1], Ivan DOKMANIC[2], Rene VIDAL[1]
1: The Johns Hopkins University, United States of America; 2: University of Illinois at Urbana Champaign, United States of America

Nonlinear matrix recovery

Florentin GOYENS[1], Coralia CARTIS[1], Armin EFTEKHARI[2], Greg ONGIE[3]
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 WANG[1], Kevin LIN[2], Rebecca WILLETT[3]
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 ELVIRA[1], Rémi GRIBONVAL[1], Charles SOUSSEN[2], Cédric HERZET[1]
1: Univ Rennes, Inria, CNRS, IRISA; 2: L2S, CentraleSupélec-CNRS-Université Paris-Saclay

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