

SIMONE ROMITI

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Computational scientist and software engineer with 8+ 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 PROJECTS

Patient Management Web App

2026

- Built a full-stack **Streamlit** web application for a nutritionist's practice to manage patient records, appointment history, and nutritional assessments. Delivered solo from requirements to deployment

EDUCATION

<i>Roma Tre University</i> PhD in Physics (defended April 2022) <ul style="list-style-type: none">• Focus: numerical algorithms, Monte Carlo methods, HPC simulation• Ranked 1st in national competitive admission exam	Rome, Italy Nov. 2018 – Oct. 2021
<i>Roma Tre University</i> M.S. in Physics <ul style="list-style-type: none">• GPA: 29.85/30, graduated with highest honours	Rome, Italy Oct. 2016 – Oct. 2018
<i>Roma Tre University</i> B.S. in Physics <ul style="list-style-type: none">• GPA: 28.84/30, graduated with highest honours Merit Scholarship recipient	Rome, Italy Oct. 2013 – Jul. 2016

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