Curriculum Vitae

Dr. Arpan Mukherjee

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Personal Information

Date of Birth: 06.04.1994
Nationality: Indian
Gender: Male
Marital Status: Married with 1 kid

Academic Visits & Academic Positions

Sept 2024 – *Present*
Joint Research Center of Applied Mathematics, Shenzhen MSU-BIT University, China (jointly by Moscow State University (MSU), Russia & Beijing Institute of Technology (BIT), China).
• ***Lecturer*** *(Tenure-Track Assistant Professor)*
Mentor*: Prof. Dr. Hongyu Liu, Chair Professor, City University of Hong-Kong, Hong-Kong SAR.*

Aug 2020 – July 2024
Johann Radon Institute (RICAM), Austrian Academy of Sciences (ÖAW), Austria.
• ***Post-Doc. Research Scientist*** *(Dec 2023-July 2024)*
Project [FWF-P32660]: Electromagnetism with Extreme Materials: Modeling, Analysis and Applications.
• ***Doc. Research Scientist*** *(Aug 2020-Nov 2023)*
Project [FWF-P32660/36942] : Electromagnetism with Extreme Materials: Modeling, Analysis and Applications / Resolvent Analysis of Sub-wavelength Resonators.
Project Leader: Univ.-Doz. Dr. Mourad Sini

Sep 2019 – Mar 2020
Department of Mathematics & Steinbuch Center for Computing (SCC), Karlsruhe Institute of Technology (KIT), Germany.
• ***Researcher***

Research Interest

1. Analysis of Partial Differential Equations. 2. Mathematical Physics 3. Engineering Mathematics
3. Mathematical Materials Science. 4. Wave Propagation 5. Uncertainty Quantification.

Scientific Works & Publications

Journal Articles

1. A. Mukherjee and M. Sini, "Heat Generation Using Lorentzian Nanoparticles: Estimation via Time-Domain Techniques," *SIAM Journal on Multiscale Modeling and Simulation*, vol. 21, no. 2, pp. 542–597, 2023.
2. A. Mukherjee and M. Sini, "Acoustic Cavitation using Resonating Micro-Bubbles. Analysis in the Time-Domain," *SIAM Journal on Mathematical Analysis*, vol. 55, no. 5, pp. 5575–5616, 2023.
3. A. Mukherjee and M. Sini, "Heat Generation Using Lorentzian Nanoparticles. The Full Maxwell System," *SIAM Journal on Applied Mathematics*, vol. 84, no. 1, pp. 285–315, 2024.
4. A. Mukherjee and M. Sini, "Time-Dependent Acoustic Waves Generated by Multiple Resonant Bubbles: Application to Acoustic Cavitation," *Journal of Evolution Equations*, vol. 24, no. 90, 2024.
5. A. Mukherjee and M. Sini, "Dispersive Effective Model in the Time-Domain for Acoustic Waves Propagating in Bubbly Media," 2024. SIAM Journal on Applied Mathematics (Accepted). arXiv: 2408.01158 [math.AP].

6 X. Cao, A. Mukherjee, and M. Sini, "Effective Medium Theory for Heat Generation Using Plasmonics: A Parabolic Transmission Problem Driven by the Maxwell System," 2024. Mathematische Annalen (Accepted). arXiv: 2411.18091 [math.AP].

7 A. Mukherjee and M. Sini, "Dispersive Effective Metasurface Model for Bubbly Media," 2024. **In Review to Journal of Differential Equations**. arXiv: 2412.14895 [math.AP].

Education

Oct 2021–Nov 2023 — **Doctor of Philosophy (Ph.D), Johannes Kepler University Linz, Austria.**
Industrial Mathematics.
Thesis Title: *Mathematical Analysis of Therapy Modalities using Heat Generation or Acoustic Cavitation.*
Supervisors: Univ.-Doz. Dr. Mourad Sini and Prof. Dr. Haibing Wang.
Marks/ Grades: 1 **(Excellent)**
PhD Courses: Inverse Problems, Mathematical Methods in Electrodynamics, Integral Equation & Boundary Value Problems, Pseudo-differential operators and Fourier integral operators, etc.

Aug 2018 – May 2020 — **Master of Technology (M.Tech), IIT Madras, India & KIT, Germany.**
Industrial Mathematics and Scientific Computing.
Thesis title: *Approximate-Newton Approach for the Intrusive Polynomial Moment Method.*
Supervisors: Prof. Dr. Sundar S and Prof. Dr. Martin Frank.
Marks/ Grades: 8.91/10
Courses: Mathematical Modelling in Industry, Applied Statistic in R, Numerical PDE, Computer Modelling, Applied Linear Algebra, Numerical Optimization, Data Structure and Algorithm, etc.

Aug 2015 – May 2017 — **Master of Science (M.Sc), Pondicherry University - A Central University, India.**
Mathematics.
Marks/ Grades: 9.83/10
Courses: Mathematical & Functional Analysis, Measure Theory and Integration, Linear Algebra, Advance Algebra, Advance Topology, Ordinary & Partial Differential Equation, etc.

July 2011 – July 2015 — **Bachelor of Science (B.Sc), Vivekananda Mahavidyalaya, The University of Burdwan, India.**
Mathematics.
Marks/ Grades: 7.2/10
Courses: Differential Equation, Group and Field Theory, Number Theory, 2D and 3D Geometry, Theory of Dynamics, Theory of Metric Space, Linear Programming Problem, etc.

Teaching Experience

Instructor (Summer 2025)
1. Introduction to Mathematical Theory of Electromagnetism

Instructor (Winter 2025)
1. Probability Theory and Mathematical Statistics
2. Linear Algebra
3. Mathematics for Biological Sciences
(Calculus, Linear Algebra & Discrete Mathematics)

Student Supervision

Under-graduate
1. Mei Jia, Thesis Title: Introduction to Scattering Theory: Uniqueness Results and Expansion Theorems for Solutions of the Helmholtz Equation

Miscellaneous Academic Success

Fellowships & Awards

2020 Awarded Doctoral Fellowship based on the project FWF-P32660: "**Electromagnetism with Extreme Materials: Modeling, Analysis and Applications**", Austrian Science Fund (FWF), Austria.

2019-2020 Awarded a Scholarship "Combined Study and Practice Stays for Engineers from Developing Countries (KOSPIE) with Indian IITs", Deutscher Akademischer Austauschdienst - **DAAD**, Germany.

2018-2019 Awarded a **Fellowship Half Time Teaching Assistant (HTTA)**, IIT Madras & Ministry of Human Resource Development (MHRD), Chennai, India.

2018 Awarded **DST-INSPIRE Fellowship (Junior Research Fellowship)**, Govt. of India, Ministry of Science and Technology, Dept. of Science and Technology (DST), India. (Not availed)

2016-2017 Awarded a **Merit Scholarship for obtaining good academic performance in MSc**, Pondicherry University (A Central University), Pondicherry, India.

2011-2016 Awarded a **Scholarship for Higher Education – Innovation in Science Pursuit for Inspired Research (INSPIRE)**, Govt. of India, Ministry of Science and Technology, Dept. of Science and Technology (DST), India.

Certification

2018 Qualified in **Graduate Aptitude Test in Engineering (GATE)**, IITs and IISc, All India Rank (AIR) 469, GATE Score 464.

2015 Qualified in **Joint Admission Test (JAM)**, IITs and IISc, India.

Research Activity

Presentations (Invited, conference or Seminar)

2025 The 3^{rd} HKSIAM Biennial Conference, July 7-11, 2025, The Chinese University of Hong Kong and Hong Kong Society for Industry and Applied Mathematics (HKSIAM), Hong-Kong SAR.

The 1^{st} Sino-Belarusian Mathematics and Applied Mathematics Conference, April 3, 2025, Shenzhen MSU-BIT University, China.

The 2^{nd} SMBU Sino-Russian Conference on Mathematics, March 22, 2025, Shenzhen MSU-BIT University, China.

2024 14^{th} AIMS Conference, December 16 – 20, 2024, New York University Abu Dhabi and AIMS, Abu Dhabi, UAE.

CityU-SJTU Joint Workshop on Computational Mathematics, November 23 – 24, 2024, City University of Hong-Kong, Hong-Kong SAR.

9^{th} European Congress of Mathematics (ECM 2024), July 15 - 19, 2024, European Mathematical Society, Spain.

8^{th} International Conference on Applied Mathematics (ICAM 2024), May 28- June 1, 2024, City University of Hong-Kong, Hong-Kong SAR.

Department of Mathematics and Statistics Seminar, "Mathematical Analysis of Therapy Modalities using Acoustic Cavitation", January 18, 2024, IIT Tirupati, India.

2023 17^{th} International Workshop on Optimization and Inverse Problems in Electromagnetism (OIPE 2023), September, 17 – 20, 2023. TU Graz, Austria.

11^{th} Applied Inverse Problems Conference 2023 (AIP 2023), September 4-8, 2023, University of Göttingen, Germany.

3^{rd} Alps-Adriatic Inverse Problems Workshop 2023 (AAIP 2023), July 5-7, 2023, Alpen Adria Universitaet Klagenfurt, Austria.

2022 International Conference on Analysis, Inverse Problems, and Applications, July 18-21, 2022, IIT Madras, India. (Paper accepted for Presentation).

2019 "Stability of miscible displacements in Porous Media: Rectilinear flow", 2019, IIT Madras, India.

Research Activity (continued)

2018
- "Comparative Study of Various Image Noise Reduction Techniques and A Small Survey on PSNR and MSE", 2018, IIT Madras, India.
- "A Small Survey about Traffic Flow Problem", 2018, IIT Madras, India.

Conference/Workshop Organizing

2025
- Co-organizer, Minisymposium: "Inverse Problems for Evolution Equations", 12^{th} Applied Inverse Problem Conference (AIP2025), Rio de Janeiro, Brazil, July 28-August 1, 2025.

Conference Participation

2022
- Special Semester on Tomography Across the Scales, Oct 3 - Dec 2, 2022, RICAM, Austrian Academy of Sciences, Austria.
- Austrian Numerical Analysis Day, May 4-6, 2022, RICAM, Austrian Academy of Sciences and JKU Linz, Austria.

2021
- Special Semester on Tomography Across the Scales, October 11-15, 2021, RICAM, Austrian Academy of Sciences, Austria.

2013
- MTTS (Mathematical Training and Talent Search) Program, IIT Bhubaneswar, School of Basic Sciences, funded by NBHM (National Board of Higher Mathematics), India.

Skills

Languages
- Strong reading, writing and speaking competencies for English, Hindi (National), Bengali (Native).

Coding
- Python, Julia, Matlab, R

Misc.
- LATEX typesetting and publishing.

References

Univ.-Doz. Dr. Mourad Sini
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Inverse Problems and Mathematical Imaging
RICAM, Austrian Academy of Sciences
Altenbergerstrasse 69, 4040 Linz
Upper Austria, Austria.
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Prof. Dr. Martin Frank
Director and Professor
Steinbuch Centre for Computing
Karlsruher Institut für Technologie (KIT)
Hermann-von-Helmholtz-Platz 1
76344 Eggenstein-Leopoldshafen, Germany
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Prof. Dr. Hongyu Liu
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Prof. Dr. S. Sundar (Director, NIT Mizoram)
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