

# CIMI Workshop

## "Optimization and Statistics in Image Processing"

### 24 - 28 June 2013, Toulouse

- **Monday 24th, 08:30 - 09:30 : Registration**

- **Monday 24th, 09:30 - 10:15 : Opening**

Chairs: Michel Ledoux, Denis Kouamé, François Malgouyres and Jean-Yves Tournet

- **Monday 24th, 10:15 - 11:45 : Classification & segmentation**

Chairs: Mario Figueiredo and Jean-Yves Tournet

- 10:15 - 11:00 : Alfred O. Hero, *University of Michigan, USA*  
« Physics-based dictionary learning for image classification »
- 11:00 - 11:45 : Raymond Chan, *Chinese University of Hong-Kong, China*  
« A Two-stage Image Segmentation Method using a Convex Variant of the Mumford-Shah Model and Thresholding »

- **Monday 24th, 13:30 - 15:00 : Bayesian methods I**

Chair: José Bioucas Dias

- 13:30 - 14:15 : Stephen McLaughlin, *Heriot-Watt University, Edinburgh, Scotland*  
« Gaussian processes for nonlinear spectral unmixing of hyperspectral images »
- 14:15 - 15:00 : Xavier Descombes, *INRIA Sophia-Antipolis, France*  
« Marked Point Process in Image Analysis »

- **Monday 24th, 15:30 - 17:00 : Biomedical imaging I**

Chairs: Jeffrey Fessler and Denis Kouamé

- 15:30 - 16:15 : Jean-Philippe Thiran, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*  
« Global optimization in brain connectivity analysis and sparsity-driven quantitative tractography »
- 16:15 - 17:00 : Jean-Christophe Olivo-Marin, *Institut Pasteur, France*  
« Cell mechanics analysis through physically-constrained optical flow and optimal control »

- **Tuesday 25th, 09:00 - 10:30 : Graphical and geometry-based methods I**

Chairs: Raymond Chan and François Malgouyres

- 09:00 - 09:45 : Clem Karl, *Boston University, USA*  
« Graph-cut methods for joint reconstruction and labeling »
- 09:45 - 10:30 : Olivier Lezoray, *Université de Caen, France*  
« Partial Difference Equations (PdE) on Graphs for Image and Data Processing »

- **Tuesday 25th, 11:00 - 11:45 : Graphical and geometry-based methods I**

Chair: Steve McLaughlin

- 11:00 - 11:45 : Boaz Nadler, *Weizmann Inst. of Science, Israel*  
« Optimal Denoising of Natural Images and the multiscale geometry and density of image patches »

- **Tuesday 25th, 13:30 - 15:00 : Bayesian methods II**

Chairs: Xavier Descombes and Nicolas Dobigeon

- 13:30 - 14:15 : Rafael Molina, *Universidad de Granada, Spain*  
« Variational Bayesian Methods for Image Recovery and Beyond »
- 14:15 - 15:00 : Philippe Ciuciu, *CEA Saclay, France*  
« A comparative study of Variational EM and MCMC inferences for the joint detection-estimation of brain activity in fMRI »

- **Tuesday 25th, 15:30 - 17:00 : Biomedical imaging II**

Chairs: Jean-Christophe Olivo-Marin and Adrian Basarab

- 15:30 - 16h15 : Jeffrey Fessler, *University of Michigan, USA*  
« Accelerated optimization methods for large-scale medical image reconstruction »
- 16h15 - 17:00 : Françoise Peyrin, *INSA de Lyon, France*  
« Advances in 3D X-ray imaging and associated inverse problems »

• **Wednesday 26th, 09:00 - 10:30 : Theoretical results in inverse problems I**

Chair: Mike Davies

- 09:00 - 09:45 : Gabriel Peyré, *Université Paris Dauphine, France*  
« Inverse Problem Regularization with Weak Decomposable Priors. Part I: Recovery Guarantees »
- 09:45 - 10:30 : Jalal Fadili, *Université de Caen, France*  
« Inverse Problem Regularization with Weak Decomposable Priors. Part II: Sensitivity Analysis and Parameter Selection »

**Wednesday 26th, 11:00 - 11:45 : Theoretical results in inverse problems I**

Chair: Steve McLaughlin

- 11:00 - 11:45 : Mike Davies, *University of Edinburgh, Edinburgh, Scotland*  
« A Sample Distortion Analysis for Compressed Imaging »

• **Wednesday 26th, 13:30 - 15:00 : Theoretical results in inverse problems II**

Chairs: Philippe Ciuciu and Pierre Weiss

- 13:30 - 14:15 : Mila Nikolova, *Ecole Normale Supérieure de Cachan, France*  
« L0 norm as a regularizer or as a constraint for least squares: analytical comparison of the optimal solutions »
- 14:15 - 15:00 : Cédric Herzet, *INRIA Rennes, France*  
« Exact recovery conditions for sparse representations with partial support information »

• **Wednesday 26th, 15:30 - 17:00 : Filtering**

Chairs: Jérôme Idier and Herwig Wendt

- 15:30 - 16h15 : Peyman Milanfar, *University of California, Santa Cruz, USA*  
« Data-adaptive Filtering and the State of the Art in Image Processing »
- 16h15 - 17:00 : Fredrik Andersson, *Lund University, Sweden*  
« Time extended structure tensors for multiple directionality estimation »

• **Thursday 27th, 09:00 - 10:30 : Compressed sensing/imaging**

Chairs: Gabriel Peyré and Ami Wiesel

- 09:00 - 09:45 : Yonina Eldar, *Technion, Israel*  
« Sparsity in Optical Imaging: Bandwidth Extrapolation, Phase Retrieval, and Nonlinearities »
- 09:45 - 10:30 : José M. Bioucas-Dias, *Instituto Superior Técnico, Lisboa, Portugal*  
« Interferometric Phase Image Estimation via Sparse Coding in the Complex Domain »

**Thursday 27th, 11:00 - 11:45 : Compressed sensing/imaging**

Chair: Guillermo Sapiro

- 11:00 - 11:45 : Pierre Vandergheynst, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*  
« Compressive Source Separation: Algorithms and Applications »

• **Thursday 27th, 13:30 - 15:00 : Algorithms for inverse problems I**

Chairs: José Bioucas Dias and Yonina Eldar

- 13:30 - 14:15 : Guillermo Sapiro, *University of Minnesota, USA*  
« Optimizing to Optimize »
- 14:15 - 15:00 : Mario Figueiredo, *Instituto Superior Técnico, Lisboa, Portugal*  
« Alternating Direction Optimization for Imaging Inverse Problems »

• **Thursday 27th, 15:30 - 17:00 : Algorithms for inverse problems II**

Chairs: Mila Nikolova and Jérémie Bigot

- 15:30 - 16:15 : Daniel Cremers, *Technische Universität München, Germany*  
« Convex Relaxation Methods for Computer Vision »
- 16:15 - 17:00 : Jérôme Idier, *IRCCyN, France*  
« Majorize-Minimize stepsize strategies for image restoration »

• **Friday 28th, 10:15 - 11h45 : Graphical and geometry-based methods II**

Chair: Alfred O. Hero

- 10:15 - 11:00 : Gabriele Steidl, *Technische Universität Kaiserslautern, Germany*  
« Quadrature errors, discrepancies, and their relations to halftoning on the torus and the sphere »
- 11:00 - 11:45 : Ami Wiesel, *Hebrew University of Jerusalem, Israel*  
« Geodesic convexity and covariance estimation »

• **Friday 28th, 14:00 - 16:00 : CIMI Colloquium**

Chairs: Denis Kouamé, François Malgouyres and Jean-Yves Tournet