Pengcheng (Louis) Bu

My website: https://louisbu.github.io/

EDUCATION

Dalhousie University September 2023 - Ongoing
MSc in Mathematics *Halifax, NS*

Supervisor: Dr. Robert Milson

Dalhousie University September 2019 - June 2023
BSc in mathematics with honours and Minor in Computer Science *Halifax, NS*
Supervisor: Dr. Robert Milson

Harry Ainlay High School September 2016 - June 2019
International Baccalaureate Diploma, Alberta Highschool Diploma *Edmonton, AB*

EXPERIENCES

Science Atlantic MSCS 2023 October 2023
Attendee, Presenter *Charlottetown, PEI*

- Attended Science Atlantic Mathematics, Statistics, and Computer Science Conference 2023 at University of Prince Edward Island.
- Presented 2023 Mitacs Internship results as a graduate student talk.

  Abstract Title: A Comparative Study on Optimization Methods for Maritime Transport Routing; Supervisors: Dr. Robert Milson, Dr. David Gómez-Ullate.
- Won first place in Graduate Student Presentations.

Canonical Green June 2023 - September 2023
Mitacs Internship *Madrid, Spain*

- Developed and improved the backend that computes and optimizes maritime transportation routes in Python and other scientific computing packages. Utilized Numpy and vectorization tools to preprocess and interpolate data, which is then used for optimization algorithms.
- Integrated optimization algorithms and improved computation pipeline for all three classes of solutions (Hybrid Search w/ Zermelo's Navigation Problem, A^* Search, and CMA-ES Genetic Algorithm).
- Worked on a ready-to-publish paper with the results of the internship, collaboration with Dr. Daniel Precioso, Javier Jiménez, Dr. Rafael Ripoll-Ballester, Dr. Robert Milson, Dr. David Gómez-Ullate.
- Attended Wildlife Monitoring Bots: Environmental Monitoring: An Exploratory Workshop at Spainish Royal Academy of Sciences, Madrid.
- Met with Startup companies at the PIER Halifax to discuss potential collaboration of
- Worked At ie University for the duration of the internship.

Atlantic Topological Quantum Field Theory (TQFT) Spring School May 2023
Attendee *Wolfville, NS*

- Attended the Atlantic TQFT Spring School hosted at the Old Orchard's Inn. It was organized by Theo Johnson-Freyd and Geoff Vooys. The school provided an introduction to some aspects of TQFT, a powerful organizing framework for many areas of mathematics and physics.

Canadian Mathematics Society (CMS) Winter Meeting 2023 December 2023
Attendee *Montreal, QC*

- Attended CMS Winter Meeting 2023 hosted in Montreal, QC.

Nova Scotia Math Circles April 2022 - Ongoing
Presenter, organizer *Halifax, NS*

- Travelled and presented/taught intriguing math topics to K-12 students around Halifax Region;
- Provided valuable feedback and suggested changed on the presentations; and listened to suggestions to improve as a public speaker.
- Kangaroo Math Contest planning Committee: Help with seating arrangements, room setup, and invigilator scheduling.

IBM Qiskit Halifax Hackathon Jan 2023
Attendee *Halifax, NS*

- Attended a one-day hackathon, utilizing IBM's `qiskit` development kit with python.
- Improved and extended a pre-existing Julia set fractal generator from a 3 quantum-bit Fourier Transform to 5 quantum-bit Fourier Transform applied to a section of music. Achieved Honorary Mention/Runner-up of the competition.

Science Atlantic MSCS 2022 October 2022
Attendee, Presenter *Sackville, NB*

- Attended Science Atlantic Mathematics, Statistics, and Computer Science Conference 2022 at Mount Allison University
- Presented summer research results as student contributed talks.

  Abstract Title: Hybrid Search: Application of Zermelo's Navigation Problem.;
  Supervisor: Dr. Robert Milson.

Symmetry, Invariants, and their Applications August 2022
Attendee *Halifax, NS*

- Attended Symmetry, Invariants, and their Applications: A Celebration of Peter Olver's 70th Birthday Conference.

Komorebi AI June 2022 - August 2022
Summer Intern *Halifax, NS*

- Prototyped and developed a path-routing algorithm for container ships to reduce fuel consumption (carbon emissions) and voyage time using Python (Numpy, Scipy, Google's JAX) as an application of Zermelo's Navigation Problem;
- Improved a time-dependent, Discretized-Jacobi-Newton Method developed by Sebastián J. Ferraro et al., and implemented in previously mentioned path-routing algorithm.
- Results presented at Science Atlantic MSCS 2022 as mentioned above.

TEACHING EXPERIENCES

Dalhousie University September 2021 - Ongoing
Teaching Assistant *Halifax, NS*

- MATH 1280T08: Engineering Calculus I
- MATH 1290T04: Engineering Calculus II

Nova Scotia Math Circles April 2022 - Ongoing
Presenter, organizer *Halifax, NS*

- Presented intriguing math topics (e.g., Tessellations and Symmetry, Tangrams, Pentominoes, Ciphers and Cryptography, etc.) to K-12 students around Halifax Region;

PUBLICATIONS

Preprints

· Hybrid Search method for Zermelo's navigation problem

ACHIEVEMENTS

Graduate Presentations, Science Atlantic MSCS 2023 October 2023

· First place in Graduate Student Presentations.

Mitacs Accelerate International Program June - Aug. 2023

· Awarded CAD$15,000 worth internship for research in maritime transportation routing optimization mentioned above.

George H. Campbell Scholarship 2022

· CAD$1000 worth scholarship for outstanding GPA

Dean's List 2019-2022

· Award for achieving term GPA above 3.70.

Student Honour Roll, Fermat Contest 2018
The Center for Education in Mathematics and Computing (CEMC) *Edmonton, AB*

· Achieved Group IV (132 - 133) in 2018 Fermat Contest.

SKILLS

Languages	Python, Java (OOP), Maple, Mathematica
Software	Affinity Photos, AutoCAD
Tools	LaTeX, Git
Spoken Languages	English (fluent), Chinese (native); German (Deutsches Sprachdiplom A2\B1)