

Lek Man

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INTRODUCTION & OBJECTIVE

Hi, I'm Lek, an Aerospace Engineering student at UC San Diego with a strong passion for mechatronics, robotics, and control systems. Through projects like building drones, gimbals, and ball-balancing robots, I have gained hands-on experience in CAD, embedded systems, computer vision, and PID control. I am eager to apply my technical skills, problem-solving mindset, and collaborative spirit to contribute meaningfully to your team, while continuing to learn and grow as an engineer through real-world, team-driven projects.

PROJECTS (DOCUMENTATION: <https://lekman.info>)

Autonomous Antenna Tracker | ESP32, PID Control, GPS, UDP Networking, CAD (Onshape)

- Designed a dual-axis antenna tracker maintaining long-range UAV communication using GPS telemetry.
- Implemented custom PID firmware on ESP32, integrated magnetometer/GPS over I²C, and built Python calibration tools for magnetometer distortion correction.

2-Axis Camera Gimbal | STM32, Field-Oriented Control, CAN Bus, CAD, 3D Printing

- Built an autonomous camera gimbal for UAV stabilization with IMU sensing and custom STM32 ESC firmware.
- Developed closed-loop FOC + PID control with encoder feedback, and designed vibration-isolated mechanical assembly.

CNC Drawing Machine | Arduino (GRBL), Python (OpenCV), Stepper Motors, CAD

- Developed a CNC pen plotter converting digital images to precise vector drawings using custom Python → G-code pipeline.
- Engineered motion system with microstepped stepper motors, precision linear rails, and optimized firmware parameters.

Quadcopter Development (Iterative Builds) | Betaflight, ArduPilot, ExpressLRS, CAD, Power Systems

- Designed and built multiple UAV platforms (3D-printed prototype, carbon fiber racing drone, long-range FPV system).
- Configured flight controllers, tuned PID loops with blackbox analysis, integrated GPS/autonomy systems, and optimized powertrain efficiency.

Autonomous Robot Turret | Arduino, Computer Vision, Mechatronics, PCB Design

- Built a vision-guided robotic turret with projectile launcher and 3-DOF articulation for STEM outreach.
- Integrated CV pipeline, PID-controlled servos, custom PCB motor drivers, and safety interlocks in a modular mechatronic system.

Ball-Balancing Robot | Raspberry Pi 4, OpenCV, PID Control, MG9666 Servos

- Developed a dual-axis balancing platform using CV tracking to stabilize a rolling ball in real time.
- Implemented Python-based PID control with camera feedback, servo PWM actuation, and mechanical frame prototyping.

TECHNICAL SKILLS

Computer Aided Design (Fusion360, Onshape, SketchUp) | Proficient, (Solidworks) | Beginner

Programming (Python, Javascript, C++, C) | Proficient

Operating 3D printers, laser cutters, resin printers, power tools | Proficient

Soldering | Proficient

PCB design (Altium) | Beginner

EDUCATION

University of California, San Diego (Current)

Sophomore | Aerospace Engineering Major | GPA: 3.2

Christian Alliance International School

Grade 7-12 | GPA: 3.75

EXPERIENCES

Leader/founder | Mechanical Engineering Club, CAIS | September 2022 to June 2024

- Founded and served as the President of the Mechanical Engineering Club for 2 years, leading a team of 30 members in organizing/participating in school events to promote interest and engagement in the field of mechanical engineering.
- Utilized strong organizational, communication, and project management skills to oversee club operations -- such as managing budgets, initiating club activities, club promotion and recruitment, and communicating with faculty advisors and school administration.

Software + Hardware + Electrical | Team Member, Triton Unmanned Aerial Systems | UCSD | Sept 2024 – Present

Fabrication & CAD:

- Layup composite airframe (fiberglass & carbon fibre) using epoxy resin bonding.
- Designed & 3D-printed mission-critical components: 2-axis camera-gimbal mount (with vibration isolation), antenna-tracker bearings, motor-jigs.

Embedded Systems & Electrical:

- Wrote ESC firmware on STM32 G431B-ESC1: acquired IMU data over I²C, implemented FOC + PID motor control.
- Developed antenna-tracker firmware; boosted pointing accuracy via Python-driven magnetometer calibration (ellipsoid fitting).
- Designed PCB for ICM-40690 IMU and integrated Hardware-in-the-Loop (HIL) testing.

Software & Autonomy:

- Configured open-source flight stacks (Betaflight, ArduPilot) for fixed-wing UAV and quadcopters.
- Contributed to CV-based localization: computed object GPS coordinates from image offsets and UAV GPS.

Engineering Intern | CYC Motors (E-bike Motor Company) | July 2023 - Aug 2023

- Assembled and soldered motor testing stand for performance evaluation of BLDC motors.
- Conducted performance and durability tests using VESC tools, collecting data to provide feedback for product optimization.
- Assisted in motor assembly and quality control processes (IQC & OQC) to ensure reliability and manufacturing standards.
- Authored Standard Operating Procedures (SOPs) based on hands-on experience, improving workflow consistency and knowledge transfer.

Student presenter | ACAMIS technology conference | 18th March 2023

- Participated as a student presenter in the ACAMIS technology conference and delivered a presentation based on the topic "empowering learning"
- Delivered a dynamic and informative presentation to an audience of educators and administrators, utilizing effective speaking to convey key messages.

Main designer | Greendeck VR Competition | 2021-2022

- Participated in a one-year-long competition to create a virtual interactive 3D model of the green deck in Hong Hum.
- Worked in a team of 4 students to successfully plan and design a 3D model of the green deck park in Hong Hum during summer.
- Attended training lessons for software such as Unity and SketchUp, before applying these skills to create the final product submitted to the competition. Won the champion of the competition.

AWARDS

Student Unmanned Aerial System competition (SUAS) top 25% | UC San Diego | 2025

- Participated in SUAS competition involving 81 teams/universities achieved top 20% mission demonstration score
- Contributed significantly design of mission critical projects, particularly the antenna tracker used to ensure signal integrity between aircraft flight computer and ground station, thus responsible for the team's outstanding performance

Cayley contest top 25%, School Grade Champion | the University of Waterloo | 2022

- Participation in the mathematics Gauss contest and achieved the top score in the school grade, with a top 25% score among worldwide contestants.

Champion, Greendeck VR Competition | Technological and Higher Education Institute of Hong Kong | 2021

- Participated and won the championship of the Green Deck VR Competition with a group of 4 students, among the 12 schools who have participated.