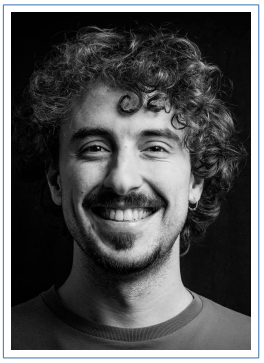
Giacomo Bartolucci



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Education

2024- present **Postdoc**, *University of Barcelona*, Barcelona, Spain.

2023 **Postdoc**, *University of Augsburg*, Augsburg, Germany.

2018-2023 **PhD Physics**, *Max Planck Institute for the Physics of Complex Systems*, Dresden, Germany.
- Advisors: Prof. Dr. Christoph Weber, and Prof. Dr. Franck Jülicher
- Defence date: February 27, 2023

2015-2018 **MS Master in Theoretical and Computational Physics**, *University of Trento and International School for Advanced Studies (SISSA)*, Trento and Trieste, Italy.
- Advisor: Prof. Dr. Pietro Faccioli

2012-2015 **BS Physics**, *University of Bologna*, Bologna, Italy.
- Undergrad research advisor: Prof. Roberto Casadio

2007-2013 **MS Saxophone**, *Conservatorio di Musica 'G. Rossini'*, Pesaro, Italy.
- Tutor: Maestro Federico Mondelci

Publications

Journal Articles

2024 Giacomo Bartolucci, Ivar S Haugerud, Thomas CT Michaels, and Christoph A Weber. The interplay between biomolecular assembly and phase separation. *eLife*, October 2024.

2023 Alexander M. Bergmann, Jonathan Bauermann, Giacomo Bartolucci, Carsten Donau, Michele Stasi, Anna-Lena Holtmannspötter, Frank Jülicher, Christoph A. Weber, and Job Boekhoven. Liquid spherical shells are a non-equilibrium steady state. *Nature Communications*, October 2023.

2023 Jonathan Bauermann, Giacomo Bartolucci, Job Boekhoven, Christoph A. Weber, and Frank Jülicher. Formation of liquid shells in active droplet systems. *Phys. Rev. Res.*, volume 5, page 043246. American Physical Society, Dec 2023.

2023 Giacomo Bartolucci, Adriana Calaça Serrão, Philipp Schwintek, Alexandra Kühnlein, Yash Rana, Philipp Janto, Dorothea Hofer, Christof B. Mast, Dieter Braun, and Christoph A. Weber. Selection of prebiotic oligonucleotides by cyclic phase separation. *Proceedings of the National Academy of Sciences*, October 2023.

2021 Xueping Zhao, Giacomo Bartolucci, Alf Honigmann, Frank Jülicher, and Christoph A. Weber. Thermodynamics of wetting, prewetting and surface phase transitions with surface binding. *New Journal of Physics*, volume 23, page 123003. IOP Publishing, December 2021.

2021 Giacomo Bartolucci, Omar Adame-Arana, Xueping Zhao, and Christoph A. Weber. Controlling composition of coexisting phases via molecular transitions. *Biophysical Journal*, volume 120, pages 4682–4697, November 2021.

2018 Giacomo Bartolucci, Simone Orioli, and Pietro Faccioli. Transition path theory from biased simulations. *The Journal of Chemical Physics*, volume 149, page 072336. American Institute of Physics, August 2018.

Under Review

2024 Ivar S. Haugerud, Giacomo Bartolucci, Dieter Braun, and Christoph A. Weber. Theory for sequence selection via phase separation and oligomerization. *arXiv*, October 2024.

2024 Jonathan Bauermann, Giacomo Bartolucci, Job Boekhoven, Frank Jülicher, and Christoph A. Weber. Critical transition between intensive and extensive active droplets. *arXiv*, September 2024.

2023 Daxiao Sun, Xueping Zhao, Tina Wiegand, Giacomo Bartolucci, Cecilie Martin-Lemaitre, Stephan W. Grill, Anthony A. Hyman, Christoph Weber, and Alf Honigmann. Assembly of tight junction belts by surface condensation and actin elongation. *bioRxiv*, June 2023.

Teaching Assistantship

Spring, 2020 **Tutor of Theoretical Biophysics**, held by Prof. Dr. Franck Jülicher, at TU Dresden.

Fall, 2017 **Tutor of General Physics**, held by Prof. Franco Dalfovo, at University of Trento.

Personal skills

Programming Python, Mathematica, C++

Languages Italian (mother tongue), English (IELTS certificate, obtained on 17/05/14 with overall band score: 7.5.), Spanish, German

Major scientific achievements

2025 Physics IG Nobel Prize, "For discoveries about the physics of pasta sauce, especially the phase transition that can lead to clumping, which can be a cause of unpleasantness.".

Contributions to the scientific field, In past years I focused on applying theoretical physics tools to describe biological and synthetic chemistry experiments. I have seeded numerous collaborations within the Dresden network (with the Hymann Lab and the Honigmann Lab) and beyond (with the Braun and Mast Lab and the Boekhoven Lab in Munich, and the Michaels Lab in Zürich). The fruitful collaboration with the Honigmann Lab received funding by the DFG Priority Program 2191. My research in Barcelona was recently funded by the Juan de la Cierva postdoctoral fellowship. I am currently designing a project that will bring together the labs of Jaume Casademunt and Ricard Solé, in Barcelona.

Contributions in tutoring and supervision, In 2017, I was the tutor of the course General Physics, held by Prof. Franco Dalfovo at the University of Trento. In the spring semester of 2020, I was the tutor of the Theoretical Biophysics course, held by Prof. Frank Jülicher at the TU Dresden. In 2019 I co-supervised the master student Yash Rana during his internship at MPI PKS, together with Prof. Christoph Weber. Since 2022 and together with Prof. Christoph Weber, I have been co-supervising the PhD project "Polymer sequence distributions with two information carriers in coexisting phases" led by the PhD student Ivar Haugerud at the University of Augsburg.

Contributions to the community, I have a long-lasting passion for teaching science at all levels. Indeed, starting in 2019, every summer I organised a summer school at my former high school in Italy (Liceo Scientifico G. Marconi, in Pesaro). During my PhD, I participated in the "Science Goes to School" project in Dresden. Through lectures at high schools, this initiative aimed at inspiring students to pursue a scientific career while showing society how diverse nationalities and cultural backgrounds come together in research teams. I have always been active in bridging art and physics and I took an active part in several disseminative events aimed at communicating science to a broad audience. In 2014, I won a prize in the poetry competition "PopScience2014" organised by CERN, which led to the publication of three poems inspired by physics topics. In 2021 I collaborated with the Italian video artists collective "Ophelia Borgesan" producing a series of videos to showcase my research, entitled "Mixture" .

Grants and Scholarships

DFG Priority Program, During my PhD, I started a collaboration between the Weber group and the Honigmann Lab, which received funding from the DFG Priority Program 2191: Molecular Mechanisms of Functional Phase Separation.

Juan de la Cierva fellowship, My current research at the University of Barcelona with Jaume Casademunt was recently funded by the Juan de la Cierva postdoctoral fellowship .

Participation in conferences and seminars

June 2024, Cambridge — **Anti-Diffusion in Multiphase and Active Flows**, *poster presentation*, title: Mixing of a passive scalar in active nematic turbulence.

March 2024, Augsburg — **Dynamics of interfaces**, *Invited talk*, title: A critical transition regulates coarsening, scaling, and shape instabilities in active emulsions.

July 2022, Barcelona — **Biological Evolution and Nonequilibrium Physics: Close Encounters**, *poster presentation*, title: On the interplay between phase separation and reversible aggregation.

May 2022, Heidelberg — **EMBL symposium Cellular mechanisms driven by phase separation**, *poster presentation*, title: Localized control of protein phase separation via membrane binding.

March 2022, Chicago — **APS March meeting**, *Contributing talk*, title: On the interplay between phase separation and aggregation.

Sept 2021, Munich — **MIAPP - Physics of the Emergence of Life**, *contributing talk*, title: Selection via Cycles of Phase Separation.

March 2021, Virtual — **APS March meeting**, *Contributing talk*, title: Phase separation controlled by molecular transitions.

July 2020, virtual — **Emergence of Life, CRC 235**, *poster presentation*, title: Selection via Cycles of Phase Separation.

June 2019, Regensburg — **CRC Emergence of Life Summer School**, *Invited talk*, title: Gel Formation of Self-Complementary DNA strands.

May 2019, Munich — **MECO44: conference of the Middle European Cooperation in Statistical Physics**, *poster presentation*, title: Gel formation of self-interacting DNA strands.