Institut Henri Poincaré

Thematic program of the Centre Émile Borel

«The Mathematics of Imaging»
Paris, January 7th – April 5th, 2019

Conference «Variational Methods and Optimization in Imaging»
Paris, February 4th – 8th, 2019
Amphitheater Hermite

All lectures will be videotaped

Organizers: Jean-François Aujol (Université de Bordeaux & IUF), **Julie Delon** (Paris 5), **Agnès Desolneux** (CNRS and ENS Cachan), **Jalal Fadili** (ENSICAEN), **Bruno Galerne** (Université d'Orléans), **Gabriel Peyré** (CNRS and ENS)

Invited Speakers:

Rémy Abergel (CNRS and Paris Descartes)
Jérôme Bobin (CEA)
Nicolas Bonneel (CNRS Lyon)
Kristian Bredies (Univ. Graz)
Xavier Bresson (Nayang Technological Univ.)
Blanche Buet (Univ. Paris Sud)
Antonin Chambolle (CNRS and Polytechnique)
Caroline Chaux (CNRS and Aix-Marseille Univ.)
Emilie Chouzenoux (CentraleSupélec)
Camille Couprie (Facebook)
Charles Dossal (INSA Toulouse)
Vincent Duval (INRIA)
Albert Fannjiang (UC Davis)
Guy Gilboa (Technion)
Anders Hansen (Univ. Cambridge)
Michael Hintermuller (Humboldt-Universität)
Dirk Lorenz (Univ. Braunschweig)
Jean-Michel Morel (ENS Paris-Saclay)
Nicolas Papadakis (CNRS and Univ. de Bordeaux)
Fabien Pierre (Université Nancy)
Clarice Poon (Univ. Bath)
Martin Rumpf (Bonn)
Carola Schoenlieb (Cambridge)
Christoph Schnörr (Univ. Heidelberg)
Gabriele Steidl (Kaiserslautern)
Hugues Talbot (Centrale Paris)
Yves van Gennip (TU Delft)
Joachim Weickert (Univ. Saarland)
Rebecca Willett (Univ. Chicago)
Luca Zanni (Univ. Modena, Italy)

PROGRAM

Monday February 4th

10.30 am – 11.00 am	**Registration and welcome coffee – IHP ground floor**	
11.00 am – 11.45 am	**Carola Schoenlieb**	A geometric integration approach to non-smooth and non-convex optimisation.
11.45 am – 12.30 pm	**Antonin Chambolle**	Finite element discretizations of the total variation.
12.30 pm – 02.00 pm	**Lunch break**	
02.00 pm – 02.45 pm	**Joachim Weickert**	TBA.
02.45 pm – 03.30 pm	**Fabien Pierre**	Coupling variational method with CNN for image colorization.
03.30 pm – 04.00 pm	Coffee break	IHP ground floor
04.00 pm – 04.45 pm	**Michael Hintermuller**	TBA.
04.45 pm – 05.30 pm	**Gabriele Steidl**	Vector-valued optimal Lipschitz extensions on finite graphs.

Tuesday February 5th

09.30 am – 10.15 am	**Christoph Schnörr**	The Assignment Flow.
10.15 am – 10.45 am	Coffee break	IHP ground floor
10.45 am – 11.30 am	**Guy Gilboa**	Characterizing functionals and flows by nonlinear eigenvalue analysis.
11.30 am – 12.15 pm	**Nicolas Papadakis**	Covariant LEAst-square Re-fitting for Image Restoration.
12.15 pm – 02.00 pm	**Lunch break**	
02.00 pm – 02.45 pm	**Xavier Bresson**	Convolutional Neural Networks on Graphs.
02.45 pm – 03.30 pm	**Emilie Chouzenoux**	Deep Unfolding of a Proximal Interior Point Method for Image Restoration.
03.30 pm – 04.00 pm	Coffee break	IHP ground floor
04.00 pm – 04.45 pm	**Camille Couprie**	Image generative modeling for future prediction or inspirational purposes.
04.45 pm – 05.30 pm	**Rebecca Willett**	Learning to Solve Inverse Problems in Imaging.
06.30 pm – 10.00 pm	**Cocktail Reception**	**Sorbonne Université**
Registration starting at 06.00 pm		**Tower Zamansky – 24th floor**
		4 place Jussieu – 75005 Paris
		Subway line 7 – Station: Jussieu
		Note: Bring your ID card or Passport

Wednesday February 6th

09.30 am – 10.15 am	**Anders Hansen**	On computational barriers in mathematics of information and instabilities in deep learning for inverse problems.
10.15 am – 10.45 am	Coffee break	IHP ground floor
10.45 am – 11.30 am	**Vincent Duval**	An atomic norm perspective on total variation regularization in image processing.
11.30 am – 12.15 pm	**Clarice Poon**	On support localisation, the Fisher metric and optimal sampling in off-the-grid sparse regularisation.

12.15 pm – 02.30 pm Lunch break

02.30 pm – 03.15 pm	**Charles Dossal**	Exact rate of Nesterov Scheme.
03.15 pm – 04.00 pm	**Rémy Abergel**	The Shannon Total Variation.
04.00 pm – 04.30 pm	Coffee break	IHP ground floor
05.00 pm – 06.30 pm	**Jean-Michel Morel**	**Grand public en français – L'évolution de la pensée mathématique sur les images digitales, et ses implications pratiques et visibles dans nos photographies.**

Thursday February 7th

09.30 am – 10.15 am	**Blanche Buet**	A varifold approach to surface approximation and curvature estimation on point clouds.
10.15 am – 10.45 am	Coffee break	IHP ground floor
10.45 am – 11.30 am	**Kristian Bredies**	Infimal-convolution-type regularization for inverse problems in imaging.
11.30 am – 12.15 pm	**Caroline Chaux**	From the modelization of direct problems in image processing to the resolution of inverse problems.

12.15 pm – 02.00 pm Lunch break

02.00 pm – 02.45 pm	**Yves van Gennip**	Variational methods on graphs with applications in imaging and data classification.
02.45 pm – 03.30 pm	**Nicolas Bonneel**	Sliced Partial Optimal Transport.
03.30 pm – 04.00 pm	Coffee break	IHP ground floor
04.00 pm – 04.45 pm	**Martin Rumpf**	Metamorphosis on generalized image manifolds.
04.45 pm – 05.30 pm	**Dirk Lorenz**	Quadratically regularized optimal transport.

Friday February 8th

09.30 am – 10.15 am	**Albert Fannjiang**	Blind Ptychography: Theory and Algorithm.
10.15 am – 11.00 am	**Luca Zanni**	Spectral properties of steplength selections in gradient methods: from unconstrained to constrained optimization.
11.00 am – 11.30 am	Coffee break	IHP ground floor
11.30 am – 12.15 pm	**Jérome Bobin**	Sparse matrix factorization, and its applications in astrophysics.
12.15 pm – 01.00 pm	**Hugues Talbot**	Discrete multigrid convergent estimators of curvature.

Lunch break – End of the Conference

More information of the trimester «The Mathematics of Imaging»: **https://imaging-in-paris.github.io/semester2019/workshop1**

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