Giorgio Tortarolo

Doctor of Philosophy

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Education

Ph.D Degree — *Genoa, Italy*
Istituto Italiano di Tecnologia, University of Genoa — *March 2020*
- **Thesis @ IIT**: Laser Scanning Microscopy with SPAD Array Detector: Towards a New Class of Fluorescence Microscopy Techniques
- **Advisor**: Dr. Giuseppe Vicidomini
- **Final Grade**: Excellent

M.Sc. in Bioengineering — *Genoa, Italy*
University of Genoa — *November 2015*
- **Thesis @ IIT**: Modular Integration of a STED Imaging System into a Custom Confocal Microscope
- **Advisors**: Prof. Marco Fato, Dr. Giuseppe Vicidomini, Prof. Alberto Diaspro
- **Final Grade**: 110 / 110 cum laude, right of publication

B.Sc. in Biomedical Engineering — *Genoa, Italy*
University of Genoa — *December 2009*
- **Thesis @ IIT**: Development and Validation of Microcontact Printing Techniques to Pattern Neuronal Cell Cultures on Microelectrode Arrays
- **Advisors**: Prof. Sergio Martinoia, Dr. Luca Berdondini
- **Final Grade**: 110 / 110 cum laude

Experience

HFSP Postdoctoral Fellowship — *Lausanne, Switzerland*
École Polytechnique Fédérale de Lausanne — *January 2023 to date*
- **Project**: A multi-scale all-optical platform for the investigation of membrane potential dynamics.
- **Host Research Group**: Laboratory of Experimental Biophysics
- **Advisor**: Prof. Suliana Manley

Post Doctoral Fellowship — *Lausanne, Switzerland*
École Polytechnique Fédérale de Lausanne — *February 2022 - December 20222*
- **Project**: Design and implementation of a multiplexed MINFLUX microscope to enable extended, parallel tracking of assemblies in cells.
- **Research Group**: Laboratory of Experimental Biophysics
- **Advisor**: Prof. Suliana Manley

Post Doctoral Fellowship — *Genoa, Italy*
Istituto Italiano di Tecnologia — *April 2020 - January 2022*
- **Project**: Implementation of an Adaptive Single Molecule Tracking system; design and implementation of a multi-channel acquisition platform enabling time-resolved measurements.

Ph.D Program in Bioengineering and Robotics — *Genoa, Italy*
Istituto Italiano di Tecnologia, University of Genoa — *November 2016 - March 2020*
- **Research Activity**: Development of Super-Resolution Microscopy Techniques
- **Department**: Dipartimento di Informatica, Bioingegneria, Robotica e Ingegneria dei Sistemi (DIBRIS)
- **Research Group**: Molecular Microscopy and Spectroscopy

Company Internship — *Champaign, Illinois, USA*
ISS Inc. — *September 2016*
- **Project**: Design and development of a novel commercial STED microscope

Internship — *Genoa, Italy*
Istituto Italiano di Tecnologia — *February 2016 - August 2016*
- **Project**: Fourier Ring Correlation Analysis

M.Sc. Program in Bioengineering — *Genoa, Italy*
University of Genoa — *September 2013 - November 2015*
- **Major**: Neuroengineering and Neurotechnologies

Full-Time Employment *Genoa, Italy*

BLUTEC CHEMICALS *January 2010 - October 2015*

- Workflow design and management

Selected Publications

† Shared First Author

- G. Tortarolo†, A. Zunino†, S. Piazza, M. Donato, S. Zappone, A. Pierzynska-Mach, M. Castello, G. Vicidomini (2023). A Compact and Effective Photon-Resolved Image Scanning Microscope, *Advanced Photonics*, submitted.

- G. Tortarolo†, A. Zunino†, F. Fersini, M. Castello, S. Piazza, C.J.R. Sheppard, P. Bianchini, A. Diaspro, S. Koho, G. Vicidomini (2022). Focus image scanning microscopy for sharp and gentle super-resolved microscopy, *Nature Communications*, 13, 7723.

- D. Ferrante, B. Sterlini, C. Prestigio, A. Marte, A. Corradi, F. Onofri, G. Tortarolo, G. Vicidomini, A. Petretto, J. Muià, A. Thalhammer, P. Valente, L. A. Cingolani, F. Benfenati, P. Baldelli (2021). PRRT2 modulates presynaptic Ca2+ influx by interacting with P/Q-type channels, *Cell Reports*, 35(11):109248.

- C. J. R. Sheppard, M. Castello, G. Tortarolo, T. Deguchi, S. V. Koho, G. Vicidomini, and A. Diaspro (2020). Pixel reassignment in image scanning microscopy: a re-evaluation, *Journal of the Optical Society of America A*, 37(1):154-162.

- M. Castello†, G. Tortarolo†, M. Buttafava, T. Deguchi, F. Villa, S. Koho, M. Oneto, S. Pelicci, L. Lanzanò, P. Bianchini, C. J. R. Sheppard, A. Diaspro, A. Tosi, and G. Vicidomini (2019). A robust and versatile platform for image scanning microscopy enabling super-resolution FLIM, *Nature Methods*, 16(2):175–178.

- G. Tortarolo, Y. Sun, K. Teng, Y. Ishitsuka, L. Lanzanò, P. R. Selvin, B. Barbieri, A. Diaspro and G. Vicidomini (2019). Photon-separation to enhance the spatial resolution in pulsed STED microscopy, *Nanoscale*, 11:1754-1761.

- G. Tortarolo†, M. Castello†, A. Diaspro, S. Koho and G. Vicidomini (2018). Evaluating image resolution in stimulated emission depletion microscopy, *Optica*, 5(1):32-35.

- M. Castello†, G. Tortarolo†, I. Coto Hernandez, T. Deguchi, A. Diaspro, and G. Vicidomini (2017). Removal of anti-Stokes emission background in STED microscopy by FPGA-based synchronous detection, *Review of Scientific Instruments*, 88:053701.

Not Peer-Reviewed Publications

- G. Tortarolo, S. Manley (2022). Optical microscopy gets down to angstroms, *Nature Biotechnology*, 41, 473–474.

Editorial Activities

- Referee for *Nature Photonics*, *Nature Communications*, *Light: Science and Applications*, *Optics Letters* and *PLOS ONE*.

- G. Tortarolo, M. Castello, G. Vicidomini, Book Chapter *Super-Resolution Imaging through Laser-Scanning Microscopy*, Book *Biomedical Optical Imaging: From Nanoscopy to Tomography*, AIP Publishing LLC

- Co-Guest Editor for *Applied Science*. Special issue: State-of-the-Art in Super-Resolution Optical Microscopy.

Awards

- Awardee, *Post-Doctoral Fellowship, Human Frontiers Science Program (HFSP), 2022.* Project: *"A multi-scale all-optical platform for the investigation of membrane potential dynamics".* Starting date: *January 2023.*

- Seal of Excellence, *Horizon 2020 - MSCA - Individual Fellowships, 2020.*

- Finalist, *EPFL Life Sciences Early Independent Research Scholar (ELISIR), Lausanne, Switzerland, 2020.*

- Travel Award, *EMBL Workshop on Single Molecule Spectroscopy, Heidelberg, Germany, 2019.*

- Master Degree Award for the thesis "Modular Integration of a STED Imaging System into a Custom Confocal Microscopy", *Società Italiana di Ottica e Fotonica, Italian Branch of the European Optical Society, 2016.*

Patents

- G. Vicidomini , G. Tortarolo, M. Castello, S. Piazza, P. Bianchini, A. Diaspro (2021). Imaging simultaneo multispecie in super-risoluzione mediante multiplazione temporale e array di rivelatori a fotone singolo, *patent pending, deposit number 102021000017018.*

- G. Vicidomini, M. Castello, G. Tortarolo, A. Tosi, M. Buttafava, F. Villa, P. Bianchini, A. Diaspro, C. J. R. Sheppard (2019). Time-resolved imaging method with high spatial resolution, *patent allowed, international publication number WO2019/145889 A1.*

- G. Vicidomini, G. Tortarolo, M. Castello, L. Lanzanò, P. Bianchini, A. Diaspro(2019). Stimulated Emission Depletion (STED) super resolution fluorescence microscopes, *Know-how licensed to ISS.*