

EDUCATION

MS/PhD ECE, UCLA

September 2024 - Present

- GPA: 3.96/4.0 (Updated: July 2025) [[transcript](#)]

B.Tech ECE, Manipal Institute of Technology [[transcript](#)]

July 2018 - August 2022

- CGPA: 9.24/10.0 (**3.94/4.0**) (Minor in Data Science: 10.0/10.0)
- Ranked 1st in the 7th semester with a GPA of 9.8/10
- Awarded a [Certificate of Merit](#) for being ranked 11th out of 228 finishing in the top 5%

MAJOR RESEARCH PUBLICATIONS AND PROJECTS

- [Published - 6 June 2025] J. Hirschman, H. Zhang, R. Lemons, F. Cropp, B. Mencer, and **A. Borthakur**, *Leveraging the capabilities of LCLS-II: Linking adaptable photoinjector laser shaping to X-ray diagnostics through start-to-end simulation*, **16th International Particle Accelerator Conference (2025)**, ([pdf](#))
- [Accepted - 16 May 2025] **A. Borthakur**, J. Hirschman, S. Carbajo, *Ultrafast Pulse Retrieval from Partial FROG Traces Using Implicit Diffusion Models*, **Optica Nonlinear Optics Topical Meeting 2025**, (Paper and code coming soon !)
- [Preprint - 27 March 2025] J. Hirschman, **A. Borthakur**, J. Baker, and S. Carbajo et al., *Long-short term memory model for χ^2 nonlinear processes: Enhancing simulation with ML*, **arXiv [physics.optics] (2025)**, ([preprint](#))
- [Accepted - 21 March 2025] J. E. Hirschman, E. Abedi, H. Zhang, R. Lemons, **A. Borthakur**, J. Baker, and S. Carbajo, *Towards digital twins of high-power laser systems*, **Solid State Lasers XXXIV: Technology and Devices**, (SPIE, 2025), p. 50.
- [Published - 05 January 2024] G. Bhatta, S. Gharat, **A. Borthakur** and A. Kumar, *Gamma-ray Blazar Classification using Machine Learning with Advanced Weight Initialization and Self-Supervised Learning Techniques*, **Monthly Notices of The Royal Astronomical Society**, ([Link](#)) ([Code](#))
- [Published - 23 November 2023] S. Gharat, **A. Borthakur** and G. Bhatta, *Estimation of redshift and associated uncertainty of Fermi/LAT extra-galactic sources with Deep Learning*, **Monthly Notices of The Royal Astronomical Society**, ([Link](#)) ([Code](#))
- [Accepted - 31 October 2023] S. Gharat, G. Bhatta and **A. Borthakur**, *Gamma Ray AGNs: Estimating Redshifts and Blazar Classification using Neural Networks with smart initialization and self-supervised learning*, **37th Conference on Neural Information Processing Systems (NuerIPS) @ ML4PS workshop**, ([Paper #116](#)) ([Paper pdf](#)) ([Poster png](#))
- [Published - 12 July 2023] S. Gharat, B. Bose, **A. Borthakur** and R. Mazumder, *An Image Processing approach to identify solar plages observed at 393.37 nm by the Kodaikanal Solar Observatory*, **Royal Astronomical Society Techniques and Instruments**, ([Link](#)) ([Code](#))

RESEARCH EXPERIENCE

Quantum Light-Matter Co-Operative (QLMC) @ UCLA ([Website](#))

October 2024 - Present

Start-to-End (S2E) Modeling Framework for a high-powered laser system

Guide: Prof. Sergio Carbajo, UCLA

- Led the development of a high-fidelity digital twin for a high-powered laser system, integrating complex nonlinear optical phenomena like CPA [\[ref\]](#).
- Built a synthetic data pipeline generating 1M+ spectrogram-pulse pairs to train and evaluate large ML models across diverse optical simulation settings.
- Achieved 10× improvement in pulse retrieval from sparse FROG spectrograms using diffusion models, outperforming state-of-the-art (SOTA) CNN and RNN baselines [\[ref\]](#).

University of Zielona Góra & IIT Bombay

September 2022-January 2024

Gamma Ray AGNs: Estimating Redshifts and Blazar Classification using Neural Networks with smart initialization and self-supervised learning

Guide: Prof. Gopal Bhatta, University of Zielona Góra, Poland

- Developed a neural network to predict redshifts of active galactic nuclei — with a correlation of 0.78, outperforming previous SOTA models [\[ref\]](#).
- Modeled uncertainty using variational inference, enabling reliable redshift predictions even for sources lacking ground truth labels.
- Designed and deployed an algorithm to classify supermassive blackhole systems on [AWS EC2](#), achieving 93% accuracy and 0.914 F1-score, 7× faster than previous SOTA [\[ref\]](#).

WORK EXPERIENCE

Seance Inc @ Pune, Maharashtra, India

January 2022 - September 2022

Machine Learning Engineer

Manager: Dr. Muthukumaraswamy B, Associate Director - Applied AI

- Earned the [Google Cloud Professional ML Engineer Certificate](#) within 6 months — an exam recommended for professionals with 3+ years of industry experience.
- Architected a custom OCR system to extract fields from Indian tax forms, achieving 92.1% mean average precision on test data with an average (CPU) processing time of 3.4 seconds.
- Co-led the database design pipeline for a US-based client project, deployed at scale on GCP BigQuery.

SKILLS

- **Languages:** C, C++, Python, Java, MATLAB, LabVIEW, R, RStudio, SQL
- **Frameworks:** OpenCV, TensorFlow, Scikit-Learn, PyTorch
- **Cloud:** GCP, AWS
- **Experiment tracking:** Weights and Biases, mlflow
- **Containerization:** Docker, Kubernetes
- **Version Control:** Git
- **Projects:** [Portfolio](#)
- **Certifications:** [List of certifications](#)
- **TOEFL:** [Score report](#)