Rafal Krzysiak

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Objective

Gain a position as a mechanical, electrical or mechatronics engineer utilizing my skills in machine learning (TensorFlow, Explainable AI), structural and thermal analysis (ANSYS thermal, mechanical FEA, NX Nastran thermal), solid modeling (Solidworks, NX), software (C++, Python, Matlab), robotic operating systems (ROS), and small drone build and implementation (both VTOL and fixed-wing).

Education

PhD in Mechanical Engineering – GPA – 4.0
University of California-Merced—Merced, CA
Expected graduation: December 2025

December 2021 **MS in Mechanical Engineering** – GPA – 4.0
Northern Illinois University—DeKalb, IL

May 2019 **BS in Mechanical Engineering** – GPA – 3.8
Northern Illinois University—DeKalb, IL

Projects

- Explainable AI planetary earth science and satellite remote sensing
- Explainable AI empowered sensors and smart sensing in health monitoring
- Information based control of multi-robot teams (Master's Thesis)
- Human following robot with ROS and OpenCV
- Search and rescue using quad-rotor swarm with ROS and OpenCV
- Archaeological drone survey mission

Experience

01/2022-01/2024 **Mechanical Engineer - Subcontract,** NASA Jet Propulsion Laboratory, CA

- Conducted FEA thermal and structural analysis on JPL flight instrument to be used on the International Space Station (ISS). This involved verifying instrument performance and survival under thermal and vibrational launch loads.
- Designed, built, and utilized a tunable laser spectrometer for quantifying total water concentration of lunar regolith for NASA's Artemis program.
- Constructed a digital-twin (Level-II) of miniature tunable laser spectrometer to measure ISS water quality and verified digital twin via environmental chamber testing.

Summer 18/19/24 **Mechanical Engineering Intern,** NASA Jet Propulsion Laboratory, CA

- Applied 3D mechanical design/simulation software to improve designs on highly sensitive instruments that will be mounted to drones for planetary science missions.
- Did design and layout for power distribution circuit for drone gas sensor and verified its performance.
- Integrated a methane gas sensor with robotic platforms using ROS.
- Collaborated with Chevron to upgrade and implement robotic H_2S sensor with wireless data collection and conducted measurements of this sensor at JPL.
- Collaborated with NASA Armstrong Flight Research Center (AFRC) to provide mechanical substantiation for NASA's next-generation fire detection instrument.
- Conducted thermal analysis for JPL's airborne program, specifically on radar technology for planetary Earth science missions.

Key Skills

- Proficient in SolidWorks
- Accomplished C/C++, Python, MATLAB programmer
- More than five years experience using ANSYS for structural and thermal modeling
- Four years experience building instruments using mill, lathe, water-jet (NIU/UCM)
- Seven year designing and building structures using 3D printers