

# SIMONE ROMITI

simone.romiti.1994@gmail.com | [Website](#) | [GitHub](#) | [LinkedIn](#) | [ORCID](#)

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Computational scientist and software engineer with 7+ 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

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**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, Docker, L<sup>A</sup>T<sub>E</sub>X, Quarto, RMarkdown, Markdown

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

## WORK EXPERIENCE

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### [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

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### [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

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*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

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**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** – competitive international grant

[TU Wien](#) | 2026

**5+ peer-reviewed publications** – [full list on ORCID](#)

2021 – Present