

Levi Brunelle

www.linkedin.com/in/lbrunell || (431) 335-4252 || lbrunell@uwaterloo.ca || Portfolio: levibrunelle.com

SKILLS

Languages:	Python, Java, MATLAB, SQL	Design:	Fusion 360, Solidworks, COMSOL, AutoCAD
Libraries:	Pandas, SciPy, SciKit-Learn, NumPy	Electronics:	Function Gen, Oscilloscope, Four-point Probe
Microscopy:	Fluorescent, AFM, SEM	Semiconductor:	Sputtering, RIE, Lithography, Parametric Analyzer
Spectroscopy:	Raman, FTIR, UV-Vis	Materials:	DSC, TGA, XRD, Impact/Tensile Tests
Wet-lab:	Most Wet-lab Techniques	Fabrication:	GMAW, SMAW, Sheet Metal, General Fabrication

WORK EXPERIENCE

Terray Therapeutics — R&D Associate

Pasadena, California

Sept 2023 – April 2024

- Single-handedly built a 3-axis AC electromagnetic stage for a fluorescent microscope to manipulate magnetic nanoparticles for self-assembly in microarray experiments. This involved a complete CAD design, laser-cutting steel components, machining and heat treating magnetic core iron, 3D printing parts in biocompatible materials, hand winding of coils, and wiring of amplifiers
- Utilized the electromagnetic stage to perform sequences of tests varying frequency, field strength, and bias on different axes to manipulate magnetic nanoparticles into silicon microarrays, resulting in 90% loading in less than 60s with one touchpoint
- Developed and optimized image processing scripts using Pandas, NumPy, Scikit-Learn, and ImageJ to extract and plot intensity data, analyze trends, and ultimately discover a more efficient surface chemistry microarray, improving loading efficiency by 20%
- Evaluated different gold, gold-thiol, and nitride functionalized surface coatings for silicon microarrays to reduce non-specific binding by bio-enabled magnetic nanoparticles in various chemical environments
- Conducted glovebox tagging to create DNA-encoded combinatorial libraries attached to nanoparticle suspensions by means of photocleavable linkers for use with FRET-based cleavage experiments
- Optimized loading procedure for gold-coated microarrays using centrifuge drying in custom 3D printed adapters, reducing the process from 12 touchpoints to 5

Jan 2023 – April 2023

- Designed and executed experiments to improve surface properties on scaled-up production of passivated optical windows
- Characterized hundreds of passivated optical windows of various anti-fouling surface chemistries, both internally produced and externally sourced, using fluorescent microscopy and contact angle
- Analyzed large image datasets using ImageJ to quantify fluorescent intensity on passivated surfaces
- Executed basic solid phase synthesis, FMOC quantifications, and DNA click reactions on magnetic nanoparticle suspensions

Evonik Industries — Peroxide Process Engineer

Maitland, Ontario

May 2022 – August 2022

- Fixed the reverse osmosis and multi-media water filtration systems by performing advanced water tests and sample analyses with various filter-aids, trending key performance parameters to determine corrective measures for maximum productivity
- Collaborated with outside companies to acquire cheaper and more effective water treatment chemicals, saving the plant an estimated \$40,000 a year
- Created interactive Excel dashboards to pull and organize live data from plant instruments, as well as to generate predictive equations using macros for optimal performance

Archangel Ironworks — Blacksmith, Founder

Winnipeg, Manitoba

- Works closely with customers to design metalwork to fit their vision, including blades, jewelry, and decorative ironwork
- Creates handmade kitchen knives and other blades to high degrees of precision, delivering a far better custom product than can be bought commercially

EDUCATION

University of Waterloo — BAsC. Nanotechnology Engineering (GPA: 3.8)

Sept 2021 – April 2026

- Activities: Varsity Ski Team, campus volunteering
- Pursuing a minor in Combinatorics and Optimization, and an Option in Quantum Engineering

PROJECTS (See Portfolio for More)

Surface Grinding Attachment

- Built a fully functional aluminum prototype surface grinding attachment for 2x72 belt grinder, designed in Fusion 360 and built using both manual and CNC machining
- Includes a dovetail feed mechanism with UHMW polyethylene gib for smooth operation, and a switchable magnetic chuck with sine bar, able to grind parallel flats or precise tapers to within 0.001" across a 15" surface

INTERESTS

- Nanofabrication, Materials Science, Photonics, Data Science, Quantum Computing, Blacksmithing, Mechanical design