

CURRICULUM VITAE ET STUDIORUM

Marco Francardi, PhD

Personal Information

I am a proactive and problem solver Researcher in applied physics (micro and nanotechnology for several optoelectronics applications). My experiences in multidisciplinary areas have generated a teamwork and goal-oriented attitude. The excellent ability to relate has always allowed a rapid integration in new realities, as well as a great ability to collaborate in highly interdisciplinary environments. The personal interest in the application of light-based technology in several fields, from quantum communication to spectroscopy, together with an analytical nature has generated a dynamic point of view for design and development of new technologies.

Birthday

Place of birth

Nationality

Citizenship

Mobile phone

Skype contact

e-mail

PEC

Italian National Enabler as Associate Professor

Enrolled for second-class professor functions (Associate Professor) in the competition sector (Experimental Physics of Matter) 02/B1-Bando ASN2016 (DD No. 1532/2016).

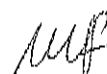
Enrollment Validation: from 12/04/2017 to 12/04/2023.

Formation

Master in Business Administration	In course	Bologna Business School
Attended course	April 2016	"Strategy Technology and Innovation Management" held in IIT Central Lab, Genoa, by Prof. Lorenzo Massa (Corporate Strategy & Innovation – EPFL)

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Specialization course	January 2014	"Lumerical FDTD Solutions" held in Paris, organized by the LovaLite SAS, on the optimization for FDTD simulation using the software "Lumerical"
Ph.D. in "MATERIALS SCIENCE"	19/12/2008	Thesis: "Photonic crystals for single photon source" - University of Rome "Sapienza"
DEGREE in PHYSICS address: Condensed Matter	29/09/2005	Thesis: "Photonic crystals structures for quantum-optics applications" - University of Rome "Sapienza"
Winter school	March 2006	"Optoelectronic Integration: Technology and Applications" held in Pontresina, organized by the European circuit ePIXnet
Work experiences		
Dicember 2017 – October 2018	Manager of Optics Department at GlassUp s.r.l.	
December 2016 – November 2017	Senior Researcher in optoelectronics at GlassUp s.r.l.	
January 2015 – November 2016	Researcher at Italian Institute of Technology (IIT)	
October 2013 – December 2014	Postdoctoral Fellow (senior level) at King Abdullah University for Science and Technology (KAUST)	
July 2012 – October 2013	Research postdoctoral (senior level) at the University of Magna Graecia of Catanzaro	
June 2010 - June 2012	Research postdoctoral (senior level) at the International School for Advanced Studies of Trieste (SISSA).	
March 2010 - April 2010	External professional collaboration at the University of Magna Graecia of Catanzaro.	
March 2009 - March 2010	Postdoc collaboration in research activities at the University of Perugia.	
January 2006 - March 2009	Fellow C.N.R. at the Institute of Photonics and Nanotechnology, CNR .	
Other informations		
ORCID	0000-0001-5268-7586	
Languages	Italian (mother tongue) - English (written and spoken)	



Computer skills	<ul style="list-style-type: none"> - Strong experience in the main MS Office systems in Windows or Macintosh (Power Point, Word, Excel) environment - Usage of the main software for calculation such as MatLab or Mathematica - Usage of software for graphics rendering (Rhino 3D) - Usage of software for data analysis (Origin) - CAD for generation of patterns for different lithographic techniques (.GDS, .GDSII, etc ..) by LASI or AutoCAD - Usage of Lumerical software (LovaLite SAS) for FDTD simulations (interaction radiation / nano- Microsystems) using Lumerical software
Skills & Research score	
Fields of science to which is dedicated	Nanotechnology, Nanofabrication, nano-photonics, photonic crystals, interaction of radiation with matter, nano emitters, LED, single photon sources, Quantum Key Code, spintronics, spin valves, plasmonics, nano antennas, plasmonic adiabatic compression, nanotechnology applied to biology, nanofabrication of device for SERS and TERS, RAMAN measurements and analysis, FDTD simulations, single molecule detection, nanoscopy, polymeric micro particles for drug release, nanomedicine, microfluidics, Principal Component Analysis on RAMAN dataset, Digital Image Analysis, Holography.
Techniques acquired	Electron Beam Lithography (Vistec EBPG 5HR@100KV; CRESTEC), Optical Lithography, double faces Optical Lithography, many kind of Resist (positive and negative tone), wet etching, dry etching (RIE, ICP, IB), Direct Laser Writing (DLW, Heidelberg), metal growth by deposition (sputtering) and evaporation (Electron Beam assisted evaporation), growth of Si based materials (PECVD, ECR-PECVD), AFM and profilometric analysis, scanning electron microscopy (SEM), SEM on biological elements, Focused Ions Beam (FIB) for nano-patterning, Dual-Beam nanofabrication (FEI machines), assisted deposition from electronic and ionic beam, EDAX microanalysis of biological and inert samples, electrical characterization of opto-electronic devices with a 3 points probe station, micro photo luminescence (μ PL) characterization, FDTD simulations ("Lumerical" software produced by LovaLite SAS), RAMAN (Renishaw set-up) acquisition and analysis, soft lithography (PDMS replica) for microfluidics, design and realization of optical set-up.

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Experiences and collaborations offsite	<ul style="list-style-type: none"> • During the PhD, between 2006 and 2008, he performed the μPL characterization of the devices in the Ecole Polytechnique Fédérale de Lausanne (EPFL), in collaboration with the group of Professor A. Fiore. • Between 2008 and 2009, he performed measures resolved in time, for the study of the average life-time of the emitted photons from quantum structures electrically pumped, at the Eindhoven University of Technology TU/e in Eindhoven in collaboration with the group of Professor A. Fiore. • From September 2009 to December 2009 he worked in the laboratory of Dr. Ursula Ebels, at the Atomic Energy and Alternative Energies Commission (CEA) in Grenoble, in order to gain experience in the fabrication and characterization of spin torque nano-oscillators through spin polarized current.
Participation in Funded Project	<ul style="list-style-type: none"> • “μ-BLS INNESCO” project Partial financial support from Italian “Ministero Istruzione, Università e Ricerca” (MIUR) and “Consorzio Interuniversitario per le Scienze Fisiche della Materia” (CNISM). • “New Frontiers in Plasmonic Nanosensing” (Grant No. 2011-0338) Funded by CARIPLO Foundation • European Projects “Single Molecule Detection” SMD FP7-NMP-2008-SMALL-2 proposal No. CP-FP 229375-2 • “Nuove strategie nanotecnologiche per la messa a punto di farmaci e presidi diagnostici diretti verso cellule cancerose circolanti”. Italian Project PON (cod. PON01_02782, CUP B71H11000870005). • “POTENT” Funded by ERC – Consolidator Grant - (FP7/2007-2013)/ERC Grant Agreement No. 616695
Scientific interest of the editors	<ul style="list-style-type: none"> • Interview on the basis of the publication “Francardi, M., et Al., <i>Appl. Phys. Lett.</i>, 93, (2008)” on <i>Nature Photonics-Technology Focus</i>, Vol. 3, January 2009. • Vignolini, S.; Intonti, F.; Riboli, F.; Balet, L.; Li, L.H.; Francardi, M.; Gerardino, A.; Fiore, A.; Wiersma, D.S.; Gurioli, M.; "Publisher's Note: Magnetic Imaging in Photonic Crystal Microcavities [<i>Phys. Rev. Lett.</i> 105, 123902 (2010)]", <i>Physical Review Letters</i>, 105, 14, 149901, 2010, APS
Invited Seminar	4 November 2015 – Talk: “Nanotechnology and Biology: an interdisciplinary driving to Nano-medicine” invited by Dr. Monica Bollani at LNESS laboratory of “Politecnico di Milano”
Papers on Peer review	57



international journals		
H-index	20 (www.scopus.com)	24 (www.scholar.google.com)
Citations	> 1000	>1300
Book Chapters		3
International Conferences proceeding		13
Participation to International Conferences	<p><i>Oral presentation</i></p> <ul style="list-style-type: none"> • New Frontiers in Micro and Nano Photonics, FMNP08, April 2008 • First Mediterranean Photonics Conference, MPC08, June 2008 • Micro and Nano Engineering, MNE08, September 2008 • Photonic West, PW09, January 2009 • (SPIE) Photonics Europe-DOID, May 2018 <p><i>Poster presentations</i></p> <ul style="list-style-type: none"> • Quantum Dots, QD06, May 2006 • International Conference on Transparent Optical Networks, ICTON07, July 2007 • Micro and Nano Engineering, MNE07, September 2007 • Micro and Nano Engineering, MNE09, September 2009 • Micro and Nano Engineering, MNE10, September 2010 • Micro and Nano Engineering, MNE12, September 2012 • Micro and Nano Engineering, MNE14, September 2014 • Micro and Nano Engineering, MNE15, September 2015 • Plasmonica 2015 (Italian Network Workshop) 	

References

(The following have agree to supply references)

Prof Andrea Fiore	Eindhoven University of Technology (TU/e), Department of Applied Physics,	a.fiore@tue.nl
Dr Annamaria Gerardino	Institute of Photonics and Nanotechnologies of the National Council for Research (IFN-CNR, Rome)	gerardino@ifn.cnr.it
Dr Francesco De Angelis	Italian Institute of Technologies, Director of the Department of Nanostructures	francesco.deangelis@iit.it

Description of Scientific Activities

Starting from the MD Thesis, he worked to optimize the process for the nano-fabrication of photonic crystal (PhC) micro-cavities on a heterostructure composed by an optical-active layer of InAs Quantum Dots (QD) embedded in a Gallium Arsenide (GaAs) membrane. In details, his work was aimed to study a system able to manipulate the confinement of electromagnetic field (PhC on the xy plane and Total Internal Reflection on the z) obtaining Quality Factor (Q) of the order of 10^4 . The possibility to confine a single QD in a point-defect PhC cavity will allow the directional emission of single photons on telecom wavelengths ($\lambda_{InAs QD} \sim 1.3 \mu\text{m}$). This activity has been carried out at CNR-Institute of Photonics and Nanotechnology in the group of Dr. A. Gerardino. He verified experimentally the Purcell Effect in the Near Infra Read (NIR), observing a

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modulation in the life-time of the emitted photons. This work was focalized on the possibility to use this technology for Single Photons Sources (SPS) with application in Quantum Cryptography. In this period he has gained experience on Electron Beam Lithography (EBL), etching of III-V compounds, optical characterization by micro Photo-Luminescence (μ PL), study of optical resonances in photonic crystal nano-cavities. Himself carried out the μ PL characterization at EPFL in Lausanne in collaboration with the group of Prof. A. Fiore.

During the PhD, he was dedicated to the design and fabrication of a QD-LED device, coupled with a PhC nano-cavity, in order to have a SPS "on demand", working under electrical injection, and integrable with an optical circuit. The following acquired skills were necessary for the fabrication of the device: implementation of knowledge relating to the EBL for the realignment, with a high degree of accuracy ($<100\text{nm}$), on pre-patterned substrates; deposition of silicate (SiO_2 and Si_3N_4) by ECR-PECVD techniques; evaporation, sputtering and Rapid Thermal Annealing (RTA) of conductive materials for the realization of ohmic contacts on GaAs; electrical and electro-optic characterization of LED with a cryogenic micro probe station; implementation of time resolved measurement for the study of the average life-time of the emitted photons from quantum structures. The electrical and electro-optics characterization have been carried out at the TU/e Eindhoven.

Such expertise had made possible his participation in studies for the growth of localized QD of InAs/GaAs on patterned substrates and the investigation of the effects of polarization in photo-hetero-structures of GaAsN/GaAsN:H. These studies were conducted in collaboration with the group of Prof. M. Capizzi of the University of Rome "La Sapienza".

The experience gained on PhC fabricated in GaAs has made possible an intensive collaboration with the group of Dr. M. Gurioli of the European Laboratory for Non-linear Spectroscopy (LENS) in which a SNOM apparatus were used to study the cavity modes. Then it was possible to use this set-up to tuning the resonance frequencies of the optical modes. We focalize our studies on the effect of local infiltration (with polymeric materials and water) of some holes constituting the matrices of photonic crystals. This technique can be extremely advantageous for the realization of integrated optical circuits.

From 2009, he was also dedicated to the development of the fabrication process of matrices formed by nano-magnetic structures to be used in the study of thermal spin waves excited through current. These matrices were composed of ellipsoidal elements having submicron lateral dimensions and thicknesses of a few nanometers. For this purpose, the knowledge in the context of Spintronics, and in general on ferromagnetic materials, have been expanded. From September 2009 to December 2009 he worked in the laboratory of Dr. Ursula Ebels, at the CEA in Grenoble, in order to gain experience in the fabrication and characterization of spin torque nano-oscillators through spin polarized current ("spin valves" and "nano-contact" geometry).

Since April 2010, he has worked at the University of Magna Graecia (UMG) of Catanzaro, on the coupling of PhC nano-cavities with plasmonic nano-antennas on AFM cantilever. Several studies were carried out on the coupling between the excitation source and the plasmonic antenna to enhance the adiabatic compression and consequently the electric field in an hot spot suitable for an amplified RAMAN. The aims of these devices were the Single Molecule Detection (SMD) and obtaining structural information on biological objects in-situ, such as membrane proteins. These investigation techniques, not requiring the purification and crystallization of the particular protein studied, allowed the study of biological elements that would otherwise be extremely complex to analyse. During this period he studied techniques of nano-fabrication needing the use of systems at very high resolution such as Focused Ion Beam (FIB), with which is possible to fabricate, in the same working section, PhC cavity (through Ion Milling) and plasmonic antennas (through electron gun assisted growth of Platinum/Carbon precursor).

From June 2010 to June 2012, he worked under the direction of SISSA in Trieste, with the group "Bionem Lab" UMG, headed by Prof. Enzo Di Fabrizio. During this period he has optimized the fabrication of different kinds of plasmonic devices, always with the aim to increase the efficiency of TERS and SERS signal to reach higher resolution that is possible. He has then refined fabrication techniques with Dual-Beam designing and manufactured a variety of media that allow the processing of complex samples such as fiber optics, STM tips, SNOM tips, AFM cantilever. He has worked in the integration of plasmonic devices in microfluidic channels with the focus to obtain devices for quick diagnostic, always based on the possibility

of RAMAN analysis. In this period he begun to work with the software Lumerical for Finite-Difference in Time-Domain (FDTD) simulation, thus gaining autonomy to design and construct new prototypes of devices, always targeted to the integration of nanotechnology with biomedical fields.

Starting from October 2013 he work in King Abdullah University for Science and Technology (KAUST), Saudi Arabia, as design and fabrication of nanostructures responsible in the SMILES (Structural Molecule Imaging Light Enhanced Spectroscopy) Lab, headed by Prof. Enzo Di Fabrizio. In this contest he started to work on Super Hydrophobic Surfaces (SHS) able to concentrate a diluted amount of molecules in a very reduced area. These surfaces can also be used for strain single lambda-DNA filament with the aim of direct imaging of the double helix using a TEM. For the fabrication of these structures he took experiences in Direct Laser Writing (DLW) and double face optical lithography.

From January 2015 He starts to work in the laboratory of Nanotechnology for precision medicine headed by Prof. Paolo Decuzzi at the Fondazione Istituto Italiano di Tecnologia (IIT). From a technological point of view He has work on the realization of Silicon templates for the synthesis, by soft lithographic process, of polymeric nano-construct of several dimensions and shapes. More, He starts to study by micro-RAMAN analysis the drug released from these polymeric micro-particles. The combination between multivariate (Principal Component Analysis, PCA) and univariate analysis of RAMAN data is used for the quantification of drug release and, in parallel, to extract information on the mechanism of release. In these period He takes experiences in the fabrication of microfluidic chips for the bio-mimic of endothelial barrier to study the extravasation.

From December 2016 He start to work for GlassUp S.r.l., a startup working on augmented reality glasses.

List of Publications on Peer Review International Journal

(Legend: Corresponding author)

2006	1. M. Francardi, L. Balet, A. Gerardino, C. Monat, C. Zinoni, L. H. Li, B. Alloing, N. Le Thomas, R. Houdré, A. Fiore, "Quantum dot photonic crystal nanocavities at 1300 nm for telecom-wavelength single-photon sources" <i>Phys. Stat. Sol. (c)</i> 3 (11) (2006).
2007	2. L. Balet, M. Francardi, A. Gerardino, N. Chauvin, B. Alloing, C. Zinoni, C. Monat, L. H. Li, N. Le Thomas, R. Houdré, A. Fiore, "Enhanced spontaneous emission rate from single InAs quantum dots in a photonic crystal nanocavity at telecom wavelengths" <i>Appl. Phys. Lett.</i> , 91 (12) (2007).
	3. A. Gerardino, M. Francardi, L. Balet, C. Monat, C. Zinoni, B. Alloing, L.H. Li, N. Le Thomas, R. Houdré, A. Fiore, "Fabrication and characterization of point defect photonic crystal nanocavities at telecom wavelength" <i>Microel. Eng.</i> , 84 (2007).
	4. A. Fiore, C Zinoni, B Alloing, C Monat, L Balet, L H Li, N Le Thomas, R Houdré, L Lunghi, M. Francardi, A Gerardino, G Patriarche, "Telecom-wavelength single-photon sources for quantum communications" <i>J. of Phys.: Cond. Matt.</i> , 19 (22) (2007).
	5. F. Intonti, S. Vignolini, F. Riboli, A. Vinattieri, D.S. Wiersma, M. Colocci, M. Gurioli, L. Balet, C. Monat, L.H. Li, N. Le Thomas, R. Houdré, A. Fiore, M. Francardi, A. Gerardino, F. Roemer and B. Witzigmann, "Near-field mapping of quantum dot emission from single-photon crystal cavity modes" <i>Physica E:Low-Dimensional Systems and Nanostructures</i> , 40 (6) (2007).

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2008	<ol style="list-style-type: none"> 6. <u>M. Francardi</u>, A. Gerardino, L. Balet, N. Chauvin, D. Bitauld, C. Zinoni, L.H. Li, B. Alloing, N. Le Thomas, R. Houdré, A. Fiore., "Towards a LED based on a photonic crystal nanocavity for single photon sources at telecom wavelength" <i>Microel. Eng.</i>, 85, (2008). 7. F. Intonti, S. Vignolini, F. Riboli, A. Vinattieri, D. S. Wiersma, M. Colocci, L. Balet, C. Monat, C. Zinoni, L. H. Li, R. Houdré, <u>M. Francardi</u>, A. Gerardino, A. Fiore, M. Gurioli, "Spectral tuning and near-field imaging of photonic crystal microcavities" <i>Physical Review B</i>, 78 (4), 041401 (2008). 8. <u>Francardi, M.</u>, Balet, L., Gerardino, A., Chauvin, N. Bitauld, D., Li, L. H., Alloing, B.; Fiore, A., "Enhanced spontaneous emission in a photonic-crystal light-emitting diode" <i>Appl. Phys. Lett.</i>, 93 (4), (2008). 9. S. Vignolini, F. Intonti, L. Balet, M. Zani, F. Riboli, A. Vinattieri, D. S. Wiersma, M. Colocci, L. Li, <u>M. Francardi</u>, A. Gerardino, A. Fiore, M. Gurioli, "Nonlinear optical tuning of photonic crystal microcavities by near-field probe" <i>Appl. Phys. Lett.</i>, 93 (2), (2008). 10. Trotta, R.; Polimeni, A.; Capizzi, M.; Giubertoni, D.; Bersani, M.; Bisognin, G.; Berti, M.; Rubini, S.; Martelli, F.; Mariucci, L.; <u>Francardi, M.</u>; Gerardino, A., "Effect of hydrogen incorporation temperature in in plane-engineered GaAsN/GaAsN:H heterostructures" <i>Appl. Phys. Lett.</i>, 92 (22), (2008). 11. P. El-Kallassi, S. Balog, R. Houdre, L. Balet, L. Li, <u>M. Francardi</u>, A. Gerardino, A. Fiore, R. Ferrini, L. Zuppiroli, "Local infiltration of planar photonic crystal with UV-curable polymers" <i>J. Opt. Soc. Am. B</i>, 25 (10) (2008).
2009	<ol style="list-style-type: none"> 12. <u>M. Francardi</u>, A. Gerardino, L. Balet, N. Chauvin, D. Bitauld, L. Li, B. Alloing, A. Fiore, "Cavity-enhanced photonic crystal light-emitting diode at 1300nm" <i>Microel. Eng.</i>, 86, (2009). 13. S. Vignolini, F. Intonti, M. Zani, F. Riboli, D. S. Wiersma, L. H. Li, L. Balet, <u>M. Francardi</u>, A. Gerardino, A. Fiore, and M. Gurioli, "Near-field imaging of coupled photonic-crystal microcavities" <i>Appl. Phys. Lett.</i>, 94 (15), (2009). 14. S. Vignolini, F. Intonti, F. Riboli, D. S. Wiersma, L. Balet, L. H. Li, <u>M. Francardi</u>, A. Gerardino, A. Fiore, and M. Gurioli, "Polarization-sensitive near-field investigation of photonic crystal microcavities" <i>Appl. Phys. Lett.</i>, 94 (16), (2009). 15. Trotta, R.; Polimeni, A.; Capizzi, M.; Martelli, F.; Rubini, S.; <u>Francardi, M.</u>; Gerardino, A.; Mariucci, L., "Light polarization control in strain-engineered GaAsN/GaAsN:H heterostructures" <i>Appl. Phys. Lett.</i>, 94 (26), (2009). 16. F. Intonti, S. Vignolini, F. Riboli, M. Zani, D. S. Wiersma, L. Balet, L. Li, <u>M. Francardi</u>, A. Gerardino, A. Fiore, M. Gurioli, "Tuning of photonic crystal cavities by controller removal of locally infiltrated water" <i>Appl. Phys. Lett.</i>, 95 (17), (2009). 17. H. S. Lee, S. Kiravittaya, S. Kumar, J. D. Plumhof, L. Balet, L. H. Li, <u>M. Francardi</u>, A. Gerardino, A. Fiore, A. Rastelli, O. G. Schmidt, "Local tuning of photonic crystal nanocavity modes by laser-assisted oxidation" <i>Appl. Phys. Lett.</i>, 95 (19), (2009). 18. Chauvin, N.; Zinoni, C.; <u>Francardi, M.</u>; Gerardino, A.; Balet, L.; Alloing, B.; Li, LH; Fiore, A., "Controlling the charge environment of single quantum dots in a photonic-crystal cavity" <i>Physical Review B</i>, 80 (24), (2009).

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2010	<p>19. S. Vignolini, F. Intonti, F. Riboli, M. Zani, A. Vinattieri, D. S. Wiersma, M. Colocci, L. Balet, L. Li, M. Francardi, A. Gerardino, A. Fiore, M. Gurioli, "Sub-wavelength probing and modification of photonic crystal nano-cavities" <i>Photon Nanostruct: Fundam Appl</i>, 8 (2), 78-85 (2010).</p> <p>20. M. Abbarchi, F. Intonti, F. Riboli, S. Vignolini, M. Zani, A. Vinattieri, L. Balet, L. Li, M. Francardi, A. Gerardino, A. Fiore, M. Gurioli, "Experimental mapping of the spatial and angular emission patterns in photonic crystal microcavities" <i>Physica E:Low-Dimensional Systems and Nanostructures</i>, 42 (4), 1148-1150 (2010).</p> <p>21. S. Vignolini, F. Intonti, F. Riboli, L. Balet, L. H. Li, M. Francardi, A. Gerardino, A. Fiore, D. S. Wiersma, M. Gurioli, "Magnetic Imaging in Photonic Crystal Microcavities", <i>Phys. Rev. Lett.</i> 105,123902 (2010).</p> <p>22. M. Francardi, M. Sepioni, A. Gerardino, F. Sansone, G. Gubbiotti, M. Madami, S. Tacchi, G. Carlotti, "Magnetic dot clusters for application in magneto-electronics" <i>Microel. Eng.</i>, 87 1614 (2010).</p> <p>23. S. Vignolini, F. Riboli, D. S. Wiersma, L. Balet, L. H. Li, M. Francardi, A. Gerardino, A. Fiore, M. Gurioli, F. Intonti "Nanofluidic control of coupled photonic crystal resonators", <i>Appl. Phys. Lett.</i> 96,141114 (2010).</p> <p>24. S. Vignolini, F. Riboli, F. Intonti, D. S. Wiersma, L. Balet, L. H. Li, M. Francardi, A. Gerardino, A. Fiore, M. Gurioli, "Mode hybridization in photonic crystal molecules", <i>Appl. Phys. Lett.</i> 97, (2010).</p> <p>25. Trotta, R.; Cavigli L., Felisari, L., Polimeni, A., Vinattieri, A, Gurioli, M., Capizzi, M.; Martelli, F.; Rubini, S.; Mariucci, L., Francardi, M.; Gerardino, A. "Quantum confinement effects in hydrogen-intercalated Ga_{1-x}As_xN_x-GaAs_{1-x}N_x:H planar heterostructures investigated by photoluminescence spectroscopy" <i>Phys. Rev. B</i>, 81, 235327 (2010).</p> <p>26. Gerardino, A.; Francardi, M.; Gaggero, A.; Mattioli, F.; Leoni, R.; Balet, L.; Chauvin, N.; Marsili, F.; Fiore, A., "Nanophotonic technologies for single-photon devices" <i>Opto-Electronics Review</i>, 18 (4) (2010)</p>
2011	<p>27. F. Intonti, F. Riboli, N. Caselli, M. Abbarchi, S. Vignolini, D. S. Wiersma, A. Vinattieri, D. Gerace, L. Balet, L. H. Li, M. Francardi, A. Gerardino, A. Fiore, and M. Gurioli, "Young's Type Interference for Probing the Mode Symmetry in Photonic Structures" <i>Phys. Rev. Lett.</i>,106, 143901 (2011).</p> <p>28. S. Kiravittaya, H. S. Lee, L. Balet, L. H. Li, M. Francardi, A. Gerardino, A. Fiore, A. Rastelli, and O. G. Schmidt, " Tuning optical modes in slab photonic crystal by atomic layer deposition and laser assisted oxidation", <i>J. Appl. Phys.</i> 109, 053115 (2011).</p> <p>29. F. De Angelis, R.P. Zaccaria, M. Francardi, C. Liberale, E. Di Fabrizio, "Multi-scheme approach for efficient surface plasmon polariton generation in metallic conical tips on AFM-based cantilevers" <i>Optics Express</i>,19 (22), (2011).</p> <p>30. Trotta, R.; Polimeni, A.; Martelli, F.; Pettinari, G.; Capizzi, M.; Felisari, L.; Rubini, S.; Francardi, M.; Gerardino, A.; Christianen, P., "Fabrication of Site-Controlled Quantum Dots by Spatially Selective Incorporation of Hydrogen in Ga (AsN)/GaAs Heterostructures" <i>Adv. Mater.</i>, 23 (24), (2011).</p>

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2012

31. Vignolini, S.; Intonti, F.; Riboli, F.; Wiersma, D.S.; Balet, L.; Li, L.H.; Francardi, M.; Gerardino, A.; Fiore, A.; Gurioli, M., "Ideal homoatomic and heteroatomic photonic crystal molecules" *Photon Nanostruct: Fundam Appl*, **10** (3), 271-275, (2012).
32. S. Vignolini, F. Intonti, F. Riboli, D. S. Wiersma, L. Balet, L. H. Li, M. Francardi, A. Gerardino, A. Fiore, M. Gurioli, "Simultaneous near field imaging of electric and magnetic field in photonic crystal nanocavities" *Photon Nanostruct: Fundam Appl*, **10** (3), 251-255, (2012).
33. Intonti, F.; Caselli, N.; Vignolini, S.; Riboli, F.; Kumar, S.; Rastelli, A.; Schmidt, O.G.; Francardi, M.; Gerardino, A.; Balet, L., L. H. Li, A. Fiore, M. Gurioli, "Mode tuning of photonic crystal nanocavities by photoinduced non-thermal oxidation" *Appl. Phys. Lett.* **100** (3), (2012).
34. Malerba, M.; Alabastri, A.; Cojoc, G.; Francardi, M.; Perrone, M.; Proietti Zaccaria, R.; De Angelis, F.; Di Fabrizio, E., "Optimization of Surface Plasmon Poariton generation in a nanocone through linearly polarized laser beams" *Microel. Eng.*, **97**, 204-207. (2012).
35. Tirinato, L.; Gentile, F.; Di Mascolo, D.; Coluccio, ML; Das, G.; Liberale, C.; Pullano, SA; Perozziello, G.; Francardi, M.; Accardo, A.; De Angelis, F.; Candeloro, P.; Di Fabrizio, E., "SERS Analysis On Exosomes Using Super-Hydrophobic Surfaces" *Microel. Eng.*, **97**, 337-340, (2012).
36. Simone, G., Neuzil, P., Perozziello, G., Francardi, M., Malara, N., Di Fabrizio, E., Manz, A., "A facile in situ microfluidic method for creating multivalent surfaces: toward functional glycomics", *Lab. on a Chip*, **12** (8), 1500-1507, (2012).
37. Caselli, N. Intonti, F Riboli, F. Vinattieri, A. Gerace, D. Balet, L. Li, L. H. Francardi, M. Gerardino, A. Fiore, A. Gurioli, M., "Antibonding ground state in photonic crystal molecules", *Phys. Rev. B*, **86** (3), 035133 (2012).
38. M. Moretti, C. Canale, C. Canale, M. Francardi, S. Dante, F. De Angelis, E. Di FabrizioO, "AFM Characterization of Biomolecules in Physiological Environment by an Advanced Nanofabricated Probe", *Microscopy Research and Technique* **75** (12), 1723-1731 (2012).
39. N. Caselli, F. Intonti, C. Bianchi, F. Riboli, S. Vignolini, L. Balet, L. H. Li, M. Francardi, A. Gerardino, A. Fiore, and M. Gurioli, "Post-fabrication control of evanescent tunnelling in photonic crystal molecole", *Appl. Phys. Lett.* **101**, 211108 (2012).

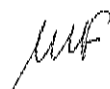
2013	<p>40. G. Perozziello, R. Catalano, <u>M. Francardi</u>, E. Rondanina, F. Pardeo, F. De Angelis, N. Malara, P. Candeloro, G. Morrone, E. Di Fabrizio, "A microfluidic device integrating plasmonic nanodevices for Raman spectroscopy analysis on trapped single living cells", <i>Microel. Eng.</i>, 111, 314-319 (2013).</p> <p>41. Simone, G., Malara, N., Trunzo, V., Perozziello, G., Neuzil, P., <u>Francardi, M.</u>, Roveda, L., Renne, M., Prati, U., Mollace, V., Manz, A. and Di Fabrizio, E., "Protein-Carbohydrate Complex Reveals Circulating Metastatic Cells in a Microfluidic Assay" <i>Small</i>, 9 (12), 2152-2161 (2013).</p> <p>42. F Gentile, ML Coluccio, E Rondanina, S Santoriello, D Di Mascolo, A Accardo, <u>M Francardi</u>, F De Angelis, P Candeloro, E Di Fabrizio, "Non Periodic Patterning of Super-Hydrophobic Surfaces for the Manipulation of Few Molecules" <i>Microel. Eng.</i>, 111, 272-276 (2013).</p> <p>43. <u>M Francardi</u>, P Candeloro, N. Malara, F. Gentile, ML Coluccio, G. Perozziello, A. Gaggero, F. De Angelis, E. Cherubini, E. Di Fabrizio, "Preliminary results on an innovative plasmonic device for macromolecules analysis and sequencing" <i>Microel. Eng.</i> 111, 360-364 (2013).</p> <p>44. P. Candeloro, E. Grande, R. Raimondo, D. Di Mascolo, F. Gentile, ML Coluccio, G. Perozziello, N. Malara, <u>M. Francardi</u>, E. Di Fabrizio, "Raman database of amino acids solutions: a critical study of Extended Multiplicative Signal Correction" <i>Analyst</i> 138 (24), 7331-7340 (2013).</p> <p>45. A Giugni, B Torre, A Toma, <u>M Francardi</u>, M Malerba, A Alabastri, R Proietti Zaccaria, MI Stockman, E Di Fabrizio "Hot-electron nanoscopy using adiabatic compression of surface plasmons" <i>Nature Nanotechnology</i> 8 (11), 845-852 (2013).</p>
2014	<p>46. F. Gentile, M. L. Coluccio, R. Zaccaria, <u>M. Francardi</u>, G. Cojoc, G. Perozziello, R. Raimondo, P. Candeloro, E. Di Fabrizio "Selective on Site Separation and Detection of Molecules in Diluted Solution with Super-Hydrophobic Clusters of Plasmonic Nanoparticles" <i>Nanoscale</i>, 6, 8208-8225 (2014).</p> <p>47. M. L. Coluccio, F. Gentile, <u>M. Francardi</u>, G. Perozziello, N. Malara, P. Candeloro, E. Di Fabrizio "Electroless deposition and nanolithography can control the formation of materials at the nano-scale for plasmonic applications" <i>Sensors</i>, 14 (4), 6056-6083 (2014).</p> <p>48. F. Gentile, M. L. Coluccio, P. Candeloro, M. Barberio, G. Perozziello, <u>M. Francardi</u>, E. Di Fabrizio "Electroless deposition of metal nanoparticle clusters: Effect of pattern distance" <i>Journal of Vacuum Science & Technology B</i>, 32 (3), 031804 (2014).</p> <p>49. A. Giugni, M. Allione, B. Torre, G. Das, <u>M. Francardi</u>, M. Moretti, M. Malerba, G. Perozziello, P. Candeloro, E. Di Fabrizio "Adiabatic nanofocusing: spectroscopy, transport and imaging investigation of the nano world" <i>Journal of Optics</i>, 16 (11), 114003 (2014)</p> <p>50. M. Felici, S. Birindelli, R. Trotta, <u>M. Francardi</u>, A. Gerardino, A. Notargiacomo, S. Rubini, F. Martelli, M. Capizzi, A. Polimeni "Nanoscale Tailoring of the Polarization Properties of Dilute-Nitride Semiconductors via H-Assisted Strain Engineering" <i>Physical Review Applied</i>, 2 (6), 064007 (2014).</p>
2015	<p>51. T. Limongi, R. Schipani, A. Di Vito, A. Giugni, <u>M. Francardi</u>, B. Torre, M. Allione, E. Miele, N. Malara, S. Alrasheed, R. Raimondo, P. Candeloro, V. Mollace, E. Di Fabrizio "Photolithography and micromolding techniques for the realization of 3D polycaprolactone scaffolds for tissue engineering applications" <i>Microel. Eng.</i>, 141, 135-139 (2015).</p> <p>52. A. Falqui, M. Marini, <u>M. Francardi</u>, E. Di Fabrizio "From single molecule to suspended DNA nanowires" <i>Materials Today</i>, 18 (4) (2015).</p>

MF

2016	<p>53. ML Coluccio, M Francardi, F Gentile, P Candeloro, L Ferrara, G Perozziello, E Di Fabrizio "Plasmonic 3D-structures based on silver decorated nanotips for biological sensing" <i>Optics and Lasers in Engineering</i>, 76, 45-51, (2016).</p> <p>54. D. Di Mascolo, P. Basnett, A. L. Palange, M. Francardi, I. Roy, P. Decuzzi "Tuning core hydrophobicity of Spherical Polymeric Nanoconstructs for Docetaxel Delivery" <i>Polymer International</i>, 65, 741-746 (2016).</p> <p>55. A. Lee, D. Di Mascolo, M. Francardi, F. Piccardi, T. Bandiera, P. Decuzzi "Spherical polymeric nanoconstructs for combined chemotherapeutic and anti-inflammatory therapies" <i>Nanomedicine: Nanotechnology, Biology and Medicine</i>, 12 (7), 2139-2147 (2016)</p> <p>56. D Garoli, L Lovato, G Della Giustina, M Oliverio, M Francardi, E Zanchetta, G Brusatin, F De Angelis "Directly nanopatternable nanoporous titania: application to cell growth engineering" <i>Microel. Eng.</i> 155, 102-106 (2016).</p> <p>57. C Manneschi, RC Pereira, G Marinaro, A Bosca, M Francardi, P Decuzzi "A microfluidic platform with permeable walls for the analysis of vascular and extravascular mass transport" <i>Microfluidics and Nanofluidics</i>, 20 (8), 1-12 (2016).</p>
2019	<p>58. E. Palma, N. Costa, R. Molinaro, M. Francardi, D. Paolino, D. Cosco, M. Fresta "Improvement of the therapeutic treatment of inflammatory bowel diseases following rectal administration of mesalazine-loaded chitosan microparticles vs Asamax[®]" <i>Carbohydrate Polymers</i>, 212, 430-438. (2019)</p> <p>59. D. Di Mascolo, A. Coclite, F. Gentile, M. Francardi "Quantitative micro-Raman analysis of micro-particles in drug delivery" <i>Nanoscale Advances</i>, DOI: 10.1039/C8NA00187A (2019)</p>
Book Chapters	
<ul style="list-style-type: none"> • A. Giugni, B. Torre, M. Allione, F. Gentile, P. Candeloro, M. L. Coluccio, G. Perozziello, T. Limongi, M. Marini, R. Raimondo, L. Tirinato, M. Francardi, G. Das, R. Proietti Zaccaria, A. Falqui, E. Di Fabrizio, "Novel Plasmonic Probes and Smart Superhydrophobic Devices, New Tools for Forthcoming spectroscopies at the Nanoscale", Book: "Nano-Structures for Optics and Photonics" edited by B. Di Bartolo, J. Collins, L. Silvestri, Springer (2015). • A. Toma; G. Das; R. Proietti Zaccaria; M. Chirumamilla; F. Gentile; F. Mecarini; M. L. Coluccio; M. Leoncini; C. Liberale; M. Francardi; F. De Angelis; E. Di Fabrizio, "Nanostructures for plasmonics: Design, fabrication, and characterization", Book: "Nanoantenna: Plasmon-Enhanced Spectroscopies for Biotechnological Applications" edited by M. Lamy de la Chapelle and A. Pucci, Pan Stanford Publishing (2013). • A. Toma, R. Proietti Zaccaria, R. Krahne, A. Alabastri, M. L. Coluccio, G. Das, C. Liberale, F. De Angelis, M. Francardi, F. Mecarini, F. Gentile, A. Accardo, L. Manna, E. Di Fabrizio "Nanostructures for Photonics" Book: "Encyclopedia of Nanotechnology" edited by B. Bhushan, Springer (2012). 	
International Conferences proceeding	

MF

1. Fiore, A.; Zinoni, C.; Alloing, B.; Monat, C.; Li, L.H.; Le Thomas, N.; Houdre, R.; Lunghi, L.; Francardi, M.; Gerardino, A. "Telecom-Wavelength Single-Photon Sources from Quantum Dots in Microcavities," *2006 International Conference on Transparent Optical Networks*, vol.2, no., pp.235-236, 18-22 June 2006
2. Francardi, M.; Balet, L.; Gerardino, A.; Chauvin, N.; Alloing, B.; Zinoni, C.; Monat, C.; Li, L.H.; Le Thomas, N.; Houdre, R.; Fiore, A.; , "Control of the Spontaneous Emission of Single InAs Quantum Dots at 1.3 μ m in Point-Defect Photonic Crystal Nanocavities," *9th International Conference on Transparent Optical Networks, 2007. ICTON '07*, vol.4, no., pp.294-296, 1-5 July 2007
3. L. Balet, M. Francardi, A. Gerardino, N. Chauvin, B. Alloing, C. Zinoni, C. Monat, L. H. Li, N. Le Thomas, R. Houdré, and A. Fiore, "Coupling of Single InAs Quantum Dots at 1.3 μ m to a Photonic Crystal Defect Cavity Mode," in *Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference and Photonic Applications Systems Technologies (CLEO/QELS)*, OSA Technical Digest (CD) (Optical Society of America, 2007), paper QMI4.
4. Balet, L., Francardi, M., Gerardino, A., Chauvin, N., Bitauld, D., Li, L.H., Alloing, B., Fiore, A. "Quantum dot photonic crystal membrane LED at 1.3 μ m" *ECIO'08 Eindhoven - 14th European Conference on Integrated Optics and Technical Exhibition*, pp. 51-53 (2008)
5. Chauvin, N.; Bitauld, D.; Fiore, A.; Balet, L.; Li, L.H.; Alloing, B.; Francardi, M.; Gerardino, A.; , "Enhancement of the recombination rate of InAs quantum dots in a photonic crystal light emitting diode." *20th International Conference on Indium Phosphide and Related Materials, 2008. IPRM 2008*, article number: 4703072.
6. Gerardino, A.; Francardi, M.; Balet, L.; Chauvin, N.; Bitauld, D.; Li, L.H.; Alloing, B.; Fiore, A.; , "Electrical injection of a photonic crystal nanocavity," *10th Anniversary International Conference on Transparent Optical Networks, 2008. ICTON 2008*, vol.2, no., pp.124-126, 22-26 June 2008
7. Ferrini, R.; El-Kallassi, P.; Zuppiroli, L.; Balog, S.; Le Thomas, N.; Houdré, R.; Balet, L.; Li, L.; Berrier, A.; Anand, S.; Talneau, A.; Francardi, M.; Gerardino, A.; Fiore, A.; "Hybrid inorganic-organic photonic devices", in *European Optical Society Annual Meeting 2008 – Topical Meeting on Organic Photonics (EOS - TOM 5)*, Paris, France, September 29-October 2, 2008
8. N. Chauvin, L. Balet, M. Francardi, A. Gerardino, L. Li, B. Alloing, and A. Fiore, "Controlling Energy and Charge Environment of Single Excitons in a Photonic-Crystal Diode," in *Conference on Lasers and Electro-Optics/International Quantum Electronics Conference (CLEO/QELS)*, OSA Technical Digest (CD) (Optical Society of America, 2009), paper IThN2.
9. Chauvin, N.; Francardi, M.; Gerardino, A.; Balet, L.; Zinoni, C.; Alloing, B.; Li, L.H.; Fiore, A.; , "Origin of the non-resonant quantum dot-cavity coupling," *23rd Annual Meeting of the IEEE Photonics Society, PHOTONICS 2010*, vol., no., pp.496-497, 7-11 Nov. 2010
10. Intonti, F.; Riboli, F.; Vignolini, S.; Wiersma, D.S.; Balet, L.; Li, L.H.; Francardi, M.; Gerardino, A.; Fiore, A.; Gurioli, M.; , "Tunable homo- and hetero-atomic photonic molecules," *12th International Conference on Transparent Optical Networks (ICTON), 2010*, vol., no., pp.1-4, June 27 2010-July 1 2010.
11. Vignolini, S.; Intonti, F.; Zani, M.; Riboli, F.; Wiersma, DS; Balet, L.; Li, LH; Francardi, M.; Gerardino, A.; Fiore, A.; "Near field mapping of coupled photonic crystal microcavities" *Journal of Physics: Conference Series, 210*, 012059, IOP Publishing (2010)




12. Perozziello, G., Simone, G., Francardi, M., La Rocca, R., Malara, N., Candeloro, P., Carbone, E., Di Fabrizio, E., Manz, A. "A simple in situ microfluidic procedure to create multivalent biofunctionalized surfaces" *15th International Conference on Miniaturized Systems for Chemistry and Life Sciences 2011, MicroTAS 2011*, 3, pp. 1837-1839 (2011)

13. Patrini, M.; De Angelis, F.; Zaccaria, R.P.; Francardi, M.; Lazzarino, M.; Businaro, L.; Di Fabrizio, E.; "Nanoscale chemical mapping through plasmonic tips on AFM-based cantilevers" *Theory and Applications in Computational Chemistry: The First Decade of the Second Millennium – TACC-2012 AIP Conference Proceedings*, 1456, 240-247 (2012)

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