Prof. Sabina Merlo, PhD
Full Professor of Electrical and Electronic Measurements
Dipartimento di Ingegneria Industriale e dell'Informazione
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Sabina Merlo (born 1962)
http://orcid.org/0000-0003-2559-5939
https://scholar.google.it/citations?hl=it&user=HzWkZdUAAAAJ
ResearcherID: B-2010-2017
Scopus author ID: 7004308534

Indicators (December 2018)
Total citations: Google Scholar 1700; Scopus 1197; ISI Web of Science 1041
Hirsch Index: Google Scholar 22; Scopus 19; ISI Web of Science 17
Google Scholar i10-index: 41

Education and Degrees:
1992 Ph.D. Electronic Engineering, University of Pavia (UniPV), Pavia Italy
1989 M.S.E., Bioengineering, University of Washington (UW), Seattle, WA, USA
1987 Laurea Degree *cum laude* (5-year program) in Electronic Engineering, UniPV

Positions:
Since Oct. 2018: Full Professor of Electrical and Electronic Measurements, Department of Electrical, Computer, and Biomedical Engineering, University of Pavia (UniPV), Pavia, Italy
2001 - 2018 Associate Professor of Electronics, Department of Electrical, Computer, and Biomedical Engineering, UniPV, Pavia, Italy
2016 Visiting Professor (2 months), Microphotonic center, Dept. of Material Science and Engineering, Massachusetts Institute of Technology (MIT), USA
2012 Short-term Visiting professor, Optoelectronic Research Center, University of Southampton (UK)
1993 - 2000 Assistant Professor of Electronics, Department of Electronics, UniPV, Pavia, Italy
1992 - 1993 R&D Engineer, Marelli Autronica (Electronic branch of FIAT group), Pavia, Italy
1989 - 1991 Research Assistant, Department of Electronics, UniPV, Pavia, Italy
1988 - 1989 Research Assistant, Center for Bioengineering, UW
1987 - 1988 Rotary Foundation Scholar for International Understanding, UW

Distinctions and awards:
2016 Fellowship - Pavia-Boston Project.
2013 Best poster – Section Methodology – Technology, XXXI National conference on Cytometry [Publication A.55].
2013 National scientific qualifications (Abilitation) to function as Full Professor of Electronics in Italian Universities, valid until 2021
https://asn.cineca.it/ministero.php/public/esitoAbilitati/settore/09%252FE3/fascia/1
2012 National scientific qualifications (Abilitation) to function as Full Professor of Electronics in Italian Universities, valid until 2020
https://abilitazione.cineca.it/ministero.php/public/esitoAbilitati/settore/09%252FE3/fascia/1
2012 Erasmus Staff Mobility Grant for teaching at the Optoelectronic Research Center of the University of Southampton (UK)

1996 Best paper presented at Elettroottica ’96 (Premio speciale del “Gruppo Specialistico Optoelettronica” dell’AEI per il miglior lavoro presentato al convegno nazionale Elettroottica ’96) [Publication A.13].

1996 Best experimental paper published in the field of Electronics – AEI Prize “*O. Bonazzi*” 1996 [Publication A.8].

1989 Italian National License to practice as Electronics Engineer

Teaching duties:

2011 - now Electronics 1, 6 of 9 ECTS (Microelectronic circuits for undergraduate students in Electronic Engineering, Computer Engineering and Bioengineering)
http://www-4.unipv.it/offertaformativa/prod_2015/corso.php?lingua=2&idAttivitaFormativa=275844&modulo=1&anno=2018/2019

Results of teaching evaluations:
https://valmon.disia.unifi.it/sisvaldidat/report.php?At=unipv&anno=2018&Ind=1&keyf=688956&keyc=31400&keyi=31400i502498o3496&az=a&t=r1

2003 - now Biomedical optoelectronics, 6 ECTS (a.k.a.Biophotonics A) (for graduate students in Electronic Engineering and in Bioengineering)
http://www-4.unipv.it/offertaformativa/prod_2015/corso.php?lingua=2&idAttivitaFormativa=248597&modulo=0&anno=2018/2019

2009 - now Microsensors, Integrated Microsystems and MEMS, 6 ECTS (for graduate students in Electronic Engineering and in Bioengineering)
http://www-4.unipv.it/offertaformativa/prod_2015/corso.php?lingua=2&idAttivitaFormativa=253792&modulo=0&anno=2018/2019

2001 - 2010 Electronic circuits and systems (Advanced microelectronic circuits class for undergraduate students in Electronic Engineering)

2005 – 2006 Electro-optical Instrumentation 5 ECTS (for graduate students in Photonics)

1997 - 2003 Electronics (Basic Electronic circuits class for undergraduate students in Electronic Engineering, Computer Engineering and Bioengineering)

She is the referring professor for students enrolled in the MS degree in Electronic Engineering, and for students applying to this degree, also from abroad.
She is coordinator of Laurea Magistrale Plus in Electronic Engineering, a Master Degree program in collaboration with companies.
She has been advisor of several theses in Electronic engineering and Bioengineering, of undergraduate, graduate and PhD students.
(http://www-3.unipv.it/merlo/Tesi.html)

Membership of scientific committees, reviewer for journals/funding agencies, editorial board:

She has been involved in Organizing and Technical committees of conferences and meetings on topics related to Optoelectronics.
She is reviewer for various scientific journals of IEEE, IOP, OSA, MDPI.
She is reviewer for various funding agencies: Italian Ministry of University, Research and Education (MIUR), Italian Region Valle d’Aosta, Netherlands Organisation for Scientific Research (NWO), CONICET-CUIA for bilateral projects ITALY-ARGENTINA.
Since 2006, she is an associate editor of IEEE/ASME Journal of Micro-Electro-Mechanical-Systems (JMEMS).
Since 2018, she is an associate editor of the MDPI journal “Micromachines”.
She was Guest Editor of the 2017 special issue of the MDPI journal “Micromachines” on “Silicon Micromachined Devices.”
http://www.mdpi.com/journal/micromachines/special_issues/silicon_micromachined_devices
She is Guest Editor of the 2019 special issue of the MDPI journal “Sensors” on “Refractive index sensors.”

https://www.mdpi.com/journal/sensors/special_issues/Refractive_index_sensors
She is member of the Italian technical society AEIT and Senior member of IEEE-Photonics Society.

Grants:

SM was project manager and principal investigator of the following projects:
"3D Si microstructures for label-free detection of circulating tumor cells by optical tomography," funded in 2012 by Cariplo Foundation;
"Toward the development of a cell-based optical biosensor: investigation of silicon micromachined photonic crystals as micro-opto devices for monitoring cellular activities," funded in 2010 by Fondazione Alma Mater Ticinensis, Pavia, Italy.
She was Associate Investigator and responsible of the UniPV Unit of the PRIN-MIUR (Italian ministry of University, Research and Education) funded projects: "Silicon micromirrors for optical switching matrices" in 2002, "Photonic Crystal Optofluidic Microsystems for Biosensing" in 2007.

She was involved in other research programs: the Cariplo Foundation project "Optical biosensor for the detection of amyloid fibrils-ligands interactions" funded in 2007; EU FP5 OCCULT FET project, 2001-2004, and EU FP6 PICASSO STREP project, 2006-2009 (both in collaboration with different European research groups); PRIN-MIUR 2005 project "Transmission system for optical chaotic cryptography"; FIRB-MIUR 2001 MITE TIV "Microtecnologie per la telepresenza immersiva virtuale"; CNR Progetto finalizzato MADESS II "Sensors" 1999-2001.
Since 2000, SM is collaborating with STMicroelectronics, Agrate Brianza, Italy, (responsible for various research contracts) in the field of inertial MEMS (accelerometers and gyroscopes), MOEMS (micromirrors, microlens), lab-on-chip devices for real-time polymerase chain reaction and for cells handling by dielectrophoresis.

Research Areas:

She has carried on scientific researches in the field of optoelectronics, in collaboration with Italian and foreign Universities and companies, with regard to the study, design and characterization of new components and measuring systems, relative to biomedical and industrial applications. She gave innovative contributions in the following fields:

1) Silicon micromachined devices: MEMS, MOEMS, Silicon micromachined structures for biosensing, Silicon photonic crystals.
2) Optical interferometry: Semiconductor laser feedback interferometry and low coherence reflectometry.
3) Fiberoptic sensors and components.
4) Optical cryptography and chaotic phenomena in laser oscillators.
5) Noise limits in optoelectronic systems.

1) Silicon micromachined devices

The research activity on MEMS (Micro-Electro-Mechanical-Systems), in collaboration with ST Microelectronics (STM), Milan, Italy, and other Italian Universities, includes the study and the characterization of micromachined devices fabricated by STM, such as gyroscopes, accelerometers and resonator. SM carried on the characterization of the dynamic behavior of these resonant structures (based on a suspended, vibrating mass in the horizontal plane) by means of diode laser feedback interferometry. This optical method, based on a compact and flexible configuration, performs a direct monitoring of the mass displacement in the horizontal plane. A miniaturized version of this interferometer, which fits in a small vacuum chamber, was able to record the frequency response of various devices at different pressures as well as to detect the Coriolis force acting on the gyro mass and thus to perform the optical sensor readout.
The research activity on MOEMS (Micro-Opto-Electro-Mechanical-Systems) started in 2002 and included the optical design and the characterization of optical, silicon microstructures for beam steering, as well as the assembling of a micromirror switching matrix for optical cross connect at 1.55 μm, with a limited number of input-output ports. Innovative optical microstructures, fabricated

using the planar micromachining technology of STM, were called Venetian blind micromirrors, and consisted in a variable blazed grating where the reflecting sections could be tilted with respect to the plane of the substrate, by means of electrostatic actuation. SM was involved, in particular, in the design and assembling of optical measuring setups, for characterizing the static and dynamic behavior of monolithic mirrors and Venetian blind reflective microstructures. In addition to measurements of the reflected beam direction by means of position sensitive or image detectors, a laser diode feedback interferometer, with external path in single mode optical fiber, was efficiently applied for measurements requesting high spatial resolution, such as for the detection of dynamical deformations and for the multipoint characterization of single sections of the Venetian blind microstructures, even for quasi-static monitoring. More recently, she worked on the characterization of the dynamic behavior of resonant and linear silicon micromirrors with wide angle scanning, fabricated by STM for pico-projector applications as well as on the investigation of the opto-electro-mechanical properties of tunable piezo-actuated microlenses.
The research activity on silicon micromachined Photonic Crystal (Si PhC) started in 2005, in collaboration with researchers at University of Pisa. Initially, Si photonic crystals were studied as microsystems for ICT, i.e. as building blocks for optical devices used in all-optical network at λ = 1.55 μm. Since 2007, SM is involved in the application of these Si photonic crystals also for optofluidic devices and label-free biosensing (Italian patent). In these projects, SM is mainly in charge in the activities related to the optical characterization of PhC devices and to evaluation of the optical response of sensing devices, based on the silicon micromachined photonic crystals, for refractive index measurements, in chemical and biochemical applications.
SM has been involved in the development of molecular biosensors and cellular biosensors exploiting a new kind of 3D periodic silicon microstructure operating in the near infrared wavelength region, where the electromagnetic radiation is not absorbed by biological matter and silicon. She demonstrated the operation of a new optofluidic system based on a highly ordered, vertical 3D silicon microstructure anodically bonded to a micromachined glass cover, this last one provided with inlet/outlet holes and paths for liquid injection in the air gaps. SM acquired a great expertise on different kinds of optical reflectrometric and interferometric techniques in the near infrared wavelength region, carried out with flexible and reconfigurable setups which would enable to perform different and maybe complementary measures on miniaturized devices. SM designed and implemented an instrumental configuration for back-reflection measurements based on standard single-mode fibers (SMR, 9/125 μm core/cladding diameter), taking advantage of lensed fiber termination for the readout of the silicon structure under test and of single-mode optical fibers to shine radiation on the device and to carry the reflected light back into a suitable photodetector, such as the monochromator of the optical spectrum analyzer. Using this setup, she was able to extract information about the material that is inside the microchannels; for example, an antigen-antibody immunoassay for detecting C-reactive protein in silicon microchannels with a width of about 4 μm was demonstrated. More recently, optical systems suitable to interrogate microdevices with microchannels with different width (from a few microns to tens of microns) were implemented in the laboratory for detecting the presence of cells grown in them. SM has coordinated the interdisciplinary activities related to the use of 3D Silicon microstructures for cell cultures in a three-dimensional microenvironment for applications in cancer research and oncology.

2) Optical interferometry.
SM worked on the development of instrument prototypes, based on feedback interferometry, using diode lasers in the range 630-850 nm, for measurements of displacement of reflecting and diffusing targets. This interferometric scheme (also known as self-mixing interferometer) is based on a three-mirror configuration, in which two of them confine the laser active medium while the third mirror is on the moving target. Amplitude and frequency modulation of the emitted electric field are induced by the optical radiation, which is reflected or scattered by the moving target and coupled back into the laser cavity. Important features of semiconductor laser feedback interferometry, compared to classical interferometric schemes, are: a) an optical reference arm is not required; b) the signal

obtained by direct detection of the amplitude modulation is sufficient for recovering the target displacement without signal ambiguity. A low coherence reflectometer operating in the IR has been realized and applied for non-destructive in-depth testing or optical readout of multilayered micro-devices also incorporating materials that not transparent in the visible (e.g., silicon).

3) Fiberoptic sensors and components.

SM started to work on fiber optic sensors in 1986. Her first relevant project was on general anesthesia monitoring (US patent No. 5,094,819): phospholipid bilayers labeled with a fluorescent dye were used to measure the concentration of general anesthetics and other small organic molecules, which generate a perturbation of the lipid phase transition. She was also involved with large infrastructures optical-monitoring, vectorial measurements of magnetic field as well as on fiberoptic passive components, such as polarization rotators and optical isolators (Italian patent). She worked on the development of fiberoptic attenuators, based on metal films deposited on the fiber termination and incorporated in a splice. Recently, she is has worked as a consultant of a start-up company for the design, realization and characterization of a fiberoptic sensor for detection of bending of needle-probes employed in the transcutaneous treatment of solid tumors.

4) Optical cryptography and chaotic phenomena in laser oscillators.

Re-injection in the semiconductor laser cavity of the emitted radiation, due to back reflection or diffusion from an external target may induce the transition to a chaotic behavior of the laser oscillator, with loss of coherence. Chaos induced by back-injection can be successfully applied in cryptography. Secure data transmission was demonstrated by exploiting different chaotic masking schemes. SM collaborated with different European research groups on this topic. Financial support for this research was obtained in the fifth EU Program (FP5 OCCULT FET project, 2001-2004, http://ifisc.uib-csic.es/project/occult/) as well as in the sixth EU Program (FP6 PICASSO STREP project, 2006-2009, http://picasso.di.uoa.gr/). Within the OCCULT project, she performed experimental work on the demonstration of a transmission/detection system of encrypted data, based on 1.55 μm DFB lasers, chaotic by external feedback, suitable for a fiber optic network. Highly relevant scientific results were obtained with this project, as recognized by the EU reviewers. The goal of the project PICASSO (Photonic Integrated Components Applied to Secure chaoS encoded Optical communications systems) was the development of photonic components and subsystems to build chaos-based optical communication systems. In particular, design, fabrication and characterization of monolithic as well as of hybrid photonic integrated circuits were investigated for the realization of chaotic transmitters and receivers. The PICASSO project, too, was completed with great satisfaction of the referees and of the project officer.

5) Noise limits in optoelectronic systems.

SM performed theoretical research work on the following topics: use of sub-poissonian radiation to overcome the photodetection quantum limit in optoelectronic measuring systems (interferometry and coherent detection); evaluation of phase noise due to thermodynamic fluctuations in long-path fiberoptic interferometers and its effect on system sensitivity; development of a semiclassical model for noise propagation in depleted pump erbium-doped and parametric fiber amplifiers (also supported by experimental data collected by other authors).

Statement of Research

I am interested in applying my expertize in new research projects involving optoelectronics and micromachined devices, for application in sensing, new components development, and bioengineering.

I have a long time expertize on operation, application, optical characterization of: silicon MEMS device, micromachined analog mirrors (with electrostatic actuation) for light beam dynamic scanning and static redirection; Si microstructures as core elements of optical filters, optofluidic components, and transducers. I have expertize on design, realization and application of instrumental

configurations for device characterization, testing and readout, such as fiberoptic setup for spectral reflectivity measurements, fiberoptic setup for low coherence interferometry, semiconductor laser feedback interferometry.
Strength points:
I have an interdisciplinary background, acquired with academic studies as well as with research and teaching experiences, which is important for successfully managing projects based on the collaboration between researchers from different fields (engineering, physics, biology, biomedicine). The combination of expertise in the field of optoelectronics, photonics, optical biosensors, and micromachined devices with some knowledge of biology contributes to the formation of a rare scientific profile.

On-going research activities
Currently, I am working on the investigation and development of a novel microfluidic sensing platform that incorporates glass micro-capillaries with rectangular cross-section. A flexible measuring configuration realized with single mode optical fibers has been designed and realized for remote, non-contact optical read-out (in the near infrared wavelength region) of absolute values of group refractive index or of refractive index variations, for example related to increasing concentrations of solutions flowing through the capillary. Low-coherence interferometry provides data on the inner structure of the capillary and is potentially useful for detection of group refractive index of fluids flowing into the channel. Spectral readout of rectangular capillaries is proved very efficient for detecting RI variation with respect to a reference fluid since reflectivity spectra shifts toward longer wavelengths for increasing fluid RI.
Another activity is related to the characterization of the opto-electro-mechanical properties of focus tunable micro-lenses, in collaboration with STMicroelectronics and poLight. Spot optical measurements performed low coherence reflectometry provide several parameters as functions of the driving voltage applied to the piezo-electric actuator, such as lens displacement, optical thickness variations, hysteretic cycle and actuation efficiency.

Brief Statement of Teaching
I am interested in teaching classe at undergraduate and graduate levels.

Courses for undergraduate students in Electrical Engineering or in Bioengineering:
-Microelectronic circuits (preferred text book Sedra&Smith, Microelectronic circuits)

Course for graduate students in Bioengineering:
-Biomedical Optoelectronics

Courses for graduate students in Electrical Engineering and Bioengineering:
-Microsensors, Integrated Microsystems and MEMS
-Optoelectronic Instrumentation

Publications
Update December 2018

International Journal with Referees (J)

[J.1] S. Merlo, L. W. Burgess, P. Yager, **An optical method for detecting anesthetics and other lipid-soluble compounds**, *Sensors and Actuators*, Vol. A21-A23, pp. 1150-1154, Elsevier Sequoia S.A., Olanda (1990). DOI: 10.1016/0924-4247(90)87106-S

[J.2] S. Merlo, P. Yager, **Optical method for monitoring the concentration of general anesthetics and other small organic molecules -- An example of phase transition sensing**, *Analytical Chemistry*, Vol. 62, pp. 2728 - 2735, American Chemical Society, Washington D.C., USA (1990). DOI: 10.1021/ac00223a015

[J.3] V. Annovazzi-Lodi, S. Donati, S. Merlo, **Squeezed states in direct and coherent detection**, *Optical and Quantum Electronics*, Vol. 24, pp. 285-301, Chapman and Hall, London, UK (1992). DOI: 10.1007/BF00619404

[J.4] V. Annovazzi-Lodi, S. Donati, S. Merlo, **Coiled-fiber sensor for vectorial measurement of magnetic field**, *IEEE/OSA Journal of Lightwave Technology*, Vol. 10 No. 12, pp. 2006-2010, Piscataway, NJ, USA (1992). DOI: 10.1109/50.202810

[J.5] S. Donati, G. Giuliani, S. Merlo, **Laser diode feedback interferometer for measurement of displacements without ambiguity**, *IEEE Journal of Quantum Electronics,* Vol. 31 No. 1, pp. 113-119, Piscataway, NJ, USA (1995). DOI: 10.1109/3.341714
IF 1995: 2.306

[J.6] V. Annovazzi-Lodi, S. Donati, S. Merlo, A. Leona, **All-fiber Faraday rotator made by a multiturn figure-of-eight coil with matched birefringence**, *IEEE/OSA Journal of Lightwave Technology*, Vol. 13 No. 12, pp. 2349-2353, Piscataway, NJ, USA (1995). DOI: 10.1109/50.475574
IF 1995: 1.225

[J.7] V. Annovazzi-Lodi, S. Donati, S. Merlo, **Thermodynamic phase noise in fiber interferometers**, *Optical and Quantum Electronics*, Vol. 28, pp. 43-49, Chapman and Hall, London, UK (1996). DOI: 10.1007/BF00578549
IF 1996: 0.472

[J.8] V. Annovazzi-Lodi, S. Donati, S. Merlo, L. Zucchelli, F. Martinez, **Protecting a power laser-diode from retroreflections by means of a fiber λ/4 retarder**, *IEEE Photonics Technology Letters*, Vol. 8 No. 4, pp. 485-487, Piscataway, NJ, USA (1996). DOI: 10.1109/68.491091
IF 1996: 1.063

[J.9] S. Donati, L. Falzoni, S. Merlo, **A PC-interfaced, compact laser-diode feedback interferometer for displacement measurements**, *IEEE Transactions on Instrumentation and Measurement,* Vol. 45 No. 6, pp. 942-947, Piscataway, NJ, USA (1996). DOI: 10.1109/19.543990

[J.10] V. Annovazzi-Lodi, S. Donati, S. Merlo, G. Zapelloni, **Statistical analysis of fiber failures under bending-stress fatigue**, *IEEE/OSA Journal of Lightwave Technology*, Vol. 15 No. 2, pp. 288-293, Piscataway, NJ, USA (1997). DOI: 10.1109/50.554379
IF 1997: 1.458

[J.11] S. Merlo, S. Donati, **Reconstruction of displacement waveforms with a single-channel laser-diode feedback interferometer**, *IEEE Journal of Quantum Electronics,* Vol. 33 No. 4, pp. 527-531, Piscataway, NJ, USA (1997). DOI: 10.1109/3.563379
IF 1997: 1.606

[J.12] S. Donati, S. Merlo, **Applications of diode laser feedback interferometry**, Invited paper on *Journal of Optics*, Vol. 29 No. 3, Special issue on Optoelectronic distance/displacement measurements and applications, pp. 156-161, Institute of Physics Publishing, Bristol, UK (1998). DOI:10.1088/0150-536X/29/3/010
IF 1998: 0.338

[J.13] V. Annovazzi-Lodi, S. Donati, S. Merlo, D. Beltrami, **Fast characterization of metal films for fiber attenuators**, *Applied Optics*, Vol. 37 No. 22, pp. 5298-5301, OSA, Washington D.C. USA (1998). DOI: 10.1364/AO.37.005298
IF 1998: 1.138

[J.14] V. Annovazzi-Lodi, S. Merlo, **A semiclassical model for noise propagation in depleted-pump optical amplifiers**, *IEEE Journal of Quantum Electronics,* Vol. 34 No. 10, pp.1823-1829, Piscataway, NJ, USA (1998). DOI: 10.1109/3.720213
IF 1998: 1.854

[J.15] V. Annovazzi-Lodi, S. Merlo, D. Beltrami, R. Galeotti, **Metal-film fiber attenuators with flat spectral response**, *Optical Fiber Technology*, Vol. 5, pp.331-337, Academic Press, San Diego, CA, USA (1999). DOI: 10.1006/ofte.1999.0301
IF 1999: 1.212

[J.16] V. Annovazzi-Lodi, S. Merlo, **Mechanical thermal noise in micromachined gyros**, *Microelectronics Journal*, Vol. 30, No. 12, pp. 1227-1230, Elsevier Science Ltd., Oxford, UK (1999). DOI: 10.1016/S0026-2692(99)00046-4
IF 1999: 0.363

[J.17] P. Abbiati, F. Casciati, S. Merlo, **An optical fibre sensor for dynamic structural response monitoring**, *Journal of Structural Control,* Vol. 7, No. 1, pp. 35-49, John Wiley (2000). DOI: 10.1002/stc.4300070104

[J.18] V. Annovazzi-Lodi, S. Merlo, S. Moroni, **Power efficiency of a semiconductor laser with an external cavity**, *Optical and Quantum Electronics*, Vol. 32, No. 12, pp. 1343-1350, Kluwer Academic Publishers, Dordrecht, NL (2000). DOI: 10.1023/A:1026565619195
IF 2000: 0.602

[J.19] V. Annovazzi-Lodi, S. Merlo, M. Norgia, **Measurement on a micromachined silicon gyroscope by feedback interferometry**, *IEEE/ASME Transactions on Mechatronics*, Vol. 6, No. 1, pp.1-6, Piscataway, NJ, USA (2001). DOI: 10.1109/3516.914385
IF 2001: 0.696

[J.20] V. Annovazzi-Lodi, S. Merlo, M. Norgia, **Comparison of capacitive and feedback-interferometric measurements on MEMS**, *IEEE/ASME Journal of Microelectromechanical systems*, Vol. 10, No. 3, pp. 327-335 Piscataway, NJ, USA (2001). DOI: 10.1109/84.946778
IF 2001: 1.854

[J.21] V. Annovazzi-Lodi, S. Merlo, M. Norgia, A. Scirè, **Characterization of a chaotic telecommunication laser for different fiber cavity lengths**, Invited paper, *IEEE Journal of Quantum Electronics,* Vol. 38 No. 9, pp.1171-1177, Piscataway, NJ, USA (2002). DOI: 10.1109/JQE.2002.801948
IF 2002: 2.097

[J.22] V. Annovazzi-Lodi, S. Merlo, M. Norgia, **Characterization of silicon microstructures by feedback interferometry**, *Journal of Optics A: Pure Appl. Opt.*, Vol. 4, pp. S311-S317, Institute of Physics Publishing, Bristol, UK (2002). DOI:10.1088/1464-4258/4/6/374
IF 2002: 1.274

[J.23] V. Annovazzi-Lodi, S. Merlo, M. Norgia**,** G. Spinola, B. Vigna, S. Zerbini, **Optical Detection of the Coriolis Force on a Silicon Micromachined Gyroscope**,
in: *IEEE/ASME Journal of Microelectromechanical systems*, Vol. 12, No. 5, pp.540-549, Piscataway, NJ, USA (2003). DOI: 10.1109/JMEMS.2003.817893
IF 2003: 2.759

[J.24] V. Annovazzi-Lodi, M. Benedetti, S. Merlo, M. Norgia, **Fiberoptics setup for chaotic cryptography communication**, *Comptes Rendus Physique (Numero speciale Cryptography using optical chaos)*, Vol. 5, No. 6, pp. 623-631, Académie des sciences/Elsevier SAS, (2004). DOI: 10.1016/j.crhy.2004.03.005
IF 2004: 1.122

[J.25] V. Annovazzi-Lodi, M. Benedetti, S. Merlo, M. Norgia**, Spot Optical Measurements on Micromachined Mirrors for Photonic Switching**, *IEEE Journal of Selected Topics in Quantum Electronics* (Special Issue on Optical Microsystems, 2004) Vol. 10, No. 3, pp. 536-544, Piscataway, NJ, USA (2004).
DOI: 10.1109/JSTQE.2004.830625
IF 2004: 3.048

[J.26] V. Annovazzi-Lodi, M. Benedetti, S. Merlo, M. Norgia**, Optical detection of multiple modes on resonant micromachined structures**, *IEEE Photonics Technology Letters*, Vol. 16, No. 7, pp. 1703-1705, Piscataway, NJ, USA (2004). DOI: 10.1109/LPT.2004.828841
IF 2004: 2.552

[J.27] V. Annovazzi-Lodi, M. Benedetti, S. Merlo, M. Norgia, B. Provinzano, **Optical chaos masking of video signals**, *IEEE Photonics Technology Letters*, Vol. 17 No. 9, pp. 1995-1997, Piscataway, NJ, USA (2005).
DOI: 10.1109/LPT.2005.853267
IF 2005: 2.266

[J.28] S. Merlo, V. Annovazzi-Lodi, M. Benedetti, F. Carli, M. Norgia, **Testing of "Venetian-Blind" Silicon Microstructures with Optical Methods**, *IEEE/ASME Journal of Microelectromechanical systems*, Vol. 15, No. 3, pp.588-596, Piscataway, NJ, USA (2006). DOI: 10.1109/JMEMS.2006.876664
IF 2006: 2.659

[J.29] G. Barillaro, A. Diligenti, M. Benedetti, S. Merlo, **Silicon micromachined periodic structures for optical applications at λ=1.55μm**, *Applied Physics Letters*, Vol. 89, 151110, American Institute of Physics, NY, USA (2006). DOI: 10.1063/1.2358323
IF 2006: 3.977

[J.30] V. Annovazzi-Lodi, M. Benedetti, S. Merlo, T. Perez, P. Colet, C.R. Mirasso, **Message encryption by phase modulation of a chaotic optical carrier**, *IEEE Photonics Technology Letters*, Vol. 19, No. 2, pp. 76-78, Piscataway, NJ, USA (2007). DOI: 10.1109/LPT.2006.888968
IF 2007: 2.015

[J.31] G. Barillaro, V. Annovazzi-Lodi, M. Benedetti, S. Merlo, **Reflection properties of hybrid quarter-wavelength silicon microstructures,** *Applied Physics Letters*, Vol. 90, 121110, American Institute of Physics, NY, USA (2007). DOI: 10.1063/1.2714293
IF 2007: 3.596

[J.32] V. Annovazzi-Lodi, G. Aromataris, M. Benedetti, I. Cristiani, S. Merlo, P. Minzioni, **All-optical wavelength conversion of a chaos masked signal,** *IEEE Photonics Technology Letters*, Vol. 19, No. 22, pp. 1783-1785, Piscataway, NJ, USA (2007). DOI: 10.1109/LPT.2007.906847
IF 2007: 2.015

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Pavia, December 2018