NOLAN KNIGHT

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EDUCATION

Northwestern University - Evanston, IL **Expected December 2026**
Master of Science in Robotics

Purdue University - Weldon School of Biomedical Engineering - West Lafayette, IN **May 2025**
Master of Science in Biomedical Engineering

Purdue School of Engineering & Technology - Indianapolis, IN **May 2024**
Bachelor of Science in Biomedical Engineering

Butler University - Indianapolis, IN **May 2024**
Bachelor of Arts in Computer Science

WORK EXPERIENCE

GM Diecron Inc., *CAD/Automation Manufacturing (Contract)* - Remote **May 2025 - August 2025**

- Designed and modeled robotic machining layouts using Fusion 360 for aerospace manufacturing applications.
- Modeled and assembled 3D designs and milling fixtures per engineering drawings and design constraints.
- Produced fixture assemblies, orientation zones, and motion studies for robotic workflow automation.

Zimmer Biomet, *Development Engineering Co-Op* - Warsaw, IN **May 2024 - August 2024**

- Developed verification protocols and refined ROM reports to ensure compliance with ASTM / ISO Standards.
- Improved anatomical knowledge through initiating involvement in sawbones, specimen harvesting, and cadaver labs.

Roche Diagnostics, *Logistics/Operations* Intern - Indianapolis, IN **May 2023 - August 2023**

- Analyzed data using PostgreSQL to improve warehouse functionality and streamline processes across warehouses.
- Identified procedural and data inconsistencies, communicating findings to leadership to drive process improvements.
- Increased weight check success rate from 75% to 90% through process optimization and key global data fixes.

PROJECTS

Custom Quadruped Robot Design & Development - Rudy **Winter 2026**

- Designed a 12-DOF quadruped with hip abduction for active balance, dynamic stability, and center-of-mass control.
- Modeled and iterated the full mechanical system in CAD to validate joint range of motion and assembly fit.
- Integrated Dynamixel actuators with TTL Bus, Ubuntu OS Raspberry Pi, and proximity sensors into a unified system.
- Built a ROS 2 C++ control stack with URDF modeling, joint position control, and kinematics for Bézier-curve gait.

Franka Emika Panda Emika - Autonomous Color Sorting **Fall 2025**

- Led a team in developing a Python-based ROS 2 motion package for the Franka Panda Emika robotic arm.
- Gained experience with Linux and robotics control, enabling autonomous object identification and sorting.
- Calibrated robot workspace and object drop zones using AprilTags with position-averaging techniques.
- Implemented vision-based object detection and color differentiation using an Intel RealSense camera with OpenCV.

CNN Efficiency in Mobile Architecture – GhostNet Reimplementation **Spring 2025**

- Evaluated efficiency and resource usage of GhostNet, a lightweight CNN, on ImageNet and CIFAR-10 using Python.
- Compared model accuracy, inference speed, and computational cost across channel attention in lightweight CNNs.
- Optimized hyperparameters with PyTorch and TensorFlow, deploying top configurations to enhance model accuracy.

SKILLS

- **Programming & Version Control** - Python, C, C++, R, MATLAB, SQL, ROS 2, Linux, Unit Testing, Git
- **Software Libraries**: OpenCV, NumPy, PyTorch, TensorFlow
- **Perception & Mapping:** Computer Vision, LiDAR, SLAM
- **Robotics Control:** Motion/Path Planning, Position Control, Microcontrollers, Machine Learning
- **Simulation/Modeling**: CoppeliaSim, Gazebo, RViz, MATLAB-Simulink
- **Manufacturing & Design:** Fusion 360, Siemens NX, GD&T, 3D Printing, CNC Machining, soldering

Leadership & Involvement: Butler University Engineering Club (President, 2022), Sigma Nu (Housing Manager, 2021)