HASHAN KAVINGA WEERASOORIYA

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EDUCATION

Purdue University, Graduate Student **GPA: 3.96/4.00** 2022–Present
Intelligent Imaging Lab, Electrical and Computer Engineering

B.Sc. in Engineering, University of Peradeniya, Sri Lanka. **GPA: 3.95/4.00** 2015–2020
Electrical and Electronic Engineering

RESEARCH, PUBLICATIONS, AND SELECTED PROJECTS

Single-Photon LiDAR Sensing, Simulation, Compression, and Reconstruction 2023–Present

Joint Depth and Reflectivity Estimation Using Single-Photon LiDAR, *IEEE TCI*, 2025 (under review).
Developed a unified deep-learning framework for joint reconstruction of depth and reflectivity from photon timestamps under high-noise conditions.
Skills: Deep learning, PyTorch, statistical modeling, inverse problems, simulation

Single-Photon LiDAR Lab-Bench Construction, *Hardware Project*, 2025.
Designed and implemented a complete SP-LiDAR laboratory bench integrating TCSPC electronics, single-photon detectors, and galvanometric scanning optics.
Skills: Optical system design, data acquisition

Real-Time Scene-Adaptive Compression for Single-Photon LiDAR, *Ongoing Project*, 2025–2026.
Developing an end-to-end spatiotemporal compression framework on NVIDIA Jetson Xavier, incorporating tracking and RGB-guided adaptive encoding while improving 3D reconstruction accuracy using a lightweight neural decoder.
Skills: Embedded systems, sensor fusion, compression techniques

Real-Time Markov Modeling for Single-Photon LiDAR: Accel. and Convergence Analysis, 2025 (under review).
Accelerated a Markov-based probabilistic framework for SP-LiDAR, enabling fast PDF generation with rigorous convergence guarantees.
Skills: Probabilistic modeling, Markov processes, algorithm acceleration

Markov-Renewal Single-Photon LiDAR Simulator, 2025 (under review).
Proposed a physics-consistent Markov-renewal simulation framework modeling photon arrivals, dead-time effects, and temporal correlations for realistic performance evaluation.
Skills: Stochastic processes, photon-detection modeling, simulation

Resolution Limits of Single-Photon LiDAR, *IEEE/CVF CVPR*, 2024.
Established theoretical and experimental limits on SP-LiDAR spatiotemporal resolution, defining photon-efficient imaging benchmarks.
Skills: Signal processing, theoretical analysis

Hyperspectral Imaging for Remote Sensing and Applications 2019–2022

Transmittance Multispectral Imaging for Reheated Coconut Oil Differentiation, *IEEE Access*, 2022.
Designed a cost-effective multispectral imaging system to reliably differentiate reheated coconut oils using transmittance spectra.
Skills: Optical system design, image processing

Constrained Nonnegative Matrix Factorization for Blind Hyperspectral Unmixing Incorporating Endmember Independence, *IEEE JSTARS*, 2021.
Developed a hyperspectral matrix factorization framework enforcing endmember independence for improved spectral separation.
Skills: Optimization, MATLAB, linear algebra

Transmittance Multispectral Imaging for Edible Oil Quality Assessment, *Optica Imaging and Applied Optics Congress*, Vancouver, Canada, 2020.
Demonstrated a novel optical imaging prototype for rapid, non-destructive edible oil quality assessment using transmittance spectra.
Skills: Optical instrumentation, data acquisition, spectral analysis

Convolutional Autoencoder for Blind Hyperspectral Image Unmixing, *15th IEEE ICIIS*, IIT Ropar, India, 2020.
Introduced a deep autoencoder for efficient blind hyperspectral unmixing, producing accurate abundance maps and endmembers.
Skills: Deep learning, TensorFlow

EXPERIENCE

Teaching Assistant, Purdue University, USA 2022–2025
Assisted graduate and undergraduate courses, including Electrical Engineering Fundamentals I, Digital Signal Processing I, and Machine Learning. Conducted recitations, supervised labs, and provided detailed feedback on assignments, strengthening mentorship and communication skills.

Temporary Instructor, University of Peradeniya, Sri Lanka 2020–2022
Instructed and supervised undergraduate communication laboratories; served as a teaching assistant for Network Analysis, Electromagnetic Theory, Digital Signal Processing, Communication Systems, and Telecommunications; and coordinated third-year laboratory scheduling and undergraduate project supervision.

INTERESTS

Signal Processing, Machine Learning, Remote Sensing, Sensor Fusion, Computational Imaging, LiDAR, and RADAR

ACHIEVEMENTS

SRC JUMP 2.0 CogniSense Center Best Poster Award for scene-adaptive SP-LiDAR compression. 2025
Prof. E. F. Bartholameusz Endowment Award for the best undergraduate project in Engineering Mathematics. 2020
W. P. Jayasekara Prize for the best undergraduate project in Electrical and Electronic Engineering. 2020