Shreshth Saini

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Education

MS+Ph.D. in Electrical and Computer Engineering (DICE Track)
The University of Texas at Austin, USA *2022 – 2026*
Supervisor: **Prof. Alan C Bovik**

Bachelor of Technology in Electrical Engineering
Indian Institute of Technology (IIT) Jodhpur, India *2016 – 2020*
Supervisor: **Dr. Anil K Tiwari**

Research Interests

Generative AI, Multimodal LLMs, Diffusion Models, Computer Vision, High Dynamic Range (HDR) Imaging, Perceptual Quality Assessment, Inverse Problems.

Selected Employment and Research Appointments

Graduate Research Assistant **Austin, Texas**
YouTube/Laboratory for Image and Video Engineering, UT Austin *Aug. 2022 – Present*
- Developing scalable vision models for HDR video tasks including Inverse Tone Mapping (ITM) and quality assessment.
- Created the largest public HDR UGC video dataset and developed novel MLLM-based Video Quality Assessment (VQA) methods; currently researching HDR Video Generation and Discrete Diffusion Models.

Student Researcher **Mountain View, California**
Google Research (LUMA Team) *June 2025 – Oct 2025*
- Engineered a scalable multi-modal, multi-task perceptual quality evaluator to automate internal image generation model assessment and accelerate data labeling pipelines.
- Worked with the **Gemma 3** multimodal model, implementing advanced post-training techniques including Supervised Fine-Tuning (SFT), DPO, and Reinforcement Learning (RL/GRPO).

Applied Scientist Intern **Seattle, Washington**
Amazon (Prime Air / Perception) *June 2024 – August 2024*
- Developed synthetic data generation pipelines using SD1.5 and SDXL for consistent image/video editing, enhancing training data diversity for Prime Air perception systems.
- Established a novel image/video editing benchmark and learned metric on internal preference datasets to rigorously train and evaluate generative models.

Research Intern **Sunnyvale, California**
Alibaba Group *Jan. 2024 – May 2024*
- Pioneered an inference-time Image Quality Assessment (IQA) metric by extracting perceptual priors from the UNet latents of pre-trained diffusion models (SD1.5).
- Validated the efficacy of latent-based metrics for generalizable quality evaluation, demonstrating superior alignment with human perception compared to standard baselines.

Co-Founder **Austin, Texas**
Short-X *Jan. 2023 – Jan. 2024*
- Built core AI pipelines to automate short-form content creation from long-form videos, including transcription, semantic highlight extraction, and smart vertical cropping.

Machine Learning Engineer **Singapore**
BioMind *Feb. 2022 – June 2022*
- Developed SOTA multimodal DL models for segmentation and classification of 25+ tumor classes; optimized memory-intense 4D datasets using TFRecords.

Research Engineer – AI **Kyoto, Japan (Remote)**
Arkray, Inc. *Aug. 2020 – Dec. 2021*
- Proposed semi-supervised DL models to leverage large-scale unlabelled private datasets; deployed models for commercial products including the *Aution EYE* analyzer.

Research Assistant **Singapore**
National University of Singapore, Singapore *May 2019 – July 2019*
- Developed novel deep learning architectures for large-scale public health datasets; published SOTA results for skin lesion analysis with low computational cost.

Publications

Conferences:

1. **Trajectory-Aware Backward-on-Entropy Steering for Masked Diffusion Model**
   S Saini, A Saha, B Adsumilli, N Birkbeck, Y Wang, AC Bovik. ***Under Review - ICML 2026***
2. **LumaFlux: Lifting 8-Bit Worlds to HDR Reality with Physically-Guided Diffusion Transformers**
   S Saini, H Gedik, N Birkbeck, Y Wang, B Adsumilli, AC Bovik. ***Under Review - CVPR 2026***
3. **Seeing Beyond 8bits: Subjective and Objective Quality Assessment of HDR-UGC Videos**
   S Saini, B Chen, N Birkbeck, B Adsumilli, AC Bovik. ***Under Review - CVPR 2026***
4. **BrightRate: Quality Assessment for User-Generated HDR Videos (Oral)**
   S Saini, B Chen, N Birkbeck, B Adsumilli, AC Bovik. ***IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2026***
5. **Rectified CFG++ for Flow Based Models**
   S Saini, S Gupta, AC Bovik. ***The Thirty-Ninth Annual Conference on Neural Information Processing Systems (NeurIPS 2025) ; (Also at 3rd CVPR Workshop on Generative Models)***
6. **LGDM: Latent Guidance in Diffusion Models for Perceptual Evaluations**
   S Saini, R Liao, Y Ye, AC Bovik. ***International Conference on Machine Learning (ICML) 2025***
7. **CHUG: Crowdsourced User-Generated HDR Video Quality Dataset**
   S Saini, N Birkbeck, B Adsumilli, AC Bovik. ***IEEE International Conference on Image Processing (ICIP) 2025***
8. **Contrastive HDR-VQA: Deep Contrastive Representation Learning for HDR Video Quality Assessment**
   S Saini, A Saha, AC Bovik. *IEEE/CVF WACV 2024*
9. **(M)SLAe-Net: Multi-Scale Multi-Level Attention Embedded Network for Retinal Vessel Segmentation**
   S. Saini, G. Agrawal. *IEEE ISBI 2021 & IEEE ICHI 2021 (Oral)*
10. **B-SegNet: Branched SegMentor Network for Skin Lesion Segmentation**
    S Saini, YS Jeon, M Feng. *ACM CHIL 2021 (Oral)*
11. **Detector-SegMentor Network for Skin Lesion Localization and Segmentation**
    S Saini, D Gupta, AK Tiwari. *NCVPRIPG 2019 (Oral)*

Journals & Book Chapters:

1. **PixISegNet:pixel-level iris segmentation network using convolutional encoder–decoder with stacked hourglass bottleneck**
   RR Jha, G Jaswal, **S Saini**, et al. *IET Biometrics, 2019*
2. **Iris Segmentation in the Wild using Encoder-Decoder based Deep Learning Techniques**
   S Saini, et al. *AI and Deep Learning in Biometric Security, CRC Press, 2020*

Selected Coursework

- ***CS/EE***: Computational and Variational Methods for Inverse Problems, Applied Machine Learning, Machine Learning, Artificial Intelligence, Advanced Computer Vision, Digital Image Processing, Computational Imaging, Digital Video, Vision Systems, Information Theory and Coding, Algorithms.
- ***Mathematics***: Probability, Statistics, and Random Processes, Linear Algebra and Calculus, Complex Analysis and Differential Equations, Adv. Probability and Stochastic Processes, Statistical Methods I/II.
- ***Others***: Principles of Management, Professional Ethics, IP Management and Exploitation, Technology Management, Basic of Leadership, Longhorn Startup.

Technical Skills

- ***Languages:*** Python, MATLAB, Bash, SQL.
- ***Deep Learning:*** PyTorch, JAX, TensorFlow, HuggingFace (Transformers, Diffusers, TRL).
- ***Generative AI:*** Diffusion Models, Rectified Flow, DiT, VAE, LLM/VLM Fine-tuning (SFT, DPO, LoRA).
- ***Computer Vision:*** OpenCV, FFmpeg, HDR Imaging, Image/Video Processing, Quality Assessment.
- ***Tools:*** Linux, Git, Docker, LaTeX, HPC (Slurm), CUDA.

Leadership

- Assistant Director, **Laboratory for Image and Video Engineering (LIVE)**, UT Austin. *March. 2025 – Present*
- Student Leader, **LAMBDA-IIT Jodhpur**, India. *Aug. 2018 – Aug. 2020*
- Volunteer, **NUS-MIT Datathon**, Singapore. *May 2019 – July 2019*
- Overall Student Head, **Entrepreneurship Cell-IIT Jodhpur**, India. *May 2018 – May 2019*
- Assistant Head, **Counselling Services-IIT Jodhpur**, India. *May 2018 – May 2019*

- Volunteer, **International Workshop on Deep Learning (IWDL)**, India. *May 2018 – July 2018*
- Vice Captain, **Astronomy Club-IIT Jodhpur**, India. *May 2017 – May 2018*

Professional Service

- ***Reviewer:*** ICLR (2025, 2026), ICML (2025, 2026), CVPR (2025, 2026), WACV (2024-2026), EECV, ICCV, IEEE TIP, IEEE TMM.

Selected Achievements

- **Cockrell Engineering Graduate Fellowship** (UT Austin) for exceptional academic record, *2022-2027*.
- Won Medical Imaging Track at **NUS-MIT Datathon** (2019); led a team of 10 data scientists and clinicians.
- **Merit-Cum-Means Scholarship**, IIT Jodhpur (2017-2019).
- Founded undergraduate research group **LAMBDA**; fostered student publications in international conferences.
- Letter of Appreciation from District Collector Sirohi (Rajasthan, India) for Academic Excellence, *2013*.

References

- Up to 4 references available on request