

# Shika Rao

## Curriculum Vitae

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### Education

2024–2026 : **Master of Science, Computer Science**, *New York University, Courant Institute of Mathematical Science (NYU)*.

CGPA : 3.9/4

2019–2023 : **Bachelor of Engineering, Electrical & Electronics Engineering**, *Birla Institute of Technology and Science, Pilani (BITS Pilani)*.

CGPA : 8/10

### Publications

TMLR 2025 Shankhanil Mitra, Diptanu De, **Shika Rao**, and Rajiv Soundararajan, Image and Video Quality Assessment using Prompt-Guided Latent Diffusion Models for Cross-Dataset Generalization. Transactions on Machine Learning Research (TMLR) [\[Link\]](#)

WACV 2024 Suhas Srinath, Shankhanil Mitra, **Shika Rao**, and Rajiv Soundararajan, Learning Generalizable Perceptual Representations for Data-Efficient No-Reference Image Quality Assessment. Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) [\[Link\]](#)

ICVGIP 2024 Sanjot Sagar Totade, Nithin C. Babu, **Shika Rao**, and Rajiv Soundararajan, Internal Embeddings of Multi-modal LLMs as Generalizable Representations for Image Quality Assessment. Proceedings of the Fifteenth Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP) [\[Link\]](#)

MGV 2023 **Shika Rao**, and Nitya Mitnala, Exploring Automated Object Detection Methods for Manholes Using Classical Computer Vision and Deep Learning. Machine Graphics & Vision (MGV) [\[Link\]](#)

Vehicles 2022 **Shika Rao**, Alexander Quezada, Seth Rodriguez, Sebastian Chinolla, Chan-Jin Chung, and Joshua Siegel, Developing, Analyzing, and Evaluating Vehicular Lane Keeping Algorithms Using Electric Vehicles. Vehicles [\[Link\]](#)

### Research Experience

Jan 2023 - **Indian Institute of Science (IISc)- Visual Information Processing Lab.**

June 2024 Prof. Rajiv Soundararajan

Summer 2022 **Lawrence Technological University and Michigan State University- National Science Foundation Research Experience for Undergraduates (NSF REU) Intern.**  
Prof. C.J. Chung and Prof. Joshua Siegel

Summer 2021 **University of Maryland (Remote Intern).**  
Prof. Lester Schultheis

## Work Experience

Summer 2025 **Dell Technologies- Applied AI Research and Engineering Team, Austin.**

Dr. Xiongyu Chen

July 2022 - **Dell R&D Division, Bangalore.**

January 2023

## Selected Projects

### 1. New York University — Course Project.

Advisor Prof. Ilia Sucholutsky

Topic Alignment of Vision-Language Models by Learning from Multimodal LLMs with Limited Data

- Found that multimodal LLMs exhibit greater robustness to spurious correlations than vision-language models (VLMs).
- Proposed a novel few-shot distillation framework transferring latent reasoning and language structure from multimodal LLMs to VLMs, improving alignment under data-scarce settings.
- Developed an unsupervised contrastive learning method leveraging gradient activations and class activation maps (CAMs) to refine VLM representations.
- Achieved a 51.74% improvement over state-of-the-art on the worst-group accuracy metric on the Waterbirds dataset. [\[GitHub\]](#)

### 2. New York University — Course Project.

Advisor Prof. Jinyang Li

Topic Optimizing Gaussian Splatting Kernels for 3D Rendering (Inference Optimization)

- Benchmarked 3D Gaussian Splatting (3DGS), Level-of-Detail pruning methods, SpeedySplat, and TCGS (TensorCore-optimized 3DGS) on the MipNeRF-360 dataset.
- Profiled all methods using NVIDIA Nsight to identify computational bottlenecks.
- Improved performance through engineering optimizations including CUDA Graphs and pipelined WMMA matrix multiplications.
- Achieved a 1.4× speedup over TCGS, a recent state-of-the-art method (published Oct. 2025). [\[GitHub\]](#)

### 3. Indian Institute of Science (IISc).

Advisor Prof. Rajiv Soundararajan

Topic Video Quality Assessment with Generative Diffusion Models

- Improved Stable Diffusion-based quality modeling by fine-tuning cross-attention maps using prompt learning, QLoRA adapters, and post-training quantization (PTQ).
- Designed a temporal quality modulator combining diffusion features with multi frame-rate motion features.
- Achieved a 31% improvement over state-of-the-art on PIPAL and a 39% improvement on temporal quality metrics for LIVE-YT-HFR. [\[Paper\]](#) [\[GitHub\]](#)

### 4. Indian Institute of Science (IISc).

Advisor Prof. Rajiv Soundararajan

Topic Image Quality Assessment with VLMs and Multimodal LLMs

- Applied a group contrastive learning framework to improve CLIP-based VLM representations for perceptual quality assessment.
- Designed a quality-weighted contrastive loss for better feature learning.
- Achieved a 43% improvement over state-of-the-art on the PIPAL dataset. [\[Paper\]](#) [\[GitHub\]](#)
- Proposed a self-supervised IQA framework resolving multimodal LLMs' inability to distinguish images with identical content but varying distortions, leading to ~5% additional gains. [\[Paper\]](#) [\[GitHub\]](#)

## 5. Michigan State University & Lawrence Technological University.

Advisors Prof. C. J. Chung, Prof. Josh Siegel

Topic Perception Systems for Autonomous Vehicles

- Designed and evaluated lane-keeping algorithms under challenging conditions on full-scale electric vehicles using classical computer vision techniques (Canny edge detection, Hough transforms) and two novel algorithms (blob and spring physics based).
- Integrated perception pipelines with drive-by-wire systems and multimodal sensor data. [\[Paper\]](#) [\[GitHub\]](#)
- Benchmarked classical approaches against deep learning-based object detection for manhole cover detection, evaluating accuracy, inference speed, and computational complexity. [\[Paper\]](#) [\[GitHub\]](#)
- Built an Automated Intersection Management System (AIMS) using A\* path planning, SLAM (gmapping), pure-pursuit control, and occupancy grid mapping in ROS and Gazebo.

## 6. University of Maryland.

Advisor Prof. Lester Schultheis

Topic Diagnostic Device for Visual Snow Syndrome (VSS)

- Investigated Visual Snow Syndrome, a rare neurological disorder, and collected evidence supporting its classification for an FDA Humanitarian Use Device (HUD) proposal.
- Developed a diagnostic software system to simulate VSS symptoms and quantify sensitivity analysis and disease progression. [\[GitHub\]](#)

## Academic Achievements

2019 - 2023 Recipient of 30% merit scholarship at BITS Pilani.

## Academic Services

NYU **DS 301: Advanced Topics in ML and DL: Intro to Deep Learning and LLM-based Generative Systems**

Fall 2024, Spring 2025, Fall 2025, Spring 2026

Developed the laboratory course material. Taught lab sessions and supervised student projects (research and industry oriented applications).

Instructor: Prof. Parijat Dube

BITS Pilani **Student Welfare Division (SWD)**

Designed and implemented a scholarship program for students using surplus funds. Provided mentorship and facilitated professor-student communication through management of the SWD website.

Supervisor: Prof. Kannan Ramaswamy

Reviewer CVPR 2024, ACM Multimedia 2024