Lucas COEURET

Born on 20 September 1996, in Rouen (76), France

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	Research	*Teaching*
Adress:	IECL (Site de Nancy)	IUT Nancy-Charlemagne
	Campus, Boulevard des Aiguillettes, 54506 Vandoeuvre-lès-Nancy	2 ter Boulevard Charlemagne, 54000 Nancy
	Bureau 317	Bureau 114

Updated on 1 September 2025

Academic position

— 2025-Present *Assistant Professor (Maître de conférences stagiaire, Section CNU 26)*

University: Université de Lorraine
Research laboratory: Institut Elie Cartan de Lorraine (IECL), UMR CNRS 7502
Teaching unit: IUT Nancy-Charlemagne

— 2024-2025 *Postdoctoral researcher (Assegnista di ricerca)*

University: Università degli studi di Padova
Research laboratory: Dipartimento di Matematica Tullio Levi-Civita
Supervisors: Fabio Ancona, Roberta Bianchini, Laura Caravenna, Elio Marconi
Project: PRIN Project 2022 PNRR (No. 2022XJ9SX) entitled "Heterogeneity on the road - Modeling, analysis, control"

Academic background

— 2021-2024 *PhD in Applied Mathematics*

University: Université Toulouse 3 Paul Sabatier
Research laboratory: Institut de Mathématiques de Toulouse (IMT), UMR CNRS 5219
Advisors: Jean-François Coulombel and Grégory Faye
Title: Stability of discrete shock profiles for systems of conservation laws
Defense: 12 July 2024
Referees: Hermen Jan Hupkes, Pauline Lafitte
Jury: Claire Chainais-Hillairet *(President of the jury)*, Frédéric Rousset
Financing: "Contrat Doctoral Spécifique pour Normalien" of the ENS Paris-Saclay

— 2017-2021 *Élève normalien* at ENS Paris-Saclay, Cachan

- **2020-2021** M2 Mathématiques de la Modélisation at Sorbonne Université with highest honors
- **2020** Admitted 29th at the competitive exam of the Agrégation of Mathematics (option B scientific calculus)
- **2019-2020** M2FESup in Mathematics option B, ENS Paris-Saclay, preparation for the Agrégation of Mathematics with highest honors
- **2018-2019** M1 Hadamard, ENS Paris-Saclay (with courses at Université de Paris-Sud and École Polytechnique) with high honors
- **2017-2018** L3 in Mathematics from ENS Paris-Saclay in collaboration with Université Paris-Diderot with high honors
- **2017** Admitted to ENS Paris-Saclay (Competitive exam)

— 2014-2017 MPSI and MP* at Lycée Louis-le-Grand, Paris

— 2014 Scientific Baccalauréat (section Abibac) with highest honors at Lycée Gustave Flaubert, Rouen

Research interests

- Finite difference schemes for the transport equation: Stability, large-time behavior, boundary conditions, GKS theory
- Conservative finite difference schemes for hyperbolic systems of conservation laws: stability of discrete shock profiles via spatial dynamics technique and Green's function analysis
- Traffic flow models

List of (pre)publications

— Preprint

- L. Coeuret — **Nonlinear orbital stability of stationary discrete shock profiles for scalar conservation laws**
  (2024), Submitted, pp. 1-49

  HAL: https://hal.science/hal-04712769 arXiv: https://arxiv.org/abs/2409.18930

— Publications

- L. Coeuret — **Linear stability of discrete shock profiles for systems of conservation laws**
  Journal of Hyperbolic Differential Equations, *(2025)*, Vol. 22, No. 02, pp. 261-414

  Journal: https:///doi.org/10.1142/S0219891625500092 arXiv: https://arxiv.org/abs/2311.02507
  HAL: https://hal.science/hal-04270648

- L. Coeuret — **Local limit theorem for complex valued sequences**
  Asymptotic Analysis, *(2025)*, 142 (2), pp. 379-431

  DOI: https://doi.org/10.1177/09217134241308379 arXiv: https://arxiv.org/abs/2201.01514
  HAL: https://hal.science/hal-03463375

- L. Coeuret — **Tamed stability of finite difference schemes for the transport equation on the half-line**
  Mathematics of Computation, *(2024)*, Volume 93, Number 347, pp. 1097-1151

  DOI: https://doi.org/10.1090/mcom/3901 arXiv: https://arxiv.org/abs/2304.02612
  HAL: https://hal.science/hal-04059973

— Proceedings

- L. Coeuret — **Large time behavior of finite difference schemes for the transport equation**
  Hyperbolic Problems: Theory, Numerics, Applications. Volume II. HYP 2022. SEMA SIMAI Springer Series, Vol 35., *(2024)*, pp. 63-71

  DOI: https://doi.org/10.1007/978-3-031-55264-9_6 HAL: https://hal.science/hal-04191971

— Thesis

- **Stability of discrete shock profiles for systems of conservation laws**
  Defended on *12 July 2024*, at the Institut de Mathématiques de Toulouse, Université Toulouse III Paul Sabatier

  HAL: https://theses.hal.science/tel-04652121

Seminars, Conferences and Scientific Schools

— Talks at seminars

- **Séminaire EDP et Applications de l'Institut Élie Cartan de Lorraine**, 25 March 2025, Nancy (France)
- **Seminari Generali dell'IAC**, 8 October 2024, Rome (Italia)
- **Séminaire EMA**, 23 November 2023, Calais (France)
- **Séminaire d'Analyse Numérique de l'IRMAR**, 16 November 2023, Rennes (France)

— Participation to conferences with talk

- *(Upcoming)* **HyPNuT : Hyperbolic Prolems - Numerics and Theory**, 5-7 November 2025, Amiens (France)
  Presentation of a 40 minutes talk
- **Workshop: Traffico e Leggi di Conservazione**, 5 June 2025, Rome (Italy)
  Presentation of a 40 minutes talk
- **Conference on Mathematics of Wave Phenomena**, 24-28 February 2025, Karlsruhe (Germany)
  Presentation of a 25 minutes talk
- **13th Meeting on Nonlinear Evolution PDEs, Fluid Dynamics and Transport Equations**, 17-21 February 2025, Trieste (Italia)
  Participation to the poster session
- **Journées Jeunes EDPistes 2025**, 8-10 January 2025, Nice (France)
  Presentation of a 25 minutes talk
- **Equadiff 2024**, 10-14 June 2024, Karlstad (Sweden)
  Presentation of a 30 minutes talk
- **CANUM (Congrès d'Analyse Numérique) 2024**, 27-31 May 2024, Île de Ré (France)
  Presentation of a 30 minutes talk
- **Congrès des Jeunes Chercheurs en Mathématiques et Applications 2023**, 25-27 September 2023, Gif-sur-Yvette (France)
  Presentation of a 20 minutes talk
- **Numhyp23 : Numerical Methods for Hyperbolic Problems**, 26-30 June 2023, Bordeaux (France)
  Presentation of a 20 minutes talk
- **Workshop on spatial dynamics and related approaches**, 5-7 September 2022, Stuttgart (Germany)
  Participation to the poster session
- **HYP 2022: XVIII International Conference on Hyperbolic Problems: Theory, Numerics, and Applications**, 20-24 June 2022, Málaga (Spain)
  Presentation of a 20 minutes talk

— Participation to conferences without talk

- **Summer School on "Population Dynamics: From fundamental to applied science"**, 16-27 June 2025, Grasse (France)
- **Summer school in fluid dynamics and nonlinear PDEs**, 9-13 September 2024, Padova (Italia)

Teaching

Université Toulouse III - Paul Sabatier, Mathematics department

2021-2024 64HETD each year, *L1 and L2*,

— *Course:* Introduction to real analysis

— *Teaching assistant (TD):* Functions and Calculus 1, Introduction to real analysis, Numerical Methods

— *Practical sessions (TP):* Introduction to real analysis, Numerical Methods, Linear Algebra

Organizing responsabilities

- **02/2024 - 09/2024** Representative of the PhD Students and Postdoctoral Researchers on the Laboratory Council at the Institut de Mathématiques de Toulouse
- **09/2023 - 09/2024** Organizer of the PDE student seminar at the Institut de Mathématiques de Toulouse

Internships

- **2021 - April / July** Scientific traineeship at Institut de Mathématiques de Toulouse, Université Toulouse 3 Paul Sabatier under the guidance of Jean-François Coulombel and Grégory Faye (4 Months)
- **2019 - April / July** Scientific traineeship at Institut de Mathématiques de Toulouse, Université Toulouse 3 Paul Sabatier: Laurent Operators and Stability of Numerical Schemes, under the guidance of Jean-François Coulombel (4 Months)
- **2018** Scientific traineeship at CMLA, ENS Paris-Saclay: Theoretical and numerical study of an inequality in fluid mechanics with Yasinne El-Kaouni, under the guidance of Laure Quivy (3 Months)
- **2015 - July / August** Linguistic traineeship at Humboldt Universität, Berlin

Languages and Various Information

- German (Abitur with a note of 1.8, Level C1 certification of the Humboldt Universität, Level B2 certification of the Goethe Institut)
- English (Level C2 certification at the Cambridge Advanced Exam)
- Programming skills in Python and LaTeX