

# Giuseppe Vicidomini - Curriculum Vitae

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## CONTACT INFORMATION

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## PERSONAL DATA

*Last name:* Vicidomini  
*First name:* Giuseppe  
*Birth:* November, 29th 1978, Savona, Italy  
*Nationality:* Italian  
*Family status:* Unwed with one daughter and one son (Anna Sofia born in 2009 and Matteo Évariste born in 2012)

## SHORT BIOSKETCH

I studied computer science at the Department of Computer and Information Science, University of Genoa (Italy) and received my Diploma cum laude in 2003 (advised by Prof. Mario Bertero and Prof. Patrizia Boccacci). From 2003 to 2007 I worked at the Laboratory of Advance Microscopy and Spectroscopy (LAMBS, University of Genoa, Italy); where I received my Ph.D (advised by Prof. Alberto Diaspro) about image processing and analysis for fluorescence microscopy.

From February 2008 to April 2011, I worked as a post-doctoral fellow at the Department of NanoBio-photonics (headed by Prof. Stefan W. Hell, Nobel Laureate in 2014), Max Planck Institute for Biophysical Chemistry (MPI, Germany); where I developed a new approach, based on the temporal analysis of the fluorescence signal, which allows stimulated emission depletion (STED) microscopy to achieve tens of nanometres spatial resolution with a substantial reduction of the dose of light requested, thus opening the effective application of STED microscopy with fluorescent proteins and living cells [6]. Currently, all commercially available STED microscopes implement this method - called gated-STED. This work pioneered the use of the temporal information channel of a microscope, such as the ability of measuring the fluorescence signal dynamics at the nanoseconds scale, for improving the microscope spatial-resolution [2].

Form May 2011 to April 2016, I worked in the Department of NanoPhysics (headed by Prof. Alberto Diaspro), Italian Institute of Technology (IIT, Italy), where in September 2013 I obtained a Researcher position.

In May 2016 I became principal investigator (Tenure Track, Stage II) of the Molecular Microscopy and Spectroscopy research line, and in December 2019 I was granted tenure. While constantly working on STED microscopy [5], and on its combination with fluorescence-correlation spectroscopy (STED-FCS) [3], I started also developing novel single-photon-avalanche diode (SPAD) arrays for fluorescence microscopy. This research has recently evolved in the invention of a new scanning microscopy technique able to double the spatial resolution of conventional microscopy, while maintain live-cell, multi-color, and three-dimension imaging capabilities and adding time-resolved spectroscopy/imaging (e.g., fluorescence lifetime, intensity fluctuation analysis, anti-bunching) [1]. This technique has introduced a new paradigm in fluorescence microscopy which proposes to unlock the secret carried by each single-photon, thus moving from the era of single-molecule microscopy [4] to the era of single-photon microscopy. Nikon Instruments and Genoa Instruments already commercialise a laser-scanning microscopy based on this technology, named NSPARC and PRISM, respectively.

My work has been supported by grants from various agencies such as the Fondazione San Paolo (Italy), the Marie Skłodowska Curie Actions (MSCA) and the European Research Council (ERC). My most recent research grant is the five-years ERC Consolidator Grant project, entitled BrightEyes: Multi-Parameter Live-Cell Observation of Biomolecular Processes with Single-Photon Detector Array. The overall objective of the BrightEyes project is to develop a set of innovative and non-invasive imaging and spectroscopy tools able to observe a single-biomolecule at work in a living multi-cellular system. Specifically, by exploring novel SPAD arrays, the BrightEyes project will implement an optical system able to continuously (i) track in real-time a biomolecule of interest; (ii) measure its nano-environment and its structural changes; (iii) observe its interactions with other biomolecules; (iv) visualize its sub-cellular micro-environment with nanometre resolution.

I am co-founder and scientific advisor of the Genoa Instruments spin-off company. The spin-off is dedicated to launch a software and hardware add-on system which will transform any conventional confocal microscope into a high-resolution single-photon microscope.

I have authored or co-authored 76 articles in peer reviewed international journals (10 as first author, 3 as shared first author, 2 as shared last author, and 26 as last author), 5 reviews in peer reviewed international journals, 23 proceedings in international conferences, 12 chapters in books and 1 editorial. I have given 61 invited talks at international conferences, advanced schools or workshops, 18 oral communications (as speaker). I have filled 5 patents (two granted, and two licensed), and signed 1 know-how licence agreement. My bibliometrics data (source Scopus, January 2024) scores a total of 3742 citations (h-index 30).

#### SELECTED PUBBLICATIONS

- [1] M. Castello, G. Tortarolo, M. Buttafava, T. Deguchi, F. Villa, S. Koho, L. Pesce, M. Oneto, S. Pelicci, L. Lanzañò, P. Bianchini, C. J. Sheppard, A. Diaspro, A. Tosi, and G. Vicidomini. A robust and versatile platform for image scanning microscopy enabling super-resolution FLIM. *Nat. Methods*, 16(2):175–178, 2019.
- [2] L. Lanzañò, I. Coto Hernández, M. Castello, E. Gratton, A. Diaspro, and G. Vicidomini. Encoding and decoding spatio-temporal information for super-resolution microscopy. *Nat. Commun.*, 6:6701, 04 2015.
- [3] L. Lanzañò, L. Scipioni, M. Di Bona, P. Bianchini, R. Bizzarri, F. Cardarelli, A. Diaspro, and G. Vicidomini. Measurement of nanoscale three-dimensional diffusion in the interior of living cells by sted-fcs. *Nat. Commun.*, 8(1):65, 2017.
- [4] A. Rossetta, E. Slenders, M. Donato, S. Zappone, F. Fersini, M. Bruno, F. Diotallevi, L. Lanzañò, S. Koho, G. Tortarolo, A. Barberis, M. Crepaldi, E. Perego, and G. Vicidomini. The BrightEyes-TTM as an open-source time-tagging module for democratising single-photon microscopy. *Nat Commun*, 13(1), 2022.
- [5] G. Vicidomini, P. Bianchini, and A. Diaspro. STED super-resolved microscopy. *Nat. Methods*, 15(3):173–182, 2018.
- [6] G. Vicidomini, G. Moneron, K. Y. Han, V. Westphal, H. Ta, M. Reuss, J. Engelhardt, C. Eggeling, and S. W. Hell. Sharper low-power STED nanoscopy by time gating. *Nat. Methods*, 8(7):571–573, 2011.

#### EDUCATION

##### University of Genoa, Genoa, Italy

Ph.D., Sciences and Technologies for Information and Knowledge, [Department of Computer and Information Science \(DiSI\)](#), May 2008

- Thesis Title: Three-Dimensional Image Restoration in Fluorescence Microscopy
- Advisors: [Professor Alberto Diaspro](#), [Professor Patrizia Boccacci](#)
- Final grade: excellent

M.Sc., Computer Science, [Department of Computer and Information Science \(DiSI\)](#), December 2003

- Thesis Title: Web Oriented Image Processing in Three-Dimensional Microscopy
- Advisors: [Professor Alberto Diaspro](#), [Professor Patrizia Boccacci](#), [Professor Mario Bertero](#)
- Final grade: 110/110 *cum laude*

## ACADEMIC EXPERIENCES

### [Istituto Italiano di Tecnologia \(IIT\)](#), Genoa, Italy

*Senior Researcher, Tenured*

**December 2019 to date**

- Principal investigator of the [Molecular Microscopy and Spectroscopy](#) research line at the [Department of Nanophysics](#)

*Senior Researcher, Tenure-Track, Step II*

**May 2016 to November 2019**

- Principal investigator of the [Molecular Microscopy and Spectroscopy](#) research line at the [Department of Nanophysics](#)

*Researcher*

**September 2013 to April 2016**

- Researcher at the [Department of Nanophysics](#)

*PostDoctoral Research*

**May 2011 to August 2013**

- Senior PostDoctoral fellow at the [Department of Nanophysics](#)

### [Max-Planck-Institute \(MPI\) for Biophysical Chemistry](#), Göttingen, Germany

*PostDoctoral Research*

**June 2008 to April 2011**

- PostDoctoral fellow at the [Department of NanoBiophotonics](#) (June 2010 to April 2011)  
Theoretical design and development of novel implementations of stimulated emission depletion (STED) microscopy attaining subdiffraction spatial resolution at moderate focal intensities.
- PostDoctoral fellow at the [Department of NanoBiophotonics](#) (June 2008 to May 2010)  
INVERS project: Development of new approaches to analyze data obtained by new emerging super resolution light microscopy techniques such as stimulated emission depletion (STED) microscopy, 4Pi microscopy and single molecule switching (SMS) microscopy.

*Doctoral Research*

**February 2008 to May 2008**

- Computer Science Ph.D fellow at the [Department of NanoBiophotonics](#)

### [University of Genoa](#), Genoa, Italy

*Doctoral Research*

**January 2005 to January 2008**

- Computer Science Ph.D fellow at the Laboratory Advanced Microscopy Bioimaging Spectroscopy ([LAMBS](#)) (January 2005 to January 2008)  
Design and implementation of new statistical deconvolution algorithms for three-dimensional fluorescence microscopy images. Derivation of new prior-functions (using the Markov-random-field (MRF) and the fuzzy-logic (FL) frameworks) for maximum a-posteriori based deconvolution's algorithms.
- Computer Science Ph.D fellow at the Correlative Microscopy and Spectroscopy in Biomedicine and Oncology ([MicroSCoBio](#)) research center (January 2006 to January 2008)  
Development of new correlative light and electron microscopy (CLEM) protocols and related data analysis tools.

*Postgraduate Research*

**January 2004 to December 2004**

- Research fellow at the Laboratory Advanced Microscopy Bioimaging Spectroscopy ([LAMBS](#))

Characterization of polyelectrolyte capsules for applications in nano-technology and bioimaging and development of new related analysis tools.

*Undergraduate Student*

**September 1997 to December 2003**

SCIENTIFIC  
SERVICES

Institutional Responsibility

- **Member** of the steering committee for the [Nikon Imaging Center at the Istituto Italiano di Tecnologia \(NIC@IIT\)](#)
- **Member** of the PhD Program Committee in Bioengineering and Robotics, DIBRIS, University of Genoa
- **Head** of the PhD Program in Bioengineering and Robotics, Curriculum in Bionanotechnologies, DIBRIS, University of Genoa (XXXIV-XXXIX cycles)

Commission of Trust

- **Referee** for the QS-ranking system of the University of Turku
- **Remote referee** for European Research Council, STG 2023, COG 2015, ADG 2022

Organisation of Scientific Meeting

- **Co-organizer** for the NIC@IIT, Nanoscopy 2.0, Practical Workshop on Advanced Microscopy (2014-2018, Istituto Italiano di Tecnologia)
- **Co-organizer** for the 3<sup>rd</sup> International Practical Course on Advanced Optical Microscopy Methods (17 December 2013, Istituto Italiano di Tecnologia)
- **Co-organizer** for the 1<sup>st</sup> International Practical Course on Advanced Optical Microscopy Methods (12-16 December 2011, Istituto Italiano di Tecnologia)

Conference Committee

- **Member** of the Local Committee for the [13th Conference on Methods and Applications of Fluorescence](#) (8-11 September 2013, Genoa, Italy)
- **Member** of the Programme Committees for CLEO/Europe 2021, 2023

PROFESSIONAL  
SOCIETIES

- [Biophysical Society \(American\)](#)
- [Società Italiana di Biofisica Pura ed Applicata](#)
- [Società Italiana di Fisica](#)
- [SPIE – The International Society for Optical Engineering](#) (since January 2015)
- [Optica, former Optical Society of America](#)

EDITORIAL  
ACTIVITY

- **Referee** for various journals including Nature Journals (Nature Communications, Nature Methods, Nature Photonics, and Scientific Reports), OSA Journals (Optics Express, Biomedical Optics Express, and Optics Letters), Wiley Online Library (Journal of Microscopy, and Microscopy Research and Techniques), RCS Journal (Photochemical & Photobiological Sciences, and Nanoscale), Methods, and AIP Advances.
- **Editor** of the Special Issue "Fluorescence Microscopy in the Spotlight" for Microscopy Research and Technique (Volume 77, Issue 7, July 2014)
- **Editor** of the Special Issue "Stimulated Emission Depletion Microscopy" for Journal of Physics D: Applied Physics (Volume 52-53, 2019-2020)

SUPERVISED  
PERSONNEL

Bachelor Students (1)

- May 2016 - July 2016: Matteo Moro (supervisor at IIT, current Research Fellow at University of Genoa)

Master Students (3)

- March 2014 - August 2014: Nicolaas van der voort (supervisor at IIT, current PhD Students at Heinrich-Heine-Universität Dsseldorf)

- June 2015 - December 2015: Giorgio Tortarolo (supervisor at IIT, Master Degree Award from Società Italiana Ottica e Fotonica, current PostDoc at IIT)
- June 2022 - October 2022: Giacomo Garré (supervisor at IIT, current PhD Students at IIT)

#### Graduate Fellows (2)

- February 2016 - July 2016: Giorgio Tortarolo (supervisor at IIT, current PostDoc at IIT)
- January 2020 - October 2021: Sabrina Zappone (supervisor at IIT, current PhD Students at IIT)

#### PhD Students (10)

- January 2012 - April 2015: Ivàn Coto Hernández (co-supervisor at IIT, current Instructor at Harvard Medical School)
- January 2014 - April 2017: Marco Castello (co-supervisor at IIT, current CTO at Genoa Instruments)
- November 2016 - March 2020: Giorgio Tortarolo (supervisor at IIT, current PostDoc at EPFL)
- November 2018 - December 2021: Alessandro Rossetta (co-supervisor at IIT, current CEO at FLIM Labs)
- November 2019 - July 2023: Andrea Bucci (supervisor at IIT, current PostDoc at IIT)
- November 2020 - Ongoing: Francesco Fersini (supervisor at IIT)
- November 2021 - Ongoing: Sabrina Zappone (supervisor at IIT)
- November 2022 - Ongoing: Giacomo Garré (supervisor at IIT)
- November 2022 - Ongoing: Sanket Patil (supervisor at IIT)
- November 2023 - Ongoing: Francesco del Bufalo (supervisor at IIT)

#### Postdoctoral Fellows (11)

- May 2010 - April 2011: Haisen Ta (co-supervisor at MPI, current Head of Imaging at Pixel-Biotech GmbH)
- May 2016 - July 2020: Takahiro Deguchi (co-supervisor at IIT, current PostDoc at EMBL)
- January 2017 - December 2018: Sami Koho (supervisor at IIT, current Software Engineer at Scandit)
- May 2017 - April 2023: Marco Castello (co-supervisor at IIT, current CTO at Genoa Instruments)
- August 2018 - August: Simonluca Piazza (co-supervisor at IIT, current CEO at Genoa Instruments)
- January 2019 - February 2021: Eli Slenders, Fondazione San Paolo PostDoc Fellow (supervisor at IIT, current Researcher at IIT)
- April 2020 - Febbraio 2022: Giorgio Tortarolo (supervisor at IIT, current PostDoc at EPFL)
- March 2021 - July 2023: Eleonora Perego (supervisor at IIT, current Researcher at IIT)
- March 2022 - Ongoing: Alessandro Zunino (supervisor at IIT)
- October 2022 - Ongoing: Marcus Oliver Held (supervisor at IIT)
- August 2023 - Ongoing: Andrea Bucci (supervisor at IIT)

#### Researchers (3)

- January 2019 - December 2020: Sami Koho, MSCA EF-IF Research Fellow (supervisor at IIT, current Software Engineer at Scandit)
- March 2021 - Ongoing: Eli Slenders, MSCA EF-IF Research Fellow (supervisor at IIT)
- August 2023 - Ongoing: Eleonora Perego, Trapezio (Compagnia San Paolo) Research Fellow (supervisor at IIT)

#### Visitors (3)

- July 2017 - August 2017: Eli Slenders (PhD student from Hasselt University, current Researcher at IIT)
- July 2017 - August 2017: Elena Tcarenkova (PhD student from Turku University)
- December 2023 - January 2024: Felix Hildebrandt (PhD student from Leibniz-IPHT)

In addition, I have been invited to participate to: 3 PhD examination committees (Dr. Sami Koho,

University of Turku, May 2016, Dr. Michele Gintoli, University of Padua , May 2018, Dr. Sebastian Acuna, University of Tromsø, December 2023); 1 PhD thesis review (Dr. Mario Marini, University of Milano-Bicocca, December 2021); 1 Master Thesis examination committee (Sebastian Acuna, University of Tromsø, March 2019).

#### TEACHING EXPERIENCES

- **Subject Expert** (Cultore della Materia), course for the PhD program in Bioengineering and Robotics, University of Genoa, “Fluorescence Super-Resolution Microscopy: Basis, Applications and Perspectives” (June 2019, June 2020, June 2021)
- **Adjunct professor**, course for the PhD program in Bioengineering and Robotics, University of Genoa, “Fluorescence Super-Resolution Microscopy: Basis, Applications and Perspectives” (June 2019)
- **Adjunct professor**, course for the PhD program in Bioengineering and Robotics, University of Genoa, “Fluorescence Nanoscopy” (April 2018)
- **Adjunct professor**, course for the PhD program in Bioengineering and Robotics, University of Genoa, “Fluorescence super-resolution microscopy: photo-physical mechanisms underlying and combination with fluorescence dynamic investigations” (September 2014)
- **Laboratory assistant**, [Principles of Fluorescence Techniques Course](#) (June 2004, September 2005, June 2006 and June 2007)
- **Teaching assistant**, University Master in “Microscopy and Microscopy Analysis in Biology” (2004 and 2005 edition)

#### HONOURS & AWARDS

- Innovation Awards, SMARTcup Liguria 2016, category “industrial” (with Genoa Instruments)
- Habilitation for Associate Professor (fascia II) in Applied Physics (bando D.D. 1532/2016, settore concorsuale 02/D1, fisica applicata, didattica e storia della fisica)

#### SPIN-OFF

I am co-founder and scientific advisor of the Genoa Instruments spin-off company, based on the results output of the Marco Castello’s and Giorgio Tortarolo’s Ph.D. works (under my supervision). The spin-off will be dedicated to launch a software and hardware upgrade tool based on single-photon-avalanche-diode (SPAD) array able to transform any confocal microscope into a super-resolved time-resolved image scanning microscope (Patent Pending, WO/2019/145889).

#### PROJECTS

- Observation of Biomolecular Processes in Live-Cell with Nanocamera, Fondazione San Paolo, Principal Investigator, 2018-2020;
- AdaptiveSTED, H2020-MSCA-IF-2017, Supervisor (Fellowship applicant Dr Sami Koho), 2019-2021;
- BrightEyes, H2020-ERC-2018-COG, Principal Investigator, 2019-2024;
- SM-SPAD, H2020-MSCA-IF-2019, Supervisor (Fellowship applicant Dr Eli Slenders), 2021-2023;
- Augmented Fluorescence Correlation Spectroscopy with a Novel SPAD Array Detector to Observe Complex Biological Processes in Living Cells, Fondazione San Paolo, Supervisor (Fellowship applicant Dr Eleonora Perego), 2023-2024;
- Development of High-Throughput Imaging and Spectroscopy Methods to Track RNA Therapeutics Activity in Living Cells, The Next Generation PNRR, National Center for Gene Therapy and Drugs based on RNA Technology, 2022-2024.

#### INVITED SEMINARS AND SYMPOSIA (61)

- *Image Scanning Microscopy with SPAD Array Detector: Bridging the Gap between super-resolution and confocal microscopy*, Nikon Event, Dipartimento di Farmacia e Biotecnologia, Università di Bologna, Bologna, Italy, 15 December 2023.
- *Image Scanning Microscopy with SPAD Array Detector: Bridging the Gap between super-resolution and confocal microscopy*, GDR Imabio Partners Club, on-line, 5 December 2023.
- *Single-Photon Microscopy: Opening the Door to the Next Generation of Laser-Scanning Microscopy with SPAD Array Detectors*, PAIS2023, 2nd Photonics & Advanced Intelligent Systems Workshop, University of Shanghai for Science and Technology (USST), Shanghai, China (on-line), 1 December 2023.

- *Image Scanning Microscopy with SPAD Array Detector: Bridging the Gap between super-resolution and confocal microscopy*, 8th NIC@IIT Advanced Microscopy Practical Workshop, Istituto Italiano di Teconologia, Genoa, Italy, 28 November 2023.
- *Image Scanning Microscopy with SPAD Array Detector: Bridging the Gap between super-resolution and confocal microscopy*, Revolutionize Your Imaging: Unveiling NSPARC Detector, UNITECH NOLIMITS, Universit degli Studi di Milano, 26 November 2023.
- *Multi Parameter Live-Cell Observation of Biomolecular Process with Single Photon Detector Array*, 5th Annual Workshop on Advanced Microscopy and Biophotonics, Institut Pasteur de Montevideo, Montevideo, Uruguay (on-line), 20 November 2023.
- *Fluorescence Microscopy Photon-by-Photon*, 20th Annual Vienna BioCenter PhD Program Symposium, BioCenter, Vienna, Austria, 9 November 2023.
- *The BrightEyes project: how a SPAD array detector can boost your confocal laser scanning microscope*, ATC-ALM Symposium, Advanced light imaging by the developers, Institut Pasteur, Paris, France, 26 October 2023.
- *Image Scanning Microscopy with Single-Photon Detector Array: the Next-Generation of Confocal Laser Scanning Microscopy*, Photonics Colloquium 2023, Albert-Ludwigs-University, Faculty of Engineering Dept. of Microsystems Engineering - IMTEK, Freiburg, Germany (on-line), 14 June 2023.
- *The BrightEyes Project: Towards a New Generation of Fluorescence Laser-Scanning Microscopy*, A\*STAR - IIT, Virtual Workshop on Biomedical Research Domain, Istituto Italiano di Teconologia, Genoa, Italy (on-line), 22 May 2023.
- *The BrightEyes Project: RNA-biology Meets Single-Photon Microscopy*, HT - IIT Joint Meeting, Istituto Italiano di Teconologia, Genoa, Italy, 17 April 2023.
- *The BrightEyes Project: The Next Generation of Confocal Microscopy for Observing BioMolecular Processes in Live-Cell*, Fondazione Biotechnopolo di Siena - IIT Joint Meeting, Istituto Italiano di Teconologia, Genoa, Italy, 14 April 2023.
- *The BrightEyes Project: The Next Generation of Fluorescence Laser-Scanning Microscopy*, Lab Visit at IISc, Department of Instrumentation and Applied Physics, Indian Institute of Science, Bangalore, India (on-line), 18 March 2023.
- *Confocal and Image Scanning Microscopy*, Principles and Applications of Fluorescence Microscopy, Institut Pasteur, Paris, France, 9 March 2023.
- *The BrightEyes Project: Towards Single-Photon Laser-Scanning Microscopy*, One Day Symposium on Advanced Microscopy Techniques in the Biomedical Sciences, Department of Biology, University of Virginia, Charlottesville, Virginia, USA (on-line), 6 March 2023.
- *The BrightEyes Project: The Next Generation of Confocal Microscopy for Observing BioMolecular Processes in Live-Cell*, INGM - IIT Joint Meeting, Istituto Nazionale di Genomica Molecolare, Milan, Italy, 16 Febbraio 2023.
- *The BrightEyes Project: Towards Single-Photon Laser-Scanning Microscopy*, Faculty of Physics, University of Warsaw, Warsaw, Poland, 30 January 2023.
- *Towards a New Generation of (Super-Resolved) Laser-Scanning Microscopy*, 7th NIC@IIT Advanced Microscopy Practical Workshop, Istituto Italiano di Teconologia, Genoa, Italy, 29 November 2022.
- *The BrightEyes Project: Towards a New Generation of Laser-Scanning Microscopy*, 4th Annual Workshop on Advanced Microscopy and Biophotonics, Institut Pasteur de Montevideo, Montevideo, Uruguay (on-line), 23 November 2022.
- *Time-Resolved STED Microscopy for Improving Contrast and Resolution*, Super Resolution Optical Microscopy with STELLARIS 8 and  $\tau$ -STED, University of Genoa, Genoa, Italy, 10 November 2022.
- *The BrightEyes Project: Towards a New Generation of Laser-Scanning Microscopy for Imaging, Tracking and Spectroscopy*, FNIP day, Neuroscience and Microscopy, University of Padua, Padua, Italy, 29 September 2022.
- *Single-Photon Array Detectors Open to A New Age in Laser-Scanning Microscopy*, Virtual Pub Euro-BioImaging , on-line, 17 June 2022.
- *Time-Resolved STED microscopy for improving contrast and resolution: from time-gating detec-*



- tion to phasor analysis*, Super-Resolution Microscopy: Time-Resolved STED Nanoscopy: EMBL Course, EMBL, Heidelberg, Germany, 11-15 July 2022.
- *Single-Photon Laser-Scanning Microscopy*, International School of Physics "Enrico Fermi Multimodal and Nanoscale Optical Microscopy, Varenna, Italy, 10 July 2022.
  - *The Next Generation of Confocal Microscopy*, EMBL-IIT Scientific Workshop 2022, EMBL Rome, Monterotondo, Italy, 11-12 April 2022.
  - *Super-resolution laser scanning microscopy*, 6th NIC@IIT Advanced Microscopy Practical Workshop, Istituto Italiano di Teconologia, Genoa, Italy, 29 November - 3 December 2021.
  - *Multi-Parameter Live-Cell Observation of Biomolecular Processes with Single-Photon Detector Array*, 3rd Annual Workshop on Advanced Microscopy and Biophotonics, Institut Pasteur de Montevideo, Montevideo, Uruguay (on-line), 24 November 2021.
  - *Fluorescence Laser-Scanning Microscopy with Single-Photon Detector Array: A New Class of Multi-Dimensional Inverse Problems*, Advanced optimization methods for inverse problems & applications to image microscopy, Centro Didattico Morgagni, University of Florence, Florence, Italy (on-line), 23 November 2021.
  - *Fluorescence Laser-Scanning Microscopy with Single-Photon Detector Array*, ICON Europa 2021, on-line, 8 November 2021.
  - *Fluorescence Laser-Scanning Microscopy with SPAD Array Detector*, EPIC, Technology Meeting on Novel Photonic Solution for Microscopy, on-line, 28 June 2021.
  - *Time-Resolved STED Microscopy for better imaging: from time-gating detection to phasor analysis*, Super-Resolution Microscopy: Time-Resolved STED Nanoscopy: EMBL Course, EMBL, Heidelberg, Germany, 12-16 July 2021.
  - *Fluorescence Laser-Scanning Microscopy with SPAD Array Detector*, OSA, Biophotonics Congress: Optics in the Life Science, on-line, 12 April 2021.
  - *Laser-Scanning Microscopy with Single-Photon Detector Array*, XXV International School of Pure and Applied Biophysics on Quantitative Analysis of Optical Imaging for Medicine and Biophysics, on-line, 18 January 2021.
  - *Super-Resolution STED Microscopy*, Ospedale San Raffaele Ph.D. Lecture, on-line, 25 September 2020.
  - *Laser-Scanning Microscopy with Single-Photon Detector Array*, 65<sup>th</sup> Biophysical Society Annual Meeting, on-line, 22 February 2020.
  - *Fluorescence Laser-Scanning Microscopy with SPAD Array Detector*, HHMI, janelia research campus seminar, on-line, 13 May 2020.
  - *Time-Resolved STED Microscopy*, LabRoot WebSeminar sponsored by Leica Microsystems, on-line, 17 March 2020.
  - *Point-Scanning Microscopy with SPAD Array*, Super-Resolution Microscopy: EMBL Course, EMBL, Heidelberg, Germany, 8-13 July 2019.
  - *Light Point-Scanning Microscopy with Single-Photon-Avalanche-Diode Array*, PhotonIcs & Electromagnetics Research Symposium, University of Rome – La Sapienza, Rome, Italy, 17-20 June 2019.
  - *Point-Scanning Microscopy with SPAD Array*, International School on Nanoscale Optical Microscopy, Venice, Italy, 13 June 2019.
  - *Image-Scanning Microscopy*, Inauguration Center of Excellence Amsterdam UMC/Nikon, Universitair Medische Centra, Amsterdam, Netherlands, 12 June 2019.
  - *Image-Scanning Microscopy*, School of Microscopy: Deep Imaging, Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori Meldola, Italy, 16 May 2019.
  - *Moving from Confocal Microscopy to Super-Resolved Microscopy*, Workshop on Advances in label-free and fluorescence microscopy, Politecnico di Torino, Torino, Italy, 26 June 2018.
  - *Fluorescence Scanning Microscopy with Single-Photon Detector Array*, International School on Nanoscale Optical Microscopy, Venice, Italy, 13 June 2018.
  - *STED microscopy: from imaging to fluorescence correlation spectroscopy*, From Pictures to Numbers: Workshop on Quantitative Fluorescence Microscopy, Royal Belgian Society for Microscopy Symposium, Antwerp, Belgium, 7 September, 2017.
  - *Fluorescence scanning microscopy with SPAD array*, SPIE Nanoscience + Engineering 2017,



Nanoimaging and Nanospectroscopy V, San Diego, CA, USA, 6 August 2017.

- *STED microscopy: an introduction and Figure out what the microscopy is actually trying to tell you: SPAD array, TCSPC, noise*, International School, Nanoscale Optical Microscopy, Venice, Italy, 7 June 2017.
- *STED microscopy: spectral, temporal and spatial conditions to achieve effective sub-diffraction resolution images*, Nanochemistry of molecular materials for 2-photon functional applications, Parma, Italy, 12 May 2017.
- *How to boost your microscope by exploring new dimensions (temporal, spatial, spectral)*, International School of Biophysics "Antonio Borsellino", 43rd Course: Nanoscale Biophysics: Focus on Methods and Techniques, Erice, Italy, 22 April 2016.
- *Introduction to Microscopy*, 8th European Short Course on Time-resolved Microscopy and Correlation Spectroscopy, Picoquant, Berlin, Germany, 8 March 2016.
- *Laser sources for STED microscopy: a perspective*, Bioimaging: MPE User Group Meeting and Workshop, Istituto Italiano di Tecnologia, Genoa, Italy, 15 October 2015.
- *STED Microscopy*, Advanced Imaging, PhD program in systems medicine, SEMM, Milan, Italy, 20 February 2015.
- *Time-gated detection and VECSELs: A grand unison towards the wide dissemination of STED microscopy*, SPIE Photonics West LASE, Vertical External Cavity Surface Emitting Lasers (VECSELs), San Francisco, CA, USA, 10 February 2015.
- *Stimulated emission depletion microscopy: exploring the arrival times of photons to go next*, School of Photonics, Seeing sharp and further with the optical microscope, Cortona, Italy, 2 April 2014.
- *STED Microscopy by Time-Gating: when the arrival time of a photon matters*, Applied Super-Resolution Light Microscopy, Course at CGR, Barcelona, Spain, 1 October 2013.
- *At the cutting-edge of gated-STED microscopy*, 3rd European Super-Resolution User-Club Meeting, Istituto Italiano di Tecnologia, Genoa, Italy, 18 June 2013.
- *Super-resolution: STED basic and new gateable technology*, Confocal Workshop on Recent Advances Application in Confocal and Widefield Microscopy, Nencki Institute of Experimental Biology, Warsaw, Poland, 16 January 2013.
- *Reducing the power demand for STED microscopy using time-gated detection*, 2nd European Super-Resolution User-Club Meeting, Karolinska Institute Science Park, Stockholm, Sweden, 27 September 2012.
- *Sharper low-power STED microscopy by time gating*, 2nd Summer Symposium on Nanomaterials and their application to Biology and Medicine, NanoBioMedical Centre, Poznań, Poland, 21 June 2012.
- *Optical nanoscopy and super-resolution methods in protein science*, Emerging Methodologies and Applications in Protein Science, University of Milan, Milan, Italy, 24 November 2011.
- *Imaging in 3D Fluorescence Microscopy*, XI School of Pure and Applied Biophysics on Advanced Optical Microscopy Methods in Biophysics, Campo Santo Stefano, Venice, Italy, 31 January 2007.

#### CONFERENCE TALKS (18)

- Società Italiana di Fisica (on-line, 2020)
- Single-Photon Workshop (SPW) (Italy, 2019)
- Applied Inverse Problem (AIP) (Austria, 2009)
- European Biophysical Societies' Association (EBSA) (Italy, 2009)
- Focus on Microscopy (FOM) (Spain, 2007; Germany, 2011; Singapore 2012; Germany 2015; Taiwan 2016; France 2017; Singapore 2018, UK 2019, Online 2022)
- Methods & Application in Fluorescence (MAF) (Italy, 2013)
- Optics within Life Sciences (OWLS) (Italy, 2012)
- Società Italiana di Biofisica Pura ed Applicata (SIBPA) (Italy, 2012)
- SPIE – The International Society for Optical Engineering (SPIE) (California, 2015)
- Seeing is believing: imaging the molecular processes of life (EMBO, EMBL, Germany 2023)