Amadeo Lee

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EDUCATION

Georgia Institute of Technology **2027**

Electrical Engineering, GPA 4.0

WORK EXPERIENCE

Tesla – Megapack Electronics Design Engineering (Internship) **2025 - Present**

- Tesla Field Communication Module (TFC)
  - Performed full schematic capture and PCB layout in **Altium** for a **10-layer PCB**, incorporating **high-speed impedance-controlled traces** for **10Gbps Fiber SFP+** networking, QSGMII, SGMII, RGMII, and Gigabit Ethernet.
  - New TFC board replaces the **outdated copper cable setup** with **fiber-optic communications** in a **HSR ring**, effectively mitigating signal degradation caused by **EMI from high-voltage AC cables** and enhancing reliability.

HOPE Technik – Electrical & Systems Engineer (Full Time) **2021- 2023**

- Electric Jetboard
  - Designed and prototyped **300 custom Jetboard state-of-charge(SOC) PCBs** using **Altium** to **improve sensor reliability** and **enhance the safety of users**
  - Developed the SOC PCB's **STM32 microcontroller program** in C, **doubling up** as the project's **embedded programmer**

- Singapore 6th Generation Firefighting vehicle
  - Performed **schematic capture** and **PCB layout** for a custom CAN-BUS to USB converter, enabling data communication between firefighting vehicles and the base station.
  - Developed **STM32 microcontroller firmware** to **encode CAN bus data frames onto USB packets**, improving real-time monitoring and decision-making for the firefighting team

- Singapore Airlines Seat Track Inspection Robot
  - Developed a **precision motor control PCB** which incorporates **Trinamics motor controller and closed-loop stepper drivers** to achieve **0.1mm precision positioning** along the aircraft seat track.

PERSONAL PROJECTS (www.amadeolee.com)

FPGA Full HD (1920x1080) Hardware Video Interceptor **2024**

- Designed and fabricated a **custom 6-layer Xilinx FPGA PCB**, utilizing **high-speed differential impedance-controlled trace routing** and **precise length matching on the DDR3/LVDS bus**
- Implemented in **VHDL** the capability to **intercept 8x LVDS differential signals** between the GPU and a Full HD (1920×1080) display; enabling **seamless capture of HDCP content directly in hardware**

FPGA real-time hardware streamer from SD-card to LVDS display **2023**

- Leveraged FPGA resources such as (FIFO, BRAM, LUT, DDR3 RAM and LVDS differential transceivers) to create a **low latency hardware streamer** – fully written in **VHDL**
- Wrote **custom SD Card Controller** and **LVDS Display** Controller in **VHDL** to enable low-latency communication between them

Linear Motor + BLDC Controller **2022**

- Built a Linear Motor using **bespoke Neodymium Magnets** and **hand-wound 3-phase motor coils**
- Implemented **Field-Oriented-Control (FOC) algorithm** on an STM32 microcontroller, enabling **precise high-speed torque and position control** of the linear motor.

30-min Fast Charging Powerbank **2020**

- Designed a PCB with a **99% efficient buck-boost converter**, enabling **rapid 30-minute charging** of a power bank via **USB-C Power Delivery (100W).**

COMPETITIONS

1st Place Nationwide for Singapore's Category D1 Semi-Autonomous Competition **2021**

- Created an innovative **Autonomous Drone with Omni-directional Mecanum car**, capable of creatively performing diverse tasks, including retrieving payloads and transporting them to specified destinations

Project of the year in Element14 International Annual Competition **2020**

- **Built an electric go-kart single-handedly** by integrating various engineering techniques such as **3D printing, CNC machining, FEA stress simulation** and **biometric authentication systems**
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SKILLS

Skills: Programming (Objective-C, C++, C, VHDL), CAD&CAM (Fusion 360, Solidworks), 3D Printing, PCB Design (Altium, KiCAD), Drone Photography