

Averil Prost | PhD student in Applied Mathematics

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Born 22th Feb. 2000 in Albertville.
French nationality.

Academic background

PhD in Applied Mathematics, with Nicolas Forcadel and Hasnaa Zidani <i>LMI - Laboratory of Mathematics of INSA</i> ○ Control problems in networks and applications to urban traffic ○ Scholarship of INSA Rouen	<i>since Oct. 2022</i>
Engineering diploma in Applied Mathematics <i>National Institute of Applied Sciences - INSA Rouen</i> ○ Functional and numerical analysis for PDEs, deterministic control theory	<i>2017-2022</i>
Master in Fundamental and Applied Mathematics <i>University of Rouen Normandie</i> ○ Viscosity solutions, Markov processes, particle systems	<i>2021-2022</i>
Integration of Graduate School MINMACS <i>Excellence scholarship in M2</i>	<i>2021-2022</i>

Participation to projects

ANR COSS - Control over Stratified Structures <i>National Research Agency project</i>	<i>2023-2026</i>
COPTI - Optimal control for mathematical modelling and numerical simulation with applications in environment, transport and image processing <i>European excellence chair on OPTimal Control</i>	<i>2021-2025</i>
ANID-ECOS - Sensitivity Analysis of State Constrained Optimal Control Problems <i>Chilean-French research cooperation project</i>	<i>2021-2023</i>

Mobility

CMM Visiting program <i>6-months academic stay in the Technical University Federico Santa María</i>	UTFSM, Valparaíso <i>1st July - 22th Dec. 2023</i>
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Thematic schools

SEME - Research summer school <i>Academic-Industry research week (Semaine d'Étude Mathématique-Entreprise)</i> ○ On a workaround for an overflow in streaming process mining. https://hal.science/hal-04108539	Pointe-à-Pitre <i>15th May - 19th May 2023</i>
Summer school on Mean-Field Games <i>Mini-courses by François Delarue, Pierre-Emmanuel Jabin and Eva Löcherbach</i>	Centre Henri Lebesgue <i>12th June - 16th June 2023</i>
CEMRACS - Vlasov-Poisson plasma sheath <i>Summer school on Transport in Physics, Biology and Urban traffic</i> ○ Numerical methods for a bispecies plasma sheath with absorbing wall. https://hal.science/hal-03926305/	CIRM <i>15th July - 31th Aug. 2022</i>

Internships

Numerical methods for Hamilton-Jacobi equations

Master internship (4.5 months) with Olivier Bokanowski

- Semi-Lagrangian scheme for obstacle problems with neural networks.

<https://github.com/averil-prost/numHJ>

Lab. J.L. Lions
1st Mar. - 15th Jul. 2022

Implicit-explicit scheme for the wave equation

Undergraduate internship (3 months) with Alexandre Impériale

- Multi-scale semi-implicit scheme in inhomogeneous media, with finite elements.

<https://www.github.com/averil-prost/Wonderbubbleland>

CEA Saclay
Jun - Aug. 2021

Teaching activities

Numerical methods for Partial Differential Equations

4th year, dep. of Mathematics. Course and exercise sessions.

Introduction to spectral theory, parabolic/hyperbolic second order equations.

INSA Rouen
Jan. - May 2023

Numerical optimization

4th year, dep. of Mathematics. Exercise sessions.

Optimality conditions, KKT conditions, simplex algorithm.

INSA Rouen
Sept. - Dec. 2022

Introduction to probability

2th year, Common cursus. Exercise sessions.

INSA Rouen
Sept. - Dec. 2022

Service for the community

Member of the local organizing committee

Workshop Optimal control and Applications

UTFSM, Valparaíso
Dec. 2023

Organizer of the doctoral seminar

Joint seminar (*Kαfεmιναrιo*) between the consortium of universities of Valparaíso

<https://whitengine.github.io/2023/09/cafeminario/>

UTFSM, Valparaíso
July - Dec. 2023

Elected representant of the doctoral students

Participation to the scientific council of the institution

INSA Rouen
since Oct. 2022

Vulgarization and diffusion of mathematics

Organization of school visits to INSA Rouen

supervision of middle school 1-week internships

INSA Rouen
sporadic

Oral communications

Befriending $\mathcal{P}_2(\mathbb{R}^d)$: viscosity solutions of centralized control problems in measure spaces

Talk in the Workshop Optimal Control and Applications, Valparaíso

<https://averil-prost.github.io/files/presentations/befriend.pdf>

WOpCoT
December 2023

Using optimal transport to define viscosity solutions of control problems

Poster in Foundations of Computational Mathematics (FoCM)

<https://averil-prost.github.io/files/posters/FoCM23.pdf>

FoCM 2023
June 2023

A neural network Lagrangian scheme for HJB equations

Talk in the 11th French Biennial of Applied and Industrial Mathematics

<https://averil-prost.github.io/files/presentations/SMAI2023.pdf>

SMAI 2023
May 2023

Quadratic is the new smooth: a notion of viscosity for control problems in $\mathcal{P}_2(\mathbb{R}^d)$

Talk in the Optimization and Control research group seminar

<https://averil-prost.github.io/files/presentations/BPviscosity.pdf>

LMI Seminar
April 2023

Publications

Comparison between geometrical and analytical viscosity solutions for control problems in the Wasserstein space *in preparation*

Viscosity solutions of centralized control problems in measure spaces *submitted*
Joint work with O. Jerhaoui and H. Zidani
<https://hal.science/hal-04335852>

Neural networks for first order HJB equations and application to front propagation with obstacle terms *published*
Joint work with O. Bokanowski and X. Warin
<https://link.springer.com/article/10.1007/s42985-023-00258-8>

High order numerical methods for Vlasov-Poisson models of plasma sheaths *submitted*
Joint work with V. Ayot, M. Badsì, A. Crestetto, N. Crouseilles, M. Mehrenberger and C. Tayou-Fotso
<https://hal.science/hal-03926305/>

Master's thesis - First approach of non-linearity
Introduction to Navier-Stokes equation and their control
<https://github.com/averil-prost/NonLinearite>

Miscellaneous

Spoken languages

- French: native speaker
- English: C1, 990/990 at TOEIC (2021)
- Spanish: B1

Programming languages

- Favorites: C++, Julia, Matlab
- Comfortable: Python
- Beginner: R, Fortran