

Theo Sullivan

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EDUCATION

University of Illinois Urbana-Champaign
*Bachelor of Science in **Electrical Engineering***
*Minor in **Semiconductor Engineering***

May 2028
GPA: 3.92 / 4.0

EXPERIENCE & LEADERSHIP

Fab Engineering Intern

Summer 2026

Samsung Austin Semiconductor

- Modeled the power distribution architecture of a **SEMES IRIS 300mm single-wafer wet cleaning tool**, supporting power delivery across 8 wafer-cleaning chambers.
- Specified and configured **SolaHD industrial voltage regulators** and installed a panel meter for remote **DAQ** access, improving power input stability and targeting a 15% reduction in chamber pressure variance.
- Built a **Streamlit** dashboard powered by **machine learning** models to quantify and visualize pressure stability improvements in real time.
- Applied **Python** and **pandas** to analyze over 10,000 DAQ data points, identifying correlations between power distribution parameters and chamber pressure.
- Co-developed data analysis scripts to evaluate wafer yield trends, supporting process optimization efforts.
- Implemented a query system for chamber stability analysis, improving search efficiency by 80%.

Undergraduate Research Assistant

August 2025 – Present

Center for Plasma Material Interactions (ASML-Partnered)

- Study debris formation and migration on silicon test samples in a simulated EUV lithography (EUVL) device environment under hydrogen plasma conditions.
- Designed a **Tkinter**-based GUI to interface an **Osaka TG60F** turbo-pump controller via **RS-232C** serial communication, reducing operator workload by 95%.
- Integrated a **LabJack U6 Pro**, **DC power supply**, and **solid-state relay** to automate **cryogenic LN₂ valve** actuation for a **hydrogen plasma chamber**, enabling reliable low-temperature operation.

PROJECTS

Custom AES-128 Hardware Accelerator

May 2026

- Designed a custom **AXI4-Lite** peripheral and IP core to accelerate AES-128 encryption and decryption locally on FPGA.
- Built a hardware-based encryption/decryption pipeline, offloading cryptographic operations from the processor to improve throughput.
- Implemented user control via a 3.5mm microphone input and Python scripts to trigger and manage encryption operations.

Plasma Chamber Thermal Automation

April 2026

Center for Plasma Material Interactions

- Developed an autonomous power regulation system using a Mealy state machine to control a Variac transformer for heat sourcing within a hydrogen plasma environment.
- Integrated a **LabJack U6 Pro** with a **stepper motor** and driver via a custom **Tkinter** GUI to enable software-defined voltage control and reduce manual workload by 90%.
- Designed and installed a custom-machined mechanical attachment to interface the motor shaft with the Variac adjustment dial.
- Implemented high-resolution data acquisition to monitor thermal profiles, replacing manual adjustments with precise, automated feedback loops.

TECHNICAL SKILLS

- Programming:** C, C++, Java, Python
- Hardware Design:** Circuit Design (Xilinx Vivado), SystemVerilog, PCB Design (KiCad)
- Software:** MATLAB, Simulink, SolidWorks, Fusion 360

INTERESTS

- Weightlifting & Bodybuilding, Running, Cooking