Allegato B

VALERIA GILIBERTI
Curriculum Vitae

Rome
23rd September, 2024

Part I – General Information

Full Name	Valeria Giliberti
Date of Birth	
Place of Birth	
Citizenship	
Permanent Address	
Mobile Phone Number	
E-mail	
Spoken Languages	

Part II – Education

Type	Year	Institution	Notes
PhD in Material Sciences	2014	**Sapienza University of Rome** and **Institute for Photonics and Nanotechnologies of National Research Council** (IFN-CNR). Rome, Italy.	Thesis title: "*Nonlinearity of Terahertz Plasmons in a Two-Dimensional Electron Gas*".
			Supervisor: Prof. Florestano Evangelisti (PI of the project at IFN-CNR). Internal advisor: Dr. Michele Ortolani External referee: Prof. Dr. Heinz-Wilhelm Hübers.
			The research activity during the three years of PhD was fully carried out at IFN-CNR exploiting a fully-equipped clean room for micro- and nano-fabrication (electron beam lithography, lift-off, etching techniques).
ESONN (European School On Nanosciences & Nanotechnologies)	2012	University Grenoble Alpes, Grenoble, France.	Three-week international course aiming at providing theoretical and practical training in the fields of Nanosciences and Nanotechnologies. Admission on comparative basis.
Master degree in Physics (Italian Laurea Magistrale)	2011	**Sapienza University of Rome**. Rome, Italy.	Thesis title: "*Study of the electromagnetic response from terahertz to infrared frequencies of innovative metamaterials*".
			Supervisor: Prof. S. Lupi

			Mark: 110 cum laude.
Bachelor degree in Physics (Italian Laurea Triennale)	2009	**Sapienza University of Rome.** Rome, Italy.	Thesis title: "*Superfluidity of He4*". Supervisor: Prof. S. Caprara. Mark: 110 cum laude.

Part III – Appointments

IIIA – Research appointments

Start	End	Institution	Position
2022	today	Center for Life Nano- and Neuro-Science **CLNS** of the **Italian Institute of Technology** (IIT). Rome, Italy.	**Researcher** (3 year-contract). **In charge of the Nano-Infrared laboratory** at CLNS and head of research unit for CLNS in one European project. My current activities mainly leverage on **AFM-assisted mid-IR nanospectroscopy,** in combination with other microscopic and spectroscopic approaches, for the **study at the nanoscale of biomaterials and related soft-matter nanostructures, plasmonic nanostructures and nano-photonic devices**.
2016	2022	Center for Life Nano- and Neuro-Science **CLNS** of the **Italian Institute of Technology** (IIT). Rome, Italy.	**Post-doc** (2+3 year-contract, including maternity leave). Member of the Nano-Infrared laboratory and head of research unit for CLNS for regional projects. *After this 5-year position as post-doc I have been promoted to Researcher in charge of the same laboratory.*
2020	2021	**8 months of maternity leave**	
2014	2016	**Physics Department, Sapienza University of Rome**. Rome, Italy.	**Post-doc** as team member of the European project FP7 FET-Open "*GEMINI: germanium for mid-infrared plasmonics*".
2014	2014	**Molecular Foundry of Lawrence Berkeley National Laboratory.** Berkely, USA.	**Visiting period** as leading research scientist with authorized access to the clean-room within a proposal evaluated on comparative basis (Title: "*Nanofabrication of Mid-Infrared Plasmonic Tips from Epitaxial Germanium*") for three-dimensional prototyping of semiconductor nanostructures and plasmonic nanoantennas by use of advanced Focused Ion Beam (FIB) technology;

			(3 months).
2012	2014	**Institute for Photonics and Nanotechnologies of National Research Council.** Rome, Italy.	Research fellowship owner during the PhD.

IIIB – Other Appointments

Start	End	Institution	Position
2023	2034	**Abilitazione Scientifica Nazionale alle funzioni di professore universitario di Seconda Fascia nel Settore Concorsuale 02/B1 - FISICA SPERIMENTALE DELLA MATERIA**	
2023	2027	**BESSY II** of the **Helmholtz-Zentrum Berlin fur Materialien und Energie GmbH** (HZB). Berlin, Germany	**Member of the Scientific Selection Panel (SSP) for Helmholtz-Zentrum Berlin fur Materialien und Energie GmbH.** Nominated member for Condensed Matter college.
2019	today	**BESSY II** of the **Helmholtz-Zentrum Berlin fur Materialien und Energie GmbH** (HZB). Berlin, Germany.	Participation as responsible experimentalist at several beam-times at the IRIS beamline at BESSY II of HZB (one or two weeks each beam-time).
2012	2013	Johann Wolfgang Goethe-Universität in Frankfurt, Germany.	Short visiting periods during the PhD in the group of H. Roskos to perform experiments of heterodyne and sub-harmonic mixing in field effect transistors.

Part IV – Teaching experience

Year	Institution	Lecture/Course
2024 (a.a. 2024/2025, first semester)	Sapienza University of Rome; Faculty of Pharmacy and Medicine, Degree Course: Bioinformatics - Bioinformatica. *(Vincitrice del bando su base comparativa per il conferimento di incarichi di insegnamento a titolo oneroso).*	**Principles of Physics** (10596081) - SSD PHYS-03/A – 6 CFU. Number of students ~ 100
2020	CLNS	Monographic lesson in a Microscopy Course for PhD students in Physics, Molecular Biology and Life Science at Sapienza University of Rome. Title of the seminar: "*Infrared spectroscopy and imaging beyond the diffraction limit*" (4 hours). Number of students ~ 30
2019	CLNS	Monographic lesson for students of the **Master's degree in Physics** at Sapienza University. Title of the seminar: "*Infrared and terahertz imaging*" (4 hours). Number of

		students ~ 20
2015	Sapienza University of Rome; Faculty of Information Engineering, Informatics, and Statistics, Degree Course: Management Engineering.	Teaching assistant at the General Physics course (20 hours). Number of students ~ 200

Part V – Supervision of personnel

2021-today	**Research supervisor of 1 post-doc, 1 fellowship student and 1 PhD student.**
	Tommaso Venanzi, post-doc at CLNS and team member of the European project NEHO since 2023;
	Federica Verde postgraduate fellowship student at CLNS since 2023;
	Antonia Intze PhD student in Life Science at Sapienza University since 2021.
2020-2024	**Research supervisor of 1 PhD student.**
	Maria Eleonora Temperini, PhD student in Mathematical models for engineering, electromagnetism and nanoscience at **Sapienza University. Thesis title:** "*Infrared laser spectroscopy of proteins at the nanoscale*".
2021-2024	**Research co-supervisor of 1 post-doc and 4 Master degree students.**
	Raffaella Polito post-doc at Sapienza University of Rome (2021-2023);
	Giorgio Gregori, Luna Iacobini, Alessandro Fulli and Federica Verde Master degree students in Physics at Sapienza University of Rome;
2018-2021	**Research supervisor of 1 PhD student.**
	Raffaella Polito, PhD student in Mathematical models for engineering, electromagnetism and nanoscience at Sapienza University of Rome. Thesis title: "*Plasmonic and photonic strategies to measure conformational changes of transmembrane proteins at the nanoscale*".

Part VI - Society memberberships, Awards and Honors

Year	Title
2023	**Young Scientist Award of the IRMMW-THz society.** Motivation: "for important breakthroughs in the domain of biophysical research with infrared near-field techniques". *The prize is instituted to recognize interdisciplinary, outstanding scientific work by a young scientist who has made innovative contributions and discoveries in the field of infrared, millimeter, and Terahertz waves. It is awarded after a rigorous evaluation by a peer committee that broadly represents the Infrared, Millimeter-Wave and Terahertz communities.*
2022-2023	Member of the Italian Society of Physics (SIF).
2016-2018	Member of the Italian Society of Optics and Photonics (SIOF) and the European Optical Society (EOS).

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

Year	Title and Role	Program	Grant value
2023-today	**NEHO**: *Neuromorphic computing Enabled by Heavily doped*	Horizon EIC 2021 Pathfinder Open project	

	semiconductor Optics. Partners: IIT - both CBN@Lecce (coordinator) and CLNS@Rome - (Italy), CNRS (France), CNR (Italy), Ghent University (Belgium), LMU University (Germany).		
	Investigator: scientist in charge of research sub-unit (CLNS), responsible of funding and personnel.		
2023-today	**NARCISSUS**: *Monitoraggio del Rischio Idrogeologico da Satellite tramite misura Spettroscopica dell'Umidità del Suolo*. Partner: Nhazca S.R.L.(coordinator) and IIT (CLNS).	POR FESR LAZIO 2021-2027 Ambito ASAM "Aerospazio, Sicurezza e Automotive e Mobilità Sostenibile"	
	Investigator: scientist in charge of research unit (CLNS), responsible of funding.		
2020-2022	**MICOLET**: *Optical cavity microscope for the diagnosis of deep skin lesions at terahertz frequencies*. Partner: Crisel Instruments S.R.L (coordinator), Sapienza University of Rome and IIT (CLNS).	POR FESR LAZIO 2014-2020, LIFE 2020	
	Investigator: scientist in charge of research unit (CLNS).		
2018-2019	**MICOTED**: THz confocal microscope for the diagnosis of skin cancer. Partner: Crisel Instruments S.R.L (coordinator) and IIT (CLNS).	POR FESR LAZIO 2014-2020, LIFE 2020	
	Investigator: scientist in charge of research unit (CLNS).		
2015	*Plasmonic proximal probes for infrared nano-spectroscopy of functional oxides with intrinsic inhomogeneities*.	Early career fund ("Avvio alla Ricerca") at Sapienza University of Rome.	
	Principal Investigator.		

Part VIII – Organization of conferences

Year	Title
Next 2026	**Person in charge of the organization of the "European IR Nanospectro-Imaging Meeting" to be held in 2026 at CLNS in Rome.** ~150 participants
2017	Co-organizer of the international NanoIR user workshop, CLNS, Italy. ~50 participants
2014	Participation to the local organizing committee of the workshop "Plasmonica 2014".

Physics Department, Sapienza University, Italy. ~100 participants

Part IX – Research Activities

Keywords	Brief Description
Mid-Infrared nanospectroscopy **Atomic Force Microscopy** **Protein conformational changes** **Complex biological systems**	My current activities mainly leverage on **AFM-assisted mid-IR nanospectroscopy,** in combination with other microscopic and spectroscopic approaches, for the **study at the nanoscale of biomaterials and related soft-matter nanostructures, plasmonic nanostructures and nano-photonic devices**. The advanced approaches are mainly intended to uncover fundamental but still elusive molecular mechanisms underlying **protein conformational changes** and **protein misfolding**, with a specific focus on optogenetic membrane proteins and aggregation-prone proteins. I am the **leading scientist of a research activity aiming at the study of light-sensitive membrane protein conformational changes** by means of state-of-the-art infrared vibrational nanospectroscopy and nanotechnology strategies. To carry on this activity, I have established long-term collaboration with Humboldt University in Berlin (Prof. P. Hegemann, biophysics goups) and Helmholtz-Zentrum Berlin fur Materialien und Energie GmbH (Dr. U. Schade and Dr. L. Puskar, high resolution IR laboratory at IRIS beamline). Recently, thanks to an internal collaboration at IIT (Prof. Tartaglia, biophysics group), I started working also on the study of **protein misfolding and aggregation** with the aim to elucidate how the interaction of proteins with other biological molecules may affect the formation of **supramolecular structures**.
Mid-IR Plasmonics **Highly-doped semiconductors** **Functionalization of scanning probe tips** **Near-field microscopy**	I started working in the field of **mid-IR plasmonics** during my participation to the European FP7 project "*GEMINI: germanium for mid-infrared plasmonics*" **project** (first post-doc), which introduced me also to the working group of SIOF named "Plasmonics and Nano-Optics" since 2014. Besides the spectroscopic characterization of the as-grown semiconductor materials, in the framework of the GEMINI project, I have demonstrated the possibility of using a highly n-doped Ge-on-Si material for fabrication of **novel resonant scanning probe tips for near-field IR nanospectroscopy**. I have been the reference person of the **micro- and nano-fabrication process**, which I have performed during the **visiting period at the Molecular Foundry in Berkeley**, as well as of the **near-field optical microscopy experiments** performed to demonstrate the optical functionalities of the probes by characterizing nanomaterials. The experiences described above gave me the chance to establish collaborations with diverse national and international groups (P. Biagioni, Politecnico di Milano; F. De Angelis, IIT-Genova; R. Colombelli, Université Paris-Sud) that went on after 2016, when I moved to CLNS (IIT). Part of my actual work at CLNS is aimed to gain a deeper understanding of the **electromagnetic and thermal phenomena occurring at the nanoscale on which photothermal AFM-assisted spectroscopy relies**, and that must be considered for a quantitative modelling and for a complete understanding of the experimental data. An activity that has contributed to this goal is the extensive work aimed to exploit the AFM-assisted

	spectroscopy to investigate and characterize mid-IR plasmonic devices, with the objective to gain insights into the **light-matter interaction at the single device level** (plasmonic planar or vertical antennas, waveguides), such as the study of thermoplasmonic effects and of the strong coupling regime.
Terahertz spectroscopy **Plasmons in 2DEGs** **Hydrodynamic nonlinearity** **Micro- and nano-fabrication**	My interest in **THz plasmonics** and **technology** started during my PhD at IFN-CNR, where I could benefit of a fully-equipped clean-room for micro- and nano-fabrication. My main PhD activity was focused on the investigation of resonant plasmons in two-dimensional gases (2DEGs). I was in charge of the **design and of the micro- and nano-fabrication of the devices based on III-V semiconductor heterostructures**, as well as of the THz spectroscopic characterization, both at room and cryogenic temperatures. My work led to the demonstration of an **intrinsic plasmon-induced nonlinearity due to the hydrodynamic behavior of the 2DEGs**, observed by probing the down-conversion by unscreened THz resonant plasmons in 2DEG field-effect transistors. During the PhD, I have been involved also on the investigation of resonant THz plasmons in topological insulators and metamaterials. For this latter activity, I was the person in charge of the design and micro-fabrication of the samples.

Part X – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	**51 peer-review publications** + 49 conference proceedings	Scopus	2012	2024
Papers [national]				
Books [scientific]				
Books [teaching]				

Total Impact factor	247
Total Citations	1160 (Scopus)
Average Citations per Product	22.7 (Scopus, calculated without conference proceedings); 11.6 (Scopus, calculated including conference proceedings).
Hirsch (H) index	17 (Scopus)
Normalized H index*	1.42

*H index divided by the academic seniority.

Part XI – Oral presentation at international conferences

More than 20 oral presentations at international conferences, among which **7 invited talks** and **2 keynote talks**.

- **Invited oral presentation** at the 1st *European meeting on InfraRed Nanospectro-Imaging,* Paris, France, (March 2024).
- **Invited oral presentation** at the international conference *Sci-X - Federation of Analytical Chemistry and Spectroscopy Societies,* Sparks, Nevada (USA), (Oct 2023).
- **Invited keynote oral** at The 2023 48th International Conference on Infrared, Millimeter and Terahertz Waves (IRMMW-THz) that will be held next September in Montreal, Canada, (Sept 2023).
- **Invited oral presentation** at the International Conference on Advanced Vibrational Spectroscopy (ICAVS12), Krakow, Poland, (Aug 2023).
- Oral presentation at the 5th European Forum on Nanoscale IR Spectroscopy (EFNS 2022), Vienna (Austria), (Sept 2022).
- **Invited oral contribution** at the national congress of the Italian Physical Society (SIF) - session "Fisica della Materia", Milan (Italy), (Sept 2022).
- Oral presentation at *The 46th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2019)*, Chengdu, China, (Aug 2021). Remote-based online talks.
- Oral presentation at the workshop *CT4OPTO-Principles of light-induced charge transfer for optogenetics*, (June 2021). Virtual edition.
- **Invited oral presentation** at *Sci-X - Federation of Analytical Chemistry and Spectroscopy Societies*, Palm Springs, USA, (Oct 2019).
- **Keynote oral presentation** at *The 44th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2019)*, Paris, France, (Sept 2019) Proc.: 10.1109/IRMMW-THz.2019.8874519.
- Oral presentation at *S3IC (Single-Molecule Sensors and NanoSystems International Conference)*, Munich, Germany, (Apr 2019)
- **Invited oral presentation** at European Forum on Nanoscale IR Spectroscopy, London, UK, (Sept 2018)
- Oral presentation at *The 15th international conference of Near-field Optics and Nanophotonics (NFO-15).* Troyes, France (Aug 2018).
- Oral presentation at *Plasmonica 2018.* Florence, Italy, (Jul 2018).
- Oral presentation at the *International Conference on Enhanced Spectroscopy (ICES2017).* Munich, Germany, (Sept 2017).
- Oral presentation at SPIE Optics + Photonics 2017. San Diego, USA, (Aug 2017) Proc.: 10.1117/12.2273796.
- Oral presentation at *Plasmonica 2017.* Lecce, Italy, (Jul 2017).
- Oral presentation at *SPIE Photonics West 2017.* San Francisco, USA, (Feb 2017). Proc.: 10.1117/12.2253851.
- **Keynote oral presentation** at *The 41st International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2016).* Copenhagen, Denmark, (Sept 2016). Proc.: 10.1109/IRMMW-THz.2016.7758341.

- Oral presentation at *The 14th International Conference of Near-Field Optics, Nanophotonics and Related Techniques (NFO-14)*. Hamamatsu, Japan, (Oct 2016).
- Oral presentation at the *International Conference on Enhanced Spectroscopy (ICES2015)*. Messina, Italy, (Oct 2015).
- Oral presentation at Plasmonica 2015. Padova, Italy, (Jul 2015).
- Oral presentation at Plasmonica 2014. Rome, Italy, (Jun 2014).
- Oral presentation at *The 4th EOS Topical Meeting on Terahertz Science and Technology (EOS-TST 2014)*. Camogli, Italy, (May 2014).

Part XII– Selected Publications

List of the publications selected for the evaluation. For each publication I report authors, title, reference data, publication date, citations and journal IF.

[1] M.E. Temperini, R. Polito, T. Venanzi, L. Baldassarre, H. Hu, C. Ciracì, M. Pea, A. Notargiacomo, F. Mattioli, M. Ortolani, and **V. Giliberti**

An Infrared Nanospectroscopy Technique for the Study of Electric-Field-Induced Molecular Dynamics,

Nano Letters 24(32), 9808-9815 (2024)
Publication Date: August 1, 2024
Citations : 0
Impact Factor : 9.6

[2] A. Intze, M. E. Temperini, G. Gregori, F. Verde, M. Ortolani, and **V. Giliberti**

Effect of 0.6 THz Continuous-Wave Irradiation on Pathologically Relevant Protein Aggregates,

IEEE Transactions on Terahertz Science and Technology, 14(5), 652-660 (2024)
Publication Date: July 30, 2024
Citations : 0
Impact Factor : 3.9

[3] T. Venanzi, **V. Giliberti**, M.E. Temperini, S. Sotgiu, R. Polito, F. Mattioli, A. Pitanti, V. Mišeikis, C. Coletti, S. Roddaro, L. Baldassarre and M. Ortolani,

Mid-infrared photocurrent nano-spectroscopy exploiting the thermoelectric effect in graphene,

Applied Physics Letters, 123(15) (2023)
Publication Date: October 12, 2023
Citations : 2
Impact Factor : 3.5

[4] M. Malerba, S. Sotgiu, A. Schirato, L. Baldassarre, R. Gillibert, **V. Giliberti,** M. Jeannin, M. Jean-Michel, L. Li, A.G. Davies, E.H. Linfield, A. Alabastri, M. Ortolani, and R. Colombelli,

Detection of strong light–matter interaction in a single nanocavity with a thermal transducer,

ACS nano, 16(12), 20141-20150 (2022)
Publication Date: November 18, 2022
Citations : 6
Impact Factor : 15.8

[5] R. Polito, M.E. Temperini, E. Ritter, L. Puskar, U. Schade, M. Broser, P. Hegemann, L. Baldassarre, M. Ortolani, and **V. Giliberti**,

Conformational changes of a membrane protein determined by infrared difference spectroscopy beyond the diffraction limit,

Physical Review Applied, 16(1), 014048 (2021)
Publication Date: July 20, 2021
Citations: 6
Impact Factor : 3.8

[6] **V. Giliberti**, R. Polito, E. Ritter, M. Broser, P. Hegemann, L. Puskar, U. Schade, L. Zanetti-Polzi, I. Daidone, S. Corni, F. Rusconi, P. Biagioni, L. Baldassarre, and M. Ortolani,

Tip-enhanced Infrared Difference-Nanospectroscopy of the Proton Pump Activity of Bacteriorhodopsin in Single Purple Membrane Patches,

Nano Letters 19, 53104-3114 (2019)
Publication Date: April 5, 2019
Citations: 36
Impact Factor : 9.6

[7] **V. Giliberti**, E. Sakat, M. Bollani, M.V. Altoe, M. Melli, A. Weber-Bargioni, L. Baldassarre, M. Celebrano, J. Frigerio, G. Isella, S. Cabrini, and M. Ortolani,

Functionalization of scanning probe tips with epitaxial semiconductor layers,

Small Methods, 1(3), 1600033 (2017)
Publication Date: January 5, 2017
Citations: 8
Impact Factor: 10.7

[8] **V. Giliberti**, M. Badioli, A. Nucara, P. Calvani, E. Ritter, L. Puskar, E. F. Aziz, P. Hegemann, U. Schade, M. Ortolani, and L. Baldassarre,

Heterogeneity of the Transmembrane Protein Conformation in Purple Membranes Identified by Infrared Nanospectroscopy,

Small, 13 (44), (2017)
Publication Date: September 27, 2017
Citations: 29
Impact Factor : 13.0

[9] J. Frigerio, A. Ballabio, G. Isella, E. Sakat, G. Pellegrini, P. Biagioni, M. Bollani, E. Napolitani, C. Manganelli, M. Virgilio, A. Grupp, M. P Fischer, D. Brida, K. Gallacher, D. J Paul, L. Baldassarre, P. Calvani, **V. Giliberti**, A. Nucara, and M. Ortolani,

Tunability of the dielectric function of heavily doped germanium thin films for mid-infrared plasmonics,

Physical Review B, 94(8), 085202 (2016)
Publication Date: August 15, 2016
Citations: 86
Impact Factor: 3.2

[10] **V. Giliberti**, L. Baldassarre, A. Rosa, V. de Turris, M. Ortolani, P. Calvani, and A. Nucara,

Protein clustering in chemically stressed HeLa cells studied by infrared nanospectroscopy,

Nanoscale, 8(40), 17560-17567 (2016)
Publication Date : September 8, 2016
Citations : 16
Impact Factor : 5.8

[11] **V. Giliberti**, A. Di Gaspare, E. Giovine, M. Ortolani, L. Sorba, G. Biasiol, V. V. Popov, D. V. Fateev, and F. Evangelisti,

Down-conversion of terahertz radiation due to intrinsic hydrodynamic nonlinearity of a two-dimensional electron plasma,

Physical Review B, 91, 165313 (2015)
Publication Date: April 30, 2015
Citations: 19
Impact Factor: 3.2

[12] M. Autore, F. D'Apuzzo, A. Di Gaspare, **V. Giliberti**, O. Limaj, P. Roy, M. Brahlek, N. Koirala, S. Oh, F. Javier García de Abajo and S. Lupi,

Plasmon–phonon interactions in topological insulator microrings,

Advanced Optical Materials, 3(9), 1257-1263 (2015)
Publication Date: April 29, 2015
Citations: 71
Impact Factor: 8.0

Roma, 23 Settembre 2024

Firma