

SECTION 1: CURRICULUM VITAE

PERSONAL INFORMATION

RECH, Ivan:

Researcher unique identifiers: Scopus Author ID [6602249405](#)
ORCID [0000-0002-1430-1010](#)

Date of birth: April 29, 1976



RESEARCH INTEREST AND ROLE IN THE PROJECT

I have been involved in the research on single-photon detection for about 19 years, starting from my master thesis when I had the opportunity to join Prof. S. Cova's group. Since the beginning I had to manage my own research and during my PhD I supervised more than 10 master students, learning the issues related to the management of a group but also the beauty of teamwork and of being able to transfer my skills to others. My contributions to single-photon world are in the area of device, fast integrated electronics and final system developing. My vision for this emerging field is that a multidisciplinary approach that addresses all the aspects of the detection from the device physics to the final data acquisition could bring to the development of real groundbreaking detection systems in crucial fields like drug analysis, single molecule or protein analysis. I think my consolidated background on single-photon detection is a key advantage to pursue this research ambition.

EDUCATION

- 2001-2004 PhD with honors in Engineering for Information Technology defending the experimental thesis: "Electronics and Sensors for Analysis and Separation of DNA in Micro-and Nanoscale" at Politecnico di Milano (PoliMi)
- 2000 Master's Degree (Final mark:100/100 cum laude) in Electronics Engineering at the PoliMi discussing the thesis: "*Optimization of an apparatus for DNA separation in capillary electrophoresis*" resulting from a collaborative research activity between PoliMi and Italian National Research Council.

CURRENT AND PAST POSITIONS

- 2015-now Associate Professor at PoliMi, Department of Electronics, Information and Bioengineering (DEIB)
- 2005-2015 Assistant Professor at PoliMi, DEIB
- 2004 Research Associate at PoliMi, Contract "*Development of microsystems for genetic diagnostics*"

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

- 2001-2015 I was **supervisor of ten Ph.D students**, technical supervisor of **4 postdoc** and supervisor of more than 30 Master students at PoliMi. Some of my students are now working in some important university and research centers like University of Maryland, NIST, UCLA or in major electronics company like Maxim or STMicroelectronics.

TEACHING ACTIVITY

- 2017-now Appointed lecturer of the course "Signal Recovery " in the Master Degree in Electronics Engineering at PoliMi
- 2005-now Appointed lecturer of the course "Fundamentals of Electronics " in the third year of the Degree in Information Engineering at PoliMi. The student's course evaluation was 10 times (out of 12) above the faculty average
- 2011-2015 Teaching assistant in the course Signal Recovery in the Master Degree in Electronics Engineering at PoliMi
- 2008 Invited lecturer for the Master's Degree in "Elements of design in micro- and nano- technologies for bio-artificial systems " at Politecnico di Torino
- 2001-2009 Teaching assistant in the course "Fundamentals of Electronics " in the second year of the Degree in Information Engineering at PoliMi.

INSTITUTIONAL RESPONSIBILITIES

- 2005-now Faculty member, Politecnico di Milano.

- 2014-now Board Member, Examination Commission for the selection of teaching assistants.
 2007-2015 Board Member, Doctorate in Engineering for Information Technology, PoliMi.
 2005 Aggregate Member, Examination Commission for Enablement to Professional Engineering, PoliMi.

COMMISSIONS OF TRUST

- 2015-now Technical committee member for the Advanced Photon Counting Techniques conference at the annual SPIE DSS meeting.
 2004-now Reviewer for various scientific journals (including Review Scientific Instruments, Transaction Electron Devices, Journal of Modern Optics, Applied Optics, Transaction on Nuclear Science, Sensors).

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- 2017-now Senior Member, "Institute of Electrical and Electronics Engineers" (IEEE)
 2007-2016 Member, "Institute of Electrical and Electronics Engineers" (IEEE)

EDITORIAL ACTIVITIES

- 2018 Guest Editor, *special issue "Single Photon Avalanche Diode/Superconducting Nanowire Single Photon Detectors" of Applied Science*

ERC GRANTS

- 2016 STEP 2 at ERC-2016_COG Consolidator Grant with the project "PICA: Picosend time resolved CAMera for fast and high performance fluorescence imaging (first participation at a ERC call)

INVITED PRESENTATIONS TO INTERNATIONALLY ESTABLISHED CONFERENCES

My research results have been presented at more than 80 international conferences, including 7 invited talks, and an invited talk at "Elements of design in micro- and nano- technologies for bio-artificial systems" Master at Politecnico di Torino. Here is a list of the personal invitations to internationally established conferences:

- Meeting "High Time Resolution Astrophysics", Marostica, Italy (2018)
- COST-FAST Meeting, Lisbon, Portugal (2017)
- Workshop on "Factors influencing the timing performance of SiPM", Calvi, France (2015)
- Electrochemical Society Meeting 2014, Orlando, FL, US (2014)
- SPIE Optics & Photonics 2011, San Diego, CA, US (2011)
- Electro Optical Society Annual Meeting 2010, Paris, France (2010)
- SPIE DSS-2009, Defense and Security Symposium 2009, Orlando, FL, US (2009)

I was Session Chairman at the conference SPIE Europe 2011, Optics+ Optoelectronics, Prague, Czech Rep. (2011) and at Electrochemical Society Meeting 2014, Orlando, FL, US (2014).

MAJOR COLLABORATIONS

- Professor S. **Xie**, Harvard University, Dep. Chemistry and Chemical Biology, Cambridge, Massachusetts, USA. 2 papers published together including a *Science* paper(656 citations). *Development of the first compact high time resolution module for single molecule analysis.*
- Professor S. **Weiss** and X. **Michalet**, University of California Los Angeles (UCLA), Department of Chemistry and Biochemistry, Los Angeles, California, USA. 9 papers published together (179 citations). *Development of counting SPAD arrays for Fluorescence Correlation Spectroscopy.*
- Professor G. **Buller**, Heriot Watt University, School of Engineering and Physical Sciences, Edinburgh, UK. 9 papers published together (122 citations). *Detectors and electronics for quantum key distribution and three-dimensional imaging.*
- Professor M. S. **Unlü**, Boston University, Department of Electrical and Computer Engineering, Boston, Massachusetts, USA. 2 papers published together (29 citations). *Development of the first Resonant Cavity Single Photon Avalanche Diode.*
- Dr. J. **Bienfang**, National Institute of Standard and Technology (NIST), Quantum Optics Group, Gaithersburg, Maryland USA. 1 papers published together. *Implementation of my ps-timing electronics on free space quantum cryptography.*

- Professor Yves **Bérubé-Lauzière**, University of Sherbrooke, Department of Electrical and Computer Engineering, Sherbrooke, Québec, Canada. *Optical tomography with time resolved SPAD detectors.*
- Prof. M. **Chiari**, Institute of Chemistry of Molecular Recognition of the National Research Council (CNR-ICRM), Milano, Italy. 5 papers published together (57 citations). *Development of an apparatus for DNA separation in capillary electrophoresis based on single photon detectors during my PhD.*
- Prof. D. **Englund**, Columbia University, Quantum Photonics Group, New York, USA. *Quantum dots analysis with counting SPAD array.*

Technologies I developed during the first years of my research have been successfully exploited by MPD Micro Photon Devices, a spinoff company of Politecnico di Milano. Detector modules for single photon counting and timing produced by MPD have been widely used and have gained very good acceptance in the international scientific community.