

Josef Ullrich

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EDUCATION

University of California, Santa Barbara

September 2023 - June 2027

- B.S. Electrical Engineering
- GPA: **3.96/4.0** | Tau Beta Pi Honors Society | Engineering Honors Program

WORK EXPERIENCE

Northrop Grumman Mission Systems

June 2026 - August 2026

Electrical Engineering Intern

San Diego, CA

- Coded, tested, and debugged **FPGA verification modules**.
- Translated verification requirements into sequence diagrams, outlining specific **OSVVM calls** and messages between verification components.
- Adhered to strict coding standards and documentation requirements in preparation for an **Internal Critical Design Review**.

Northrop Grumman Mission Systems

June 2025 - September 2025

Systems Engineering Intern

San Diego, CA

- Assisted engineering design lifecycle management, including **redline analysis**, fit checks, and **SolidWorks** modeling.
- Participated in daily meetings with Project Managers, **Engineers**, and Manufacturing Leads to discuss project blockers and action steps.

LHPH Capital

July 2024 - September 2024

AI Implementation Intern

San Diego, CA

- Implemented an **AI chatbot** securely trained on proprietary datasets within **Microsoft Azure's OpenAI resource**.
- Assisted in company-wide adoption of **ChatGPT Team** to streamline efficiency of everyday tasks.
- Participated in **weekly team meetings** and presentations to track progress and relay information.

RESEARCH EXPERIENCE

Wireless Communications and Sensornets Laboratory

January 2026 - Present

Undergraduate Researcher

Santa Barbara, CA

- Developing a FR3 wireless **Digital Twin** simulation framework using **NVIDIA Sionna** to model realistic RF propagation, multipath, and channel characteristics for sensing applications.
- Implemented and evaluated **CNN-based positioning algorithms**, comparing performance and training efficiency.
- Integrated **Overture Maps** building height data to replace missing OSM heights, improving digital twin accuracy.

SELECTED PROJECTS

Ground-Penetrating Radar Imaging | [Paper](#) | (MATLAB, FMCW Radar, Signal Processing)

2026

- Reconstructed subsurface pavement images from **FMCW radar data**.
- Used **inverse FFT processing** with MATLAB, identifying rebar approximately 10-15 cm below the surface.

Guitar Signal Chain and Filters | [Paper](#), [Circuits](#), [Demonstration](#) | (LTspice, Analog Circuit Design)

2025

- Developed and tested a full **guitar signal chain** (input buffer, pre-amp, drive amp, output buffer) from initial design and simulation through hands-on build and verification.
- Applied principles from Signal Processing and Circuit Analysis courses to design and implement fuzz, band-pass, and delay filters, selecting **cutoff frequencies** and tuning component values for desired **frequency responses**.

Digital Highpass Butterworth Filter | [Paper](#) | (MATLAB, DSP, Digital Filters)

2026

- Designed and verified a digital highpass Butterworth filter using **analog lowpass conversion** and the **bilinear transformation**.
- Final design achieved **0.47 dB passband attenuation** and **24.21 dB stopband attenuation**.

SKILLS

Technical: Wireless Communications, Signal Processing, DSP, FPGA Verification, Digital System Design

Hardware & Modeling: VHDL, OSVVM, QuestaSim, LTspice, SysML

Programming & Tools: Python, MATLAB, C/C++, Linux, NVIDIA Sionna, IBM DOORS