JACOB BELDING

6968 Beery Lane ◆ Dublin, OH 43017
belding.14@osu.edu ◆ 614-273-9082

SUMMARY

Through my research experience, I have pursued both experimental and computational research in a variety of settings, including corporate R&D facilities at Procter & Gamble, chemistry labs and computational groups at The Ohio State University, and the labs at NASA's Glenn Research Center. Throughout this time, I have discovered a passion for the development of novel materials and structures, especially those with applications in the fields of energy and sustainability. My goal is to attend graduate school in pursuit of a PhD in advanced materials research, allowing me to further my work of creating the efficient and sustainable materials needed for our future.

EDUCATION

The Ohio State University Columbus, Ohio
Bachelor of Science in Chemical Engineering, GPA 4.00, Expected Graduation May 2022
Honors Program Student and Eminence Fellowship Recipient

RESEARCH EXPERIENCE

National Aeronautics and Space Administration Solar Energy Researcher
NASA Glenn Research Center, Cleveland, OH
January 2020 – August 2020, January 2021 – April 2021

- As part of the Photovoltaic and Electrochemical Systems Branch, worked on the improvement and application of a large area LED-based solar simulator, assisted with an investigation into perovskite-based solar cells for space use, and conducted a literature review of current electrodynamic dust screening technologies

Computational Material Discovery Group Undergraduate Researcher
The Ohio State University, Columbus, OH
August 2019 – Present

- Working with Dr. Li-Chiang Lin, using state-of-the-art molecular dynamics simulations to evaluate nanoporous membranes on the basis of pore geometry for their potential use in reverse osmosis water desalination

Procter & Gamble Research and Development Intern
Cincinnati, OH
May 2019-August 2019

- Developed methods for use of chemical foaming additives to achieve structural color in PET as a sustainable alternative to traditional colorant, and with potential for UV protection applications
- Developed a procedure for evaluating crystallinity of foamed PET using differential scanning calorimetry
- Automated the photography and addition to digital database of experimental retains using Python and C++

The Ohio State University Department of Chemistry X-Ray Diffraction and UV-Visible Spectroscopy Technician
January 2019 – April 2019

- Performed XRD and UV-Vis and analyzed resulting data to characterize synthesized perovskite compounds
- Worked closely with chemistry students to teach and encourage interest in solar energy research

Procter & Gamble Research and Development Intern
Cincinnati, OH
May 2018-August 2018

- Collected data using both experimentation and simulation, and analyzed this data using Excel and JMP
- Led design of new packaging, including ideation, concept drawing, 3D modeling, and prototyping
- Worked across disciplines to bring an understanding of materials chemistry into the packaging design process

Battelle Memorial Institute Lab Analyst
Columbus, OH
June 2017 – May 2018

- Developed and revised experimental procedures based on lab work and extensive review of literature
- Independently designed and performed modifications of living cells using CRISPR gene-editing

***Fundamentals of Engineering Honors* (FEH) Nanotechnology and Microfluidics Research Project**

January 2018 – April 2018

- Designed, concept modeled, and 3D printed a prototype nanotechnology-based lab-on-a-chip device
- Used C++ computation and experimental work to study yeast cell adhesion in the context of microfluidics

WORK EXPERIENCE

The Ohio State University Department of Chemical Engineering

Teaching Assistant for *Thermodynamics*, January 2021 – April 2021

- Helping to instruct a course in thermodynamics, focused on the theory and applications of mass, energy, and entropy balances

Teaching Assistant for *Transport Phenomena I*, August 2020 – December 2020

- Helping to instruct a course in momentum transport, focused on derivation and application of fundamental fluid mechanics equations

Teaching Assistant for *Separation Process*, August 2019 – December 2019

- Helping to instruct a course in mathematical and practical analysis of processes including distillation, adsorption, reverse osmosis, liquid-liquid extraction, leaching, evaporation, drying, and filtration

HONORS & AWARDS

Eminence Scholarship at The Ohio State University

- Full cost of attendance fellowship awarded to 20-25 students each year, with an emphasis on research, leadership, and service

Fulbright Canada – Mitacs Globalink Program

- Summer 2020 awardee; cancelled due to COVID-19 pandemic
- Summer 2021 awardee; will proceed in a virtual format at the University of Alberta - Edmonton

PRESENTATIONS

Review of Literature on Electrodynamic Dust Screening Technologies; August 2020, NASA

Computational Study of Heat Transfer in an Incandescent Bulb; November 2019, The Ohio State University

Characterization and Prevention of Crystallinity in Foamed PET (Final Presentation); August 2019, Procter & Gamble

Sustainable Color through Chemical Foaming (R&D Intern Poster Session)**;** July 2019, Procter & Gamble

Innovation of a Large Bottle Suitable for eCommerce (Final Presentation); August 2018, Procter & Gamble

A Landscape Assessment of Large HDPE Packaging (R&D Intern Poster Session); July 2018, Procter & Gamble

*Celiac Detection Using a Nanotechnology-based Lab-on-a-chip Device***;** April 2018, The Ohio State University

SERVICE

The Adaptive Adventure Sports Coalition

- As part of an Eagle Scout Project, designed, planned, and led the construction of a 100-foot-long accessible pathway at TAASC, a Columbus-based organization that empowers people with disabilities to enjoy adventure sports such as kayaking and skiing

Franklin County Public Health Medical Reserve Corp

- Volunteered to aid in COVID-19 vaccine distribution to vulnerable community members and trained to help respond to other disasters

RELEVANT COURSEWORK

Honors General Chemistry 1, 2, and lab, **Organic Chemistry** 1, 2, and lab, and **Physical Chemistry**

Transport Phenomena 1: Momentum Transfer (Fluid Mechanics) and **Transport Phenomena 2**: Heat and Mass Transfer

Thermodynamics, **Kinetics & Reactor Design**, **Unit Operations Laboratory** 1 & 2, and **Separation Process**