

Curriculum Vitae

EDOARDO PROVENZI

PERSONAL INFORMATION

- *Name*: Edoardo Provenzi;
- *E-mail*: ottoemmezzo@hotmail.com (personal); edoardo.provenzi@upf.edu (academic);
- *Nationality*: Italian;
- *Year of birth*: 1975.

EDUCATION

- *2001 - 2004*:
 - PhD in Mathematics and applications at Università di Genova and Politecnico di Torino;
 - Title of the thesis: '*A mathematical overview on canonical and covariant loop quantum gravity*', successfully defended on May 3rd, 2004;
 - Supervisor: Prof. C. Bartocci.
- *1994 - 2000*:
 - Degree in Physics (equivalent to a MS) at Università Statale di Milano;
 - 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: Profs. M.C. Abbati, A. Manià and R. Cirelli.
- *1989 - 1994*: Undergraduate studies in Electronics and Electrotechnics. Final grade: 60/60.

SHORT 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 and Politecnico di Torino (Italy), spending the academic year 2002-2003 in the University of California Riverside (USA). Both the master and the PhD thesis have been devoted to the study of Quantum Gravity. After the PhD I joined the image processing group of the Università di Milano, Sezione di Crema (Italy) with a four-years Post-Doc position to study the problem of color perception and its representation in digital images. During this time, I was invited by the image processing group of the Universitat Pompeu Fabra of Barcelona (Spain) as a visiting researcher. In 2008 I got the five-years 'Ramón y Cajal' from the spanish ministry of education. During the academic year 2010-2011 I followed the courses of the MVA (Mathématiques/Vision/Apprentissage) Master at École Normale Supérieure of Paris-Cachan (France). At the moment I'm working on mathematical models applied to image processing, more specifically I'm performing research about: variational models of contrast enhancement and histogram fusion; generation and tone mapping of high dynamic range images of static and moving scenes; computer vision applications of wavelets theory; motion segmentation. As a future project, I'm particularly interested in the use of digital technology and historic documents and I would like to use my experience in both theoretical and applied research in order to improve math education.

TEACHING ACTIVITY

- Academic Year 2010/2011:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Differential equations*, April-June 2011; *Calculus II*, February-April 2011; *Precalculus*, September 2010;
- Academic Year 2009/2010:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Differential equations*, April-June 2010; *Precalculus*, September 2009;
- Academic Year 2008/2009: Universitat Pompeu Fabra, Barcelona, Spain. Course: *Precalculus*, September 2008;
- Academic Year 2007/2008:
 - Universitat Pompeu Fabra, Barcelona, Spain. Courses: *Research seminar II*. February - September 2008; *Precalculus*, September 2007;
- Academic Year 2006/2007: Università di Bergamo, Italy. Course: *Precalculus*;
- Academic Year 2004/2005:
 - Università di Milano - Dipartimento di Tecnologie dell'Informazione, Crema, Italy. Course: *Fundamentals of continuous mathematics*;
 - Politecnico di Milano, Italy. Course: *Linear Algebra, Calculus I*.
 - Università di Bergamo, Italy. Course: *Precalculus*;
- Academic Year 2003/2004:
 - Università di Bergamo, Italy. Courses: *Precalculus, Linear Algebra, Calculus I, Calculus II, Physics I, Physics II*;
 - Politecnico di Milano, Italy. Courses: *Linear Algebra, Calculus I, Calculus II*;
- Academic Year 2001/2002: Università di Torino, Italy, Department of Mathematics. Course: *Geometric and homologic methods of mathematical physics*;
- Academic Year 2000/2001: Teacher of *Mathematics* at the high school Istituto Galbani di Melzo, Milano, Italy.

GRANTS

- *Started in 2008, December 1st*: Ramón y Cajal research grant from the Spanish Ministry of Education;
- *2004, November 1st - 2008, October 31th*: Researcher for Università Statale di Milano - Department of Technology of Information, Crema. Topic of the research: *Mathematical analysis of models of color reproduction in digital images*.

RESEARCH PROJECTS

- GRC project 2009 SGR 773, at Universitat Pompeu Fabra, 2009-2011. Research leader: Vicent Caselles;
- MICINN MTM2009-08171, at Universitat Pompeu Fabra, 2009-2011. Research leader: Vicent Caselles;
- IP-RACINE CN 511316 IV PM, at Universitat Pompeu Fabra, June 2007-September 2007. Research leader: Josep Blat;
- PRIN-MIUR 2005115173-002, at Università degli studi di Milano, January 2006-December 2007. Research leader: Daniele Marini;
- Geometry of completely integrable Hamiltonian systems, at Università di Genova, January 2002-December 2002. Research leader: Claudio Bartocci;
- Field theory, superstrings and supergravity PRIN MIUR 20011025-492, at Università degli studi di Milano, January 2001-December 2002. Research leader: Luciano Girardello.

PUBLICATIONS

- **Scientific magazines** (the impact factors of the magazines indicated below refer to the ISI impact factors in the year of publication of each paper):
- 11) S. Ferradans, M. Bertalmío, E. Provenzi, V. Caselles: ‘*An analysis of visual adaptation and contrast perception for tone mapping*’, accepted for publication in IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) [Impact factor: 5.96];
 - 10) N. Papadakis, E. Provenzi, V. Caselles: ‘*A Variational Model for Histogram Transfer of Color Images*’, accepted for publication in IEEE Transactions on Image Processing (TIP) [Impact factor: 3.32];
 - 9) L. Zappella, X. Lladò, E. Provenzi, J. Salvi: ‘*Enhanced Local Subspace Affinity for Feature-Based Motion Segmentation*’, Pattern Recognition (PR) [Impact factor: 3.28], 44 (2), 454-470, February 2011;
 - 8) E. Provenzi: ‘*Perceptual color correction: a variational perspective*’, Springer Verlag Lecture Notes in Computer Science (LNCS) [Impact factor: 0.402], Volume 5646, 109-119, July 2009;
 - 7) M. Bertalmío, V. Caselles, E. Provenzi: ‘*Issues about Retinex Theory and Contrast Enhancement*’, International Journal of Computer Vision (IJCV) [Impact factor: 5.36], 83, 101-119, March 2009;
 - 6) R. Palma-Amestoy, E. Provenzi, V. Caselles, M. Bertalmío: ‘*A perceptually inspired variational framework for color enhancement*’, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) [Impact factor: 5.96], 31 (3), 458-474, March 2009;
 - 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) [Impact factor: 5.96], 30 (10), 1757-1770, October 2008;
 - 4) M. Bertalmío, V. Caselles, E. Provenzi, A. Rizzi: ‘*Perceptual Color Correction Through Variational Techniques*’, IEEE Transactions on Image Processing (TIP) [Impact factor: 3.32], 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) [Impact factor: 3.32], 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 [Impact factor: 1.9], 22, 2613-2621,

December 2005;

- 1) M.C. Abbati, A. Manià , E. Provenzi: '*Inductive construction of the loop transform for Abelian gauge theories*', Letters in Mathematical Physics [Impact factor: 0.98], Vol.57 (1) pp.69-81, July 2001.

- **Books:**

- 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.

- **Conferences:**

- 6) L. Zappella, E. Provenzi, X. Lladò, J. Salvi: '*Adaptive Motion Segmentation Algorithm Based on the Principal Angles Configuration*', 10th ACCV Conference, Queensland, New Zeland, November 8th-10th 2010.
- 5) E. Provenzi: '*Un marco teórico variacional para la corrección de imágenes en color*', Proceedings of the 9th Spanish conference on color, University of Alicante, June 29th-July 2nd 2010. *Award for the best presentation of the conference.*
- 4) E. Provenzi: '*A unified variational framework for perceptually inspired color correction algorithms*', Proceeding of the CREATE conference on color, Gjøvik, Norway, June 2nd-4th 2010, pp. 48-51.
- 3) 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 12th-13th 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 20th-22th 2006, pp. 55-65;
- 1) E. Provenzi, M. Fierro: "*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, pp.39-46, October 20-21, 2005;

INVITED SPEAKER

- 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 lessons about Abstract Harmonic Analysis:

- *'Peter-Weyl's theorem and irreducible unitary representations of compact Lie groups;*
- *$SL(2, \mathbb{C})$ infinite-dimensional irreducible unitary representations;*
- *Riemannian symmetric spaces;*
- *Helgason-Harish-Chandra decompositions and non-compact semisimple Lie groups.*

1) 2001, October, 29th: Università di Genova (Italy), Dipartimento di Matematica. Topic: *'Loop quantization of diffeomorphism-invariant gauge theories'*.

POST-DOC SCHOOLS ATTENDED

- Courses of the Master MVA on Computer Vision at the École Normale Supérieure de Cachan, Paris, France, during the academic year 2010-2011;
- Summer School in Jyvaskyla, Finland. Department of Mathematics and Natural Science, August 7th-11th 2006. Lectures on the topic: ‘Variational methods in imaging’. Total ECTS credits after final exam: 5 (excellent).

REFeree ACTIVITY

Referee for the following journals (in alphabetic order): IEEE Transaction on Image Processing, Journal of Electronic Imaging, Journal of the Optical Society of America A, Optical Engineering.

ADMINISTRATIVE ACTIVITY

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.

FOREIGN LANGUAGES KNOWLEDGE

- *Italian*: mother tongue;
- *English*: excellent writing, reading and verbal skills;
- *Spanish*: excellent reading, verbal and writing skills;
- *French*: excellent reading skills, average writing and verbal skills;
- *Portuguese*: excellent reading skills, basic writing and verbal skills;
- *Catalan*: excellent reading skills, basic writing and verbal skills;

COMPUTER SCIENCE KNOWLEDGE

In alphabetic order: Adobe Photoshop, LaTeX, Linux OS (Ubuntu distribution), Maple, Matlab, Microsoft OS (Win98/ME/2000/XP/Vista/7), Microsoft Office, Moodle.

PERSONAL INTERESTS

In my spare time I enjoy authors’ cinema, traveling, going to art expositions, listening to music, reading, playing tennis, ping pong, swimming, riding my bike all over and, last but not least, cooking.