

SIMONE ROMITI

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Theoretical physicist specialized in lattice QCD and high-performance computing, with proven expertise in Monte Carlo simulations, Machine Learning (PINNs, VAEs), and code optimization. Track record of developing innovative algorithms that achieved substantial performance improvements, and leading collaborative research projects across international institutions. Passionate about expanding expertise and tackling complex computational challenges in collaborative, interdisciplinary environments.

EDUCATION

<i>Roma Tre University</i>	Rome, Italy
PhD in Theoretical Physics (Dissertation 22 April 2022)	2018 – 2021
<ul style="list-style-type: none">1st in ranking for public admission exam to PhD programAffiliation with INFN (Istituto Nazionale di Fisica Nucleare)Tutorial sessions and teaching assistant for undergraduate courses	
<i>Roma Tre University</i>	Rome, Italy
M.S. in Theoretical Physics of Elementary Particles	2016 – 2018
<ul style="list-style-type: none">Final grade: 110/110 <i>cum laude</i>, GPA: 29.85/30	
<i>Roma Tre University</i>	Rome, Italy
B.S. in Physics	2013 – 2016
<ul style="list-style-type: none">Final grade: 110/110 <i>cum laude</i>, GPA: 28.84 / 30Merit Scholarship awarded for top high school marks and academic excellence.	

WORK EXPERIENCE

University of Bern <i>Postdoctoral Researcher</i>	Apr 2024–Present Bern, Switzerland
<ul style="list-style-type: none">Innovative method using Physics-Informed Neural Networks (PINNs) → exponential to polynomial scaling of memoryReference scientist for Hadronic Vacuum Polarization (HVP) analysis of Bern group → sub-permille precision achievementPole contribution to Hadronic Light-by-Light contribution to $(g - 2)_\mu$ → achieved N^6 to $N \log(N)$ scaling improvementMain developer of open-source libraries → my code for Monte Carlo simulations led to scientific publicationsSupervision of PhD students	
University of Bonn <i>Postdoctoral Researcher</i>	Nov 2021–Mar 2024 Bonn, Germany
<ul style="list-style-type: none">Generated ETMC ensembles with O(a)-improved configurations, enabling more accurate lattice QCD calculations for the European Twisted Mass CollaborationGPU code optimization → achieved ~ 1.5 improvement by auto-tuning of Multigrid parametersNovel method for SU(2) Hamiltonians → achieved machine-precision exactness for canonical commutation relationsMonte Carlo and Quantum Computing → obtained Hamiltonian limit and calculations of glueballs spectrumSupervision of 1 Master's and 2 PhD students of their thesis project, tutorial sessions of undergraduate courses	

SELECTED PUBLICATIONS

- SU(N) lattice gauge theories with Physics-Informed Neural Networks
- The anomalous magnetic moment of the muon in the Standard Model: an update
- Strange and charm quark contributions to the muon anomalous magnetic moment in lattice QCD with twisted-mass fermions
- Towards determining the (2+1)-dimensional Quantum Electrodynamics running coupling with Monte Carlo and quantum computing methods
- Digitizing lattice gauge theories in the magnetic basis: reducing the breaking of the fundamental commutation relations

SKILLS

Programming Languages - C, C++, Python, Bash, R

High-Performance Computing - openMP, MPI, CUDA, EasyBuild, SLURM

Frameworks and Libraries - Jupyter, NumPy, SymPy, SciPy, Pandas, Matplotlib, Plotly, PyTorch, Streamlit

Computational Methods - Monte Carlo, Bayesian statistics | Machine Learning (PyTorch): PINNs, VAEs, diffusion models

Tools & DevOps - L^AT_EX, Markdown, RMarkdown, Quarto, Docker, Git, GitHub Actions

Languages - Italian (native), English (proficient), German (A2.1)

LEADERSHIP & RECOGNITION

Invited speaker at Scale Setting workshop

ECT* | March 2025

Main organizer of Hamiltonian LGTs workshop

ECT* | September 2025

Principal Investigator for 240k GPU node-hours allocation

CSCS (ALPS) | October 2025

Leading organizer of weekly seminars at HISKP department

HISKP | 2022 - 2024