

# Giorgio NICOLETTI



## PERSONAL DATA

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PLACE AND DATE OF BIRTH: Dolo, Italy | 9<sup>th</sup> July 1995  
ADDRESS: Department of Physics and Astronomy "Galileo Galilei"  
Room 382, Via Francesco Marzolo 8, 35131 Padova, Italy  
PERSONAL WEBSITE: giorgionicoletti.github.io  
EMAIL: giorgio.nicoletti.1@phd.unipd.it

## RESEARCH EXPERIENCE

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JUNE 2022 - JULY 2022



**Visiting PhD student**

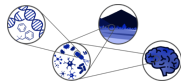
**Max Planck Institute for the Physics of Complex Systems**, Division of Biological Physics, Dresden, Germany

Supervisor: Dr. DANIEL M. BUSIELLO

## EDUCATION

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OCT 2019 - PRESENT



**PhD in PHYSICS**

Laboratory of Interdisciplinary Physics, **University of Padova**

Supervisor: Prof. AMOS MARITAN

Co-supervisor: Prof. SAMIR SUWEIS

OCT 2017 - JULY 2019



**Master's Degree in PHYSICS, University of Padova, Italy**

Thesis: *Scaling and renormalization group for models of neural activity.*

Advisor: Prof. AMOS MARITAN, Co-Advisor: Prof. SAMIR SUWEIS

FINAL GRADE: 110/110 *cum laude*, GPA: 29.93/30

SEPT 2018 - FEB 2019



**Erasmus semester**

INTERNATIONAL MASTER IN PHYSICS OF COMPLEX SYSTEM, **Sorbonne University, Paris Diderot University, Paris-Sud University, Paris**

ECTS GPA: A/A

OCT 2014 - JULY 2017



**Bachelor's Degree in PHYSICS, University of Padova, Italy**

Thesis: *Quantum Mechanics and de Finetti theorem. A Bayesian interpretation of quantum probability.*

Advisor: Prof. PIERALBERTO MARCHETTI

FINAL GRADE: 110/110 *cum laude*, GPA: 29.19/30

SEPT 2009 - JULY 2014

**High school diploma, Liceo Scientifico "U. Morin", Venice**

Final essay: *The emergent universe. Beyond mechanicism: does something fundamental exist?*

FINAL GRADE: 100/100 *cum laude*

## PUBLICATIONS & PREPRINTS

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**PHYS. REV. E**  
106, 014118 (2022)

Giorgio Nicoletti, Amos Maritan, Daniel M. Busiello. **Information-driven transitions in projections of underdamped dynamics.**

<b>J. PHYS. COMPLEXITY</b> 3 025010 (2022)	Giacomo Barzon*, Giorgio Nicoletti*, Benedetta Mariani, Marco Formentin, Samir Suweis. <b>Criticality and network structure drive emergent oscillations in a stochastic whole-brain model</b> (*equal contribution).
<b>SCIENTIFIC REPORTS</b> 12, 10770 (2022)	Benedetta Mariani, Giorgio Nicoletti, Marta Bisio, Marta Maschietto, Stefano Vassanelli, Samir Suweis. <b>Disentangling the critical signatures of neural activity.</b>
<b>ARXIV</b> 2204.01644 (2022)	Giorgio Nicoletti, Daniel M. Busiello. <b>Mutual information in changing environments: non-linear interactions, out-of-equilibrium systems, and continuously-varying diffusivities.</b>
<b>PHYS. REV. LETT.</b> 127, 228301 (2021)	Giorgio Nicoletti, Daniel M. Busiello. <b>Mutual information disentangles interactions from changing environments.</b> <i>Selected as Editors' Suggestion and for a viewpoint in "Physics".</i>
<b>ARXIV</b> 2110.10014 (2021)	Giorgio Nicoletti, Leonardo Saravia, Ferdinando Momo, Amos Maritan, Samir Suweis. <b>The emergence of scale-free fire outbreaks in Australia.</b>
<b>FRONT. SYST. NEUROSCIENCE</b> 15:709677 (2021)	Benedetta Mariani, Giorgio Nicoletti, Marta Bisio, Marta Maschietto, Oboe Roberto, Alessandro Leparulo, Samir Suweis, Stefano Vassanelli. <b>Neuronal avalanches across the rat somatosensory barrel cortex and the effect of single whisker stimulation.</b>
<b>PHYS. REV. RESEARCH</b> 2, 023144 (2020)	Giorgio Nicoletti, Samir Suweis, Amos Maritan. <b>Scaling and criticality in a phenomenological renormalization group.</b>

## INVITED TALKS

13 <sup>TH</sup> JUL 2022	Seminar at the <b>Max Planck Institute for the Physics of Complex Systems</b> , Dresden, Germany. <b>INVITED TALK:</b> <i>Information theory in stochastic processes and complex systems.</i>
23 <sup>RD</sup> - 24 <sup>TH</sup> MAY 2022	<b>BrainNet workshop</b> , KTH Royal Institute of Technology, Stockholm, Sweden. <b>INVITED TALK:</b> <i>What can phase transitions and criticality teach us about brain dynamics?</i>
10 <sup>TH</sup> MAR 2022	<b>Young Seminars of the Italian Society of Statistical Physics</b> , online. <b>INVITED TALK:</b> <i>Unfolding complex systems with Information Theory.</i>

## CONTRIBUTED TALKS AND POSTERS

25 <sup>TH</sup> - 29 <sup>TH</sup> OCT 2021 <b>CONFERENCE</b>	<b>Conference on Complex Systems 2021</b> , Lyon, France. <b>CONTRIBUTED TALK:</b> <i>Disentangling the role of external and intrinsic dynamics on the critical signatures of neural activity.</i> <b>CONTRIBUTED TALK:</b> <i>Modeling the emergence of scale-free fire outbreaks in Australia.</i> <b>POSTER:</b> <i>Disentangling internal interactions from noisy environments through mutual information.</i>
22 <sup>ND</sup> - 25 <sup>TH</sup> JUNE 2021 <b>CONFERENCE</b>	<b>Stochastic Models and Experiments in Ecology and Biology 2021</b> , ECLT, Venice, Italy. <b>POSTER:</b> <i>Modeling the emergence of scale-free fire outbreaks in Australia.</i>
6 <sup>TH</sup> - 9 <sup>TH</sup> OCT 2020 <b>CONFERENCE</b>	<b>Brain Criticality Virtual Meeting</b> , online. <b>POSTER:</b> <i>What can a phenomenological Renormalization Group teach us about criticality in a network of neurons?</i>
29 <sup>TH</sup> SEPT - 1 <sup>ST</sup> OCT 2020 <b>CONFERENCE</b>	<b>Bernstein Conference 2020</b> , organized by the Bernstein Network. <b>POSTER:</b> <i>Scaling and criticality in a phenomenological renormalization group.</i>
1 <sup>ST</sup> - 3 <sup>RD</sup> JULY 2019 <b>CONFERENCE</b>	<b>Italian Conference on Complex Systems</b> , Bruno Kessler Foundation, Trento. <b>POSTER:</b> <i>Scaling and Renormalization Group for the activity of neurons.</i>

## ORGANIZED CONFERENCES

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- 27<sup>TH</sup> OCT 2021 **SATELLITE** **Robustness, Adaptability and Critical Transitions in Living Systems Satellite** held at the Conference on Complex Systems 2021, Lyon, France. Main organizer.

## ATTENDED SCHOOLS AND WORKSHOPS

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- 24<sup>TH</sup> - 28<sup>TH</sup> JAN 2022 **WORKSHOP** **Winter Workshop on Complex Systems 2022**, Arc-et-Senans, France.
- 30<sup>TH</sup> MAY - 12<sup>TH</sup> JUNE 2021 **SCHOOL** **The Beg Rohu Summer School “Statistical Mechanics and Emergent Phenomena in Biology”**, Beg Rohu, Saint Pierre Quiberon, France.
- 30<sup>TH</sup> NOV - 18<sup>TH</sup> DEC 2020 **SCHOOL** **Winter School on Quantitative Systems Biology**, organized by the International Center for Theoretical Physics, Italy, online.
- 9<sup>TH</sup> - 16<sup>TH</sup> SEPT 2019 **SCHOOL** **Computational and Theoretical Models in Neuroscience Summer School**, Venice, Italy.

## TEACHING EXPERIENCE AND STUDENT SUPERVISION

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- 2021/22 **SUPERVISION** Co-supervisor of one master’s thesis. Supervision of two students research projects, Master’s Degree in Physics of Data, University of Padova.
- 2021/22, 1<sup>ST</sup> SEMESTER **TEACHING** **Models of Theoretical Physics**, Master’s Degree in Physics of Data, University of Padova. *Teaching assistant (20 hours)*.
- 2021/22, 1<sup>ST</sup> SEMESTER **TEACHING** **IT and Bioinformatics**, Bachelor’s Degree in Molecular Biology, University of Padova. *Teaching assistant (20 hours) for the Python programming language*.
- 2020/21, 1<sup>ST</sup> SEMESTER **TEACHING** **IT and Bioinformatics**, Bachelor’s Degree in Biology, University of Padova. *Teaching assistant (21 hours) for the Python programming language*.
- 21<sup>ST</sup> - 30<sup>TH</sup> OCT 2020 **ATTENDED WORKSHOP** **Innovative University Teaching and Learning Physics**, University of Padova.

## SERVICE AND MEMBERSHIPS

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- 2021 - PRESENT Member of the **Italian Society of Physics**.
- 2021 - PRESENT Member of the **Complex Systems Society**.
- 2021 - PRESENT Elected representative in the **PhD Program Committee** and in the **Academic Board of the PhD program**, Department of Physics and Astronomy, University of Padova.

## HONORS AND AWARDS

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- 20<sup>TH</sup> DEC 2021 **Winner of the SECS grant**, funded by the *Young Researchers in Complex Systems Society*.
- 22<sup>ND</sup> NOV 2021 **Physical Review Letters Editors’ Suggestion, viewpoint in “Physics” magazine and highlight in PRL’s weekly tip sheet for reporters** for the paper *Mutual information disentangles interactions from changing environments*, Phys. Rev. Lett. 127, 228301 (2021).
- 25<sup>TH</sup> JUNE 2021 **Best Poster Award** for the poster “Modeling the emergence of scale-free fire outbreaks in Australia” at *Stochastic Models and Experiments in Ecology and Biology 2021*, ECLT, Venice, Italy. **Sponsored by MDPI**.
- 2020 Graduate Alumni Award for the best students who graduated in the academic year 2018/2019, **University of Padova**.
- FEB 2017 Winner of the grant for the best students of scientific first cycle degrees, granted by **University of Padova**.

10<sup>TH</sup> OCT 2014 Winner of the award for the high school students with the highest final grade and honors, granted by **MIUR**, the Italian Ministry for Education, University and Research.

## IT SKILLS

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ADVANCED KNOWLEDGE Python  
GOOD KNOWLEDGE Mathematica,  $\text{\LaTeX}$   
BASIC KNOWLEDGE C++, ROOT, Matlab, LINUX, HTML, CSS

2020 - PRESENT Web curator and administrator of the website of the Laboratory of Interdisciplinary Physics, University of Padova, and of the related academic initiatives (workshops, conferences, etc.).

## LANGUAGES

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ITALIAN: Native.  
ENGLISH: Fluent, C1 level per the Cambridge English assessment.  
FRENCH: Intermediate knowledge, B1-B2 level per the Erasmus OLS language assessment.