

SIMONE PESCUMA

Postdoctoral Fellow in Applied Mathematics
Institut Polytechnique de Paris
Laboratory CERMICS (École nationale des ponts et chaussées)

Last update: July 2026

I am a Postdoctoral Fellow and my research interests concern theoretical aspects and numerical methods for the propagation of waves, with a focus on discontinuous Galerkin methods and iterative solvers as well as multi-scale hyperbolic and parabolic equations.

INFORMATION

Place of birth: Como, Italy
Date of birth: 09/03/1998
Nationality: Italian
Email: simone.pescuma@enpc.fr

LANGUAGES

Italian – C2 (native)
English – C1 (fluent)
French – C1 (fluent)

PROFESSIONAL POSITIONS

Postdoctoral Fellow at École nationale des ponts et chaussées

Laboratory CERMICS – Champs-sur-Marne, France

Since Jan 2026

École nationale des ponts et chaussées – Champs-sur-Marne, France

Theoretical and numerical study for time-dependent hyperbolic and parabolic multiscale problems: multiscale finite volume method.

For this project, I'm developing an Octave/MATLAB code from scratch.

Collaborators: Claude Le Bris (ENPC), Frédéric Legoll (ENPC).

PhD Student at Institut Polytechnique de Paris

Laboratory POEMS (CNRS, Inria, ENSTA) – Unité de Mathématiques Appliquées (ENSTA) – Palaiseau, France

Oct 2022 – Nov 2025

ENSTA – Palaiseau, France

Theoretical and numerical study for time-harmonic wave propagation problems: hybridizable discontinuous Galerkin method with transmission variables for symmetric hyperbolic systems (with application to the convected Helmholtz equation) and for the Helmholtz equation in heterogeneous media.

For this project, I developed some MATLAB code modules and joined them to an existing discontinuous Galerkin code.

Supervisors: Axel Modave (CNRS), Gwénaél Gabard (Le Mans Université).

Intern at Laboratory POEMS (ENSTA)

Apr 2022 – Aug 2022

ENSTA – Palaiseau, France

A Trefftz Discontinuous Galerkin method with Absorbing Boundary Conditions for the numerical simulation of the Helmholtz problem.
[\[thesis\]](#)

For this project, I developed a MATLAB code from scratch.

Supervisors: Axel Modave (CNRS), Gwénaél Gabard (Le Mans Université).

EDUCATION

MSc in Mathématiques et application at Sorbonne Université – Paris, France

Sep 2021 – Dec 2022

Analyse numérique et équations aux dérivées partielles

Relevant subjects: Méthodes d'approximation variationnelle des EDP, Aspects théorique et numérique pour les fluides incompressible, Équations de réaction – diffusion et dynamiques de populations biologiques.

I was admitted to M2 in the framework of a Double-Degree program supported by an Erasmus+ scholarship.

MSc (Laurea magistrale) in Mathematical engineering at Politecnico di Milano – Milano, Italy

Sep 2020 – May 2023

Computational science and computational learning

Relevant subjects: Advanced partial differential equations, Numerical analysis for partial differential equations, Mathematical and physical modeling in engineering, Algorithm and parallel computing.

BSc (Laurea) in Mathematical engineering at Politecnico di Milano – Milano, Italy

Sep 2017 - Jul 2020

Relevant subjects: Mathematical analysis, Numerical analysis, Algebra, Statistics, Probability, Partial differential equations.

TEACHING ACTIVITY

During my PhD and post-doc, I was involved in some teaching activities concerning several engineering courses (Level “Bachelor 3”) at ENSTA – Palaiseau, France and ENPC – Champs-sur-Marne, France.

Partial differential equations: variational approaches

Spring 2026

Teacher: Frédéric Legoll (ENPC)

Relevant topics: Lax-Milgram theorem, variational formulation of PDEs

Theoretical and exercise sessions (6h).

Introduction to partial differential equations and to finite differences method

Spring 2024, Spring 2025, Spring 2026

Teacher: Sonia Fliss (ENSTA)

Relevant topics: hyperbolic PDEs in 1D, method of characteristics, finite differences, CFL condition, stability

Exercise and computer sessions (12h).

Dynamical systems: analysis and stability

Fall 2024

Teacher: Frédéric Jean (ENSTA)

Relevant topics: dynamical systems, ODEs, phase portrait, equilibria, stability

Exercise sessions (13h).

PUBLICATIONS

S.P., G. Gabard, T. Chaumont-Frelet, A. Modave (2026). *A HDG method with transmission variables for time-harmonic wave propagation problems with constant coefficients*

Submitted to Journal of Computational Physics, currently under review. Preprint [\[HAL\]](#) [\[arXiv\]](#)

S.P., G. Gabard, T. Chaumont-Frelet, A. Modave (2025). *A hybridizable discontinuous Galerkin method with transmission variables for time-harmonic acoustic problems in heterogeneous media*

Journal of Computational Physics, 534, 114009 [\[link\]](#) [\[HAL\]](#) [\[arXiv\]](#)

INTERNATIONAL CONFERENCES

S.P., G. Gabard, T. Chaumont-Frelet, A. Modave.

A HDG method with transmission variables for time-harmonic wave propagation problems

Talk in a minisymposium at the Seventeenth International Conference on Mathematical and Numerical Aspects of Wave Propagation (**WAVES 2026**)

Concordia University (Montréal, Canada), June 22 – 26, 2026

S.P., G. Gabard, T. Chaumont-Frelet, A. Modave.

A HDG method with transmission variables for general time-harmonic wave problems: application to convected acoustics

Talk in a minisymposium at the Twenty-ninth International Conference on Domain Decomposition Methods (**DD29 2025**)

Politecnico di Milano (Milano, Italy), June 23 – 27, 2025

S.P., G. Gabard, T. Chaumont-Frelet, A. Modave.

A HDG method with transmission variables for time-harmonic scalar wave problems in inhomogeneous media

Talk in a minisymposium at the Sixteenth International Conference on Mathematical and Numerical Aspects of Wave Propagation (**WAVES 2024**)

Harnack House (Berlin, Germany), June 30 – July 5, 2024

S.P., G. Gabard, T. Chaumont-Frelet, A. Modave.

HDG methods with transmission variables for Helmholtz problems

Talk in a minisymposium at the Seventh Chilean Workshop on Numerical Analysis for Partial Differential Equations (**WONAPDE 2024**)

Universidad de Concepción (Concepción, Chile), January 15 – 19, 2024

PROGRAMMING LANGUAGES

- Matlab
- Octave
- Latex
- C++ (used in the past)
- Python (used in the past)
- FreeFem++ (used in the past)