

Alessandro Carraro

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🌐 alecarraro

KTH Royal Institute of Technology

September 2025 — Present

Master of Science in Computer Simulations for Science and Engineering (Joint degree with TU Delft)

Delft University of Technology

September 2024 — Present

Master of Science in Computer Simulations for Science and Engineering (Joint degree with KTH)

GPA: 8.99 (Top 3% of the last 3 years graduates)

Delft University of Technology

September 2021 — June 2024

Bachelor of Science in Aerospace Engineering

Minor in Computational Science and Engineering

Relevant coursework: Machine Learning for Graph Data, Scientific Machine Learning, Scientific Computing, Applied Finite Element

WORK EXPERIENCE

Google Summer of Code Contributor, JuliaReach

May 2025 — August 2025

Project: Reachability Analysis for Control of Uncertain Dynamical Systems 🌐

- Implemented state-of-the-art algorithms from recent literature for reachability analysis using Julia.
- Contributed production-ready code to the open-source **JuliaReach** ecosystem, ensuring maintainability, performance, and integration with existing tools.
- Strengthened software engineering skills through collaborative open-source development, version control with Git, and large-scale code optimization.

Teaching Assistant, TU Delft

September 2024 — March 2024

Master Level Course: Introduction to HPC and Bachelor Level Course: Parallel Computing

- Assisted students in navigating the Linux environment and using the DelftBlue Supercomputer during labs.
- Guided students through hands-on exercises focused on high-performance computing standards, MPI, and OpenMP.

RELEVANT ACADEMIC PROJECTS

Embeddings for Physics-Informed Neural Networks (PINNs)

February 2024 — June 2024

- Implemented PINNs in **JAX** to solve the Poisson equation on complex 2D bounded domains, augmenting inputs with graph Laplacian eigenvectors to encode domain topology.
- Interfaced the neural network with Finite Element solvers (**Netgen**, **NGSolve**) for ground-truth generation and comparisons.
- Performed theoretical analysis to frame the results in the context of regularization theory.

SKILLS

Programming Languages:

- Python (Proficient)
- Julia (Proficient)
- C/ C++ (Basic)

Tools: Git, LaTeX.

Software: Microsoft Excel, PowerPoint, CATIA, XFLR5, Blender 3D.

Language Skills: Italian (native), English (fluent).

Libraries and Frameworks:

- Experience with NumPy, PyTorch and JAX.
- Familiar with OpenMP and MPI for parallel programming in C/C++.