

# ISAAC P. HAGEDORN

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## Education

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### Purdue University

West Lafayette, Indiana

#### College of Engineering

*Master of Science in Electrical and Computer Engineering*

*Aug. 2023 – May 2025*

*Bachelor of Science in Computer Engineering*

*Aug. 2018 – May 2023*

*Certificate in Semiconductors and Microelectronics*

*Aug. 2018 – May 2023*

#### Krannert School of Management

*Bachelor of Science in Industrial Management*

*Aug. 2018 – May 2023*

## Technical Experience

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### Purdue Center for Secure Microelectronic Ecosystems - Dr. Joerg Appenzeller

Birck Nanotechnology Center

*Research Trainee || E-Beam Lithography, Ion Mill, Plasma Etch — Virtuoso, Genus, Innovus, Xcellium*

*May 2023 – Present*

- Taped out RISC-V SoC applying novel hardware redaction techniques for hardware design in Cadence (TSMC180).
- Instantiated a SAT Attack to benchmark hardware redaction security and conclude its inviolability.
- Fabricated Magnetic Tunnel Junction (MTJ) Arrays for MRAM sensitization research and probabilistic computing.

### Purdue SoCET Research Group

West Lafayette, Indiana

*Graduate Research Assistant || SystemVerilog, YOSYS, FuseSoC Questasim, Quartus, KiCad*

*August 2022 – Present*

- Translated formal verification test benches for I2C peripheral to UVM standard test benches to improve coverage by 28%.
- Proposed novel method of sensitizing commercial MRAM to at-risk temperature environments.
- Streamlined the project build management and toolkit through the integration of open-source FuseSoc.

### Purdue Undergraduate Senior Design Project - RevEx

West Lafayette, Indiana

*Embedded Engineer || Embedded C, Rust, Unity*

*August 2021 – December 2021*

- Devised a non-optical, wearable VR/AR controller with passive/active user-haptic feedback for low-cost/energy applications.
- Provided firmware for the SPI, I2C, UART, ADC, PWM, and DMA peripherals and an Interrupt Scheduler/Handler.
- Delivered software for sensor fusion of gyroscope and accelerometer data with magnetometer data for drift correction.
- Built a PCB layout to improve the modularity and performance of the environmental data acquisition.

### Jacobs Engineering/KeyW Group

Baltimore, Maryland

*Software Engineering Intern || Bitbake, Yamcs*

*May 2021 – August 2021*

- Coordinated communication and integration efforts between two separate development teams for a custom compression algorithm and firmware update to a cube satellite.
- Stood up the automated thermal environment and vacuum testing for PCB limitation testing and profiling.
- Improved a REST API for a satellite ground station using Yamcs and reduced development time on the order of months

### Allegion PLC

Indianapolis, Indiana

*Firmware Engineering Intern || Azure DevOps, Jenkins, Helix QAC, Postman*

*May 2020 – August 2020*

- Developed an automated repository build structure w/ integrated CI, unit testing, static analysis, and Azure DevOps support to reduce setup time and normalize project file systems.
- Designed an automated firmware functionality testing setup to reduce consumer debugging emulation of user interfaces, Bluetooth communication, and wireless network accesses of electronic locks.
- Revamped Allegion's PRQA/Helix QAC static analysis tool build system to be more user-friendly and universal across all future, company projects.

## Leadership / Extracurricular

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### Eta Kappa Nu

Beta Chapter

*Treasurer*

*August 2022 – May 2023*

- Tabulated the financial management system for Purdue's largest student-run lounge and the chapter's finances
- Created a PHP-based analytics and auditing tool to identify selling trends and boost lounge sales 300% while reducing operations management

*President*

*August 2021 – May 2022*

- Supervised the activities for the executive officers of Purdue's only Electrical and Computer Engineering Honors Society.
- Interfaced with the ECE department, National Chapter, and other organizations to help support the ECE community of Purdue.
- Established a new help room program for members to volunteer as supplemental instructors for introductory-level ECE classes.

## Technical Skills

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**Languages:** C, Embedded C, C++, Java, Python, Rust, HTML/CSS, PHP, SQL, ROS, Verilog/SystemVerilog

**Tools/Platforms:** Git, Docker, Quartus, STMCube, YOSYS, Verilator, UVM

**Foreign Languages:** Spanish, Mandarin