Cristina Campi

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Date of birth: 30 June 1982

Scopus ID: 24079776000
ResearcherID: L-8520-2015
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Experience

January 2017 – today **Fixed-term researcher**, *CNR–SPIN*, Genova, Italy.

October 2015 – September 2016 **Postdoctoral fellow**, *Dipartimento di Scienze di Base e Applicate per l'Ingegneria, Università di Roma "La Sapienza"*, Rome, Italy.
Research topic: Development of computational methods for the solution of the Magnetoencephalography inverse problem

May 2015 – June 2015 **Fellowship**, *Dipartimento di Matematica, Università di Genova*, Genova, Italy.

November 2012 – October 2014 **Postdoctoral fellow**, *CNR–SPIN*, Genova, Italy.
Research topic: MRI image reconstruction and integration of MRI/PET data with applications to hematology

February 2012 – October 2012 **Postdoctoral fellow**, *Dipartimento di Neuroscienze, Università di Parma*, Parma, Italy.
Research topic: Localization of neural sources in EEG data

September 2010 – August 2011 **Postdoctoral fellow**, *Department of Computer Science, University of Helsinki*, Helsinki, Finland.
Research topic: Development of correlation analysis approach to the analysis of signals

March 2010 – August 2010 **Fellowship**, *Dipartimento di Matematica, Università di Genova*, Genova, Italy.
Research topic: Bayesian methods for the regularization of ill–posed inverse problems: applications in neuroscience and astronomy

January 2010 – February 2010 **Fellowship**, *Dipartimento di Matematica, Università di Genova*, Genova, Italy.
Research topic: Integration of reconstructions obtained from neurophysiological data with magnetic resonance images

January 2007 – December 2009 **PhD student**, *Dipartimento di Matematica, Università di Genova*, Genova, Italy.

Education

2007–2009 **PhD.**, *Università di Genova*, Genova, Italy.
PhD in Mathematics and applications. Thesis defense: 15 April 2010

2004–2006 **MS.**, *Università di Genova*, Genova, Italy.
Master degree, cum laude, in Mathematics

2002–2004 **BS.**, *Università di Genova*, Genova, Italy.
Bachelor degree in Mathematics

Doctoral thesis

title A computational method for the spatio-temporal reconstruction of brain activity using Magnetoencephalography and MRI

advisor Michele Piana, Università di Genova

Masters thesis

title Semi-analytic Bayesian tracking for the inverse problem of Magnetoencephalography

advisor Michele Piana and Alberto Sorrentino, Università di Genova

Software development

- HADES software `http://mida.dima.unige.it/g_software_hades.html` for the analysis of neuromagnetic signals by means of Bayesian tracking
- `http://mida.dima.unige.it/g_software_htbone.html` for the pattern recognition of curve in images, currently employed at the Nuclear Medicine Department at IRCCS San Martino (Genova)

Computer skills

Languages C, HTML5, PYTHON, LaTeX, OsiriX

Platforms Linux, Windows, Macintosh

Tools Matlab, Office Suite, Photoshop, Gimp

Languages

Italian **mother tongue**

English **advanced**

Grants

- Italian National Research Council - Short Term Mobility 2013, grant for the project: "Integrazione di informazioni provenienti da immagini di risonanza magnetica con immagini PET"
- GNCS (National Group for Scientific Computation) – Call for young researchers 2011, grant for the project: "Studio e implementazione di un metodo per l'identificazione di sorgenti neurali comuni in due soggetti a partire da dati registrati con la magnetoencefalografia"
- GNCS (National Group for Scientific Computation) – Call for young researchers 2009, grant for the project: "Metodi computazionali per l'integrazione di serie temporali magnetoencefalografiche con informazioni ottenute da tecniche di imaging medico funzionale"
- Italian National Research Council - Short Term Mobility 2009, grant for the project: "Analisi di dati in magnetoencefalografia integrata con informazioni provenienti da elettroencefalografia"

- Italian National Research Council - Short Term Mobility 2008, grant for the project: "Validazione di un algoritmo Bayesiano per l'analisi dati in magnetoencefalografia (MEG)"
- SIMAI (Italian Society for Industrial and Applied Mathematics), financial support to attend SIMAI 2008 "IX SIMAI Conference" 15 – 19 Septmber 2008, Rome, Italy
- IPAM (Institute for Pure and Applied Mathematics - University of California, Los Angeles), grant to attend "Graduate Summer School: Probabilistic Models of Cognition: The Mathematics of Mind", 9 – 26 July 2007, Los Angeles (USA)

Visits to research labs

September 2013 Centre for Medical Image Computing, Department of Computer Science, University College London, London (UK)

October 2009 Athinoula A. Martinos Center for Biomedical Imaging, Boston (USA), Massachusetts General Hospital, Boston (USA)

October 2008 Athinoula A. Martinos Center for Biomedical Imaging, Boston (USA), Massachusetts General Hospital, Boston (USA)

July 2007 UCLA (University of California, Los Angeles), Los Angeles (USA)

Conferences organization

- INdAM workshop "A place where mathematics, clinics, and industry meet Biomedical Imaging", 6 – 10 February 2017, Roma (Italy)
- "Calcolo scientifico e modelli matematici - Alla ricerca delle cose nascoste attraverso le cose manifeste" Dipartimento di Matematica, Università di Genova, 3 – 6 June 2015, Genova (Italy)

Invited talks

- "Bayesian Tracking of neural activity in biomagnetic data", INRIA, Sophia Antipolis (France), 28 March 2014
- "Spatio-temporal reconstruction of brain activity using magnetoencephalography and particle filter", Dipartimento di Matematica, Università di Trento (Italy), 29 March 2012

Talks in international meetings

- "XIII Congresso SIMAI", Milan (Italy), 13 – 16 September 2016. Title: "Some finite bounds for testing the Hough regularity of special classes of algebraic curves"
- "SPIE Medical Imaging 2016", San Diego (USA), 27 February – 3 March 2016. Software demo presentation
- "SIAM Conference on Imaging Science (SIAM-IS14)", Hong Kong, 12 – 14 May 2014. Title: "Detection of Bone Profiles in CT Images by Means of the Hough Transform"
- "8th International Symposium on Image and Signal Processing and Analysis", Trieste (Italy), 4 – 6 September 2013. Title: "Pattern recognition in medical imaging by means of the Hough transform of curves"

- "CIMAB GASVA SIMAI: Workshop on Theoretical Approaches and Related Mathematical Methods in Biology, Medicine and Environment", Milan (Italy), 4 – 6 April 2013. Title: "Cortical constraints for particle filtering in Magnetoencephalography"
- "LASTU annual seminar" Gustavelund, Tuusula (Finland), 6–8 April 2011. Title: "Nonlinear Canonical Correlation Analysis for the analysis of magnetoencephalographty data series"
- "XI Congresso SIMAI",, Rome (Italy), 15 – 19 September 2008. Title: "Bayesian Tracking of neural activity in biomagnetic data"
- "II Workshop in Methods for Image and Data Analysis (MIDA)", Verona (Italy), March 21 2007. Title: "A semi-analytic approach to the Bayesian tracking of neural currents"

Poster in international meetings

- C. Campi, A. Perasso, M. C. Beltrametti, M. Piana, G. Sambuceti, A, M. Massone, "HT-BONE: A graphical user interface for the identification of bone profiles in CT images via extended Hough transform", SPIE Medical Imaging 2016, San Diego (USA), 27 February – 3 March 2016
- C. Campi, A. Sorrentino , M. Piana, C. Braun, "Bayesian source modeling of MEG data for cerebellar activity assessment", 19th International Conference on Biomagnetism, Halifax (Canada), 24 – 28 August 2014
- A. Sorrentino, A.M. Massone, A. Pascarella, C. Campi, G. Luria, R.Aramini, V. Vivaldi S. Sommariva, M. Piana "Mathematical Methods in Neurophysiology", Dagli Atomi al Cervello, Milan (Italy), 27 January 2014
- C. Campi and A. Hyvärinen "Nonlinear Canonical Correlation Analysis for coupling brain activities in two-person MEG data", Human Brain Mapping 2011, Quebec City (Canada), 26 – 30 June 2011
- C. Campi, A. Pascarella, M. Piana, A. Sorrentino "A guide through HADES – The Particle Filter for MEG", 17th International Conference on Biomagnetism, Dubrovnik (Croatia), 28 March – 1 April 2010
- A. Sorrentino, C. Campi, A. Pascarella, M. Piana, M.S. Hämäläinen "Cortical constraints for particle filtering in Magnetoencephalography", Human Brain Mapping 2009, San Francisco (USA), 18 – 23 June 2009
- C. Campi, L. Parkkonen, A. Pascarella, A. Sorrentino, A.M. Massone, M. Piana "Particle Filter in MEG (PFM): a Novel Method to Track Multiple Neural Sources in Biomagnetic Data", Human Brain Mapping 2007, Chicago (USA), 10 – 14 June 2007
- A. Sorrentino, L. Parkkonen, A. Pascarella, C. Campi, M. Piana "Bayesian Tracking of Rhythmic Activity", Neuroscience Today 2007, Florence (Italy), 25 – 28 March 2007

Partecipation in workshop

- "Disentangling the brain web: a perspective from Magnetoencephalography", Institute of Advanced Biomedical Technologies (ITAB), Università "G. d'Annunzio", Chieti (Italy), 16 – 17 September 2015
- "Polo Tecnobionet 2011-2014: Risultati e Prospettive Future di Sviluppo", Genova (Italy), 7 November 2014

- "Tübingen MEG Symposium 2014", Tübingen (Germany), 27 – 28 October 2014
- "Stem cells e imaging tools and development", Tecnobionet, IRCCS San Martino–IST, Genova (Italy) , 27 – 28 June 2013
- "Trends in Computational Sciences", Genova (Italy), 28 June 2006

Attendance at summer school

- "CIFAR Summer School: Neural Computation and Adaptive Perception", Canadian Institute for Advanced Research, Toronto (Canada), 2 – 6 August 2011
- "Graduate Summer School: Probabilistic Models of Cognition: The Mathematics of Mind", UCLA, Los Angeles (USA), 9 – 26 July 2007

Reviewer activity

- Reviewer for Computer Methods and Programs in Biomedicine
- Reviewer for Remote Sensing
- Referee of projects for the 2016 Call for Proposals "Research projects in physics, mathematics or engineering sciences relating to Cancer" organized by Cancer TMOI of the French National Alliance for Life and Health Sciences (AVIESAN) jointly with the French National Cancer Institute (INCa)
- "International Conference on Artificial Neural Networks 2011 (ICANN 2011)", 14 – 17 June 2011, Espoo (Finland)

Journal Publications

2016 C. Marini, A. Cistaro, C. Campi, A. Calvo, C. Caponnetto, S. Morbelli, P. Fania, M. C. Beltrametti, C. Moglia, G. Novi, A. Buschiazzo, A. Perasso, A. Canosa, C. Scialò, E. Pomposelli, A. M. Massone, S. Cammarosano, F. M. Nobili, P. Bruzzi, G. Sambuceti, G. Mancardi, M. Piana, and A. Chiò. "A PET/CT approach to spinal cord metabolism in amyotrophic lateral sclerosis". In: *European Journal of Nuclear Medicine and Molecular Imaging* 43, pp. 2061–2071.

2015 F. Fiz, C. Marini, C. Campi, A. M. Massone, M. Podestà, G. Bottoni, R. Piva, F. Bongioanni, A. Bacigalupo, M. Piana, G. Sambuceti, and F. Frassoni. "Allogeneic cell transplant expands bone marrow distribution by colonizing previously abandoned areas: an FDG PET/CT analysis". In: *Blood* 125.26, pp. 4095 –4102.

2015 V. Gizzonio, P. Avanzini, C. Campi, S. Orivoli, B. Piccolo, G. Cantalupo, C. A. Tassinari, G. Rizzolatti, and M. Fabbri-Destro. "Failure in pantomime execution correlates with the severity of social behavior deficits in children with autism: A praxis study". In: *Journal of Autism and Developmental Disorders* 45.10, pp. 3085–3097.

2015 A. M. Massone, A. Perasso, C. Campi, and M. C. Beltrametti. “Profile detection in medical and astronomical images by means of the Hough transform of special classes of curves”. In: *Journal of Mathematical Imaging and Vision* 51.2, pp. 296 –310.

2015 A. Perasso, C. Campi, C. Toraci, F. Benvenuto, M. Piana, and A.M. Massone. “Application of Possibilistic C-Means for fault detection in Nuclear Power Plant data”. In: *Journal of Engineering for Gas Turbines and Power* 137.

2014 M. Fabbri-Destro, P. Avanzini, E. De Stefani, A. Innocenti, C. Campi, and M. Gentilucci. “Interaction between words and symbolic gestures as revealed by N400”. In: *Brain Topography* 28.4, pp. 591 –605.

2014 F. Fiz, C. Marini, R. Piva, M. Miglino, M. Massollo, F. Bongioanni, S. Morbelli, G. Bottoni, C. Campi, A. Bacigalupo, P. Bruzzi, F. Frassoni, M. Piana, and G. Sambuceti. “Adult Advanced Chronic Lymphocytic Leukemia: Computational Analysis of Whole-Body CT Documents a Bone Structure Alteration”. In: *Radiology* 271.3, pp. 805–813.

2014 V. Gizzonio, P. Avanzini, M. Fabbri-Destro, C. Campi, and G. Rizzolatti. “Cognitive abilities in siblings of children with Autism Spectrum Disorders”. In: *Experimental Brain Research* 232, pp. 2381–2390.

2013 P. Avanzini, M. Fabbri-Destro, C. Campi, A. Pascarella, G. Barchiesi, L. Cattaneo, and G. Rizzolatti. “Spatiotemporal dynamics in understanding hand–object interactions”. In: *Proceedings of the National Academy of Sciences of the United States of America* 110.40, pp. 15878–15885.

2013 C. Campi, L. Parkkonen, R. Hari, and A. Hyvärinen. “Non-linear canonical correlation for joint analysis of MEG signals from two subjects”. In: *Frontiers in Neuroscience* 7.107.

2013 C. Marini, B. Salani, M. Massollo, A. Amaro, A. Esposito, A. M. Orengo, S. Capitanio, L. Emionite, M. Riondato, G. Bottoni, C. Massara, S. Boccardo, M. Fabbi, C. Campi, S. Ravera, G. Angelini, S. Morbelli, M. Cilli, R. Cordera, M. Truini, D. Maggi, U. Pfeffer, and G. Sambuceti. “Direct inhibition of hexokinase activity by metformin at least partially impairs glucose metabolism and tumor growth in experimental breast cancer”. In: *Cell Cycle* 12, pp. 3490 –3499.

2012 G. Sambuceti, M. Brignone, C. Marini, M. Massollo, F. Fiz, S. Morbelli, A. Buschiazzo, C. Campi, R. Piva, A.M. Massone, M. Piana, and F. Frassoni. “Estimating the whole bone marrow asset in humans by a computational approach to integrated PET/CT imaging”. In: *European Journal of Nuclear Medicine and Molecular Imaging* 39, p. 1326.

2011 C. Campi, A. Pascarella, A. Sorrentino, and M. Piana. “Highly Automated Dipole EStimation”. In: *Computational Intelligence and Neuroscience*.

2011 S. Pursiainen, A. Sorrentino, C. Campi, and M. Piana. “Forward simulation and inverse dipole localization with lowest order Raviart-Thomas elements for electroencephalography”. In: *Inverse Problems* 27.

2010 A. Pascarella, A. Sorrentino, C. Campi, and M. Piana. “Particle filtering, beamforming and multiple signal classification for the analysis of magnetoencephalography time series: a comparison of algorithm”. In: *Inverse Problems and Imaging* 4, pp. 169–190.

2009 A. Sorrentino, L. Parkkonen, A. Pascarella, C. Campi, and M. Piana. “Dynamical MEG Source Modeling with Multi-Target Bayesian Filtering”. In: *Human Brain Mapping* 30, pp. 1911–1921.

2008 C. Campi, A. Pascarella, A. Sorrentino, and M. Piana. “A Rao-Blackwellized particle filter for magnetoencephalography”. In: *Inverse Problems* 24, p. 025023.

Conference Publications

2016 C. Campi, A. Perasso, M. C. Beltrametti, G. Sambuceti, M. Piana, and A. M. Massone. “HT-BONE: A Graphical User Interface for the identification of bone profiles in CT images via extended Hough transform”. In: *Proceedings of SPIE, Medical Imaging 2016: Image Processing*. Vol. 9784, p. 978423.

2015 A. Perasso, C. Campi, M. C. Beltrametti, and A. M. Massone. “Spinal Canal and Spinal Marrow Segmentation by Means of the Hough Transform of Special Classes of Curves”. In: *Image Analysis and Processing — ICIAP 2015*. Vol. 9279. Lecture Notes in Computer Science, Springer-Verlag, pp. 590 –600.

2013 C. Campi, A. Perasso, M. C. Beltrametti, A. M. Massone, G. Sambuceti, and M. Piana. “Pattern recognition in medical imaging by means of the Hough transform of curves”. In: *Proceedings of ISPA 2013, 8th International Symposium on Image and Signal Processing and Analysis, Trieste, Italy, September 4–6, 2013*. Ed. by A. Carini G. Ramponi S. Lončarić and K. Egiazarian, pp. 273–276.

2009 C. Campi, A. Pascarella, A. Sorrentino, and M. Piana. “Bayesian tracking of neural activity in biomagnetic data”. In: *Communications to SIMAI Congress*, vol. 3.

2008 A. Sorrentino, A. Pascarella, C. Campi, and M. Piana. “A comparative analysis of algorithms for the magnetoencephalography inverse problem”. In: *Journal of Physics: Conference Series*. Vol. 135.

2008

A. Sorrentino, A. Pascarella, C. Campi, and M. Piana. “Particle filters for magnetoencephalography inverse problem: increasing the efficiency through a semi-analytic approach”. In: *Journal of Physics: Conference Series*. Vol. 124.

Degree thesis advisor

- “Calcolo numerico per un problema di imaging medico funzionale”, Bachelor’s Degree in Mathematics, Università degli Studi di Genova
- “Costruzione del proiettore per un tomografo microPET”, Master’s Degree in Mathematics, Università degli Studi di Genova
- “Metodi di ricostruzione di immagini in tomografia ad emissioni di positroni per piccoli animali”, Master’s Degree in Mathematics, Università degli Studi di Genova
- “Strumenti di algebra lineare per il pre-processing di dati neurofisiologici”, Bachelor’s Degree in Mathematics, Università degli Studi di Genova

Teaching activity

2016 – 2017 Teacher for the course “Application of Mathematics to Medicine”, Dipartimento di Matematica, Università degli Studi di Genova

2015 – 2016 Teacher for the course “Application of Mathematics to Medicine”, Dipartimento di Matematica, Università degli Studi di Genova

2015 – 2016 Tutor for the course "Calcolo Numerico" for the degree in Mechanical Engineering, Università degli Studi di Roma “La Sapienza”

2015 – 2016 Seminars on “Inverse Problems” for grad students, Università degli Studi di Roma “La Sapienza”

2009 – 2010 Tutor for first year courses at the Dipartimento di Biologia, Università degli Studi di Genova

2008 – 2009 Tutor for first year courses at the Dipartimento di Matematica, Università degli Studi di Genova

2008 – 2009 Teaching assistant for the course “Informatica per Applicazioni Navali 1” at the Dipartimento di Ingegneria, Università degli Studi di Genova

2007 – 2008 Tutor for first year courses at the Dipartimento di Matematica, Università degli Studi di Genova

2007 – 2008 Teaching assistant for the course “Matematica II” at the Dipartimento di Ingegneria, Università degli Studi di Genova