

Shiva Prakash

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Education

University of Waterloo - [BASc, Computer Engineering](#)

Sept. 2025 - April 2030

Technical Projects

Project Hermes - Raspberry Pi Game Streaming Handheld

- Designed complete handheld gaming system under strict \$200 CAD budget, integrating Raspberry Pi 4, custom RP2040 controller PCB, and 7" LCD display to create portable PC game streaming device
- Engineered custom USB HID controller PCB using RP2040-Zero microcontroller and GP2040-CE firmware, eliminating need for custom drivers or setup
- Overcame handheld power constraints by designing 5000mAh UPS system with USB-C passthrough, extending runtime to 2-3 hours under load
- Prevented thermal throttling in handheld form factor by integrating active cooling and 3D-printed housing, sustaining stable 720p60 streaming

HackCharm - Interactive OLED Keychain

- Developed miniaturized PCB system integrating ESP32-S3, 128×128 OLED, and ADXL362 accelerometer in keychain form factor at BOM cost of \$49.66 CAD
- Extended device runtime to multiple days by designing 450mAh Li-Po power system with deep-sleep firmware for efficient low-power operation
- Implemented gesture-recognition firmware using accelerometer polling and processing to detect tap/shake patterns, triggering facial expressions on OLED with <100ms latency

NFC PCB Business Card

- Engineered a batteryless NFC circuit using passive smartphone power harvesting, integrating antenna design with LED indicator and data transmission capability
- Delivered hands-on electronics workshop teaching PCB design fundamentals to 100+ high school students aged 13-18, with each student receiving personalized functional PCB card

Duck Off Doomscrolling (D.O.D) - Computer Vision Water Turret

- Developed real-time computer vision tracking system in 4-day hackathon using OpenCV face detection, achieving sub-100ms servo positioning response for automated targeting application
- Designed closed-loop servo positioning with 2 MG996R motors, achieving precise targeting accuracy within 1m range
- Implemented reliable mechanical actuation system with commercial water gun with servo-actuated pump trigger

Leadership

President - MDHS Student Council

Sept. 2024 - May 2025

- Directed 21-member student council to deliver school-wide events impacting 1,400+ students, managing logistics, budgeting, and promotion.

President - MDHS STEM Club

Sept. 2024 - May 2025

- Grew membership from 15 to 190+ within one year through active outreach and teaching hands-on workshops on PCB design, CAD, and programming.

Skills

- **Hardware:** PCB Design, Circuit Debugging, Power Management, Sensors & Peripherals, Prototyping
- **Tools:** KiCad, Fusion360, Git, Soldering, DMM
- **Programming & Protocols:** C, C++, Python, I²C, SPI, UART, USB HID

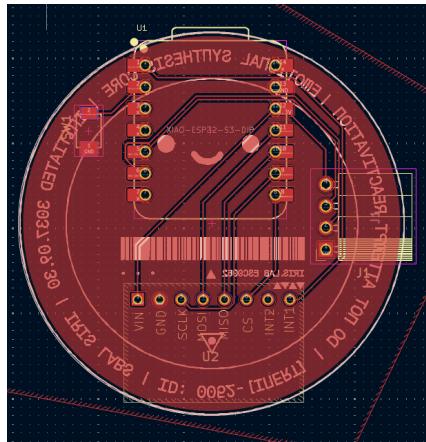
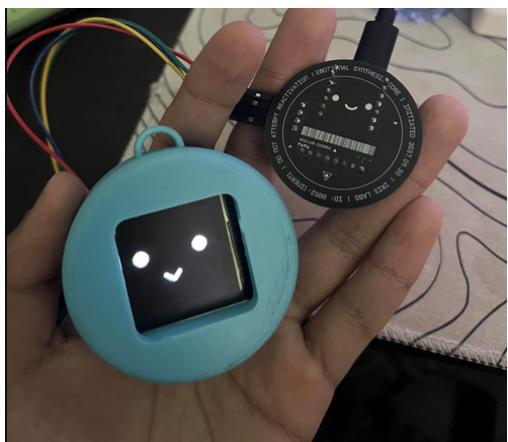
Project Hermes - Raspberry Pi Game Streaming Handheld | [Repo](#) | [Creation Journal](#)

- Designed complete handheld gaming system under strict \$200 CAD budget, integrating Raspberry Pi 4, custom RP2040 controller PCB, and 7" LCD display to create portable PC game streaming device
- Engineered custom USB HID controller PCB using RP2040-Zero microcontroller and GP2040-CE firmware, eliminating need for custom drivers or setup
- Implemented power management system with 5000mAh UPS and USB-C charging, enabling 2-3 hours of gameplay with simultaneous charging
- Integrated active cooling with 3D-printed housing to prevent thermal throttling in handheld form factor, maintaining stable 720p 60FPS streaming



HackCharm - Interactive OLED Keychain | [Repo](#) | [Creation Journal](#)

- Developed miniaturized PCB system integrating ESP32-S3, 128x128 OLED, and ADXL362 accelerometer in keychain form factor at BOM cost of \$49.66 CAD
- Designed low-power circuit with 450mAh Li-Po and deep-sleep firmware, achieving multi-day battery life
- Implemented gesture-recognition firmware using accelerometer polling and processing to detect tap/shake patterns, triggering facial expressions on OLED with <100ms latency



Portfolio

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NFC PCB Business Card | [Repo](#) | [Workshop Video](#)

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- Delivered hands-on electronics workshop teaching PCB design fundamentals to 100+ high school students aged 13-18, with each student receiving personalized functional PCB card



Duck Off Doomscrolling (D.O.D) - Computer Vision Water Turret | [Repo](#) | | [Live Demo](#)

- Developed real-time computer vision tracking system in 4-day hackathon using OpenCV face detection, achieving sub-100ms servo positioning response for automated targeting application
- Designed closed-loop servo positioning with 2 MG996R motors, achieving precise targeting accuracy within 1m range
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