BENJAMIN LARSON

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Education

BRIGHAM YOUNG UNIVERSITY, College of Engineering Provo, Utah
Bachelor of Science, Major in Chemical Engineering, Minor in Manufacturing GPA: 3.4 2024

- Early High School Graduation: BYU matriculated student at age 16
- Publication: *Synthesis and Computational Studies Demonstrate the Utility of an Intramolecular Styryl Diels–AlderReaction and Di-t-butylhydroxytoluene Assisted [1,3]-Shift to Construct Anticancer dl-deoxypodophyllotoxin*

Skills

- Organic Synthesis/Analysis
- Fabrication: Lathe/Mill, Weld, etc
- Fusion 360 CAD and FEA
- Single Crystal XRD Analysis
- Beryllium Salt Safety/Handling
- ICP-MS Analysis
- Pipe Fitting/Bending
- Cyanide Electroplating
- Vacuum Distillations
- Python: Numpy, Scipy
- Raspberry Pi
- NMR Spectroscopy
- 3d Printing: Resin, Filament
- Energetic Compounds Safety
- Pressure Vessel Safety
- Composites Manufacture
- Public Speaking
- Employee Management

Experience

Molten Salt Reactor Research Group - Research Assistant **Dec 2021-Present**

- Designed and manufactured positive pressure filter for molten FLiBe salt, reducing total filtration time by nearly half
- Performed dozens of physical property measurements on various molten salt mixtures with accuracy greater than 96%

Experimental Propulsion Research Group – Research Assistant **Sep 2021-Present**

- Designed and manufactured nozzles, experimental fuel additives, and combustion chamber ablatives for a hybrid rocket engine test stand; data for publication will be acquired winter 2022 — 20 hours/week

Brigham Larson Pianos - Electroplating Technician **Mar 2021-Sep 2021**

- Reproduced in-house (from scratch) a previously outsourced electroplating process for brass and nickel, reducing part turnaround time from 3 months to a single day with 40% lower operating costs — 40 hours/week

NuAg CBD – Co-Owner and Engineer **May 2019-Feb 2021**

- Solo designed and manufactured a supercritical CO2 extractor for $30,000, or 21% the cost of similar commercial extractor, including two 1200lb 60L pressure vessels operating at 3000psi — 65 hours/week
- Designed and optimized a commercially viable semi-synthetic multi-step pathway for natural product cannabinol

Simmons Center for Cancer Research – Research Assistant **Aug 2016-Jul 2019**

- Optimized key Intramolecular Styryl Diels-Alder (ISDA) step for natural product deoxypodophyllotoxin to increase enantioselective yields from 26% to 42% via pressurized reaction conditions — 25 hours/week
- Used green chemistry to modify and optimize multiple asymmetric reactions to use water and γ-cyclodextrin in place of carcinogenic organic solvents with improved enantioselectivity

Projects, Interests, Awards

Projects

- Personal chemistry lab with >200 chemicals and >$15,000 collected equipment. Synthesize high-energy compounds
- High-pressure 40L flamethrower 120’ range; synthesize special fuels including Trimethyl Borate which burns green
- Built freeze-dryer for $500 and pre-owned parts with similar capacity as $4000 commercial machine; in daily use

Leadership and Awards

- (2019-2020) Undergraduate Research Award: Submitted research summary to receive funding for undergraduate work
- (2014-2019) President of Church Youth Group at every two year graduation level. Led weekly meetings of 10+ youth

Hobbies

- Drone Photography
- Electric Unicycle Racing
- Powered Paragliding
- Home Chemistry