

# Francesco Randi

## Curriculum Vitae

### Personal details

Name Francesco Randi  
Email francesco.randi@gmail.com / frandi@princeton.edu  
Phone US +16092508843, IT +393406607530  
Website www.francescorandi.eu  
Goog. Scholar Francesco Randi  
Currently Postdoc, Princeton University / Grass Fellow, MBL Marine Biological Laboratory  
Address 30 Wiggins St., Apt. 3, Princeton NJ 08540

### Education

2017 – to date **Postdoc (Biophysics/Neuroscience)**, *Department of Physics, Princeton University*, Advisor: Prof. Andrew Leifer (leifer@princeton.edu).  
Jan 2014 – **PhD in Physics**, *University of Trieste*, Italy, Low-energy physics in strongly correlated materials via nonlinear spectroscopies.  
Apr 2017 Research at FERMI Free electron laser and Elettra Synchrotron laboratories. Supervisors Prof. Daniele Fausti (daniele.fausti@elettra.eu), Prof. Fulvio Parmigiani (fulvio.parmigiani@elettra.eu). Doctor Europaeus program  
2011–2013 **Master in Condensed Matter Physics**, *University of Trieste*, Italy, 110/110 cum laude.  
2008–2011 **Bachelor in Physics**, *University of Trieste*, Italy, 110/110 cum laude.

### Academic experience and appointments

2022 – to date **Grass Fellow**, *MBL Marine Biological Laboratory*.  
2020 – to date **Associate Research Scholar**, *Department of Physics, Princeton University*.  
2017 – 2020 **Postdoctoral Research Associate**, *Department of Physics, Princeton University*.  
Jan 2014 – **Graduate research assistant**, *FERMI Free Electron Laser, Elettra, and University of Trieste*, Italy, Fully funded position at the University of Trieste.  
Apr 2017  
Oct 2014 – **Guest**, *Max Planck Institute for the structure and dynamics of matter*, Hamburg, Germany.  
Mar 2015 Supervisor Prof. Dr. Martin Eckstein (martin.eckstein@fau.de)  
Oct–Dec 2013 **Graduate research assistant (Pre-PhD)**, *FERMI Free Electron Laser, Elettra*, Trieste.  
2011 **Undergraduate intern (BS thesis)**, *Elettra Synchrotron*, Trieste, Italy.  
2010 **Undergraduate intern**, *Astronomical observatory*, Trieste, Italy.

### Fellowships and scholarships

2022-to date Grass Fellow at the Marine Biological Laboratory, Woods Hole MA  
2019-2021 Swartz Foundation Fellowship for Theoretical Neuroscience (Princeton Neuroscience Institute)  
2015 Erasmus+ Traineeship funding for my stay at the MPSD in Hamburg  
2014–2016 Scholarship from the University of Trieste and the European Social Fund for my PhD  
2011–2013 Scholarship from the Luciano Fonda University College for Sciences and the Elettra Synchrotron Laboratory for my master in Condensed Matter Physics  
2008–2011 Scholarship from the Luciano Fonda College for my bachelor studies in Physics

### Publications

#### Biophysics

- Direct measurement of functional connectivity in *C. elegans* (in preparation, presented at Cosyne '22 – link to video)

- Nonequilibrium Green's functions for functional connectivity in the brain, Randi et al., Phys. Rev. Lett. 126, 118102 (2021).
- Decoding locomotion from population neural activity in moving *C. elegans*, Hallinen et al., eLife 10:e66135 (2021).
- Fast deep learning correspondence for neuron tracking and identification in *C. elegans* using synthetic training, Yu et al., eLife e66410 (2021).
- Measuring and modeling whole-brain neural dynamics in *Caenorhabditis elegans*, Randi et al., Current Opinion in Neurobiology 65, 167-175 (2020).
- Searching for collective behavior in a small brain, Chen et al., Phys. Rev. E 99 (5) 052418 (2019).

### Condensed Matter

- Anisotropic Time-Domain Electronic Response in Cuprates, Giusti et al., Phys. Rev. B (12) 125121 (2021).
- Signatures of Enhanced Superconducting Phase Coherence in Optimally Doped  $\text{Bi}_2\text{Sr}_2\text{Y}_{0.08}\text{Ca}_{0.92}\text{Cu}_2\text{O}_{8+\delta}$  Driven by Midinfrared Pulse Excitations, Giusti et al., Phys. Rev. Lett. 112 (6) 077002, (2019).
- Probing the fluctuations of optical properties in time-resolved spectroscopy, Randi et al., Phys. Rev. Lett 119 (19), 187403 (2017).
- Bypassing the energy-time uncertainty in time-resolved photoemission, Randi et al., Phys. Rev. B 95, 115132 (2017).
- Phase separation in the non-equilibrium Verwey transition in magnetite, Randi et al., Phys. Rev. B 93, 054305 (2016).
- Quantum interferences reconstruction with low homodyne detection efficiency, Esposito et al., EPJ Quantum Technology 3:7 (2016).
- Photon number statistics uncover the fluctuations in non-equilibrium lattice dynamics, Esposito et al., Nat. Comm. 6 10249 (2015).
- Pulsed homodyne Gaussian quantum tomography with low detection efficiency, Esposito et al., New J. Phys., 16 043004 (2014).
- The thinnest carpet on the smallest staircase: The growth of graphene on Rh(533), Casarin & Randi et al., J. Phys. Chem. C, 118 (12), 6242-6250 (2014).

## Programming languages

Used daily **Python, C/C++, LabView**  
 sometimes **Matlab**  
 in the past **R, Javascript, PHP, Basic**

## Teaching and co-supervision of students

2018 PHY103 Precept, Department of Physics, Princeton University  
 2016 Problems in Electrodynamics, Optics, and Relativity, Department of Physics, University of Trieste  
 2014–to date Various students for their theses, internships, papers (bachelor and master degrees, Trieste and Princeton)  
 2012, 2016 High school students for their final year project (Italy)

## Outreach

2016–2017 President and co-founder of the Trieste section of the Young Minds project of the European Physical Society and of the Science Industries association for the dissemination of science and networking of young researchers (Trieste)  
 Oct. 2012 Astronomy and science laboratory for the school of the island of Stromboli (Sicily), Italy  
 2010–2013 Representative of the group Studenti di Scienze (Science students): interdepartmental seminars and talks for the former Facoltà di Scienze (all scientific departments, Trieste).

## Other employment

2014–2016 **Tutoring of high school students for the “Stage estivo”**, *Physics Department, Trieste*.  
 2007–2017 **New technologies in education (occasional collaboration)**, *Canalescuola ONLUS*, New technologies in education, with attention to learning disabilities. (Mr. Emil Girardi).

## Languages

**Italian (Native speaker), English, German**