SKYLAR GUTMAN

Embedded Systems · Hardware-Software Co-Design · Robotics · UAS

Coral Springs, FL · (954) 579-5515 · skylar@signaturecomputer.com · skylargutman.com · linkedin.com/in/skylar-gutman

EDUCATION & CERTIFICATION

B.S. Computer Engineering · Florida Atlantic University, Boca Raton, FL · May 2026 · GPA 3.5

Coursework: Microprocessors · Computer Architecture · Advanced FPGA Design · Autonomous Robots · Computer Operating Systems · Circuits & Electronics · Software Engineering

FAA Part 107 Remote Pilot Certificate · Federal Aviation Administration · Certified for commercial UAS operations in controlled and uncontrolled airspace

PROJECTS & LAB EXPERIENCE

TurtleBot 4 Autonomous Delivery & Fleet Deployment | *FAU Robotics — Prof. Perry* May 2026

- Deployed and commissioned a 32-robot TurtleBot 4 fleet; authored a 4-part bring-up guide and configured Fast DDS discovery server for simultaneous multi-robot operation on a shared network.
- Built custom ROS2 nodes: I²C OLED status display (systemd service), LiDAR scan normalizer with linear interpolation for SLAM Toolbox compatibility, and YOLOv8n human detection integrated with OAK-D camera.
- Implemented a stateful autonomous delivery mission controller (IDLE → NAV_TO_PICKUP → WAIT_FOR_HANDOFF → NAV_TO_HOME) integrating NAV2, YOLOv8n, and AprilTag 3D pose estimation via solvePnP.

LoRaJack — FAU Campus Golf Cart Fleet Tracker | *FAU — Prof. Perry* In Progress · 2026

- Designing LoRaWAN GPS tracker nodes (ESP32-S3 + SX1262 + u-blox NEO-6M) in IP65 enclosures; C++ firmware encodes 13-byte binary payloads (lat/lon as scaled 32-bit integers) and transmits via OTAA.
- Self-hosted ChirpStack v4 network server with custom JS codec routes data via MQTT → Node-RED → InfluxDB → Grafana Geomap for real-time campus-wide cart visualization.

Custom Micro FPV Drone | *Personal Project* In Progress · 2026

- Designing original X-frame PCB in KiCad: Seeed XIAO ESP32-S3 Sense with integrated OV2640 camera, MPU6050 IMU at board center over I²C, and SI2300 MOSFET motor drivers as a reusable hierarchical sheet instanced four times.
- Ground pour on back copper layer for EMI control; targeting Espressif ESP-Drone firmware with custom GPIO mapping and PID tuning after first-article fabrication via JLCPCB.

Parametric Retrofit of Lab Equipment for Remote Control (Senior Design Capstone) | *FAU — Hardware/Software Co-Design Lead* 2025 – 2026

- Revived a failed Feedback Instruments inverted pendulum apparatus at FAU by replacing the defunct proprietary control box with a dual-ESP32 architecture: one ESP32 decodes quadrature encoders at ~984 Hz using hardware PCNT via a raw IDF v5 SPI slave driver with DMA-aligned 12-byte packets and FreeRTOS semaphore synchronization; a second ESP32 drives the DC motor through a BTS7960 H-bridge, manages limit switches, and executes a multi-step homing routine.
- Designed the custom PCB in KiCad integrating both ESP32 sockets, MCP4725 12-bit I²C DAC, ADS1115 16-bit ADC, TXS0108E level shifter, and GPIO expanders; designed the laser-cut enclosure in SolidWorks using parametric finger joints generated with Boxes.py and nested with Deepnest.
- Deployed a MATLAB/Simulink standalone executable on Raspberry Pi 5 via Simulink Coder cross-compilation; resolved code-generation constraints including replacing get_param with Constant block input ports, replacing typecast with bitshift/int32 unpacking, and adding a Rate Transition block for MCP4725 DAC timing.
- Built the full remote access pipeline: autossh reverse SSH tunnels through FAU's firewall, SRT ingest via mediamtx to Oracle Cloud VM, WebRTC/WHEP browser playback at ~1 second latency; Django + nginx + gunicorn web app with MQTT command transport enables worldwide browser control of the physical pendulum at ScienceLabToYou.com.

ROS2 RedBot Mobile Robot Platform | *Personal Project* 2024 – 2025

- Designed and implemented a full ROS2 Humble package (redbot_bridge) on Raspberry Pi 4, enabling serial communication between a SparkFun RedBot Arduino and ROS2 nodes.
- Built differential drive control via Twist messages, IMU/encoder publisher nodes, and end-to-end teleoperation; validated with rviz2 visualization.

BLE Gesture Glove | *Embedded Systems FAU — Professor Alhalabi* 2024

- Built a BLE wearable on ESP32 that detected finger-combination gestures via conductive fingertips and triggered modular Python actions: Twilio calls, email, and media playback.
- Designed the hardware sensing circuit, BLE GATT profile, and host-side Python dispatcher from scratch.

CNC Router — Full Sheet Plywood Capacity | *Personal Project* 2023

- Assembled a full-sheet CNC router with water-cooled spindle, chain-drive gantry system and tuned motion controller firmware.

RepRapPro Mendel 3D Printer Build | *Personal Project* 2022

- Assembled a full FDM printer from printed parts and threaded rod; sourced only components that could not be fabricated in-house. First-hand experience with motion systems, extruder calibration, and firmware tuning

Digital Systems Lab — Artix 7 FPGA & Zynq 7000 SoC | *Advanced FPGA FAU* 2024 – 2026

- Implemented combinational and sequential VHDL designs on Artix 7; verified timing with ModelSim and oscilloscope probing. Built and characterized RC, op-amp, and MOSFET circuits in Engineering Lab.

LabScout — University Equipment Catalog | *FAU — Prof. Perry* In Progress · 2026

- Python scraping pipeline normalizes lab equipment data from 8+ vendors into a Supabase/Postgres EAV schema with fuzzy-match spec deduplication and AI-assisted category classification; public Next.js catalog categorized with class syllabi and ABET Outcomes.

PROFESSIONAL EXPERIENCE

Project Manager & IT Lead | *Ultimate Environments General Contractor · Boca Raton, FL* Mar 2020 – Mar 2025

- Read architectural and MEP drawings to plan construction schedules and coordinate subcontractors for commercial retail fit-outs.
- Managed end-to-end project delivery — estimating, scheduling, procurement, and punch-list — for retail stores ready to open on day one.
- Administered IT infrastructure for all employees: email, network security, server and workstation maintenance.

Software Engineer | *StarStar Mobile · Pompano Beach, FL* 2015 – Mar 2020

- Designed and implemented a web-based CMS with telephony integration using PHP and Symfony; owned the system from architecture through production deployment.

Owner / IT Consultant | *Signature Computer Service · Coral Springs, FL* 1998 – Present

- Network, hardware, and software services for local businesses; sole operator managing scoping, delivery, and long-term client partnerships.

TECHNICAL SKILLS

Hardware: ESP32-S3 · Raspberry Pi 4/5 · Arduino · TI MSP430 · Zynq 7000 SoC · Artix 7 FPGA · Heltec LoRa 32 · OAK-D · Oscilloscope · DMM · Function Generator

Embedded / Firmware: C++ · VHDL · I²C · SPI · UART · BLE GATT · LoRaWAN (RadioLib) · PWM Motor Control · FreeRTOS concepts

Robotics & Autonomy: ROS2 Humble · NAV2 · SLAM Toolbox · YOLOv8n · AprilTag/ArUco · Fast DDS · MATLAB/Simulink · rviz2

PCB & Fabrication: KiCad (schematic + layout) · JLCPCB · SolidWorks · AutoCAD · 3D Printing (FDM) · CNC Machining

Languages: C++ · Python · VHDL · PHP · MySQL · JavaScript

Software & Tools: Git · Linux · PSpice · Node-RED · InfluxDB · Grafana · ChirpStack · MQTT · SolidWorks · AutoCAD · JetBrains IDEs · VS Code

UAS: FAA Part 107 Certified · Airspace Classification · RF Systems · UAS Safety Regulations

Protocols & Comms: I²C · SPI · UART · BLE · MQTT · LoRaWAN · ROS2 Topics/Services

Fabrication: 3D Printing (FDM) · CNC Machining · SolidWorks Mechanical Design · KiCad PCB Layout · Laser Cutting