# Tony Salvi

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Curriculum Vitae

January 2026

## Personal information

Born in Vendée, France, in 1999, I have French citizenship. My mother tongue is French, I also speak English at a professional level and have some basis in German.

## Position

- 2025-2027: Postdoc in Institut de Mathématiques de Jussieu-Paris Rive Gauche mentored by Jacek Jendrej and funded by his ERC INSOLIT.

## Education

- 2022-2025: PhD in mathematics at Centre de Mathématiques Laurent Schwartz (École polytechnique) and Département de Mathématiques et applications (École Normale Supérieure) under the supervision of Cécile Huneau. The title of my thesis is "High-frequency limit for the Klein-Gordon-Maxwell equations." The defense took place on the 25th of September 2025, the jury was composed of:

  President: Kleber Carrapatoso, Professeur Monge at École polytechnique (CMLS)

  Referee: Rémi Carles, Directeur de recherche CNRS at Université de Rennes (IRMAR)

  Referee: Mahir Hadžić, Professor at University College London (Department of Mathematics)

  Examiner: Daniel Han-Kwan, Directeur de recherche CNRS at Université de Nantes (LMJL)

  Examiner: Zoe Wyatt, Assistant Professor at University of Cambridge (DPMMS)

  Examiner: Jacek Jendrej, Professor at Sorbonne Université (IMJ-PRG)

  Thesis supervisor: Cécile Huneau, Chargée de recherche CNRS at École normale supérieure (DMA).
- 2019-2022: Master in mathematics at Sorbonne Université, "Master Mathématiques et applications Parcours Mathématiques de la Modélisation"
- 2016-2019: Bachelor's degree in mathematics and computer science at Université de Nantes

## Research Interest

My research topic is the study of partial differential equations arising from physics, mainly relativistic ones. More precisely, I am interested in understanding complex phenomena and deriving effective dynamics at the limit between different scales of description and different physical paradigms, such as quantum, classical, and relativistic physics.

In my thesis, I looked at the behavior of high-frequency solutions to wave-type equations, such as the Klein-Gordon or Klein-Gordon-Maxwell equations. In the case where the high-frequency limit is also a semiclassical limit, one typically recovers relativistic fluid and kinetic equations as a limit system, e.g., the relativistic Euler equation, the relativistic Euler-Maxwell equations or the relativistic Vlasov-Maxwell equations. For this reason, the study of relativistic fluid and kinetic equations is also of great interest to me. The main tools I used for

these works were semi-classical analysis, WKB analysis, and the modulated energy method. Overall, I like to adapt classical methods to the relativistic setting.

## Articles and preprints

3. **Semi-classical limit of the massive Klein-Gordon-Maxwell system toward the relativistic Euler-Maxwell system via an adapted modulated energy method**, Published in Annales Henri Poincaré 10.1007/s00023-025-01640-5 in November 2025, arXiv:2502.06622
2. **Semi-classical limit for Klein-Gordon equation toward relativistic Euler equations via an adapted modulated energy method**, preprint arXiv:2407.08066, to be published in Asymptotic Analysis
1. **Multi-phase high frequency solutions to Klein-Gordon-Maxwell equations in Lorenz gauge in (3+1) Minkowski spacetime**, Preprint Jully 2024, arXiv:2407.03554, Submitted

## Teaching

- 2022-2025: Tutorial assistant for the course MAA105 "Integral and Differential Calculus" in the Bachelor of Science at École polytechnique (taught in English).
- 2023-2024: Mentor in charge of the reinforcement class for the course MAT361 "Introduction à l'analyse réelle" in the "Cycle Ingénieur polytechnicien" at École polytechnique (taught in French).

## Conferences and seminars

Here is the list of talks I gave:

- February 2026: Seminar PM-EDP (Mathematical physics and PDE) in LAGA at Université Paris 13
- January 2026: Conference talk at Journées des Jeunes EDPistes en France at Université Paris Dauphine-PSL
- November 2025: PDE Seminar in Institut de Mathématiques de Bordeaux at Université de Bordeaux
- November 2025: Analysis Seminar in Laboratoire de Mathématiques Jean Leray at Université de Nantes
- July 2025: Seminar on Mathematical General Relativity at Laboratoire Jacques-Louis Lions
- March 2025: PhD students' Colloquium, at Département de Mathématiques et Applications in École normale supérieure
- February 2025: PhD students' Seminar in Analysis at Laboratoire de mathématiques d'Orsay in Orsay
- January 2025: Probability, Mathematical Physics, and Analysis Seminar at LAREMA in Angers
- January 2025: PDE Seminar at IRMAR in Rennes
- December 2024: Reading group on general relativity at Laboratoire Jacques-Louis Lions
- November 2024: PDE Seminar at the Department of Mathematics and Applied Mathematics at the University of Crete
- June 2024: Journée des doctorants du CMLS at École polytechnique
- April 2023: Reading group on general relativity at École polytechnique and Laboratoire Jacques-Louis Lions

Here is a list of some conferences I attended:

- January 2026: Journées des Jeunes EDPistes en France at Université Paris Dauphine-PSL
- June 2025: LICHNEROWICZ CONFERENCE — Journées Relativistes at Institut Henri Poincaré
- May 2025: Journées CY Analyse non linéaire 2025 at CY Advanced Studies

- September 2024: Aspects of cosmology, mathematics and physics at École polytechnique
- June 2024: Nonlinear Waves and Fluids at University College London
- May 2024: Turbulent·e·s Conference, at École polytechnique
- May 2024 Semiclapp: Semiclassical analysis and applications at Université Côte d'Azur
- April 2024: Curved spacetimes, field theory and beyond at Institut Henri Poincaré
- December 2023: SALVE Winter School in École normale supérieure
- June 2023: New Trends in Mathematical Fluid Dynamics, Université Grenoble Alpes
- January 2023: Conférence itinérante du GDR Analyse des équations aux dérivées partielles at Université de Nantes
- March 2022: Aspects of Gravity Mathematics and Physics at École polytechnique
- February 2022: Conférence itinérante du GDR Analyse des équations aux dérivées partielles in Vannes '

I also often go to the Laurent Schwartz Seminar at École polytechnique and Institut des Hautes Études Scientifiques, as well as to the Seminar on Mathematical General Relativity at Laboratoire Jacques-Louis Lions.

## Miscellaneous

From the Junior Scientific Visibility program of the Fondation Mathématique Jacques Hadamard I received a grant to spend the month of November 2024 in Heraklion to learn more about relativistic fluids.