

Giulio Giuseppe Giusteri, PhD

Contact information

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Summary

- Over eight years of research in Mathematics and Physics
- Over six years of graduate and undergraduate teaching
- Worked and developed collaborations in three continents
- Interests: Applied mathematics, Complex fluids, Nonlinear analysis, Thin elastic structures, Data-driven modeling, Quantum dynamics on networks, Mathematical physics

Education

2012 **PhD in Pure and Applied Mathematics** at **Università degli studi di Milano-Bicocca**

Thesis: *Higher-gradient theories for fluids and concentrated effects*. Advisor: Alfredo Marzocchi

- Developed the mathematical theory of second-gradient linear isotropic liquids
- Proved well-posedness of fluid-structure interaction problems involving one-dimensional immersed bodies
- Showed how higher-gradient models can capture concentrated effects ignored by classical models

2009 **Master's degree in Physics *cum laude***

at Facoltà di Scienze Matematiche, Fisiche e Naturali - **Università Cattolica del Sacro Cuore**, Brescia, Italy

2007 **Master's degree in Mathematics *cum laude***

at Facoltà di Scienze Matematiche, Fisiche e Naturali - **Università Cattolica del Sacro Cuore**, Brescia, Italy

2006 **Bachelor's degree in Physics *cum laude***

at Facoltà di Scienze Matematiche, Fisiche e Naturali - **Università Cattolica del Sacro Cuore**, Brescia, Italy

Professional Experience

2018

Research Associate at MOX, Department of Mathematics, **Politecnico di Milano**, Italy

- Developing of models for structural engineering applications and fluid mechanics

2015–2017

Postdoctoral Researcher at the Mathematics, Mechanics, and Materials Unit (formerly Mathematical Soft Matter Unit), **Okinawa Institute of Science and Technology**, Japan

- Studied properties of flexible frames spanned by liquid films and their mathematical description
- Assessed the limit of validity of common approximations in models of quantum evolution
- Developed a new framework for the data-driven modeling of complex fluids
- Served as Representative in the Faculty Assembly for the diverse community of OIST Researchers
- Organized an International Workshop and Contributed to OIST's outreach activities

2012–2017

Researcher (RTD-A L. 240/2010, *on leave since September 2015*) at the Department of Mathematics and Physics “Niccolò Tartaglia”, **Università Cattolica del Sacro Cuore**, Brescia, Italy

- Applied higher-gradient fluids to the study of sedimentation of slender bodies in viscous fluids
- Studied quantum transport in networks modeling natural light-harvesting complexes
- Contributed to outreach activities such as Open Campus and Math Contest for high schools

2014, 1 mo.

Visiting Researcher at the Mathematical Soft Matter Unit, **Okinawa Institute of Science and Technology Graduate University**, Japan

2012, 6 mos.

Visiting Lecturer (with research duties) at the Department of Mechanical Engineering, **University of Washington**, Seattle, United States

2009–2015

Adjunct Professor at the Department of Mathematics and Physics “Niccolò Tartaglia”, **Università Cattolica del Sacro Cuore**, Brescia, Italy

- Developed courses in Fluid Mechanics, Stochastic Processes, and Mathematics Education Lab
- Supervised 12 undergraduate and 7 graduate students in both Mathematics and Physics
- Served on several Evaluation Committees for Bachelor's and Master's degrees

Teaching and Mentoring

School of Mathematical, Physical, and Natural Sciences - Università Cattolica del Sacro Cuore

- 2009–2015 *Instructor for **Fluid Mechanics** (~10 students per year)*
– Renewed and developed part of the course
– Worked with a diverse body of undergraduates in Physics and graduates in Applied Mathematics
– Supervised several Bachelor’s theses and one Master’s thesis
- 2011–2015 *Instructor for **Stochastic Processes** (~10 students per year)*
– Designed a fully new course to complete the graduate program in Applied Mathematics
– Worked with graduate students in Physics and Applied Mathematics
– Supervised five Master’s theses on topics related to the course
- 2013–2015 *Instructor for **Mathematics Education Lab** (~100 attendees per year)*
– Devised practical activities to introduce geometric topology and group theory to younger students
– Worked with teachers of the secondary school within a certified training program
– Supervised the development by the attendees of similar activities
- 2012–2015 *Teaching Assistant for **Rational Mechanics** (Undergraduate course, ~40 students per year)*
- 2010–2012 *Teaching Assistant for **Galois Theory** (Graduate course, ~10 students per year)*
- 2008–2009 *Teaching Assistant for **Mathematical Models and Methods for Applications** (Undergraduate course, ~10 students)*

School of Engineering - Università degli Studi di Brescia

- 2009–2010 *Teaching Assistant for **Statistics and Calculus** (Undergraduate course, ~80 students)*

Secondary School “Istituto Cesare Arici”

- 2007–2009 *Teacher of **Science***

Mentoring experience

- 2010–2015 **Undergraduate students.** Supervised and co-supervised a total of **twelve Bachelor’s theses** on topics related to Quantum Transport, Fluid Mechanics, and Dynamical Systems
- 2012–2016 **Graduate students.** Eight Master’s theses supervised:
– Three on financial applications of stochastic differential equations: Dario Fontana (PhD in Economics, Applied Mathematics and Operational Research, University of Bergamo), Annalisa Bonetti (Business Analyst at Prima.it), Elisabetta Benzi (Quantitative Analyst at Banco Popolare)
– Gradient-flow formulation of the Fokker-Planck equation and its applications: Giada Ronchi
– Motion of deformable bodies in viscous fluids: Filippo Recrosi (PhD student at GSSI, L’Aquila)
– Remodeling of poroelastic continua: Simone D’Arco (OCS SpA, Brescia)
– Cooperative phenomena in open quantum systems: Filippo Recrosi (PhD student at GSSI, L’Aquila)
– Stokesian dynamics for extensional rheology: Antonio Martiniello

Grants and Awards

- 2017 Obtained the Italian **National Scientific Habilitation** for the role of *Associate Professor* (valid until Dec 5, 2023)
- 2016 Contributed to **proposal design and writing** for the competitive internal funding program *OIST Mini Symposia 2016*. Principal Organizer: Eliot Fried (¥ 3,500,000)
- 2013 Contributed to **research design and proposal writing** for the call *Università Cattolica del Sacro Cuore Competitive Funding for Research Projects 2013*. Principal Investigator: Alessandro Musesti (€ 65,000)
- 2013 **Travel grant** from *GNFM-INDAM Young Researchers Projects 2013* (€ 2,000)
- 2008 Master’s degree **thesis award** from the foundation *Ateneo di Brescia*

Scientific Publications

17. G. G. GIUSTERI, R. SETO. [A theoretical framework for steady-state rheometry in generic flow conditions](#), *J. Rheol.*, 62(3) (2018), 713–723
16. G. G. GIUSTERI, E. FRIED. [Importance and effectiveness of representing the shapes of Cosserat rods and framed curves as paths in the special Euclidean algebra](#), *J. Elast.*, 132(1) (2018), 43–65
15. R. SETO, G. G. GIUSTERI, A. MARTINIELLO. [Microstructure and thickening of dense suspensions under extensional and shear flows](#), *J. Fluid Mech.*, 825 (2017), R3
★ *Featured in Focus on Fluids with an article by H. Wilson. J. Fluid Mech.*, 836 (2018), doi:10.1017/jfm.2017.744 ★
14. G. G. GIUSTERI, F. RECROSI, G. SCHALLER, G. L. CELARDO. [Interplay of different environments in open quantum systems: Breakdown of the additive approximation](#), *Phys. Rev. E*, 96(1) (2017), 012113
13. G. G. GIUSTERI, P. PODIO-GUIDUGLI, E. FRIED. [Continuum balances from extended Hamiltonian dynamics](#), *J. Chem. Phys.*, 146 (2017), 224102
12. G. G. GIUSTERI, L. LUSSARDI, E. FRIED. [Solution of the Kirchhoff–Plateau problem](#), *J. Nonlinear Sci.*, 27(3) (2017), 1043–1063
11. G. SCHALLER, G. G. GIUSTERI, G. L. CELARDO. [Collective couplings: Rectification and super-transmittance](#), *Phys. Rev. E*, 94(3) (2016), 032135
10. G. G. GIUSTERI, P. FRANCESCHINI, E. FRIED. [Instability paths in the Kirchhoff–Plateau problem](#), *J. Nonlinear Sci.*, 26(4) (2016), 1097–1132
9. G. G. GIUSTERI, F. BORGONOV, G. L. CELARDO. [Optimal efficiency of quantum transport in a disordered trimer](#), *Phys. Rev. E*, 93(3) (2016), 032136
8. G. G. GIUSTERI, F. MATTIOTTI, G. L. CELARDO. [Non-Hermitian Hamiltonian approach to quantum transport in disordered networks with sinks: Validity and effectiveness](#), *Phys. Rev. B*, 91(9) (2015), 094301
7. G. G. GIUSTERI, A. MARZOCCHI, A. MUSESTI. [Steady free fall of one-dimensional bodies in a hyperviscous fluid at low Reynolds number](#), *Evol. Equat. Control Theory*, 3(3) (2014), 429–445
6. G. G. GIUSTERI, A. MARZOCCHI, A. MUSESTI. [Nonlinear free fall of one-dimensional rigid bodies in hyperviscous fluids](#), *Discrete Contin. Dyn. Syst. Ser. B*, 19(7) (2014), 2145–2157
5. G. L. CELARDO, G. G. GIUSTERI, F. BORGONOV. [Cooperative robustness to static disorder: Superradiance and localization in a nanoscale ring to model light-harvesting systems found in nature](#), *Phys. Rev. B*, 90(7) (2014), 075113
4. G. G. GIUSTERI, E. FRIED. [Slender-body theory for viscous flow via dimensional reduction and hyperviscous regularization](#), *Meccanica*, 49(9) (2014), 2153–2167
3. G. G. GIUSTERI. [The multiple nature of concentrated interactions in second-gradient dissipative liquids](#), *Z. Angew. Math. Phys. ZAMP*, 64(2) (2013), 371–380
2. G. G. GIUSTERI, A. MARZOCCHI, A. MUSESTI. [Nonsimple isotropic incompressible linear fluids surrounding one-dimensional structures](#), *Acta Mech.*, 217(3-4) (2011), 191–204
1. G. G. GIUSTERI, A. MARZOCCHI, A. MUSESTI. [Three-dimensional nonsimple viscous liquids dragged by one-dimensional immersed bodies](#), *Mech. Res. Commun.*, 37(7) (2010), 642–646

Proceedings

- A. MUSESTI, G. G. GIUSTERI, A. MARZOCCHI. [Predicting Ageing: On the Mathematical Modelization of Ageing Muscle Tissue](#), in G. Riva et al. (Eds.), *Active Ageing and Healthy Living*, Chapter 17
- G. L. CELARDO, A. BIELLA, G. G. GIUSTERI, F. MATTIOTTI, Y. ZHANG, L. KAPLAN. [Superradiance, disorder, and the non-Hermitian Hamiltonian in open quantum systems](#), *AIP Conf. Proc.*, 1619 (2014), 64–72

Invited presentations

- Jun 20, 2018 - *Rheometric framework for the data-driven modeling of fluids*, at the Institute of Mathematics of the University of Mainz
- Dec 8, 2017 - *Rheometric and modeling frameworks for complex fluids*, during the MIMS workshop on Modeling and Numerical Analysis of Nonlinear Phenomena (Tokyo)
- Nov 23, 2017 - *Rheological models for complex materials*, during the workshop Recent Advances in Mechanics and Mathematics of Materials (Rome)
- Apr 14, 2017 - *Mathematical modeling and characterization of non-Newtonian viscous fluids*, Nonlinear Analysis Seminar, Kanazawa University
- Jan 13, 2017 - *Paths in the special Euclidean algebra and rod shapes*, at NCTS (Taipei)
- Oct 15, 2016 - *The shapes of a rod are traced in a Lie algebra*, during the workshop Geometry and Materials Sciences (Okinawa)
- May 23, 2016 - *Instability paths in the Kirchhoff–Plateau problem*, at EPFL (Lausanne)
- May 23, 2014 - *Modeling the sedimentation of filaments in viscous fluids via dimensional reduction and hyperviscous regularization*, at Okinawa Institute of Science and Technology (Okinawa)
- Mar 20, 2014 - *Modeling the sedimentation of filaments in viscous fluids with a second-gradient dissipation functional*, during EUROMECH Colloquium 563 (Cisterna di Latina)
- Feb 26, 2013 - *Concentrated interactions in second-gradient dissipative liquids*, at the international research center M&MoCS (Cisterna di Latina)

Contributed presentations

- Apr 18, 2018 - *Theoretical framework for the data-driven modeling of fluids*, during AERC 2018 (Sorrento)
- Jul 1, 2015 - *Optimal energy transfer in disordered quantum networks*, during QuEBS 2015 (Florence)
- Sept 4, 2014 - *Modeling the morphogenesis of brain cortex*, during CIME–CIRM course on Mathematical Models and Methods for Living Systems (Levico Terme)
- May 23, 2013 - *LHI-RC complexes of Rhodobacter Sphaeroides: Superradiance, high efficiency, and adaptability*, during the workshop Transport in Open Quantum Systems (Porquerolles)
- Apr 6, 2013 - *Hyperviscous regularization of the Navier-Stokes equation and the motion of slender swimmers*, during the IV International Conference on New Trends in Fluid and Solid Models (Vietri sul Mare)
- Oct 5, 2012 - *Slender-body theory for viscous flow via dimensional reduction and hyperviscous regularization*, during the annual meeting of GNFM (Montecatini)
- Sept 22, 2011 - *Non-simple liquids dragged by 1D structures*, during GNFM summer school (Ravello)
- Jun 1, 2011 - *A variational approach to the p -Laplace equation on metric measure spaces*, during HCDTE (Trieste)
- Sept 2, 2010 - *Non-simple linear fluids surrounding 1D structures*, during STAMM 2010 (Berlin)
- Sept 24, 2009 - *Quantum computation by polarized excitons*, during GNFM summer school (Ravello)

Organization and Service

2017	Organizer of the workshop <i>Viscoelasticity and Dissipative Dynamics of Rods and Membranes</i>
2016	Postdoctoral Researchers' representative in the OIST Faculty Assembly
2016	Grant Writing Peer Support Group for OIST researchers
2015–2016	OIST Open Campus and Science Festival
since 2011	Peer reviewer activity certified on my Publons profile . Reviewer for Mathematical Reviews
2009–2015	Evaluation Committee for approximately a hundred Bachelor's and Master's degrees
2009–2015	Organizing Committee of <i>Disfida Matematica</i> , a math contest for high-school students

Memberships

- since 2010 *National Group for Mathematical Physics* of Istituto Nazionale di Alta Matematica “F. Severi” (Italy)
- since 2013 International Research Center for Mathematics & Mechanics of Complex Systems (M&MoCS)
- since 2014 *Group Dynamics and non-equilibrium states of complex systems: Mathematical methods and physical concepts* of Istituto Nazionale di Fisica Nucleare (Italy)
- since 2018 *European Society of Rheology* and *Italian Society of Rheology*

Professional Development

- 2016 *Communicating Effectively in English: Building Linguistic and Cultural Strategies for Scientists*. Certified Course
- 2016 *Introduction to Project Management*. Certified Course

Attended Scientific Workshops, Schools, and Courses

- Jan 14–15, 2017 Workshop: Analysis and Partial differential equations (NTU, Taipei)
- Oct 15–17, 2016 Workshop: Geometry and Materials Sciences (OIST, Okinawa)
- May 23–26, 2016 Workshop: Marrying continuum and molecular physics: the Andersen-Parrinello-Rahman method revised into a scale bridging device (CECAM, Lausanne)
- Jan 13–15, 2016 Workshop: Mathematical Modeling and Analysis of Protein Cages (OIST, Okinawa)
- Jun 29–Jul 2, 2015 Workshop: Quantum Effects in Biological System 2015 (Florence)
- May 25–29, 2015 School: Interaction of Microscopic Structures and Organisms with Fluid Flows (Udine)
- Sept 1–5, 2014 CIME–CIRM course on Mathematical Models and Methods for Living Systems (Levico)
- Feb 3–5, 2014 Course: Thin Elastic Structures (Brescia)
- Mar 16–21, 2014 Workshop: EUROMECH Colloquium 563 (Cisterna di Latina)
- Sept 29–Oct 4, 2013 Workshop: Evolution Problems for Material Defects: Dislocations, Plasticity, and Fracture (SISSA, Trieste)
- May 21–25, 2013 Workshop: Transport in Open Quantum Systems: Experiment and Theory (Porquerolles)
- Apr 4–6, 2013 IV International Conference on New Trends in Fluid and Solid Models (Vietri sul Mare)
- Oct 22–24, 2012 SNP Workshop 2012: New Materials and New Problems in Continuum Mechanics (Udine)
- May 14–18, 2012 BIRS Workshop: Connections Between Regularized and Large-Eddy Simulation Methods for Turbulence (Banff)
- Apr 19–20, 2012 Workshop: New concepts on active materials and actuators and bioinspired sensing-actuation control (Seattle)
- Sept 19–30, 2011 XXXVI GNFM Summer School on Mathematical Physics (Ravello)
- May 30–Jun 3, 2011 HCDTE courses: Variational approach to the Euler equation (A. Figalli), Optimal transportation on manifolds (K.-T. Sturm), at SISSA (Trieste)
- Feb 14–19, 2011 School and Workshop on Mathematical Methods in Quantum Mechanics (Bressanone)
- Jan 31–Feb 2, 2011 Course: Mathematical Models in Cardiac Physiology (Brescia)
- Sept 6–11, 2010 CIME-EMS Summer School in Applied Mathematics: Topics in mathematical fluid-mechanics (Cetraro)
- Aug 30–Sep 2, 2010 Workshop: STAMM 2010 (Berlin-Schmoekwitz)
- Jul 12–16, 2010 School: Variational Models and Methods in Solid and Fluid Mechanics (CISM, Udine)
- Sept 14–26, 2009 XXXIV GNFM Summer School on Mathematical Physics (Ravello)

Language Skills

- **Italian:** full professional proficiency (mother tongue)
- **English:** full professional proficiency
- **Japanese:** basic oral proficiency

August 21, 2018