Patrick R. Knowles

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SKILLS

Hard skills: Technical Writing, Python, CAD(SolidWorks), Microsoft Office, Common Wood/Metal Shop Tools, 3D Printing, CNC Machining.
Engineering & Physics: Thermodynamics, Solid State Physics, Rigid Body Dynamics, Finite Element Analysis, GD&T, LAMMPS, Composite Design, Elasticity Theory. Electro/Quantum dynamics.
Soft Skills: Effective Communication, Team leadership, Efficient and Flexible Time Management, Intellectual Humility, Emotional Intelligence, Oral Presentation.

RESEARCH & PROFESSIONAL EXPERIENCE

University of Colorado **Denver, CO**
Teaching Assistant MECH1100 *"computational innovation"* August 2025 - Present
Advisor: Gouying Dong

- Teach independent recitations in Python when needed.
- Provide comprehensive support to students through 1 on 1 tutoring, office hours, and grading feedback.

Reliable Cabinets **Oberlin, OH**
Finish Carpenter August 2023 - May2024

- Interpreted blueprints and design specifications while drawing from experience to deliver precise future heirlooms to clients using a full wood shop.

Bowling Green State University **Bowling Green, OH**
SCAPS Recreation of Tandem Solar Cells August 2023 - December 2023
Advisor: Marco Nardone

- Recreated Results in *Simulation of Optimized High-Current Tandem Solar-Cells With Efficiency Beyond 41%.*
- Ran computational models in Solar Cell Capacitance Simulator (SCAPS) to simulate solar cell performance, analyzing material properties and device structures to enhance efficiency and reduce energy losses.

Los Alamos National Laboratory **Los Alamos, NM**
Science Undergraduate Laboratory Internship (SULI) August 2022 - December 2022
DOE, DOD Funded
Advisor: Donald Brown

- designed and developed $70,000 optical system with in a team of three students that supported experimental research on material properties at Argonne National Laboratory, enhancing data analysis and interpretation.
- Engaged in weekly seminars and workshops focused on advanced optics and engineering methodologies,

Bowling Green State University **Bowling Green, OH**
Numerical Simulation of Time-Resolved Photoluminescence January 2022 - May 2022
(improving solar cells)
Advisor: Marco Nardone

- Prepared theoretical data of single photon time-resolved photoluminescence in MatLab

- Conducted error analysis of theoretical data to experimental data using R-squared regression.

University Of Toledo **Toledo, OH**
Research Experience Undergraduate (REU) Intern
(improving solar cells)
Advisor: Jacques Amar May 2020 - August 2020

- Ran computational models of CdTe using a *Large-scale Atomic/Molecular Massively Parallel Simulator* (LAMMPS) at the femtosecond time scale via the Ohio Supercomputer.
- Calculated theoretical minimum energy saddle points of atom interactions using the Nudged Elastic Band method.

PRESENTATIONS

Posters

- Knowles, P., Dr. Nardone M., (2022, May) *Numerical Simulation of Time-Resolved Photoluminescence*, CURS, Bowling Green, Ohio.
- Knowles, P., Dr. Nardone M.,(2023 Dec) *Investigation of Tandem Solar Cells Using SCAPS*, Bowling Green, OH.

Oral Presentations

- Knowles, P. Dr. Amar, J., (2020 Aug) *Activation barriers for the diffusion of Se interstitials in CdTe and CdSe*, NSF-REU, Toledo, OH.
- Knowles, P. Dr. Brown, D., (2022 Dec) *In-Situ Casting of TiNb Alloys*, DOE-SULI, Los Alamos, NM.

EDUCATION

University of Colorado **Denver, CO**
Masters of Science in Mechanical Engineering May 2027
GPA 3.567

Bowling Green State University **Bowling Green, OH**
Bachelor Of Science in Physics December 2023
Minor in General Science
GPA 3.61