

Christopher Lee

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Education

Northwestern University, Evanston, IL

3.73/4.0 GPA

Bachelors and Masters of Science for Mechanical Engineering

June 2024

Relevant Courses: Stress Analysis, Robotic Manipulation, Vibrational Analysis, Mechatronics, Quality Control, Machine Learning

Skills

- **Computers:** MATLAB, Python, C, C++, ROS2, Excel, SolidWorks, NX, Creo, CorelDraw, Tableau, SQL, Teamcenter
- **Manufacturing:** Milling, Lathing, CNC, GD&T, Laser cutting, 3D Printing, Breadboarding, PCB Design, Plastic Injection

Relevant Experience

Robot Design Studio - Mechanical Engineer

January 2024-Present

- Leading 5 person team to design dexterous robotic hand and haptic glove for safe remote radioactive isotope research
- Prioritized manufacturability in CAD model resulting in 20 minute full assembly time and 10 minute repair
- Maximized back-drivability using bearings and tolerance stack analysis achieving 500 N/m virtual object stiffness
- Manufactured high-fidelity prototypes with 3D printing and CNC machining to ensure encoder alignment within 0.005"
- Fit compact electrical harnessing for potentiometers, CAN lines, and motors into robot fingers and palm

Engineers for a Sustainable World - Algae Wiper Robot Lead

January 2023-June 2023

- Designed robot in Solidworks to automatically clean algae off aquaponic fish tank window ensuring fish health
- Rapidly prototyped robot using 3D printing, laser cutting, and breadboarding, and PCB design across several iterations
- Programmed ESP32 CAM in C++ to actuate DC motors with PID control on weekly schedule
- Saved 30 minutes of weekly labor and live-streamed fish tank footage to website for remote checkups

Hambleton Research Group - Research Assistant

April 2022-June 2023

- Programmed industrial ABB 6-axis robot arm and collected load cell data to study soil machine interactions
- 3D Modeled lab environment and attachments in RobotStudio environment to avoid collisions with \$24000 sand bed
- Implemented inverse kinematics trajectory generation with feedback control in Python

Experience

Drivetrain Design and Development Intern - Caterpillar Inc.

June-September 2023

- Conducted tests on transmission components using dynamometers to analyze friction coefficient data in Tableau and SQL
- Developed feature recognition software for manufacturing prints using Python OpenCV while prioritizing legal security
- Designed components in Creo for ergonomic high-torque test stand and verified strength using stress analysis
- Calculated friction coefficient with relation to pressure and temperature using historical data and tribology theory

Northwestern Formula Racing - Uprights Design Lead

August 2022-June 2023

- Led uprights and suspension assembly modeling in Solidworks optimizing weight while ensuring safety
- Mentored new team members on Finite Element Analysis for load cases such as braking and cornering
- Created manufacturing drawings of parts with GD&T for critical surfaces such as bearing bores and seal housings

Northwestern Formula Racing - Steering Design

September 2021-May 2022

- Designed steering system in SolidWorks calculating geometry for minimum radius turn and meeting SAE requirements
- Collaborated across 60 person team to tune system with driver feedback, house electronics, weld components to chassis
- Manufactured parts such as steering columns, adapters, and mounts with milling, lathing, and CNC with NX CAM
- Passed technical inspection with positive feedback from design judges and smoothly handled corners during competition

Independent Study - Origami Mechanics Researcher

June-August 2021

- Researched and wrote grant proposal to develop origami tension-resistant joint receiving \$3500
- Collected stress/strain data using tensile testing machines and analyzed and filtered data in MATLAB
- Communicated methods, visualized data, and final results in report to undergraduate research office