Jean Lagacé

Contact Information

Department of Mathematics
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Research Interests

Asymptotic analysis, spectral theory of elliptic operators, shape optimisation, minimal surfaces, homogenisation theory, mean curvature flow, Steklov problem, periodic, quasi-periodic and almost-periodic problems, lattice point counting, pseudodifferential operators.

Employment

King's College London
Lecturer in Pure Mathematics, 2022–

University of Bristol
Postdoctoral research associate, 2021
Mentor: Asma Hassannezhad

University College London
Postdoctoral research fellow, 2018–2021
Mentors: Leonid Parnovski and Alexander Sobolev

Education

Université de Montréal
Ph.D., Pure Mathematics, 2018
Dissertation Topic: Asymptotiques spectrales et géométrie des nombres
Advisor: Iosif Polterovich

B. Sc., Pure and Applied Mathematics, 2014
Dissertation Topic : Pseudodifferential operators and application to spectral geometry
Advisors : Paschalis Karageorgis and John Stalker (Trinity College Dublin)

Visiting Positions

Université Paris-Saclay, France Visiting Professor (2022–2024)
University of Bristol, UK, Visiting Lecturer (2022–2025)
University College London, UK, Visiting researcher (2016)

Publications

Submitted

17. A. Deleporte, J. Lagacé and M. Rouveyrol, Metric-uniform spectral inequality for the Laplacian on manifolds with bounded sectional curvature. Preprint arXiv 2601.16176. 16 pp.

Peer Reviewed

16. J. Lagacé and S. Lynch. Canonical foliations of bubblesheets. *Calculus of Variations and Partial Differential Equations* **65**, article number 15 (2026), 28 pp.

15. H. Koivusalo and J. Lagacé. Sharp density discrepancy for cut and project sets: an approach via lattice point counting. With an appendix by M. Björklund and T. Hartnick. *Monatshefte für Mathematik* **208** (2025) pp. 397–444.

14. J. Athreya, J. Lagacé, M. Möller and M. Raum. Spectral decomposition and Siegel–Veech transforms for strata: The case of marked tori. *Journal of Spectral Theory* **15** (2025) pp. 895–959.

13. M. Karpukhin and J. Lagacé. Flexibility of Steklov eigenvalues via boundary homogenisation, *Annales Mathématiques du Québec* **48** (2024) pp.175–186.

12. J. Lagacé. Homogenisation as control: Mimicking eigenvalue problems. *Oberwolfach Reports* **20**:36 (2023) pp.2088–2091.

11. M. Karpukhin, J. Lagacé and I. Polterovich, Weyl's law for the Steklov problem on surfaces with rough boundary, *Archive for Rational Mechanics and Analysis* **247**:77 (2023), 20 pp.

10. J. Lagacé, S. Morozov, L. Parnovski, B. Pfirsch and R. Shterenberg, The almost periodic gauge transform — An abstract scheme with applications to Dirac operators, *Annales Henri Lebesgue* **6** (2023) pp.1031–1131.

9. A. Girouard, M. Karpukhin and J. Lagacé, Continuity of eigenvalues and shape optimisation for Laplace and Steklov problems. *Geometric and Functional Analysis* **31**:3, (2021) pp. 513–561.

8. A. Girouard and J. Lagacé, Large Steklov eigenvalues via homogenisation on manifolds. *Inventiones Mathematicae* **226**:3 (2021), pp. 1011–1056.

7. J. Lagacé and S. St-Amant, Spectral invariants of Dirichlet-to-Neumann operators on surfaces. *Journal of Spectral Theory* **11**:4 (2021) pp. 1627–1667.

6. P. Freitas, J. Lagacé and J. Payette, Optimal unions of scaled copies of domains and Pólya's conjecture. *Arkiv för Mathematik* **59** (2021) pp. 11–51.

5. A. Girouard, A. Henrot and J. Lagacé, From Steklov to Neumann via homogenisation. *Archive for Rational Mechanics and Analysis* **239** (2021) pp. 981–1023.

4. J. Lagacé, Eigenvalue optimisation on flat tori and lattice points in anisotropically expanding domains, *Canadian Journal of Mathematics*,**72**:4 (2020) pp. 967–987.

3. F. Ferrulli and J. Lagacé, appendix of A. Hassannezhad and A. Laptev, Eigenvalue bounds for mixed Steklov problems, *Communications in Contemporary Mathematics*, (2020) **22**:2, pp. 18–22.

2. A. Girouard, J. Lagacé, I. Polterovich and A. Savo, The Steklov spectrum of cuboids, *Mathematika*, **65**:2 (2019) pp. 272–310.

1. J. Lagacé and L. Parnovski, A generalised Gauss circle problem and integrated density of states, *Journal of Spectral Theory*, **6**:4 (2016) pp. 859–879.

Prizes

2025 — CRM-ISM-AMQ Prize, joint with Mikhail Karpukhin
For *Flexibility of Steklov eigenvalues via boundary homogenisation*.

Fellowship and Scholarships

2019–2021 — Postdoctoral Fellowship (PDF)
National Science and Engineering Research Council of Canada

2016–2018 — Alexander Graham Bell Canada Graduate Scholarship – Doctorate (D3)
National Science and Engineering Research Council of Canada

2016 — Doctoral Scholarship (B2) (*Classed first on the competition* – declined)
Fonds de recherche du Québec - Nature et Technologie

2014–2016 — Masters Scholarship (B1) (*Classed second on the competition*)
Fonds de recherche du Québec - Nature et Technologie

2014–2015 — Canada Graduate Scholarship - Masters
National Science and Engineering Research Council of Canada

Grants

2024	PI on LMS Scheme 3 for the UK Spectral Theory Network London Mathematical Society
2024	PI on Small Grant Scheme (for organisation of two conferences in 2025) Heilbronn institute for Mathematical Research
2024	Co-I on Research in Teams (Steklov eigenproblems under [...]) Banff International Research Station (Canada)
2023	Co-I on LMS application to hold the LMS-Bath Symposium in 2024 London Mathematical Society
2022–2025	Co-I on Network Grant for UK Spectral Theory Network Isaac Newton Institute and London Mathematical Society
2022–2024	Co-I on International Emerging Action Centre National de la Recherche Scientifique (France)
2022	PI on Small Grant Scheme (for organisation of a conference in 2023) Heilbronn institute for Mathematical Research

Presentations

I have been invited to present my research in over 30 local seminars, 20 national and international conferences and workshops and as a plenary speaker at the Tbilisi Analysis and PDE workshop.

Student Supervision

I am currently supervising 3 PhD students as first supervisor at KCL. I supervised 5 MSc students (4 at KCL, 1 at Montréal), and supervised 3 BSc students (2 at KCL, 1 at Montréal).

Teaching Experience

Lecturing

2024	Minimal and Constant Mean Curvature Surfaces (LTCC)
2024	Introduction to Spectral Geometry (LTCC)
2022–2025	Operators on Infinite Dimensional Vector Spaces (KCL)
2020–2021	Functional Analysis (UCL)
2017	Calcul I (U Montréal)

Tutoring

2025	Calculus II (KCL)
2024	Sequence and Series (KCL)
2024	Calculus I (KCL)
2020–2021	Analysis (UCL)

Assisting

2013–2018	GTA for various analysis and geometry modules at U. Montréal

Service

Organisation

2024 UK Workshop on Spectral Theory at ICMS in Edinburgh
2024 LMS–Bath Symposium “Advances in Spectral Theory” in Bath
2023 Spectral Theory Workshop in Bristol
2023 Conference “Waves by the Thames” at KCL
2023 Summer school on “Periodic and ergodic spectral problems” in Montréal
CMS 2020 Winter meeting “Geometric and Computational spectral theory” session
Spectral geometry in the clouds, Joint UCL/Laval online seminar
Pint of Science 2019 Atoms to Galaxies event, UCL
CMS 2018 Summer Meetings’s student session, Fredericton
CMS 2017 Winter Meeting’s student session, Waterloo
Spectral geometry seminar, U. Montréal
2013 Canadian Undergraduate Mathematical Conference, Montréal

Referee and quick opinions	Duke Mathematical Journal, Geometric and Functional Analysis Proceedings A of the Royal Society of Edinburgh Communications in Mathematical Physics, Analysis and PDEs, Analysis and Mathematical Physics, Journal of Geometric Analysis, Canadian Journal of Mathematics Calculus of Variations and PDEs, Arkiv för Mathematik Portugaliae Mathematica, Bulletin of the LMS Discrete and Continuous Dynamical Systems, Mathematika CRM-AMS series, Journal of Spectral Theory SIAM Journal on Applied Algebra and Geometry Annals of Global Analysis and Geometry, Nonlinear Analysis Pacific Jounral of Mathematics, Revista Mathematica Iberoamericana Inverse problems and imaging, Mathematical Reviews
Committees	Organising Committee of the UK Spectral Theory Network Scientific Committee of the Geometric Spectral Theory Online Network Co-chair, student committee of the Canadian Mathematical Society President, Mathematics graduate students association, U. Montréal Grant attribution committee, U. Montreal Student Federation Advisory committee on libraries, U. Montréal

Outreach

Outreach activities in the KCL department (Queen Dido's problem), with versions for undergraduate and school students

Editor for mathematics communication journal "Chalkdust"

Columnist in mathematics for the science outreach radio show "Le lab" on CISM 89.3

Various presentations at the "club mathématiques", a series of seminars aimed at undergraduate students.

Professional Memberships

Fellow of the Higher Education Academy (FHEA)

Member of the London Mathematical Society

Languages

French (Native), English (Fluent, fully bilingual)