

Benjamin Ross Humer

[My LinkedIn](#)

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Education

University of Toronto

September 2020 – December 2025

BASc in Engineering Science - cGPA: 3.4, Honours Standing

Toronto, On.

- Specialist in Engineering Physics, Minor in Sustainable Energy Systems, Certificate in Nuclear Engineering

Work and Research Experience

Computational Plasma Physicist: Applied Physics

January 2026 – August 2026

General Fusion Inc.

Richmond, B.C.

- Development of a flexible ionization model for the plasma formation process in the LM26 experiment
- Expanding my thesis project to improve General Fusion's capacity to simulate and predict the CHI breakdown process

Teaching Assistant: Engineering Mathematics and Computation

September 2025 – December 2025

University of Toronto Dept. of Engineering Science

Toronto, On.

- Delivered tutorials and computational labs to allow students to apply core concepts in computational mathematics

Plasma Physics Data Analyst: Applied Physics

May 2024 – September 2025

General Fusion Inc.

Richmond, B.C.

- Ran custom Bayesian inference models to determine the likelihood distribution of Grad-Shafranov equilibria based on some set of input measurements, with increased time resolution compared to previous results
- Worked extensively in General Fusion's HPC environment to develop tools to support MHD simulations, as well as run MHD simulations to predict experimental behavior
- Attended the 2025 Culham Plasma Physics Summer School and presented my research on plasma instabilities in a Coaxial Helicity Injected Spherical Tokamak

NSERC USRA Researcher: Ocean Dynamics Lab

May 2023 – September 2023

University of British Columbia Dept. of Earth Ocean and Atmospheric Sciences - Ocean Dynamics Lab

Vancouver, B.C.

- Worked as an engineer developing systems to help measure turbulent dynamics on a saltwater freshwater interface
- Preliminary analysis of a CFD simulation of the entire salish sea over a one year period
- Integration of new electronics systems into existing drifter technology, seen on the [drifters website](#)

Undergraduate Research Assistant: MATHUSLA

May 2022 – September 2022

University of Toronto Dept. of Physics - MATHUSLA Collaboration

Toronto, On.

- Built a testing setup to quantify properties of different components of the upcoming MATHUSLA detector to be built at CERN in 2026
- Gathered and analyzed data to compare wavelength shifting fibers, plastic scintillator, and Silicon Photo Multipliers
- Constructed a setup for demonstrating that the MATHUSLA detector array will double up as a cosmic ray detector

Undergraduate Research Assistant: SuperCDMS

September 2021 – May 2022

University of Toronto Dept. of Physics - SuperCDMS Collaboration

Toronto, On.

- Implementation of continuous integration testing for sample data sets in CDMSBats, for verifying the outputs of new releases

ESROP Researcher: SuperCDMS

May 2021 – September 2021

University of Toronto

Toronto, On.

- Building test cases to validate the new software package for the SuperCDMS Project in C, C++, and Python
- Worked primarily in HPC environments on the Niagara and Cedar clusters

Publications, Posters, and Thesis

Effect of Lithium Liner on Stability of Compressing Plasma in LM26 Experiment

November 2025

67th Annual Meeting of the APS Division of Plasma Physics

Los Angeles, CA

- I expanded General Fusion's two phase in house MHD solver into a tool for production scale simulations
- Contributions to the solver included integrated meshing capabilities, machine geometry specification scripts, and code that automatically extracts inverse plasma equilibria
- These improvements enabled the analysis that led to the creation of this poster. The poster is available [here](#)

Investigation of X-ray Crashes in a Transient Coaxial Helicity Injected Spherical Tokamak

July 2025

62nd Culham Plasma Physics Summer School

Abingdon, UK

- This poster outlines the evidence for Double Tearing Modes and Internal Reconnection Events in the Plasma Injector 3 experiment at General Fusion
- I presented this work at the Culham Plasma Physics Summer School in July 2025. The poster is available [here](#)
- This was the culmination of the data analysis portion of my work at General Fusion, and is expected to be a substantial contribution to the final paper summarizing the experimental results of General Fusion's PI3 experimental campaign

Physics Conclusions of PI3 Spherical Tokamak Program

October 2024

66th Annual Meeting of the APS Division of Plasma Physics

Atlanta, GA

- I contributed finalized versions of various plots, and was responsible for the analysis showing AXUV data as a metric for the characterization of plasma shots. The poster is available [here](#)

DSMC Simulation of General Fusion's Fusion Plasma Injector

September 2023 – April 2024

Undergraduate Thesis

Toronto, On.

- Joint thesis with General Fusion and the University of Toronto Institute for Aerospace Studies
- Prediction of Non-Equilibrium Gas Filling and Ionization Processes in a Chamber Using Direct Simulation Monte Carlo (DSMC) Methods
- This thesis and the simulations results led to a new model for the breakdown process in General Fusion's coaxial helicity injector. The final thesis document is available [here](#)

Major Projects

Classification of Plasma Equilibria Using a Convolutional Neural Network

September 2025 – December 2025

Course Project - Applied Fundamentals of Deep Learning

Toronto, On.

- Trained a Convolutional Neural Network of custom architecture that takes in synthetic measurements of T , n , and $\vec{B}$ to determine which equilibrium states best represent the synthetic plasma that was the source of the measurements
- Write a supporting codebase for rapidly computing potential plasma equilibrium states that were used in model training

Research Awards

NSERC Undergraduate Student Research Award (\$7500)

May 2023 – September 2023

NSERC USRA – UBC Ocean Dynamics Lab

Vancouver, BC

- The NSERC USRA program provides funding for undergraduate students to pursue 16 weeks of full time research at a university in Canada

Engineering Science Research Opportunities Program (\$7000)

May 2021 – September 2021

University of Toronto – Department of Engineering Science

Toronto, On.

- The Engineering Science Research Opportunities Program (ESROP) provides grants for full time research opportunities to early career undergraduate engineering students at UofT
- ESROP reserves six awards for the top students in the first year class of Engineering Science each year

Seminars and Colloquia Presented

Measurement of Turbulent Dynamics on the Fraser River Plume Front

August 2023

Physical Oceanography Seminar Series

University of British Columbia

- A summer seminar series where students, faculty, and visiting researchers present their work in Physical Oceanography
- I presented about the progress the UBC Ocean Dynamics Lab had made in the measurement of turbulent processes in the Fraser River Plume Front

Live Long and Prosper – LLPs and the MATHUSLA Experiment

August 2022

Physics Summer Colloquium Series

University of Toronto

- A weekly series of summer colloquia where students and faculty present their research
- I presented about the planned MATHUSLA detector, and the work being done in the MATHUSLA lab at UofT

Extracurricular Activity

University of Toronto Varsity Rowing Team

September 2021 – September 2024

Varsity Blues Men's Rowing

Toronto, On.

- Ontario University Athletics athlete to watch at 2023 OUA Championships
- 2023 Oarsman of the Year (MVP), 2022 Rookie of the Year, 2021 Novice of the Year

Programming and Software Skills

Programming Languages: Python, PyTorch C, C++, Bash, MATLAB, LaTeX, Markdown

Software: High Performance Computing, Linux, Git, GitHub, GitLab, Continuous Integration Testing, SolidWorks, Fusion360

Relevant Undergraduate Coursework

Mathematics: ESC384 – Partial Differential Equations, AER210 – Vector Calculus

Computer Science: PHY407 – Computational Physics, APS360 – Applied Fundamentals of Deep Learning

Physics: AER510 – Fundamentals of Fusion Energy, PHY454 Continuum Mechanics, PHY427 – Advanced Physics Lab II, Phy327 Advanced Physics Lab I, ECE357 – Electromagnetic Fields, PHY354 – Analytical Mechanics, PHY356 – Quantum Mechanics, AER210 – Fluid Mechanics

Engineering Courses: ECE360 – Nonlinear Electronics, MIE313 – Heat and Mass Transfer

Nuclear Engineering: CHE566 – Elements of Nuclear Engineering, MIE407 – Nuclear Reactor Theory, MIE408 – Nuclear Thermal Hydraulics

Engineering Design: ESC472 – Electrical and Computer Engineering Capstone Design

Interdisciplinary Courses: APS510 – Organization of Global Energy Systems, ENV350 – Energy Policy