

Curriculum Vitae

EDOARDO PROVENZI

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1 General information

1.1 Basics

- Born in Bergamo, Italy, in 1975
- Full Professor at IMB - Institut de Mathématiques de Bordeaux, France
- edoardo.provenzi@math.u-bordeaux.fr, <https://www.math.u-bordeaux.fr/~eprovenzi/>

1.2 Undergraduate, graduate and PhD studies

- 2001 - 2004:
 - PhD in Mathematics and applications at Università di Genova under the supervisor of Claudio Bartocci;
 - Title of the thesis: '*A mathematical overview on canonical and covariant loop quantum gravity*', successfully defended on May 3rd, 2004;
- 1994 - 2000:
 - Degree in Physics (equivalent to a MS) at Università Statale di Milano under the supervision of Maria Cristina Abbati, Alessandro Manià and Renzo Cirelli;
 - Final grade: summa cum laude (in Italian: 110/110 with honors);
 - Title of the thesis: '*On the Loop Transform in Abelian Gauge Theories*', successfully defended on July 10th, 2000;
 - Supervisors:
- 1989 - 1994: Secondary school: Institute C. Pesenti, studies in Electronics and Electrotechnics. Final grade: 60/60.

1.3 Qualifications

- Qualification to 'Professeur des universités' (Full Professor), Section 26 - 'Mathématiques appliquées et applications des mathématiques', Qualification number: 17126232975, February 8th, 2017;
- Habilitation à diriger des recherches (HDR), Université Paris Descartes, 14 Juin 2016. Jury: Julie Delon (president), Jean-Francois Aujol (Referee), Céline Loscos (Referee), Frederic Dufaux, Pascal Mamassian, Laurent Perrinet, Catalina Sbert;
- Habilitation for associate professor in Italian universities, Section ING-INF05 - 09/H1 - 'Sistemi di elaborazione delle informazioni', December 4th 2013;
- Qualification to 'Maître de Conférence' (equivalent to Associate Professor), Section 27 - 'Informatique', Qualification number: 13227232975, February 12th, 2013;
- Qualification to 'Maître de Conférence' (equivalent to Associate Professor), Section 26 - 'Mathématiques appliquées et applications des mathématiques', Qualification number: 13226232975, February 5th, 2013;
- Qualification to 'Maître de Conférence' (equivalent to Associate Professor), Section 61 - 'Génie informatique, automatique et traitement du signal', Qualification number: 13261232975, January 31st, 2013;
- Qualification (ANECA) to teach and perform research as Associate Professor and Assistant Professor in all universities of Spain, July 23th, 2012.

2 Short chronological bio

- I received the 'Laurea' (equivalent to a Master Degree) in Physics in 2000 from Università di Milano (Italy) and the PhD in Mathematics in 2004 from Università di Genova (grant given in associated with Politecnico di Torino - Italy), spending the academic year 2002-2003 in the University of California Riverside (USA) performing research under the supervision of Prof. John Baez. Both the master and the PhD thesis have been devoted to the study of Quantum Gravity;
- After the PhD I joined the computer vision group of the Università di Milano (Italy) with a four-years Post-Doc position (2004, November 1st - 2008, October 31th) to study the problem of color perception and its representation in digital images, in particular the Retinex model;
- In 2008 I received the five-years 'Ramón y Cajal' grant from the Spanish ministry of education, and I performed research in the group of Prof. Vicent Caselles of the University Pompeu Fabra of Barcelona, Spain (2008, December 1st - 2013, March 31th);
- In 2012 I received the international award for "*the most outstanding paper on mathematical and computational aspects of imaging, broadly interpreted*", by the SIAM (Society of Industrial and Applied Mathematics) Group on Imaging Science (SIAG/IS);
- I have been Post-Doc researcher at Telecom-ParisTech, Paris, France, during the period April 2013-August 2014. More specifically 2013, April 1st - 2014, March 31st: LTCI group, 2014, April 1st - 2014, August 31st: Multimedia group;
- I joined Université Paris Descartes, France, as Associate Professor on September 1st 2014;
- I joined Université de Bordeaux, France, as Full Professor on September 1st 2017. There is where I teach mathematics and applications and I perform a multidisciplinary research on mathematical models of biological vision with applications to images processing and computer vision, more specifically:
 - Differential geometry of the space of perceived colors;
 - Re-foundation of colorimetry;
 - Computational models of perceptual and cognitive phenomena (e.g chromatic and achromatic induction);
 - Variational models of perceptually-inspired color and contrast enhancement;
 - Statistics of natural images in color, with particular regard to scale laws and color opponency;
 - HDR imaging: generation and tone mapping;
 - Histogram fusion;
 - Computer vision applications of wavelet theory;
 - Applications of color science to art and restoration.

I consider teaching and, in general, scientific dissemination, as important as research.

2.1 Speaking in tongues

- *English*: Full professional proficiency;
- *French*: Full professional proficiency;
- *Italian*: Mother tongue;
- *Spanish*: Full professional proficiency.

3 Research

3.1 Publications

The list of publications is subdivided in three items:

- Scientific peer-reviewed journals;
- Books and book chapters;
- Conference proceedings.

3.1.1 Scientific peer-reviewed journals

27. M. Berthier, V. Garcin, N. Prencipe, E. Provenzi: '*The relativity of color perception*'. Submitted in April 2020 to SIAM SIAGA, Applied Algebra and Geometry. Preprint available online at <https://hal.archives-ouvertes.fr/hal-02546380/document>
26. E. Provenzi: '*On the issue of linearity in chromatic induction by a uniform background*'. Submitted in March 2020 to Coloration Technology;
25. M. Berthier, E. Provenzi: '*From Riemannian trichromacy to quantum color opponency via hyperbolicity*'. Submitted in December 2019 to Journal of Mathematical Imaging and Vision;
24. N. Prencipe, V. Garcin, E. Provenzi: '*Origins of hyperbolicity in color perception*'. J. Imaging, special issue on Mathematical Models of Visual Perception and Biology with Applications to Images Processing and Computer Vision, vol 6, 42, 1-19, June 2020. doi:10.3390/jimaging6060042
23. E. Provenzi: '*Geometry of color perception. Part 1: Structures and metrics of a homogeneous color space*', Journal of Mathematical Neuroscience, special issue on Color representation and cortical-inspired image processing, vol 10, 1-19, May 2020;
22. E. Provenzi: '*Images : des applications inattendues*', Revue Tangente, 48-49, 2020;
21. Y. Jang, J. Bigot, E. Provenzi: '*Commutativity of chromatic covariance matrices in natural image statistics*', Mathematics in Engineering, vol. 2(2), 313-339, December 2019;
20. M. Berthier, E. Provenzi (the alphabetical order was chosen): '*When Geometry Meets Psycho-Physics and Quantum Mechanics: Modern Perspectives on the Space of Perceived Colors*'. In: Nielsen F., Barbaresco F. (eds) Geometric Science of Information. GSI 2019. Lecture Notes in Computer Science, vol 11712, 621-630, Springer Nature Switzerland AG 2019;
19. E. Provenzi: '*Formalizations of the retinex model and its variants with variational principles and partial differential equation*'. Journal of electronic imaging, vol. 27, 011003, 2017;
18. E. Provenzi: '*Color Space Axioms and Fiber Bundles*', Sensors & Transducers, Vol. 215, Issue 8, 43-46, August 2017;
17. G. Gronchi, E. Provenzi (the alphabetical order was chosen): '*A variational model for context-driven effects in perception and cognition*', Journal of Mathematical Psychology vol. 77, 124-141, April 2017;
16. J. Chauvin, E. Provenzi (the alphabetical order was chosen): '*SLMRACE: A noise-free new RACE implementation with reduced computational time*', J. Electron. Imaging vol. 26(3), 031202, 2017;
15. E. Provenzi: '*A differential geometry model for the perceived colors space*', International Journal of Geometric Methods in Modern Physics, vol. 13(8), 1630008, 1-8, September 2016;

14. E. Provenzi, J. Delon, B. Mazin, Y. Gousseau: '*On the Relationship Between Second Order Stationarity and Spatiochromatic Covariance Properties of Natural RGB Images*', Vision Research, special issue 'Vision and the Statistics of the Natural Environment', vol. 120, 22-38, March 2016;
13. S. Ferradans, R. Palma-Amestoy, E. Provenzi: '*An algorithmic analysis of variational models for perceptual local contrast enhancement*', Image Processing On Line (IPOL), 5, 219-233, July 2015;
12. E. Provenzi, V. Caselles: '*A Wavelet Perspective on Variational Perceptually-Inspired Color Enhancement*', International Journal of Computer Vision (IJCV), vol. 106(2), 153-171, January 2014;
11. E. Provenzi: '*Boosting the Stability of Wavelet-Based Contrast Enhancement of Color Images Through Gamma Transformations*', Journal of Modern Optics, special issue 'Photometry, Colorimetry and Radiometry: Issues and Application', vol. 60(4), 1145-1150, December 2013;
10. S. Ferradans, M. Bertalmío, E. Provenzi, V. Caselles: '*An analysis of visual adaptation and contrast perception for tone mapping*', IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 33(10), 2002-2012, October 2011;
9. N. Papadakis, E. Provenzi, V. Caselles: '*A Variational Model for Histogram Transfer of Color Images*', IEEE Transactions on Image Processing (TIP), 20(6), 1682-1695, May 2011;
8. L. Zappella, X. Lladò, E. Provenzi, J. Salvi: '*Enhanced Local Subspace Affinity for Feature-Based Motion Segmentation*', Pattern Recognition (PR), 44 (2), 454-470, February 2011;
7. M. Bertalmío, V. Caselles, E. Provenzi (the alphabetical order was chosen): '*Issues about Retinex Theory and Contrast Enhancement*', International Journal of Computer Vision (IJCV), 83, 101-119, March 2009;
6. R. Palma-Amestoy, E. Provenzi, M. Bertalmío, V. Caselles: '*A perceptually inspired variational framework for color enhancement*', IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 31 (3), 458-474, March 2009. *Award for the most outstanding paper on mathematical and computational aspects of imaging, broadly interpreted*, by the SIAM (Society of Industrial and Applied Mathematics) Group on Imaging Science (SIAG/IS);
5. E. Provenzi, C. Gatta, M. Fierro, A. Rizzi: '*A Spatially Variant White Patch and Gray World Method for Color Image Enhancement Driven by Local Contrast*', IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 30 (10), 1757-1770, October 2008;
4. M. Bertalmío, V. Caselles, E. Provenzi, A. Rizzi (the alphabetical order was chosen): '*Perceptual Color Correction Through Variational Techniques*', IEEE Transactions on Image Processing (TIP), 16 (4), 1058-1072, April 2007;
3. E. Provenzi, M. Fierro, A. Rizzi, L. De Carli, D. Gadia, D. Marini: '*Random Spray Retinex: a new Retinex implementation to investigate the local properties of the model*', IEEE Transactions on Image Processing (TIP), 16 (1), 162-171, January 2007;
2. E. Provenzi, L. De Carli, A. Rizzi, D. Marini: '*Mathematical definition and analysis of the Retinex algorithm*', Journal of Optical Society of America (JOSA) A, 22, 2613-2621, December 2005;
1. M.C. Abbati, A. Manià, E. Provenzi (the alphabetical order was chosen): '*Inductive construction of the loop transform for Abelian gauge theories*', Letters in Mathematical Physics, Vol.57 (1) 69-81, July 2001.

3.1.2 Books and book chapters

5. P. Arias, C. Ballester, B. Coll, J. M. Mazón and E. Provenzi: *L'aportació de Vicent Caselles al món de les matemàtiques i l'aplicació al processament d'imatges*, Butlletí de la Societat Catalana de Matemàtiques, Vol. 33, núm. 1, 2018, pages 5–41. DOI: 10.2436/20.2002.01.78
4. E. Provenzi (Editor): '*Color Image Processing*', MDPI Journal of Imaging, 240 pages, May 2018;
3. E. Provenzi (Author): '*Computational Color Science – Variational Retinex-like Methods*', Wiley & Sons, 142 pages, March 2017;
2. E. Provenzi: '*Spatial and Frequency-based Variational Methods for Perceptually Inspired Color and Contrast Enhancement of Digital Images*', Chapter 5 of the book: '*Color Image and Video Enhancement*', E. Celebi, M. Lecca, B. Smolka (Eds.), 131-154, Springer International Publishing, August 2015;
1. E. Provenzi: '*Introduction to the loop quantization of gauge theories and gravity*', Università di Torino, Quaderno didattico e di ricerca #14, Department of Mathematics, November 2002. 96 pages.

3.1.3 Conferences

33. E. Provenzi: '*A variational model for achromatic induction*', GDR Vision-ISIS Meeting about Biological and artificial vision in image processing and learning, 10-11 October, Marseille, France;
32. M. Berthier, E. Provenzi: '*When geometry meets psycho-physics and quantum mechanics : Modern perspectives on the space of perceived colors*', 4th conference on Geometric Science of Information, 27-29 August 2019, Toulouse, France;
31. B. Mazin, E. Provenzi: '*An alternative multiscale framework for variational perceptually-inspired contrast enhancement of color images*', Color Imaging Conference (CIC26), Vancouver, Canada, 12-16 November 2018;
30. E. Provenzi, G. Gronchi: '*A variational framework for achromatic induction and other psychophysical context-driven effects*', the 2018 Meeting of the European Mathematical Psychology Group (EMPG 2018), Genova, Italy, 30 July - 2 August 2018;
29. E. Provenzi, G. Gronchi: '*Context-driven effects in perception and cognition: A variational approach*', the 50th Annual Meeting of the Society for Mathematical Psychology, Warwick, UK, 23-25 July 2017;
28. E. Provenzi: '*Principal Fiber Bundles and Geometry of Color Spaces*', The Second International Conference on Advances in Signal, Image and Video Processing, Barcelona, Spain, 21-25 May 2017;
27. E. Provenzi: '*Similarities and differences in the mathematical formalizations of the Retinex model and its variants*', Computational Color Imaging Workshop, CCIW, Milan, 29-31 Mars 2017. Springer International Publishing, LNCS 10213, pp. 55–67, 2017. DOI: 10.1007/978-3-319-56010-6_5;
26. L. Grementieri and E. Provenzi: '*Selection of achromatic and non-neutral colors to fill lacunae in frescoes guided by a variational model of perceived contrast*', Proc. SPIE 10225, Eighth International Conference on Graphic and Image Processing (ICGIP 2016), 29-31 October 2016, 102251Z (February 8, 2017); doi:10.1117/12.2267773;

25. A. Flachot, E. Provenzi, J. Kevin O'Regan: '*An illuminant-independent analysis of reflectance as sensed by humans, and its applicability to computer vision*', 6th European Workshop on Visual Information Processing (EUVIP), Marseille, France, 25-27 October, 2016. DOI: 10.1109/EU-VIP.2016.7764601. Best student paper award;
24. A. Flachot, J. Kevin O'Regan, E. Provenzi: '*A simple way the human visual system could extract surface reflectance properties: applications to color naming and unique hues*', poster session for Seeing Colors: International Symposium on Color Vision, Regensburg, Germany, 19-21 September, 2016;
23. G. Gronchi, E. Provenzi (the alphabetical order was chosen): '*Variational achromatic induction and beyond*', Proceedings of the XII Italian conference on color, Turin, Italy, 8-9 September, 121-128, 2016;
22. V. Hulusic, G. Valenzise, E. Provenzi, K. Debattista, F. Dufaux: '*Perceived Dynamic Range of HDR Images*', DOI: 10.1109/QoMEX.2016.7498953. Qomex conference on image quality, Lisbon, Portugal, 6-8 May, 2016;
21. J.L. Lisani, A.B. Petro, E. Provenzi, C. Sbert (the alphabetical order was chosen): '*A generalized white-patch model for fast color cast detection in natural images*', IS&T International Symposium on Electronic Imaging 2016, in the Color Imaging: Displaying, Processing, Hardcopy, and Applications Conference. San Francisco, USA, 14-18 February, 2016. RETINEX 318.1-318.4.
20. E. Provenzi, J. Delon, Y. Gousseau, B. Mazin: '*On Spatiochromatic Features in Natural Images Statistics*', Proceedings of the 18th Image Analysis and Processing Conference (ICIAP), Genoa, Italy, September 7-11, 2015, Part II, 46-55, Lecture Notes in Computer Science, Springer;
19. E. Provenzi, J. Delon, Y. Gousseau, B. Mazin: '*Composantes principales spatio-chromatiques des images naturelles couleur*', XXV Colloque Gretsi, Lyon, France, 9-11 September 2015;
18. E. Provenzi: '*The space of perceived color: a model based on differential geometry*', Workshop on Variational principles and conservation laws in General Relativity, Turin, Italy, 25-26 June 2015;
17. E. Provenzi, J. Delon, Y. Gousseau, B. Mazin: '*On the second order spatiochromatic structure of natural images*', GDR-Vision, Groupement de recherche en vision, Lyon 1-2 December 2014;
16. E. Provenzi, J. Delon, Y. Gousseau, B. Mazin: '*Second order stationarity and spatiochromatic properties of natural images*', 10th International Conference on Signal Image Technology, Workshop on Color and Multispectral Imaging, Marrakech, Maroc, 22-27 November 2014, 598-605;
15. E. Provenzi: '*Achromatic induction: A variational interpretation of Rudd-Zemach's edge integration model*', The 9th International Conference on Signal Image Technology, Workshop on Color and Multispectral Imaging, Kyoto, Japan, 2-5 December 2013, 424-429;
14. E. Provenzi: '*Recent advances in perceptually-inspired variational processing of color images*', Proceedings of the Ninth Italian conference on color, September 19-20, 2013, Florence, Italy, Vol. IX B, 20-27;
13. E. Provenzi: '*A Variational Wavelet-Based Computational Model for the Enhancement of Contrast Perception in Color Images*', Computational Color Imaging Workshop (CCIW), Chiba, Japan, March 4th-5th, 2013. Published on Springer Verlag Lecture Notes in Computer Science (LNCS), Volume 7786, 324-333, 2013.
12. E. Provenzi: '*A wavelet perspective on perceptual color correction of digital images*', Proceedings of the Eighth Italian conference on color, September 13-14, 2012, Bologna, Italy, Vol. VIII B, 11-18;
11. E. Provenzi, V. Caselles: '*Embedding color perception into a variational framework*', European Conference on Visual Perception (ECVP), September 2-6 2012, Alghero, Italy;

10. E. Provenzi, V. Caselles: '*Variational Principles and Perceptual Color Correction of Digital Images*', Proceedings of the conference Predicting Perception, Third International Conference on Appearance, April 17-19 2012, Edinburgh, UK, 162-164;
9. E. Provenzi, V. Caselles: '*An artifact free wavelet Model For Perceptual Contrast Enhancement Of Color Images*', 2012 VISAPP conference, February 24-26, Rome, Italy, SciTePress, 317-322;
8. S. Ferradans, M. Bertalmío, E. Provenzi, V. Caselles: '*Generation of HDR Images in Non-Static Conditions Based On Gradient Fusion*', 2012 VISAPP conference, February 24-26, Rome, Italy, SciTePress, 31-37;
7. L. Zappella, E. Provenzi, X. Lladò, J. Salvi: '*Adaptive Motion Segmentation Algorithm Based on the Principal Angles Configuration*', 10th ACCV Conference, Queenstown, New Zealand, November 8th-10th 2010. Springer Verlag Lecture Notes in Computer Science, Vol. 6494 (3), 15-26, 2011;
6. E. Provenzi, M. Bertalmío, V. Caselles: '*Un marco teórico variacional para la corrección de imágenes en color*', Proceedings of the 9th Spanish conference on color, University of Alicante, June 29-July 2 2010, 82-84. *Award for the best presentation of the conference*;
5. E. Provenzi: '*A unified variational framework for perceptually inspired color correction algorithms*', Proceeding of the CREATE conference on color, Gjøvik, Norway, June 2-4 2010, 48-51;
4. S. Ferradans, M. Bertalmío, E. Provenzi, V. Caselles: '*A multi-modal approach to perceptual tone mapping*', Proceedings of the Conference on Visual Media Production (CVMP), London (UK), 81-90, November 12-13 2009, 81-90;
3. E. Provenzi: '*Perceptual color correction: a variational perspective*', Second Computational Color Imaging Workshop (CCIW), Saint Etienne, France, March 26-27, 2009. Published in Springer Verlag Lecture Notes in Computer Science (LNCS), Volume 5646, 109-119, 2009;
2. E. Provenzi, M. Rossetti: '*Spray formulation of Retinex and chromatic noise*', Acts of the second Italian conference about color, Università degli studi di Milano Bicocca (Italy), September 20-22 2006, 55-65;
1. M. Fierro, E. Provenzi: '*Mathematical formulation of the Retinex algorithm: analysis of the intrinsic properties of the model*', Acts of the First Italian Conference on Color, Università degli studi di Pescara, 39-46, October 20-21, 2005.

3.2 Awards

6. Grant PEDR ('Prime d'Encadrement Doctorale et de Recherche') for excellence in doctoral supervision and research: October 1st 2017-August 31st 2021;
5. Best student paper award 'An illuminant-independent analysis of reflectance as sensed by humans, and its applicability to computer vision', with Alban Flachot (student) and J. Kevin O'Regan, in the conference EUVIP, Marseille, 25-27 October 2016;
4. Best poster award, together with Giuseppe Valenzise, Journée Futur et Ruptures, Télécom ParisTech, Paris, France, Mars 5th 2015;
3. The paper '*A perceptually inspired variational framework for color enhancement*', IEEE Transactions on Pattern Analysis and Machine Intelligence, 31(3), 458-474, March 2009 received the *award for the most outstanding paper on mathematical and computational aspects of imaging, broadly interpreted, published between 2008 and 2011*, by the SIAM (Society of Industrial and Applied Mathematics) Group on Imaging Science (SIAG/IS). Ceremony held in Philadelphia, USA, on May 20th, 2012;
2. Certificate of excellence in research by the Spanish Ministry of Research and Development, January 18th, 2013;
1. Award for the best presentation of the ninth Spanish conference on color, University of Alicante, June 29th - July 2nd 2010.

3.3 Grants and research projects

16. Grant Erasmus+ to teach a master-PhD cours level about differential geometry of color vision at the University of Turin, Italy, faculty of Mathematics;
15. Grant CIFRE with Huawei Nice Sophia Antipolis for a fully founded PhD thesis on the differential geometry of color perception;
14. Grant 'GOALVision' by CNRS (80 primes), 2019: Research leader: Edoardo Provenzi;
13. Grant Erasmus+ to teach a master-PhD cours level about differential geometry of color vision at the University of Padova, Italy, faculty of Mathematics;
12. Grant 'RECOGER' by Nouvelle Aquitaine region, to co-found a PhD thesis, 2018: Research leader: Edoardo Provenzi;
11. Grant 'INFINITI' for interdisciplinary research, by CNRS (Conseil National Recherche Scientifique), 2018: Research leader: Edoardo Provenzi;
10. Grant 'BOUM' SMAI (Société de Mathématiques Appliquées et Industrielles), 2016: Research leader: Edoardo Provenzi;
9. Programme Futur et Ruptures, Fondation Télécom, April 1st 2014 - August 31st 2014. Research leader: Giuseppe Valenzise;
8. FUI (9th call) project CEDCA, at Télécom ParisTech, April 1st 2013 - March 31st 2014. Research leader: Yann Gousseau;
7. GRC project 2009 SGR 773, founded by Generalitat de Catalunya, at Universitat Pompeu Fabra, January 2009 - December 2013. Research leader: Vicent Caselles;

6. MTM2009-08171, founded by MICINN, at Universitat Pompeu Fabra, January 2009 - December 2012. Research leader: Vicent Caselles;
5. IP-RACINE CN 511316 IV PM, founded by Generalitat de Catalunya, at Universitat Pompeu Fabra, June 2007-September 2007. Research leader: Josep Blat;
4. PRIN-MIUR 2005115173-002, at Università degli studi di Milano, January 2006-December 2007. Research leader: Daniele Marini;
3. Modelli computazionali avanzati della percezione visiva per la riproduzione di immagini multi-spettrali e spettrofotometriche ad alta dinamica, COFIN 2005, January 2005-December 2006. Research Leader: Alessandro Rizzi.
2. Geometry of completely integrable Hamiltonian systems, at Università di Genova, January 2002-December 2002. Research leader: Claudio Bartocci;
1. Field theory, superstrings and supergravity PRIN MIUR 20011025-492, at Università degli studi di Milano, January 2001-December 2002. Research leader: Luciano Girardello.

4 Teaching

4.1 Support for students

- Calculus 1 and numerical methods: 166 pages (in Spanish);
- Calculus 2 and numerical methods: 106 pages (in Spanish);
- Color image processing: 125 pages (in English);
- Convex optimization: 72 pages (in French);
- Differential geometry: 122 pages (in English);
- Fourier transform and applications: 125 pages (in French);
- Hilbert spaces theory: 279 pages (in French);
- Wavelet theory: 51 pages (in French).

4.2 Courses

- Academic Year 2019/2020:
 - Université de Bordeaux, France. Courses: *Hilbert spaces and Fourier transform*, January-April 2020; *Hilbert methods and wavelets* January-April 2020 (full responsibility of all the courses);
- Academic Year 2018/2019:
 - Université de Bordeaux, France. Courses: *Hilbert spaces and Fourier transform*, January-April 2019; *Introduction to image processing* January-April 2019, *Hilbert methods and wavelets* January-April 2019, *Convex optimization and inverse problems* January-April 2019 (full responsibility of all the courses);
- Academic Year 2017/2018:
 - Université de Bordeaux, France. Courses: *Analysis for biologists*, September 2017-December 2017, *Hilbert spaces and Fourier transform*, January 2018-April 2018; *Introduction to image processing* January 2018-April 2018, *Hilbert methods and wavelets* January-April 2018, *Convex optimization and inverse problems* January-April 2018 (full responsibility of all the courses);
- Academic Year 2016/2017:
 - Université Paris Descartes, Paris, France. Courses: *Analytical methods for Engineering* (full responsibility of the course), September 2016-December 2016, *Variational methods for image processing* (Teaching Assistant) September 2016-December 2016; *Fourier analysis and its applications* (full responsibility of the course), January-March 2017;
 - ENS Ulm, Paris France. Course: *Algebra and Analysis* for the Cogmaster, Master in Cognitive Psychology, September 2016 and February 2017;
 - Universidad de la Habana, Cuba, *Fourier analysis and its applications to digital signal processing* (full responsibility of the course), January 2017;
- Academic Year 2015/2016:
 - Université Paris Descartes, Paris, France. Courses: *Calculus 1* (Teaching Assistant), September 2015-December 2015, *Variational methods for image processing* (Teaching Assistant) September 2015-December 2015; *Fourier analysis and its applications* (full responsibility of the course), January-March 2016;
 - ENS Ulm, Paris France. Course: AMS, *Atelier de Mathématiques et Statistiques* for the Cogmaster, Master in Cognitive Psychology, September 2015 and February 2016.
- Academic Year 2014/2015:
 - Université Paris Descartes, Paris, France. Courses: *Calculus 1* (Teaching Assistant), September 2014-December 2014, *Variational methods for image processing* (Teaching Assistant) September 2014-December 2014; *Fourier analysis and its applications* (full responsibility of the course), January-March 2015;

- Academic Year 2012/2013:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Calculus 1 and 2 and numerical methods* (full responsibility of the course), September 2012-March 2013, *Processing of color digital images* (full responsibility of the course) January 2013-March 2013.

- Academic Year 2011/2012:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Differential equations* (full responsibility of the course), April-June 2012; *Calculus II* (full responsibility of the course), February-April 2012; *Precalculus* (full responsibility of the course), September 2011;

- Academic Year 2010/2011:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Differential equations* (full responsibility of the course), April-June 2011; *Calculus II* (Teaching Assistant), February-April 2011; *Precalculus* (full responsibility of the course), September 2010;

- Academic Year 2009/2010:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Differential equations* (full responsibility of the course), April-June 2010; *Precalculus* (full responsibility of the course), September 2009;

- Academic Year 2008/2009: Universitat Pompeu Fabra, Barcelona, Spain. Course: *Precalculus* (full responsibility of the course), September 2008;

- Academic Year 2007/2008:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Research seminar II* (full responsibility of the course). February - September 2008; *Precalculus* (full responsibility of the course), September 2007;

- Academic Year 2006/2007: Università di Bergamo, Italy. Course: *Precalculus* (full responsibility of the course);

- Academic Year 2005/2006: Università degli Studi di Milano, Italy. Course: *Logical architectures and wires* (full responsibility of the course);

- Academic Year 2004/2005:
 - Università di Milano - Dipartimento di Tecnologie dell'Informazione, Crema, Italy. Course: *Fundamentals of continuous mathematics* (Teaching Assistant);
 - Politecnico di Milano, Italy. Course: *Linear Algebra, Calculus I* (Teaching Assistant).
 - Università di Bergamo, Italy. Course: *Precalculus* (full responsibility of the course);

- Academic Year 2003/2004:
 - Università di Bergamo, Italy. Courses: *Precalculus* (full responsibly of the course) and *Linear Algebra, Calculus I, Calculus II, Physics I, Physics II* (Teaching Assistant);
 - Politecnico di Milano, Italy. Courses: *Linear Algebra, Calculus I, Calculus II* (Teaching Assistant);

- Academic Year 2001/2002: Università di Torino, Italy, Department of Mathematics: *Geometric and homologic methods of mathematical physics* (Teaching Assistant);

- Academic Year 2000/2001: Teacher of *Mathematics* (full responsibly of the course) at the high school Istituto Galbani di Melzo, Milano, Italy.

5 International experience

5.1 Invited speaker

47. 2020, July 8th. '*On locality of chromatic and achromatic induction and its consequences on variational models for image enhancement and art restauration*', SIAM Imaging Science, Toronto, Canada;
46. 2019, September 25th. Plenary speaker: '*Towards a new model for the space of perceived colors*', 11th International Symposium on Image and Signal Processing and Analysis, Dubrovnik, Croatia;
45. 2019, September 18th. Seminar: '*A multiscale framework for variational perceptually-inspired tone mapping and contrast enhancement*', Future ISP technology workshop, Nice, France;
44. 2019, June 19th. Seminar: '*Perspectives géométriques et psycho-physiques pour une reformulation de la colorimétrie*', Le Teich, France;
43. 2019, May 23rd. Seminar: '*Après la thèse ? ... aspects entreprises et académiques*', IMB, Bordeaux, France;
42. 2019, April 17th: Seminar: '*Variational color image processing*', LIRMM, Montpellier, France;
41. 2019, April 15th: Seminar: '*A variational model to help restoration of lacunae in frescoes*', Italian Embassy in Paris, France;
40. 2018, November 22nd: Workshop on '*Cortical models for visual perception and imaging applications*', '*Resnikoff's model of perceived colors space*', Paris, France;
39. 2018, November 12th: 2 hours lesson given within the Color Imaging Conference (CIC26), Vancouver, Canada '*Variational Color Image Enhancement inspired by Human Vision*';
38. 2018, Plenary speaker. July 2nd-4th: '*An overview on variational and statistical methods for color analysis of natural images*', The 20th International Symposium on Multispectral Colour Science MCS18;
37. 2018, May 9th: '*Mathematics of color image processing*', Seminars of the Università di matematica di Pisa, Italy;
36. 2018, January 15th: '*Retinex-like Models in Color Enhancement*', MIA (Mathematics Images Applications) Conference, Berlin, Germany;
35. 2017, September 14th: '*Le modèle de Philippon-O'Regan, les couleurs pures et les propriétés de la réflectance des surfaces*', University of Bordeaux, France;
34. 2017: '*From variational principles to Poisson EDPs: mathematical formalizations of the Retinex model*', invited speaker for the plenary speech at the 9th International Conference on Graphic and Image Processing (ICGIP), Qingdao, China, 13-15 October, 2017;
33. 2017, February 7th: INSA Toulouse, France '*Variational techniques in color image processing*';
32. 2016, November 8th: 2 hours lesson given within the Color Imaging Conference (CIC24), San Diego, USA '*Variational Color Image Enhancement inspired by Human Vision*';
31. 2016, May 19th: Université de Bordeaux, France. Topic : '*Second order stationarity and spatiochromatic properties of natural images*';
30. 2016, May 12th: ENS Cachan, France. Topic : '*Second order stationarity and spatiochromatic properties of natural images*';

29. 2015, October 19th: 2 hours lesson given within the Color Imaging Conference (CIC23), Darmstadt, Germany '*Variational Color Image Enhancement inspired by Human Vision*';
28. 2015 June 4th: Universitat de les Illes Balears, Palma de Mallorca, Spain. Topic: '*Second order stationarity and tensor product spatiochromatic features of natural images*'. Research collaboration from May 25th to June 14th, 2015;
27. 2014 May 12-14: SIAM Conference on Imaging Science (SIAM-IS14), Hong Kong, China. Invited speaker for the following Minisymposia: '*Color Perception and Image Enhancement*' and '*Mathematics for Imaging: the Legacy of Vicent Caselles*';
26. 2013 June 14th: Université de la Bourgogne, Dijon, France. Topic: '*A variational approach to color science*';
25. 2013 June 4th: Technicolor, Rennes, France. Topic: '*Spatial and local frequency framework for perceptually inspired variational enhancement of color images*';
24. 2013 May 28th: Université Paris Descartes, Paris, France. Topic: '*Spatial and local frequency framework for perceptually inspired variational enhancement of color images*';
23. 2013 May 15th: Télécom ParisTech, Paris, France. Topic: '*Spatial and local frequency framework for perceptually inspired variational enhancement of color images*';
22. 2012 July 12th: Politecnico di Torino, Torino, Italy. Topic: '*Variational techniques in color imaging*';
21. 2012, May 20th: Invited speaker for the plenary talk of the SIAM conference on Imaging Science, Philadelphia, USA. Awarded, together with Rodrigo Palma Amestoy, Marcelo Bertalmío and Vicent Caselles, with the prize for the most outstanding paper on mathematical and computational aspects of imaging, broadly interpreted for the homonymous paper published in IEEE Transactions on Pattern Analysis and Machine Intelligence, 31(3), 458-474, March 2009;
20. 2012 May 21th: Johns Hopkins University, Baltimore, USA. Topic: '*A perceptually inspired variational framework for color enhancement*';
19. 2011 December 7th: University of Technology of Sydney, Australia. Topic: '*Perceptually-inspired variational models for color corrections*';
18. 2011 August 9th: Summer School on Mathematical models in Image Processing and Computer Vision at UIMP, Santander, Spain. Topic: '*Contrast and dispersion in colour compensation models: a variational analysis*';
17. 2011 March 16th: Università di Bergamo (Italy). Topic: '*Variational techniques in color image processing*';
16. 2010 February 18th: Departamento de Óptica, Universidad de Granada, Spain. Topic: '*Generation and tone mapping of High Dynamic Range Images*', invited speaker for the Erasmus Mundus CIMET Master (Vibot);
15. 2009 June 4th: Departamento de Óptica, Universidad de Granada, Spain. Topic: '*Variational techniques for perceptual color correction: overview on state of the art*', invited speaker for the Erasmus Mundus CIMET Master (Vibot);
14. 2008 January 31th: Universitat Pompeu Fabra, Barcelona, Spain. Topic: '*High Dynamic Range Images: Debevec-Malik's method to recover radiance maps and introduction to the tone mapping problem*';
13. 2007 November 15th: Universitat Pompeu Fabra, Barcelona, Spain. Topic: '*Variational histogram equalization and its developments*';

12. 2007 July 26th: Universitat Pompeu Fabra, Barcelona, Spain. Topic: '*Axiomatic framework for variational perceptually-inspired color enhancement*';
11. 2006 September 27-28-29th: Universitat Pompeu Fabra, Barcelona, Spain. Series of lessons about: '*Retinex: a mathematical perspective*';
10. 2006 April, 19th: Università di Milano (Italy), DTI. Topic: '*Dynamic Retinex*';
9. 2006 January, 29th: Università degli studi di Milano Bicocca (Italy). Topic: '*Wavelets and computational models of color perception: motivations and perspectives*';
8. 2005 November, 25th: Università di Bergamo (Italy). Topic: '*Computational models of color perception*';
7. 2005 - 2006: Università di Milano (Italy), DTI. Series of lessons about: '*Fourier, Gabor and Wavelet transforms and their application to signal and image processing*';
6. 2005 June, 14th: Università di Milano (Italy), DTI. Topic: '*Histogram equalization via partial differential equations and variational principles*';
5. 2005 March, 1st: Università di Milano (Italy), DTI. Topic: '*Mathematical formulation of Retinex: structural analysis of the algorithm*';
4. 2003 November 26th: Università di Milano (Italy), DTI. Topic: 'Dissertation on the paper "*Differential geometry and color perception*", by H.L. Resnikoff, analysis and perspectives';
3. 2003, February, 21st: Università di Milano (Italy), Dipartimento di Matematica. Topic: '*Introduction to the theory of C^* -algebras and their representations*';
2. 2002, October-December: University of Riverside, California, USA. Department of Mathematics. Series of seminars about Abstract Harmonic Analysis;
1. 2001, October, 29th: Università di Genova (Italy), Dipartimento di Matematica. Topic: '*Loop quantization of diffeomorphism-invariant gauge theories*'.

5.2 Invited visiting researcher/professor

1. University of Zagreb, Croatia, 25-27 September 2019. Invited visiting researcher in the image processing group.
2. Università di Padova, Italy, 1-5 July 2019. Invited visiting professor for the 10 hours course 'Geometrization of colorimetry' in the framework of the Erasmus+ program;
3. Universidad de La Habana, Cuba, 9-20 January 2017. Invited visiting professor for the 25 hours Master course 'Fourier transform and Image Analysis' in the framework of the Scientific cooperation between France and Cuba in Applied Mathematics;
4. Universitat des illes Balears, Palma de Mallorca, Spain, 18 May-5 June 2016. Invited visiting researcher in the group Mathematical Processing and Analysis of Images.

6 Coordination of the research activity

6.1 PhD students

1. Luvin Ragoo, co-supervision of his PhD thesis 2020-2023 (with Ivar Farup and Graham Finlayson);
2. Nicoletta Prencipe, supervision of her PhD thesis 2019-2022;
3. Valérie Garcin, co-supervision of her PhD thesis from 2019-2022 (with Michel Berthier);
4. Bruno Paun, supervision of his PhD thesis during the academic year 2012-2013;
5. Sira Ferradans, co-supervision of her PhD thesis from 2007-2010 (with Marcelo Bertalmío and Vicent Caselles);

6.2 Internships and Master students

1. Mohammed Bidou, Antoine Guennec, Marine Redondo, Dylan Russon, M2 internship, Université de Bordeaux, February 1st-July 31st;
2. Karlo Koščević, University of Zagreb, Faculty of Electrical Engineering and Computing, PhD internship, Université de Bordeaux, February 9th - 17th;
3. Fiammetta Cirrone, 'tesi di laurea' at Università di Padova, December 2019;
4. Nicoletta Prencipe, 'tesi di laurea' at Università di Padova, July 2019;
5. Nikola Banic, University of Zagreb, Faculty of Electrical Engineering and Computing, Post-Doc internship, Université de Bordeaux, February 25th - March 1st;
6. Santiago Herrero and Tooba Shams, internship for the Erasmus Mundus Master IPCV, February-December 2019;
7. Yiye Jiang, M2 internship at Université de Bordeaux, February 1st - June 31st, 2018;
8. Vivek Dewan, L3 internship at Université Paris Descartes, June 1st - July 31st, 2017;
9. Juliet Chauvin, M2 internship at Université Paris Descartes, May 1st - August 31st, 2016;
10. Alban Flachot, M2 internship at Université Paris Descartes, February 1st - July 31st, 2016 (co-supervision 50-50 with J.K. O'Regan, LPP Paris Descartes);
11. Marco Rossetti, 'tesi di laurea' at Università di Milano, Department of Information Technology of Crema, Academic years 2006-2007 (co-supervision with A. Rizzi);
12. Massimo Fierro, 'tesi di laurea' at Università di Milano, Department of Information Technology of Crema, Academic years 2005-2006 (co-supervision with A. Rizzi and C. Gatta).

7 Academic administrative activity

7.1 Master coordination

- Responsible of the option 'Signal and image processing' of the Master at University of Bordeaux, starting in September 2018;
- Member of the student selection committee for Master Erasmus Mundus IPCV;
- Member of the TICMA commission of the Universitat Pompeu Fabra from 2008 to 2010. The aim of the commission was to coordinate the Master activity for students in Computer Science and Telecommunications.

7.2 Jury and selection committees

- Examiner and jury member for the Habilitation à diriger des recherches (HDR) of Giuseppe Valenzise, CentraleSupélec - Université Paris-Sud, December 18th 2019;
- Rapporteur and jury member for the Habilitation à diriger des recherches (HDR) of Jean-Baptiste Thomas, Université de Dijon, August 31st 2018.
- Member of the jury for the PhD defense of:
 1. Hermine Chatoux, (21 May 2019, Université de Poitiers, rapporteur) ;
 2. Qi-Chong Tian, (4 Octobre 2018, Université Paris Dauphine, rapporteur) ;
 3. Prakhar Amba (3 May 2018, Université Pierre Mendès Grenoble, rapporteur and president of the jury);
 4. Fabien Pierre (23 November 2016, Université de Bordeaux, examiner);
 5. Oriël Frigo (19 October 2016, Université Paris Descartes, examiner);
 6. Paul Lauga (3 December 2015, Télécom ParisTech, examiner);
 7. Baptiste Mazin (28 Mars 2014, Télécom ParisTech), examiner).
- Member of selection committees:
 1. 2020, Maître de conférences, Université de La Rochelle;
 2. 2019, Maître de conférences, Université de La Rochelle;
 3. 2018, Maître de conférences, Université de Bordeaux (vice-president);
 4. 2018, Maître de conférences, Université de La Rochelle;
 5. 2016, Maître de conférences, MAP5 Université Paris Descartes;
 6. 2016, Maître de conférences, LPP Université Paris Descartes.
- Since September 2019, I am the local correspondent, at the Institute of Mathematics of Bordeaux, for PhD students

8 Administrative activity for research

8.1 Invited editor for international scientific journals

- Invited editor for Journal of Imaging, special session on 'Mathematical Models of Visual Perception and Biology with Applications to Images Processing and Computer Vision' (2020-ongoing)
- Invited editorial Board Member for the Journal of Imaging (2019-nowadays)
- Invited editor for Journal of Optical Society of America A, special session of 'Color', (2019-2020)
- Invited editor for Journal of Imaging, special session on 'Color Image Processing', (2015-2017)

8.2 AMIES

In 2018, Septembre 1st I started my activity as Facilitateur (local representer) of AMIES (Agence pour les Mathématiques en Interaction avec l'Entreprise et la Société - Labex, UMS 3458 CNRS, UGA). The scope of AMIES is to approach pure and applied mathematicians to the problems raised by a wide spectrum of enterprises.

8.3 GdR 'Group de Recherche' of CNRS

- Co-responsible of GDR-ISIS group 'Image and Vision', 2018-2022
 - Organization of the meeting 'Biological and artificial vision in image processing and learning', Université de Marseille, October 10th, 2019, in collaboration with GDR Vision.
 - Organization of the meeting 'Geometry and representation of color', Université Paris Jussieu, Paris, November 21st, 2018, in collaboration with the meeting 'Mathematical models of cortical vision'.
- Correspondent for GdR-ISIS for the university of Bordeaux
- Scientific committee member of GdR-MIA, in charge of inter-communication among GdR's.

8.4 Session chair for conferences

1. 2018 The 20th International Symposium on Multispectral Colour Science MCS18;
2. 2016 Color and Imaging Conference, San Diego, USA, November 7-11;
3. 2016 Electronic Imaging Conference, San Francisco, USA, February 14-18;
4. 2012 VISAPP conference, February 24-26, Rome, Italy.

8.5 Referee for international scientific journals

1. Computer vision and image understanding;
2. IEEE Signal Processing Letters;
3. IEEE Transaction on Image Processing;
4. Image Communication;
5. International Journal of Signal and Imaging Systems Engineering;
6. IPOL;
7. Journal of Electronic Imaging;
8. Journal of Mathematical Imaging and Vision;
9. Journal of Mathematical Neuroscience;
10. Journal of Mathematical Psychology;
11. Journal of the Optical Society of America A;
12. Journal of Vision;
13. Journal of real-time imaging;
14. Machine Vision and Applications;
15. Optical Engineering;
16. Signal Image and Video Processing;
17. SIAM Journal on Imaging Sciences (SIIMS).

8.6 Conference organization and management

Member of the technical and/or program committee of the followings conferences/workshops:

1. 2020 SIAM Imaging Science, Minisymposium on Geometric methods for vision and image processing: from cortical to perceptual properties, July 6-9;
2. 2019 ISPA, 11th International Symposium on Image and Signal Processing and Analysis, Dubrovnik, Croatia, September 23-25;
3. 2018 SIAM conference, Minisymposium on the geometry of color processing, Bologna, Italy, June 5-8;
4. 2017 ISPA, 10th International Symposium on Image and Signal Processing and Analysis, Ljubljana, Slovenia, September 18-20;
5. 2017 ICGIP, International Conference on Graphic and Image Processing, Qingdao (China), October 13-15;
6. 2015 IEEE International Ph.D. Workshop on Multimedia Computing Research (MCR 2015), Miami, Florida, USA, December 14-16;
7. 2014 Signal Image Technology and Internet Based Systems, Marrakech, Morocco, November 23-27;
8. 2013 Signal Image Technology and Internet Based Systems, Kyoto, Japan, December 2-5.