

# Sugata Mondal

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Lecturer, Department of Mathematics  
University of Reading, Reading

## CONTACT

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## EDUCATION

**2010–2013** Phd in Pure Mathematics,  
Institute de Mathematiques de Toulouse, Toulouse, France  
Doctoral Advisor: Prof. Jean-Pierre Otal

**2008–2010** Graduate student, TIFR, Mumbai, India.

**2006–2008** M. Math, Indian Statistical Institute, Kolkata, India.

## RESEARCH

My research interests include but not restricted to the following areas.

1. **Geometry:** Spectral Geometry, Hyperbolic Geometry.
2. **Analysis:** Geometric Analysis, Analysis of PDE.
3. **Number Theory:** Automorphic forms, Exceptional eigenvalues.

## POSITIONS

- **Current Position:** Lecturer,  
University of Reading, Reading, UK.
- Reader, School of Mathematics  
Tata Institute of Fundamental Research, Mumbai May, 2018 - March, 2022.
- Zorn Postdoctoral fellow, Indiana University,  
Bloomington, Indiana, USA August, 2015 - May, 2018.
- Visiting Postdoctoral fellow, Max Planck Institute for Mathematics,  
Bonn, Germany Nov., 2013 - April, 2015.

## GRANTS

- Visiting Scientist, Max Planck Institute for Mathematics,  
Bonn, Germany May-June, 2017.
- Ramanujan Fellowship Award, SERB, India October, 2018  
This is a five year grant of total monetary value Rs. 30,00,000 (Rs. 6,00,000  
each year) given to young scientists who are returning to India from a foreign  
university.
- (not availed) Visiting Scientist, Max Planck Institute for Mathematics, Bonn,  
Germany April-May, 2020.
- Research in Pairs, Institut Henri Poincaré, Paris, France  
Collaborator: Chris Judge. 12-26th May, 2023.

- Visiting Scientist, Max Planck Institute for Mathematics, Bonn, Germany June-August, 2023.

## PAPERS

1. Systole and  $\lambda_{2g-2}$  of closed hyperbolic surfaces of genus  $g$ . **Enseign. Math.** (2) 60 (2014), 3–24.
2. On topological upper-bounds on the number of small cuspidal eigenvalues of finite area hyperbolic surfaces. **Int. Math. Res. Not. IMRN**, 2015, no. 24, 13208–13237.
3. On largeness and multiplicity of the first eigenvalue of finite area hyperbolic surfaces. **Math. Z.** 281 (2015) no. 1-2, 333–348.
4. Small eigenvalues of closed surfaces; with Werner Ballmann and Henrik Matthiesen. **J. Differential Geom.** 103 (2016), no. 1, 1–13.
5. Geodesics and Nodal sets of eigenfunctions on Hyperbolic manifolds; with Chris Judge. **Proc. of the AMS.** 145 (2017), no. 10, 4543–4550.
6. Small eigenvalues of surfaces of finite type; with Werner Ballmann and Henrik Matthiesen. **Compositio Math.** 153 (2017), no. 8, 1747–1768.
7. On the analytic systole of complete Riemannian surfaces of finite type; with Werner Ballmann and Henrik Matthiesen, **Geom. and Func. Analysis**, Vol. 27 (2017) 1070–1105.
8. Rigidity of the length-angle spectrum for closed hyperbolic surfaces. Preprint.
9. An arithmetic property of the set of angles between closed geodesics on hyperbolic surfaces of finite type. **Geometriae Dedicata** (2018), 241–247.
10. Small eigenvalues of Riemannian surfaces - Old and New; with Werner Ballmann and Henrik Matthiesen. **ICCM Not.** 6 (2018), no. 2, 9–24.
11. Topological properties of eigenfunctions of Riemannian surfaces, Dedicated to Jean-Pierre Otal on his 60th birthday. To appear in **Annales de la Faculté des Sciences de Toulouse** (6) 28 (2019), no. 3, 593–618.
12. Euclidean triangles have no Hot Spots; with Chris Judge. **Ann. of Math.** (2) 191 (2020), no. 1, 167–211.
13. Erratum: Euclidean triangles have no Hot Spots; with Chris Judge. **Ann. of Math.**
14. Critical points of Neumann eigenfunctions of planar polygonal domains; with Chris Judge. **Comm. in PDE.**

## ACHIEVEMENTS

- 2006** Held 3rd position among Mathematics Honors candidates (in various colleges) under Calcutta University.
- 2006–2008** Received national level scholarship for pursuing Masters degree in Mathematics provided by National Board of Higher Mathematics, India.
- 2018** Awarded Ramanujan Fellowship by the Science and Engineering Research Board, Govt. of India.

## Selected Talks

- Dec., 2012** Small eigenvalues and topology of hyperbolic surfaces. IMT, Toulouse, France.

- March, 2013** A Geometric lower bound on  $\lambda_{2g-2}$ . Institut Fourier, Grenoble, France.
- Oct., 2013** Behavior of small cuspidal eigenpairs over degenerating sequence of finite area hyperbolic surfaces. EPFL, Lausanne, Switzerland.
- May, 2014** Hyperbolic surfaces with large first eigenvalue of the Laplace operator. Oberseminar Differentialgeometrie, MPIM, Bonn, Germany.
- March, 2015** Small eigenvalues of closed surfaces. Loughborough University, Loughborough, UK.
- Nov., 2015** Small eigenvalues of surfaces of finite type. Geometry seminar, IU, Bloomington, Indiana, USA.
- July, 2016** Geodesics and nodal sets of Laplace eigenfunctions. Colloquium Talk, TIFR, Mumbai, India.
- Sept., 2016** Analytic and Geometric systoles of Riemannian surfaces of finite type. Groups, Geometry and Dynamics Day, Rose-Hullmann Institute of Technology, Indiana, USA.
- Dec., 2016** Length-angle spectra as the moduli of closed hyperbolic surfaces. Geometry seminar, IU, Bloomington, Indiana, USA.
- April, 2017** Length and Angle spectrum of hyperbolic surfaces. Geometry, Dynamics and Topology Day, Charleston, Illinois, USA.
- June, 2017** Length, angle and length-angle spectra of hyperbolic surfaces. Oberseminar Differentialgeometrie, MPIM, Bonn, Germany.
- April, 2018** Hot spots conjecture for Euclidean triangles. PDE Seminar, IU, Bloomington, Indiana, USA.
- April, 2018** Hot spots conjecture for Euclidean triangles. Analysis Seminar, McGill University, Montreal, Quebec, Canada.
- September, 2019** Hot spots conjecture for Euclidean triangles. Colloquium Talk, IISER, Pune, India.
- October, 2019** Hot spots conjecture for Euclidean domains. Colloquium Talk, IISc, Bengaluru, India.
- October, 2019** Hot spots conjecture for Euclidean domains. Colloquium Talk, TIFR-CAM, Bengaluru, India.
- October, 2020** Hot spots conjecture for Euclidean triangles. Spectral Geometry in the clouds.
- October, 2020** Hot spots conjecture for Euclidean triangles. Colloquium Talk, University of Bristol, UK.
- August, 2021** Critical sets of second Neumann eigenfunctions on polygonal domain. Random Geometry Seminar, TIFR, Mumbai, India.

