

ALL. B

procedura selettiva di chiamata per n. 1 posto di **Ricercatore a tempo determinato - Tipologia A** presso il Dipartimento di Ingegneria dell'informazione, Elettronica e Telecomunicazioni, Facoltà di Ingegneria dell'informazione, Informatica e Statistica, Settore Scientifico-disciplinare ING-INF/03, Settore concorsuale 09/F2 (Telecomunicazioni) di cui al bando emanato con Prot. n. 115 del 20/01/2023, (Rep. n. 4/2023) con avviso pubblicato sulla G.U. n. 5 in data 20/01/2023, codice concorso 2023RTDAPNRR106.

CV ai fini della pubblicazione

(secondo l'art. 4 del Codice in materia di protezione dei dati personali e dall'art. 26 del D. Lgs. 14 marzo 2013, n. 33)

Roma,
02/02/2023

Part I – General Information

Part II – Education

Type	Year	Institution	Notes
Bachelor Degree	2005	“La Sapienza” University of Rome	Clinical Engineering (L10), thesis title: Information FUSION EEG/fMRI: algoritmi di elaborazioni dei segnali EEG e interscambio dati complessi
Master Degree	2008	Sapienza University of Rome	Biomedical Engineering (LS 26/S), thesis title: Metodologie di acquisizione e di analisi del segnale elettroencefalografico per l'utilizzo di un'interfaccia cervello-computer.
Professional Qualification	2009	University of Rome	Graduation to professional Industrial Engineer
Abilitazione RSPP	2012	University of Rome	Responsabile della Sicurezza Protezione e Prevenzione
Ph.D.	2014	University of Rome	Elettromagnetism (26° cycle), thesis title: Electromagnetic interaction by buried or immersed objects.
TFA (Tirocinio Formativo Attivo)	2015	Roma Tre University	TFA Classe A060 (ex A033)
National Scientific Qualification (Abilitazione Scientifica Nazionale ASN)	2021	University of Rome	Settore scientifico disciplinare ING-INF/02, 09/F1 (Campi Elettromagnetici)
National Scientific Qualification (Abilitazione Scientifica Nazionale ASN)	2022	University of Rome	Settore scientifico disciplinare FIS/01, 02/B1 (Fisica Sperimentale della Materia)

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
01/04/2022	31/03/2023	Sapienza University of Rome	Research Fellow, All-optical signal processing using non-linear multimode optical fibers". Experimental and theoretical/numerical study of the modal decomposition of the output beam from nonlinear multimode fibers, in order to exploit the nonlinear effects for the realization of a fully optical switching device
15/02/2021	14/03/2021	Sapienza University of Rome	Contratto ICE. Numerical and experimental study of hollow-core fibers. Realization of an experimental setup on an optical table for the characterization of the spatial/temporal/spectral properties of the light transmitted by the hollow-core fibers
01/04/2019	31/03/2022	University of Brescia	Ricercatore a Tempo Determinato di tipo A (ING-INF02), for the ERC European research projects: Wavescope (ERC-Proof of Concept Grant), "Wavefront Shaping System for Nonlinear Fiber-Based Microscopy and Endoscopy) and Horizon 2020 ERC Advanced Research Grant: "Spatiotemporal Multimode Complex Optical Systems" (STEMS), n. 740355, PI: Stefan Wabnitz
07/10/2018	31/03/2019	IRCCS Santa Lucia	Researcher, Progetto Giovani Ricercatori, GR13.44.3, "Multimodal experimental and theoretical approach for the study of the Spinal Cord in healthy and diseased subjects", PI: Michela Fratini
01/01/2016	31/12/2017	Centro Studi e Ricerche Enrico Fermi	Research Fellow, PAMINA project (Piattaforma per l'Analisi Multimodale Integrata in Neuroscienze Applicate), Regione Lazio POR-FESR 2014-2020 RU-2014-1092
01/08/2015	31/10/2015	Sapienza University of Rome	Post-doctoral scholarship "Studio dell'applicabilità di modelli di omogeneizzazione dielettrica per l'analisi morfologica di colture cellulari in sospensione liquida" CellTer project. Topics: Electromagnetic scattering models by buried cylindrical and spherical objects. Optical Ring Resonator for the determination of the dielectric constant of cell cultures. Theoretical and numerical models applied to Ground Penetrating Radar. Design of leaky wave antenna. Theoretical studies on metamaterials
01/01/2015	28/02/2015	Sapienza University of Rome	Post-doctoral scholarship, "Design of an image processing system for the determination of the contour of biological targets"
01/03/2013	31/08/2013	Aalto University	Scientific collaboration with Aalto University of Finland. Development of the theoretical model for the realization of metamaterials, using the theory of homogenization of eccentric and multi-eccentric spheres and the addition theorem of vectorial harmonics

IIIB – Other Appointments

Start	End	Institution	Position
01/03/2017	31/03/2019	Step Over srl/Airbus Italia	Satellite Telecommunication researcher
01/12/2015	01/03/2017	Istituto Paritario S. Giovanni Battista	High school teacher
01/02/2014	28/12/2015	So.Tel. srl	Researcher Designer of wireless systems

01/02/2008	31/07/2010	ENPQ srl	Integrated systems R&D designer
------------	------------	----------	---------------------------------

Part IV – Teaching experience

Year	Institution	Lecture/Course
2012	Sapienza University of Rome	Lectures on Electromagnetic Scattering (Electromagnetic Fields II Course, Electronics Engineering)
2013	Sapienza University of Rome	Lectures on Electromagnetic Homogenization Techniques (EM Fields II Course, Electronic Engineering)
2013	Sapienza University of Rome	Lectures on Electromagnetic Diffraction (Electromagnetic Fields II Course, Nanotechnology Engineering)
2014	Sapienza University of Rome	Lectures on Electromagnetic interaction in quasi-static approximation (EM II Fields Course, Nanotechnology Engineering)
2014	Sapienza University of Rome	Lectures on Electromagnetic Diffraction (Electromagnetic Fields Course II, Nanotechnology Engineering)
2015	Sapienza University of Rome	Lectures on Electromagnetic interaction in quasi-static approximation (EM II Fields Course, Nanotechnology Engineering)
2016	Sapienza University of Rome	Lectures on Electromagnetic homogenization techniques (EM fields II course, Nanotechnology engineering).
2020	Yococu	Lectures on Theoretical basis for Ground Penetrating Radar
2020	Sapienza University of Rome	Lectures on Electromagnetic homogenization techniques (EM fields II course, Nanotechnology engineering).
2021	Sapienza University of Rome	Lectures on Electromagnetic homogenization techniques (EM fields II course, Nanotechnology engineering).

Part V - Society memberships, Awards and Honors

Year	Title
2018	Award winner “Maurizio Marabelli” intended for young researchers/professionals who have brought about an innovation of method or analytical technique in the cultural heritage sector.
2017	Project winner PhD ITalents, funded by the CRUI (Conferenza dei Rettori delle Università Italiane).
2015	Appointed “Cultore della materia” Department of Information Engineering, Electronics and Telecommunications (DIET) of Sapienza University of Rome in Nanostructured materials and components for electromagnetic applications (s.s.d. ING-INF/02, 6 CFU, Master's Degree Course in Nanotechnology Engineering).
2015	Appointed “Cultore della materia” Department of Information Engineering, Electronics and Telecommunications (DIET) of Sapienza University of Rome in <i>Advanced Electromagnetics and Scattering</i> (s.s.d. ING-INF/02, 6 CFU, Master's Degree Course in Electronic Engineering).
2015	Winner of “Young Scientist Award” assigned by URSI (International Union of Radio Science) at Atlantic Radio Science Conference 2015
2014	Winner of “Young Scientist Award” assigned by URSI (International Union of Radio Science) at Atlantic Radio Science Conference 2014
2014	Winer of the Grant TU1208 Cost Action: Civil Engineering Applications of Ground Penetrating Radar

2012	Member of the Società Italiana ElettroMagnetismo (SIEM).
2013	Member of the Virtual Institute for Artificial Electromagnetic Materials and Metamaterials
2015	Member of the M&MoCS (Centro Internazionale di Ricerca per la “Matematica & Meccanica dei Sistemi Complessi”)
2022	Member of the Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)

2014	Patent number: 0001422154. Graph curve acquisition and comparison system: A software that allows you to effectively compare your data, obtained through measurements or mathematical models, with what is already present in the literature in order to be able to validate your work (model/measurement). Expiration date 30/01/2034.
2020	Patent number: 0001422154. Method for determining whether a cell shown in an immunofluorescence image acquired with a confocal microscope is a diseased cell, especially a tumor cell. Expiration date 28/09/2040.

2020-2022	<ul style="list-style-type: none"> - Editorial Board Member di Scientific Reports (Nature) - Editorial Board of Photonics (MDPI) as Topic Editor - Co-Editor Special issue “Optical Fibers and sensing” Photonics Journal MDPI - Guest Associate Editor in Frontiers Photonics - Scientific Committee of IEEE Conference; International Conference on Electrical, Computer, Communications and Mechatronics Engineering - Special Issue Editor in Fibers (MDPI), special issue in “Multimode Nonlinear Optical Fibers”
2016	Invited speaker at the "Conference on the Restoration and Conservation of Ancient Stained Glass: Methods and Applications". Speech entitled: "Study on Electromagnetic Interactions with the stained glass windows of the Maddalena Chapel in the Basilica of S. Francesco d'Assisi", 6 April 2016 Rome, organized by YOCOCU - YOUth in CONservation of CULTural heritage and the Faculty of Engineering of Sapienza.
2022	<p>Invited speaker at</p> <ul style="list-style-type: none"> - Advanced Photonics Congress 2022, Maastricht, 24-28 July 2022 - International Conference on laser filamentation, COFIL, 11-15 July 2022, Chania, Greece
2014-2022	<ul style="list-style-type: none"> - Journal of Physics Communications - Journal of the Optical Society of America A - Journal of the Optical Society of America B - Scientific Report - Journal of Quantitative Spectroscopy and Radiative Transfer - ACS Photonics - Optical Fiber Technology - International Journal of Optics - Results in Physics
2012-2022	<ul style="list-style-type: none"> - XIX Riunione Nazionale di Elettromagnetismo RiNEm, Roma, Italia, 10-14 September 2012 - International Union of Radio Science URSI GASS, Beijing, China, 2014 - Progress in Electromagnetics Research Symposium PIERS, Guangzhou, China, 2014 - XX Riunione Nazionale Elettromagnetismo, Rinem, Padova, Italia, 2014 - 1st URSI Atlantic Radio Science Conference (URSI ATRASC), Meloneras, Gran Canaria, Spagna, 2015 - International Symposium on Electromagnetic Theory (EMTS 2016), 14–18 August 2016 in Espoo, Finland - XXI Riunione Nazionale Elettromagnetismo, Rinem, Parma, Italia, 2016 - 12th Workshop: Investigating Brain Function and Structure by Advanced Magnetic Resonance Approaches, International School on Magnetic Resonance and Brain Function, Erice (Sicily), April 30th-May 6th, 2016 - IMEKO International Conference on Metrology for Archaeology and Cultural Heritage, MetroArchaeo 2017, Lecce, Italy, October 23-25, 2017 - 13th Workshop: Investigating Brain Function and Structure by Advanced Magnetic Resonance Approaches, International School on Magnetic Resonance and Brain Function, Erice, Italy, 2018 - International Society for Magnetic Resonance in Medicine ISMRM 2019, Canada. - 9th EPS-QEOD Europhoton Conference on Solid-State, Fibre, and Waveguide Coherent Light Sources (EUROPHOTON 2020), 2020 - Frontiers in Optics / Laser Science, OSA Technical Digest (Optical Society of America, 2020) - Conference on Lasers and Electro-Optics, OSA Technical Digest (Optical Society of America, 2021) - International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Mauritius, 2021 - Conference on Lasers and Electro-Optics, Technical Digest Series, San Jose, California, USA, CLEO 2022 - International Conference on laser filamentation, COFIL, 11-15 July 2022, Chania, Crete, Greece (invited) - Advanced Photonics Congress 2022, Maastricht, 24-28 July 2022 (invited) - Italian Conference on Optics and Photonics. Trento, June 15-17, ICOP 2022 - International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Maldives, 2022

2013	Session Chairman: - Nano-biotechnology - Nanoptics/nano tubes & nano medicine at the World Congress on Advances in Nano, Biomechanics, Robotics, and Energy Research (ANBRE13), Seoul, South Korea, August 25-28, 2013.
2016	Member of the Organizing Committee of the European School of Antennas: "Leaky Waves and Leaky waves and periodic structures for antenna applications", held at the Sapienza University of Rome, Rome.
2016	Member of the Organizing Committee of the 12th Workshop International School on Magnetic Resonance and Brain Function Erice (Sicily), April 30 - May 6, 2016, organized by the Enrico Fermi Research Center and the Ettore Majorana Foundation of Erice.
2017	Member of the Organizing Committee of the European School of Antennas: "Leaky Waves and Leaky waves and periodic structures for antenna applications", held at the Sapienza University of Rome, Rome.
2022	Chairman at CIVIS international workshop: "Multimode Photonics", Sapienza University of Rome, Via Eudossiana 18, August 22-25, 2022

Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

Anno	Titolo	Programma
2023	PI	Progetto Avvio alla Ricerca 2022-2023 (Sapienza), "Statistical mechanics of non-linear beam cross-cleaning in multimode optical fibers", n. AR2221815ED243A0, (4,000.00 €)
2022	Research fellow (I)	Progetto Multibridge (MULTIBRIDGE projects aim to demonstrate the mode-selective Raman amplification of optical signals in multimode fiber transmission systems), n. 101081871, call ERC-2022-POC (Proof of Concept) (150.000 €)
2021	Assegnista (I)	Progetti di Ricerca (Grandi) - Progetti Grandi (Sapienza), Spiral Optical Tweezer by Rainbow Light (SPOTLIGHT), n. protocollo RG12117A84DA7437, P.I. Stefan Wabnitz (68.787,00 €)
2020	RTDA (I)	Progetto Wavescope (ERC-Proof of Concept Grant), "Wavefront Shaping System for Nonlinear Fiber-Based Microscopy and Endoscopy" No. 874596 (150.000,00 €)
2019	RTDA (I)	Horizon 2020 ERC Advanced Research Grant: "Spatiotemporal Multimode Complex Optical Systems" (STEMS), n. 740355 (2.084.181,00 €)
2019	RTDA (I)	Progetto FARE 2018 "Messa in forma del fascio ottico per il controllo degli impulsi di luce tramite fibra multimodo" (WASHING, No. R18SPB8227)
2018	Research fellow (I)	GR13.44.3, Progetto Giovani Ricercatori "Multimodal experimental and theoretical approach for the study of the Spinal Cord in healthy and diseased subjects". (248.508,00 €)
2017	PI	Tag-recognition project, PhD ITalents by CRUI (75.000,00 €)

2016	Research fellow (I)	PAMINA project (Piattaforma per l'Analisi Multimodale Integrata in Neuroscienze Applicate), Regione Lazio POR-FESR 2014-2020 RU-2014-1092 (862.000,00 €)
2015	Research scholarship (I)	CellTer project: "Three-dimensional (3D) evaluation techniques of cell growth and morphology in microgravity conditions by means of electromagnetic diffraction" Italian Space Agency, Grant N. 2013-089-R.0 (80.392,00 €)
2014	Research scholarship (I)	TU1208 COST Action, "Civil engineering applications of Ground Penetrating Radar"
2012	PI	Progetto Avvio alla Ricerca 2012-2013 (Sapienza), "Comparative study between an analytical method for diffraction from spherical inclusions in a substrate and recent homogenization formulas for inverse diffraction applications" (2.000,00 €)
2008	Research scholarship (I)	Regione Lazio, "FUSION: project Framework and Unified System for Investigation on Neurosciences". (800.000,00€)

Parte VII – Research Activities

Keywords Brief Description

Optical fibers	<p>Since November 2014, after obtaining the Ph.D. in Electromagnetism, he has worked as a Post-Doctoral Researcher at the Department of Information Engineering, Electronics and Telecommunications (DIET) of Sapienza University of Rome, dealing with theoretical electromagnetic models both in dynamic and quasi-static regime by buried objects and metamaterials, with applications in the civil field (humanitarian demining), in the biomedical field, and in the field of cultural heritage. He also dealt with electromagnetic simulations with COMSOL Multiphysics on behalf of the COST TU 1208. Also in that period, he was involved in the study of three-dimensional (3D) evaluation techniques of cell growth and morphology in conditions of microgravity through electromagnetic diffraction. In 2016, he participated in the PAMINA project (Platform for Integrated Multimodal Analysis in Applied Neuroscience) as a Research Fellow at the Enrico Fermi Research Center. He was involved in the creation of a parallel heterogeneous cluster (Windows/Linux) based on Grid Engine, and in the processing algorithms (pipeline) of magnetic resonance images. From 2019 to 2022 he was a RTDA on the ERC European projects "STEMS - Spatiotemporal multimode complex optical systems" and "Wavescope". In particular, the work was based on experimental, numerical and theoretical research in the field of non-linear photonics. In particular, he studied the properties of the self-cleaning of the spatial coherence of optical beams in nonlinear multimode optical fibers. Moreover, the nonlinear Kerr properties are studied to recover spatial coherence of a multimode wave and simultaneously compensate for the modal dispersion in the time domain. He is currently a research fellow at DIET of Sapienza University of Rome. He is dealing with all-optical signal processing using non-linear multimode optical fibers". In particular, it is dealing on experimental studies of the modal decomposition of the output beam from nonlinear multimode fibers, in order to exploit the nonlinear effects for the realization of a fully optical switching device. The goal is to exploit the phase adaptation phenomenon and the four-wave mixing when the coupling conditions of the laser to the fiber vary, in order to exploit the non-linear self-cleaning phenomenon for light switching.</p>
Multimode fibers for telecommunications	
Electromagnetic scattering	
Electromagnetic interaction (GPR)	
Metamaterials	
Nonlinear optics	

Parte VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
International Papers	129	Scopus	2013	2023
International Papers	106	Scopus	2018	2022

Hirsch (H) index	16	Scopus
Normalized H index*	1,6	Scopus
Total Citations	697	Scopus
Average Citations per Product	5,4	Scopus
Total Impact factor	207,81	Scopus
Average Impact factor	3,2	Scopus

Hirsch (H) index (last 5 years)	13	Scopus
Total Citations (last 5 years)	495	Scopus

*H index divided by the academic seniority.

Part IX– Selected Publications (12)

- [1] E.V. Podivilov, F. Mangini[§], O.S. Sidelnikov, M. Ferraro, M. Gervaziev, D.S. Kharenko, M. Zitelli, M.P. Fedoruk, S.A. Babin, and S. Wabnitz, “Thermalization of orbital angular momentum beams in multimode optical fibers,” *Physical Review Letters*, Vol. 128, No. 24, 24390, 2022. (DOI: 10.1103/PhysRevLett.128.24390). (I.F. 9.185).
- [2] M. Ferraro, F. Mangini[§], Y. Sun, M. Zitelli, A. Niang, M.C. Crocco, V. Formoso, R.G. Agostino, R. Barberi, A. De Luca, A. Tonello, V. Couderc, S.A. Babin, and S. Wabnitz, “Multiphoton ionization of standard optical fibers,” *Photonics Research*, Vol. 10, No. 6, 7 pp. 1394-1400, 2022. (DOI: 10.1364/PRJ.451417). (I.F. 7.254).
- [3] F. Mangini, M. Gervaziev, M. Ferraro, D.S. Kharenko, M. Zitelli, Y. Sun, V. Couderc, E.V. Podivilov, S.A. Babin, and S. Wabnitz, “Statistical mechanics of beam self-cleaning in GRIN multimode optical fibers,” *Optics Express*, Vol. 30, No. 7, pp. 10850-10865, 2022. (DOI: 10.1364/OE.449187). (I.F. 3.833).
- [4] F. Mangini, M. Ferraro, M. Zitelli, A. Niang, T. Mansuryan, A. Tonello, V. Couderc, A. Deluca, S.A. Babin, F. Frezza, and S. Wabnitz, “Helical plasma filaments from the self-channeling of intense femtosecond laser pulses in optical fibers,” *Optics Letters*, Vol. 47, No. 1, 2022. (DOI: 10.1364/OL.445321). (I.F. 3.56).
- [5] M. Ferraro, F. Mangini, M. Zitelli, A. Tonello, V. Couderc, and S. Wabnitz “Femtosecond nonlinear losses in multimode optical fibers,” *Photonics Research*, Vol. 9, No. 12, 16 pp. 2443-2453, 2021. (DOI: 10.1364/PRJ.425878). (I.F. 7.254).
- [6] F. Mangini, M. Ferraro, M. Zitelli, V. Kalashnikov, A. Niang, T. Mansuryan, F. Frezza, A. Tonello, V. Couderc, A.B. Aceves, and S. Wabnitz “Rainbow Archimedean spiral emission from optical fibres,” *Scientific Reports*, Vol. 11, 13030, 10 pp., 2021, (DOI: 10.1038/s41598-021-92313-w). (I.F. 4.996).
- [7] F. Mangini, M. Ferraro, M. Zitelli, A. Niang, A. Tonello, V. Couderc, and S. Wabnitz, “Experimental observation of self-imaging in SMF-28 optical fiber,” *Optics Express*, Vol. 29, No. 8, pp. 12625-12633, 2021. (DOI: 10.1364/OE.419472). (I.F. 3.833).
- [8] M. Zitelli, F. Mangini, M. Ferraro, O. Sidelnikov, and S. Wabnitz “Conditions for walk-off soliton generation in a multimode fiber,” *Communications Physics Nature*, Vol. 4, 182, No. 1, pp. 1-6, 2021. (DOI: 10.1038/s42005-021-00687-0). (I.F. 6.497).
- [9] F. Mangini, M. Ferraro, M. Zitelli, A. Niang, A. Tonello, V. Couderc, and S. Wabnitz “Multiphoton absorption upconversion luminescence in optical fiber,” *Physical Review Applied*, Vol. 14, No. 5, 054063. 2020. (DOI: 10.1103/PhysRevApplied.14.054063). (I.F. 4.985).
- [10] M. Zitelli, F. Mangini, M. Ferraro, A. Niang, D. Kharenko, and S. Wabnitz, “High-energy soliton fission dynamics in multimode GRIN fiber,” *Optic Express*, Vol. 28, No. 14, pp. 20473-20488, 2020. (DOI: 10.1364/OE.394896). (I.F. 3.669).

- [11] T. Hansson, A. Tonello, T. Mansuryan, F. Mangini, M. Zitelli, M. Ferraro, A. Niang, R. Crescenzi, S. Wabnitz, And V. Couderc, "Nonlinear beam self-imaging and self-focusing dynamics in a GRIN multimode optical fiber: theory and experiments," *Optic Express*, Vol. 28, No. 17, pp. 24363-24458, 2020. (doi: 10.1364/OE.398531). (I.F. 3.669).
- [12] F. Frezza, F. Mangini, and N. Tedeschi, "Introduction to electromagnetic scattering: Tutorial," *J. Opt. Soc. Am. A*. Vol. 35, No. 1, pp. 163-173, 2018. (DOI: 10.1364/JOSAA.35.000163). (I.F. 1.861).

§ **first co-author**

Roma, 02/02/2023