

Physics Specialist  
University of Toronto, St. George

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## EDUCATION

### •University Of Toronto, St. George Campus

09/2021-

*BSc. Physics Specialist with Mathematics Minor*

## RESEARCH EXPERIENCE

### •Laser Heating and Ablation Research

09/2023 -

*Supervisor: Dr. Dwayne Miller*

University of Toronto

- Simulating breast tumor response to various pulsed lasers using COMSOL
- Quantified tissue death and heating times, comparing them to equivalent continuous wave lasers.
- Aligned optics, maintained a Q-Switched Laser and performed laser ablations of biological and inorganic samples.
- Performed parametric sweeping of voltages to optimize resolution in laser ablation based time of flight mass spectrometer.
- Interfaced voltage supplies, oscilloscopes and pulse generators using SCPI protocols.

### •Nonlinear Optics Research

06/2023 - 09/2023

*Supervisor: Dr. T.J Hammond*

University of Windsor

- Simulated the propagation of femtosecond pulses through crystals and PCF, modelling the nonlinear responses
- Through a combination of the Runge-Kutta method and the Split-Step Fourier Method, compared the accuracy and computation times of various pulse-propagation equations, utilizing Kerr Instability Amplification and the Raman Effect

### •Physics Education Research

09/2022 - 04/2023

*Supervisor: Dr. Carolyn Sealfon*

University of Toronto

- Analyzed student free-responses from surveys and clustered them into useful categories, while identifying the most insightful comments
- Applied both supervised and unsupervised Machine Learning algorithms like Naive Bayes and K-Means

### •Biophysics Research

06/2022-08/2022

*Supervisor: Dr. Anton Zilman*

University of Toronto

- Applied the Gillespie Algorithm and simulated the stochastic kinematics associated with ligand-receptor interactions

## POSTERS AND CONFERENCE PROCEEDINGS

- Alexander A. C. Wainwright, Khaled Madhoun, **Fadi Farook**, Souren Salehi, Samansa Maneshi, R. J. Dwayne Miller, "Modeling wavelength dependence of laser tumor hyperthermic treatments," Proc. SPIE 12840, Optical Interactions with Tissue and Cells XXXV, 1284008 (12 March 2024); <https://doi.org/10.1117/12.3000396>
- Farook, F. (2024, May). Comparison of Pulse-Propagation Equations using Raman Effect and Kerr Instability Amplification [Poster presentation]. Canadian Association of Physicists Congress. London, Canada.
- Farook, F. (2023, November). Comparison of Pulse-Propagation Equations using Raman Effect and Kerr Instability Amplification [Poster presentation]. Photonics Online Meetup.

## AWARDS AND HONORS

### •University of Toronto Excellence Award

2024

### •Class of 3T0 and Associates Scholarship in Mathematics and Physics

2024

### •Birkenshaw Family Scholarship

2023

### •Natalia Krasnopolkskaia Summer Undergraduate Research Fellowship

2022

### •Ronald J C McQueen Scholarship

2022

### •University of Toronto International Scholar Award

2021-

## SKILLS

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**Technical:** Soldering, Lathe and Mill Machining

**Programming Languages:** Python, MySQL, MATLAB, COMSOL

**Algorithms:** Bayesian Optimization, Binomial Naive Bayes, K-Means, Spectral Clustering

## RELEVANT COURSES

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### **Programming:**

CSC108: Introduction to Computer Programming

CSC148: Introduction to Computer Science

PHY385: Optics

PHY407: Computational Physics

PHY408: Time Series Analysis

PHY405: Electronics Lab (Winter 2025)

PHY485: Laser Physics (Winter 2025)

## TEACHING EXPERIENCE

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### **•Teaching Assistant**

*09/2023 - 04/2024*

*University of Toronto*

– Teaching tutorials and holding office hours in MAT135: Calculus I and MAT136: Calculus II

### **•Tutor**

*01/2023 - 06/2023*

*Tutor Doctor*

Toronto

– Tutored Ontario Curriculum and International Baccalaureate physics and mathematics

## SERVICE AND OUTREACH

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### **•Volunteer for Let's Talk Science**

*01/2023-*

*Outreach in the form of being a judge for science fairs and teaching python to high school students*