Laura Monk

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Research experience

2024 – 32 **Royal Society Dorothy Hodgkin Fellow**, *University of Bristol (UK)*.
Research Fellow and Proleptic Lecturer.

2022 – 24 **Research associate**, *University of Bristol (UK)*, PI: Jens Marklof.
Researcher Co-Investigator on EPSRC Standard grant EP/W007010/1.

2021 – 22 **Postdoctoral fellow**, *Max Planck Institute for Mathematics, Bonn (DE)*, mentored by Ursula Hamenstädt.

Education

2018 – 21 **PhD in Mathematics** under the supervision of Nalini Anantharaman, *Université de Strasbourg (FR)*.
Geometry and spectrum of typical hyperbolic surfaces

2014 – 18 **École Normale Supérieure** in Mathematics with minor in Physics, *Paris*.

2017 – 18 **Master's degree in Mathematics** (with honours), *Paris-Sud University*.

2017 **Agrégation of Mathematics** (7th place).
Secondary-school and University teaching degree

2014 – 15 **Bachelor's degree in Mathematics** (with honours), *Paris-Sud University*.

2014 – 15 **Bachelor's degree in Physics** (with honours), *Paris-Sud University*.

2012 – 14 **Preparatory class**, *Lycée Privé Sainte Geneviève, Versailles (FR)*.

Publications

(6) Marklof J., Monk L., *The moduli space of twisted Laplacians and random matrix theory*, International Mathematics Research Notices (2024), https://doi.org/10.1093/imrn/rnae239.

(5) Monk L., Stan R., *Spectral convergence of the Dirac operator on typical hyperbolic surfaces of high genus*, Annales Henri Poincaré (2024), https://doi.org/10.1007/s00023-024-01452-z.

(4) Anantharaman N., Monk L., *A high-genus asymptotic expansion of Weil-Petersson volume polynomials*, Journal of Mathematical Physics, 63, 043502 (2022).

(3) Monk L., Thomas J., *The tangle-free hypothesis on random hyperbolic surfaces*, International Mathematics Research Notices, Volume 2022, Issue 22, November 2022, Pages 18154–18185.

(2) Monk L., *Benjamini-Schramm convergence and spectrum of random hyperbolic surfaces of high genus*, Analysis & PDE, Vol. 15 (2022), No. 3, 727–752.

(1) Fouvry J.B., Pichon C., Chavanis P., Monk L., *Resonant thickening of self-gravitating discs: imposed or self-induced orbital diffusion in the tightly wound limit*, Monthly Notices of the Royal Astronomical Society, Volume 471, Issue 3, November 2017, Pages 2642–2673.

Preprints

2024 Anantharaman N., Monk L., *Spectral gap of random hyperbolic surfaces*, arxiv:2403.12576.

2024 Anantharaman N., Monk L., *A Moebius inversion formula to discard tangled hyperbolic surfaces*, arXiv:2401.01601.

2023 Anantharaman N., Monk L., *Friedman-Ramanujan functions in random hyperbolic geometry and application to spectral gaps*, arXiv:2304.02678.

Awards and grants

2024 – 32 Royal Society Dorothy Hodgkin Fellowship.

2024 Maryam Mirzakhani New Frontiers Prize.

2022 – 25 Researcher Co-Investigator on EPSRC Standard Grant EP/W007010/1.

2022 Best PhD in Mathematics prize from the University of Strasbourg.

2021 Prize L'Oréal-UNESCO Young Talents France for Women in Science.

2019 Best poster in Mathematics prize from the Doctoral School.

2018 – 21 PhD grant from the ENS (Paris, FR).

2014 – 18 Full scholarship at the ENS (Paris, FR).

Invited talks at conferences and colloquia

Apr 2025 Probability, Analysis and Dynamics, *Bristol (UK)*.

Nov 2024 Random hyperbolic surfaces and random graphs, *CIRM, Marseille (FR)*.

Nov 2024 Colloquium, *UCL, London (UK)*.

Sept 2024 Colloquium, *Bristol (UK)*.

Dec 2022 Brunel–Bielefeld Workshop on Random Matrix Theory and Applications, *London (UK)*.

Sept 2022 Shape Optimisation and Geometric Spectral Theory, *Edinburgh (UK)*.

July 2022 ANR workshop "Quantum Chaos, Randomness and Spectral Problems in Mathematical Physics", *Paris (FR)*.

July 2022 Journées Nancéennes de Géométrie, *Nancy (FR)*.

June 2022 Young women in Geometric Analysis, *Bonn (DE)*.

May 2022 Laplacians on random hyperbolic surfaces and on random graphs, *Northwestern (US)*.

March 2022 Mathematics & Statistics Colloquium, *Dalhousie University (CA)*.

Feb 2022 14th Meeting of the GdR Quantum Dynamics, *Toulouse (FR)*.

Feb 2022 Spectra and Dynamics on (Locally) Symmetric Spaces, *Paderborn (DE)*.

Nov 2021 ANR "Aléatoire, Dynamique et Spectre" meeting, *Nantes (FR)*.

Sept 2021 Hyperbolic dynamical systems and resonances, *Porquerolles (FR)*.

Dec 2020 Jeunes géomètres dynamiques, *GdR Platon, Rennes (FR).*

Oct 2020 Billiards and Surfaces à la Teichmüller and Riemann Online.

Nov 2019 8th Strasbourg / Zurich Meeting: Frontiers in Analysis and Probability, *Zurich (CH).*

May 2019 Spectral Theory and pRObability in Mathematical physics, *Strasbourg (FR).*

Apr 2019 Dynamics of geodesic flows and applications to PDEs, *Palaiseau (FR).*

Seminars

2025 Geometric Group Theory + Random Matrix Theory, *Oxford (UK).* Analysis and Geometry, *Rennes (FR).* Geometry and Dynamics, *Lille (FR).*

2023-24 [No travel due to pregnancy and 1 year-long maternity leave.]

Analysis, *Bristol (UK).* Mathematical Physics, *Sussex (UK).* Topology and Dynamics, *Birmingham (UK).* Spectral Geometry in the Clouds x2 *(online).* Geometry and Topology, *Bristol (UK).* Munich–Copenhagen–Santiago Seminar in Mathematical Physics *(online).*

2022 London Analysis seminar, *London (UK).* Spectra/Moduli seminar, *Durham (UK).* Differential Geometry and Topology, *Cambridge (UK).* Analysis and Geometry, *Bristol (UK).* Reading seminar, *Paris Nord (FR).* Topology and Dynamics, *Orsay (FR).*

2021 Ergodic Theory and Dynamical Systems, *Bristol (UK).* Probability and Statistics, *Marseille (FR).* Geometry and Topology, *Jussieu (FR).* Algebra, Geometry and Physics, *Bonn (DE).* Young researchers in spectral geometry II, *Spectral geometry in the clouds (online).* Number theory, *Tel-Aviv (IL).* Probability and Mathematical Statistics, *Milan–Pavia (IT).* GdR Platon *(online).* Geometry and Topology, *Toulouse (FR).* Dynamical systems and ergodic theory, *Zurich (CH).*

2020 Analysis, *Cardiff (UK).* Geometry, *Leeds (UK).* Dynamical systems, *Bremen–Oldenburg (DE).* Oberseminar Differentialgeometrie, *Bonn (DE).* Probabilities, *Orsay (FR).* Geometrical Analysis by Frédéric Naud *(online).*

2019 Spectral theory and Geometry, *Grenoble (FR).*

2018 Analysis, *Strasbourg (FR).*

Teaching and mini-courses

Mini-courses.

March 2023 GEoMetric Spectral Theory Online NEtwork minicourse, *CRM (Montréal).*

Oct 2022 Mini-course at the summer school “Random walks and related random topics”, *University of Göttingen.*

May 2022 Advance courses “Spectrum of the Laplacian and Geometry”, *University Cergy-Pontoise.*

Spring 25 **Tutorials**, *University of Bristol.*

Jan–Feb 21 **Substitute Lecturer**, *University of Strasbourg*, 2nd year analysis.

2018 – 21 **Teaching assistant**, *University of Strasbourg*.
2nd and 3rd year exercise sessions, preparation of the agrégation, math club for high-school students, 1st and 2nd year oral exams.

2018 **Higher-education teaching degree ("agrégation")**.
Competition granting a life-long position as a secondary-school or higher-education teacher, ranked 7th out of 315 admitted (1545 candidates).

2014 – 18 **Oral examiner in preparatory schools**, 1st and 2nd year.

Organisation of seminars or reading groups

2021 – ... Online seminar "Spectral Geometry in the Clouds" with Alexandre Girouard and Jean Lagacé.

2022 – 23 Analysis Reading Group in Bristol, with Antoine Métras and Dan Speed.

2022 – 23 Ergodic Theory and Dynamical Systems seminar in Bristol, with Thomas Jordan and Henna Koivusalo.

2019 Reading group on Mirzakhani's work on random hyperbolic surfaces in Strasbourg, with Yohann Bouilly and Federica Fanoni.

Outreach activities

2018 and 19 **Organisation of the RJM**, *University of Strasbourg*.
Three-day meeting for high school girls to conduct mathematical group activities, meet female researchers and engineers and speak about gender issues.

2017 and 21 **Jury for the TFJM²**.
Conference-like mathematical competition for high-school students.

Outreach talks.

2022 Talk for prospective students in context of the program "Access to Bristol".

2017 Talk for undergraduates in Lycée Privé Sainte-Geneviève.