

Aheli Poddar

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Education

- 09/22 - 06/26 **B.Tech. Electrical Engineering**, *Institute of Engineering & Management Kolkata*, India, [9.6/10.0]
o **Dept. Rank 4** out of 56 students in third year (**Transcript**)
o Recipient of **Alumni Merit Scholarship (100% fee waiver)** in fourth semester

Publications & Preprints

- [ArXiv, GitHub] *Understanding Syllogistic Reasoning in LLMs from Formal and Natural Language Perspectives*; **Aheli Poddar**, Saptarshi Sahoo, Sujata Ghosh. **Paper accepted at Bridge Logic & AI @ AAAI'26.**
[Preprint TBA] *AgrilR: A Scalable Framework for Domain-Specific Knowledge Retrieval*; **Aheli Poddar***, Shuvam Banerji Seal*, Alok Mishra*, Dwaipayan Roy. **Paper accepted at IR for Good @ ECIR'26.**

* - Equal Contribution

Presentations

- [Poster] *Metaheuristic Hyperparameter Optimization of Short-Term Weather Forecasting Models for Sustainable Agriculture*; **Aheli Poddar**, Puspargha Roy. **Accepted at AI for Climate Change Summit @ PJMT NGE'24, Oral (~top-2%).**
[Outreach] *Hybrid BiLSTM Framework for Nowcasting India's Economic Growth Trends*; **Aheli Poddar**, Dr D. Bharat. **Oral Poster @ IIT Roorkee SPARK Fellow Symposium'24.**

Experience

- 02/2026 **Red Hat**, PyTorch Engineering Intern, Bangalore, India
Present
o Contributing to upstream **PyTorch** by implementing fixes/PRs across the TorchCompile, TorchDynamo and TorchInductor stack. [GitHub]
o Initiated a GPU kernel profiling project focused on **CUDA**, **Triton** and **Helion**, analyzing performance bottlenecks using NVIDIA Nsight tools.
- 06/2025 **European Summer of Code Mentee**, Berlin, Germany
12/2025 Mentors: **Franz Király**, **Marc Rovira**, **Ankur Ankan**
o Collaborating with **German Center for Open Source AI** and **Electrolux Group** on causal inference for industrial time series analysis, targeting supply chain optimization and predictive applications.
o Contributing to open-source libraries **sktime** and **pgmpy** with multiple merged and open PRs implementing scoring methods and Causal discovery algorithms (#8797, #9075, #2269, #2295, #9023, #2380).
- 05/2025 **IIT Hyderabad [GitHub]**, Research Intern, India
07/2025 Mentor: **Dr Priyesh Shukla**
o Implemented custom BERT transformer architecture with multi-head self-attention mechanisms; researched Matrix Product Operator (MPO) decomposition techniques for neural network weight compression [GitHub].
o Investigated variational quantum circuits (VQC) for hybrid quantum-classical architectures; conducted comparative analysis of tensor network topologies including Tree Tensor Networks and Tensor Rings for transformer optimization.
- 05/2024 **IIT Roorkee**, SPARK Fellow, Summer Research Intern, India
07/2024 Mentor: **Dr D. Bharat**
o Engineered modified BiLSTM architecture for GDP nowcasting incorporating 32 macroeconomic indicators; achieved RMSE of **0.165** outperforming baseline LSTM and ARIMA models.
o Developed metaheuristic optimization framework integrating Particle Swarm Optimization (PSO) and Differential Evolution algorithms for automated hyperparameter tuning.

Projects

- 11/2025 **ExogenousAI, 4th Place – Apart Research AI Forecasting Hackathon**
o Developed quantitative framework for modeling AI capability timelines under exogenous policy and market shocks using MacKinlay-style event study methodology [GitHub].
o Implemented Monte Carlo simulations with Geometric Brownian Motion incorporating policy drift terms and volatility decomposition for probabilistic AGI timeline stress testing.

- Ongoing **Fernholz Stochastic Portfolio Theory Library**, Mathematical Finance | Portfolio Optimization
 - o Developing open-source Python library implementing E.R. Fernholz's Stochastic Portfolio Theory for functionally generated portfolios and relative arbitrage strategies [[GitHub](#)].
 - o Implementing entropy-based diversity measures, market capitalization ranking algorithms, and log-optimal growth rate calculations using continuous semimartingale theory.
 - o Building Monte Carlo backtesting framework for evaluating portfolio strategies under various volatility regimes and market conditions.
- 08/2025 **IndicAgri, Top 14 Nationals - Capital One Launchpad Hackathon**
 - o Developed multi-modal Retrieval-Augmented Generation (RAG) chatbot supporting **20+** Indian languages for agricultural advisory services.
 - o Engineered autonomous data pipeline constructing 15,000+ document knowledge base from government agricultural resources; implemented chunking strategies and embedding optimization for domain-specific retrieval.
 - o Achieved **45%** reduction in inference latency through model quantization (INT8/INT4), KV-cache optimization, and intelligent response caching mechanisms.
- 04/2025 **DeepLense**, Google Summer of Code 2025 Evaluation - ML4SCI
 - o Designed ensemble DenseNet architecture achieving **96.4%** accuracy in multi-class classification of gravitational lensing images; implemented custom ResNet for continuous parameter regression (**RMSE 0.034**).
 - o Built convolutional Variational Autoencoder (VAE) with 256-dimensional latent space for synthetic data generation; achieved **87%** structural similarity (SSIM) between generated and real astronomical images

Grants, Fellowships & Scholarships

- 2025 **European Summer of Code Mentee** – Selected for open-source research contribution program
- 2025 **Google Generation APAC Scholar** – Selected across Asia-Pacific for leadership and academic excellence
- 2025 **McKinsey APAC Next Generation Women Leader** – Recognition for leadership potential in technology
- 2025 **McKinsey Forward Scholar** – Professional development program for emerging leaders
- 2024 **SPARK Fellowship, IIT Roorkee** – Competitive research fellowship for summer research internship
- 2023 **Amazon AWS AI & ML Scholar** – Scholarship for demonstrated excellence
- 2021 **JBNSTS Senior BKMB Scholar** - Highly competitive merit-based state scholarship

Awards & Honors

- 2026 **Top 3 State Representative** – [VBYLD 2026](#) (National Parliamentary forum in New Delhi with Hon. PM)
- 2025 **4th Place** – Apart Research AI Forecasting Hackathon 2025
- 2025 **Top 14 National Finalist** – Capital One Launchpad Hackathon 2025 (5000+ teams)
- 2024 **Top 5 National Semifinalist** – Google Girls Hackathon India 2024
- 2024 **Top 2% Delegate** - Harvard Project for Asian and International Relations 2024 (50000+ applicants)
- 2024 **Best Paper Award** – PJMT AI for Climate Change Summit 2024
- 2023 **Top 150 Regionals** - IET India Scholarship 2023 (43137 applicants)
- 2023 **Global Finalist** – TCS Quantum Challenge 2023

Technical Proficiency

Languages	Python, C/C++, MATLAB, R, SQL, \LaTeX
Tools & Frameworks	Pandas, LangChain, PyTorch, TensorFlow, Scikit-learn, Hugging Face Transformers, Keras, Sktime, Pgmpy, Git/Github, Linux
Analytical Methods	Statistical Modeling, Time Series Analysis, Causal Inference, Monte Carlo Simulations

Relevant Coursework

Mathematics	Advanced Calculus, Ordinary Differential Equations, Probability & Statistics, Complex Analysis
Computer Science	Data Structures & Algorithms, Artificial Intelligence & Machine Learning, Database Management System, Object-Oriented Programming, Computer Network
Engineering	Signal Systems, Control Systems, Power Systems I/II, Analog Electronics, EMFT, Microprocessors

Professional Memberships & Service

- Present **Co-Lead** – Uttaran Social Welfare Club, IEM Kolkata
- Present **Student Member & Volunteer** – IEEE CS & WIE Society
- 2022 - 2025 **Core Board Member** – AI/ML Google Developers Student Club, IEM Kolkata