Stephen Ferro

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EDUCATION

Northwestern University, Evanston, IL — Expected Graduation **Fall 2024**
Master of Science in Robotics

Purdue University, West Lafayette, IN — Graduated **May 2018**
Bachelor of Science in Mechanical Engineering
- Minor in Economics and Certificate in Entrepreneurship and Innovation.

WORK EXPERIENCE

SKF USA

Product Engineer for Slewing Rings — **July 2022 – August 2023; Chicago, IL (Remote)**
- Performed raceway and bolting analysis to validate bearing design and recommend changes to slewing rings based on customer requirements such as life and stiffness.
- Created new designs and managed CAD drawings, models, and assemblies using PTC Creo and Windchill.
- Improved manufacturing lead times by reviewing design deviations requested by the factory with customer engineering teams.

Application Engineer for Industrial Market — **June 2018 – July 2022; Elgin, IL and Lansdale, PA**
- Supported industrial market customers to improve all aspects of bearing system design, including bearing and seal selection, life calculations, shaft and housing tolerances, and lubrication.
- Specified design features of specialty slewing and thin section bearings for customers in the defense and robotics industries.
- Worked directly with customers to reduce failures and improve bearing performance in applications such as pumps, gearboxes, and other rotating machinery.

Tenneco Automotive

Mechanical Engineering Co-Op – 5 sessions — **May 2014 – August 2017; Grass Lake, MI**
- Worked with four teams: Mechatronics, Cold End Development, Durability Testing, and Technical Support Engineering.
- Designed and performed a variety of different test procedures, including fatigue testing and various fluid flow tests.
- Worked with all stages of the product lifecycle, including initial design, prototyping. testing, and warranty support.

PROJECTS (photos and more at scferro.github.io)

Teaching an RC Car to Drive Fast with Machine Learning (in progress) — **January 2024 – Present**
- Using SLAM with an autonomous RC car to map and plan an optimal path around a previously unknown racetrack.
- Optimizing throttle, braking, and cornering behavior using reinforcement learning, optimizing for lap time.

Making Coffee With 7DOF Robot Arm: Botrista — **November – December 2023**
- Controlled a Franka Emika robot arm to brew a cup of pour over coffee using ROS 2 and MoveIt2 as part of a team of five.
- Used a RealSense camera and OpenCV to detect the handles of objects before picking them up.
- The robot would pick up objects and perform actions such as dumping grounds in the filter and pouring hot coffee.

Robot Navigation Using A* Algorithm — **October 2023**
- Developed a navigation model from scratch using the A* algorithm to plan paths for a wheeled robot from one point to another.
- Created a motion model and PID controller to simulate the motion of the robot following the planned paths.
- Optimized performance of the algorithm using different cell sizes, different obstacles, and different start and goal locations.

Design of Back-drivable Cycloidal Actuator for Quadruped — **2021 – 2022**
- Designed a 3D printed cycloidal actuator powered by a brushless motor and capable of outputting over 10 Nm of torque.
- Built prototype leg for quadruped robot using two actuators and performed basic robot leg motions on a test stand.

Purdue FSAE Electric – Member and 2018 Vehicle Dynamics Team Lead — **January 2016 - June 2018**
- 2018 Results: 1st in Skidpad and 2nd in AutoX at Formula North and FSAE Lincoln, the team's best results to that point.
- Reduced weight of suspension system by 15% by optimizing suspension component design and material selection.
- Improved driver feel and simplified tuning at the track by redesigning suspension geometry.

RELEVANT SKILLS

- **Programming/Software**: Python, C++, C, Git, Linux, Visual Studio, MATLAB
- **Robotics**: ROS/ROS 2, OpenCV, Machine Learning, Kalman and Particle Filters, Embedded Systems, SLAM, Computer Vision, MoveIt, Single Board Computers/SBCs
- **Design**: CAD (SolidWorks/Creo/ProE/Fusion360/Inventor), CAM (Fusion360), FEA (SolidWorks, Creo), PCB Design (KiCAD)
- **Manufacturing**: Manual and CNC Machining, Injection Molding, Waterjet, Laser Cutting, 3D Printing (FDM, SLA), Soldering