

SIMONE ROMITI

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Theoretical physicist specialized in the field of lattice gauge theories and lattice QCD predictions. Multi-year experience in high-performance computing, large-scale numerical simulations and machine learning. Proven track record of designing algorithms that delivered order-of-magnitude performance gains. Building open-source scientific software used in peer-reviewed research, and leading collaborative projects across international research institutions.

TECHNICAL SKILLS

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

HPC & Systems - CUDA, MPI, OpenMP, SLURM, EasyBuild, GNU/Linux

ML & Data - PINNs, VAEs, Diffusion Models, Bayesian Statistics, Markov Chain Monte Carlo, Nested Sampling

Libraries & Frameworks - Pytorch, NumPy, SciPy, Pandas, Matplotlib, Plotly, Streamlit, SymPy, Jupyter

DevOps & Tools - Git, GitHub Actions, CI/CD Docker, L^AT_EX, Quarto, Markdown

Languages - Italian (native), English (fluent), German (basic)

WORK EXPERIENCE

[University of Bern](#)

Postdoctoral Research Scientist

Apr 2024 – Present

Bern, Switzerland

- **Reduced memory complexity from exponential to polynomial** by designing a novel algorithm using Physics-Informed Neural Networks (PINNs) in PyTorch
- **Achieved sub-permille numerical precision** as lead engineer for a high-accuracy scientific computation pipeline
- **Improved algorithm scaling from $O(N^6)$ to $O(N \log N)$** through a novel mathematical reformulation
- **Built and maintained open-source simulation libraries** (Python/C++) adopted for several peer-reviewed scientific publications
- **Mentored 3 PhD students** on software engineering practices, numerical methods, and project delivery

[University of Bonn](#)

Postdoctoral Research Scientist

Nov 2021 – Mar 2024

Bonn, Germany

- **Optimized GPU kernels (CUDA)** achieving a $\sim 1.5 \times$ throughput improvement via auto-tuning of Multigrid solver parameters on HPC clusters
- **Designed and ran large-scale distributed simulations** (MPI/OpenMP) on international computing centers
- **Developed a novel numerical method** achieving machine-precision exactness for a class of operator algebra constraints
- **Integrated Monte Carlo simulations with quantum computing workflows**, delivering end-to-end prototype pipelines bridging classical HPC and quantum backends
- **Mentored 3 graduate students** and delivered tutorial sessions for undergraduate computing 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

EDUCATION

Roma Tre University

PhD in Physics (defended April 2022)

Rome, Italy

Nov. 2018 – Oct. 2021

- Focus: numerical algorithms, Monte Carlo methods, HPC simulation
- Ranked **1st** in national competitive admission exam

Roma Tre University

M.S. in Physics

Rome, Italy

Oct. 2016 – Oct. 2018

- GPA: 29.85/30, graduated with highest honours

Roma Tre University

B.S. in Physics

Rome, Italy

Oct. 2013 – Jul. 2016

- GPA: 28.84/30, graduated with highest honours | Merit Scholarship recipient

LEADERSHIP & ACHIEVEMENTS

Principal Investigator – 0.24M GPU node-hours compute grant

CSCS ALPS | 2025

Workshop Organizer – HPC & Quantum Computing workshop

ECT* | 2025

Invited Speaker – Scientific seminars at CERN and ECT*

2025 – 2026

Visiting Research Grant – Open round 2026/1 fund

TU Wien | 2026