PERSONAL INFORMATION

Giuseppe Falini

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https://ambtelaviv.esteri.it/en/

https://site.unibo.it/biological-structures-materials/en

Sex Male | Date of birth 12/10/1966 | Nationality Italian

WORK EXPERIENCE

2024 - now — Scientific Attachè
Italian Embassy in Tel Aviv, Israel
Promote scientific and technological cooperation between Italy and Israel, and supervise initiatives to assist universities, researchers, and businesses.
Business or sector Scientific and technological promotion

2018 - 2024 — Full Professor in General and Inorganic Chemistry
Alma Mater Studiorum – University of Bologna, Italy
Coordination of the research activities of the group of biomineralization and bio-crystallography. Teaching and supervision of Master and PhD students. Activity of research, fund rising with European and national institution, and industries.
Business or sector Scientific and technological research

2008 - 2018 — Associate Professor in General and Inorganic Chemistry
Alma Mater Studiorum – University of Bologna, Italy
Coordination of the research activities of the group of biomineralization and bio-crystallography. Teaching and supervision of mater and PhD students. Activity of research fund rising with European and national institution and industries.
Business or sector Scientific and technological research

1995 - 2008 — Assistant Professor in General and Inorganic Chemistry
Alma Mater Studiorum – University of Bologna, Italy
Research on biomineralization and bio-inspired materials,
Business or sector Scientific and technological research

1999 - 1998 — Post-Doctoral
University of California - Santa Barbara, USA
Two periods of six months each for research on biomineralization under the supervision of Prof. Galen Stucky and Prof. Daniel Morse
Business or sector Scientific research

1994 - 1998 — PhD / Post-Doctoral
Weizmann Institute of Science, Israel
Two periods of six months and one year (1994 and 1995) and two periods of two months (1996 and 1997) to study biomineralization under the supervision of Prof. Lia Addadi and Prof. Steve Weiner
Business or sector Scientific research

1990 - 1991 — Post “Laurea Degree” Fellowship
Alma Mater Studiorum – University of Bologna, Italy
Business or sector Scientific research and teacher assistant

EDUCATION AND TRAINING

1991 - 1995 — PhD in Chemistry
Alma Mater Studiorum – University of Bologna, Italy
Thesis title:“Molecular recognition at the organic / inorganic interface”. Supervisor Prof. Alberto Ripamonti (co-supervision Prof. Lia Addadi and Prof. Steve Weiner)

1985 - 1990 — “Laurea degree” in Chemistry cum lode
Alma Mater Studiorum – University of Bologna, Italy
Thesis title: “Struttura della fibrina”. Supervisor Prof. Alberto Ripamonti

OTHER INFORMATION

Mother tongue: Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2

Communication skills

Excellent group communication skills, including mediation in conflict situations, acquired during being member of several Department committees.
Excellent ability to support the development of personal skills and abilities, acquired through decades of tutoring of university students.
Strong ability to adapt to international and multicultural environments and contexts, acquired during my working activity abroad.

Organisational / managerial skills

Skills and experience in managing groups of researchers and students (currently responsible for a team of about 10 people).
Ability in managing scientific events as the International Conference of Crystal Growth and Epitaxy (2023) with more than 1000 participants foreseen.

Job-related skills

State of the art techniques for the characterization of materials (e.g. powder and single crystal X-ray diffraction, electron-microscopies, probe microscopies, rheological and mechanical tests). Syntheses of bio-inspired materials. Valorisation of waste seashells. Sustainable, zero pollution and green chemistry treatment of waste seashells in a circular economy view.

Computer skills

Elaboration of information	Communication	Content Creation	Security	Problem-solving
Expert user	Expert user	Independent user	Independent user	Independent user

Optimum knowledge of the Window operating system.
Use of a large number of office software. Use of numerous scientific software and online resources.

Other skills

Knowledge of Jewish culture and the history of the state of Israel.

ADDITIONAL INFORMATION

Scientific interests

Currently, my research activities are mainly addressed in the field of biomineralization and macromolecular crystallography. It can be summarized in the following subjects:
- the study of the crystalline structure using X-ray crystallography of biological macromolecules and minerals involved in the biomineralization processes of calcium carbonate; - the design and preparation of innovative surfaces of biomineralization inspiration for the crystallization of biological macromolecules; - the study of calcium carbonate deposition in corals and the effects of temperature on growth mechanisms; - the study of the structure of the byssus from *Mytilus galloprovincialis* and the application of this material for the preparation of new biomaterials for healthcare.

Experimental skills

The research activities of GF are carried out through the use of several experimental techniques. He has access to sources of synchrotron light (in Trieste, Grenoble and Brookhaven) for the study by X-ray diffraction of the crystalline structure of biological macromolecules and for the determination of molecular recognition to the inorganic-organic interface. He uses electronic microscopes (SEM, ESEM, and TEM) and scanning probe microscopes (AFM) to study the interaction betweenmineral phases and biopolymers.

ACADEMIC INFORMATION

Teaching activities

I currently teach Solid State Chemistry at the Master students in Chemistry and General and InorganicChemistry to the bachelor students in Biology. I also teach inorganic nanomaterials and research skills in the International master on Chemical Innovation and Regulation (ChIR). I am periodically teaching Biomineralization at the International School of Crystallization (Granada, Spain).

Bibliometric indices (GoogleScholar)

I am author and co-author of more than **230 publications** on international peer-reviewed journals. I also wrote 3 book chapters and I am co-inventor of 3 patents.
Hindex = **54**
Number of citations: about **11200**

Best achievements: **Two papers in Science and 3 papers in Nature journals**

Seminars

I have presented my research in more than 50 national and international conferences and I was invited by several institutions to delivery seminars.

Projects (last 5 years)

2010-2016 European Research Council under the European Union's Seventh Framework Program (FP7/2007-2013)/ERC grant agreement no. 249930 (CoralWarm: Corals and global warming: the Mediterranean versus the Red Sea). (€ 3 354 000)
2013-2015 Ministry of Foreign Affairs of Italy Binational project Italy-Israel "CaFuMa" (€ 40 000)
2015-2016 European Space Agency "Topical Team Project: Space bioreactor for marine mineralization material research (SpaceBioMat)" (€ 20 000).
2014-2020 Member of Graphene Flagship Consortium (€ 80,000 per year)
2019-2021 Ministry of Foreign Affairs of Italy Bilateral project Italy-Israel SpaceLysis (€ 98 000)
2020-2023 Era-Net BlueBio "Advanced materials using biogenic calcium carbonate from seashell wastes (CASEAWA)" (€ 750 940)
2023-2027 Horizon-EIC-2022-Pathfinderopen: "Sustainable Bioinspired Wax Coating for Multi-Functional Crop Protection (SaveWax)" 101099462 - GAP-101099462 (≈ € 150 000)

Recent Awards

- ERC-Advanced (CoralWarm: Corals and global warming: the Mediterranean versus the Red Sea)
- Direct call as Full Professor for merit (15.03.2018, Ministry of Education, Universities and Research)
- Technion: Israel Institute of Technology, Invitation Grant as Academic Visitor (July 2019 - October 2019)

Coordination of working group

- Responsible of the research group "Biocrystallization and Biomineralization Group", Dipartimento di Chimica "Giacomo Ciamician", Alma Mater Studiorum Università di Bologna (https://site.unibo.it/biocrystbiominlab);
- Responsible of the Theme "Blue & White Biotech for marine environment" of the Blue Growth Steering Committee at the University of Bologna.

Organization of recent international scientific events

- Member of Scientific Committee of the Congress of the International Union of Crystallography, Madrid (Spain), 22–30 August 2011 (http://iucr2011.iucr.org).
- Conference Chair of the 5° European Conference on Crystal Growth, Bologna (Italy) 9-11 September 2015 (www.eccg5.eu). (about 500 people)
- Member of Scientific Committee of the BioMet16, Messina (Italy) 28-29 October 2016.
- Member of Scientific Committee and Session Chair of the IV MISCA, Tenerife (Spain) 21-24 June 2016 (www.misca2016.org).
- Session Chair of the 6° European Conference on Crystal Growth, Varna (Bulgaria) 16-20 September 2018.
- Conference co-Chair of the International Conference on Crystal Growth and Epitaxy (https://www.iccge20.org), Naples (Italy), 30 Jul - 04 Aug 2023. (about 1000 people expected)

Narrative CV

Prof. Giuseppe Falini (GF), PhD in Chemistry, is full professor in chemistry at the University of Bologna. GF teaches general and inorganic chemistry and solid-state chemistry to master students in Chemistry at the School of Science at the University of Bologna. He has been advisor of Master and PhD theses of several students and currently is advisor of five master students and two PhD students.
Currently, the research activities of GF are mainly addressed in the field of biomineralization and macromolecular crystallography. It can be summarized in the following subjects: - the study of the crystalline structure using X-ray crystallography of biological macromolecules and minerals involved in the biomineralization processes of calcium carbonate; - the design and preparation of innovative surfaces of biomineralization inspiration for the crystallization of biological macromolecules; - the study of calcium carbonate deposition in corals and the effects of temperature on growth mechanisms; - the study of the structure of the byssus from *Mytilus galloprovincialis* and the application of this material for the preparation of new biomaterials for healthcare.
The research activities of GF are carried out through the use of several experimental techniques. He has access to sources of synchrotron light (in Trieste, Grenoble and Brookhaven) for the study by X-ray diffraction of the crystalline structure of biological macromolecules and for thedetermination of molecular recognition to the inorganic-organic interface. He uses electronic microscopes (SEM, ESEM, TEM and Cryo-TEM) and scanning probe microscopes (AFM) to study the interaction between mineral phases and biopolymers. He guides a laboratory of biocrystallization in which are carried out studies on the interaction between minerals (or ions) and macromolecules and their crystallization. GF is reviewing manuscripts submitted to the most prestigious journals, like Science and Nature, and has been guest editor of the Journal of Crystal Growth. GF is co-author of more than 250 scientific publications (H-index = 54) in international journals with high impact factor. The publication list of Prof. Falini includes two Science articles, one Nature Climate Changes, two Nature Communications, two PNAS articles and two Angewandte Chemie articles. He has been invited to present his research activities in numerous international and national conferences and schools. GF is a leading researcher in the study of

biomineralization processes, with widely recognized contributions in the fields of control of biological relevant mineral deposition on bio-macromolecular matrices and macromolecular crystallography. His research activity is recognized by present collaborations with other leading groups in biomineralization, such as: Prof. B. Pokroy (Technion, Israel), Prof. Tali Mass (haifa University, Israel), Prof. Juan Manual Garcia Ruiz (CSIC, Spain) and Dr. Kralj (Ruder Boškovic Institute, Croatia). He represents the European excellence in the field of biomineralization. The study of the biomineralization processes, such as the formation of corals, shells and teeth, requires interdisciplinary approaches. Thus, GF applies in his research different experimental techniques and collaborates with both leading national and international research groups. His chemical and crystallographic background is strongly enriched by the cooperative work with biologists and zoologists.
Since the beginning of his career GF has addressed crucial question in the field of biomineralization and macromolecular crystallography.
1. GF first demonstrated (Falini et al. 1996, Science), that organisms can deposit calcite or aragonite, two calcium carbonate polymorphs, only by biological control using specific proteins in a controlled environment. After this groundbreaking study a plethora of publications has addressed the field (more than 1100 citations, among them about 20 in Nature and Science).
2. GF has co-demonstrated the processes that govern the enamel formation (Du et al. 2005, Science). This research has been of great impact in the scientific community because it represents one of the first examples in which an intrinsically unfolded protein can assembly on an organized macromolecular architecture and can perform its function only when in this status.
Nowadays, GF is addressing the study of biomineralization under the effects of ocean acidification and the synthesis of advanced materials from waste sea bio-products.
3. GF has demonstrated that the ocean acidification affects only the macrostructure of the coral skeleton (Fantazzini et al. 2015, Nature Comm.), while changes the mineralogy of calcified algae (Goffredo at al. 2014, Nature Climate Changes).
4. GF has recently started to prepare new biomaterials from natural biopolymers using an approach based on the partial de-structuring of their hierarchical organization and re-assembly.
5. GF is producing new bio-inspired materials with Heidelberg-Italcementi group spa through green and sustainable processes.
Many students have done master and PhD theses under the supervision of GF. Many of them are now employed in Italian industries or are doing their PhD or PostDoc in national and foreign Universities. Erasmus and International Masters students are visiting for periods the lab of GF carrying out researches in biomineralization and protein crystallization process. Currently, Spanish and Croatian students are guest of the GF lab. The people mentored by Prof. Falini are giving a great contribute to the growth of the knowledge in the fields of biomineralization and macromolecular crystallization.

From January 2024 GF is Scientific Attachè at the Italian Embassy in Tel Aviv, Israel.

Ten most relevant publications

1. Y. Q. Niu, [. . .], G. Falini. Calcium carbonate: controlled synthesis, surface functionalization, and nanostructured materials. *Chemical Society Reviews*, (2022) 51, 7883-7943.
2. J. Ihli, […], G. Falini, […], F. Nudelman. Mechanical adaptation of brachiopod shells via hydration-induced structural changes. *Nature Communications* (2021) 12, 5383.
3. G. Magnabosco, […], G. Falini. New Material Perspective for Waste Seashells by Covalent Functionalization. *ACS Sustainable Chemistry & Engineering* (2021) 9, 6203-6208.
4. S. Mijowska, […], G. Falini, B. Pokroy. High Amino Acid Lattice Loading at Nonambient Conditions Causes Changes in Structure and Expansion Coefficient of Calcite. *Chem. Mater.* (2020) 32, 10, 4205–4212.
5. M. Zaffagnini, […], G. Falini, […], P. Trost. Glutathionylation primes soluble glyceraldehyde-3-phosphate dehydrogenase for late collapse into insoluble aggregates. *Proceedings of the National Academy of Sciences* (2019) 116, 26057–26065.
6. G. Falini, S. Fermani, S. Goffredo. Coral biomineralization: A focus on intra-skeletal organic matrix and calcification. *Seminars in Cell and Developmental Biology* (2015) 46, 17-26.
7. P. Fantazzini, […], G. Falini, S. Goffredo. Gains and losses of coral skeletal porosity changes with ocean acidification acclimation. *Nature Communications* (2015) 6, 7785.
8. S. Goffredo, […], G. Falini. Biomineralization control related to population density under ocean acidification. *Nature Climate Change* (2014) 4, 593–597C.
9. C. Du, G. Falini, S. Fermani, C. Abbott and J. Moradian-Oldak. Supramolecular Assembly of Amelogenin Nanospheres into Birefringent Micro-ribbons. *Science* (2005) 307, 1450-1454
10. G. Falini, S. Albeck, S. Weiner, L. Addadi. Control of aragonite or calcite polymorphism by mollusk shell macromolecules. *Science*, (1996) 271, 67-69.