

Curriculum Vitae

PERSONAL INFORMATIONS

Full Name POLITO RAFFAELLA

ACTUAL POSITION

Actual position **From 1/11/2021: holder of a research fellowship (Assegno di Ricerca, Bando n.196/2021– Rep.196) at Physics Department, Sapienza, Università di Roma (Italy).**
Title of the project: “Spettroscopia infrarossa di materiali a base di Silicio per emettitori laser nel terahertz”

EDUCATION AND TRAINING

PhD Course ***PhD student from 1/11/2018 to 31/10/2021***
PhD Course in Mathematical Models for Engineering, Electromagnetics and Nanosciences

Name and type of organisation providing education and training Department of Basic and Applied Sciences for Engineering (SBAI), Sapienza, Università di Roma (Italy).

Affiliation Research work carried out at the Department of Physics, Sapienza, Università di Roma (Italy).

Title of qualification awarded ***Master's degree in Physics***

Date of graduation 27.07.2018

Final mark obtained 110/110

Thesis *Spettroscopia infrarossa alla nanoscala di proteine di membrane fotoattive*

Name and type of organisation providing education and training Sapienza, Università di Roma - P.zza Aldo Moro, 5, 00185 - Roma (Italy)

Title of qualification awarded ***Bachelor's Degree in Chemical Sciences***

Date of graduation 27.10.2011

Final mark obtained 110/110 with laude

Thesis *Il DNA come strumento per la realizzazione di nanomateriali*

Name and type of organisation providing education and training Università degli Studi di Pavia - Corso Str. Nuova, 65, 27100 - Pavia (Italy)

Other University Education

Student selected through national competition at the University School for Advanced Studies IUSS Pavia

Period

From October 2008 to July 2011

Name and type of organisation
providing education and training

University School for Advanced Studies IUSS Pavia - Piazza della Vittoria 15, 27100 - Pavia (Italy)

RESEARCH EXPERIENCES

Beam time user at Bessy-II storage ring, Berlin (Germany)

Period

May 20-26, 2019

Period

November 20-24, 2019

Period

Feb 24 - Mar 01, 2020

SCIENTIFIC COMPETENCES

- Biological samples preparation; surface functionalization of silicon, germanium and gold substrates with protein samples.

- Fourier Transform Infrared Spectroscopy (FTIR) by means of Michelson interferometer in mid-Infrared range using both Global and Synchrotron radiation as sources.

- Use of pulsed and continuous light-emitting diodes (LEDs) sources to perform Infrared spectroscopy under visible illumination of biological samples.

- Nano-imaging by Atomic Force Microscopy (AFM); Infrared nano-spectroscopy using a platform consisting in an AFM coupled to IR laser; use of quantum cascade lasers (QCLs)

- Development of a confocal microscope operating in the mid-Infrared range with a QCL source.

LANGUAGE AND DIGITAL SKILLS

LANGUAGES

Mother Tongue

Italian

Other Language

English

reading: excellent; writing: good; speaking: good

DIGITAL SKILLS

Operating System

Windows, Linux

Programs

Microsoft Office (Word, Excel, Powerpoint, Outlook)

Origin and Igor Pro - data analysis softwares

Bruker OPUS - control software for IR spectrometers

Anasys Analysis Studio - control software for IR nanospectroscopy instruments

Programming Languages	WAsf - Asf for Windows - optical modeling software LaTeX text Editor, C
CONFERENCE AND SUMMER SCHOOLS	
CONFERENCES	The 46th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2021)- Chengdu (China) (Online edition), Aug 29-Sept 3, 2021. Oral presentation: <i>"Mid-Infrared Bloch Surface Waves for biosensing applications."</i> Single-Molecule Sensors and NanoSystems International Conference (S3IC 2020)-Barcelona (Spain) (Online edition), November 9-11, 2020. Oral presentation: <i>"Light-induced activity of Channelrhodopsin probed by photothermal expansion mid-infrared nanospectroscopy."</i> Poster: <i>"Bloch Surface Waves in the mid-infrared for molecular sensing."</i> International workshop on Plasmonics, Napoli (Italy), June 19-21, 2019. Oral presentation: <i>"Difference nanospectroscopy of Proteins in Cell Membranes Located in a 10-nanometer wide Plasmonic Nanogap."</i> The 44th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2019)- Paris (France), September 1-6, 2019
THEMATIC SUMMER SCHOOLS	All-optical interrogation of neuronal networks in vivo- (Online edition), May 25-28, 2021 School on Scanning Probe Microscopy (SPM)- (Online edition), September 16-18, 2020. Summer School on Vibrational Spectroscopy (VISPEC)- Università di Brescia (Italy), September 9-13, 2019. Poster: <i>"Difference IR nanospectroscopy of Bacteriorhodopsin."</i> Eighth International School for Materials for Energy and Sustainability (ISMES VIII)- California Institute of Technology, Pasadena (USA), July 21-27, 2019. Poster: <i>"Tip-enhanced difference IR nanospectroscopy to investigate the light-induced conformational changes of Bacteriorhodopsin at the nanoscale."</i> International School on Nanoscale Optical Microscopy (IVSLA)- Venice (Italy), June 11-14, 2019. Poster: <i>"Tip-enhanced difference IR nanospectroscopy to investigate the light-induced conformational changes of Bacteriorhodopsin at the nanoscale."</i> International school on Plasmonics and Nano-Optics- Cetraro (Italy), June 15-18, 2018. Oral presentation: <i>"Light-induced conformational changes of transmembrane proteins probed by differential mid-IR tip-enhanced absorption."</i>

**SCIENTIFIC
PUBLICATIONS ON
INTERNATIONAL PEER-
REVIEWED JOURNALS**

1. **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 (2021): 014048.

2. **R. Polito**, M. Musto, M. E. Temperini, M. Ortolani, L. Baldassarre, L. Casalis and V. Giliberti. *"Infrared Nanospectroscopy of Individual Extracellular Microvesicles."* Molecules 26.4 (2021): 887.

3. A. Occhicone, M. Pea, **R. Polito**, V. Giliberti, A. Sinibaldi, F. Mattioli, S. Cibella, A. Notargiacomo, A. Nucara, P. Biagioni, F. Michelotti, M. Ortolani and L. Baldassarre. *"Spectral Characterization of Mid-Infrared Bloch Surface Waves Excited on a Truncated 1D Photonic Crystal."* ACS photonics 8.1 (2020): 350-359.

4. M. E. Temperini, V. Giliberti, **R. Polito**, L. Baldassarre and M. Ortolani. *"Infrared nanospectroscopy and nanoimaging of individual cell membranes and microvesicles exposed to air."* OSA Continuum 3.9 (2020): 2564-2572.

5. F. Mattioli, G. Mazzeo, G. Longhi, S. Abbate, G. Pellegrini, E. Moggi, M. Celebrano, M. Finazzi, L. Du, C.G. Zanchi, M. Tommasini, M. Pea, S. Cibella, **R. Polito**, F. Sciortino, L. Baldassarre, A. Nucara, M. Ortolani and P. Biagioni. *"Plasmonic superchiral lattice resonances in the mid-infrared."* ACS Photonics 7.10 (2020): 2676-2681.

6. G. Costanzo, J. E. Sponer, J. Sponer, A. Cirigliano, P. Benedetti, V. Giliberti, **R. Polito** and E. Di Mauro. *"Sustainability and Chaos in the Abiotic Polymerization of 3', 5' Cyclic Guanosine Monophosphate: The Role of Aggregation."* ChemSystemsChem 3.1 (2021): e2000011.

7. 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 19.5 (2019): 3104-3114.

CONFERENCE PROCEEDINGS

1. **R. Polito**, A. Occhicone, M. Pea, V. Giliberti, A. Sinibaldi, F. Mattioli, S. Cibella, A. Notargiacomo, A. Nucara, P. Biagioni, F. Michelotti, M. Ortolani and L. Baldassarre. *"Mid-Infrared Bloch Surface Waves for biosensing applications."* The 46th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2021)- Chengdu (China), (virtual), Aug 29-Sept 3, 2021.
2. **R. Polito**, M. E. Temperini, L. Puskar, U. Schade, L. Baldassarre, M. Ortolani and V. Giliberti. *"Tip-enhanced infrared nanospectroscopy of microvesicles."* The 46th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2021)- Chengdu (China), (virtual), Aug 29-Sept 3, 2021.
3. M. E. Temperini, **R. Polito**, A. Intze, L. Baldassarre, V. Giliberti and M. Ortolani. *"Conformational changes of an oriented film of photosensitive proteins observed by polarized ATR infrared spectroscopy."* The 46th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2021)- Chengdu (China), (virtual), Aug 29-Sept 3, 2021.
4. M. E. Temperini, **R. Polito**, A. Intze, U. Schade, L. Puskar, E. Ritter, L. Baldassarre, M. Ortolani and V. Giliberti. *"Infrared nanospectroscopy study of the light-induced conformational changes of Channelrhodopsin."* EOS Annual Meeting (EOSAM) 2021- Rome (Italy), September 13-17, 2021.
5. **R. Polito**, V. Giliberti, M. E. Temperini, E. Ritter, M. Broser, P. Hegemann, L. Puskar, U. Schade, L. Baldassarre and M. Ortolani. *"Light-induced conformational changes of two different Channelrhodopsin mutants probed by difference mid-Infrared microspectroscopy with Synchrotron radiation"*. The 45th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2020)- Buffalo, NY (USA) (virtual), November 11-13, 2020.
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. *"Difference mid-IR nanospectroscopy on individual patches of purple membranes: the proton pump activity of bacteriorhodopsin at the nanoscale."* The 44th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2019)- Paris (France), September 1-6, 2019.
7. M. Ortolani, M. Pea, A. Occhicone, V. Giliberti, A. Sinibaldi, F. Mattioli, S. Cibella, **R. Polito**, A. Nucara, L. Baldassarre and F. Michelotti. *"Spectroscopic Evidence of Bloch Surface Waves in the Mid Infrared"*. The 45th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2019)- Paris (France), September 1-6, 2019.
8. V. Giliberti, **R. Polito**, E. Ritter, A. Nucara, P. Calvani, M. Broser, P. Hegemann, L. Puskar, U. Schade, L. Baldassarre and M. Ortolani. *"Light-induced conformational changes of transmembrane proteins probed by tip-enhanced mid-infrared differential nanospectroscopy"*. The 43st International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz 2018) -Nagoya (Japan), September 9-14, 2018.

AWARDS AND ACKNOWLEDGMENTS

Best poster at the Summer School on Vibrational Spectroscopy (VISPEC)-
Università di Brescia (Italy), September 9-13, 2019.
Poster: *"Difference IR nanospectroscopy of Bacteriorhodopsin."*

Third place in the best Oral presentation competition at the International school on
Plasmonics and Nano-Optics- Cetraro (Italia), June 15-18, 2018.
Oral presentation: *"Light-induced conformational changes of transmembrane proteins
probed by differential mid-IR tip-enhanced absorption."*