Nicola **Galvanetto**

PhD

Institute of Structural Biology, Grenoble, France

nicola.galvanetto@gmail.com | ORCID: 0000-0002-0408-1747 | DoB: 25 Nov 1990 | Google Scholar (link)

Research Experience

IBS (Institute of Structural Biology) — *Grenoble, France*
CNRS-ATIP Researcher — *From March 2026*
Single-molecule protein behavior at interfaces. (Team website in setup: `galvanettolab.org`)

University of Zürich — *Zürich, Switzerland*
Ernst Hadorn Fellow at the Department of Biochemistry & Department of Physics — *April 2024 - February 2026*
Host: Prof. Ben Schuler. (`ernsthadornfoundation.org`)

University of Zürich — *Zürich, Switzerland*
Postdoctoral Fellow at the Department of Biochemistry & Department of Physics — *April 2020 - April 2024*
Advisor: Prof. Ben Schuler. Single-molecule FRET to explore protein dynamics in LLPS (`schuler.bioc.uzh.ch`)

Massachusetts Institute of Technology — *Cambridge, MA, USA*
Research Affiliate at RLE — *Nov. 2019 - PRESENT*
With Prof. Peter Hagelstein. Spectroscopic methods and theory development (`qes.mit.edu`)

SISSA (International School for Advanced Studies) — *Trieste, Italy*
PhD in Neurobiology/Biophysics — *Nov. 2015 - Oct. 2019*
Advisor: Prof. Vincent Torre and Prof. Alessandro Laio. AFM-based experiments on membrane proteins

CNR (National Research Council) & VIMM — *Rome & Padua, Italy*
Lab Technician — *May 2015 - Nov. 2015*
Advisor: Prof. Fabio Mammano. Microscopy and Electrophysiology

KU Leuven — *Leuven, Belgium*
Exchange research assistant — *Jan. 2014 - Jun. 2014*
Advisor: Prof. Chris Van Haesendonk. STM on Graphene

Education

SISSA (International School for Advanced Studies) — *Trieste, Italy*
PhD in Biophysics/Neurobiology — *Nov. 2015 - Oct. 2019*

ICTP (The Abdus Salam International Centre for Theoretical Physics) — *Trieste, Italy*
School in Machine Learning and Artificial Intelligence|Theory and Practice of Deep Neural Networks — *Nov. 2018*

ShanghaiTech University — *Shanghai, P. R. China*
Visiting Student | Electron Microscopy Lab (Cryo-EM) — *Nov. 2017 - Dec. 2017*

Università di Padova — *Padova, Italy*
B.S. and M.S. in Physics, 110/110 cum laude — *Oct. 2009 - Jul. 2014*

Grants / Fellowships / Awards (∼ 1 m€)

2025	**ATIP (EUR 300,000)** , Title:“Single-molecule dynamics of aggregation at biomolecular condensate interfaces”	*France*
2024	**Ernst Hadorn Transitional Fellowship (CHF 400,000)** `link`, portable grant that will fund my independent lab worldwide. Title:“Nanoscale biomolecular dynamics from the test tube to the cell”	*Switzerland*
2024	**LS^2 “PIs of Tomorrow — The Future of Swiss Research”**, finalist	*Switzerland*
2023	**Anthropocene Institute (USD 60,000)**, grant for the supervision of a ARPA-e funded (DE-FOA-0002784) sister experiment in Europe	*Italy*
2021	**Forschungskredit UZH (CHF 71,382)**, grant (FK-21-040) “Dancing in a dense environment: monitoring disordered proteins in biomolecular condensates at the single-molecule level”	*Switzerland*
2020	**Helmut Horten Foundation (CHF 100,000)**, research grant with Prof. Sahand J. Rahi (EPFL) “Decoding decision-making at single-neuron level”	*Switzerland*
2017	**Campus Party Hackathon Dompé Pharmaceutics (€ 5,000)**, 1st Place	*Italy*
2015	**SISSA (€ 60,040)**, Fellowship for PhD	*Italy*
2015	**Università di Padova (€ 15,168)**, Fellowship for post-graduate training	*Italy*

Key Publications (Google Scholar LINK)

Galvanetto, N. ✉, Ivanovic, M. ✉,Del Grosso, S., Chowdhury, A., Sottini, A., Nettels, D., Best, R. ✉, and Schuler, B. ✉.
Material properties of biomolecular condensates emerge from nanoscale dynamics.
PNAS 122, e2424135122 (2025) (link).

- We found a universal link from the molecular scale to the mesoscale of biomolecular condensates with predictive power. We used smFRET, microrheology, simulations and theory.

Galvanetto, N.* ✉, Ivanovic, M.* ✉, Chowdhury, A., Sottini, A., Nettels, D., Best, R. ✉, and Schuler, B ✉.
Extreme dynamics in a biomolecular condensate.
Nature 619, 876–883 (2023) (link).
Covered in News and views (link).

- We discovered that despite the high viscosity of phase-separated systems, local biomolecular rearrangements required for efficient reactions at the molecular scale can remain rapid.

Galvanetto, N.* ✉, Ye, Z.*, Marchesi, A., Mortal, S., Maity, S., Laio, A., and Torre, V.
Unfolding and identification of membrane proteins *in situ*.
eLife 11, e77427 (2022) (link).

- We developed a technology to identify unlabbeled membrane proteins in isolated membrane patches using AFM-based protein unfolding spectra.

Galvanetto, N. ✉
Single-cell unroofing: probing topology and nanomechanics of native membranes.
Biochimica et Biophysica Acta (BBA) – Biomembranes, 1860, 2532–2538 (2018) (link).

- I invented a technique to rupture and isolate the apical plasma membrane of single cells and found that neurons have stiffer cell membranes than brain tumour cells.

* = Shared first authorship, ✉= Corresponding Author

Educational Activity

Teaching

- Biophysical methods, Instructor (3rd year undergraduate), University of Zurich, 2022
- Biophysical methods, Instructor (3rd year undergraduate), University of Zurich, 2020
- Nanotechnology for neuroscience, Graduate Teaching Assistant, SISSA, 2018
- Introduction to Quantum Mechanics, Teaching Assistant (4th grade), Liceo Da Vinci, Arzignano, 2013

Students Advised

- **Eric Goldhahn** (ETH Zurich, bachelor project supervisor 2024)
  Summary: Diffusive models in biomolecular condensates.
- **Simone del Grosso** (UZH, master thesis supervisor 2022, then associate scientist at Novartis)
  Summary: Single molecule spectroscopy of polyelectrolytes in phase-separated systems.
- **Feng Yanxia** (ETH Zurich, master thesis supervisor 2021, then PhD at Cornell)
  Summary: The force repulsion of negatively charged polyelectrolites resolved with smFRET and nanophotonics.
- **Zhongjie Ye** (SISSA, PhD advisor 2018-2021, then postdoc at Shenzhen Institute of Advanced Technology)
  Summary: Membrane protein unfolding on native cell membranes.
- **Jing Xu** (SISSA, PhD advisor 2017-2020)
  Summary: Tumor cell mechanics probed with AFM.
- **Vahideh Farzamrad** (Zanjan University, PhD project supervisor 2018 at SISSA, then postdoc at IRAN University of Medical Sciences)
  Summary: Tumor cell mechanics probed with AFM.

Didactic materials

- Python notebooks for an introduction to two-state quantum systems (work supported by The Anthropocene Institute as part of an educational project in Quantum Mechanics).
  https://github.com/project-ida/two-state-quantum-systems

Conference Presentations

2026	**Single Molecule Biophysics (SMB)**, Speaker	*Les Houches, Fra*
2025	**Physics of Life**, Speaker	*Harrogate, UK*
2024	**Molecular Biophysics Workshop**, Invited speaker	*Montpellier, France*
2024	**PicoQuant Single Molecule Workshop**, Speaker	*Berlin, Germany*
2024	**Protein Dynamics Workshop**, Speaker	*Les Houches, Fra*
2023	**FisMat 2023**, Speaker	*Milan, Italy*
2023	**MIAPbP Engineering Life Workshop**, Speaker	*Munich, Germany*
2022	**FRET workshop MAF2022**, Invited speaker	*Goteborg, Sweden*
2022	**International Physics of Living Systems Conference**, Speaker	*Montpellier, France*
2022	**ICCF24**, Invited speaker	*Mountain View, USA*
2022	**CECAM Workshop**, Speaker	*Zurich, Switzerland*
2019	**Biophysical Society Meeting**, Poster	*Baltimore, USA*
2017	**Linz Winter Workshop**, Speaker	*Linz, Austria*

Invited Seminars

2025	**Lund University**, Cell-scale properties of condensates emerge from nanoscale dynamics	*Sweden*
2025	**Oxford University**, Cell-scale properties of condensates emerge from nanoscale dynamics	*UK*
2025	**ISTA**, Cell-scale properties of biomolecular condensates emerge from nanoscale dynamics	*Austria*
2025	**University of Durham**, Mesoscale properties of biomolecular condensates emerge from nanoscale dynamics	*UK*
2024	**IBS (Grenoble)**, Mesoscale properties of biomolecular condensates emerge from nanoscale dynamics	*France*
2024	**University of Grenoble, LIPhy**, Mesoscale properties of biomolecular condensates emerge from nanoscale dynamics	*France*
2024	**Max Planck Zentrum für Physik und Medizin**, Single-molecule biophysics advancing membrane and condensate science and technology	*Germany*
2023	**University of Geneva**, *Host: Prof. Luigi Bonacina and Prof. Takuji Adachi, Seminar series in bioimaging*, Molecular dynamics determine mesoscale properties in biomolecular condensates	*Switzerland*
2022	**Google Quantum AI**, *Host: Hartmut Neven*, Excitation Transfer via Low-energy Couplings (*with Florain Metzler and Peter Hagelstein*)	*USA*
2022	**Princeton University**, *Scholes Lab*, Dynamics in a biomolecular condensate	*USA*
2022	**UCLA**, *Aiello lab*,Extreme dynamics in a biomolecular condensate	*USA*
2019	**MIT**, *Hagelstein lab*, Simulating non-radiative resonance energy transfer and applications	*USA*
2019	**EPFL**, *Rahi lab*, Unfolding and identification of membrane proteins in situ	*Switzerland*
2017	**ShanghaiTech**, *Chen lab*, Tear and pull	*China*

Professional and Institutional Responsibilities

Scientific reviewing *2021 - PRESENT*

Journals: *Nature Communications, Nano Letters, JACS, Biophysical Journal, Current Opinion in Structural Biology*. Funding agencies: *UK Research and Innovation-BBSRC, ANR (French National Research Agency)*.

Leadership training *Copenhagen, 2024*

Conscious worklife (COWO) course on leadership and project management.

Scientific advisor of project- ida . org *2019 - PRESENT*

I supervise the production of scientific material and raise funding for projects on Resonance Energy Transfer mechanisms.

Member of the IDP Subgroup State Letter of the Biophysical Society *2020 - 2023*

I have produced monthly summary of relevant research in the field of intrinsically disordered proteins.

Outreach

- Consultant of science communicator Dr. Sabine Hossenfelder for quantum science applied to nuclear energy production (`link to Youtube video`).
- 2019, "Notte dei ricercatori", Trieste: presented my scientific research to the public and discussed implications for the good.
- Youtube, I publish seminars of researchers that I host in my channel.