

SIMONE ROMITI

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Computational scientist and software engineer with 6+ years of experience in high-performance computing, machine learning, and large-scale numerical simulations. 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 cross-institutional projects. Experienced in parallel computing and deep learning (PyTorch).

TECHNICAL SKILLS

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

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

ML & Data - PyTorch, Physics-Informed Neural Networks (PINNs), VAEs, Diffusion Models, Bayesian Statistics, Monte Carlo

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

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

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

WORK EXPERIENCE

University of Bern

Postdoctoral Research Engineer

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, unlocking simulations previously infeasible at scale
- **Achieved sub-permille numerical precision** as lead engineer for a high-accuracy scientific computation pipeline, coordinating analysis across a multi-institution research group
- **Improved algorithm scaling from $O(N^6)$ to $O(N \log N)$** through a novel mathematical reformulation, cutting compute costs by orders of magnitude for large- N workloads
- **Built and maintained open-source simulation libraries** (Python/C++) adopted by multiple research teams and directly enabling peer-reviewed publications
- **Mentored 3 PhD students** on software engineering practices, numerical methods, and project delivery

University of Bonn

Postdoctoral Research Engineer

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 national supercomputing infrastructure, generating datasets used across a European research collaboration
- **Developed a novel numerical method** achieving machine-precision exactness for a class of operator algebra constraints, published in a peer-reviewed journal
- **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

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

EDUCATION

Roma Tre University

Rome, Italy

PhD in Physics (defended April 2022)

Nov. 2018 – Oct. 2021

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

Roma Tre University

Rome, Italy

M.S. in Physics

Oct. 2016 – Oct. 2018

- GPA: 29.85/30, graduated with highest honours

Roma Tre University

Rome, Italy

B.S. in Physics

Oct. 2013 – Jul. 2016

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

LEADERSHIP & ACHIEVEMENTS

Principal Investigator – 240,000 GPU node-hours compute grant

[CSCS ALPS](#) | 2025

Workshop Organizer – International HPC & Quantum Computing workshop (30+ attendees)

[ECT*](#) | 2025

Invited Speaker – Technical seminars at CERN and ECT*

2025 – 2026

Visiting Research Grant – competitive international grant

[TU Wien](#) | 2026