DAMIEN KOH

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EDUCATION AND SKILLS

Northwestern University, Evanston, IL — Expected 2025
Eta Kappa Nu Member, Academic Honor Society of the Institute of Electrical and Electronics Engineers (IEEE)
B.S. in Computer Engineering, M.S. in Electrical Engineering specializing in Robotics | Cum. GPA: 3.98 out of 4.0

Skills
ROS2 | Git | Linux | C & C++ | Python | MATLAB | Embedded System Design & Programming (EAGLE & Microchip Studio) | Rapid Prototyping | Basic Machine Learning & Computer Vision | Next quarter: SLAM for Robotics, Intro to Feedback Systems

PROJECTS

ROS Package: Unified Teleoperation — *Robotics Research*
- Developing a ROS package for customizable robot teleoperation across various devices, including game controllers and SpaceNav.
- Implemented configurable input/output schemes, intuitive naming, and Twist/PointStamped message support to enhance functionality.
- Fostered open-source collaboration by encouraging user contributions and providing demos and documentation for easier adaptation.

Omnid Robot Teleoperation & Visualization — *Robotics Research*.
- Implemented visualization for Northwestern's Omnid robots via RViz, enhancing testing and diagnostic capabilities.
- Developed teleoperation feature for Omnids, supporting varied control modes and enabling experiments in human-robot collaboration.
- Navigated and adapted Omnid robots' complex codebase, effectively collaborating and coordinating updates through Git for seamless project integration and development; work on teleoperation features initiated development of the Unified Teleoperation Package.

Franka Robot Arm Object Picker — *ME 495 Embedded Systems in Robotics*
- Developed custom ROS MoveIt library for a Franka Robot Arm, enabling autonomous object retrieval and dynamic motion planning.
- Programmed varied path planning tasks, such as specific poses and orientations, with immediate or delayed path execution capabilities.
- Implemented a feature for dynamically adding boxes to the planning scene, enhancing the robot's adaptability in complex environments.

Gesture Tracking Glove Prototype — *EE 327 Electronic System Design II*
- Developed a gesture-tracking glove with a custom PCB, using ESP32 and FreeRTOS for dual-core concurrency, and integrated it with 6 DoF sensors and flex sensors for real-time visualization on web platforms: via Javascript and Unity.
- Employed Edge Impulse for machine learning gesture recognition and optimized sensor data with algorithms like Madgwick's filter.

Custom Webcam Prototype — *EE 326 Electronic System Design I*
- Designed a 50 x 50 mm webcam PCB using EAGLE, incorporating the SAM4S8B MCU, ESP32 WiFi Module, and OV2640 Camera.
- Programmed interrupt-driven firmware that uses UART, SPI, and I2C communication protocols, live streaming the camera feed to a connected client through Web-Sockets; Utilized electrical lab equipment and logic analyzers for PCB assembly and debugging.

WORK & STUDENT INVOLVEMENT

Robotics Research – Prof. Matthew Elwin (www.youtube.com/watch?v=SEuFfONryL0&t=105s) — *Jan 2023 – Present*
Robot Development, Research Assistant
- Working with Northwestern's Omnid Robots in the Center for Robotics and Biosystems to further robotics expertise and experience.
- Awarded the McCormick Summer Undergraduate Research Grant and was a Fletcher Rising Research Star Finalist.

Kappa Theta Pi (KTP) – Co-ed Pre-Professional Technology Fraternity (www.ktpnu.com/) — *Nov 2022 – Present*
VP of Programming, Founding Executive Member
- Fraternity established to create a community of dedicated tech-enthusiasts and develop them professionally and academically.
- Planned and organized KTP's 20+ events throughout each quarter, such as Resume, Networking, and Technical Interview Workshops.
- Coordinated 40+ members and exec team to start and maintain concurrent initiatives such as Capstone Projects and Big-Little.
- Managed week-long interview process for 80+ applicants, coordinating coffee chats, group interviews, member deliberations and more.

InfernoGuard (www.infernoguardusa.com/) — *Jan 2022 – June 2022*
Hardware Development Team, Intern
- Aided sensor device development to optimize device performance; spearheaded InfernoGuard's efforts in the White Space Challenge – conducting primary and secondary research, preparing materials, and presenting. Team won distinguished "Start-Up" Award.

Weston Robot (www.westonrobot.com/) — *Jun 2022 – Aug 2022*
Robotics Intern
- Developed a Trash-Picking Robot with a team, capable of patrolling an area for trash and disposing of it; developed robot arm and navigation control software in C/C++ and Python using ROS 1 and MoveIt (Demo: www.youtube.com/watch?v=fR2VynbYyuk).

National Service - Singapore Armed Forces — *Jan 2019 – Nov 2020*
Army Intelligence and Reconnaissance Officer (Lieutenant)
- Served as Deputy Intelligence & Security Officer of 16th Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance Battalion (16 C4I Bn). Attended the Battalion Advanced Intelligence Analysis Course and Officer Cadet School.