Kristijan Pružinac

Osijek, Croatia | +385 95 526 93 98 | kikomali2517@gmail.com
github.com/KristijanPruzinac | linkedin.com/in/kristijan-pruzinac-522a4529b | pcb-placement.vercel.app

SUMMARY

Robotics and embedded engineer. Built GreenTitan, an open-source RTK GPS robotic lawnmower with ESP32 firmware, ROS 2 localization and MPC path tracking, tested in hardware-in-the-loop simulation before the lawn.

EXPERIENCE AND PROJECTS

GreenTitan | Open-source robotic lawnmower

Independent project | C++, FreeRTOS, micro-ROS, ROS 2, ESP32 | March 2023 - Present

- Developing an open-source robotic lawnmower prototype, designed as an affordable alternative that makers can build using 3D-printed parts and aluminium extrusion.
- Developed the ESP32 firmware in C++ on FreeRTOS, talking to ROS 2 over micro-ROS. An EKF in ROS 2 fuses RTK GPS with the gyro to estimate the mower's position and heading.
- Plans mowing routes as outline laps plus straight-row infill, tracked by a TinyMPC controller vendored and patched to run on the ESP32. In hardware-in-the-loop tests the axle stayed 2.0 cm off the rows (median; 4.9 cm at the 95th percentile).
- Built wall following with two 8×8 time-of-flight sensors, so the lawn edge recorded while driving comes out clean, and automatic docking that learns the station position over RTK: 20 of 20 docking runs passed in simulation.
- Set up Gazebo hardware-in-the-loop simulation where the real ESP32 runs the same firmware and only sensor and motor drivers are simulated. Field-tested RTK localization and line following on the first drive train.
- Received FERIT student-project funding in a 2023/24 round that selected 2 projects.

Clementine Labs | PCB prototyping machine

Co-developer | Python, PyQt, ESP32 | June 2026 - Present

- Developing Python fabrication software and ESP32 control firmware in a 2-person team, for a machine that makes prototype circuit boards directly from design files.
- Implemented 5 fabrication operations: copper milling, drilling, board cutout, solder-mask dispensing and removal. Added surface probing so the cutter maintains a consistent milling depth across uneven boards.
- Created a simulator that runs the prototype's actual ESP32 job-controller firmware, enabling development and testing of fabrication jobs before using the physical machine.

Sketch & Jig | AI tools for PCB placement

Independent project | Python, KiCad, MCP | August 2026 - Present

- Built Sketch & Jig, an MCP toolkit and pen-first web app: the designer draws the board outline and places key parts, and an LLM places the rest in KiCad using circuit analysis, editing tools and rule checks.
- Claude Opus 5.5 with Sketch & Jig finished placement on all 7 comparison boards in under 16 minutes each; the same model writing its own KiCad scripts failed to finish 3 at the 40-minute limit. On the 4 boards both finished, median placement time was 4.4 minutes versus 14.4.

SolidCraft | Open-source parametric CAD in Rust

Open-source contributor | Rust, GitHub code review | November 2026 - Present

- 3 pull requests merged (inserting a PCB from Gerber files, sketch text alignment, keeping the orbit view upright) and 2 in review.

Hivemind | LLM-powered team knowledge base

Erasmus+ team project | May 2026

- Built a knowledge base over project documents and Slack history in a 4-person team, with source links in answers; prototype done in 3 days and launched on Product Hunt.

EDUCATION

3rd-year bachelor's student in Computer Engineering | June 2027

FERIT, J. J. Strossmayer University of Osijek

- Final course and thesis remaining; available for full-time work now.
- Completed the certified Erasmus+ programme Digital Innovation Through AI (Latvia, May 2026, 5 ECTS); built Hivemind there.
- Team competitions: Ri-Hack 3.0 24-hour hackathon (October 2024) and STEM Games programming challenges (May 2024).

SKILLS

Embedded and robotics: C++, ESP32, FreeRTOS, micro-ROS, ROS 2, EKF sensor fusion, MPC (TinyMPC), RTK GNSS, Gazebo hardware-in-the-loop, stepper and brushless motor control

Software development: Python, PyQt, JavaScript, SQL, Docker, Git, pytest

PCB and manufacturing: KiCad, Gerber/Excellon, G-code

AI tools: MCP server design, agent tooling, agent evaluation