# Immanuel Varghese Koshy

607-2564995 | Immanuelvkoshy@icloud.com | linkedin.com/in/immanuel-varghese-koshy/ | Portfolio

## EDUCATION

**Cornell University**, Aug. 2025 - May 2026
*Master of Engineering in Electrical and Computer Engineering* | Ithaca, NY, USA

**Vellore Institute of Technology**, Sept. 2020 - June 2024
*Bachelor of Technology in Electronics and Communication Engineering* | Vellore, India
CGPA: 3.9 / 4

## EXPERIENCE

**Cornell University, Alumni Affairs and Development, Student Ambassador** August 2025 - Present

**Sun Mobility, Systems and Embedded Engineer** Feb 2024 - June 2025

- Accelerated a 1.5+ year career track, earning a promotion to Systems Engineer to become the first intern in team history to achieve this distinction.
- Designed the core system architecture for the company's flagship swappable battery packs(for heavy electric vehicles), high-voltage charging systems, and robotic swap solutions, contributing to 7+ pending patents.
- Developed advanced control logic and state machines for battery swap orchestration, achieving a station swap time of under 2.5 minutes. Built modular ROS2 nodes for LiDAR-based object detection, 3D reconstruction, and robust proximity sensing.
- Automated End-of-Line (EOL) testing and system validation scripts, enabling rapid, zero-touch deployment of new battery swap stations. Proficient in CAN, MODBUS, RS232, Profinet, I2C, JTAG, TCP, UDP, and AV over IP.

**Assailing Falcons , Team Vice-Captain (Mathworks Sponsored)** May 2022 - January 2025

- Achieved World Design Rank - 3 and Asia Rank - 1 by leading the development of autonomous aircraft, ground vehicles, and drones for SAE International competitions.
- Promoted from Avionics Engineer to lead and mentor a team of 50+ interns in designing advanced propulsion, telemetry, and autonomous systems.
- Engineered custom PCBs, Raspberry Pi-based target recognition systems, and real-time telemetry, working extensively with commercial and custom microcontrollers.
- Authored the complete Technical Design Report and manufactured lightweight, high-performance composite materials including carbon fiber and Kevlar.

**Keltron Component Complex LTD** May 2022 - June 2022

- Developed and prototyped electronic components for power plants, improved IP ratings, coded and tested systems, and later supported statewide security and surveillance.

## PROJECTS

**PUFFIN System Architecture & Control Overhaul (M.Eng Project)** August 2025 - Present

- Re-architecting the PUFFIN facility's system architecture to achieve end-to-end experimental automation, designing and implementing a new microservices-based system to unify all operations from real-time control to data and camera acquisition.
- Integrating subsystems by upgrading legacy hardware and developing custom network infrastructure, creating a more robust and scalable research platform.

**Foundation Model Architectures & Training Pipelines (Sponsored by Sun Mobility)** Dec 2024 - April 2025

- Built a full-stack NLP pipeline by implementing Transformer architectures (including self-attention) from scratch, fine-tuning both discriminative (BERT) and generative (GPT-2) models, and deploying efficient, distilled versions (DistilBERT) as a REST API.

**Abnormal Mammary Growth Analyser** Jul 2021 - Dec 2021

- Developed MATLAB classifier model highlighting malignant mammary scan areas with markers

**Network Surveillance and Home Automation System** 2020 - 2022

- Hybrid system converting old relays to WiFi-based relays, integrated into Apple HomeKit via Raspberry Pi, JSON Scripts, and HomeBridge API; routes DVR/IP surveillance from LAN to iCloud via DIY HomeKit bridge and Hub

## PUBLICATION

**Smart-Door Bio sentry, *Sustainable Innovation in Engineering and Technology (SIET) 2023***

- Published in SIET 2023 (IoT domain); built a smart doorbell prototype with integrated health sensors and disinfectant dispersal for Covid/viral protection, powered by a YOLOV3 model on Raspberry Pi.

**Intelligent Warehouse Optimization System.**

- Developed a linear regression-based system integrating machine learning, IoT, and predictive maintenance to optimize warehouse management, improving efficiency, accuracy, and reliability while reducing operational costs

## HONOURS AND AWARDS

**The Invenzone Award 2025** — *For contributing 7+ patents and advancing the organization's innovation.* May 2025
**The Astounding Achiever Award, SUN Mobility** — *For outstanding technical contributions* May 2025
**Special Achiever Award, VIT Vellore** — *Highest university award for international achievements* April 2024
**Best Exhibition Partner, BITS Pilani** — *Awarded at BITS APOGEE 2023* April 2023
**Bright SPOT/Regional Topper** — *Scholarship, Indian Space Research Organization (ISRO)* May 2018

## CERTIFICATIONS

- Evolution of AI (ErA 3) by **The School of AI**, IoT with Smartworks by **Altair**, Google Project Management (**Coursera**), Security Fundamentals by **MTA**.