

# Averil Aussedat | Post-doc

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in averil-aussedat

Born 22/02/2000, French.

## Academic background

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**Post-doctoral contract in the ConFine project (led by Adolfo Arroyo-Rabasa)** Since 2025  
*University of Pisa*

**PhD thesis in applied mathematics** 2022 – 2025

*LMI - Laboratory of Mathematics of INSA Rouen Normandie*

Optimal control problems and Hamilton-Jacobi-Bellman equations in some curved metric spaces.

<https://theses.hal.science/tel-05133552/>

Defended on June 19<sup>th</sup> 2025 in front of the following jury:

- |                                    |                                    |                              |
|------------------------------------|------------------------------------|------------------------------|
| ○ Nicola Gigli (rapporteur)        | ○ Yves Achdou (examinator)         | ○ Nicolas Forcadel (advisor) |
| ○ Quentin Mérigot (rapporteur)     | ○ Pierre Cardaliaguet (examinator) | ○ Hasnaa Zidani (advisor)    |
| ○ Filippo Santambrogio (president) | ○ Chloé Jimenez (examinator)       |                              |

**Master internship on numerical methods for Hamilton-Jacobi equations** March-July 2022

*Lab. J. L. Lions, with Olivier Bokanowski*

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

**Master in Fundamental and Applied Mathematics** 2021–2022

*University of Rouen Normandie*

**Engineering diploma in Applied Mathematics** 2017–2022

*National Institute of Applied Sciences - INSA Rouen*

**Integration of Graduate School MINMACS** 2021–2022

*Excellence scholarship in M2*

**Undergraduate internship on an implicit-explicit scheme for the wave equation** June-August 2021

*CEA Saclay, with Alexandre Impériale*

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

## Participation to projects

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**ConFine - Concentrations and Fine Properties of PDE-constrained measures** 2024–2029

*ERC Starting Grant held by Adolfo Arroyo-Rabasa*

**ANR COSS - Control over Stratified Structures** 2023–2026

*National Research Agency project held by Nicolas Forcadel*

**COPTI - Optimal control for mathematical modelling and numerical simulation** 2021–2025

**with applications in environment, transport and image processing**

*European excellence chair on OPTImal Control held by Hasnaa Zidani*

**ANID-ECOS - Sensitivity Analysis of State Constrained Optimal Control Problems** 2021–2023

*Chilean-French research cooperation project held by Hasnaa Zidani*

## Preprints and publications

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The links to preprint versions are available on <https://averil-aussedat.github.io/publications>.

**Local structure of centred tangent cones in the Wasserstein space** (preprint)

<http://arxiv.org/abs/2508.10837>

**A Cauchy-Lipschitz setting for control problems in complete CAT(0) spaces** (submitted)

Joint work with H. Zidani

### On the structure of the tangent cone to the Wasserstein space

<https://www.sciencedirect.com/science/article/pii/S0022039625005479>

### A minimality property of the value function in optimal control over the Wasserstein space

(preprint)

Joint work with C. Hermosilla

<https://hal.science/hal-04427139>

### Viscosity solutions of centralized control problems in measure spaces

Joint work with O. Jerhaoui and H. Zidani

<https://www.esaim-cocv.org/articles/cocv/abs/2024/01/cocv240040/cocv240040.html>

### Neural networks for first order HJB equations and application to front propagation with obstacle terms

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

Joint work with V. Ayot, M. Badsì, A. Crestetto, N. Crouseilles, M. Mehrenberger and C. Tayou-Fotso

<https://www.esaim-proc.org/articles/proc/abs/2024/02/proc2407711/proc2407711.html>

## Mobility and participation to research thematic schools

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### CMM Visiting program

6-months academic stay in the Technical University Federico Santa María

UTFSM, Valparaíso

July - December 2023

### SEME - Research summer school

Academic-Industry research week (Semaine d'Étude Mathématique-Entreprise)

<https://hal.science/hal-04108539>

Pointe-à-Pitre

15<sup>th</sup> - 19<sup>th</sup> May 2023

### CEMRACS - Vlasov-Poisson plasma sheath

Summer school on Transport in Physics, Biology and Urban traffic

<https://hal.science/hal-03926305/>

CIRM, Luminy

July - August 2022

## Teaching activities

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In France, PhD students can be contracted to teach for max. 64 hours per year. I benefited three years from such contracts, all at INSA Rouen, which has students from the first to fifth year (2y common cursus, 3y department).

### Numerical methods for Partial Differential Equations

4<sup>th</sup> year, dep. of Mathematics. Course and exercise sessions.

Jan. - May 2024 & 2025

### Differential equations

3<sup>rd</sup> year, dep. of Mathematics. Exercise sessions.

Jan. - May 2025

### Computer-assisted mathematics

2<sup>nd</sup> year, Common cursus. Course and exercise sessions.

April 2025

### Linear algebra

2<sup>nd</sup> year, Common cursus. Exercise sessions.

Jan. - May. 2024

### Numerical optimization

4<sup>th</sup> year, dep. of Mathematics. Exercise sessions.

Sept. - Dec. 2022

### Introduction to probability

2<sup>nd</sup> year, Common cursus. Exercise sessions.

Sept. - Dec. 2022

## Service for the community

### Co-organizer of the doctoral seminar

Joint seminar between the LMI and LMRS

<https://sites.google.com/view/atelier-des-doc-lmi-lmrs/accueil?authuser=1>

INSA Rouen/University of Rouen

July - Dec. 2023

### Member of the local organizing committee

Workshop Optimal control and Applications

UTFSM, Valparaíso

Dec. 2023

### Organizer of the doctoral seminar

Joint seminar ( $K\alpha f\epsilon m\iota n\alpha r\iota o$ ) 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

## Oral communications

In general the slides are available on <https://averil-aussedat.github.io/presentations>. I also participated regularly to various student seminars during my phd years, but almost never to present my own research.

### Who's who in $\mathcal{P}_2$ : Towards a characterization of the geometric tangent cone

Talk in the working group (GT) OT-EDP-ML

Orsay

May 2025

### Follow the distance: Viscosity solutions of monotone PDEs in some metric spaces

Talk in the SPOC seminar of the Institut the Mathématiques de Bourgogne

IMB

February 2025

### A relaxation theorem in CAT(0) spaces

Poster at the Italian-Japanese workshop on variational perspectives for PDEs

Pavia

September 2024

### Swirling measures: The quotient structure of the tangent cone to the Wasserstein space

Talk in the Journée de la Fédération Normandie Mathématiques

Rouen

July 2024

### Think horizontally: Control problems with possibly infinite cost in the Wasserstein space

Talk in the LMJL Seminar, Nantes

Nantes

April 2024

### Viscosity solutions in the Wasserstein space

Talk in the SMAI MODE Days

SMAI MODE 2024

March 2024

### $D_\mu$ vs $\langle \cdot, \cdot \rangle_\mu$ : Test functions versus semidifferentials in Wasserstein

Talk in the ANR COSS Meeting Days

ANR COSS Days

March 2024

### 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

WOpCoT

March 2023

### Using optimal transport to define viscosity solutions of control problems

Poster in Foundations of Computational Mathematics (FoCM)

FoCM 2023

June 2023

### A neural network Lagrangian scheme for HJB equations

Talk in the 11<sup>th</sup> French Biennial of Applied and Industrial Mathematics

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

LMI Seminar

April 2023

## Languages

### Human (besides native french)

○ English: fluent, spanish: minimal, italian: bad

### Computer

○ Julia, C++, Matlab,  $\text{\LaTeX}$ , Python if unavoidable

Completed on August 28, 2025.

