

# Dr. Simone Biondini

## Curriculum Vitae

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### Education

- Feb. 2012- May 2016 **Ph.D. in Physics**, Technische Universität München and Max Planck Institute for Physics, Munich, Germany.
- **Ph.D. Thesis:** “*Effective field theories for non-relativistic Majorana neutrinos in a thermal bath*”
- Oct. 2009 - Dec. 2011 **M.Sc. in Physics**, University of Perugia, Italy.
- **M.Sc. Thesis:** “*Phenomenology of excited doubly charged heavy leptons at the LHC*”
- Oct. 2006 - Sept. 2009 **B.Sc. in Physics**, University of Perugia, Italy.
- **B.Sc. Thesis:** “*Scattering and bound state analysis of the radial Dirac equation in the Woods-Saxon potential in the effective position dependent mass case*”
- July 2006 **High School Diploma**, Liceo Scientifico Jacopone da Todi, Todi, Italy.
- Full Mark and Honors*

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### Research Experiences

- Sept. 2020 - August 2024 **Postdoc/Principal Investigator - SNSF Ambizione Grantee.**  
University of Basel, Physics Department - Particle Physics and Cosmology group, Switzerland
- Nov. 2018 - Aug. 2020 **Postdoc - Faculty of Science and Engineering Fellowship.**  
Van Swinderen Institute for Particle Physics and Gravity, University of Groningen, the Netherlands
- Oct. 2016 - Oct. 2018 **Postdoc - Albert Einstein Center Fellowship.**  
Albert Einstein Center, Institute for Theoretical Physics, University of Bern, Switzerland
- May 2016 - June 2016 **Research Assistant.**  
Technische Universität München, Munich, Germany

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### Research Interests

- **Astroparticle Physics and Cosmology**  
Physics of the early universe, dark matter theory, dark matter searches, cosmological phase transitions, leptogenesis
- **Particle Physics Phenomenology**  
Collider physics, composite models for quarks and leptons, neutrino physics, Quantum Chromo-Dynamics (QCD), heavy-quarkonium and heavy-ions collisions

- **Effective Field Theories (EFTs)**  
Non-Relativistic EFTs (Heavy-Quark EFT, Non-Relativistic QED/QCD), potential Non-Relativistic EFTs

## Honors, Awards & Academic Qualifications

- **Swiss National Science Foundation - Ambizione Grant**  
“*Effective Field Theory and Open Quantum Systems Approach for Dark Matter Dynamics in the Early Universe*”  
Project funds 520'000 CHF (September 2020)
- **“University Teaching Qualification”**  
National qualification for academic teaching practice and competences  
Awarded by the University of Groningen (July 2020)
- **University training program in pedagogical disciplines for teaching**  
University of Perugia, Italy (2019)
- **“Springer thesis Award”- Recognizing Outstanding Ph.D. Research**  
together with the publication of the Ph.D. Thesis (April 2017)
- **“Universe Ph.D. Awards 2016 (Theory)”**  
Awarded by the Universe Excellence Cluster in Munich, Germany
- **DAAD Fellowship for foreign teaching assistant**  
Awarded by Deutscher Akademischer Austauschdienst (June 2013)
- **High School Award by “Fondazione Ing. Franco Todini”**  
Fellowship for the following five years of undergraduate studies (2006-2011)

## Teaching and Supervision

- Mar. 2024 - **Invited Lecturer**, M. Sc. in Physics: “Quantum Field Theory”.  
Oct. 2024 University of Camerino, Italy
- Feb. 2024 - **Invited Lecturer**, Graduate course in Theoretical Physics:  
Apr. 2024 “Introduction to Particle Dark Matter”.  
University of Bern, Switzerland
- Mar. 2023 - **Invited Lecturer**, M. Sc. in Physics: “Quantum Field Theory”.  
Oct. 2023 University of Camerino, Italy
- Jan.-June 2022 **Supervisor**, Bachelor student Francesco Lottatori.  
Thesis “*Cross section for elementary processes in particle physics*”
- Nov. 2022 - **Teaching Assistant**, M. Sc. in Physics: “General Relativity”.  
Feb. 2023 Physics department, University of Basel, Switzerland
- Feb.- May 2022 **Teaching Assistant**, B. Sc. in Physics: “Advanced Quantum Mechanics”.  
Physics Department, University of Basel, Switzerland
- Nov. 2019 - **Lecturer**, B. Sc. in Physics: “Advanced Mechanics”.  
Feb. 2020 University of Groningen, Faculty of Science and Engineering, The Netherlands

- July 2019 **Lecturer**, Graduate course “An Introduction to Effective Field Theories”.  
University of Perugia, Physics Department, Italy
- Sept. 2019 - **Teaching Assistant**, M. Sc. in Physics, “Lie Groups in Physics”.  
Oct. 2019 University of Groningen, Faculty of Science and Engineering, The Netherlands
- Apr.-June **Teaching Assistant**, M. Sc. in Physics, “Quantum Field Theory II”.  
2016 Technische Universität München, Germany
- Apr.-June **Teaching Assistant**, M. Sc. in Physics, “Quantum Field Theory I”.  
2013 Technische Universität München, Germany
- Oct. 2012 - **Teaching Assistant**, B. Sc. in Physics, “Electrodynamics”.  
Feb. 2013 Technische Universität München, Germany
- Mar.-July **Supervisor**, Bachelor student Ivo Gabrovski.  
2020 Thesis “*Simplified Models for Dark Matter-Neutrino Interactions*”
- Mar.-July **Supervisor**, Bachelor student Josse Niezing.  
2019 Thesis “*Freeze-in as a dark matter production mechanism*”
- July 2010 **Lecturer**, Remedial courses in Mathematics.  
Liceo Scientifico Jacopone da Todi, Todi, Italy

## Institutional Activities & Membership in Scientific Collaborations

- Member in the advisory committee for the workshop “Quarkonia meet dark matter 2024”, Munich, Germany
- External expert for the Ph.D. committee at the University of Groningen  
Ph.D. candidate Ruud Peeters, defence on May 7th 2021
- “Theory embedded” collaborator in the Compact Muon Solenoid (CMS) Collaboration at CERN
- Member of the organizing committee for the COMPOSE-IT Workshop 2020, University of Perugia, Physics Department
- Reviewer for the Journal of High Energy Physics, European Physical Journal C, Computer Physics Communications Journal
- As of July 2016, Associate member of the LISA Consortium for the construction of a space-based gravitational wave interferometer.

## Science Communication

- Jan. 2020 **High School Science Seminar Series**, “*Il più grande spettacolo dopo il Big Bang*”.  
Liceo Jacopone da Todi, Italy

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## Publications

- The list of published papers can be found at the following links [INSPIRE HEP](#), [ORCID](#) and [Scopus](#)

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## Computer Skills

- **Editing software**  
Microsoft Word, Latex, Google Doc
- **Learning Management Systems**  
Blackboard, Google Classroom
- **Automatic calculations**  
Wolfram Mathematica, FeynCalc, FeynArts, CalcHEP
- **Program Languages**  
Python

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## Languages

- **Italian:** Native speaker
- **English:** Highly proficient in written and spoken language
- **German:** Basic knowledge (level A2/B1)