

# Jalal M. Fadili

## Professor Image and Signal Processing

### Junior member Institut Universitaire de France

#### PERSONAL INFORMATION

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Last name	FADILI
First name(s)	Mohamed JALAL
Date and place of birth	07/02/73 Casablanca (Morocco).
Family status	Married, 2 children.
Professional status	Full Professor
Institution	Ecole Nationale Supérieure d'Ingénieurs de Caen
Research unit	GREYC, UMR CNRS 6072
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#### EDUCATION

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Mar. 2010	Habilitation, University of Caen.
Dec. 1999	Ph.D. in image and signal processing, U. of Caen, With highest honors.
1996	M.Sc. in image and signal processing, U. of Caen, cum laude.
1996	Engineering degree ENSICAEN, ranked first, summa cum laude.

#### PROFESSIONAL APPOINTMENTS

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Since Oct 2011	Full Professor (image processing and computer science), ENSICAEN.
Sept 2001-2011	Associate Professor (signal and image processing), ENSICAEN.
2000-2001	ATER (signal and image processing), Caen Institute of Technology.
1999-2000	Research Assistant U. of Cambridge, (McDonnell Foundation fellowship).

#### HONORS AND DISTINCTIONS

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2013-2018	Junior member Institut Universitaire de France.
Since 2003	PEDR and PES (Ministry of Education premium for distinguished research activity).
1999-2000	McDonnell Pew Fellow.

#### TEACHING AND EDUCATIONAL ACTIVITIES

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Keywords : Computer science ; Image processing ; Signal processing ; Applied mathematics.  
Audience : Engineering schools, M.Sc., summer schools, national and international lecture series.

#### RESEARCH

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Keywords : Mathematical signal and image processing. Inverse problems and regularization theory. Optimization. Variational methods. Sparsity and beyond. Statistical theory for modeling and estimation. Reproducible research. My research interests are in mathematical image and signal processing with an emphasis on designing the models, the algorithms and their theoretical justification and guarantees. My work focuses on : (i) stochastic approaches for modelling and estimation of signals and images ; (ii) variational models and low complexity regularization ; (iii) non smooth optimization. In the last years, I worked intensively on a variety of inverse inverse arising in image processing such as restoration, super-resolution, inpainting, sparse source decomposition and separation, sparse recovery and compressed sensing. With my collaborators, we proposed several provably good statistical estimators for several restoration problems. We also proposed several novel and provably convergent algorithms to solve in a unified framework a wide range of difficult non smooth inverse problems. We also exhibited several theoretical guarantees of low-complexity regularization, from which one of the first identifiability and noise stability guarantees of  $\ell_1$  analysis-type prior. The pursuit of challenging applications (both in academia and industry) are also at the heart of my work through several collaborations.

#### COLLABORATIONS

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- National : CEA Saclay (J.-L. Starck), CEREMADE-Paris Dauphine (G. Peyré, V. Duval), IMB-Bordeaux (C. Dossal et C. Deledalle), CMLA-ENS Cachan (M. Nikolova), MAP5-Paris 5 (S. Durand), LMNO-Caen (C. Chesneau), Laboratoire Dieudonné-Nice (G. Aubert).
- International : Cambridge (E. Bullmore), Stanford (D. Donoho, S. Digel), MIT (L. Demanet), U. Oregon (D. Hammond), U. Colorado (S. Becker), QUT (C. Collet), Technion (M. Elad), Royal U. of London (F. Murtagh), EPFL (P. Vandergheynst, D. VandeVille), UCL (L. Jacques).

## SUPERVISED STUDENTS

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- 4 post-docs.
- 8 Ph.D. (5 defended).
- Several M.Sc. students.

## NATIONAL SCIENTIFIC COORDINATION AND ORGANIZATION

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- Since Jan. 2013 : Director of GdR MIA (Mathematics of Imaging and Applications).
- Jan. 2010-2013 : Scientific Vice-Director of GDR ISIS.
- National research evaluation (ANR, CNRS, AERES, SEE PhD award).
- Member of the organizing committees of two 2 national conferences.
- Co-organizer of the Summer School Peyresq 2011 (major french image and signal processing summer school).
- Since Jan. 2012 : Scientific leader of the department "Pattern Recognition" within the lab.
- Since Sept. 2002 : Scientific leader of a group within the lab.
- Since 2003 : Organizer and coordinator of the Image Processing seminar.
- Since 2003 : Elected member of the GREYC Governing Council.
- 2006-2012 : Elected member of the scientific board of ENSICAEN.
- Since 2004 : Member of several hiring committees in image/signal processing, computer science and applied mathematics at several universities.
- Reviewer and member of PhD committees.

## INTERNATIONAL SCIENTIFIC COORDINATION AND ORGANIZATION

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- Member of IFIP TC7 "System Modeling and Optimization", WG 7.4 "Inverse Problems and Imaging".
- International research evaluation (ERC, Romanian Innovation Council).
- Chair of the steering committee of the SPARS conference series.
- Vice-chair IFAC international workshop ALCOSP 2013.
- General chair of of the French-German Mathematical Image Analysis Conference 14.
- Member of scientific, program and/or steering committees of international conferences.
- Co-organizer of international workshops and conferences (e.g. Mathematical Image Analysis 09-12).
- Co-organizer of international lecture series.
- Co-organizer of special sessions and minisymposia at major international conferences in the field.
- Reviewer for major international conferences and journals of the field.
- Reviewer and member of PhD committees at european universities (e.g. EPFL).
- 2012 : Member of the hiring committee dept. mathematics and computer science, Saarland U., Germany.

## EDITORIAL SERVICES

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- Associate Editor of SIAM Journal on Imaging Science.
- Guest Editor of special issues in international journals (IEEE JSTSP, J. Samp. Th. Appl., JMIV).
- Associate Editor of Image Processing Online ([www.ipol.im](http://www.ipol.im)).

## INVITED AND PLENARY TALKS

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- Since 2003 : 36 invited or plenary talks in top international conferences of the field, and in national and international summer schools, average of 3/year.

## VISITING POSITIONS

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July-Aug. 2005	Queensland University of Technology, Brisbane, Australia.
Apr.-May 2005	Stanford University, Dept. of Statistics, CA, USA.
Apr. 2006	EPFL, Biomedical Imaging Group, Lausanne, Switzerland.
Jul. 2008	Stanford University, SLAC, CA, USA.
Sept. 2008	EPFL, LTSI, Lausanne, Switzerland.
Apr. 2009	CalTech, ACM dept., CA, USA.
Nov. 2010	MIT, Dept. of mathematics, Cambridge, USA.
June 2011	EPFL, LTSI, Lausanne, Suisse.
Mai-June 2013	Labex CIMI, Toulouse, France.

## FUNDING AND CONTRACTS

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- Regional (1) 2001-2003 : co-leader with Philips Semiconductors.
- National (6) :  
2002-2005 : Co-PI of a project CNRS PICTI SDV/STIC.

2007-2008 : Co-PI of a junior researcher project funded by GdR ISIS.  
 2009-2012 : Co-PI ANR NatImages (coordinator Paris-Dauphine).  
 2010-2012 : Member ANR Carte (coordinator Sagem).  
 2012-2014 : Member project MAORI "Optimization in image processing" (program PGMO).  
 2014-2019 : Member ANR GRAPHSIP (coordinator Caen).

- European and international (3) :  
 2003-2008 : Co-PI international project Humain Brain Project (NIH) (coordinator Cambridge).  
 2009-2014 : Co-PI workpackage ERC advanced grant SparseAstro (PI Jean-Luc Starck).  
 2011-2016 : Co-PI workpackage ERC starting grant SIGMA-Vision (PI Gabriel Peyré).
- Contracts with private companies (4) : 3 Institut Français du Pétrole, 1 Cifre with Sagem DS.
- Software dissemination and reproducible research (<https://fadili.users.greyc.fr/software.html>).

## PUBLICATIONS

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Type	Number	
Book	1	
Book chapters	6	
Peer reviewed international journals	64	
Peer reviewed national journals	2	
Peer reviewed international conferences	84	
Peer reviewed national conferences	16	
Image and Signal Processing	Math. and Stat.	Applications
50%	25%	25%