

Joshua Jimenez

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EDUCATION

University of Illinois Urbana-Champaign

BS in Systems Engineering and Design, Minor in Computer Science

Urbana, IL

Expected May 2028

- **Coursework:** Data Structures, Linear Algebra, Analysis of Data, Discrete Structures, Dynamics, Statics, Strength of Materials; *in progress:* Control Systems, System Programming, AI-Driven Intelligent Systems

EXPERIENCE

Autonomous Systems Research Assistant

Center for Autonomous Construction and Manufacturing at Scale (CACMS)

Apr. 2026 – Present

Urbana, IL

- Lead perception/ML engineering on a soil-moisture perception system for autonomous construction vehicles: RGB, near-infrared, and lidar sensing, physically based synthetic data, and embedded deployment
- Own the ROS 2 Humble autonomy stack on the lab's Clearpath Husky A200 UGV, taking it from tethered manual teleoperation to wirelessly operated autonomous navigation (sensor integration, SLAM, Nav2, safety watchdog)
- Annotated 1,000+ images in CVAT for GPS-denied underwater AVs; model AV sensor platforms in Fusion 360

PROJECTS

Soil-Moisture Perception for an Unmanned Ground Vehicle | *PyTorch, Blender, ROS 2* Apr. 2026 – Present

- Designed a physics-grounded RGB + near-IR + lidar terrain classifier (dry / semi-wet / saturated + no-verdict) against a hard embedded budget: a 6 W x86 SBC decoding two 5 MP camera streams under ROS 2
- Built a ~13k-line, 201-test Blender/Cycles synthetic-data renderer: 10,000+ labeled frames per batch with per-pixel moisture, depth, segmentation, and simulated lidar; moisture curves calibrated to LUCAS soil spectra
- Found lighting randomization swamping the class signal ($3.55\times$ vs. $1.7\times$) and fixed it with irradiance-tracked exposure and a regression-rejecting validator; traced a later domain shift to lamp color temperature
- Showed via a controlled A/B pilot (1,200 synthetic images, one variable) that a brightness shortcut was capping the model: widening photometric jitter gained +0.12 macro-F1 and cut saturated→dry confusions from 21 to 0

Autonomous Navigation on a Clearpath Husky A200 | *ROS 2, C++, Python, Linux*

June – July 2026

- Took a 50 kg UGV from bare hardware to autonomous point-to-goal navigation with Nav2 on a SLAM-built map
- Integrated Ouster OS1 lidar, MultiSense S27 stereo camera, and MicroStrain AHRS into ROS 2 Humble
- Built an instrumented closed-loop controller (C++/Python) with configurable gains, a safety watchdog, and per-run metrics logging; authored a field runbook with an e-stop pre-flight checklist

Audio Rate – Acoustic Exertion Estimation | *SE 498 Team Lead; CNN + GRU, iOS*

Sep. – Dec. 2026

- Lead a 3-person team building a smartphone system that estimates exercise exertion (%HRR per 10 s window) from breathing audio; designed the 16 kHz log-mel → CNN + GRU → int8 on-device inference pipeline
- Built the iOS capture app (48 kHz audio, motion logging, BLE chest-strap client); verified clock sync to ~6 ms

CATrack Inspect AI – HackIllinois Caterpillar Challenge | *Python, FastAPI, Modal*

Feb. 2026

- Fused Whisper speech-to-text and Claude Vision to flag equipment anomalies from technician voice notes and photos of a Cat D6N dozer; built the FastAPI backend on Modal integrating two cross-team services

LEADERSHIP & INVOLVEMENT

Product Lead, Product Space UIUC

Product Fellowship (6% acceptance rate); student product-consulting organization

Feb. 2026 – Present

Urbana, IL

- Co-lead a six-person team on a 12-week Brownlee Lighting engagement evaluating 3D-printed lamp shades; own the feasibility track (cost model, make-vs-buy, risk register) and the weekly client call
- Led development of a parametric shade-family generator (Python, Fusion 360 API): one spreadsheet row yields the solid, printability and clearance checks, and sliceable STLs
- Developed a U.S. go-to-market strategy for an international games company via market research and segmentation

Treasurer, Philippine Student Association

Lead financial advisor for 200+ members

May 2026 – Present

Urbana, IL

- Manage financial operations for the Midwest's largest student-led Filipino-American conference

ADDITIONAL INFORMATION

Technical Skills: Python, C++, C, ROS 2 (Humble), Nav2, PyTorch, OpenCV, NumPy/SciPy, scikit-learn, ONNX/OpenVINO, Blender (Cycles, bpy), Fusion 360, Linux, Git, FastAPI, SQL, Pandas, MATLAB, Swift
Languages: English (fluent), Japanese (intermediate)