

Jérémie Szeftel

Curriculum Vitae

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1 Research interests

Current interests Nonlinear partial differential equations, general relativity, asymptotic stability, finite time blow-up phenomenon.

Past interests Domain decomposition methods, long-time existence problems, absorbing boundary conditions, pseudo differential and paradifferential calculus, propagation and reflection of singularities.

2 Honors and awards

Plenary speaker at the ICMP, Geneva, 2021.

PI of the ERC consolidator grant EPGR 2017-2022.

Alexandre Joannides prize of the french academy of sciences 2014.

Invited speaker at the ICM, Seoul, 2014.

Prize of the Fondation Sciences Mathématiques de Paris 2009-2010.

Cours Peccot of the Collège de France 2006-2007.

3 Academic employment

10/2013-present Senior CNRS researcher (promoted to first class on 10/2018)
Laboratoire Jacques-Louis Lions, Sorbonne Université.

9/2010-8/2019 Adjunct professor
Ecole Polytechnique.

9/2009-9/2013 Junior CNRS researcher
Department of mathematics, Ecole Normale Supérieure.

10/2004-8/2009 Junior CNRS researcher
Institut de Mathématiques de Bordeaux, Université Bordeaux 1,
on leave at Princeton University.

9/2004-6/2009 Instructor and then Visiting Assistant Professor
Department of Mathematics, Princeton University.

4 Education

Habilitation Université Paris 13, 2012.

Ph.D. Université Paris 13, 2004. Under the guidance of Laurence Halpern.

5 Oral communications

INVITED LECTURES IN INTERNATIONAL CONFERENCES

- 12/2022 Conference MathFlows at CIRM, Marseille (France).
- 10/2022 Tunisian-French PDE Conference, Hammamet (Tunisia).
- 9/2022 Clay Mathematics Institute workshop on "Stability and Instability in General Relativity", Mathematical Institute of the University of Oxford (England).
- 7/2022 AMS-SMF-EMS Joint International Meeting, Université Grenoble Alpes (France).
- 6/2022 Workshop "Nonlinear Waves and Dispersive Equations", Mathematisches Forschungsinstitut, Oberwolfach (Germany).
- 2/2022 Workshop "Mathematical perspectives of gravitation beyond the vacuum regime", Erwin Schrödinger Institute, Vienna (Austria).
- 8/2021 Plenary lecture at the 20th International Congress on Mathematical Physics at Geneva (Switzerland).
- 2/2021 Workshop "Mathematical perspectives of gravitation beyond the vacuum regime", Erwin Schrödinger Institute (by visio), Vienna (Austria).
- 6/2019 Conference "Dispersive Waves and related topics" at Bergen (Norway).
- 5/2019 Conference "Nonlinear effects in PDEs and related problems" at Ecole Polytechnique, Palaiseau (France).
- 3/2019 Conference "Les 60 ans de Jean-Yves Chemin" at Institut Henri Poincaré, Paris (France).
- 5/2018 Conference "Mathematical General Relativity" at Institut Henri Poincaré, Paris (France).

- 12/2017 “International Conference on Nonlinear Waves and General Relativity” at the Chinese University of Hong Kong, Hong Kong (China).
- 10/2017 Workshop “Propagation of Singularities in Dispersive PDEs” at the Wolfgang Pauli Institute, Vienna (Austria).
- 8/2017 Workshop “Advances in General Relativity” at the Erwin Schrödinger Institute, Vienna (Austria).
- 6/2017 Conference “Equations hyperboliques et physique mathématique” in honor of Alain Bachelot, Bordeaux (France).
- 6/2016 “Journées Equations aux Dérivées Partielles” at Roscoff (France).
- 3/2016 “Conference on singularity formation and long-time behavior in dispersive PDEs” at the Mathematical Institute of the University of Bonn (Germany).
- 1/2016 “Conference on Analysis, Partial Differential Equations, and Geometry” celebrating the 65th birthday of Sergiu Klainerman, Princeton University, Princeton (USA).
- 11/2015 “Conference for the 100th Anniversary of General Relativity”, Institut Henry Poincaré, Paris (France).
- 10/2015 “Workshop on Geometric Hyperbolic PDE” at Imperial College, London (UK).
- 07/2015 Workshop “Mathematical aspects of general relativity”, Mathematisches Forschungsinstitut, Oberwolfach (Germany).
- 02/2015 “Dynamics and PDE’s”, Saint-Etienne de Tinée (France).
- 01/2015 “Journées de Mathématiques Appliquées” in honor of Laurence Halpern, Institut Henry Poincaré, Paris (France).
- 10/2014 “Workshop on Dispersive equations with nonlocal dispersion”, Wolfgang Pauli Institute, Vienna (Austria).
- 08/2014 “International Congress of Mathematicians”, Seoul (South Korea).
- 07/2014 “HYP2014” at IMPA, Rio (Brazil).
- 07/2014 “Workshop on Asymptotic Analysis in General relativity” at the Institut Fourier, Grenoble (France).

- 01/2014 “Workshop on Nonlinear Wave Equations and General Relativity” at Oxford university, Oxford (UK).
- 11/2013 “Workshop on Initial Data and Evolution Problems in General Relativity” at MSRI, Berkeley (USA).
- 7/2013 “20th International Conference on GR and Gravitation” at Warsow (Poland).
- 5/2013 Conference “Harmonic Analysis, PDEs and Geometry” at ICMAT, Madrid (Spain).
- 9/2012 Conference “Evolution equations of physics, fluids, and geometry: asymptotics and singularities” at Banff International Research Station, Banff (Canada).
- 7/2012 Conference “Nonlinear Hamiltonian PDEs” at Ascona (Switzerland).
- 7/2011 Conference “Asymptotic dynamics driven by solitons and travelling fronts in nonlinear PDE” at the University of Chile, Santiago (Chile).
- 2/2011 Conference “Nonlinear Wave and Dispersive Equations” at Kyoto University, Kyoto (Japan).
- 9/2010 Conference “Nonlinear waves and dispersive equations” at Mathematisches Forschungsinstitut, Oberwolfach (Germany).
- 6/2010 Conference “Equations d’évolutions non-linéaires dispersives” at CIRM, Marseille (France).
- 2/2010 Conference “Linear and nonlinear hyperbolic equations” at Centro Ennio de Giorgi, Pisa (Italy).
- 11/2009 Conference “Mathematical methods in general relativity and quantum fields theories” at Paris 6-Paris 7, Paris (France).
- 6/2009 Conference “Nonlinear waves and dispersion” at the center Emilie Borel, Paris (France).
- 1/2009 “Carolina meeting on Harmonic analysis and PDE” at Chapel Hill (USA).
- 6/2008 Conference “Hyperbolic Equations in General Relativity” at Bordeaux (France).
- 6/2008 Conference “Analyse des Equations aux Dérivées Partielles” at Evian (France).
- 7/2007 “6th International Congress on Industrial and Applied Mathematics” at Zurich (Switzerland).

- 7/2006 “17th International Conference on Domain Decomposition Methods” at Strobl (Austria).
- 8/2005 “Introductory Workshop in Nonlinear Dispersive Equations” at MSRI, Berkeley (USA).
- 6/2005 Conference “Analyse des Equations aux Dérivées Partielles” at Forges-Les-Eaux (France).
- 6/2002 Conference CANUM 2002 at Anglet (France).

INVITED LECTURES IN SEMINARS ABROAD

- 2022 Michigan State University (East Lansing, USA), University of Science and Technology (China)
- 2021 One World PDE seminar (Bath and Heriott-Watt, UK), Gravitational physics seminar (Vienna, Austria)
- 2020 Department Colloquium of the University of Vienna (Vienna, Austria), UC Berkeley (Berkeley, USA), University of Kentucky (Lexington, USA)
- 2019 Department Colloquium of Princeton University (Princeton, USA), Columbia University (New York, USA), Institut Mittag-Leffler (Djursholm, Sweden)
- 2018 Princeton University (Princeton, USA), ISCTE (Lisbon, Portugal), Discussion group in PDE’s at the Simons center (New York, USA)
- 2017 Department Colloquium of Columbia University (New York, USA), New York Relativity seminar (Columbia-CUNY-SUNY), EPFL (Lausanne)
- 2015 ETH analysis seminar (Zurich, Switzerland)
- 2014 Basel-Fribourg-Zurich seminar in analysis (Basel, Switzerland)
- 2013 Imperial College (London, UK), Princeton University (Princeton, USA)
- 2012 Department Colloquium of Princeton University (Princeton, USA), MIT (Cambridge, USA), Courant Institute (New York, USA), Columbia University (New York, USA)
- 2010 University of Cambridge (Cambridge, UK)
- 2009 Courant Institute of Mathematical Sciences (New York, USA)

- 2008 Brown University, (Providence, USA)
- 2007 Toronto University (Toronto, Canada)
- 2006 Oberseminar für Numerische Mathematik (Berlin, Allemagne)
- 2004 Princeton University (Princeton, USA)

INVITED LECTURES IN SEMINARS IN FRANCE

- 2022 Paris 11, Paris 13, Darboux seminar of the Laboratoire de Physique Théorique et Hautes Energies
- 2021 Seminar X-IHES
- 2020 Analysis seminar of ENS-Paris 6-Paris 7
- 2019 Cergy, Groupe de lecture en relativité générale du LJLL, Video seminar Paris 13-Berkeley-Bonn-Zurich
- 2017 Journée EDP non linéaires at Paris 13
- 2016 Institut d'Astrophysique de Paris
- 2014 Nantes, Paris 7, Seminar XEDP at IHES-Ecole Polytechnique, Paris 13, Bordeaux, London-Paris Analysis seminar
- 2013 Nice, Cergy, Seminar of the laboratoire Jacques-Louis Lions at Paris 6, Paris 7, Toulouse, Seminar on gravitation of IHES
- 2012 Marseilles, Paris 6, Bordeaux
- 2011 Inria Rocquencourt, Ecole Normale Supérieure, Paris 6, Paris 11, analysis seminar of ENS-Paris 6-Paris 7
- 2010 Video seminar Paris 13-Berkeley-Bonn, Ecole Normale Supérieure de Lyon, Seminar of the laboratoire Jacques-Louis Lions at Paris 6, Rennes 1
- 2009 Paris 11, Amiens, Ecole Normale Supérieure, Seminar XEDP at Ecole Polytechnique, analysis seminar of ENS-Paris 6-Paris 7
- 2007 Paris 7
- 2005 Bordeaux 1
- 2004 Seminar XEDP at Ecole Polytechnique, Grenoble, Marseille, Rennes, Paris 11

- 2003 Paris 13, Toulouse, Paris 11
- 2002 Ecole Normale Supérieure de Lyon, Paris 13

6 Teaching experience

GRADUATE COURSES

- 06/2016 Mini course at “Journées Equations aux Dérivées Partielles” (6 hours)
Roscoff.
- 06/2014 Mini course at the summer school of the Institut Fourier ”Asymptotic
Analysis in General Relativity” (8 hours)
Institut Fourier.
- 01/2014 Mini course at the “Workshop on Nonlinear Wave Equations and Gen-
eral Relativity” (4 hours)
Oxford university.
- 3/2010-5/2010 Distinguished lecture series of the Foundation Sciences Mathématiques
de Paris (20 hours)
Fondation Sciences Mathématiques de Paris.
- 6/2007 Peccot course (8 hours)
Collège de France.

MASTER LEVEL COURSES

- 2010-2019 Since 2012, in charge of the general relativity course MAT568 for third
year students (77 hours per year)
Ecole Polytechnique.
- 2018 Course in the Master program of UPMC (24 hours)
Université Pierre et Marie Curie.
- 2014 Mini course on ”The stability of solitary waves” for second year students
(8 hours)
Ecole Normale Supérieure.
- 2013 Mini course ”The stability of solitary waves” for second year students
(8 hours)
Ecole Normale Supérieure.

UNDERGRADUATE LEVEL COURSES

- 9/2004-6/2009 Multivariable calculus for economists (MAT200), linear algebra (MAT202)
Princeton University.
- 2001-2004 Graduate assistant, 1st year of mathematics cursus
Universite Paris 13.

7 Mentoring activities

POST-DOCTORAL STUDENTS

- 9/2022-present Arthur Touati.
- 9/2018-8/2022 Siyuan Ma. Siyuan is Junior Scientist at the Albert Einstein Institute
of Potsdam since 9/2022.
- 9/2015-12/2018 Volker Schlue. Volker is Lecturer at the university of Melbourne since
1/2019.

PHD STUDENTS

- 9/2020-present PhD of Dawei Shen on stability problems in general relativity.
- 9/2018-8/2022 PhD of Allen Fang on stability problems in general relativity. Allen
is a postdoc at Princeton University since 9/2022.
- 1/2016-10/2020 PhD of Olivier Graf on the Cauchy problem in general relativity.
Olivier is Maître de Conférence at Université Grenoble Alpes since
9/2022.
- 2/2014-7/2017 PhD of Stefan Czimek on the Cauchy problem in general relativity.
Stefan is Professor at Leipzig University since 9/2022.
- 9/2010-12/2014 PhD of Cécile Huneau on the Einstein equations with a translation
symmetry. Cécile is a junior CNRS researcher since 2/2016 at CMLS
(Ecole Polytechnique) since 9/2017.

MASTER STUDENTS

- 1/2020-6/2020 Master thesis of Dawei Shen on stability problems in general relativity.

- 2017-2018 Tutor of Fatima Jabiri, student of the PGSM program of the Fondation Sciences Mathématiques de Paris.
- 3/2015-8/2015 First year of master of Caterina Valcu on the wave equation on Kerr.
- 9/2014-6/2015 Master thesis of Laurent Côté on the constraints equations in general relativity.
- 1/2010-8/2010 Master thesis of Cécile Huneau on general relativity.

UNDERGRADUATE STUDENTS

- 2012-2019 Mentoring of several students of the Ecole Polytechnique per year on small projects related to general relativity.
- 2012 First year internship of Benoît Cadorel at Ecole Normale Supérieure.
- 2011 Second year internship of Frédéric Machbach at Ecole Normale Supérieure.
- 9/2009-8/2013 Counseling of several students per year on their cursus at the Ecole Normale Supérieure.

8 Service

RESEARCH GRANTS

- PI of the ERC consolidator grant EPGR 725589, 2017-2022.
- PI of the NSF Grant DMS-0504720, 2005-2008.
- Member of ERC consolidator grant SingWave (PI Pierre Raphaël, 2015-2020), of ERC advanced grant BlowDiSol (PI Frank Merle, 2012-2017), of ANR SWAP (PI Pierre Raphaël, 2009-2014), of ANR MicroWave (PI Xavier Antoine, 2009-2012), and of ANR SHPCO2 (PI Michel Antony, 2008-2011).

THESIS REFEREE

- Referee on the PhD thesis of Bruno Premoselli (2014).
- Referee on the PhD thesis of Martin Taylor (2015).
- Referee on the habilitation thesis of Jacques Smulevici (2017).

- Referee on the PhD thesis of Siyuan Ma (2018).
- Referee on the PhD thesis of Léo Bigorgne (2019).
- Referee on the PhD thesis of Nicolas Besset (2019).

MEMBER OF PHD AND HABILITATION COMMITTEES

- Head of the PhD committee of Fatima Ezzahra Jabiri (Sorbonne Université, 10/2021).
- Member of the habilitation committee of Jacek Jendrej (Université Paris 13, 03/2021).
- Member of the habilitation committee of Jérémie Joudioux (Université de Grenoble, 12/2019).
- Member of the PhD committee of Nicolas Besset (Université de Grenoble, 12/2019).
- Member of the PhD committee of Léo Bigorgne (Paris Sud, 6/2019).
- Member of the habilitation committee of Michal Wrochna (Université de Grenoble, 12/2018).
- Member of the habilitation committee of Jacques Smulevici (Paris Sud, 11/2017).
- Member of the PhD committee of Martin Taylor (University of Cambridge, 12/2015).
- Member of the PhD committee of Van Thien Nguyen (Paris Nord, 12/2014).
- Member of the PhD committee of Bruno Premoselli (Cergy Pontoise, 12/2014).
- Member of the PhD committee of Yue Ma (Paris 6, 12/2014).
- Member of the PhD committee of Sari Ghanem (Paris 7, 11/2014).
- Member of the PhD committee of David Parlongue (Paris Nord, 11/2012).
- Member of the PhD committee of Pauline Klein (Nancy, 11/2010).

MEMBER OF HIRING COMMITTEES

- Member of the hiring committee of the Chair of Excellence CNRS/Université de Cergy-Pontoise (2010).
- Member of the hiring committee of the Chair of Excellence CNRS/Ecole of the Mines de Nancy (2011).

- Member of the hiring committee at the level of Assistant Professor (Maitre de Conférence) of Insa Toulouse (2011).
- Member of the hiring committee at the level of Assistant Professor (Maitre de Conférence) of Université Paris 11 (2012).
- Member of the hiring committee at the level of Professor of Université Montpellier 2 (2014).
- Member of the hiring committee for Hadamard lecturers and adjunct professors of Ecole Polytechnique (2016, 2017).
- Member of the hiring committee at the level of Professor of Université Pierre et Marie Curie (2017).
- Head of the hiring committee at the level of Professor of Université Pierre et Marie Curie (2018).
- Member of the hiring committee at the level of Professor of Université de Bordeaux (2018).
- Member of the hiring committee at the level of Professor of Université Paris Diderot (2021).
- Member of the hiring committee of the Chair of junior professor at Rennes (2022).

EDITORIAL ACTIVITIES

2016-2021 Member of the editorial board of the Annales Scientifiques de l'Ecole Normale Supérieure.

POPULARIZATION OF SCIENCE

- Talk for high school students as part of the program Science Académie (4/2010).
- Talk at the Cité des Sciences in Paris (4/2012).
- Interview “Un critère pour prévoir l’apparition de singularités dans l’espace-temps” for the french newspaper La Recherche (6/2012).
- Talk at Télécom Paris Tech (1/2013).
- Article “Une conjecture sur les solutions des équations d’Einstein a été démontrée” in the french newspaper Pour La Science (11/2015).

- Discussions on the topic “Conceive the unconceivable: infinity, quantum physics and other counter-intuitive notions” at l’Université Pierre et Marie Curie as part of a Science Festival (10/2016).

ORGANIZATION OF SEMINARS AND CONFERENCES

- Analysis seminar organizer, Princeton university, 2006-2008.
- Co-organizer (with Sergiu Klainerman and Philippe LeFloch) of the conference “Non-linear Wave Equations” at the Institut Henry Poincaré (5/2013).
- Co-organizer (with Philippe LeFloch and Ghani Zeghib) of the general relativity seminar, Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, 2014-2016.
- Co-organizer (with Filipa Caetano, Martin Gander, Florence Hubert, Stephane Labbé, Olivier Lafitte, Véronique Martin, Juliette Ryan and Kevin Santugini) of the a conference in honor of Laurence Halpern at the Institut Henry Poincaré (1/2015).
- Co-organizer (with Sergiu Klainerman) of the mini symposium “Mathematical problems of general relativity” at the conference Equadiff 2015 at Lyon (7/2015).
- Co-organizer (with Yvan Martel, Frank Merle, Fabrice Planchon and Pierre Raphaël) of a special trimester on “Nonlinear dispersive equations” at the Institut des Hautes Etudes Scientifiques (5/2016-7/2016).
- Co-organizer (with Philippe LeFloch and Jacques Smulevici) of the general relativity seminar, Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, 2016-present.
- Co-organizer (with Philippe LeFloch and Jacques Smulevici) of the conference “Mathematical General Relativity” at the Institut Henri Poincaré (5/2018).

OTHERS

- Member of the HCERES committee for the mathematics department of Reims (2022).
- Member of the scientific advisory board of the mathematics UFR of Sorbonne Université (2022–present).
- Member of the mathematics section of the national committee of CNRS (2020-present).
- Member of the committee on parity at the LJLL (2019-2021).
- Head of the committee in charge of short term invitations to the LJLL (2017-present).

- In charge of the Analysis of PDEs part of the report given to the evaluation committee of the LJLL by the HCERES (2017).
- Member of the committee of following up of PhD students of Paris 13 (2017-2018).
- Member of the jury for the rehearsal of ERC Consolidator interviews organized by INSMI (9/2017) and by Sorbonne Université (9/2018, 9/2019).
- Grant proposal reviewing for the NSERC (2017).
- Grant proposal reviewing for the ERC (2016).
- Grant proposal reviewing for the Agence Nationale de la Recherche (2014).
- Grant proposal reviewing for the Austrian Science Fund (2012).
- Steering committee, mathematics department of the Ecole Normale Supérieure (2012-2013).