

GAIA PETRUCCI



Contact

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LANGUAGES

Mother tongue:

Italian

Other Languages:

English – C1

French – B2

Spanish – A1

Summary:

PhD in Chemistry and Material Science, curious about outer and inner worlds.

Skill Highlights:

Surface functionalization and characterization, micro- and nano-fabrication, formulations, hands-on on homebuilt spectroscopic apparatus, inorganic chemical synthesis..

WORK EXPERIENCE

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| <ul style="list-style-type: none">• Dates (from – to)• Name and address of employer• Type of business or sector• Occupation or position held• Main activities and responsibilities | <p>From October 2021, ongoing</p> <p>The BioRobotics Institute, Scuola Superiore Sant’Anna, Polo Sant’Anna Valdera, Viale Rinaldo Piaggio, 34, 56025 Pontedera (PI)</p> <p>Microrobotics, Biomedicine</p> <p>Postdoc Researcher</p> <p>Synthesis of active particles, and of biocompatible membranes for their encapsulation. Characterization of the system movement in solution and in phantoms.</p> <p>Work financed by the ERC grant 948590 — CELLOIDS</p> |
| <ul style="list-style-type: none">• Dates• Name and address of employer• Type of business or sector• Occupation or position held• Thesis title• Main activities and responsibilities | <p>From November 2017 to July 2021</p> <p>Department of Chemistry and Industrial Chemistry (DCCI), University of Pisa, Via Giuseppe Moruzzi 13, Pisa (PI) 56124 ITALY
(Supervisors: Prof. Francesco Pineider francesco.pineider@unipi.it).</p> <p>Chemistry and Material Science</p> <p>PhD Student</p> <p><i>“Nanofabrication of Magnetic-Plasmonic Surfaces and their Magneto-Optical Properties”</i></p> <p>Synthesis and characterization of ferrite nanoparticles, use of evaporators for metals and molecules, surface characterization using XPS, AFM, SEM, TEM, MCD, CD, SQUID magnetometer and XRD diffractometer.</p> <p>The work has been partially financed by the EC grant 737093 — FEMTOTERABYTE — H2020-FETOPEN-2016-2017, and thus has comprised the attendance to semestral meetings and the writing of periodic reports.</p> |

ABROAD EXPERIENCES

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| <ul style="list-style-type: none">• Dates• Name and address of employer• Type of business or sector• Main activities and responsibilities | <p>From January 2013 to June 2013</p> <p>Laboratoire de Chimie des Polymères (UMR7610), 3 Rue de Galilée, 94200, Ivry sur Seine, France (Supervisor: Prof. Fabrice Mathevet fabrice.mathevet@upmc.fr).</p> <p>Chemistry/ Polymers/ Liquid crystals</p> <p>Synthesizing and characterizing polymers for organic electronics, using DSC, ¹H-NMR, POM, XRD, Cyclic Voltammetry apparatus, UV spectroscopy apparatus and Flash Chromatography apparatus.</p> |
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- Dates | From April 2019 to October 2019
- Name and address of employer | Göteborgs Universitet, Origovägen 6 b, 41296 Göteborg, **Sweden**
(Supervisor: Prof Alexander Dmitriev alexnd@physics.gu.se).
- Type of business or sector | **Physics/Plasmonics/Chirality**
- Main activities and responsibilities | Nanofabrication and characterization of plasmonic and magnetoplasmonic nanoantennas of different geometries through the in-house developed hole-mask colloidal lithography method (HCL). Basics of FDTD simulations using Lumerical. Study of the effect of chiral nanoantennas on prochiral photoswitches, to test the feasibility of a physically-driven enantioselective reaction.

EDUCATION AND TRAINING

- Dates | From September 2014 to April 2017
 - Name and type of organization | **Università degli studi di Firenze**, Scuola di Scienze Matematiche Fisiche e Naturali
 - Principal subjects/occupational skills covered | **Nanochemistry**, Supramolecular Chemistry, Inorganic Chemistry, Magnetochemistry, Material Chemistry, Formulation Chemistry, Spectroscopy
 - Title of qualification awarded | Degree in Chemistry (**Master** level)
 - Thesis title | *“Synthesis and multitechnique characterization of surface assembled monolayers of cobalt ferrite nanoparticle”*
 - Level in national classification | 110/110 Cum Laude, Graduated with Honors
- Dates | From September 2012 to June 2013 (**ERASMUS** program)
 - Name and type of organization | **UPMC** Université Pierre et Marie Curie, **Paris**, France.
 - Principal subjects covered | Physical Chemistry, Inorganic Chemistry, Biochemistry, Polymeric Chemistry
- Dates | From September 2010 to April 2014
 - Name and type of organization | **Università degli studi di Firenze**, Scuola di Scienze Matematiche Fisiche e Naturali
 - Principal subjects covered | **Chemistry**
 - Title of qualification awarded | Degree in Chemistry (**Bachelor** level)
 - Thesis title | *“Synthesis and characterization of Organic Semiconductors (OSCs) organized in the liquid crystal phase for Molecular Electronics”*
 - Level in national classification | 103/110

TECHNICAL SKILLS AND COMPETENCES

Use of basics computer's functions, Office, LaTeX, Markdown, MatLab, Jullia, Origin, Gwyddion, ImageJ, basic skills of FORTRAN.

Use of X-ray Photoelectron Spectroscopy (XPS), VSW mod. TA10, Mg/Al anodes);

Use of Atomic Force Microscopy (AFM) apparatus, (NT-MDT mod. P47-PRO);

Use of Low-temperature Magnetic Force Microscopy (LT-MFM) apparatus (attoAFM/MFM Ixs - Attocube systems AG) insert in a *Physical Properties Measurement System* (PPMS-9, Quantum Design);

Use of Superconductive Quantum Interference Device (SQUID) magnetometer (Quantum Design MPMS);

Use of X-ray Powder Diffraction (XRPD) diffractometer (Bruker New D8 Advance DAVINCI);

Use of E-beam thin film evaporators (PVD-225, Lesker, and AVAC HVC600);

Use of Transmission Electron Microscopy (TEM) (CM12 PHILIPS, JEOL 100 SX);

Use of Scanning Electron Microscopy (SEM), (SEM-FEG Quanta 450 microscope, JEOL JSM-6301F, Zeiss Supra 55 or a Zeiss Supra 60 VP, Phenom XL);

Use of optical microscopy, phase contrast microscopy, fluorescence microscopy;

Use of UV-vis-NIR spectroscopy Instruments (Cary, Jasco, Perkins);

Use of homebuilt Magnetic Circular Dichroism (MCD) and circular Dichroism (CD) setups.

ORAL COMMUNICATIONS AT CONFERENCES

- "Self-Assembly of Magnetic Nanoparticles over Plasmonic Nanoantennas" at International School of Plasmonics and Nano-Optics, Cetraro (Cs), 15-18.06.2018, Pitch presentation.
- "Plasmonic nanoantennas as local magnetic field probes" at the Joint European Magnetic Symposia (JEMS), Uppsala, 26-30.08.2019, talk (15 min).

POSTER COMMUNICATIONS AT CONFERENCES

- "Self-Assembly of Magnetic Nanoparticles over Plasmonic Nanoantennas" Gaia Petrucci, Alessio Gabbani, Elvira Fantechi, Alexandre Dmitriev, Massimo Gurioli, Andrea Caneschi, Claudio Sangregorio, Francesco Pineider at Workshop Plasmonica 2018, Firenze, 4-6.07.2018.
- "Plasmonic Nanoantennas: Toward the Optical Control of the Magnetization of Nanoparticles" Gaia Petrucci, Alessio Gabbani, Elvira Fantechi, Alexandre Dmitriev, Massimo Gurioli, Andrea Caneschi, Claudio Sangregorio, Francesco Pineider at European School on Magnetism - Magnetism by light, Cracovia, 17-28.09.2018.
- "Developing a Local Probe of the Magnetic Field at the Nanoscale", Gaia Petrucci, Alessio Gabbani, Elvira Fantechi, Esteban Pedrueza-Villalmanzo, Oleg Lysenko, Claudio Sangregorio, Francesco Biccari, Alexander Dmitriev, Francesco Pineider, AIMagn Italian School on Magnetism 2020", Roma, 3-7.02.2020.
- "Local Magnetic Field Sensor Based on Plasmonic Nanoantennas", Gaia Petrucci, Alessio Gabbani, Elvira Fantechi, Esteban Pedrueza-Villalmanzo, Oleg Lysenko, Claudio Sangregorio, Francesco Biccari, Alexander Dmitriev, Francesco Pineider, Web event "Magnet2021", 11-12.02.2021.

TEACHING ACTIVITIES

- 26/02/2018 - 09/04/2018 and 19/11/2018 - 07/12/2018 - Laboratory assistant for the Laboratory of General and Inorganic Chemistry.
- 18/12/2018 - 2h Teaching seminar: Microscopic Techniques for Surface Characterization (in the course of Chemistry of nanomaterials of the master degree in Industrial Chemistry, Prof. Andrea Pucci).
- Summer 2018 - Chemistry teacher for the summer preparation of students willing to attend the medical school admission test at Logical Education, Florence.

PUBLICATIONS

- A. Gabbani, E. Fantechi, G. Petrucci, G. Campo, C. de Julián Fernández, P. Ghigna, L. Sorace, V. Bonanni, M. Gurioli, C. Sangregorio, F. Pineider, "Dielectric Effects in FeOx-Coated Au Nanoparticles Boost Magnetoplasmonic Response: Implications for Active Plasmonic Devices", *ACS applied nano materials* 4.2 (2021): 1057-1066, DOI 10.1021/acsnm.0c02588.
- Gabbani, Alessio, Gaia Petrucci, and Francesco Pineider. "Magneto-optical methods for magnetoplasmonics in noble metal nanostructures." *Journal of Applied Physics* (2021), 129.21 211101, DOI 10.1063/5.0050034.
- Petrucci, G.; Gabbani, A.; Pedrueza-Villalmanzo, E.; Cucinotta, G.; Atzori, M.; Dmitriev, A.; Pineider, F., "Macroscopic Magneto-Chiroptical Metasurfaces", *APL, Applied Physics Letters* (2021), 118, 25, 251108, DOI 10.1063/5.0050797.
- J. Kuttruff, A. Gabbani, G. Petrucci, Y. Zhao, M. Iarossi, E. Pedrueza-Villalmanzo, A. Dmitriev, A. Parracino, G. Strangi, F. De Angelis, D. Brida, F. Pineider, N. Maccaferri, "Magnetic Circular Dichroism Induced by Optical Electric and Magnetic Dipoles in Hyperbolic Metamaterial Nanoparticles", 2021, arXiv: 2103.14180, Submitted to *PRL, Physical Review Letters*, under review.