

Prof Daniele Fioretto

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Education and Employment:

1988 Degree in Physics at the University of Perugia.
1994 Ph.D. in Condensed Matter Physics at the University of L'Aquila.
1994 Researcher at the Engineering Faculty of the University of Perugia.
2004 Associate Professor.
2010 Full Professor of Physics of Matter at the University of Perugia.

Research Activity:

Senior Research Leader at the Research Group on Soft Matter and Glasses of the Department of Physics and Geology, University of Perugia, Italy | Since 1998

Specializing in the dynamics and structure of Soft Matter and Glasses and in applying advanced spectroscopic techniques to investigate complex systems, including biological materials.

Key Research Focus & Achievements

- **Pioneering Spectroscopy Techniques:** Established and led the development of several advanced in-house spectroscopy laboratories, including Brillouin, micro-Brillouin/micro-Raman, Photon-Correlation, and Dielectric Spectroscopy, at the University of Perugia.
- **Methodological Innovation:** Led the development of the Extended frequency range Depolarized Light Scattering (EDLS) technique, of the Brillouin-Raman micro spectroscopy (BRMS) at the University of Perugia and co-developed a high-resolution ultraviolet Brillouin scattering setup at Elettra Sincrotrone Trieste.
- **Large Scale Facility Research:** Secured and executed over 30 accepted proposals (totalling more than 20 weeks of beamtime) at major international Large-Scale Facilities (ESRF, ILL, Elettra), demonstrating significant international collaboration and research impact.
- **Core Scientific Topics:**
 - Dynamics: Collective and single-particle dynamics of pure water and hydration water in biological systems; collective dynamics of amorphous solids.
 - Mechanisms of structural arrest in glass transition, gelation, and polymerization processes.
 - Bio-Systems: Micro- and nano-spectroscopic-imaging of biological systems.

Funded Research Projects (since 2000):

- 2000 PRIN *Vibrations and relaxations in condensed disordered systems. Experimental, theoretical and numerical study*, Local Coordinator, 135 k€.
- 2001 INFM PAIS *Aging, off equilibrium dynamics and generalized fluctuation-dissipation theorem in structural glasses*. Core Partner, 70 k€.
- 2002 PRIN *Off-equilibrium properties of structural glasses, gels and polymers. An integrated setup for simultaneous dielectric and optical spectroscopy*. Local Coordinator, 89 k€.
- 2002 INFM PRA-GenFDT *Generalization of the Fluctuation-Dissipation Theorem in out-of-equilibrium Systems*, Core Partner, 50 k€.
- 2003 INFM CRS-SOFT *Complex Dynamics in Structured Systems*, Senior Investigator, 2.7 M€.
- 2005 PRIN *Arrested States in Soft Matter at low packing fraction: gelation in stepwise macromolecular systems*. Local Coordinator, 60 k€.
- 2009 THYSSENKRUPP-AST, Convention for Applied Research, P.I., 74.4 k€.
- 2012 Fondazione-CRP *Frontiers in Water Biophysics*, 5 k€.
- 2014 Fondazione-CRP *Nanomateriali e materiali di riciclo per la produzione di cementi ecosostenibili*, Co-Investigator, 80 k€.
- 2015 EPSRC First Grant EP/M028739/1, 2015-2017, *A New Platform for Biomechanical Imaging Based on Brillouin Scattering*, Co-investigator, 125 k£.
- 2017 Cancer Research UK – Application C61025/A24341 *Detecting the pathology specific chemo-mechanics of epithelial tissue in dysplastic Barrett's esophagus using light scattering*, Co-investigator, 140 k£.
- 2017 COST Action *Brillouin Light Scattering Microspectroscopy for Biological and Biomedical Research and Application*, (BioBrillouin) CA16124, Secondary Proposer and Core Group component, 412 k€.
- 2019 BBSRC/Unilever Training Grant, Industrial CASE CSV, 2020-24, Co-investigator, 158 k£.

- 2020 Royal Society - EC\R2\202232 - International Exchanges 2020 Cost Share (Italy), *Novel tools for mechanobiology: from Atomic Force Microscopy to Brillouin spectroscopy*, Co-Applicant, 11 k€.
- 2021 CARIT Foundation Project, Call 02/2021 (Project Code: FCTR21UNIPG), *La complessità dei processi decisionali alla luce della crisi sanitaria e ambientale: Organoidi di cellule testicolari prepuberi, un modello 3-d per lo studio della spermatogenesi e dei tossici ambientali* Co-investigator, 406 k€
- 2021-22 COST Innovators Grant *BLISS-BMD* IG16124, Co-investigator, €116,150
- 2022 CARIT Foundation Project, Call 1/2022 (Project Code: FCTR22UNIPG), *L'Università per l'innovazione e lo sviluppo sostenibile: sanità, società, economia e tecnologia nel territorio ternano*, Principal Investigator 470 k€.
- 2023 CARIT Foundation Project, Call 1/2023 (Project Code: FCTR23UNIPG), *Vulnerabilità e nuove opportunità di sviluppo nel territorio di Terni e Narni: un approccio multidisciplinare*. Principal Investigator 220 k€.

Contributions to the Community:

2004–2009 Co-founder, and member of the Governing Council of the Centre for Research and Development CNR-INFM SOFT.

2005–2010 Member of the Management Board of the University of Perugia.

2010–present Member of the Governing Council of CEMIN (Centre of Excellence on Innovative Nanostructured Materials for Physical, Chemical and Biomedical Applications).

2014–2020 Coordinator of the PhD Course on Biotechnology of the University of Perugia.

2016–2019 Vice-Director of the Department of Physics and Geology of the University of Perugia

2018–2021 Member of the National Committee ASN (Abilitazione Scientifica Nazionale) for the competition sector 02/B1 – Experimental Physics of Matter.

2019 – 2021 Director of the Department of Physics and Geology of the University of Perugia

2021 – President of the Degree Course in Optics and Optometry at the University of Perugia.

He serves as referee for several international scientific journals, including Nature, Physical Review Letters, Physical Review B, Physical Review X, Journal of Chemical Physics, Journal of Physical Chemistry, Journal of Optics, Polymer, European Polymer Journal, etc.

Teaching activity:

Engineering, Physics, and Biotechnology undergraduate and graduate programs: General Physics, Physics of Matter, Laboratory of Physics, Elements of Molecular Biophysics, and Spectroscopy courses.

Outreach and Dissemination:

- *Dalle sfere armillari alle onde gravitazionali: la misura del mondo e la Fisica a Perugia. Un percorso didattico tra antichi e nuovi strumenti scientifici.* Coordinator of the project to set up a permanent exhibition at the Department of Physics and Geology of Perugia. (2022-2023)
- *Biotechnologie e Società* Perugia, Sala Podiani e Sala dei Notari, January 2015-2016-2017-2018-2019.
- *La Creazione della Materia* Seminar, Centro S. Martino, Perugia, November 16, 2012.
- *E infine uscimmo a riveder le stelle: Dante Alighieri e la scienza moderna*, series of conferences for high school students, Perugia 2008-2010.
- *Introduction to University*, seminar for Freshmen, University of Perugia, October 18, 2008.
- *Università: educare alla ragione o inseguire una riforma?* seminar at the Faculty of Political Science, Perugia March 8, 2007.

Membership

European Physical Society (EPS), Società Italiana di Fisica (SIF).

Publications:

Until February 2025, over 210 referred articles in peer-reviewed international journals, H-index 42 ISI;

Google Scholar: <http://scholar.google.it/citations?user=Usv6mH4AAAAJ&hl=it&oi=ao>