




# Sally Khaidem

Indian Institute of Technology Madras (India)

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## Education

Program	Institution	CGPA	Year
PhD (EE)	Indian Institute of Technology, Madras	7.87/10	2020-25
MTech (VLSI & Embedded Systems)	National Institute of Technology, Manipur	8.35/10	2018-20
BE (ECE)	BMS College of Engineering, Bengaluru	8.37/10	2013-17

## Publications

### Journals

- Khaidem, S., Jangid, R. and Sharma, M., 2025. **Lightweight and High-Speed Contextual Intensity Image Reconstruction from Event-Based Sensors with Adaptive FastDynamicNet**, *Journal of Electronic Imaging*
- Khaidem, S., Kumar, A.N., Sharma, M. and Mitra, K., 2025. **Blur to Brilliance: Neuromorphic Data Guided Deblurring and HDR Novel View Synthesis** (*Manuscript under review*)
- Ravishankar, J., Sharma, M. and Khaidem, S., 2022. **A Hybrid Tucker-VQ Tensor Sketch Decomposition Model for Coding and Streaming Real World Light Fields Using Stack of Differently Focused Images**, *Pattern Recognition Letters*
- Khaidem, S., Keisham, P., Loitongbam, S. and Khumanthem, M., 2020. **Detection and Removal of Impulse Noise from Colour Image Using Lagrange Interpolation and Centre Weighted Vector Median Filter**, *Journal of Advanced Research in Dynamical and Control Systems*

### Conferences

- Khaidem, S., Dharmaraj, A.C. and Sharma, M., 2025. **Towards Efficient Neuromorphic Data Processing: A Novel Representation with Lossless Spatio-Temporal Compression** *Visual Communications and Image Processing (VCIP)*, Klagenfurt, Austria
- Khaidem, S. and Sharma, M., 2024. **A Deep Belief Network Approach to Scalable Compression of Light Field Data for Auto-Stereoscopic Displays**, *35th British Machine Vision Conference (BMVC)*, Glasgow, UK
- Ravishankar, J., Khaidem, S. and Sharma, M., 2023. **A Data-Driven Approach based on Dynamic Mode Decomposition for Efficient Encoding of Dynamic Light Fields**, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop*, Vancouver, Canada
- Khaidem, S., Nevatia, A. and Sharma, M., 2023. **A Novel Approach for Neuromorphic Vision Data Compression Based on Deep Belief Network**, *Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP)*, IIT Ropar
- Ravishankar, J., Sharma, M. and Khaidem, S., 2021. **A Novel Compression Scheme Based on Hybrid Tucker-Vector Quantization via Tensor Sketching for Dynamic Light Fields Acquired Through Coded Aperture Camera**, *International Conference on 3D Immersion (IC3D)*, Brussels, Belgium
- Khaidem, S. and Sharma, M., 2024. **An Integrated Representation & Compression Scheme Based on Convolutional Autoencoders with 4D-DCT Perceptual Encoding for High Dynamic Range Light Fields**, *IEEE 8th International Conference on Information and Communication Technology (CICT)*, IIIT Allahabad
- Khaidem, S., Choudhary, R., Sharma, M. and Sankarnarayan, B., 2025. **High Resolution Multi-exposure Stereo Event-Intensity-Depth Database of Natural Scenes**, *IEEE International Conference on Emerging Technologies and Applications (ICETA)*, IIIT Gwalior

## Research Projects

- 1. Neuromorphic Data Guided Deblurring and HDR Novel View Synthesis** Nov 2024 - Ongoing  
Guide: Prof. Kaushik Mitra; Co-Guide: Prof. Mansi Sharma IIT Madras
  - Deblur RGB images using event-driven luma fusion and synthesize sharp HDR novel views via NeRF and 3DGS.
- 2. Towards Efficient Neuromorphic Data Processing** Nov 2024 - Mar 2025  
Guide: Prof. Mansi Sharma IIT Madras
  - A two-stage scheme combining a voxelized Super Binary Map to exploit spatiotemporal sparsity with a Temporal Event Vector for polarity, then applied RLE and context-adaptive entropy coding for highly efficient, no-loss compression.

3. **NeuReCon: Intensity Image Reconstruction from Event Cameras** Jan 2024 - Nov 2024  
Guide: Prof. Mansi Sharma IIT Madras
  - We propose NeuReCon, a context-guided framework that leverages FastDynamicNet—a recurrent, spatially adaptive neural network—to efficiently recover image intensities from asynchronous, microsecond-precise DVS event streams.
4. **Scalable Compression of Light Field Data for Auto-Stereoscopic Displays** Jul 2024 - Nov 2024  
Guide: Prof. Mansi Sharma IIT Madras
  - Compressed weighted binary patterns from stacked attenuating layers into DBN-derived latent codes and H.265, enabling high-resolution, wide-angle transparent light-field displays with natural depth and parallax.
5. **Neuromorphic Vision Data Compression Based on Deep Belief Network** Feb 2023 - Aug 2023  
Guide: Prof. Mansi Sharma IIT Madras
  - Developed a lossless two-stage compression framework using voxelized Super Binary Maps and Temporal Event Vectors, enhanced by RLE and context-adaptive entropy coding.
6. **Dynamic Mode Decomposition for Efficient Encoding of Dynamic Light Fields** Dec 2022 - March 2023  
Guide: Prof. Mansi Sharma IIT Madras
  - Developed a dynamic light-field codec by combining coded-aperture capture, DMD-based multi-dimensional decorrelation, and HEVC compression.
7. **Coding & Streaming of Real World Light Fields Using Focal Stack** Jan 2022 - Aug 2022  
Guide: Prof. Mansi Sharma IIT Madras
  - Introduced three focal-stack tensor decomposition schemes (FS-HTTSVQ, FS-TTS, FS-TALS) for compact, efficient coding and streaming of autostereoscopic light fields using minimal focus stacks.
8. **Compression for Dynamic Light Fields captured using Coded-Aperture camera** Nov 2020 - Mar 2021  
Guide: Prof. Mansi Sharma IIT Madras
  - Introduced a single-pass HTTSVQ + HEVC pipeline for real-time coded-aperture dynamic light-field compression, removing intra, inter and intrinsic redundancies without storing the full tensor.

## Course Work

1. **Key Courses** September 2020 - May 2021  
(Core and electives) IIT Madras  
Advanced Topics in Signal Processing(Deep Learning), Pattern Recognition(Machine Learning), Photometry & Geometry in Computer Vision, Image Signal Processing, Applied Linear Algebra, Probability for Electrical Engineering

## Technical Skills

- Programming Languages: Python, MATLAB
- Operating Systems: Windows, Linux, ROS, MacOS
- ML Frameworks: PyTorch, TensorFlow, Keras
- Tools: Docker, Blender

## Positions of Responsibility

**Teaching Assistant, EE Dept., IIT Madras:** EE5155 (Wireless Networks, Jul–Nov 2021); EE6130 (Advanced Topics in Signal Processing, Jan–May 2022); EE1100 (Basic Electrical Engineering, Jul–Nov 2022); EE5180 (Introduction to Machine Learning, Jan–May 2023); EE5179 (Deep Learning for Imaging, Jul–Nov 2023); EE5176 (Computational Photography, Jul–Nov 2024); EE5178 (Modern Computer Vision, Jan–May 2024 & Jan–May 2025).

## Achievements/Awards

- HTRA(Half Time Research Assistantship) 2020-2025
- Qualified GATE-2019 and 2020 in ECE.
- Stood overall 1<sup>st</sup> in M.Tech in VLSI and Embedded System Design (ECE).

## Languages

- Manipuri (native speaker)
- English (fluent in speaking, reading, writing, and listening)
- Hindi (fluent in speaking, reading, writing, and listening)
- Bengali (fluent in speaking, reading, writing, and listening)