Axelle Drouard | PhD student in Applied Mathematics

Paris-Saclay University – Bruyères-le-Châtel, France
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Education

LiHPC, CEA, Paris-Saclay University — **Bruyères-le-Châtel**
PhD in Applied Mathematics — *2022–Present*
Thesis topic: *Kinetic methods for hyperbolic problems on unstructured meshes*
Supervisors: Rémi Abgrall, Stéphane Del Pino, Emmanuel Labourasse
Kinetic methods – Vector Lattice Boltzmann Methods (VLBM).
Numerical analysis of hyperbolic PDEs.
Eulerian and Lagrangian schemes on unstructured meshes.

Nantes University — **Nantes**
Master's Degree in Numerical Analysis, Modeling and Scientific Computing (MACS) — *2020–2022*
Analysis and numerical analysis of elliptic, parabolic and hyperbolic PDEs.
Implementation (C/C++, Fortran) of finite element and finite volume approximation methods.
Continuum mechanics, fluid mechanics, beam theory.
Introduction to SPH methods for Navier-Stokes equations.
Research project on the approximation of Maxwell's equations in 2D.
Probability and statistics – Python programming.
Deterministic and stochastic optimization.

Nantes University — **Nantes**
Bachelor's Degree in Mathematics — *2017–2020*

Internship

Master's Thesis Internship — **Bruyères-le-Châtel**
CEA, Campus Teratec — *Apr–Sep 2022*
Topic: *Study of a finite volume nodal scheme for diffusion in anisotropic media*
Supervisors: Christophe Buet, Emmanuel Labourasse

Teaching Experience

Teaching Assistant — **Orsay**
Université Paris-Saclay, Department of Mathematics (Orsay) — *Sep–Dec 2023*
Courses: Linear Algebra (1st year), Introduction to Scientific Computing – Python (2nd year)

Publications and Presentations

Journal article: Abgrall R., Del Pino S., Drouard A., Labourasse E. (2025). "Extension to non-uniform meshes of a high-order computationally explicit kinetic scheme for hyperbolic conservation laws." *Computers and Fluids*, 106648.

Workshop presentation:
Kinetic methods for hyperbolic problems in Eulerian and Lagrangian coordinates

LBM Working Group – April 2025 – Orsay, France.

Seminar presentation:
Kinetic methods on unstructured meshes in Eulerian coordinates and Lagrangian extension for the Euler equations
CEA-SMAI/GAMNI – January 2025 – Paris, France.

Conference presentations:
Lagrangian extension of a semi-implicit numerical scheme for Euler equations on 1D non-uniform meshes
HONOM 2024 – September 2024 – Chania, Greece
MultiMat 2024 – August 2024 – Breckenridge, Colorado, USA

Conference presentations:
Arbitrarily high-order semi-implicit numerical methods on 1D non-uniform meshes for hyperbolic problems
ECCOMAS 2024 – June 2024 – Lisbon, Portugal
CANUM 2024 – May 2024 – Le Bois-Plage-en-Ré, Île de Ré, France

Posters:
Semi-implicit numerical methods for hyperbolic problems
CJCMA 2023 – September 2023 – Gif-sur-Yvette, France
SMAI 2023 – May 2023 – Le Gosier, Guadeloupe, France

Skills

Programming

- Python
- Fortran
- C/C++
- Parallel computing: OpenMP/MPI

Tools

- Git
- LaTeX
- Jupyter
- Linux
- Beamer
- Overleaf

Languages

- French (native)
- Spanish (B1)
- English (B2, TOEIC: 930)

Interests

Motorsports, motorcycle road trips, hiking, running

References

PhD Supervisors:
Rémi Abgrall, Professor, University of Zurich. E-mail: remi.abgrall@math.uzh.ch
Emmanuel Labourasse, Research Director, CEA. E-mail: emmanuel.labourasse@cea.fr

PhD Co-supervisor:
Stéphane Del Pino, Research Engineer, CEA. E-mail: stephane.delpino@cea.fr