

Mithun Bhowmik

Assistant Professor

Department of Mathematics

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Personal Information

Name Mithun Bhowmik
Sex Male
Date of Birth March 12, 1988
Nationality India
Marital Status Married.

Academic Qualification

- 2011-2018 **Doctor of Philosophy**,
Affiliation: *Statistics and Mathematics Unit, Indian Statistical Institute*, Kolkata, India,
Title of Thesis: Theorems of Ingham, Levinson and Paley-Wiener on certain Lie groups.
Supervisor: Prof. Swagato K Ray.
- 2009-2011 **Master of Science: Mathematics**,
Affiliation: Indian Institute of Technology Kanpur, India,
Grade: First Class (7.0 CPI).
- 2006-2009 **Bachelor of Science: Mathematics**,
Affiliation: Calcutta University (Presidency College), Kolkata, India,
Grade: First Class (71%).
- 2006 **Higher Secondary (10+2)**,
Affiliation: W.B.C.H.S.E., West Bengal, India,
Grade - First class (83 %).

Research Experience

- July, 2023- **Assistant Professor**,
till date Affiliation: Department of Mathematics, Indian Institute of Technology Kharagpur, India.
- August 2020- **INSPIRE Faculty**,
July, 2023 Affiliation: Department of Mathematics, Indian Institute of Science, Bangalore, India.
- June 2018- **Post Doctoral Fellow**,
July 2020 Affiliation: Department of Mathematics, Indian Institute of Technology Bombay, India.
- August 2011- **Research Fellow**,
May 2018 Affiliation: Statistics and Mathematics Unit, Indian Statistical Institute, Kolkata, India.

Research Interest

My area of research is Harmonic Analysis. To be more specific, we work on the following problems:

- Uncertainty Principles We work on the quantitative formulation of uncertainty principles related to the support of a function and the decay of its Fourier transform on various noncommutative Lie groups and homogeneous spaces. We study the applications of these uncertainty principles to the uniqueness properties for the solutions of partial differential equations on various Lie groups.
- Geometric Inequalities We are also working on fractional Sobolev embedding including Hardy, Poincaré, Sobolev inequalities on Riemannian symmetric spaces of noncompact type.

Fourier restriction We are studying Fourier restriction theorems, spectral multiplier, uniform resolvent estimates and their applications in the context of symmetric spaces and harmonic NA groups

Publications in Peer Reviewed Journals

- (11) Title: Unique continuation inequalities for Schrödinger equation on Riemannian symmetric spaces of noncompact type.
Authors: Mithun Bhowmik and Swagato K Ray.
Journal Ref: *Annali di Matematica Pura ed Applicata* (1923 -), doi.org/10.1007/s10231-023-01365-4
- (10) Title: A theorem of Chernoff on quasi-analytic functions for Riemannian symmetric spaces.
Authors: Mithun Bhowmik, Sanjoy Pusti and Swagato K Ray.
Journal Ref: *International Mathematics Research Notices*, (IMRN), 2023, no. 13, 10942-10963.
- (9) Title: Ingham-type theorems for the Dunkl Fourier transforms.
Authors: Mithun Bhowmik, Sanjay Parui and Sanjoy Pusti.
Journal Ref: *Complex Variables and Elliptic Equations*, 67 (2022), no. 5, 1031-1045.
- (8) Title: An extension problem and Hardy's inequality for the fractional Laplace-Beltrami operator on Riemannian symmetric spaces of noncompact type.
Authors: Mithun Bhowmik and Sanjoy Pusti.
Journal Ref: *Journal of Functional Analysis*, 282(9), 2022, 109413.
- (7) Title: A theorem of Levinson for Riemannian symmetric spaces of noncompact type.
Authors: Mithun Bhowmik and Swagato K. Ray.
Journal Ref: *International Mathematics Research Notices*, (IMRN), vol. 2021 (4), (2021), 2403-2436.
- (6) Title: Theorems of Ingham and Chernoff on Riemannian symmetric spaces of noncompact type.
Authors: Mithun Bhowmik, Sanjoy Pusti and Swagato K. Ray.
Journal Ref: *Journal of Functional Analysis*, 279 (2020), 108760.
- (5) Title: A result of Paley and Wiener on Damek-Ricci spaces.
Author: Mithun Bhowmik.
Journal Ref: *Journal of the Australian Mathematical Society*, 109 (2020), 1-16.
- (4) Title: A local Levinson theorem for compact symmetric spaces.
Author: Mithun Bhowmik.
Journal Ref: *Journal of Lie Theory* 29 (2019), no. 3, 787-800.
- (3) Title: Around theorems of Ingham-type regarding decay of Fourier transform on $\mathbb{R}^n, \mathbb{T}^n$ and two step nilpotent Lie group.
Authors: Mithun Bhowmik, Swagato K. Ray and Suparna Sen.
Journal Ref: *Bulletin des Sciences Mathématiques* 155 (2019), 33-73.
- (2) Title: Uncertainty principles of Ingham and Paley-Wiener on semisimple Lie groups.
Authors: Mithun Bhowmik and Suparna Sen.
Journal Ref: *Israel Journal of Mathematics* 225 (2018), no. 1, 193-221.
- (1) Title: An uncertainty principle of Paley and Wiener on Euclidean motion group.
Authors: Mithun Bhowmik and Suparna Sen.
Journal Ref: *Journal of Fourier Analysis and Applications* 23 (2017), 1445-1464.

Preprints

- (2) Title: Spectral projections and resolvent estimates on Damek-Ricci spaces and their applications. arXiv:2306.06875 (submitted)
Author: Mithun Bhowmik and Utsav Dewan.
- (1) Title: Sharp Adams type inequalities for the fractional Laplace-Beltrami operator on noncompact symmetric spaces. arXiv:2106.08794. (submitted)
Author: Mithun Bhowmik.

Teaching Experience

As an Assistant Professor in IIT Kharagpur, I am teaching now the following courses: Advanced Calculus for B. Tech and Linear Algebra for M.Sc. students.

Awards/ Fellowships

- Secured 52th rank (all India rank) in JAM 2011 in Mathematics.
- Secured 18th rank (All India Rank) in CSIR-UGC NET 2011 in Mathematical Science.
- Secured 23th rank (All India Rank) in GATE 2011 in Mathematics.
- Selected for Research Fellowship in Mathematics by National Board of Higher Mathematics (NBHM) in 2011.
- Selected for Post Doctoral Fellowship in Mathematics by National Board of Higher Mathematics (NBHM) in 2018.
- INSPIRE Faculty award 2020 in Mathematical Sciences from DST, Govt. of India.

Talk Presentation

- Jan. 2022 Title: Sharp Adams type inequalities for the fractional Laplace-Beltrami operator on noncompact symmetric spaces.
Venue: 17th discussion meeting on harmonic analysis, NISER Bhubaneswar, India.
- Sept. 2020 Title: Certain quasi-analyticity results on Riemannian symmetric spaces of noncompact type.
Venue: APRG seminar, Department of Mathematics, IISc., Bangalore, India.
- Dec. 2019 Title: Analogs of certain quasi-analyticity results on Riemannian symmetric spaces.
Venue: 16th discussion meeting on harmonic analysis, IISER Bhopal, India.
- March 2018 Title: Theorems of Ingham, Levinson and Paley-Wiener on certain Lie groups.
Venue: Departmental Seminar, Department of Mathematics, IIT Bombay, India.
- March 2018 Title: Theorems of Ingham, Levinson and Paley-Wiener on certain Lie groups.
Venue: Departmental Seminar, SMS, NISER Bhubaneswar, India.
- Dec. 2015 Title: Around a theorem of Paley and Wiener.
Venue: 14th discussion meeting on harmonic analysis, University of Delhi, India.

References

1. Professor Swagato K. Ray
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Indian Statistical Institute, Kolkata, India.
E-mail: swagato@isical.ac.in
2. Professor Sundaram Thangavelu
Department of Mathematics
Indian Institute of Science, Bangalore, India.
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3. Professor Rudra P. Sarkar
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