

PERSONAL INFORMATION

Giacomo Mazzamuto giacomo.mazzamuto@ino.cnr.it mazzamuto@lens.unifi.it <https://github.com/gmazzamuto> <https://github.com/lens-biophotonics> ORCID 0000-0003-3077-3904

CURRENT WORKING LEVEL

EPR: Level III Researcher

WORK EXPERIENCE

jul 2019 – present

Level III Researcher**Consiglio Nazionale delle Ricerche, Istituto Nazionale di Ottica CNR-INO**

jul 2018 – jun 2019

Assegnista di ricerca**European Laboratory for Non-Linear Spectroscopy (Laboratorio Europeo di Spettroscopie non Lineari - LENS), Università di Firenze**

Human Brain Project, Specific Grant Agreement 2 (HBP-SGA2).

nov 2016 – jun 2018

Tecnologo di I livello, categoria EP**European Laboratory for Non-Linear Spectroscopy (Laboratorio Europeo di Spettroscopie non Lineari - LENS), Università di Firenze**

Project: Human Brain Project (HBP-SGA1)

Profile: Big data software engineer / machine learning developer

apr 2015 – nov 2016

Assegnista di ricerca**Consiglio Nazionale delle Ricerche, Istituto Nazionale di Ottica CNR-INO**

Project GRANCASSA ("Grafene ed effetto Casimir per Sensoristica Avanzata")

apr 2012 – mar 2015

Assegnista di ricerca**European Laboratory for Non-Linear Spectroscopy (Laboratorio Europeo di Spettroscopie non Lineari - LENS), Università di Firenze**

Project MALICIA (Light-Matter Interfaces in Absence of Cavities), single-photon quantum emitters based on organic Dibenzoterrylene (DBT) molecules in anthracene crystals.

EDUCATION AND TRAINING

apr 2012 – nov 2015

International Doctorate in Atomic and Molecular Photonics**European Laboratory for Non-Linear Spectroscopy (Laboratorio Europeo di Spettroscopie non Lineari - LENS), Università di Firenze**

Tesi: Single Organic Molecules and Light Transport in Thin Films (SSD: FIS/03)

Final examination: excellent

2009 – dec 2011

Master of Science in Physics and Astrophysics**Università degli Studi di Firenze** Final examination: 110/110 *cum laude*

2004 – dec 2008

Bachelor of Science in Physics**Università degli Studi di Firenze** Final examination: 110/110

SELECTED PROJECTS

01/09/2023 – present	(co-PI for the LENS unit) BRAIN CONNECTS: Mapping Connectivity of the Human Brainstem in a Nuclear Coordinate System, US National Institutes of Health (NIH), Grant n. U01NS132181
01/11/2023 – present	(co-PI) NEUROCIG: A systematic analysis of neuronal activity alterations during chronic cigarette smoke and e-cigarette vapor exposure and withdrawal in the mouse. PRIN 2022SCK8MW
01/11/2022 – present	Responsabile di unità CNR-INO EBRAINS-Italy: Infrastruttura di Ricerca IR00011 PNRR
01/10/2020 – 31/12/2021	(PI) BIGBRAIN – Gestione dei big data per la mappatura ad alta risoluzione dell'intero cervello, Fondazione CR Firenze
22/08/2018 – 31/5/2023	(co-PI for the LENS unit) Imaging and analysis techniques to construct a cell-census atlas of the human brain, BRAIN Initiative Cell Census Network, US National Institutes of Health (NIH), Grant n. 1U01MH117023-01
01/10/2020 – present	REPAIR – Restoring Cardiac Mechanical Function by Polymeric Artificial Muscular Tissue, Grant Agreement n. 952166 European Commission
01/04/2020 – 30-09-2023	Human Brain Project SGA3. Grant agreement n. 945539 European Commission
01/04/2018 – 31/03/2020	Human Brain Project SGA2. Grant agreement n. 785907 European Commission
14/11/2016 – 31/03/2018	Human Brain Project SGA1. Grant agreement n. 720270 European Commission
01/01/2018 – 31/12/2018	Member of the Joint Technical Committee 1 of the International Organization for Standardization (ISO) SC29, "Coding of Audio, Picture, Multimedia and Hypermedia Information" and UNINFO (Ente Italiano federato all'UNI per le tecnologie informatiche e loro applicazioni)

SOFTWARE DEVELOPMENT

C++ GUI	SPIMlab: a data acquisition and control software Ligh Sheet Microscopy. https://github.com/lens-biophotonics/SPIMlab
Python package	ZetaStitcher: a tool designed to stitch large volumetric images such as those produced by Light-Sheet Fluorescence Microscopes. https://github.com/lens-biophotonics/ZetaStitcher
C++ library	MCPlusPlus: A Monte Carlo C++ code for radiative transport. G. Mazzamuto, L. Pattelli. www.lens.unifi.it/quantum-nanophotonics/mcplusplus
CUDA	CUDA-accelerated Electromagnetic scattering for Large Ensembles of Spheres. https://github.com/disordered-photonics/celes

COMPETENCES

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C1	C1	C1
	TOEFL IBT, score 109/120, September 2013 (Test Of English as a Foreign Language)				
French	B2	C1	B1	B2	B2
	DELFI (Diplôme d'Études en Langue Française)				

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
[Common European Framework of Reference for Languages](https://www.europecollege.edu/CEFR/)

Digital skills	Advanced knowledge of operating systems: Linux, UNIX, Mac OS, Windows. Advanced knowledge of the following programming languages and tools: C, C++, Qt framework, Python (Numpy, Scipy, Pandas, Dask, Jupyter), Bash scripting, Boost C++ Libraries, MATLAB, FFTW, GSL
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PUBLICATIONS

- [1] Xiangrui Zeng, Oula Puonti, Areej Sayeed, Rogeny Herisse, Jocelyn Mora, Kathryn Evancic, Divya Varadarajan, Yael Balbastre, Irene Costantini, Marina Scardigli, Josephine Ramazzotti, Danila DiMeo, **Giacomo Mazzamuto**, Luca Pesce, Niamh Brady, Franco Cheli, Francesco Saverio Pavone, Patrick R Hof, Robert Frost, Jean Augustinack, André Van Der Kouwe, Juan Eugenio Iglesias, and Bruce Fischl. "Segmentation of supragranular and infragranular layers in ultra-high-resolution 7T *ex vivo* MRI of the human cerebral cortex". In: *Cerebral Cortex* 34.9 (Sept. 3, 2024), bhae362. URL: <https://doi.org/10.1093/cercor/bhae362>.
- [2] Russell A. Poldrack et al. "The past, present, and future of the brain imaging data structure (BIDS)". In: *Imaging Neuroscience* 2 (Mar. 8, 2024), pp. 1–19. URL: https://doi.org/10.1162/imag_a_00103.
- [3] Ernesto Pini, **Giacomo Mazzamuto**, Francesco Riboli, Diederik S. Wiersma, and Lorenzo Pattelli. "Non-self-similar light transport in scattering media". In: *Physical Review Research* 6.3 (July 31, 2024), p. L032026. URL: <https://doi.org/10.1103/PhysRevResearch.6.L032026>.
- [4] Danila Di Meo, Josephine Ramazzotti, Marina Scardigli, Franco Cheli, Luca Pesce, Niamh Brady, **Giacomo Mazzamuto**, Irene Costantini, and Francesco S. Pavone. "Optical Clearing and Labeling for Light-sheet Fluorescence Microscopy in Large-scale Human Brain Imaging". In: *Journal of Visualized Experiments* 203 (Jan. 26, 2024), p. 65960. URL: <https://dx.doi.org/10.3791/65960>.
- [5] Michele Sorelli, Irene Costantini, Leonardo Bocchi, Markus Axer, Francesco Saverio Pavone, and **Giacomo Mazzamuto**. "Fiber enhancement and 3D orientation analysis in label-free two-photon fluorescence microscopy". In: *Scientific Reports* 13.1 (Mar. 13, 2023), p. 4160. URL: <https://doi.org/10.1038/s41598-023-30953-w>.
- [6] Lorenzo Pattelli and **Giacomo Mazzamuto**. "Experimental imaging and Monte Carlo modeling of ultrafast pulse propagation in thin scattering slabs". In: *Journal of Biomedical Optics* 27.8 (June 2, 2022). URL: <https://doi.org/10.1117/1.JBO.27.8.083020>.
- [7] Marie-Hélène Bourget, Lee Kamentsky, Satrajit S. Ghosh, **Giacomo Mazzamuto**, Alberto Lazari, Christopher J. Markiewicz, Robert Oostenveld, Guiomar Niso, Yaroslav O. Halchenko, Ilona Lipp, Sylvain Takerkart, Paule-Joanne Toussaint, Ali R. Khan, Gustav Nilsson, Filippo Maria Castelli, The BIDS Maintainers, and Julien Cohen-Adad. "Microscopy-BIDS: An Extension to the Brain Imaging Data Structure for Microscopy Data". In: *Frontiers in Neuroscience* 16 (2022), p. 871228. URL: <https://doi.org/10.3389/fnins.2022.871228>.
- [8] Luca Pesce, Marina Scardigli, Vladislav Gavryusev, Annunziata Laurino, **Giacomo Mazzamuto**, Niamh Brady, Giuseppe Sancataldo, Ludovico Silvestri, Christophe Destrieux, Patrick R. Hof, Irene Costantini, and Francesco S. Pavone. "3D molecular phenotyping of cleared human brain tissues with light-sheet fluorescence microscopy". In: *Communications Biology* 5.1 (2022), p. 447. URL: <https://doi.org/10.1038/s42003-022-03390-0>.
- [9] Claudia Capitini, Luca Pesce, Giulia Fani, **Giacomo Mazzamuto**, Massimo Genovese, Alessandra Franceschini, Paolo Paoli, Giuseppe Pieraccini, Michael Zasloff, Fabrizio Chiti, Francesco S. Pavone, and Martino Calamai. "Studying the trafficking of labeled trodusquemine and its application as nerve marker for light-sheet and expansion microscopy". In: *The FASEB Journal* 36.12 (Dec. 2022). URL: <https://doi.org/10.1096/fj.202201276R>.
- [10] Marina Scardigli, Luca Pesce, Niamh Brady, **Giacomo Mazzamuto**, Vladislav Gavryusev, Ludovico Silvestri, Patrick R. Hof, Christophe Destrieux, Irene Costantini, and Francesco S. Pavone. "Comparison of Different Tissue Clearing Methods for Three-Dimensional Reconstruction of Human Brain Cellular Anatomy Using Advanced Imaging Techniques". In: *Frontiers in Neuroanatomy* 15 (2021), p. 90. URL: <https://doi.org/10.3389/fnana.2021.752234>.
- [11] L Silvestri, MC Müllenbroich, I Costantini, AP Di Giovanna, **G Mazzamuto**, A Franceschini, D Kutra, A Kreshuk, C Checcucci, LO Toresano, P Frascioni, L Sacconi, and FS Pavone. "Universal autofocus for quantitative volumetric microscopy of whole mouse brains". In: *Nature Methods* 18.8 (2021), pp. 953–958. URL: <https://doi.org/10.1038/s41592-021-01208-1>.

- [12] I Costantini, **G Mazzamuto**, M Roffilli, A Laurino, FM Castelli, M Neri, G Lughi, A Simonetto, E Lazzeri, Luca Pesce, C Destrieux, L Silvestri, V Conti, R Guerrini, and Pavone FS. "Large-scale, cell-resolution volumetric mapping allows layer-specific investigation of human brain cytoarchitecture". In: *Biomedical Optics Express* 12.6 (2021). Publisher: Optical Society of America, pp. 3684–3699. URL: <https://doi.org/10.1364/B0E.415555>.
- [13] Irene Costantini, Enrico Baria, Michele Sorelli, Felix Matuschke, Francesco Giardini, Miriam Menzel, **Giacomo Mazzamuto**, Ludovico Silvestri, Riccardo Cicchi, Katrin Amunts, Markus Axer, and Francesco Saverio Pavone. "Autofluorescence enhancement for label-free imaging of myelinated fibers in mammalian brains". In: *Scientific Reports* 11.1 (2021), p. 8038. URL: <https://doi.org/10.1038/s41598-021-86092-7>.
- [14] Simone Zanolto, **Giacomo Mazzamuto**, Francesco Riboli, Giorgio Biasiol, Giuseppe C. La Rocca, Alessandro Tredicucci, and Alessandro Pitanti. "Photonic bands, superchirality, and inverse design of a chiral minimal metasurface". In: *Nanophotonics* (2019). Publisher: De Gruyter. URL: <https://doi.org/10.1515/nanoph-2019-0321>.
- [15] M Caroline Müllenbroich, Ludovico Silvestri, Antonino P Di Giovanna, **Giacomo Mazzamuto**, Irene Costantini, Leonardo Sacconi, and Francesco S Pavone. "High-Fidelity Imaging in Brain-Wide Structural Studies Using Light-Sheet Microscopy". In: *eNeuro* (2018). Publisher: Society for Neuroscience, ENEURO–0124. URL: <https://doi.org/10.1523/ENEURO.0124-18.2018>.
- [16] **G Mazzamuto**, I Costantini, M Neri, M Roffilli, L Silvestri, and FS Pavone. "Automatic Segmentation of Neurons in 3D Samples of Human Brain Cortex". In: *International Conference on the Applications of Evolutionary Computation*. Springer, 2018, pp. 78–85. URL: https://doi.org/10.1007/978-3-319-77538-8_6.
- [17] **Giacomo Mazzamuto**. "HEVC for high-resolution biomedical tomographies". In: *121st MPEG meeting, International Organization for Standardization (ISO)*. 2018, p. m42109.
- [18] P Lombardi, AP Ovvy, S Pazzagli, **G Mazzamuto**, G Kewes, O Neitzke, N Gruhler, O Benson, WHP Pernice, FS Cataliotti, and C Toninelli. "Photostable Molecules on Chip: Integrated Sources of Nonclassical Light". In: *ACS Photonics* 5.1 (2018), pp. 126–132. URL: <https://doi.org/10.1021/acsp Photonics.7b00521>.
- [19] Amos Egel, Lorenzo Pattelli, **Giacomo Mazzamuto**, Diederik S. Wiersma, and Uli Lemmer. "CELES: CUDA-accelerated simulation of electromagnetic scattering by large ensembles of spheres". In: *Journal of Quantitative Spectroscopy and Radiative Transfer* 199 (2017), pp. 103–110. URL: <https://doi.org/10.1016/j.jqsrt.2017.05.010>.
- [20] Lorenzo Pattelli, **Giacomo Mazzamuto**, Diederik S Wiersma, and Costanza Toninelli. "Diffusive light transport in semitransparent media". In: *Physical Review A* 94.4 (2016). Publisher: APS, p. 043846. URL: <https://doi.org/10.1103/PhysRevA.94.043846>.
- [21] Günter Kewes, Max Schoengen, Oliver Neitzke, Pietro Lombardi, Rolf-Simon Schönfeld, **Giacomo Mazzamuto**, Andreas W Schell, Jürgen Probst, Janik Wolters, Bernd Löchel, Costanza Toninelli, and Oliver Benson. "A realistic fabrication and design concept for quantum gates based on single emitters integrated in plasmonic-dielectric waveguide structures". In: *Scientific Reports* 6.28877 (2016). Publisher: Nature Publishing Group. URL: <https://doi.org/10.1038/srep28877>.
- [22] **Giacomo Mazzamuto**, Lorenzo Pattelli, Costanza Toninelli, and DS Wiersma. "Deducing effective light transport parameters in optically thin systems". In: *New Journal of Physics* 18.2 (2016). Publisher: IOP Publishing, p. 023036. URL: <https://doi.org/10.1088/1367-2630/18/2/023036>.
- [23] Fabrizio Sgrignuoli, **Giacomo Mazzamuto**, Niccolò Caselli, Francesca Intonti, Francesco Saverio Cataliotti, Massimo Gurioli, and Costanza Toninelli. "Necklace state hallmark in disordered 2D photonic systems". In: *ACS Photonics* 2.11 (2015), pp. 1636–1643. URL: <https://doi.org/10.1021/acsp Photonics.5b00422>.
- [24] **G Mazzamuto**, A Tabani, S Pazzagli, S Rizvi, A Reserbat-Plantey, K Schädler, G Navickaite, L Gaudreau, FS Cataliotti, F Koppens, and C Toninelli. "Single-molecule study for a graphene-based nano-position sensor". In: *New Journal of Physics* 16.11 (2014). Publisher: IOP Publishing, p. 113007. URL: <https://doi.org/10.1088/1367-2630/16/11/113007>.

Curriculum Vitae

PERSONAL INFORMATION

Family name, First name: **Toninelli, Costanza**
Researcher unique identifiers: Research ID: C-2184-2009, orcid.org/0000-0002-6843-058X,
SCOPUS AUTHOR ID: 24776990200

Nationality: **Italian**
Group web site: <http://www.quantumnanophotonics-lab.it>

CURRENT POSITION

03/11/2011-Present Permanent Researcher (PI)
National Research Council (CNR)/ National Institute of Optics (INO)
Associated to LENS, University of Florence (Italy)

CURRENT RESEARCH INTERESTS

In my lab, we study solid state quantum emitters and in particular organic molecules. In these systems, a strong interaction with light is combined with powerful designing of the chemical structure at the atomic level. **Our vision is to bring the flexibility of organic materials in quantum technologies by integrating isolated molecules in proper photonic platforms.** Addressing single molecules, we realize bright sources of non-classical light states as well as nanoscale sensors of fields, temperature and local defects. We have recently developed novel strategies to efficiently collect indistinguishable photons into single mode optical fibers, that have already been used for the metrological calibration of single photon detectors. Based on our recently-demonstrated technologies for in-situ tuning of the molecular resonance and for the selective coupling to complex photonic structures, we currently target the realization of large single-photon-source arrays. Also, we are developing single photon sources based on single molecules at room temperatures, to be specifically deployed for in-field quantum communications.

PREVIOUS POSITIONS

01/2009–06/2011 Post-Doctoral Research Associate
Laboratory of Physical Chemistry, ETH Zürich, (Switzerland)
(Research Group: Prof. V. Sandoghdar),
Research Activity: Nanophotonics and Quantum Optics with Single Molecules
2008 Visiting Researcher
Institut NonLinéaire de Nice, Nice, (France) (Research Group: D. Wilkowski)
Research Activity: Photonic Hall Effect from a cold atom cloud
02/2007–12/2008 Post-Doctoral Research Associate
European Laboratory for NonLinear Spectroscopy (LENS), Florence, (Italy)
Research Activity: Nanophotonics, Complex Systems, Wave Transport

EDUCATION AND TRAINING

2004–2007 Ph.D. Degree in Physics with Distinction
University of Florence (Mentor: Prof. D.S. Wiersma), Florence (Italy)
1998–2003 Master degree in Physics (Summa cum Laude)
University of Florence (Mentor: Prof. G.M.L. Tino), Florence (Italy)
2002 DEA (Ph.D. School) in Quantum Physics

Ecole Normale Supérieure de Paris, Paris (France)

AWARDS, FELLOWSHIPS

2017	Invited to Interview for the ERC Starting grant 2017
2017	Seal of Excellence in Marie Skłodowska-Curie actions
2011	Caroline von Humboldt prize for excellent young female researcher Humboldt University, Berlin (Germany)
2007	Firenze University Press 2007 (PhD Thesis with high scientific impact)

STUDENT SUPERVISION

I have the Italian national Professorship “abilitazione”.

03/11/2011-Present	Supervisor of 2 Bachelor, 4 Master, 7 PhD students, 2 Erasmus Mundus PhD Students at LENS and University of Florence, Florence (Italy)
01/2009–06/2011	Co-supervisor of 1 Bachelor student, 1 Master Student, 1 PhD student Laboratory of Physical Chemistry, ETH Zürich, (Switzerland)

TEACHING ACTIVITIES

2019	Lecturer - Complex Nanophotonics Science Camp (UK 11-14 August 2019)
2018	Lecturer – Varenna summer school “Nanoscale Quantum Optics”, PhD students, Varenna (IT)
2018	Lecturer – ADOPT winter school “Advanced Optics and Photonics”, PhD students, Romme (Sweden)
2017-2023	Seminars during the course by F.S. Cataliotti on Tecnologie Quantistiche, at University of Florence (Italy)
2016	Lecturer – Heraus seminar “Hybrid systems for quantum optics”, PhD students, Physikzentrum Bad Honnef (GE)
2014	Lecturer - Summer school “Quantum Information, Computing and Control”, PhD students, Exeter (UK)
2013	Teaching Assistant - Laboratory course on Advanced Spectroscopy Techniques University of Florence (Italy)
02-07/2010	Teaching Assistant - Spectroscopy Course, 4th year, ETH Zürich (CH)
02-07/2009	Teaching Assistant - Quantum Mechanics Course, 2nd year, ETH Zürich, (CH)

FUNDED GRANTS

2023 (5 years)	QUINTESSENCE, ERC-Co grant, (2 MEuro)
2020 (3 years)	SEQUE: Single-and entangled photon sources for quantum metrology; Local PI (1.8 MEuro)
2018 (3 Years)	ORQUID: Organic Quantum Integrated Devices: Coordinator (1.7 MEuro) QuantERA, EU ERANET on Quantum technologies
2018 (3 Years)	SIQUEST: Single-photon sources as new quantum standards; Local PI (1.8 MEuro) European Metrology Programme For Innovation And Research EMPIR
2018 (3 Years)	FASPEC: Fibre-Based Planar Antennas for Biosensing and Diagnostics: Local PI (100 kEuro for the PI) Regione Toscana (Italy)
2015 (3 Years)	Intermodal Secure Quantum Communication on Ground and Space: Local PI (30 kEuro for the PI)

2014 (2 Years)	MIUR (Ministry of University and Research, Italy) Atom-Based Nano-Technology: Scientific Coordinator (800 kEuro, out of which 120 kEuro for the PI)
2014 (6 Months)	MIUR (Ministry of University and Research, Italy) Electrical nano-diamond single-photon source (10 kEuro) EU (Nanophotonics for Energy Efficiency, Seed Project): Coordinator
2014 (2 Year)	Graphene-Based nano-position sensor (55 kEuro) Ente cassa di Risparmio di Firenze (Private Foundation)
2012 (6 Months)	OLEIT Organic Light Emitters for Information Transfer (31 kEuro): Coordinator EU (Nanophotonics for Energy Efficiency, Seed Project)

ORGANIZATION OF SCIENTIFIC MEETINGS

2022	Director of the workshop/school in Erice, Italy: "The foremost photonics 2022"
2021, 2020, 2019, 2017	CLEO committee member
2021	Co-Organizer of the famous Quantum Science Seminars (average 500 followers)
2018	Co-organizer of the Workshop: "Plasmonica" for SIOF, Florence (IT)
2018	International School of Physics "E. Fermi": Nanoscale Quantum Optics
2016	Single-Photon-Single-Spin Meeting – Co-organizer Oxford (GB)
2014	Fermi Colloquia, LENS, University of Florence - Chair, Florence (Italy)
2014	Material Research Society (MRS) - Chair, Boston (USA)
5/12/2008	50 Years of Anderson Localization, Symposium, Chair, Paris (FR)
2006	PhOREMOST Network of Excellence, Organizing Committee, Firenze (Italy)

PUBLIC OUTREACH

2022	Organizer of the exhibition Speakable and Unspeakable (https://qw.ino.cnr.it)
2019	Speaker for "Notti di scienza al teatro romano", Lecce (Italy)
2018-2019	Co-Organizer of the Festival "Scienza Estate", Florence (Italy)
2018-2019	CNR local Outreach coordinator
2017	Organizer of the "Festival of Light" for high school students, Florence (Italy)
2015	Organizer of the "Festival of Light", Florence (Italy)
2014	Interview for the Magazine Humboldt Chancengleich, November 2014 (Germany)
2014	Video Documentary for the 90 th Anniversary of the CNR (Italy)

INSTITUTIONAL RESPONSIBILITIES

2022	PhD Thesis Jury Member (I. Palestra), Amolf, Amsterdam (NL)
2021	PhD Thesis Rferee (V. Cimini), University of Roma 3, (It)
2020	Guest Editor for APL
2020	PhD Thesis Jury Member (U. Stella), Politecnico di Torino, (It)
2018	PhD Thesis Jury Member (S. Zhao), Ecole Normale Supérieure Paris Saclais, (Fr)
2018	PhD Thesis Jury Member (K. Schaedler), ICFO, Barcelona (ES)
2016	Scientific evaluator for the ANR, French National Research Agency (FR)
2014	PhD Thesis Jury Member, Karlsruhe Institute of Technology, Karlsruhe (GE)
2014	PhD Thesis Jury Member, Université Pierre et Marie Curie, Paris, (FR)
2012-2014	Organizer of Seminar cycle: Incontri di micro e nano-fotonica, LENS (IT)
2013-2016	Member of the Faculty Committee, University of Florence, (I)
2010-present	Reviewer for ERC Starting Grants, ACS, Nature, OSA publishing groups and Optical Materials journals

MEMBERSHIPS OF SCIENTIFIC SOCIETIES AND NETWORKS

- 2018-present Member of SIOF, Società Italiana di Ottica e Fotonica
- 2016-present Management Board Member, COST Action Nanoscale Quantum Optics
- 2014-present Member of the Material Research Society

- 2013-2014 Member of the Research Network “Nanophotonics for Energy Efficiency”

CAREER BREAK

I have two children, born on February 12th 2014 and on March 10th 2016, respectively. In both cases I was officially on maternity leave (5 months off and 7 months 50% employed each time).

INVITED PRESENTATIONS

- I have been invited to give plenary seminars and colloquia in many prestigious research institutes and universities, including the ICN2 University in Barcelona (2022), N. Bohr University Copenhagen (2023), the German Transregional Collaborative Research Center “Quantum Cooperativity of Light and Matter” (June 2021), the Humboldt University in Berlin (November 2020), CDT Advanced Lecture - Cambridge Graphene Centre (UK) (2019), TU University of Vienna (2017), the Imperial College (London, UK 2015), ICFO (Barcelona, SP 2013), the Humboldt University (Berlin, GE 2011), the Columbia University (New York 2010).
- I have held invited talk to over 30 international workshops and conferences, including Quantum 2.0 (Denver 2023), the Lavoisier conference: Quantum Emitters in 2D (Nice 2023), DPG conference on solid state (Regensburg 2022), HBSM conf. (Bayreuth 2022), BQIT (Bristol 2020), SPIE Photonics Europe (2020), Frontiers in Optics 2020, “Quantum” (Torino, May 2019), “13TH European Conference On Atoms, Molecules And Photons” (Florence 2019), Workshop on “Quantum Nanophotonics” (Benasque 2019), “Heraus Workshop on Quantum Networks” (Bad Honnef 2018), “Engineering of Quantum emitter properties” (Rome, 2018), SPIE conference San Diego (USA 2017), SCOM (San Sebastian, SP 2016), the Material Research Society Fall Meeting, (Boston, USA 2014), the GDR MesolImage Summer School, (Cargese, FR 2014), ICTON conference, (München, GE 2010), 50 Years of Anderson Localization Symposium, (Paris FR 2008) and OSA Topical Meeting, (Jackson hole, Wyoming USA, 2007).
- I have been Lecturer for the international Summer School for Quantum Communication Information and Control, in Exeter (UK 2014), the Europhotonics Spring School (Paderborn GE 2014), the Heraus seminar “Hybrid systems for quantum optics” in Bad Honnef (GE 2016) and invited as a lecturer to the Heraus seminars on “Quantum Networks” (Bad Honnef 2018), ADOPT winter school on quantum photonic technologies (Romme, Sweden March 2018), Complex Nanophotonics Science Camp (UK 11-14 August 2019), the Varenna Summer school (2018), Complex Nanophotonics Science Camp (UK 11-14 August 2019), DK ALM (PhD Atom Light Molecule, Innsbruck) summerschool 2021.

MAJOR COLLABORATIONS

Prof. F. Koppens, Institute of Photonic Sciences (ICFO) in Barcelona (Spain)

Prof. O. Benson, Humboldt University in Berlin (Germany)

Prof. D.S. Wiersma and **Prof. F.S. Cataliotti**, University of Florence, (Italy)

Dr. M. Agio, Siegen University (Germany)

Prof. W. Pernice, University of Muenster (Germany)

Prof. N. F. van Hulst, Institute of Photonic Sciences (ICFO) in Barcelona (Spain)

Prof. M. Orrit, University of Leiden, (The Netherlands)

LIST of SELECTED PEER-REVIEWED PUBLICATIONS

1. V Estesó, R Duquennoy, RC Ng, M Colautti, P Lombardi, G Arregui, E Chavez-Ángel, CM Sotomayor-Torres, PD García, M Hilke, C Toninelli, “Quantum thermometry with single molecules in portable nanoprobe”, *Phys. Rev. X Quantum* **4**, 040314 (2023)
2. R. Duquennoy, M. Colautti, P. Lombardi, V. Berardi, I. Gianani, C. Toninelli, and M. Barbieri, “Singular Spectrum Analysis of Two Photon Interference from Distinct Quantum Emitters”, *Phys. Rev. Research* **5**, 023191 – (2023)

3. G.Murtaza et al., "Efficient room-temperature molecular single-photon sources for quantum key distribution", (2022) <https://doi.org/10.48550/arXiv.2202.12635>, Optics Express
4. R. Duquennoy, M. Colautti, R. Emadi, P. Majumder, P. Lombardi, C. Toninelli, "Real-time two-photon interference from distinct molecules on the same chip", Optica 9, 731-737 (2022)
5. P. Lombardi et al., "Triggered emission of indistinguishable photons from an organic dye molecule", Appl. Phys. Lett. 118, 204002 (2021); <https://doi.org/10.1063/5.0048567>
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24. G. Mazzamuto, L. Pattelli, C. Toninelli and D.S. Wiersma, "Deducing effective light transport parameters in optically thin systems", *New J. Phys.* 18, 023036 (2016)
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Curriculum Vitae

INFORMAZIONI PERSONALI

ISTRUZIONE

Abilitazione all'esercizio della professione di chimico

2011

Dottorato di Ricerca in Spettroscopia Atomica e Molecolare

2011-2013

LENS-European Laboratory for Non-Linear Spectroscopy,

Università di Firenze

Formazione nell'uso di sistemi laser e nella progettazione e applicazione di tecniche spettroscopiche continue e pulsate. Caratterizzazione di processi di trasferimento di carica ed energia mediante tecniche di spettroscopia transiente con risoluzione al femtosecondo nel campo dell'UV/VIS. Sintesi chimica di sistemi metallici ed inorganici nanostrutturati: Quantum Dots, nanoparticelle e nanotubi di biossido di titanio e nanoparticelle d'oro. Lavoro di tesi svolto in collaborazione con l'Università di Perugia e l'Istituto ENI Donegani finalizzato allo studio di processi a trasferimento di carica ed energia in sistemi molecolari e nanostrutturati per lo sviluppo di sistemi fotovoltaici di nuova generazione.

Associato INO-CNR negli anni 2012 e 2013.

Dottorato conseguito in data 17/03/2014

Laurea Specialistica in Scienze Chimiche - Indirizzo Chimica Fisica

2008-2010

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Competenze nelle principali tecniche spettrofotometriche e loro applicazioni, caratterizzazione di proprietà molecolari, processi di catalisi e catalizzatori, modelli di dinamica in sistemi fluidi e gassosi e sviluppo di database in rete. Tesi di laurea incentrata nella sintesi di biossido di titanio nanostrutturato e caratterizzazione dei processi di trasferimento di carica con coloranti organici attraverso tecniche fotochimiche e di flash photolysis per potenziali applicazioni in ambito fotovoltaico.

Laurea conseguita in data 15/07/2010 con votazione 110/110 e lode

Laurea Triennale in Chimica

2005-2008

Università di Perugia

Acquisite conoscenze in chimica analitica, organica, fisica, ambientale, inorganica, biochimica, ottimizzazione di processi industriali e sicurezza nei laboratori. Tesi di laurea incentrata nella sintesi di nanoparticelle di oro e nello studio delle loro interazioni con peptidi e coloranti organici.

Laurea conseguita in data 31/10/2008 con votazione 110/110

Diploma Tecnico Industriale, Spec. Chimico

2000-2005

I.T.I.S. Montani, Fermo

Progettazione di impianti chimici industriali, analisi chimiche qualitative e quantitative, sintesi organica, gestione e organizzazione di un laboratorio chimico.

Diploma conseguito nel Luglio 2015 con votazione 97/100

ESPERIENZE LAVORATIVE

Ricercatore

2022-in corso

Istituto Nazionale di Ottica (INO-CNR), LENS-Università di Firenze

IRicercatore a tempo indeterminato. Lavoro incentrato nella caratterizzazione e sviluppo di nuovi materiali fotonici, sia organici che inorganici, attraverso l'applicazione di tecniche spettroscopiche transienti ultraveloci

Docente

2018-2021

Scuola secondaria

Insegnate di Chimica presso le scuole secondarie di II grado e matematica e scienze presso le scuole secondarie di I grado

Assegno di ricerca

2014-2017

Istituto Nazionale di Ottica (INO-CNR), LENS-Università di Firenze, Full-time

Assegno di ricerca nell'ambito del Progetto ELI Network, Extreme Light Infrastructure, per la caratterizzazione di proprietà ottiche non-lineari di composti organici interagenti con nanostrutture. Lavoro di ricerca focalizzato nello sviluppo e caratterizzazione di sistemi molecolari ibridi e biotecnologici capaci di trasferire carica ed energia in modo efficiente con potenziali applicazioni nel campo della sensoristica e del fotovoltaico di nuova generazione. Le misurazioni sono state effettuate su coloranti organici in soluzione e adsorbiti su film sottili di nanoparticelle di titania per verificare il trasferimento di carica e la sua efficienza, nel caso del BODIPY anche su fullerene. Trasferimenti di carica ed energia intramolecolari sono stati caratterizzati anche in molecole bicromofore. In collaborazione con MIT ed ENI é stato caratterizzato il trasferimento di energia tra molecole legate sullo scaffold di un virus del tabacco deattivato. Si sono eseguiti studi su proprietà chimico fisiche di molecole photoswitch ad alta efficienza capaci di modificare la struttura a seguito di irraggiamento. La caratterizzazione é avvenuta attraverso l'utilizzo di tecniche fotochimiche e di spettroscopia stazionaria e transiente con risoluzione nell'ordine dei femtosecondi. Sviluppo e assemblaggio di setup di spettroscopia transiente ultraveloce UV/VIS e di un oscillatore ottico parametrico non lineare (NOPA). Tutti i progetti sono stati sviluppati in collaborazione con enti di ricerca ed aziende tra cui il MIT, l'Istituto ENI Donegani, il gruppo del Prof. Ben Feringa, l'Università di Buenos Aires e le Università di Perugia, Bologna e Parma.

Autorizzo il trattamento dei miei dati personali contenuti nel CV ai sensi del Dec. Leg. 30/06/2003, n. 196 e art. 13 GDPR 679/16