

Curriculum Vitae

Arthur Touati

Last update: October 24th 2025

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Personal information

- *Nationality* French,
- *Birth* August 1995 in Bordeaux, France,
- *Address* Institut de Mathématiques de Bordeaux, Bureau 153
351 cours de la Libération, 33400 Talence, France,
- *Mail* arthur.touati@math.u-bordeaux.fr,
- *Website* arthurtouati.fr,
- *Languages* French (mothertongue), English (professional), German (B1 level).

Employment and education

- *2025-?* **Chargé de recherche CNRS** at IMB (Université de Bordeaux).
- *2022-2024* **Postdoc** Huawei Young Talents Program at IHES.
- *2019-2022* **PhD** at CMLS (Ecole Polytechnique):
 - Advisor: Cécile Huneau,
 - Title: Construction of high-frequency spacetimes,

- Defended on October 6th 2022,
- Referees: Lars Andersson and David Lannes,
- Jury: Lars Andersson, Cécile Huneau, David Lannes, Frédéric Rousset, Jacques Smulevici and Jérémie Szeftel,
- **2017-2019 Master in mathematics** at Université Paris-Sud,
- **2016-2017 Licence in mathematics** at Université Paris-Sud,
- **2015-2016 Licence in physics** at Université Paris-Sud,
- **2015-2019** Student in physics and mathematics at **Ecole Normale Supérieure**, Paris,
- **2013-2015** Student in *Classes préparatoires PCSI-PC** at Lycée Louis-le-Grand.

Articles & preprints

In reverse chronological order taking into account the first release on the arXiv.

8. **Wave turbulence for a semilinear Klein-Gordon system**
(with Anne-Sophie de Suzzoni & Annalaura Stingo)
Preprint arXiv:2503.24222.
7. **Spacelike initial data for black hole stability**
(with Allen Juntao Fang & Jérémie Szeftel)
Preprint arXiv:2405.02071, accepted in *Communications in Mathematical Physics*.
6. **The reverse Burnett conjecture for null dusts**
Preprint arXiv:2402.17530, accepted in *Annals of PDE*.
5. **Initial data for Minkowski stability with arbitrary decay**
(with Allen Juntao Fang & Jérémie Szeftel)
Advances in Theoretical Mathematical Physics, 29(4):933-1043, 2025.
4. **High-frequency solutions to the constraint equations**
Communications in Mathematical Physics, 402(1):97-140, 2023.
3. **Geometric optics approximation for the Einstein vacuum equations**
Communications in Mathematical Physics, 402(3):3109-3200, 2023.
2. **Global existence of high-frequency solutions to a semi-linear wave equation with a null structure**
Asymptotic Analysis, 131(3-4):541–582, 2023.
1. **Einstein vacuum equations with $U(1)$ symmetry in an elliptic gauge: local well-posedness and blow-up criterium**
Journal of Hyperbolic Differential Equations, 19(04):635–715, 2022.

Articles 2, 3 and 4 above compose my PhD thesis.

Proceedings & surveys

2. **Burnett’s conjecture in general relativity**
Recent advances in general relativity: an issue in memory of Yvonne Choquet-Bruhat, Comptes Rendus Mécanique, Volume 353, pp 455-476, 2025.
1. **Geometric optics approximation for the Einstein vacuum equations**
Séminaire Laurent Schwartz — EDP et applications, Exposé no. 7, 12 p., 2022-2023.

Scientific talks

- *2026*
 - **Conference Turbulent Days**, Imperial College London,
 - **Séminaire d'analyse**, Institut de Mathématiques de Toulouse.
- *2025*
 - **Séminaire de Géométrie**, IMB Bordeaux,
 - **Groupe de travail EDP non-linéaires**, organised by David Lannes at IMB,
 - **Groupe de travail Ondes et Aléas**, organised by Francis Nier at IHP,
 - **Séminaire de l'équipe EDP Analyse Numérique**, Université Côte d'Azur Nice,
 - **Seminar on Mathematical General Relativity**, LJLL Sorbonne Université.
- *2024*
 - **Conference Singularity formation for nonlinear PDEs**, Cambridge University,
 - **Mathematical GR and Hyperbolic PDE Seminar**, Columbia University,
 - **Séminaire de Géométrie**, LMPT Tours,
 - **Vienna Relativity Seminar**, University of Vienna,
 - **Seminar of Differential Equations and Numerical Analysis**, University of Crete,
 - **Séminaire de l'équipe Analyse Numérique-EDP**, LMO Orsay,
 - **Séminaire Mathématique-Physique**, IMB Dijon,
 - **Séminaire d'analyse**, LMJL Nantes.
- *2023*
 - **Séminaire de Physique Mathématique EDP**, IMB Bordeaux,
 - **Greater Paris Postdocs in Mathematics Welcome Day**, IHES,
 - **Evolution Equations Workshop**, IHES,
 - **Séminaire Analyse & EDP**, CY AGM,
 - **Journée des Jeunes EDPistes**, Tours,
 - **Gravity Initiative Seminar**, Princeton University,
 - **Séminaire du laboratoire**, LMR Reims,
 - **London PDE Seminar**, Imperial-UCL-Queen Mary London,
 - **Séminaire de physique mathématique**, Institut Fourier Grenoble,
 - **Groupe de lecture en relativité générale**, LJLL Sorbonne Université.
- *2022*
 - **Séminaire Laurent Schwartz**, CMLS-IHES,
 - **Séminaire EDP**, IRMAR Université Rennes 1,
 - **Mathematical GR and Hyperbolic PDE Seminar**, Columbia University,
 - **Topics in general relativity**, WWU Münster,
 - **HADES Seminar**, Berkeley University,
 - **Analysis & PDE Seminar**, Stanford University,
 - **Séminaire EDP et Physique mathématique**, LAGA Université Sorbonne Paris Nord.
- *2021*

- **Vienna Relativity Seminar**, University of Vienna,
- **Seminar on Mathematical General Relativity**, LJLL Sorbonne Université,
- **Séminaire des doctorants du CMAP et du CMLS**, Ecole Polytechnique, “How to solve Einstein’s equations?”,
- **Groupe de travail en analyse**, CMLS Ecole Polytechnique.
- *2020* **Groupe de lecture en relativité générale**, LJLL Sorbonne Université,
- *2019* **Séminaire des doctorants ANH et ANEDP**, LMO Orsay.

Organization

- *2026* **Conférence MARGAUx : EDP et Analyse Numérique en Nouvelle-Aquitaine**, Conference at IMB from March 30th to April 1st 2026 (co-organised with Ludovic Godard-Cadillac and Victor Arnaiz Solorzano),
- *2025-?* **Groupe de travail EDP Non-linéaires**, IMB Université de Bordeaux.
- *2025* **Conference on Harmonic Analysis and Turbulence**, Conference at IMB on April 14th to 16th (co-organised with Aingeru Fernández Bertolin, Francesco Fanelli, David Lannes and Luis Vega),
- *2024* **Conférence Turbulent·e·s**, Conference at Ecole Polytechnique on May 23rd & 24th (co-organised with Anne-Sophie de Suzzoni, Guillaume Dubach and Annalaura Stingo),
- *2022-2024* **Groupe de lecture en relativité générale**, LJLL Sorbonne Université.

Teaching

- *2024-2025* Lecturer of MAT568 **Wave equations and general relativity** for the third year engineers students of Ecole Polytechnique with Anne-Sophie de Suzzoni,
- *2022-2023* Lecturer (in English) of MAA310 **Measure and Integration (Condensed)** for the third year of the Bachelor of Science of Ecole Polytechnique,
- *2019-2022* Tutorials (in English) for the Bachelor of Science of Ecole Polytechnique MAA202 **Topology and multivariable calculus**,
- *2015-2019* Oral interrogations in mathematics in **Classes Préparatoires aux Grandes Ecoles** in Lycées Louis-le-Grand and Henri IV.

Supervision

- *2022-2023* PSC (Projet Scientifique Collectif), four second year Polytechnique students working on the Gregory-Laflamme instability,
- *2022 (Mai to June)* Antoine Peyronnet, L3 internship from ENS Rennes, on approximate solutions of the Einstein-Maxwell system.

Other activities

- *2026* **Yvonne Choquet-Bruhat, une mathématicienne dans l’univers d’Einstein**, talk for the general public given for a day in honor of Yvonne Choquet-Bruhat at Académie des Sciences,
- *2025-2026* **Concours d’éloquence en mathématiques**, project between maths and theater at Lycées Gustave Eiffel and Vaclav Havel in Bordeaux,

- *2022-2023* Member of the press review writing team for the website **Images des mathématiques**,
- *2022* "Trous noirs : sont-ils stables ?", short popular piece on **Polytechnique Insights website**,
- *2021* "Ecrire un livre de vulgarisation scientifique pendant sa thèse", interview on **IP-Paris website**,
- *2021* Guest of **La Conversation Scientifique** on France Culture hosted by Etienne Klein (June 26th 2021),
- *2021* Writing and publication (First Editions) of **Voyage au coeur de l'espace-temps**, a popularization book on relativity,
- *2018-2020* **Animath**, organization of week-ends for high-school girls around mathematics and coaching of several teams for french tournaments,
- *2017* **Savoir Pour Tous** (presentation for high-school student available on Youtube), "Vers l'infini et au-delà..."