

CURRICULUM VITAE

Paolo Minzioni

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EDUCATION

2002 – 2006 **University of Pavia** **Pavia, Italy**
Ph.D. in Electronic, Electric and Computer Science Engineering, January 2006
Thesis title: “*Devices for Next Generation Optical Networks*” Supervisor: Prof. ██████████

1996 – 2002 **University of Pavia** **Pavia, Italy**
Laurea in Ingegneria Elettronica (110 cum Laude /110), March 2002
Thesis title: “*Non-Linear Effects Reduction in a Fiber Telecommunication System by Optical Phase Conjugation*”

WORK EXPERIENCE

Aug. 2020 – present *Associate Professor @ University of Pavia* *Pavia, Italy*

- Responsible of the Integrated Photonics Lab
- Professor of three courses: Physics 1, Biophotonics, Methods & Techniques for Underwater Ecology

Dec. 2008 – Jul. 2020 *Assistant Professor @ University of Pavia* *Pavia, Italy*

- Responsible of UNIPV unit for EU-Project NISTAS research activities
- Co-investigator of EU-Project FABULOUS
- Professor of different physics courses, member of various internal Commission of trust
- Tutor of 4 Ph.D. students and supervisor of 30+ BS & MS in Electronics and Biomedical Engineering
- National Scientific Habilitation for Associate Professor and Full Professor position since April 2017

Oct – Dec. 2019 *Visiting Researcher @ Wellman Center (HMS/MGH)* *Cambridge, MA USA*

- Defining the organization and the best technical approach to be used for an internal biophotonic project including partners from *Harvard Medical School (HMS)* and *Massachusetts General Hospital (MGH)*

Oct – Dec 2016 *Visiting Researcher @ Tufts University, Silk Lab* *Medford, MA, USA*

- Responsible for the research activity in photonic applications of regenerated silk fibroin

2006 – 2008 *Post-doc Researcher @ University of Pavia* *Pavia, Italy*

- Received 3 annual research grants from University of Pavia to study optical properties and nonlinear applications of innovative materials (doped lithium niobate crystals and their possible applications)
- Conducted first studies regarding development of fiber-based optical tweezers yielding

2001 – 2005 *Consultant @ Pirelli Labs* *Milan, Italy*

- Advisor for long-distance fiber optic transmission system design (EU project ATLAS)
- Advisor for the analysis of device-impact on transmission systems

INSTITUTIONAL RESPONSIBILITIES AT UNIPV

- 2016 – present** Member of “Commissione Paritetica Docenti-Studenti” at the Engineering School (University of Pavia, Italy)
- 2017 - present** Member of “Collegio Docenti” for the Ph.D. School in Electronics, Computer Science and Electrical Engineering of the University of Pavia
- 2015 - 2018** Member of “Consiglio Direttivo di Facoltà” (University of Pavia, Italy)
- 2015 - 2018** Member of “Giunta di Dipartimento” of the Electrical, Computer, and Biomedical Engineering Dept. (University of Pavia, Italy)

COMMISSIONS OF TRUST

- 2018 present** Associate Editor of Optics Express (Optical Society of America)
- 2016 present** Member of the Editorial Board of Scientific Reports (Nature Publishing Group)
- 2016 – present** Member of the International Traveling Lecturer Program of the Optical Society of America
- 2017 2018** Member of the Editorial Board of Micromachines (MDPI)
- 2016 2018** Member of the Editorial Board of Applied Sciences (MDPI)
- 2016 2018** Member of the Advisory Board of Preprints (MDPI)
- Projects and Papers Reviewer for the Italian Ministry of University and Research
- Reviewer for different journals (see [PUBLONS](#) profile)
- External member of the Ph.D. final-exam commission at University of Padova, Italy (four times)
- External member of the Ph.D. final-exam commission at Aston University, UK (twice)
- Ph.D. Thesis Reviewer for Scuola Superiore Sant'Anna, Pisa, Italy (once)

ORGANIZATION OF SCIENTIFIC MEETINGS AND EVENTS

- 2017 - present** Member of the Technical Committee for the Italian Conference “Fotonica”
- 2010 - present** Member of the “BergamoScienza” selection committee since 2010
- 2010** Organizer of the Italian LASERFEST outreaching event
- 2003** Co-organizer of Workshop “Recent Trends in Nonlinear Optics and Ultra-Short Pulse Generation”

TEACHING ACTIVITIES

- **2020/21 – present** Professor of “Biophotonics” at Università degli Studi di Pavia
- **2019/20 – present** Professor of “Methods & Techniques for Underwater Ecology” at Università degli Studi di Pavia
- **2015/16 – present** Professor of “Physics 1” at Università degli Studi di Pavia
- **2017/18 – 2019/20** Professor of “Biophotonics B” at Università degli Studi di Pavia
- **2014/15** Professor of “Microfluidics” course at Istituto Universitario di Studi Superiori in Pavia
- **2010/11 – 2014/15** Professor of “Physics 2” at Università degli Studi di Pavia
- **2007/08 – 2009/10** Professor of “Optical Communications Systems” course for the ESAS Master in Materials Science.
- Tutor of 4 Ph.D. students
- Supervisor of 30+ BS & MS in Electronics and Biomedical Engineering.

SCIENTIFIC PUBLICATIONS & SEMINARS

- Author of **60+ scientific papers** on peer-reviewed JCR-indexed journals:
 - 15 as first author; 28 as corresponding author 10 as last author
 - See [ORCID](#), [Scopus](#), [ResearcherID](#), [Scholar](#) for updated publication list and statistics
- Author of **80+ conference contributions** (international conferences only)
- Author of **2 book chapters**:
 - “Miniaturized Optical Tweezers Through Fiber-End Microfabrication” Springer International Publishing (2015) DOI: 10.1007/978-3-319-06998-2_8
 - “Can Nanotechnology Shine a New Light on antimicrobial Therapies?” InTechOpen (2017), DOI: 10.5772/65974
- Author of different invited papers published by IEEE, MDPI and IOP
- Author of **10+ invited seminars** in foreign universities and centers including (but not limited to): Aston University (UK) Peking University (CN), University of California Irvine (US) Chinese Academy of Sciences (CN), Manipal University, Jaipur (IN), University of California Los Angeles (US).
- Guest Editor of **5 Special Issues**:
 - “Silicon Photonics Components and Applications” by MDPI Applied Sciences (2016)
 - “Cell manipulation and analysis in microfluidic chips” by De Gruyter Optofluidics, Microfluidics and Nanofluidics (2017)
 - “Roadmap Paper on Optofluidics” by IOP Journal of Optics (2017)
 - “Optofluidics: From Fundamental Research to Applications” by MDPI Micromachines (2017)
 - “Roadmap Paper on All-Optical Processing” by IOP Journal of Optics (now in preparation) (2018)

SHORT DESCRIPTION OF RESEARCH ACTIVITIES

My activity has always been characterized by a strong collaboration with different universities and companies, both in Italy and in other countries. The performed research activity has been focussed on the following topics:

- DESIGN AND CHARACTERIZATION OF INTEGRATED-OPTIC DEVICES FOR OPTICAL COMMUNICATIONS

Integrated optics devices, based on $\text{SiO}_2/\text{SiON}/\text{Si}$, with high performance have been designed (and characterized), by using an innovative technique that allows tailoring separately the amplitude and phase of a 1D photonic-crystal's transfer function. This technique allows obtaining optical filters with an almost-ideal transfer function, and hence they can be successfully exploited to filter optical signals with very high bit-rate. Recently a large part of the research activity has been devoted to the study of Si-based optical components (waveguides, filters, couplers, etc...) suitable to realize the integrated devices required for high bit-rate passive optical networks (PONs).

- FIBER OPTIC NONLINEAR EFFECTS: ANALYSIS AND STUDY OF POSSIBLE COMPENSATION TECHNIQUES

In this research field a method for the compensation of nonlinear optical distortions has been identified and demonstrated, both theoretically and experimentally. This result, obtained by an appropriate use of nonlinear devices for optical phase conjugation, opened the way to the possibility of implementing real optical-transmission systems realizing simultaneous dispersion and nonlinearity compensation.

- STUDY AND CHARACTERIZATION OF INNOVATIVE NONLINEAR OPTICAL MATERIALS:

The use of lithium niobate (LN) crystals for nonlinear optics applications is strongly limited by the photorefractive effect, which causes a distortion of the refractive indices of the material, and can also produce a complete distortion of the propagating optical beam, thus making the crystal unusable. The performed research has demonstrated that a relevant reduction of LN photorefractivity can be obtained by doping the crystal with a small quantity of tetravalent ions, without producing a significant change of crystal quality. Moreover very interesting results were obtained regarding the possibility to use semiconductor waveguides (using different geometries and materials) for the realization of integrated nonlinear optical devices allowing all-optical wavelength conversion and switching.

- DESIGN AND REALIZATION OF MICRO-STRUCTURED AND INTEGRATED OPTICAL DEVICES FOR BIOPHOTONIC APPLICATIONS

The research activity carried out in this field included two main aspects: the realization of a fiber-based 3D-optical-tweezer, and that of an integrated optical stretcher/sorter. Regarding the fiber-optic tweezer, the most significant result has been the first-ever demonstration, in 2007, of the possibility to use optical beam output from a fiber to trap and move microscopic particles (thanks to the radiation pressure) without any physical contact. Regarding the integrated optical stretcher/sorter, we demonstrated the first fully-integrated micro-fluidic chip including both a square-section micro-channel and the optical waveguides required to trap, stretch and sort single-cells.