Agniva Banerjee

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Degree/Certificate	Institute	Year	GPA/%
PhD - EECS	Indian Institute of Science Education and Research Bhopal	2024-Present	9.5/10
M.Sc - Applied Mathematics	Indian Institute of Engineering Science and Technology, Shibpur	2022-24	9.64/10
B.Sc - Mathematics	Ramakrishna Mission Vivekananda Centenary College, Rahara	2019-22	8.94/10
Higher Secondary	Ramakrishna Mission Vidyapith, Purulia	2019	88 %
Secondary	Ukhra Kunja Bihari Institution	2017	90.28 %

Ph.D. Thesis

- **Title:** Control and Learning of Autonomous Vehicles
  - **Supervisor:** Dr. Arijit Sen, Electrical Engineering and Computer Science Department, IISER Bhopal
  - **Co-supervisor:** Prof. Sujit P.B., Electrical Engineering and Computer Science Department, IISER Bhopal

WORK EXPERIENCE

- **Project Intern - Indian Institute Of Technology, Ropar (Department Mathematics)** *(May'22-July'22)*
  Project: Riemann Zeta Function and the Prime Number Theorem: A Critical Link in Number Theory
  - This project explores the deep connection between the distribution of prime numbers and the analytic properties of the Riemann zeta function. It highlights how the non-vanishing of the zeta function on the line $Re(s) = 1$ leads to the proof of the Prime Number Theorem. The study emphasizes the role of complex analysis in understanding prime number behavior.

- **Project Intern - Indian Statistical Institute Kolkata (WSDL 2023)** *(Jan'23-March'23)*
  Project: Build Diffusion Model
  - This project focuses on constructing a diffusion model used in generative AI to create realistic images. It explores the mathematical foundation of diffusion processes and how neural networks learn to reverse noise over iterative steps.

PUBLICATIONS

1. **Banerjee, A.**, Sen, A. (2026, January). "Fusing Time-Domain and Constellation Views: A Multimodal MAE for Wireless Signals (Student Abstract)". In AAAI 2026 (accepted).
2. **Banerjee, A.**, Sood, D., Sen, A. & Sujit, PB. (2025, December). "SHIELD: Safe Hybrid Integration of PPO and MPC for Reliable Trajectory Tracking of Autonomous Ground Vehicles". In 13^{th} International Conference on Robot Intelligence Technology and Applications (RITA 2025) (accepted).
3. **Banerjee, A.**, Sood, D., Shah, A. Sen, A. & Sujit, PB. (2025, December). "TRaCe: Trajectory Tracking with Budgeted Localization using Meta-Reinforced Learning and Belief-Aware MPC". In 13^{th} International Conference on Robot Intelligence Technology and Applications (RITA 2025) (accepted).
4. **Banerjee, A.**, Shukla, A., Mathur, Y. & Sen, A. (2025, December). "Continuous-Time Adaptive Distributed Optimization Driven Geometric-mean within a Weight-Unbalanced Network". In Eleventh Indian Control Conference (ICC 2025) (accepted). ***(This paper is selected as one of the finalist for Best Student Paper award)***
5. **Banerjee, A.**, Das, S. & Agarwal, A. (2025, November). "On Visual Saliency Maps for Identifying Fidelity of Deepfake Detection Datasets". In Media Authenticity in the Age of Artificial Intelligence Workshop BMVC 2025 (accepted).
6. Mathur, Y., **Banerjee, A.**, Shukla, A., Deo, I., & Sen, A. (2025, December). "Distributed Optimization Driven by Geometric Mean over an Unbalanced Network". In 12th International Conference on Automation, Robotics and Applications (ICARA 2026) (accepted).

7. Sunil., M, Singh., A, **Banerjee., A**, Sen., A & Sujit., P.B. (2026, March). "Experimental Evaluation Of Multi-Agent Consensus Protocols Using Aerial Swarms". In 18^{th} International Conference on Agents and Artificial Intelligence (ICAART 2026) (accepted).

8. **Banerjee, A.** (2025, January). "Quantum-enhanced machine learning for precision breast cancer diagnosis". In: Proc. of 2025 17^{th} International Conference on COMmunication Systems & NETworkS (COMSNETS), pp. 1124–1129, 2025.

ACCEPTED STUDENT ABSTRACT

1. Mathur, Y., **Banerjee, A.**, Shukla, A., & Sen, A. (2025, December). Distributed Optimization Driven by Geometric Mean over an Unbalanced Network. (***This paper is selected as one of the finalist for Best Poster award at IEEE MRS 2025)***

2. Chandpa, D., Rajan, A., Kushwaha, A., **Banerjee, A.,** Sen, A. & Thakar, P.S. (2025, December). Smart Waste Classification System: Experimental Validation. (accepted for Oral Presentation at the Eleventh Indian Control Conference)

3. Sunil, M., Singh, A., **Banerjee, A.**, Sen, A., & Sujit., P.B. (December 2025). Experimental Evaluation Of Multi-Agent Consensus Protocols Using Aerial Swarms. (accepted for Oral Presentation at the Workshop on Advances in AI-Driven Control and Estimation for Robotics and Autonomous Systems ICC 2025)

4. Nayak, P., Srivastava, M., Agnihotri, H., **Banerjee, A.** & Sen, A. (December 2025). Experimental Evaluation Of Multi-Agent Consensus Protocols Using Aerial Swarms. (accepted for Oral Presentation at the Eleventh Indian Control Conference)

5. Sinha, K., Joshi, M., Baranwal, A., **Banerjee, A.** & Sen, A. (December 2025). Hybrid Learning-based Control for Reliable Robotic Arm Manipulation. (accepted for Oral Presentation at the Workshop on Advances in AI-Driven Control and Estimation for Robotics and Autonomous Systems ICC 2025)

SUBMITTED PAPERS

- **RestAware: Non-Invasive Sleep Monitoring Using FMCW Radar and AI-Generated Summaries** *(Submitted at IEEE Internet of Things Journal)*
  - This paper proposes a non-invasive, FMCW radar-based sleep monitoring system that uses machine learning for posture and behavior recognition, achieving 92% accuracy and enabling real-time, privacy-preserving sleep tracking with human-readable summaries via instruction-tuned language models.
- **Cooperative Containment using Binary State Measurements under a Switching Network** *(Submitted at IFAC World Congress 2026)*
  - Proposed a novel containment-based consensus algorithm that enables agents to achieve consensus in an undirected network under a switching based topology.

CURRENT PROJECTS

- **Heterogeneous Event-Triggered Min-Consensus Strategy under Unifromly Strongly Connected Networks**
  - The work proposes a scalable event-triggered min-consensus protocol for heterogeneous agents that reduces communication and avoids Zeno behavior.
- **Preference-driven Differentiable MPC with Reinforcement Learning for Social Navigation**
  - Developing a preference-driven, differentiable MPC and reinforcement learning (DMPC+RL) framework to manage social navigation for a multi-agent drone swarm.

FELLOWSHIP AND GRANTS

- **AAAI Student Scholarship (2026)** — Received a prestigious student scholarship to present my work at the AAAI Conference on Artificial Intelligence (AAAI-26).
- **IEEE RAS Travel Support (2025)** — Awarded competitive travel funding to present my research at the International Symposium on Multi-Robot and Multi-Agent Systems (MRS 2025).
- **Indian Control Conference Student Support (2025)** — Student funding awarded to present my research at the Eleventh Indian Control Conference (ICC 2025).
- **Dr. A.P.J. Abdul Kalam Young Research Fellowship (2024–25)** — Awarded for outstanding research contributions and academic excellence.
- **Indian Control Conference Student Support (2024)** — Student funding awarded to attend at the Tenth Indian Control Conference (ICC 2024).

SCIENTIFIC DUTY

- Reviewer of the following (but not limited to) publication venues:
  - **Journals:** Scientific Reports, IEEE Sensor Journal, ScienceDirect NAHS.
  - **Conferences:** IFAC, CORL, RITA, PREMI, ICC, F&G, IJCB.

SKILLS & INTERESTS

- **Programming Languages**: ROS, Python, Matlab, C
- **Tools & Libraries**: Gazebo, Gym, Numpy, Pandas, Matplotlib, Scikit, Tensorflow, Pytorch, Qiskit
- **Interests**: Computer Vision, Deep Learning, Reinforcement Learning, Multi Agent Systems, Control System, SLAM

POSITIONS OF RESPONSIBILITY & ACHIEVEMENTS

- Selected to present our ongoing research at the **Indian Mobile Congress 2025**.
- Selected for **Student Innovation Grant** at Indian Institute of Science Education and Research Bhopal.
- Received **Dr. A.P.J. Abdul Kalam Young Research Fellowship 2024-25**.
- Cleared TCS NQT 2024 as a Digital Profile.
- Secured All India Rank 715 in GATE MA 2023.
- Teaching Assistant for the courses, ECS323 : Control System, ECS311 : Applied Optimization, ECS201 : Discrete Mathematics. Conducted tutorials/lab sessions, evaluated assignments, quizzes and examination papers.
- **NCC Cadet** [Jan'15-Jan'16]
  - Responsible for National Cadet Crops
  - WBNCC/ARMY-CERT/16/166