CURRICULUM

Prof. Gianluca Maria Farinola
Università degli Studi di Bari "Aldo Moro"

Full Professor of Organic Chemistry
Pro-Rector for Research and Innovation

President of SCI – Società Chimica Italiana

Adjunct Professor Department of Biomedical Engineering
Tufts University, Medford, Boston, USA

Chemistry Europe Fellow

Membro Corrispondente dell'Istituto Lombardo Accademia di Scienze e Lettere

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: gianlucamaria.farinola@uniba.it

Adjunct Professor - Department of Biomedical Engineering, Tufts University
4 Colby Street; Medford, MA 02155

https://www.farinolagroup.com/

ORCID ID 0000-0002-1601-2810

Education
1992: M.Sc. in Chemistry, University of Bari (summa cum laude).
1997: Ph.D. in Chemical Sciences University of Bari

Professional appointments
From 2023: President of Società Chimica Italiana
From 2019: Pro-Rector for Research and Innovation at the University of Bari Aldo Moro
From 2019: Adjunct Professor, Department of Biomedical Engineering, Tufts University, Boston, USA
From 2015: Full Professor of Organic Chemistry, Department of Chemistry, University of Bari
2014 National Habilitation full Professorship in three different disciplines: Organic Chemistry, Industrial Chemistry, Chemical Fundaments of Technologies
2010: Habilitation Full Professorship in Organic Chemistry, University of Torino
2002-2015: Associate Professor of Organic Chemistry, Department of Chemistry, University of Bari
1996-2002: Assistant Professor of Organic Chemistry, Department of Chemistry, University of Bari

Visiting professorships
2023: Visiting Professor Université Paris Cité, Laboratories ITODYS, Paris, France
2018, 2017: Visiting Scholar, Department Biomedical Engineering, Tufts University, Medfors, Boston,USA
2015: Invited Visiting Professor, Moltech Anjou CNRS, University of Angers, France
2014, 2013: Invited Professor, Institut de Science et d'Ingégnerie Supramoléculaire, University of Strasbourg
2009: Visiting Professor, University Muenster, Germany

Selected Awards and Honours

2023: Membro Corrispondente dell'Istituto Lombardo Accademia di Scienze e Lettere
2019: "Chemistry Europe Fellows" Class 2018/2019
2019: Highlight Profile on Chemistry Views (Chemistry Europe)
2018: Pemio Anassilaos Megale Ellàs
2013 Speakers at the Burgenstock Conference
2008: "Innovation in Organic Synthesis Award" of Interuniversitary Consortium CINMPIS
2003: "Medaglia Ciamician" of Società Chimica Italiana 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 Commettee - 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

International Advisory Committees and Conference Organizations

2024 Chair of the Scientific Committee of the XXVIII National Conference of Società Chimica Italiana
2023 Co-chair of the ECME – European Conference on Molecular Electronics
2023 Elected Chair of Intern. Sci. Committee of ESOC (European Symposium of Organic Chemistry)
2019-2024 Member of Sci. Committee European Winter School Physical Organic Chemistry (e-WISPOC)
2020- International Advisory Board, European Journal of organic Chemistry (Wiley)
2011-2019 Member and Chair (2018-2019) of the Scientific Committee of the Annual National Conferences of the Organic Chemistry Division of the Italian Chemical Society;
2014-2018 Member of the Scientific Committee of the SISOC – Spanish-Italian Symposium on Organic Chemistry (Editions X, XI, XII);
2014-2022 Symposium Chair for CIMTECH 2014, 2018, 2022 and 6th , 8^{th}, 9^{th} Forum on New Materials
2015-22 MRS Fall Boston Meeting - Symposium Co-chair of three symposia
2016 Co-Chair of the Symposium Orbitaly 2016 – Organic Bioelectronics in Italy
2016 Member of the Program Committee of the European Optical Society Annual Meeting (EOSAM)
2013 Co-director of the XIII International Krutyn Summer School 2013 (May 2013, Poland)
2012 Chairman of the International Conference FUTURMAT II

Thesis Advisor and Postgraduate-Scholar Mentorship

Mentor of over 150 younger collaborators: ca. 70 undergraduate students, ca. 60 PhD Students, ca. 20 post-doctoral researchers. 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 (*e.g.* environmental agencies, military).

Research

Gianluca Farinola is author of over 220 publications on international peer-reviewed journals (Scopus H-index 42, 7100 citations, Google Scholar H-index 46, 8000 citations), several international patents, and six book chapters. He has presented his research in more than 120 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 research interests are very broad with a specific focus on the design and synthesis of multifunctional molecular, polymeric and supramolecular photo/electro-active organic materials for applications ranging from photonics and (opto)electronics to biology. Envisaging new concepts in materials' structures and composition has led Gianluca to propose new molecular, nano- and micro-architectures based on functional molecules/polymers, and also complex assemblies from the combination of tailored organic molecules and components of photosynthetic microorganisms or intact living cells interfaced with optoelectronic devices. He masters sustainable protocols to generate novel functional materials. Classical Pd-catalyzed cross-coupling reactions, such as coupling of organotin, organoboron and organosilicon compounds, have been investigated in the first part of his career, while more recently he has reported many contributions on direct arylation processes via C-H activation as sustainable protocols, demonstrating the possibility to carry out the reactions in solvent-free conditions and promoted by IR irradiation. On a completely different approach, he has demonstrated the use of natural materials such as biopolymers, photoenzymes or living photosynthetic microorganisms as components for building-up functional structures. Several classed of biopolymers have been investigated, including polydopamine, lignin, silk fibroin. The use of photosynthetic microorganisms (diatoms microalgae and photosynthetic bacteria), both as a source of biomaterials (e.g. biosilica, photoenzymes) for optoelectronics and as intact cells in living electrodes for photoconversion has been reported.

Main research achievements

1) Development of Pd-catalyzed organometallic reactions for the synthesis of molecular and polymeric polyconjugated compounds

A number of Palladium-catalyzed cross-coupling protocols for the synthesis of π-conjugated molecules and polymers, with applications in optoelectronics, have been developed over the last 30 years. Many classes of compounds have been reported, with several functional groups: these include polyenic chains and several classes of π-conjugated polymers, e.g. poly(phenylenevinylene)s (PPVs), poly(aryleneethynylene)s (PPEs) and many different poly(hetero)arylenes. In the last years, the focus has been 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. Application of direct C-H bond arylation polymerization processes as scalable routes to π-conjugated polymers for plastic solar cells has been demonstrated.

Some of the classes of materials developed are listed below.

1.1 π-conjugated polymers and organometallic complexes for OLEDs

Several classes of electroluminescent polymers have been designed and synthesized using organometallic cross-coupling reactions. A special expertise of the group of Farinola is the synthesis of π-conjugated polymers, small molecules and organometallic complexes with selectively fluorinated backbone. In fact, this functionalization 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, Gianluca Farinola has 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 emitted light.

1.2 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.

1.3 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 sensors has been demonstrated based on the chiral bio-conjugated molecular semiconductors as the active thin organic films.

2) Biological polymers for optoelectronics and nanotechnology

Farinola has reported the investigation of several biological polymers, both in their pure form or with functionalizations, as versatile materials for uses in catalysis, biomedicine, optoelectronics. Melanin, polydopamine, lignin and silk fibroin are investigated as sustainable alternatives to synthetic polymers. The use of polydopamine in electronic devices has been studied, also including chemical modified alternatives to the pristine polymer. Silk fibroin has been reported as a catalysts' support. High performance adhesives mimicking byssus using combination of silk fibroin and polydopamine have been recently described. Polydopamine has also been demonstrated as an effective interface to address living photosynthetic microorganisms onto electrodes ensuring charge transport.

3) Functional materials form photosynthetic microorganisms

Diatoms microalgae have been used as a source of nanostructured biosilica. 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. Biomimetic polymeric interfaces to address living photosynthetic bacteria on the surface of electrodes have been developed, enabling devices based on living cells for photoconversion of light.

Coordination of national and international projects

Some recent research project as PI of research units:

- ITN Project GREENS (Responsible microrobots)- H2020-MSCA-ITN-2023, from 2024, 48 months
- PRIN National project: "PhOLcs-Photosynthesis for Organic Light-Powered Electronics"(2024/2026)
- ITN Project BEEP (Bio-inspired and bionic materials for enhanced photosynthesis) — H2020-MSCA-ITN-2019 Starting from 1/1/2020, 48 months
- HyPhOE (Hybrid Electronics based on Photosynthetic Organisms) — H2020 FETOPEN-2016-2017 Starting from 1/9/2018, 36 months
- XF-ACTOR (Xylella Fastidiosa Active Containment Through a multidisciplinary-Oriented Research Strategy) (Project ID 727987) - H2020-SFS-2016-3, 2017, 48 months
- National Project PMGB on Mechatronic, genomic and bioinformatc 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 – Traiettoria 4 – *"Biotecnologie, Bioinformatica e Sviluppo Farmaceutico"* Life Science Hub Regione Puglia (starting 2023, 36 months)
- PNRR Partenariato esteso 04: Scienze e Tecnologie Quantistiche (PE 0023) NATIONAL QUANTUM SCIENCE AND TECHNOLOGY INSTITUTE (2023-2026)

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 "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)

Main teaching activities

Bachelor and Master degree
Organic Chemistry first course (Degree in Chemistry – First cycle)
Organic Chemistry and Laboratory (Degree in Biotechnological Sciences-First cycle)
Physical Methods in Organic Chemistry (Degree in Environmental Sciences-First cycle)
Organic Material Devices (Degree in Materials Sciences-First cycle)
Chemistry of Organic Materials (Master degree in Chemical Sciences and in Chemistry and Technology of Materials-Second Cycle)
Chemistry of Marine Pollutants (Degree in Environmental Sciences-First cycle).
PhD and Specialization School
Industrial Organic Chemistry (Specialization school in Biotechnological Applictions).
MALDI-TOF Mass Spectrometry (PhD courses in Chemical Sciences and in Chemistry of Materials).
Conjugated compounds for photonics and electronics (PhD courses in Chemical Sciences and in Chemistry of Materials).
Advanced course on synthesis and characterization of organic compounds (PhD courses in Chemical Sciences and in Chemistry of Materials).
Didactics in Organic Chemistry (Specialization school for high school professors).
Didactics in Laboratory of Organic Chemistry (Specialization school for high school professors).

Outreach and communication
Gianluca Farinola has presented several interviews on popular magazines, radio and TV, both as researcher and as President of scientific societies, including articles in national newspapers and youTube videos. He is also very active on the social media of chemical societies.
Some examples of interviews are reported below:
https://www.chemistryviews.org/new_president_of_the_italian_chemical_society/
https://www.chemistryviews.org/details/ezine/11144950/Great_People_Dont_Need_to_Show_Off.html
https://www.raiplaysound.it/audio/2024/03/Caterpillar---La-Societa-Chimica-Italiana-aderisce-a-Millumino-di-Meno-091935b8-23e0-48bf-a7e5-85f2d05e2c72.html
https://www.youtube.com/watch?v=yLagcjrmLE4