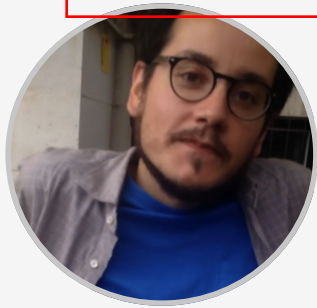


## Giuseppe Negro



Date of birth: 04/01/1988 | Nationality: Italian | Gender: Male |

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Via F. S. Racanelli 1, 70028, Sannicandro, Italy

### ● WORK EXPERIENCE

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07/01/2020 – 01/07/2020 – Edinburgh, United Kingdom

#### **POSTDOCTORAL RESEARCH ASSOCIATE – SUPA, School of Physics and Astronomy, University of Edinburgh**

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Modelling and simulations, via parallel implementation of Lattice Boltzmann methods, of biological fluids.

Edinburgh, United Kingdom

### ● EDUCATION AND TRAINING

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01/11/2016 – 17/03/2020 – Bari, Italy

#### **PhD in theoretical physics – Università degli studi di bari "A. Moro"**

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The main topic of the PhD project concerns the study of the properties and the dynamics of complex and active fluids, and is carried on under the supervision of Professor G. Gonnella. We have developed continuum models to study different motility modes and self-organisation properties of active fluids under topological confinement, and the kinetics of phase separation in multiphase fluids.

To solve the dynamical equations we have developed a parallel implementation of the Lattice Boltzmann method, able to resolve the relevant time and space scales of the systems under study.

Final exam passed cum Laude |

MODELING AND SIMULATIONS OF DYNAMICS AND MOTILITY IN ACTIVE FLUIDS |

<https://www.dropbox.com/sh/qs7fbvk8p2ttcst/AAC988O90RnPSYLhsX8sf13ua?dl=0>

*Giuseppe Negro*

**MSc Theoretical Physics (marks: 110/110) – Università degli studi di Bari A. Moro**

Thesis title : "Large deviations and condensation transitions in systems with factorized steady states". Supervisor: Prof. G. Gonnella.

Abstract: the thesis concerns the study of a phenomenon of condensation, known as "condensation of fluctuations", which is the counterpart of ordinary condensation in the realm of rare events, in systems with factorized steady states. The study has been carried on with both analytical techniques from "large deviations theory", and numerical simulations.

Competences acquired during the master courses:

- advanced knowledge about Mathematical Physics (Functional Analysis, Probability Theory);
- advanced knowledge about the most important fields in Theoretical Physics (Quantum Field Theory, Quantum Theory of Fundamental Interactions, Quantum Mechanics, Statistical Mechanics, Solid State Physics, General Relativity);
- advanced knowledge about numerical methods applied in Physics;

Competences acquired during the Thesis:

- Large Deviations theory
- Non-Equilibrium phase transitions in the steady states of some lattice models in the mean field geometry configuration.
- Characterization of the fluctuations behavior of extensive observables in systems displaying factorized steady states, and study of a condensation transition of fluctuations.
- Exactly solvable models in statistical mechanics (Quenching of the Gaussian model, Spherical Model)
- Implementation of various Monte Carlo Algorithms for numerical simulations in different programming language (mostly Fortran and Python)

**BSc Physics – Università degli studi di Bari A. Moro**

Thesis title : "L'oscillatore di Rayleigh: determinazione variazionale del ciclo limite".

Supervisor: Prof G. Gonella.

Competences acquired during the bachelor courses:

- good knowledge about pure Mathematics (Analysis, Algebra, Geometry) and applied Mathematics (Mathematical Physics);
- basic knowledge about Chemistry;
- deep knowledge about Classical Mechanics, Thermodynamics, Classical Electromagnetism, Optics and Electronics;
- good knowledge about the experimental techniques in classical and modern Physics;
- good knowledge about the basis of modern Physics (Special Relativity, Quantum Mechanics, Statistical Physics);
- good knowledge about numerical methods applied in Physics;
- good knowledge about Scientific English.

Competences acquired during the thesis:

- Theory of dynamical systems and non-linear differential equations.
- Perturbative methods for the determination of the period of limit cycles.
- Numerical study of the phase portrait using Mathematica software.



## ● LANGUAGE SKILLS

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Mother tongue(s): **ITALIAN**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	C2	C2	C2	C2	C2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

## ● PUBLICATIONS

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### Publications

- **"Morphology and flow patterns in highly asymmetric active emulsions"**. Physica A: Statistical Mechanics and its Applications, Volume 503, 2018, Pages 464-475, <https://doi.org/10.1016/j.physa.2018.03.011>.
- **"Lattice Boltzmann methods and active fluids"** LN Carena, G Gonnella, A Lamura, G Negro, A Tiribocchi. The European Physical Journal E 42 (6), 81.
- **"Rotation and propulsion in 3D active chiral droplets"**. LN Carena, G Gonnella, D Marenduzzo, G Negro. Proceedings of the National Academy of Sciences 116 (44), 22065-22070.
- **"Rheology of active polar emulsions: from linear to unidirectional and inviscid flow, and intermittent viscosity"**. G Negro, LN Carena, A Lamura, A Tiribocchi, G Gonnella. Soft matter 15 (41), 8251-8265.
- **"Dynamically asymmetric and bicontinuous morphologies in active emulsions"**. LN Carena, G Gonnella, A Lamura, G Negro. International Journal of Modern Physics C, 1941002.
- **"Comparison between isothermal collision-streaming and finite-difference lattice Boltzmann models"**. G Negro, S Busuioc, VE Ambrus, G Gonnella, A Lamura, V Sofonea. International Journal of Modern Physics C.
- **"Hydrodynamics of contraction-based motility in a compressible active fluid"**. G. Negro, A Lamura, G Gonnella, D Marenduzzo. EPL (Europhysics Letters) 127 (5), 58001.
- **In silico characterization of asymmetric active polar emulsions**. G Negro, LN Carena, P Digregorio, G Gonnella, A Lamura. AIP Conference Proceedings 2071 (1), 020012.

*Giuseppe Negro*

## ● DRIVING LICENCE

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Driving Licence: **B**

## ● CONFERENCES AND SEMINARS

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### Conferences

- 16th Workshop on Statistical Mechanics and Nonperturbative Field Theory (SM&FT 2015), Bari Italy.
- Poster contribution to **Flowing Matter 2017** conference in Porto. **Poster: "Phase Diagram of the Cellular Potts Model"** on a work in collaboration with professor D. Marenduzzo of the University of Edinburgh. The abstract can be found here: [Flowing matter 2017](#) .
- 17th Workshop on Statistical Mechanics and Nonperturbative Field Theory (SM&FT 2017), Bari Italy.
- Talk contribution to **Bari Theory Xmas Theory Workshop 2016 (22 December 2016)**, Bari Italy. **Talk: "phase transitions and metastability in the Zeta Urn Model"**.
- Talk contribution to **TIM 18 Physics Conference, Timisoara, Romania**. **Talk: "In Silico Characterization of Asymmetric Active Polar Emulsions"**.
- Talk contribution to **DSFD 2018 27th international conference on discrete simulation of Fluids Dynamics, Wocheater MA, USA**. **Talk: "Unidirected motion and negative viscosity in microphase separation with an active polar component"**.
- Poster contribution to **Italian Soft Matter days 2019**, Padua, Italy.
- Talk contribution to **APS Fluids 2018 conference, Atlanta, USA**.
- Talk contribution to **FisMat 2019**, Catania Italy.

## ● ORGANISATIONAL SKILLS

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### Organisational skills

- good organization skills gained as coordinator of various Urban laboratories on Music, Poetry and Science, and as a participant in the logistic of Scouts camps.
- good management skills gained during a 18 months work experience in the low level administration of a small Pharmaceutical Industry NecoFarma s.r.l, Brescia, Italy.

## ● SCHOOLS

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### Schools

- INTERNATIONAL SUMMER SCHOOL FPSP XIV, 16-29 JULY, 2017.
- TAU-ESPCI INTERNATIONAL WINTER SCHOOL ON "ACTIVE MATTER" JANUARY 28-FEBRUARY 1, 2018, TEL AVIV.

*Giuseppe Negro*

## ● EXPERIENCES ABROAD

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### Experiences Abroad

- 1/10/2017-23/12/2017 Visiting PhD student at the [University of Edinburgh](#) under the supervision of [Professor Davide Marenduzzo](#), for a project regarding *Lattice Boltzmann simulations of active fluids*.
- 21/05/2018-28/05/2018 Visiting PhD student at [Universitatea de Vest din Timisoara](#), under the supervision of [Professor V. Sofonea](#), for a project regarding *Lattice Boltzmann simulations of Liquid-Vapor phase separation in 3D*.
- 13/03/2019-01/06/2019 Visiting PhD student at the [University of Edinburgh](#) under the supervision of [Professor Davide Marenduzzo](#), for a project regarding *3D Lattice Boltzmann simulations of active cholesteric droplets, funded by the Project HPC-EUROPA3 (INFRAIA-2016-1-730897), with the support of the EC Research Innovation Action under the H2020*
- 07/01/2020-25/02/2020 Visiting PhD student at the [University of Edinburgh](#) under the supervision of [Professor Davide Marenduzzo](#), for a project regarding *Rheology of soft deformable droplets immersed in a nematic liquid crystal, funded by the Project HPC-EUROPA3 (INFRAIA-2016-1-730897), with the support of the EC Research Innovation Action under the H2020*

## ● TEACHING EXPERIENCE

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### Teaching Experience

- (2017) **Lecturer** for the **two weeks course** "[Statistical Mechanics and Renormalization Group](#)" held at the Physics department of the university of Bari.
- (2018) **Lecturer** for the **two weeks course** "[Statistical Mechanics and Renormalization Group](#)" held at the Physics department of the university of Bari.

Giuseppe Negro