
CURRICULUM VITAE

Gabriele Facciolo

Short Bio

Gabriele Facciolo received his B.Sc. and M.Sc. from Universidad de la Republica del Uruguay, and his Ph.D. from the DTIC at Universitat Pompeu Fabra (Barcelona, Spain) under the supervision of Vicent Caselles. He is currently at the CMLA, ENS Paris-Saclay working within Jean-Michel Morel's group. The algorithms for 3D reconstruction and the satellite stereo pipeline (S2P) he has developed at the CMLA has been adopted as the CNES's official pipeline, and has won the 2016 IARPA 3D Stereo Mapping Challenge. The denoising algorithms he has developed are currently beating the state-of-the-art. He has been teaching mathematics and image processing for over 10 years, and has co-supervised three Ph.D theses. G. Facciolo is one of the founding Editors of IPOL (www.ipol.im), the first journal publishing articles associated to online executable algorithms.

Summary

Image Science Researcher at DxO Labs

Associate Member at CMLA, ENS Paris-Saclay

Mathematics applied to image processing and computer vision.

Doctor from Universitat Pompeu Fabra, Barcelona (2011)

- **Advisor:** Vicent Caselles
- **Examining board:** Jean-Michel Morel (**chair**), José Mazón Ruiz, and Andrés Almansa

Habilitation à diriger des recherches (HDR) from ENS Paris-Saclay (2016)

- **Advisor:** Jean-Michel Morel
- **Examining board:** Mila Nikolova (**chair**), Julie Delon, Laure Blanc-Réraud, Luis Alvarez, Pascal Monasse, Andrés Almansa, and Guillermo Sapiro

Qualifications *Professeur des universités*:

Section **26** - Mathématiques appliquées et applications des mathématiques (17126241750)

Research subjects: Stereovision and optical flow estimation; 3D modeling from satellite images; Image and video restoration; Patch-based methods applied to inpainting and denoising; Variational modeling

Publications:

- **20** in international journals (2×IJCV, 3×MMS, 8×IPOL, 4×SIIMS, M3AS, JPCS, OSA)
- **20** in peer reviewed conferences (CVPRW, 6×ICIP, 2×EMMCVPR, 2×BMVC, VISAPP, ISPRS Annals, IGARSS, 2×CIARP, GRETSI, NCIMP, ISPA, CCIS)
- **1** patent

Supervised PhDs:

- Carlo de Franchis. *Earth Observation and Stereo Vision*.
ENS-Cachan, Oct. 5, 2015. Co-supervisor (50-50) with Jean-Michel Morel.
Currently: Postdoc at ENS Paris-Saclay.
- Nicola Pierazzo. *Advances in image denoising*.
ENS-Cachan, Sep. 2016. Co-supervisor (50-50) with Jean-Michel Morel.
Currently: Research Engineer at Google.
- Martin Rais. *Fast and Accurate Image Registration Applications to On-board Satellite Imaging*.
ENS-Cachan, Dec. 2016. Co-supervisor (25%) with Jean-Michel Morel and Bartolomeu Coll-Vicens.
Currently: Postdoc at ENS Paris-Saclay.

Teaching:

- Lecturer at **École des Ponts ParisTech (101h in total)**
- Lecturer and internship mentoring at **ENS-Cachan (148h in total)**
- Lecturer and Teaching assistant at **Universitat Pompeu Fabra, Barcelona (368h in total)**
- Teaching assistant at **UdelaR, Uruguay, Faculty of Engineering, Uruguay (10h in total)**

Personal Information and Addresses

Gabriele Facciolo

Birth date: september 18th, 1978

Citizenship: Italian

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Page Web : <http://dev.ipol.im/~facciolo/>

Professional address:

Laboratoire CMLA

Ecole Normale Supérieure Paris-Saclay

61 Avenue du Président Wilson

94235 Cachan Cedex

01 47 40 59 07

Current Situation

Since April 2016

Laboratory

Mentor

Subject

Keywords

Post-Doctoral Research Associate

CMLA, École Normale Supérieure Paris-Saclay

Prof. Jean-Michel Morel

Mathematics applied to image processing and computer vision

stereovision, satellite imaging, denoising, optic flow, variational methods

Education

2016

Habilitation à diriger des recherches, ENS Paris-Saclay (June 20, 2016)

Discipline: mathematics

Title: Geometry-aware patch modelling for 3D reconstruction and image denoising

Advisor: Jean-Michel Morel

Examining board: Mila Nikolova (chair), Julie Delon (rapporteur), Laure Blanc-Réraud (rapporteur), Luis Alvarez (rapporteur), Pascal Monasse, Andrés Almansa, Guillermo Sapiro

2005-2011

PhD in Information and Communication Technologies (*Summa cum Laude*),
Universitat Pompeu Fabra (UPF), Barcelona (March 3, 2011)

The PhD candidates at UPF must teach ~70 h/year, thus are also teaching assistants.

Title: Irregularly sampled image restoration and interpolation

Advisor: Prof. Vicent Caselles

Examining board: Jean-Michel Morel (chair, rapporteur), José Mazón Ruiz (rapporteur),
Andrés Almansa (rapporteur)

2004-2005

Master in Computer Sciences,

FING, Universidad de la Republica Oriental del Uruguay

2001-2005

Worked as a full-time engineer at

ANTEL (Telecommunications company), Montevideo, Uruguay

1996-2001

Degree in Computer Engineering (eq. BAC+5),

FING, Universidad de la Republica Oriental del Uruguay

Specific skills

- **Image processing and computer vision:** data structures, stereo-vision, optical flow, 3D reconstruction, satellite imaging, variational methods, patch-based inpainting and denoising, image restoration and interpolation, video editing
- **Coding/Unix:** C/C++, Python, Matlab/Octave, Bash, L^AT_EX, XHTML, CSS, JavaScript, OpenGL, git, Novell Certified Linux Administrator (ID: 10112069)
- **Languages:** Italian (native), Spanish (native), English (fluent), and French (fluent)

Professional experience

- since 2016 **Associate Member at CMLA, ENS Paris-Saclay** (apr 2016 – present)
Topic: Mathematics applied to image processing and computer vision.
Collaborator: Prof. Jean-Michel Morel
- since 2016 **Image Science Researcher at DxO Labs** (apr 2016 – present)
Topic: Oversee the work of three to four small teams of engineers in the image processing and image quality evaluation departments. Advising on the design and specification of new algorithms and protocols.
Collaborators: Frédéric Guichard and Wolf Hauser
- 2015 **Consultant for *Digital Sense Technologies*** (nov 2015–jan 2016)
Topic: Analysis of physical model approximations of satellite pushbroom sensors.
Collaborator: Javier Preciozzi
- 2014 **Consultant for *CS Systèmes d'information*** (sep–dec 2014)
Topic: Etude métiers Benchmark MEDICIS, Logiciel CNES de Traitement d'Images.
Supervisor: Myriam Cournet
- 2014-2016 **Post-doc at IMAGINE/LIGM, École des Ponts ParisTech** (jul 2014 – apr 2016)
Topic: High precision stereovision using noiseless images.
Collaborators: Prof. Pascal Monasse and Prof. Jean-Michel Morel
- 2013 **Invited at the TAMI Lab of Universitat Illes Balears, Palma de Mallorca** (sep 2013 – nov 2013)
Topic: Reliable stereo matching.
Collaborator: Antoni Buades
- 2011-2014 **Post-doc at CMLA, ENS-Cachan** (apr 2011 – jul 2014)
Topic: Mathematics applied to image processing and computer vision. Design and development of the state-of-the-art and online publication.
Collaborator: Prof. Jean-Michel Morel
- 2010 **Research staff at BarcelonaMedia** (sep–dec 2010)
Topic: Temporally consistent video inpainting.
Supervisor: Monica Caballero
- 2005-2011 **PhD in Information and Communication Technologies, Universitat Pompeu Fabra, Spain** (sep 2005 – mar 2011)
Title: Irregularly sampled image restoration and interpolation.
Advisor: Prof. Vicent Caselles
- 2001-2005 **Worked at ANTEL (Telecommunications company), Uruguay**
Role: Unix administrator and system integration engineer.
- 1999-2005 **Part-time jobs at Universidad de la Republica Oriental del Uruguay**
Roles: Sysadmin and system integration engineer.

Thesis supervision

- **PhD thesis co-advising of Carlo de Franchis (ENS Cachan, 2012–2015)**

Co-advisor (50-50): Jean-Michel Morel

Description: This thesis deals with the problem of computing accurate digital elevation models of the Earth's surface from optical images taken by pushbroom observation satellites. This work stems from a long time collaboration with the CNES. The main contribution of this thesis is s2p: a fully automatic and modular stereo pipeline to produce digital elevation models from satellite images. The s2p pipeline can be tested on-line on a large database of satellite images (<http://dev.ipol.im/~carlo/s2p/>).

Personal commitment: I coordinate the work, serve as permanent interlocutor to evacuate doubts, and support in the preparation of the scientific publications. I also provide support and formation with the technical development.

Scientific production: Four peer reviewed international conferences, two national journals, one international journal, and other two international journal papers in preparation.

- C. de Franchis, E. Meinhardt, D. Greslou, and G. Facciolo. Attitude Refinement for Orbiting Pushbroom Cameras: a Simple Polynomial Fitting Method. *Image Processing On Line*, 2015.
- G. Facciolo, C. de Franchis, and E. Meinhardt MGM: A Significantly More Global Matching for Stereovision. *BMVC*, 2015. (ORAL PRESENTATION)
- C. de Franchis, E. Meinhardt, Michel J., J.-M. Morel, and G. Facciolo On stereo-rectification of pushbroom images. *ICIP*, 2014.
- C. de Franchis, E. Meinhardt, Michel J., J.-M. Morel, and G. Facciolo S2P: An automatic and modular stereo pipeline for pushbroom images. *ISPRS Annals*, 2014. (ORAL PRESENTATION)
- C. de Franchis, E. Meinhardt, Michel J., J.-M. Morel, and G. Facciolo Automatic sensor orientation refinement for Pléiades stereo images. *IGARSS*, 2014. (ORAL PRESENTATION)
- Chen A., Darbon J., C. de Franchis, G. Facciolo, E. Meinhardt, Michel J., and J.-M. Morel Numerical simulation of landscape evolution and water run-off on digital elevation models obtained from pléiades. *Revue Française de Photogrammétrie et de Télédétection*, 2014.
- C. de Franchis, E. Meinhardt, Michel J., J.-M. Morel, and G. Facciolo Automatic digital surface model generation from Pléiades stereo images. *Revue Française de Photogrammétrie et de Télédétection, special issue Pléiades Days & ORFEO*, 2014.

- **PhD thesis co-advising of Nicola Pierazzo (ENS Cachan, 2013–2016)**

Co-advisor (50-50): Jean-Michel Morel

Description: This thesis aims at improving the quality of state-of-the-art denoising algorithms. These objectives are in line with a collaboration with DxO. One of the contributions of this thesis is DA3D (<http://dev.ipol.im/~pierazzo/da3d/>), a fast last-step denoising method that improves the visual quality and PSNR of many state-of-the-art algorithms such as NL-Bayes. Current research is focused on further improving the computational efficiency and quality of DA3D and NL-Bayes.

Personal commitment: I participate in the coordination, propose new approaches, and support in the preparation of the scientific publications. I also provide support with the technical development.

Scientific production: Three peer reviewed international conferences and three international journal papers.

- G. Facciolo, N. Pierazzo, and J.-M. Morel. Conservative Scale Recomposition for Multiscale Denoising (The Devil is in the High Frequency Detail). *SIIMS* 2017.
- N. Pierazzo, J.-M. Morel, and G. Facciolo Data Adaptive Dual Domain Denoising: a Method to Boost State of the Art Denoising Algorithms. *IPOLE* 2017.
- N. Pierazzo, J.-M. Morel, and G. Facciolo Multi-Scale DCT Denoising. *IPOLE* 2017.
- N. Pierazzo, M. Rais, J.-M. Morel, and G. Facciolo DA3D: Fast and Data Adaptive Dual Domain Denoising. *ICIP* 2015. (ORAL PRESENTATION)
- N. Pierazzo, J.-M. Morel and G. Facciolo Optimizing the Data Adaptive Dual Domain Denoising Algorithm. *CIARP* 2015. (ORAL PRESENTATION)
- N. Pierazzo, M. Lebrun, M. Rais, J.-M. Morel, and G. Facciolo Non-local Dual Image Denoising. *ICIP* 2014. (ORAL PRESENTATION) **Top 10% Paper Award**

- **PhD thesis co-advising of Martin Rais (ENS Cachan, 2013–2016)**

Co-advisor (25%) with Jean-Michel Morel and Bartomeu Coll-Vicens

Description: This thesis studies the problem of fast and accurate image registration for remote sensing applications. It starts with an extensive review of sub-pixel shift estimation methods. The first contribution, which stems from the review, is the identification of a classical shift estimation method based on image gradients, previously ignored by the remote sensing community. This method is proved to be extremely precise and cheap if carefully refined, and was later applied to measure the wavefront aberrations. The second major contribution is related to the RANSAC algorithm. The proposed variant aggregates the minimal samples generated during the random sampling, instead of keeping just the best one, which permit to improve on state-of-the-art methods.

Personal commitment: I served as permanent interlocutor to evacuate doubts, and support in the preparation of the scientific publications. I also provided support and formation with the technical development.

Scientific production: Three peer reviewed international conferences, two international journals, another submitted, and one in preparation.

- M. Rais, G. Facciolo, E. Meinhardt-Llopis, J.-M. Morel, A. Buades, and B. Coll-Vicens. Accurate Motion Estimation through Random Sample Aggregation, Submitted, 2016.
- M. Rais, J.-M. Morel, C. Thiebaut, J.-M. Delvit, and G. Facciolo. Improving wavefront sensing with a Shack-Hartmann device, *OSA Applied Optics*, 2016.
- M. Rais, J.-M. Morel, C. Thiebaut, J.-M. Delvit, and G. Facciolo. Improving the accuracy of a Shack-Hartmann wavefront sensor on extended scenes, IOP Publishing, Journal of Physics: Conference Series NCIMP, 2016. (ORAL PRESENTATION)
- M. Rais, J.-M., Morel, and G. Facciolo. Iterative Gradient-Based Shift Estimation: To Multiscale or Not to Multiscale?, CIARP 2015.

Awards

- **Winner of the IARPA Multi-View Stereo 3D Mapping Challenge.**

C. de Franchis, E. Meinhardt, and G. Facciolo. Presented at the *IARPA's Multi View Stereo 3D mapping Challenge Workshop*, Washington DC, Nov 30, 2016.

- **Top 10% Paper Award** for the conference paper:

N. Pierazzo, M. Lebrun, M. Rais, J.-M. Morel, and G. Facciolo. Non-local Dual Image Denoising. Presented in the *21th IEEE International Conference on Image Processing (ICIP)*, 2014.

Projects

- **Remote sensing with CNES.** I'm involved in several research projects financed by CNES. These projects can be organized in two groups. The first one is concerned with all the mathematical and geometrical issues related to a 3D reconstruction pipeline for satellite images including image quality. The second one aims at developing the theory and practice of reliable and efficient stereo matching algorithms.

Since 2012, I'm also involved in the elaboration of the project proposals for the CNES R&T (Research and Technology) calls. So far, five of these research projects have been accepted.

- G. Facciolo, C. de Franchis, E. Meinhardt, and J.-M. Morel Reconstruction du relief et localisation absolue a partir de collections d'images. *Appel à idées R&T CNES 2017*, September 2016.
- G. Facciolo, A. Buades, and J.-M. Morel Stéréo satellitaire multi-vue par méthode locale et globale rapide. *Appel à idées R&T CNES 2016*, September 2015.
- G. Facciolo and J.-M. Morel Modèles numériques d'élévation denses: conception et évaluation de stratégies d'interpolation pour des zones urbaines et rurales. *Appel à idées R&T CNES 2015*, September 2014.

- A. Buades, G. Facciolo, and J.-M. Morel Débruiteur avant de comprimer? L’impact du débruitage sur la transmissibilité et la qualité des images d’observation de la Terre (UIB). *Appel à idées R&T CNES 2013*, September 2012.
- G. Facciolo and J.-M. Morel Exploitation de données Pléiades multi-vues synchrones: adaptation des algorithmes stéréoscopiques et synthèse de nuages 3D (CMLA). *Appel à idées R&T CNES 2013*, September 2012.

- **Image denoising with DxO.** This research project, financed by DxO aims at inventing and industrializing the state-of-the-art in denoising algorithms.
- **Participation in the research project with Schlumberger: *Traitement des données images acquises dans les puits de forage par des méthodes de traitement d’images et d’apprentissage*.** A two year research project, financed by Schlumberger, that started in May 2015. I participate in the realization of the state-of-the-art and research new approaches for the automatic interpretation of borehole images.
- **Participation in project as Barcelona Media staff (sep–dec 2010).** Integrated Project - ”2020 3D Media: Spatial Sound and Vision”, Financed by EC, 7mo Programa Marco, ICT - call 1. Working on temporally consistent video editing and inpainting.
- **IPOL.** The IPOL journal is an initiative to establish a clear and reproducible state-of-the-art in the domain of image processing. An IPOL article must include an algorithmic description of the proposed method, its code, and an on-line demo. I’m involved with the IPOL journal since its beginnings (in 2011) at several levels: as technical aid for the on-line demo infrastructure, as a spokesperson to publicize the project, as **member of the steering committee**, as **editor**, and as author.

Teaching activities

Center	Subject	Responsible	Type	Hours ¹
UdelaR	Introduction to Fourier Analysis	A. Almansa	TP	10h in 2005
UPF	Linear Algebra and Discrete Math. I	C. Ballester	TD/TP	116h in 2005–2006
UPF	Linear Algebra and Discrete Math. II	C. Ballester	TD/TP	54h in 2007
UPF	Mathematical Analysis	C. Ballester	TD/TP	30h in 2008
UPF	Signal Processing II: Image and Video	V. Caselles	C/TD/TP	122h in 2008–2010
UPF	Linear Algebra and Discrete Math. I	C. Ballester	TD/TP	46h in 2009–2010
Cachan	Hilbert and Fourier Analysis (L3)	GF	C/TP	58h in 2011–2013
Cachan	Research Internship (seamless cloning)	F. de Vuyst	Mentoring	15h in 2013
Cachan	Research Internship (scattering transf.)	GF	Mentoring	20h in 2014
Cachan	Research internship (IPOL+Matlab)	GF	Mentoring	15h in 2014
Cachan	Research internship (TGV)	GF	Mentoring	20h in 2016
Cachan	Research internship (Graph-Cuts)	GF	Mentoring	20h in 2016
Cachan	Research internship (epi plane stereo)	GF	Mentoring	20h in 2017
ENPC	Algorithms and Programming (L3)	P. Monasse	C/TP	101h in 2014-2016

Academic activities and Collective responsibilities

- Member of PhD examining boards
 - Pedro Henriquez - Universidad de las Palmas de Gran Canaria, 28 jun 2013
 - Miguel Colom Barco - Universitat de les Illes Balears, 25 jun 2014
 - Carlo de Franchis - École Normale Supérieure de Cachan, 5 oct 2015
 - Nicola Pierazzo - École Normale Supérieure Paris-Saclay, 20 sep 2016
 - Roberto Pablo Pérez Palomares - Universitat Pompeu Fabra, 6 abr 2017
- PhD reporter

¹Note that an year denotes an academic year. For example 2008 corresponds to the academic year 2008/2009, while year spans such as 2009–2010 corresponds to two academic years: 2009/2010 and 2010/2011.

- Nelson Monzón López - Universidad de las Palmas de Gran Canaria, 18 abr 2017
- Mathias Paget - Université Paris Est , 13 dic 2017
- Member of PhD mid-term examining boards
 - Thuc Trinh Le - Telecom ParisTech, 4 jul 2017
 - Xiaoyi Yang - Telecom ParisTech, 13 sep 2017
- Reviewer for international journals and conferences
 - *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*
 - *IEEE Transactions on Image Processing*
 - *SIAM Journal on Imaging Sciences*
 - *Journal of Mathematical Imaging and Vision*
 - *Journal of Visual Communication and Image Representation*
 - *Conferencia Latinoamericana en Informática (Program Committee)* , 2013
 - *20th Iberoamerican Congress on Pattern Recognition (Program Committee)* , 2015
 - *Image Processing On Line*
- Member of the editorial board and a founding member of the Journal: Image Processing On Line (IPOL)
- Member of IPOL system administration and technical support teams (2011–present)
- Co-organizer (with A. Buades) of the mini-symposium “High Precision Stereo Vision” in SIAM Conference on Imaging Sciences 2014, Hong Kong Baptist University, may 2014
- Regular presenter at the CMLA image processing group seminars (2011–present)
- External evaluator for the program “Proyectos de I+D UTE-UdelaR 2017” of the *Comisión Sectorial de Investigación Científica (CSIC)*, Universidad de la República (Uruguay), aug 2017.

Complete list of publications

I’m dividing the list of my scientific communications in four groups:

- International journals
- Peer reviewed international conferences (with proceedings)
- Patents
- Other publications
- Relevant invited talks to seminars, conferences, and workshops

Monographs

- [1] G. Facciolo. Geometry-aware patch modelling for 3D reconstruction and image denoising. *Mémoire d’Habilitation à Diriger des Recherches (HDR)*. École normale supérieure Paris-Saclay, June 20, 2016.
- [2] G. Facciolo. Irregularly sampled image resortation and interpolation. *PhD. Thesis. Universitat Pompeu Fabra, Departament de Tecnologies de la Informació i les Comunicacions*, March 3, 2011.

International journals

- [3] G. Facciolo, N. Pierazzo, and J.-M. Morel. Conservative Scale Recomposition for Multiscale Denoising (The Devil is in the High Frequency Detail). *SIAM Journal on Imaging Sciences*, 2017.

- [4] J. Anger, G. Facciolo, and M. Delbracio. Recovering the blur kernel from natural image statistics: An analysis of the Goldstein-Fattal method. *IPOL*, 2017.
- [5] N. Pierazzo, J.-M. Morel, and G. Facciolo. Multi-Scale DCT Denoising. *IPOL*, 2017.
- [6] N. Pierazzo, J.-M. Morel, and G. Facciolo. Data Adaptive Dual Domain Denoising: a Method to Boost State of the Art Denoising Algorithms. *IPOL*, 2017.
- [7] M. Rais, J.-M. Morel, C. Thiebaut, J.-M. Delvit, and G. Facciolo. Improving wavefront sensing with a Shack-Hartmann device. *OSA Applied Optics*, [Impact Factor: 1.598], Vol. 55, Issue 28, pp. 7836-7846, 2016.
- [8] J. M Di Martino, G. Facciolo, and E. Meinhardt. Poisson Image Editing. *Image Processing On Line*, 6, pp. 300-325, 2016.
- [9] M. Rais, J.-M. Morel, C. Thiebaut, J.-M. Delvit, and G. Facciolo. Improving the accuracy of a Shack-Hartmann wavefront sensor on extended scenes. *IOP Publishing, Journal of Physics: Conference Series*, [Impact Factor: 0.45], Volume 756, Number 1, 2016.
- [10] C. de Franchis, E. Meinhardt, D. Greslou, and G. Facciolo. Attitude Refinement for Orbiting Push-broom Cameras: a Simple Polynomial Fitting Method. *Image Processing On Line*, 5, pp. 328-361, 2015.
- [11] V. Fedorov, G. Facciolo, and P. Arias. Variational Framework for Non-Local Inpainting. *Image Processing On Line*, 5, pp. 362-386, 2015.
- [12] V. Fedorov, P. Arias, R. Sadek, G. Facciolo, and C. Ballester. Linear Multiscale Analysis of Similarities between Images on Riemannian Manifolds: Practical Formula and Affine Covariant Metrics. *SIAM Journal on Imaging. Sciences*, [impact factor 2.27], 8(3), 2021-2069. 2015.
- [13] A. Buades and G. Facciolo. Reliable multi-scale and multi-window stereo matching.. *SIAM Journal on Imaging. Sciences*, [impact factor 2.27], 8(2), 888-915 2015.
- [14] C. Ballester, F. Calderero, V. Caselles, and G. Facciolo. Multiscale Analysis of Similarities between Images on Riemannian Manifolds. *Multiscale Modeling & Simulation, SIAM*, [impact factor 1.795], 12, 616-649, 2014.
- [15] G. Facciolo, N. Limare, and E. Meinhardt. Integral Images for Block Matching. *Image Processing On Line*, 4, 344-369, 2014.
- [16] R. Sadek, G. Facciolo, P. Arias, and V. Caselles. A variational model for Gradient-Based video editing. *International Journal of Computer Vision*, [impact factor 3.533], 103, 127-162, 2013.
- [17] J. Sánchez, E. Meinhardt, and G. Facciolo. TV-L1 optical flow estimation. *Image Processing On Line*, 3, 137-150, 2013.
- [18] P. Arias, V. Caselles, G. Facciolo, V. Lazcano, and R. Sadek. Nonlocal variational models for inpainting and interpolation. *Mathematical Models and Methods in Applied Sciences*, [impact factor 1.874], 22, 1230003, 2012.
- [19] P. Arias, V. Caselles, and G. Facciolo. Analysis of a Variational Framework for Exemplar-Based Image Inpainting. *Multiscale Modeling & Simulation, SIAM*, [impact factor 1.562], 10, 473-514, 2012.
- [20] P. Arias, G. Facciolo, V. Caselles, and G. Sapiro. A variational framework for Exemplar-Based image inpainting. *International Journal of Computer Vision*, [impact factor 3.741], 1-29, Jan. 2011.
- [21] V. Caselles, G. Facciolo, and E. Meinhardt. Anisotropic Cheeger Sets and Applications. *SIAM Journal on Imaging. Sciences*, [impact factor 4.656], 2, 1211-1254, 2009.
- [22] G. Facciolo, A. Almansa, J.-F. Aujol, and V. Caselles. Irregular to Regular Sampling, Denoising, and Deconvolution. *Multiscale Modeling & Simulation, SIAM*, [impact factor 2.198], 7, 1574-1608, 2009.

Peer reviewed international conferences

- [23] G. Facciolo, C. de Franchis, and E. Meinhardt. Automatic 3D Reconstruction from Multi-Date Satellite Images. *Earth Vision CVPR Workshop*, 2017.

- [24] B. Rajaei, R. Grompone, G. Facciolo, and J.-M. Morel. Straight Subjective Contour Detector. *IEEE International Symposium on Image and Signal Processing and Analysis (ISPA)*, 2017.
- [25] V. Fedorov, P. Arias, G. Facciolo, and C. Ballester. Exemplar-Based Image Inpainting Using an Affine Invariant Similarity Measure. *Computer Vision, Imaging and Computer Graphics Theory and Applications. VISIGRAPP 2016, Revised Selected Papers. Communications in Computer and Information Science, vol 693. Springer, Cham*, 2017.
- [26] M. Rais, J.-M. Morel, C. Thiebaut, J.-M. Delvit, and G. Facciolo. Improving the accuracy of a Shack-Hartmann wavefront sensor on extended scenes. *In 6th International Workshop on New Computational Methods for Inverse Problems (NCIMP)*, 2016. (ORAL PRESENTATION)
- [27] V. Fedorov, P. Arias, G. Facciolo, and C. Ballester. Affine Invariant Self-Similarity for Exemplar-Based Inpainting. *In International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISAPP)*, 2016. (ORAL PRESENTATION)
- [28] N. Pierazzo, J.-M. Morel, and G. Facciolo. Optimizing the Data Adaptive Dual Domain Denoising Algorithm. *In Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications (CIARP)*, Springer, 2015. (ORAL PRESENTATION)
- [29] M. Rais, J.-M. Morel, and G. Facciolo. Iterative Gradient-Based Shift Estimation: To Multiscale or Not to Multiscale?. *In Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications (CIARP)*, Springer, 2015.
- [30] G. Facciolo, C. de Franchis, and E. Meinhardt. MGM: A Significantly More Global Matching for Stereovision. *26th British Machine Vision Conference (BMVC)*, 2015. (ORAL PRESENTATION)
- [31] N. Pierazzo, M. Rais, J.-M. Morel, and G. Facciolo. DA3D: Fast and Data Adaptive Dual Domain Denoising. *22th IEEE International Conference on Image Processing (ICIP)*, 2015. (ORAL PRESENTATION)
- [32] N. Pierazzo, M. Lebrun, M. Rais, J.-M. Morel, and G. Facciolo. Non-local Dual Image Denoising. *21th IEEE International Conference on Image Processing (ICIP)*, 2014. (ORAL PRESENTATION)
Top 10% Paper Award.
- [33] C. de Franchis, E. Meinhardt, J. Michel, J.-M. Morel, and G. Facciolo. On stereo-rectification of pushbroom images. *21th IEEE International Conference on Image Processing (ICIP)*, 2014.
- [34] C. de Franchis, E. Meinhardt, J. Michel, J.-M. Morel, and G. Facciolo. S2P: An automatic and modular stereo pipeline for pushbroom images. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 2014. (ORAL PRESENTATION)
- [35] C. de Franchis, E. Meinhardt, J. Michel, J.-M. Morel, and G. Facciolo. Automatic sensor orientation refinement for Pléiades stereo images. *IGARSS*, 2014. (ORAL PRESENTATION)
- [36] V. Lazcano, P. Arias, G. Facciolo, and V. Caselles. A gradient based neighborhood filter for disparity interpolation. *19th IEEE International Conference on Image Processing (ICIP)*, 2012.
- [37] E. Meinhardt, O. D'Hondt, G. Facciolo, and V. Caselles. Relative depth from monocular optical flow. *18th IEEE International Conference on Image Processing (ICIP)*, 2011.
- [38] G. Facciolo, R. Sadek, A. Bugeau, and V. Caselles. Temporally consistent gradient domain video editing. *Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR)*, 2011. (ORAL PRESENTATION)
- [39] G. Facciolo, P. Arias, V. Caselles, and G. Sapiro. Exemplar-Based Interpolation of Sparsely Sampled Images. *Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR)*, 2009. (ORAL PRESENTATION)
- [40] G. Facciolo and V. Caselles. Geodesic neighborhoods for piecewise affine interpolation of sparse data. *16th IEEE International Conference on Image Processing (ICIP)*, 2009.
- [41] G. Facciolo, F. Lecumberry, A. Almansa, A. Pardo, V. Caselles, and B. Rougé. Constrained Anisotropic Diffusion and some Applications. *British Machine Vision Conference, Proceedings of (BMVC)*, 2006.

- [42] G. Facciolo, A. Almansa, and A. Pardo. Variational approach to interpolate and correct biases in stereo correlation. *20eme Colloque sur le traitement du signal et des images GRETSI*, 2005. (ORAL PRESENTATION)

Patents

- [43] J. Kherroubi, E. Meinhardt-Llopis, R. Grompone, J. Costes, G. Facciolo, J.-M. Morel. Automatic Dip Picking in Borehole Images. *EU patent application*, 16290116.9 - 1901, 2016.

Other publications

- [44] M. Renaudin, A.-C. Vlachomitrou, G. Facciolo, W. Hauser, C. Sommelet, C. Viard, F. Guichard. Towards a quantitative evaluation of multi-imaging systems. *IS&T International Symposium on Electronic Imaging (EI 2017)*, 2017.
- [45] J. Michel, C. de Franchis, E. Meinhardt-Llopis, J.M. Morel, G. Facciolo, and J.M. Delvit. S2P: un pipeline libre de restitution du relief par stéréoscopie pour l’imagerie satellite THR. *SFPT: Colloque Photogrammétrie Numérique et Perception 3D: les nouvelles conquêtes*, ENSG, Paris, 15-17 March, 2016. (POSTER)
- [46] J. Michel, C. de Franchis, E. Meinhardt, and G. Facciolo. S2P: a new open-source stereo pipeline for satellite images. *FOSS4G Europe 2015*, Como, Italy 2015. (ORAL PRESENTATION)
- [47] J. Michel, and G. Facciolo. ICE: lightweight, efficient rendering for remote sensing images. *FOSS4G Europe 2015*, Como, Italy 2015.
- [48] M. Colom, G. Facciolo, M. Lebrun, N. Pierazzo, M. Rais, Y.-Q. Wang, and J.-M. Morel. A mathematical perspective of image denoising. *Proceedings of the International Congress of Mathematicians (ICM)*, 2014.
- [49] E. Meinhardt and G. Facciolo. Riemannian Image Processing. *Curves and Surfaces*, Paris, 2014.
- [50] A. Chen, J. Darbon, C. de Franchis, G. Facciolo, E. Meinhardt, J. Michel, and J.-M. Morel. Numerical simulation of landscape evolution and water run-off on digital elevation models obtained from pléiades. *Revue Française de Photogrammétrie et de Télédétection*, 2014.
- [51] C. de Franchis, E. Meinhardt, J. Michel, J.-M. Morel, and G. Facciolo. Automatic digital surface model generation from Pléiades stereo images. *Revue Française de Photogrammétrie et de Télédétection, special issue Pléiades Days & ORFEO*, 2014.
- [52] M. Rodriguez, J. Preciozzi, G. Facciolo, and A. Almansa. Simulation and Real-Time Visualization of Changing Baseline in a Stereo Pair Visualization. *Imaging, and Image Processing VIIP*, 2008.
- [53] A. Almansa and G. Facciolo. Towards a more general psychophysic validation of the Helmholtz Principle” and “Variational approach to interpolate and correct biases in stereo correlation. *Poster at the symposium: Representation of reality by brain and machines, crossed views from neurosciences and computer vision*, Montevideo, Uruguay, November 2004.
- [54] T. Lorenzo and G. Facciolo. Una herramienta de análisis de estrategias de fútbol de robots middle league simurosot. *Workshop en inteligencia artificial aplicada a robotica movíl*, Universidad Nacional del Centro de la Provincia de Buenos Aires, June 2004.

Relevant participations to workshops, symposiums and seminars

- [55] 5/6/2018: SIAM Conference on Imaging Science (IS18): *MiniTutorial: Automated 3D reconstruction from satellite images*, University of Bologna, Bologna, Italy
- [56] 22/9/2017: Invited speaker at the Huawei Future ISP Technology Workshop, Nice
- [57] 22/6/2017: Invited speaker at the CNES CCT 3D Reconstruction Workshop, Toulouse
- [58] 6/12/2016: Meeting MISS: *How to win the IARPA Challenge*, CMLA

- [59] 17/11/2016: “Dagstuhl Seminar #16462: Inpainting-Based Image Compression”. *I POL: Image Processing On Line*, Schloss Dagstuhl - Leibniz-Zentrum für Informatik
- [60] 13/10/2016: “Séminaire Images Optimisation et Probabilités”. *MGM: A Significantly More Global Matching for Stereovision*, Institut de Mathématiques de Bordeaux, Bordeaux
- [61] 15/07/2015: Encounter on space imaging science - between Beijing Institute of Space Mechanics & Electricity (BISME), Research Center for Space Optical Engineering, Dept. of Astronautics, Harbin Institute of Technology and, CMLA ENS-Cachan with the participation of CNES. “A perspective on image denoising”, G. Facciolo, CMLA. (<https://goo.gl/7iWUHK>)
- [62] 05/03/2015: Séminaire de Mathématiques Appliquées au Traitement d’Images (SMATI Seminar), *Data Adaptive Dual Domain Denoising*, LTCI, Telecom ParisTech
- [63] 03/07/2014: Rencontre de Technologies Spatiales (RTS): “Extraction d’informations des images”: *Multi-Scale Multi-Window ’our last’ word on stereovision*, CNES, Toulouse
- [64] 03/06/2014: IMAGINE Seminar: *Satellite Stereo Pipeline s2p*, ENPC
- [65] 09/01/2014: DTIC Seminar: *Reproducible Research, I POL, and Satellite Stereo Image*, UPF, Barcelona
- [66] 04/10/2013: Technicolor Seminar: *Temporally consistent gradient based video editing*, Rennes, France
- [67] 22~27/07/2013: Fondation des Treilles seminar participation: *Acting the universality of image science / Reproducible Research in Signal, Image, and Geometric Processing*, Tourtour, France
- [68] 11/04/2013: Oxford Future of Science conference: Rigour and Openness in 21st Century Science: *I POL: Image Processing On Line; Beyond Traditional Articles*, Oxford, UK
- [69] 29/05/2012: Groupe de travail “Statistique et imagerie” CEREMADE: *Analysis of a variational framework for exemplar based image inpainting*, Université Paris-Dauphine
- [70] 20/05/2012: SIAM Conference on Imaging Science, in Mini-Symposium: “Recent Advances in Patch-based Image Processing”: *Analysis of a Variational Framework for Exemplar Based Image Inpainting*, Philadelphia, PA
- [71] 12/08/2011: Santaló’s Summer School on Mathematical Models in Image Processing and Computer Vision: *Temporally consistent gradient domain video editing*, UIMP, Santander, Spain
- [72] 30/01/2011: MFO Workshop “Trends in Mathematical Imaging and Surface Processing”: *A variational framework for exemplar-based image inpainting* (with P. Arias, V. Caselles, and G. Sapiro), Oberwolfach, Germany
- [73] 06/04/2010: IIE Seminar: *Geodesic Neighborhoods for piecewise affine interpolation of sparse data*, FING, Montevideo, Uruguay