



CURRICULUM

Prof. Gianluca Maria Farinola

President of SCI - Italian Chemical Society

Chemistry Europe Fellow

*Full Professor of Organic Chemistry
Rector Delegate for Research and Innovation
Università degli Studi di Bari "Aldo Moro"*

*Dipartimento di Chimica
Università degli Studi di Bari "Aldo Moro"*
via Orabona 4, I-70126 Bari, Italy
Phone 0039 080 5442073
Mobile 0039 3332176021
Fax 0039 080 5442129
e-mail: gianluca maria.farinola@uniba.it

<https://www.farinolagroup.com/>

[ORCID ID 0000-0002-1601-2810](https://orcid.org/0000-0002-1601-2810)

His profile as researcher and president of Scientific Societies is reported in this interview on a very popular magazine of Chemistry Europe:

https://www.chemistryviews.org/new_president_of_the_italian_chemical_society/

https://www.chemistryviews.org/details/ezone/11144950/Great_People_Dont_Need_to_Show_Off.html

Education

1992: M.Sc. in Chemistry, University of Bari (summa cum laude).

1997: Ph.D. in Chemical Sciences University of Bari.

Academic career

1996-2002: Assistant Professor of Organic Chemistry, Department of Chemistry, University of Bari;

2002-2015: Associate Professor of Organic Chemistry, Department of Chemistry, University of Bari;

2010: Habilitation Full Professorship in Organic Chemistry, University of Torino;

From 2015: Full Professor of Organic Chemistry, Department of Chemistry, University of Bari.

From 2019: Adjunct Professor, Department of Biomedical Engineering, Tufts University, Boston, USA

From 2019: Pro-Rector of research and innovation at the University of Bari Aldo Moro

From 2023: President of Società Chimica Italiana

Visiting professorships

2019-2022: Adjunct Professor, Department of Biomedical Engineering, Tufts University, Medford (MA)
Boston, USA

2018, 2017: Visiting Scholar, Department of Biomedical Engineering, Tufts University, Medford (MA) Boston, USA (Laboratories Prof. Fiorenzo Omenetto)

2015: Invited Visiting Professor, Moltech Anjou CNRS, University of Angers, France (Laboratories Dr. Jean Roncali)

2014, 2013: Invited Professor, Institut de Science et d'Ingénierie Supramoléculaire, University of Strasbourg, France (Laboratories Prof. Luisa De Cola)

2009: Visiting Professor, University Muenster, Germany (Laboratories Prof. Luisa De Cola)

Awards

2019: "Chemistry Europe Fellows" Class 2018/2019

2008: "Innovation in Organic Synthesis Award" of Interuniversity Consortium CINMPIS

2003: "Medaglia Ciamician" prize of the Italian Chemical Society for young researchers

Other professional appointments

2019-2022 – Member of the Scientific Committee of the Department of Chemical Sciences and Materials Technology of the CNR (Italian National Research Council)

2016-2018 - Consultant of the Italian Parliamentary Committee - Commissione Parlamentare Bicamerale Camera dei Deputati / Senato della Repubblica Italiana di Inchiesta sulle Attività Illecite Connesse al Ciclo dei Rifiuti e su Illeciti Ambientali ad esse Correlati.

Spin-off: Co-founder and member of the administrative committee of a spin-off company SYNCHIMIA s.r.l. of the University of Bari started in November 2008.

Italian Chemical Society (SCI) and European Chemical Society (EuChemS)

2023-2025: President of Società Chimica Italiana - SCI

2020-2022: Vice President of SCI

Since 2022: Member of the Chemistry Europe Council

2018-2021: President of the Organic Chemistry Division of EuChemS

2017-2019: President of the Organic Chemistry Division of SCI

2014-2017: Italian representative, secretary and treasurer in the Organic Chemistry Division of EuChemS

2011-2016: Member of the SCI Organic Chemistry Division Committee

2005-2010: Member of the SCI Regional Committee (Puglia)

2002-2003: Member of the Constituent Committee of the SCI Young Group

Thesis Advisor and Postgraduate-Scholar Sponsor

Sponsored and advised more than 120 students, undergraduate students (about 70), PhD Students (about 30) and post-doctoral researchers (about 20). Mentees have gone on to multiple positions including faculty appointments at University of Pisa, Angers, Tufts, CNR, many important chemical and pharmaceutical companies, public service as chemists (environmental agencies, military)

Research

Gianluca Farinola is author of more than 210 publications on international peer-reviewed journals (Scopus H-index 41, more than 6500 citations), several international patents, and five book chapters. He has presented his research in more than 110 invited lectures in national and international conferences and schools, in Universities and Research Institutes.

He is presently coordinating a research group of about 20 people at the Department of Chemistry of the University of Bari "Aldo Moro".

Gianluca Farinola and his group develop methods, particularly organometallic protocols, for the synthesis of multifunctional molecular, polymeric and supramolecular photo/electro-active organic materials for applications ranging from organic photonics and electronics to biology. The study covers development of new protocols mainly based on Pd-catalyzed cross-coupling reaction, such as coupling of organotin, organoboron and organosilicon compounds, and more recently direct arylation processes. His recent studies have focused on sustainability of methods for the production of materials for optoelectronics. This has been achieved both by the set-up of sustainable organometallic protocols, or by use of natural materials such as biopolymers. Several classes on biopolymers have been investigated, including polydopamine, lignin, silk fibroin. The use of photosynthetic microorganisms, both as a source of biomaterials (e.g. biosilica, photoenzymes) for optoelectronics and as living cells in living photoelectrodes for photoconversion has been reported.

In many cases, the structures developed have been used as active materials in organic photonic and electronic devices including OLEDs, organic solar cells, organic field effect transistors and sensors. More recently, various biological applications have been targeted and bio-hybrid functional smart structures have been synthesized.

Main research achievements

1) Development of synthetic methods for Palladium-catalyzed cross-coupling chemistry

A number of Palladium-catalyzed cross-coupling protocols for the synthesis of π -conjugated compounds have developed over the last 15 years in my group. We have used such versatile reactions to synthesize extended polyenic chains and also several classes of π -conjugated polymers e.g. poly(phenylenevinylene)s (PPVs), poly(aryleneethynylene)s (PPEs) and poly(arylene)s. In the last years, we have focused on the development of direct C-H bond arylation of (hetero)arenes under green and sustainable conditions, including the use of recoverable catalysts, aqueous or solvent-free conditions, and very recently IR radiation-assisted and mechanical milling-assisted conditions. Moreover, we also applied direct C-H bond arylation polymerization processes as scalable routes to π -conjugated polymers for plastic solar cells.

2) Synthesis of π -conjugated polymers and organometallic complexes for OLEDs

Several classes of electroluminescent polymers, and particularly poly(phenylenevinylene)s have been designed and synthesized using organometallic cross-coupling reactions. A special expertise of our group is the synthesis of π -conjugated polymers, small molecules and organometallic complexes with selectively fluorinated backbone. In fact, fluorination has been demonstrated as a convenient structural modification to increase the stability of π -conjugated materials against photooxidation and to tune the emission color over all the visible spectrum. On this topic, we have also collaborated with industrial partners, and especially with

Philips research in Eindhoven and Aachen. The first ever reported blue and white electroluminescent fluorinated PPVs were synthesized and tested in OLED devices. Selective fluorination of ligands of electrophosphorescent Ir complexes has been explored as a structural modification able to improve stability and to tune the color of light emitted.

3) Polymers for photovoltaics

Functional polymers for bulk heterojunction solar cells based on different heteroarylene systems, also conjugated with double bonds, have been developed. Direct arylation processes have been applied for the synthesis of these polymers. Fluorination has been explored also in this context as a structural modification able to improve the performances of the resulting materials in polymer solar cells.

4) Synthesis of chiral π -conjugated polymers

Functionalization of π -conjugated polymers with small enantiopure bio-molecules, such as monosaccharides or amino acids, induces chiral supramolecular architectures in the solid state. Synthetic methods to chiral bio-functionalized polymers have been studied. The chiral organization of the resulting materials in the solid state has been investigated. Finally, a new generation of high performance enantioselective transistor sensors has been demonstrated based on the chiral bio-conjugated polymers as the active thin films

5) Biological polymers for optoelectronics and nanotechnology

We investigate a number of biological polymers, both as pristine materials or with functionalization, as versatile functional materials for many uses including catalysts, biomedicine, optoelectronics. Melanin, polydopamine, lignin and silk fibroin are investigated as sustainable alternative to synthetic polymers. The use of polydopamine in electronic devices has been investigated in depth, also including chemical modified alternatives to the pristine polymer. Silk fibroin has been reported as a catalyst. We have also demonstrated high performance adhesives mimicking byssus using combination of silk fibroin and polydopamine.

6) Functional materials from photosynthetic microorganisms

Diatoms microalgae have been used as a source of nanostructured biosilica. In particular, functionalization of biosilica with several classes of organic molecules have been performed both in vivo or after extraction, obtaining hybrid nanostructures with photonic properties and for application in drug delivery and for tissue and cells growth.

Photoenzymes extracted from photosynthetic bacteria have been chemically modified to be addressed onto electrodes and used as the photoactive components in optoelectronic devices. We have also developed biomimetic polymeric interfaces to address living photosynthetic bacteria on the surface of electrodes, and obtained devices for photoconversion of energy based on living cells.

Coordinator and PI of many national, international and industrial projects.

Some most recent research project as PI of research units:

ITN Project BEEP (Bio-inspired and bionic materials for enhanced photosynthesis) — H2020-MSCA-ITN-2019 Starting from 1/1/2020

HyPhOE (Hybrid Electronics based on Photosynthetic Organisms) — H2020 FETOPEN-2016-2017 Starting from 1/9/2018

XF-ACTOR (Xylella Fastidiosa Active Containment Through a multidisciplinary-Oriented Research Strategy) (Project ID 727987) - H2020-SFS-2016-3

National Project PMGB on Mechatronic, genomic and bioinformatic platforms for high tech oncology - (PON "R&I" 2014- 2020) (2018-2020)

National Project BIOMIS on biobank of microbiota - (PON "R&I" 2014- 2020) (2018-2020)
PSC SALUTE 2014-2020 – Traiettorie 4 – "Biotecnologie, Bioinformatica e Sviluppo Farmaceutico"
Life Science Hub Regione Puglia (starting 2023)

As Scientific Coordinator

PRIN Italian National project: "Aqueous processable polymers for plastic solar cells: from materials to photovoltaic modules" (AQUASOL) (2014-2017).

Industrial research project financed by ENI to the University of Bari (Chemistry Department) "Production of photoactive polymers for photovoltaic cells, production of aromatic intermediates for the synthesis of conjugated polymers and of modified fullerenes and optimization of metal-free dyes for DSSC cells" (2012-2015)

PRIN National Italian project: "Innovative materials for organic and hybrid photovoltaics" (2011-2013).

PRIN National Italian Project "Organic materials for photovoltaics and electro-luminescence: design, synthesis, evaluation" (2008-2010).

Italian-German Bilateral Vigoni Project : "Self-assembling of polymers and organometallic complexes for (electro)luminescent materials" (2006-2007)

He also collaborated with Philips Research and with ENI in research projects focused on development of new generation of photo-active materials for future optoelectronics

Selected Publications

- Albano, G., Zinna, F., Taddeucci, A., Capozzi, M.A.M, Pescitelli, G., Punzi, A., Di Bari, L., Farinola, G.M. Chiral diketopyrrolo[3,4-c]pyrrole-1,2,3-1H-triazole dyes with highly tunable properties in solution and thin films *Chemistry A European Journal* **2023** DOI: 10.1002/chem.202300291
- G. Albano, A. Punzi, M. A. M. Capozzi, G. M. Farinola, Sustainable protocols for direct C-H bond arylation of (hetero)arenes, *Green Chemistry* **2022**. <https://doi.org/10.1039/D1GC03168F>
- G. Albano, G. Decandia, M A. M. Capozzi, N. Zappimulso, A. Punzi, G. M. Farinola, Infrared Irradiation-Assisted Solvent-Free Pd-Catalyzed (Hetero)aryl-aryl Coupling via C-H Bond Activation, *ChemSusChem* **2021**, 14 (16), 3391-3401. <https://doi.org/10.1002/cssc.202101070>
- M. Lo Presti, G. Rizzo, G.M. Farinola, F. Omenetto "Bioinspired Biomaterial Composite for All-Water-Based High-Performance Adhesives" *Advanced Science* **2021**, DOI 10.1002/advs.202004786
- G. Buscemi, D. Vona, R. Ragni, R. Comparelli, M. Trotta, F. Milano, G. M. Farinola, Polydopamine/Ethylenediamine Nanoparticles Embedding a Photosynthetic Bacterial Reaction Center for Efficient Photocurrent Generation, *Adv. Sust .Syst.* **2021**. <https://doi.org/10.1002/adsu.202000303>

- Leone, G., De la Cruz Valbuena, G., Cicco, S.R., Vona, D., Altamura, E., Ragni, R., Molotokaite, E., Cecchin, M., Cazzaniga, S., Ballottari, M., D'Andrea, C., Lanzani, G., Farinola, G.M. Incorporating a molecular antenna in diatom microalgae cells enhances photosynthesis **2021** Scientific Reports, 11 (1), art. no. 5209. DOI: 10.1038/s41598-021-84690-z
- F. Milano, A.Punzi, R. Ragni, M. Trotta G. M. Farinola, Photonics and Optoelectronics with Bacteria: Making Materials from Photosynthetic Microorganisms, *Adv. Funct. Mater.* **2018**. <https://doi.org/10.1002/adfm.201805521>
- R. Ragni, F. Scotognella, D. Vona, L. Moretti, E. Altamura, G. Ceccone, D. Mehn, S.R. Cicco, F. Palumbo, L. Lanzani, G. M. Farinola, Hybrid Photonic Nanostructures by In Vivo Incorporation of an Organic Fluorophore into Diatom Algae, *Adv. Funct. Mater.* **2018**. <https://doi.org/10.1002/adfm.201706214>
- G. Marzano, F. Carulli, F. Babudri, A. Pellegrino, R. Po, S. Luzzati, G. M. Farinola, PBDTPD for plastic solar cells: Via Pd(PPh₃)₄-catalyzed direct (hetero)arylation polymerization, *J. of Mater. Chem. A* **2016**, 4(43), 17163–17170. <https://doi.org/10.1039/c6ta06679h>
- G. Marzano, C. V. Ciasca, F. Babudri, G. Bianchi, A. Pellegrino, R. Po, G. M. Farinola, Organometallic approaches to conjugated polymers for plastic solar cells: from laboratory synthesis to industrial production, *Eur. J. Org. Chem.* **2014**, 30, 6583–6614. <https://doi.org/10.1002/ejoc.201402226>
- F. Milano, R. R. Tangorra, O. Hassan Omar, R. Ragni, A. Operamolla, A. Agostiano, G. M. Farinola, M. Trotta, Enhancing the Light Harvesting Capability of a Photosynthetic Reaction Center by a Tailored Molecular Fluorophore, *Angew. Chem. Int. Ed.* **2012**, 51, 11019–11023. <https://doi.org/10.1002/anie.201203404>

Main Teaching activities

BC and Master degree

Organic Chemistry first course (Degree in Chemistry – First cycle) (2016-2023)
 Organic Chemistry and Laboratory (Degree in Biotechnological Sciences-First cycle) (2001-2019);
 Physical Methods in Organic Chemistry (Degree in Environmental Sciences-First cycle) (2001-2005);
 Organic Material Devices (Degree in Materials Sciences-First cycle) (2002-2011);
 Chemistry of Organic Materials (Master degree in Chemical Sciences and in Chemistry and Technology of Materials-Second Cycle) (2012-2019)
 Chemistry of Marine Pollutants (Degree in Environmental Sciences-First cycle) (2003-2010).

PhD and Specialization School

Industrial Organic Chemistry (Specialization school in Biotechnological Applications) (1998-2003).
 MALDI-TOF Mass Spectrometry (PhD courses in Chemical Sciences and in Chemistry of Materials) (2001-2003).
 Conjugated compounds for photonics and electronics (PhD courses in Chemical Sciences and in Chemistry of Materials) (2004).

Advanced course on synthesis and characterization of organic compounds (PhD courses in Chemical Sciences and in Chemistry of Materials) (1998, 2005).

Didactics in Organic Chemistry (Specialization school for high school professors) (2005-2008).

Didactics in Laboratory of Organic Chemistry (Specialization school for high school professors) (2003-2009).