

Kacper Paraniuk

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EDUCATION

University of Illinois at Urbana Champaign

Urbana Champaign, IL

Bachelor of Science in Electrical Engineering

May 2029

Related Coursework: Embedded Systems / Microcontrollers, Circuit Analysis, Combinational and Sequential Logic,

GPA: 3.9

Instrumentation & Measurement, Analog Signal Processing, Computer Systems

PROJECTS

Payload Interface Board | *Electric Propulsion Lab*

- Designed, hand-assembled, and debugged 5+ 4-layer PIBs, optimizing power architecture to meet a strict <1 W power budget.
- Performed low-level hardware bring-up diagnosing MCU code execution issues through continuity checks, pin probing, and datasheet analysis, revealing errors in PCB design which caused memory placement errors and constant board resets.
- Evaluated signal acquisition pipelines for ultra-low-current sensing, validating system performance for 10pA to 1nA electrospray thruster plume measurement.
- Developed bare-metal (no-OS) C drivers in STM32CubeIDE for ADXL355, MAX31856, FDC2214, and ADC7124 sensors over SPI, I2C, and UART to acquire multi-sensor telemetry.
- Designed the main flight software architecture for the PIB in C using FreeRTOS, leveraging task prioritization, queues, and semaphores for asynchronous command execution.
- Built a custom Python CLI using pyserial and uv to create a portable and user friendly command line interface for easy commanding of the PIB through UART.
- Conducted space environment survivability analysis evaluating single event effects, total ionizing dose radiation, outgassing, and low-density plasma risks for payload electronics.
- Authored a research paper on space environmental effects on electronic components and defended payload design at 2 academic research symposiums

LEADERSHIP & INVOLVEMENT

Illinois Space Society

Urbana Champaign, IL

E-Hardware Lead | *Illinois Space Society - Spaceshot Avionics*

August 2025 - Present

- Assembled flight ground stations for 3 high-power rocket launches ensuring RF link verification and proper antenna handling.
- Leading a 20+ member avionics sub-team, developing, and executing a new on-boarding curriculum to bring new members from zero experience to designing a functional L1 Altimeter in KiCad.
- Overhauled electronic hardware supply chain, enforcing an inventory management system tracking 500+ distinct components to accelerate board ordering and prevent shortages of components.
- Produced and enforced E-Hardware PCB design standards-including controlled impedance matching, footprint creation, and schematic symbol guidelines-to eliminate design flaws across 12+ ISS boards.
- Performed failure analysis and board level repairs on commercial and custom flight altimeters following a ballistic booster crash, successfully recovering 100% of critical flight data.
- Operated live video system during 13k+ altitude rocket launch - LUNA

Electrical Propulsion Lab

Urbana Champaign, IL

Research Assistant | *Electrical Team* | *UROP Paid Summer Undergraduate Researcher*

January 2026 - Present

- Researched and designed the payload electrical system for data handling and thruster control of a monopropellant multi-mode propulsion CubeSat mission. (MonARCH)
- Authored critical aerospace documentation- including Interface Control Documents (ICD), Master Design Document (MDD), assembly/cleaning standard operating procedures, and PIB materials for user accessibility and easy handling in lab.
- Executed high-vacuum environmental testing using roughing and turbo-pumping systems following operating procedures.
- Verified and followed safety protocols when testing high pressure feed systems
- Performed dielectric breakdown analysis via Megger testing to validate Paschen's Curve across emitter/extractor plates prior to thruster ignition.
- Analyzed FAM142 thrust and current draw data by setting up picoammeter, waveform generators, and high voltage power sources to ToF sensor, trans-impedance amplifier for experiment execution.
- Integrated prototype feed system with payload electronics to evaluate fluid seals, propellant delivery, and material compatibility.
- Acknowledged SDS and followed procedures for safe handling of dangerous chemical substances such as FAM142 propellant.
- Evaluated and computed capacitance calibration curves using Matlab for measuring the liquid level of a conductive propellant.

SKILLS

Programming: C/C++, Java, Python, JavaScript, React, React Native, STM32CubeIDE, PlatformIO, Arduino IDE, Vivado, Matlab

Tools & Tech: Oscilloscope, Digital Logic Analyzer, Multi-meter, KiCad, GitHub, Fusion 360, Inventor, Laser Cutter

Languages: English, Polish (Seal of Bilingualism)