Lorenzo Poggioni

PhD Student in Applied Mathematics & Scientific Computing
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Research Interests

Numerical Analysis, High-Performance Computing (HPC), Computational Fluid Dynamics (CFD), High-order numerical methods, Nonlinear Wave Propagation.

Publications & Preprints

2025 **L. Poggioni, D. Clamond, Y. D'Angelo**, "A new class of finite difference methods: The zigzag schemes" *arXiv:2505.17969* [math.NA]. (Under Review).

In Prep. **L. Poggioni**, "Improved spectral methods for nonlinear advection models."

Education

2023 – **PhD Student**, Numerical Modeling and Fluid Dynamics group, J.A. Dieudonné Lab, Nice, France.
Thesis: Numerical methods for fluid dynamics. Supervised by Didier Clamond & Yves D'Angelo.

2022–2023 **Master 2, "Mathématiques Pures et Appliquées" (Honors)**, Université Côte d'Azur.
Specialization in Theoretical and Applied Mathematics.

2020–2022 **Master 1 & last year of Bachelor**, Université Côte d'Azur, France.
Mathematics curriculum, specialised in scientific computing.

2018–2020 **Classes préparatoires aux Grandes Écoles (CPGE)**, Valbonne, France.
Intensive program in Mathematics, Physics and Computer Science (MPSI/MP).

2015–2018 **Baccalauréat scientifique**, Lycée Guillaume Apollinaire, France.
Programming specialty (ISN).

Research Experience

Nov 2025 **Research Guest**, Technological University Dublin, Ireland. (Host: Rossen Ivanov).
Mathematical modeling of internal water waves in layered media.

2023 **Research Internship**, Lagrange Lab, Observatory Côte d'Azur, France.
Developed novel spectral methods for nonlinear conservation laws.

2022 **Research internship**, J.A. Dieudonné Lab, Nice, France.
Studied numerical methods for the propagation of unstable flame fronts.

Technical Skills

Programming Fortran, Matlab, Python (NumPy, SciPy), LaTeX.

HPC Parallel computing with MPI and CUDA.

Languages French (Native), English (Fluent), Japanese (JLPT N4).

Academic Awards

Dec 2025 **Best Poster Award**, French Group of Rheology (GFR).
Awarded at the Fluids and Complexity conference.

Teaching Experience

2023–2025 **Teaching Assistant**, Université Côte d'Azur.
192 hours of Bachelor-level instruction: Linear Algebra, Probability, Statistics.

2023–2024 **Colleur (Oral Examiner)**, Université Côte d'Azur.
Oral examinations in Linear Algebra II for Bachelor students.

Talks & Conferences

Dec 2025 **Fluids and Complexity**, Nice, France.
Poster showcasing results about an improved spectral method for nonlinear advection models.

Nov 2025 **Technological University Dublin**, Dublin, Ireland.
Talk about a new hybrid finite difference scheme featuring improved stability constraints for solving advection-dominated problems.

Nov 2025 **Laboratory's Ph.D. Seminar**, Nice, France.
Talk about the construction of new finite difference schemes with arbitrary stencils.

June 2025 **Mat du Labo**, Nice, France.
Poster showcasing Ph.D. results.

May 2025 **Applied Analysis Nice–Toulon–Marseille day**, Porquerolles, France.
Talk about an improved finite difference scheme for linear advection problems.

Nov 2024 **Laboratory's Ph.D. Seminar**, Nice, France.
Talk about advanced tools for numerical integration.

May 2024 **Analysis workshop of the laboratory**, Nice, France.
Talk about an introduction to variational principles in physics.

March 2024 **Math PhD Students Colloquium**, Les Cévennes, France.
Talk about an introduction to numerical integration and adaptive time stepping.

June 2023 **Ulysseus Spring School in PDEs**, Sevilla, Spain.