Bao Doan

CONTACT INFORMATION

Email: ndoan6@uwo.ca

EDUCATION

Western University, London, Ontario, Canada — September 2017 - present
Department of Applied Mathematics
Bachelor of Science: Honours Specialization in Mathematical and Statistical Sciences
- Honours Thesis, supervised by Professor Lyle Muller

RESEARCH EXPERIENCE

Undergraduate Researcher — May 2020 - August 2020
Department of Applied Mathematics — *Supervisor: Professor Lyle Muller*
- Developing an analytical form for the transformation from the adjacency matrix of the complete network on n nodes to any subgraph with n nodes in order to study the spectra of said transformation.

Undergraduate Researcher — May 2019 - August 2019
Department of Applied Mathematics — *Supervisor: Professor Lindi Wahl*
- Developed and optimized *Mathematica* programs to run simulations and create transmission tree graphs to better observe the bottleneck effect in the evolution rate of the HIV virus between-hosts.

PRESENTATION

Canadian Undergraduate Mathematics Conference — August 2020
Speaker
- *Title:* What Is The Structure Of Random Graphs At Finite Scales?
- *Shortened Abstract:* Random graphs provide important models for a range of social, technological, and biological systems and the eigenvalues of these graphs are important in determining the behaviors of networked systems. This talk offers an introduction to networks, regular graphs, random graphs, and their eigenspectra. We will then investigate the connections between regular graphs and random graphs via patterned edge removal. When viewed in a sequential manner, the effects of systematic edge removal exhibit surprising regularity. At the end of this talk, we will discuss prospects for our future research work.

TEACHING EXPERIENCE

Complex Variables: The Cauchy's Integral Formula and Its Consequences — March 2020
Speaker
- *Abstract: Cauchy's Integral Formula* is one of the fundamental findings in complex analysis. In this lecture, the proof of the formula is introduced with the help of an extension of the *Cauchy's Integral Theorem*. Its consequences are also introduced and investigated.

Math Club at Western Outreach Event: High School Night — March 2019
Speaker
- *Abstract: Infinite series* is a concept often feared by many beginners to post-secondary mathematics. In this lecture, the *method of exhaustion* and *infinite series* will be applied in order to calculate the area enclosed by $f(x) = x^2$ and $h(x) = 1$ without Calculus.

Mathnasium - The Math Learning Centre, London, Ontario, Canada — May 2018 - February 2019
High School Instructor

AWARDS

NSERC: Undergraduate Student Research Award — May 2020
Department of Applied Mathematics — *Supervisor: Professor Lyle Muller*

NSERC: Undergraduate Student Research Award — May 2019
Department of Applied Mathematics — *Supervisor: Professor Lindi Wahl*

Dean's Honor List, April 2018, 2019, and 2020
Awarded to full-time students with 80% or higher average with no failed courses.

Western Entrance Scholarship of Excellence September 2017
Awarded to high school graduates with 90% or higher average.

CEMC: Hypatia Mathematics Contest April 2016
School Champion - Achieved the highest score at Saint Andre Bessette Secondary School

Extra-Curricular Activities

The Interdisciplinary Contest in Modeling February 2020
Contestant

- Analysed the given data of a soccer team
- Developed *Mathematica* programs to create an adjacency matrix for the team's network in order to apply regular measures such as *eigenvector centrality* and *degree distributions*
- Adapted the *Erdős-Renyi Model* and the *Fitness Model* in order to develop a random graph model for the given data and performed sensitivity analysis

Math Club at Western (MaCAW) September 2018 - June 2019
President

- **Canadian Undergraduate Mathematics Conference (CUMC) Bid**
  Collaborated on a successful bid to host the CUMC at Western University in 2020.
- **MaCAW's Pizza Seminar series**
  Organized seminars on various mathematical topics given by Western Professors
- Participated in *MaCAW's Annual Team Math Competition*
- Attended and contributed to MaCAW's weekly *Putnam Competition Training Sessions*

Science Rendezvous May 2019
Volunteer

- Participated in the School of Mathematical and Statistical Sciences's outreach team.
- Explained graph theory and system of equations through means that are accessible to a younger audience i.e. puzzles, riddles, and magic show.

Undergraduate Society of Applied Mathematics (USAM) November 2018 - April 2019
Communications Officer

- **USAM Conference for the Mathematical Sciences**
  Organized the conference to showcase undergraduate research in the mathematical sciences, which was held in March 2019

SheHacks III at Western January 2019
Delegate

- Collaborated to develop an application that collects stock data from the internet over the period of time relevant to the investor.
- The program performs *linear regression* on the collected data, and notifies the investor.
- Led the UX/UI development of the application

Programming Languages

MATLAB, C++, Python, LaTeX, Wolfram Mathematica

Relevant Coursework

Completed: Real Analysis, Complex Variables, Advanced Linear Algebra, Abstract Algebra, Group Theory, Ordinary Differential Equations, Partial Differential Equations, Neural Networks
Projected: Functional Analysis, Commutative Algebra, Non-Linear Ordinary Differential Equations, Number Theory, Cryptography, Rings and Modules, Intermediate Probability, Mathematical Statistics