Zachary Dietderich

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Work Experience

Student Assistant – Engineering Division

Lawrence Berkeley National Laboratory (May 2025 - August 2025)

- Evaluated new impregnation materials for superconducting magnets using single-fiber pull (SFP) and 3-point bending tests to characterize mechanical and thermal performance.
- Designed and 3D-printed TPU (95A HF) molds for curing resin/wax samples; conducted SFP testing at room temperature and 4.3 K (liquid helium).
- Improved an automated superconducting magnet winder by converting legacy Excel-based calculations to Python, increasing computational efficiency.
- Developed Python scripts to validate automated winding parameters and designed/printed Creo-modeled mandrel prototypes for dipole, quadrupole, and combined function coils.
- Led a technical seminar presenting project design, methods, and results to scientists and engineering teams.

Student Engineering Intern

Applied Spectra Inc. (May 2024 - August 2024)

- Conducted energy stability testing of Pulsed Nd:YAG laser spectroscopy systems to optimize performance.
- Collected and analyzed energy data under varying ambient temperatures to determine system efficacy under varying conditions.
- Gained hands-on experience in web development using C#, contributing to proprietary licensing software for global instrumentation.

Student Assistant – Engineering Division

Lawrence Berkeley National Laboratory (May 2023 - August 2023)

- Designed a test fixture and implemented materials testing to analyze the permanent deformation (creep) at high temperatures in inert environments (argon gas).
- Developed a LabVIEW program to display real-time temperature vs. time and log the temperature data during the vacuum impregnation cycle for coils to be used in superconducting magnets.
- Assisted with winding and assembly of the superconducting coils into a magnet to be used for proton and carbon radiation therapy to treat non-operable cancers.

Education (Graduating May 2026)

Bachelor of Science in Mechanical Engineering with Mathematics minor from San Diego State University GPA: 3.64

Automotive Engineering courses and shopwork (August 2019 – May 2022)

- Completed automotive engineering coursework with hands-on shop experience in vehicle systems, including engines, brakes, suspension, and drivetrains.
- Applied diagnostic, maintenance, and repair techniques using industry-standard tools while following proper safety and shop procedures.

Projects

ASML – Student Affiliate (August 2025 – Current)

- Actuating stage and camera system for vacuum chamber testing hydrogen radical and tin reactions.
- Used thermal and mechanical analysis to determine validity of prototyping and engineering design through FEA analysis.

Personal – Transparent OLED time and date display (August 2023)

- Designed and built an Arduino based time and date display using an RTC module and transparent OLED display, integrating real time clock communication and embedded display control.
- Modeled and fabricated 3D printed housing for the Arduino based system, designing for thermal considerations, airflow and mechanical tolerances.

Skills

SolidWorks • MATLAB • Python Creo Parametric • LabVIEW • Arduino • Microsoft Excel