

# Alexandre Jollivet

## Curriculum Vitæ

<b>Date of birth</b>	November 20th, 1981
<b>Citizenship</b>	France
<b>Title</b>	Ph.D.
<b>Current position</b>	Research Position for CNRS (CRCN), Laboratoire de Mathématiques Paul Painlevé, CNRS & University of Lille, France.
<b>Professional address</b>	Laboratoire de Mathématiques Paul Painlevé, Université de Lille 1, Cité scientifique, 59 655 Villeneuve d'Ascq Cédex, France
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## Education

- 2004-2007** - PH.D. THESIS IN MATHEMATICS, University of Nantes.  
Title : *Inverse problems for the multidimensional  
Newton-Einstein equation.*  
Ph.D. Thesis Supervisor : Roman G. Novikov.  
Ph.D. Thesis Defence : July 6, 2007. The jury was composed of

Mr Didier Robert	President	Nantes
Mr Mikhail I. Belishev	Referee	St.-Petersbourg
Mr Piotr G. Grinevich	Referee	Moscou
Mr Vesselin Petkov	Examiner	Bordeaux
Mr Xue-Ping Wang	Examiner	Nantes
Mr Dimitri Yafaev	Examiner	Rennes
Mr Roman G. Novikov	Ph.D. Advisor	Nantes

- 2003-2004** - DEA MATHEMATICS AND APPLICATIONS (mention TB), University of Nantes, France.  
- AGRÉGATION EXTERNE (national contest for french high school teachers recruitment) in Mathematics (option : scientific calculus), ranked 42/321.

## Positions

- 2013-** Research Position for CNRS, Laboratoire de Mathématiques Paul Painlevé, University of Lille, France.
- 2009-2013** Research Position for CNRS, Laboratoire de Physique Théorique et Modélisation, University of Cergy-Pontoise, France.
- 2007-2009** Postdoc Research Scientist, Department of Applied Physics & Applied Mathematics, University of Columbia in the City of New York, USA.
- 2004-2007** Ph.D. Student, University of Nantes.

## Research area

Inverse problems, PDE, Mathematical physics.

Inverse scattering problem, Inverse boundary value problem, Inverse transport problem, integral geometry.

Newton-Einstein equation, Scattering data, Inverse kinetic problem, Dynamics in electromagnetic or gravitational field.

Linear Boltzmann transport equation, Albedo operator, Boundary angularly averaged measurements, Photoacoustics, Stability estimates.

Attenuated x-ray transform, SPECT.

Steklov spectrum of a planar domain, zêta-function of the Steklov spectrum.

## Other abilities

**Languages :** French (mother tongue),

English (written and spoken), german (basic knowledge).

**Computer skills :** *Software* Maple, Matlab ;

*Languages* C<sup>++</sup>, Fortran, Pascal ;

TEX, L<sup>A</sup>T<sub>E</sub>X ;

*Systems* Linux, Windows.

## Ph.D. Thesis

*Inverse problems for the multidimensional Newton-Einstein equation*, available on Thèses-en-ligne, <http://tel.archives-ouvertes.fr>, reference number : tel-00164558 (mainly written in french).

## Publications

17. A. Jollivet and V. Sharafutdinov, *Steklov zeta-invariants and a compactness theorem for isospectral families of planar domains*, J. Funct. Anal. **275** :(7), 1712–1755 (2018).
16. G. Bal and A. Jollivet, *Generalized stability estimates in inverse transport theory*, Inverse Probl. Imaging **12** :(1), 59–90 (2018).
15. A. Jollivet and V. Sharafutdinov, *An inequality for the zeta function of a planar domain*, J. Spectr. Theory **8** :(1), 271–296 (2018).
14. A. Jollivet, *Inverse Scattering at High Energies for Classical Relativistic Particles in a Long-Range Electromagnetic Field*, AHP **16** :(11), 2569—2602 (2015). See preprint 2013, ArXiv :1401.0182 , for a previous longer version.
13. A. Jollivet, *Inverse scattering at high energies for a classical particle in a long range force field*, Eurasian Journal of Mathematical and Computer Applications **2** :(1), 14—39 (2014), hal-01063458.
12. A. Jollivet, *Inverse scattering at high energies for the multidimensional Newton equation in a long range potential*, Asymptotic Analysis **90** :(1&2), 105—132 (2014). ArXiv :1306.3638.
11. A. Jollivet, *On inverse scattering at fixed energy for the multidimensional Newton equation in a non-compactly supported field*, J. Inverse Ill-posed Probl. **21** :(6), 713–734 (2013).
10. G. Bal, A. Jollivet, I. Langmore and F. Monard, *Angular average of time-harmonic transport solutions*, Comm. Partial Differential Equations **36** :(6), 1044–1070 (2011).
9. G. Bal and A. Jollivet, *Stability for time-dependent inverse transport*, SIAM J. Math. Anal. **42** :(2), 679–700 (2010); arXiv :0809.0906.
8. G. Bal, A. Jollivet and V. Jugnon, *Inverse transport theory of photoacoustics*, Inverse Problems **26** :(2) , 025011 (2010); arXiv :0908.4012.
7. G. Bal and A. Jollivet, *Time-dependent angularly averaged inverse transport*, Inverse Problems **25** :(7), 075010 (2009); an extended version of this paper is available in arXiv, arXiv :0902.3432.
6. A. Jollivet, *On inverse scattering at high energies for the multidimensional Newton equation in electromagnetic field*, J. Inverse Ill-posed Probl. **17** :(5), 441–476 (2009); arXiv :0710.0085.
5. G. Bal and A. Jollivet, *Stability estimates in stationary inverse transport*, Inverse Probl. Imaging **2** :(4), 427–454 (2008); arXiv :0804.1320.
4. A. Jollivet, *On inverse scattering in electromagnetic field in classical relativistic mechanics at high energies*, Asympt. Anal. **55** :(1&2), 103-123 (2007);

arXiv :math-ph/0506008.

3. A. Jollivet, *On inverse problems in electromagnetic field in classical mechanics at fixed energy*, J. Geom. Anal. **17** :(2), 275-319 (2007); arXiv :math-ph/0701008.
2. A. Jollivet, *On inverse problems for the multidimensional relativistic Newton equation at fixed energy*, Inverse Problems **23** :(1), 231-242 (2007); arXiv :math-ph/0607003.
1. A. Jollivet, *On inverse scattering for the multidimensional relativistic Newton equation at high energies*, J. Math. Phys. **47** :(6) 062902, (2006); arXiv :math-ph/0502040.

## Proceedings

4. A. Jollivet, *Convexity properties of the normalized Steklov zeta function of a planar domain*, to appear in the special QIPA issue of J. Inverse Ill-posed Probl., see preprint 2020, hal-02918987 for a previous version.
3. A. Jollivet and V. Sharafutdinov, *On an inverse problem for the Steklov spectrum of a Riemannian surface*, Inverse problems and applications, Eds. P. Stefanov, A. Vasy, M. Zworski, Contemporary Mathematics 615 (2014), 165–191.
2. G. Bal and A. Jollivet, *Combined source and attenuation reconstruction in SPECT*, Tomography and Inverse Transport Theory, Eds. G. Bal, D. Finch, P. Kuchment, J. Schotland, P. Stefanov, G. Uhlmann. Contemporary Mathematics **559** (2011), 13 – 27.
1. G. Bal and A. Jollivet, *Approximate stability estimates in inverse transport theory*, Biomedical Mathematics : Promising Directions in Imaging, Therapy Planning and Inverse Problems, Ed. Yair Censor, Ming Jiang and Ge Wang, Medical Physics Publishing, Madison, Wisconsin USA, 2010; available on <http://jollivet.u-cergy.fr/papers/HGS-Proceedings-Bal-Jollivet.pdf>.

## Preprints

3. G. Bal and A. Jollivet, *Boundary control for transport equations*, preprint 2021, hal-03199743.
2. A. Jollivet and V. Sharafutdinov, *An inequality for the zeta function of a planar domain derived from a first variation formula*, preprint 2020, hal-02515278.
1. A. Jollivet, M. K. Nguyen and T.T. Truong, *Properties and inversion of a new Radon transform on parabolas with fixed axis direction in  $\mathbb{R}^2$* , preprint 2010.

## Talks

- Conference on Quasilinear Equations, Inverse Problems and their applications, Moscow, Russia, 12/2020.
- Conference on Quasilinear Equations, Inverse Problems and their applications, Moscow, Russia, 12/2019.
- Seminar PDE and Mathematical Physics, LAGA, Villetaneuse, France, 09/2018.
- Conference on Quasilinear Equations, Inverse Problems and their applications, Moscow, Russia, 12/2018.
- Ninth International Conference "Inverse problems : modeling and simulation", Mellieha, Malta, 05/2018.
- Workshop "RIMS Workshop on inverse problems of partial differential equations and related topics", Kyoto, Japan, 01/2018.
- Conference on Quasilinear Equations, Inverse Problems and their applications, Moscow, Russia, 12/2017.
- Workshop "Mathematical Methods in Inverse Scattering and Spectral Theory", Leeds, England, 09/2017.
- Conference "Control Theory, Integral Geometry, Inverse Problems", Saint Petersburg, Russia, 06/2017.
- Conference on Theory and Numerical Methods for Inverse and Ill-Posed Problems, Novosibirsk, Russia, 09/2016.
- Geometry seminar, Novosibirsk, Russia, 08/2016.
- Eighth International Conference "Inverse Problems : Modeling and Simulation", Ölüdeniz, Fethiye, Turkey, 05/2016.
- Conference on Quasilinear equations, inverse problems and their applications, Moscow, Russia, 11/2015.
- Conference on Spectral and Analytic Inverse Problems, IHP, Paris, France, 05/2015.
- International Workshop "Inverse Problems and Integral Geometry", Kaliningrad, Russia, 10/2014.
- Conference on "Inverse Problems and Related Topics", Saint Petersburg, Russia, 08/2014.
- Quantum and Classical Dynamics Seminar, CPT, Luminy, 01/2014.
- Journée de rentrée du laboratoire de Mathématiques Paul Painlevé, University of Lille 1, 10/2013.
- Seminar of Mathematical Physics, University of Lille 1, 06/2013.
- Conference on Inverse Problems and Nonlinear Equations, CMAP, Ecole Polytechnique, 05/2013.
- Workshop on Inverse Transport Problems, University of Manchester, UK, 03/2013.
- Seminar on Quasilinear Equations and Inverse Problems, CMAP, Ecole Polytechnique, 01/2013.
- Conference on Inverse Problems in honor of Gunther Uhlmann, University of California, Irvine, USA, 06/2012.
- Working group on Mathematical Methods in Imaging, ENS, 03/2012.
- Workshop on Inverse Problems and Applications, CMAP, Ecole polytechnique, 09/2011.
- Workshop on Inverse Transport Theory and Tomography, Banff International Research Station, Alberta, Canada, 06/2010.

- Mathematical Physics working group, University of Cergy-Pontoise, 03/2010.
- Seminar at CMAP, Ecole polytechnique, 12/09.
- Mathematics Research Communities Summer Conference on Inverse Problems, Snowbird Resort, Utah, USA, 06/2009.
- Seminar of the Theoretical Physics and Modelling Laboratory, University of Cergy-Pontoise, France, 04/2009.
- Mathematical Physics seminar, University of Lille 1, France, 04/2009.
- Seminar on Mathematics of Imaging, Institut Henri Poincar, Paris, France, 03/2009.
- ANR blanc NONAa meeting, University of Nantes, France, 02/2009.
- Mathematical Physics and Geometry seminar, University of Paris 7, France, 02/2009.
- Working group on Inverse Problems in Radiative Transfer, University of Merced, USA, 06/2008.
- Working group on inverse problems, Columbia University, New York, USA, 02/2008.
- Working group on inverse problems, Columbia University, New York, USA, 11/2007.
- Working group on inverse problems, Columbia University, New York, USA, 10/2007.
- Workshop on Microlocal Analysis and Harmonic Analysis in Inverse Problems, CIRM, Marseille, France, 03/2007.
- Rennes-Nantes Applied Analysis and Partial Differential Equations teams meeting, Rennes, France, 01/2007.
- Numerical working group, University of Cergy-Pontoise, France, 11/2006.
- Maths Ph. D. candidates meeting, Rennes, France, 05/2006.
- Seminar of the team Applied Analysis of Amiens A<sup>3</sup>, University of Picardie-Jules Verne, France, 01/2006.
- Seminar of Ph.D. candidates, University of Nantes, France, 11/2005.
- Seminar of the team Partial Differential Equations, University of Metz, France, 10/2005.
- Seminar of the team Partial Differential Equations and Applications, University of Poitiers, France, 10/2005.
- Analysis seminar, University of Nantes, France, 03/2005.
- Seminar of Ph.D. candidates, University of Nantes, France, 11/2004.

## Collective activities

- Member of the organizing committee of the Second Congress of the French Mathematical Society, Lille, 06/2018.
- Organizer of the Mathematical Physics Seminar, Laboratoire Paul Painlevé, Université de Lille, 2015–.
- Co-organizer of the Mathematical Physics Seminar (together with Gabriel Rivière), Laboratoire Paul Painlevé, Université de Lille, 2014–2015.
- (Elected) member of the council of Laboratoire Paul Painlevé, 2015–2019.
- Member of the organizing committee of the Welcoming Day of Paul Painlevé Lab and Fédération de Recherche, Lille, France, October 10th 2014.
- Organizer of the symposium “Inverse scattering and spectral problems” at the XIII international scientific conference and young scientist school “Theory and Numerics of Inverse and Ill-posed Problems”, Novosibirsk, Russia, 04/2021.
- Organizer of the minisymposium M11 “Geometric inverse problems” of the Ninth International Conference “Inverse Problems : Modeling and Simulation” Mellieha, Malte, 05/2018.
- Organizer of the minisymposium M5 “Geometric Inverse Problems” of the Eighth International Conference “Inverse Problems : Modeling and Simulation”, Ölüdeniz, Fethiye, Turkey, 05/2016.
- Member of the scientific committee of the conference “Stability and Reconstruction Issues in Inverse Problems”, IHP, Paris, France, June 29th – July 3rd 2015.
- Member of the organizing committee of the conference “Geometric Inverse Problems”, IHP, Paris, France, June 8th - 12th 2015.

Reviewer at least once a time for *Inverse Problems*, *Applied Mathematics and Computation*, *Inverse Problems and Imaging*, *Journal of Geometric Analysis*, *Journal of Mathematical Imaging and Vision*, *Inverse Problems in Science & Engineering*, *The American Journal of Mathematics*, *SIAM Journal on Imaging Sciences*, *Contemporary Mathematics*, *GAFa*, *AHP*, *SIAM Journal on Mathematical Analysis*, *Applied Mathematics Letters*, *Reviews in Mathematical Physics*, *Journal of Mathematical Analysis and Applications*.



## Teaching experience

**2006-2007** Exercices sessions, examinations, in basic analysis for first year physics and chemistry students, and in topology, differential calculus and integration for second year computer science students.

**2005-2006** Exercices sessions, examinations, in basic analysis for first year physics and chemistry students, and in topology, differential calculus and integration for second year computer science students.

**2004-2005** Exercices sessions, examinations, in differential calculus for third year maths students, and in analytical functions for third year maths students.

Exercices sessions in sequences and series of functions to second year maths students, and in basic algebra to first year maths and computer science students.

Exercices sessions, examinations, in basic analysis for first year maths and computer science students.