Debabrata Mandal

linkedin·debabrata-mandal — homepage — git·codejaeger

RESEARCH INTERESTS

Broad interests: Image/video generation and understanding, domain generalization
Current: Camera-aware video generation, computational imaging, diffusion models
Past: High-performance computing, 3D inverse rendering, human pose tracking

EDUCATION

University of North Carolina, Chapel Hill, United States — Aug 2023 — Present
Ph.D. in Computer Science
Advisor: Prof. Praneeth Chakravarthula

University of North Carolina, Chapel Hill, United States — Aug 2023 — Aug 2025
MS in Computer Science — Grade: H (highest)
(Obtained en route to Ph.D.)

Indian Institute of Technology, Madras, India — July 2021 — June 2022
Course only (9.0/10.0) (Part-time)
Focus: Convex Optimization (Research on Distributed ADDM)

Indian Institute of Technology, Bombay, India — July 2017 — June 2021
Bachelor of Technology: Computer Science (8.69/10.0)
Research Focus: 3D hand mesh tracking and registration

EXPERIENCE

VCAIL Lab — UNC-CH
Research assistant — July 2023 - Present

- Full camera-aware optical video generation using disentangled 3D scene and camera representations
- Controllable and scalable all-in-one image restoration using mixture-of-experts for latent diffusion models
- Validate novel metalens designs for applications in wearable displays and thin cameras

Advanced Micro Devices — Santa Clara, USA
Co-Op GenAI Intern — June 2025 - Aug 2025

- Worked on accelerated game rendering using 3D aware video generation models for faster rendering cycles
- Explored camera control integration into latest video diffusion model architectures

KLA-Tencor Corp. Chennai, India
Algorithm Engineer July 2021 — July 2023

- Optimized inference throughputs of defect detection networks by 6x (2x compute & 3x memory) on bare metal Nvidia Tesla cards (INT8) using GPU efficient algorithms
- Part of the development team responsible for building next-gen inference framework (in `CUDA` and C++17) shipped with memory improvements over Tensorflow

VIGIL Lab IIT Bombay
URA, Prof. Parag Chaudhuri December 2020 — July 2021

- Developed a hand mesh to point cloud registration algorithm from RGBD data using a non-linear entropy optimization in the presence of severe occlusions

PUBLICATIONS

Accepted

- UniCoRN: Latent Diffusion-based Unified Controllable Image Restoration Network across Multiple Degradations, **D. Mandal**, S. Chattopadhyay, G. Tong, P. Chakravarthula (WACV'2026)
- Enabling High-Quality In-the-Wild Imaging from Severely Aberrated Metalens Bursts, **D. Mandal**, Z.Peng, Y. Wang, P. Chakravarthula (WACV'2026)

Published

- Split-Knit Convolution: Enabling Dense Evaluation of Transpose and Dilated Convolutions on GPU, A. Vadakkeveedu, **D. Mandal**, P. Ramachandran and N. Chandrachoodan (HiPC'2022)

OPEN SOURCE

Javis.jl, The Julia Project Remote,
Open Source contributor, GSOC'21 March 2021 — Sept 2021

- Fix issues and add features to Javis.jl, the highest-starred open source 2D animation package in the Julia community
- Start and independently maintain JavisGraphs.jl as a package to animate network graphs using Javis.jl (work started as part of GSoC'21)

Open Horizon (IBM), The Linux Foundation Remote,
LFX mentee March 2021 — June 2021

- Implemented (in Go) a secret sharing mechanism between isolated edge nodes (agbots) and management nodes using Hashicorp Vault.
- Eliminated secret-leaking within nodes using access control lists.

Boost.C++ Remote,
Open Source contributor, GSOC'20 March 2020 — Sept 2020

- Designed a generic multidimensional histogram container class tailored for Boost.GIL using template meta-programming in C++11
- Implementation supports image processing algorithms with superior quality and comparable speeds to ones in OpenCV.

AWARDS

Bertelsmann Technology Nanodegree Scholar, Udacity Remote
Free course enrollment to top 500/50k based on course performance 2021

Kaggle's November ML Research Spotlight global winner Remote
1000 $ awared to top 3 out of all submissions Nov 2022

x2 times LiFT scholar Remote
Scholarship to pursue any Linux foundation sponsored certification course 2021, 2020

OTHER EXPERIENCES

Automation in games Pune, India
Intern, Ubisoft May 2019 — June 2019

- Developed an AI based game scorer for `Steep` to automatically find scoring bugs
- Created an intelligent RL agent using Deep Q-Learning and mobile object detection to correct scoring bugs within game

IITB Mars Rover team Mumbai, India
Mars Rover project Sept 2018 — April 2019

- Integrated the visual SLAM algorithm Gmapping's feedback with the rover's control system (in ROS)
- Improved rover's path-planning module using the A* algorithm

SKILLS

- **Programming:** Python, C/C++(11/14/17), Julia, Matlab, GoLang
- **Software:** Linux systems, Tensorflow/PyTorch, OpenGL/Open3D, WebGL (three.js), Scikit-Learn, CUDA, ONNX, Zemax OpticStudio, Blender
- **Soft Skills:** Technical writing, mentoring, communications, organising workshops