

Laurent Seppecher

Curriculum Vitae

*Assistant Professor of Mathematics, École Centrale de Lyon —
Institut Camille Jordan*

Current Position

2015–present **Assistant Professor (Maître de conférences)**, *École Centrale de Lyon and Institut Camille Jordan*, Écully, France, Department of Mathematics and Computer Science.
Research interests: inverse problems, wave propagation, PDE and numerical analysis, solid mechanics, multiscale media, medical imaging, and nondestructive testing.

Research Funding

2025–2028 **ECOS-Sud Chile–France project**, €45,000, Principal investigator.
2023–2028 **ANR PRC REWARD**, €250,000, Principal investigator.
2018–2022 **ANR PRC Multiwave Inverse Problems (MultiOnde)**, €255,000, Scientific partner, Coordinator: Faouzi Triki.
2017–2018 **PALSE project**, €10,000, Principal investigator, Programme Avenir Lyon Saint-Étienne.
2016–2017 **BQR project**, €12,000, Principal investigator, École Centrale de Lyon.

Awards and Distinctions

2023–present **RIPEC — C3 component**.

Previous Positions and Education

2014–2015 **Postdoctoral researcher**, *Massachusetts Institute of Technology*, Cambridge, MA, USA, Host: Prof. Laurent Demanet, Imaging and Computing Group.
Inverse problems, interferometric imaging, wave propagation in heterogeneous media, and optimization.
2015 **Qualification by the French National Council of Universities (CNU)**, *Sections 25 and 26*, Qualification for Maître de conférences positions.
2011–2014 **PhD in Applied Mathematics**, *École Normale Supérieure and Université Pierre-et-Marie-Curie*, Paris, France, Advisors: Habib Ammari and Josselin Garnier.
Dissertation: *Mathematical Modeling of Hybrid Biomedical Imaging by Mechanical Perturbations*.
2011 **Research internship**, *Department of Mathematics and Applications, École Normale Supérieure*, Paris, France, Supervisor: Habib Ammari.
Mathematical modelling of acousto-electromagnetic interactions between acoustic shocks and microwaves in biological tissues.
2011 **Master's degree in Numerical Analysis and PDEs**, *Université Pierre-et-Marie-Curie*, Paris, France, Graduated with highest honors.
2010 **Agrégation externe de mathématiques**.
2009 **Research internship**, *Carnegie Mellon University*, Pittsburgh, PA, USA, Supervisor: K. Larsen.
Numerical schemes for pricing a call option governed by a Black–Scholes-type equation.
2008 **Research internship**, *Laboratoire Jean-Alexandre Dieudonné, Université de Nice*, Nice, France, Algebra, Topology and Geometry group.
K-theory and the Grothendieck group.
2007–2011 **Scholarship student**, *École Normale Supérieure de Cachan, Rennes campus*, Rennes, France, Bachelor's and first-year master's degrees in Mathematics, Université de Rennes 1.
Graduated with highest honors.
2004–2007 **Classes préparatoires**, *Lycée Masséna*, Nice, France.

Research Visits

- 2026 **University of Chile and Pontifical Catholic University of Chile**, *Santiago, Chile*, Hosts: Prof. A. Osses and Prof. N. Barnafi.
- 2023 **Massachusetts Institute of Technology**, *Cambridge, MA, USA*, Host: Prof. Laurent Demanet.
- 2015 **University of Washington**, *Seattle, WA, USA*, Host: Prof. Gunther Uhlmann.
- 2013 **Yonsei University**, *Seoul, South Korea*, Host: Prof. Jin Keun Seo, PDE-Based Medical Imaging Laboratory.
- 2013 **University of Oxford, Mathematical Institute**, *Oxford, United Kingdom*, Host: Prof. Yves Capdeboscq.

International Conferences

- 2027 **Session organizer**, *WAVES Conference*, Karlsruhe, Germany, Forthcoming.
- Forthcoming **Plenary speaker**, *CODS Conference*, IIT Roorkee, India.
- 2026 **Invited speaker**, *Inverse Problems, Modeling and Simulations Conference*, Malta.
- 2025 **Invited speaker**, *Viennese Conference on Optimal Control and Dynamic Games*, Vienna, Austria.
- 2025 **Invited speaker**, *Applied Inverse Problems Conference*, Rio de Janeiro, Brazil.
- 2024 **Invited speaker**, *WAVES Conference*, Berlin, Germany.
- 2024 **Plenary speaker**, *IPPHYS*, Puerto Varas, Chile, *Non-convex Interferometric Inversion from Sparse Wave-Source Recovery in Complex Media*.
- 2022 **Invited speaker**, *PICOF*, Caen, France, *Reverse Weak Formulation for Quasi-static Medical Elastography: Inversion under the Plane-Stress Approximation and Stability Issues*.
- 2022 **Invited speaker**, *IPMS*, Malta, *Regularization for Seismic-Source Inversion from Interferometric Data*.
- 2022 **Session organizer**, *IPMS*, Malta, *Inverse Problems in Biomedical and Material Imaging*, with A. Samore and D. Lazzaro (University of Bologna).
- 2021 **Invited speaker**, *Workshop on Spectral Problems, Inverse Problems and More*, Université Grenoble Alpes, *Inf-sup Constants and Stability for Inverse Parameter Problems and Their Discretizations*.
- 2019 **Invited speaker**, *Applied Inverse Problems Conference*, Grenoble, France, *Direct Reconstruction Methods in Elastography*.
- 2018 **Invited speaker**, *PICOF*, Beirut, Lebanon.
- 2018 **Plenary speaker**, *Series of Lectures on Waves and Imaging II*, Zurich, Switzerland, *Direct Linear Inversion for Discontinuous Elastic-Tensor Recovery from Internal Displacements*.
- 2017 **Contributed speaker**, *Applied Inverse Problems Conference*, Hangzhou, China.
- 2015 **Session organizer**, *Applied Inverse Problems Conference*, Helsinki, Finland, *Quantitative Imaging of Soft Biological Tissues*.
- 2014 **Invited speaker**, *Multiwave Imaging Workshop*, Université Joseph Fourier, Grenoble, France.
- 2014 **Contributed speaker**, *CANUM*, Carry-le-Rouet, France.
- 2014 **Invited speaker**, *Inverse Problems and Imaging Conference*, Institut Henri Poincaré, Paris, France.
- 2014 **Invited speaker**, *Applied Inverse Problems Conference*, KAIST, Daejeon, South Korea.
- 2014 **Invited speaker**, *Mathematical Methods for Imaging Seminar*, CIRM, Marseille, France, *Applied Analysis for the Material Sciences*.
- 2013 **Plenary speaker**, *Coupled Physics Inverse Problems Conference*, CMM, Santiago, Chile.
- 2012 **Invited speaker**, *Computational Inverse Problems Workshop*, Oberwolfach, Germany.
- 2012 **Invited speaker**, *Computational Inverse Problems Workshop*, Erwin Schrödinger Institute, Vienna, Austria.

Seminars and Other Scientific Communications

- 2026 **Co-organizer**, *Journées MMCS*, Lyon, France.
- 2025 **Seminar speaker**, *Journées MMCS*, Saint-Étienne, France.
- 2025 **Seminar speaker**, *SPOC*, Université de Bourgogne, Dijon, France.
- 2024 **Seminar speaker**, *LMPA seminar*, Calais, France, *Inversion interférométrique de systèmes linéaires*.

- 2024 **Co-organizer**, *Journées POPILS*, Lyon, France.
- 2023 **Seminar speaker**, *Journées MMCS*, Institut Camille Jordan, Lyon, France.
- 2023 **Seminar speaker**, *Department of Mathematics and Computer Science seminar*, École Centrale de Lyon.
- 2018 **Seminar speaker**, *Scientific Computing and Modelling Seminar*, Institut de Mathématiques de Bordeaux.
- 2018 **Seminar speaker**, *Inverse Problems and Related Fields Workshop*, Marseille, France.
- 2018 **Seminar speaker**, *Journées MMCS*, Mathematical Modelling and Scientific Computing group.
- 2017 **Seminar speaker**, *Laboratoire de Mécanique et d'Acoustique*, Marseille, France.
- 2016 **Seminar speaker**, *Centre de Physique Théorique*, Marseille, France.
- 2016 **Seminar speaker**, *Department of Mathematics and Computer Science*, École Centrale de Lyon.
- 2015 **Poster**, *MIT Energy Initiative Seed Fund Meeting*, Cambridge, MA, USA.
- 2014 **Seminar speaker**, *DEFI group*, CMAP, École Polytechnique, Palaiseau, France.
- 2014 **Poster**, *Applied Analysis for the Material Sciences*, CIRM, Marseille, France.

Teaching

- 2015–present **École Centrale de Lyon**, *Approximately 220 hours per year*, Bachelor's and master's levels. Numerical analysis; functional analysis; mathematics for biology; finite-element approximation of linear elasticity; wave equations; variational methods for inverse problems; optimization and sparse representations.
- 2011–2014 **Teaching assistant**, *Université Pierre-et-Marie-Curie*, Paris, France, 192 hours at bachelor's level (64 hours per year).
- 2010 **Oral examiner**, *Lycée Chateaubriand*, Rennes, France, 36 hours in classes préparatoires.

PhD Supervision

- 2025–present **P. Kaassis**, Mechanical Modeling of Biological Tissues Using Stochastic Homogenization for Medical Imaging.
- 2023–present **E. Kacedan**, Reverse Weak Formulation for Inverse Problems in Elasticity.
- 2019–2022 **A. Niclas**, Inverse Problems and Local Resonances in Irregular Mechanical Waveguides, Thesis awarded the L'Oréal–UNESCO For Women in Science France Young Talents Award and the SMAI–GAMNI Prize.

Administrative Responsibilities

- 2026–present **Elected member**, *Council of the Department of Mathematics and Computer Science*, École Centrale de Lyon.
- 2025–present **Secretary**, *École Centrale de Lyon academic jury*.
- 2023–present **Programme head**, *Master 2 in Applied Mathematics*, École Centrale de Lyon, MAS “Math en Action” dual curriculum.
- 2016–2024 **Programme head**, *Third-year bachelor's curriculum in Mathematics*, École Centrale de Lyon.
- 2015–present **Selection-committee member**, *Two Maître de conférences and three ATER recruitment committees*.
- 2015–2022 **Member**, *Scientific Committee of the Institut Camille Jordan*.

Development

- FIFEMLab [Github page]

Languages

- French: native; English: fluent; Italian: basic

Publications

Articles

- [1] Habib Ammari, Emmanuel Bossy, Josselin Garnier, and Laurent Seppecher. Acousto-electromagnetic tomography. *SIAM Journal on Applied Mathematics*, 72(5):1592–1617, 2012.
- [2] Habib Ammari, Emmanuel Bossy, Josselin Garnier, Wenjia Jing, and Laurent Seppecher. Radiative transfer and diffusion limits for wave field correlations in locally shifted random media. *Journal of Mathematical Physics*, 54(2), 2013.
- [3] Habib Ammari, Josselin Garnier, Loc Hoang Nguyen, and Laurent Seppecher. Reconstruction of a piecewise smooth absorption coefficient by an acousto-optic process. *Communications in Partial Differential Equations*, 38(10):1737–1762, 2013.
- [4] Habib Ammari, Emmanuel Bossy, Josselin Garnier, Loc Nguyen, and Laurent Seppecher. A reconstruction algorithm for ultrasound-modulated diffuse optical tomography. *Proceedings of the American Mathematical Society*, 142(9):3221–3236, 2014.
- [5] Habib Ammari, Loc Hoang Nguyen, and Laurent Seppecher. Reconstruction and stability in acousto-optic imaging for absorption maps with bounded variation. *Journal of Functional Analysis*, 267(11):4361–4398, 2014.
- [6] Habib Ammari, Pol Grasland-Mongrain, Pierre Millien, Laurent Seppecher, and Jin-Keun Seo. A mathematical and numerical framework for ultrasonically-induced lorentz force electrical impedance tomography. *Journal de mathématiques pures et appliquées*, 103(6):1390–1409, 2015.
- [7] Habib Ammari, Elie Bretin, Pierre Millien, Laurent Seppecher, and Jin-Keun Seo. Mathematical modeling in full-field optical coherence elastography. *SIAM Journal on Applied Mathematics*, 75(3):1015–1030, 2015.
- [8] Alice Conchin Gubernati, Fabio Freschi, Luca Giaccone, Riccardo Scorretti, Laurent Seppecher, and Grégory Vial. Modeling of exposure to low-frequency electromagnetic fields of workers in arbitrary posture. *IEEE Transactions on Magnetics*, 56(2):1–4, 2019.
- [9] Habib Ammari, Elie Bretin, Pierre Millien, and Laurent Seppecher. A direct linear inversion for discontinuous elastic parameters recovery from internal displacement information only. *Numerische Mathematik*, 147:189–226, 2021.
- [10] Éric Bonnetier, Angèle Niclas, Laurent Seppecher, and Grégory Vial. Small defects reconstruction in waveguides from multifrequency one-side scattering data. *Inverse Problems and Imaging*, 16(2):417–450, 2022.
- [11] Laurent Seppecher, Elie Bretin, Pierre Millien, Lorena Petrusca, and Elisabeth Brusseau. Reconstructing the spatial distribution of the relative shear modulus in quasi-static ultrasound elastography: plane stress analysis. *Ultrasound in Medicine & Biology*, 49(3):710–722, 2023.
- [12] Elie Bretin, Pierre Millien, and Laurent Seppecher. Stability for finite element discretization of some inverse parameter problems from internal data: Application to elastography. *SIAM Journal on Imaging Sciences*, 16(1):340–367, 2023.
- [13] Eric Bonnetier, Angèle Niclas, Laurent Seppecher, and Grégory Vial. The helmholtz problem in slowly varying waveguides at locally resonant frequencies. *Wave Motion*, 120:103157, 2023.
- [14] Eric Bonnetier, Angèle Niclas, and Laurent Seppecher. Well-posedness of wave scattering in perturbed elastic waveguides and plates: application to an inverse problem of shape defect detection. *Proceedings of the Royal Society A*, 479(2273):20220646, 2023.
- [15] Angèle Niclas and Laurent Seppecher. Reconstruction of smooth shape defects in waveguides using locally resonant frequencies. *Inverse Problems*, 39(5):055006, 2023.
- [16] Angèle Niclas and Laurent Seppecher. Layer stripping approach to reconstruct shape variations in waveguides using locally resonant frequencies. *SIAM Journal on Applied Mathematics*, 84(1):75–96, 2024.
- [17] Élie Bretin, Eliott Kacedan, and Laurent Seppecher. Multi-parameter identification in systems of PDEs from internal data. submitted to *Journal des mathématiques pures et appliquées*, May 2025.

- [18] Laurent Seppecher. Generalized Morrey-Campanato estimates for elliptic equations with coefficients of integrable oscillation. submitted to Journal of functional analysis, June 2026.
- [19] E. Bretin, E. Kacedan, and L. Seppecher. Diffusion parameter reconstruction in a stratified medium from a longitudinal measurement. preprint, 2026.

Books

- [1] Habib Ammari, Josselin Garnier, Hyeonbae Kang, Loc Hoang Nguyen, and Laurent Seppecher. *Multi-Wave Medical Imaging: Mathematical Modelling and Imaging Reconstruction*. 2017.
- [2] H Ammari, J Garnier, H Kang, L Nguyen, and L Seppecher. Multi-wave medical imaging, volume 2 of modelling and simulation in medical imaging, 2017.

Proceedings

- [1] Alice Conchin Gubernati, Freschi Fabio, Giaccone Luca, Riccardo Scorretti, Laurent Seppecher, and Grégory Vial. Modeling of exposure to low frequency electromagnetic fields of workers in arbitrary posture. In *Compumag 2019*, Paris, France, July 2019.
- [2] Elisabeth Brusseau, Lorena Petrusca, Elie Bretin, Pierre Millien, and Laurent Seppecher. Reconstructing the shear modulus contrast of linear elastic and isotropic media in quasi-static ultrasound elastography. In *2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, pages 3177–3180. IEEE, 2021.
- [3] Elisabeth Brusseau, Lorena Petrusca, Elie Bretin, Pierre Millien, and Laurent Seppecher. Mapping the relative shear modulus within biological tissues from internal displacement fields measured in quasi-static ultrasound elastography. In *10th International Conference 'Inverse Problems: Modeling and Simulation' (IPMS-2022)*, 2022.
- [4] Laurent Seppecher and Laurent Demanet. Regularization for seismic sources inversion from interferometric data. In *10th International Conference 'Inverse Problems: Modeling and Simulation' (IPMS-2022)*, Mellieha, Malta, May 2022. The Eurasian Association on Inverse Problems.
- [5] Elisabeth Brusseau, Lorena Petrusca, Elie Bretin, Pierre Millien, and Laurent Seppecher. Relative shear modulus mapping in quasi-static ultrasound elastography: a plane stress-based approach. In *European Solid Mechanics Conference*, Galway, Ireland, July 2022.
- [6] Angèle Niclas, Eric Bonnetier, L. Seppecher, and Grégory Vial. High sensibility imaging of defects in elastic waveguides using near resonance frequencies. In *WAVES Conference*, Palaiseau, France, July 2022.
- [7] Demanet L. and L. Seppecher. Non-convex interferometric inversion for wave scatters recovery in complex media. In *WAVES Conference*, Berlin, Germany, 2024.
- [8] Bretin E., Kacedan E., and Seppecher L. Stability for transient shear wave elastography. In *WAVES Conference*, Berlin, Germany, 2024.