Yuchong Pan

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Education

- **Massachusetts Institute of Technology** — Cambridge, MA
  Ph.D. Candidate, Applied Mathematics (GPA: 5.0/5.0) — *September 2021 – present*
  - **Research Interests**: Algorithms, combinatorics, optimization, graph theory, theoretical computer science
  - **Thesis Advisor**: Prof. Michel X. Goemans
- **University of British Columbia** — Vancouver, BC
  B.Sc., Honours Computer Science and Mathematics, with Distinction (GPA: 94.4%) — *September 2017 – May 2021*
  - **Thesis**: *Optimization Problems on Network Flows with Degree Constraints*, advised by Prof. F. Bruce Shepherd

Selected Experiences

- **Massachusetts Institute of Technology** — Cambridge, MA
  Mentor (Research Science Institute) — *June 2023 – August 2023*
  - **Concatenations of Two Incidence Matrices**: Mentored a high school student on a mathematics research problem in graph theory and linear algebra. With the student, established a connection between the largest determinant of a square concatenation of two incidence submatrices and the maximum number of spanning trees in a planar graph, and proved asymptotic lower and upper bounds on these two quantities. Paper *Concatenations of Incidence Matrices and Spanning Trees in Planar Graphs: Two Related Problems* in preparation.
- **Massachusetts Institute of Technology** — Cambridge, MA
  Research Assistant (advised by Prof. Michel X. Goemans) — *March 2023 – present*
  - **Submodular Flows and Edge Orientation Problems**: Worked on research problems in combinatorial optimization related to submodular flows and edge orientation problems. With Prof. Goemans, disproved a conjecture by Abdi, Cornuéjols and Zambelli by giving a compact counterexample. Produced an unpublished manuscript *A Counterexample to Box-Half-Integrality of the Intersection of Crossing Submodular Flow Systems.*
- **Microsoft** — Vancouver, BC (remote)
  Software Engineer Intern (Cloud and Artificial Intelligence) — *May 2020 – August 2020*
  - **.NET Runtime IL Interpreter**: Resurrected the IL (intermediate language) interpreter inside .NET Runtime. Conducted performance analyses for various configurations of the IL interpreter.
- **Microsoft** — Redmond, WA
  Software Engineer Intern (Cloud and Artificial Intelligence) — *June 2019 – August 2019*
  - **.NET Core Uninstall Tool**: Developed a guided tool that enables the controlled clean-up of a system such that only the desired versions of .NET Core SDKs and Runtimes remain. Conducted user research with project managers. Prepared user documentation. Released as an open source command-line tool by Microsoft to external users (497 stars and 50 forks on Github as of August 1, 2023).
- **Microsoft** — Vancouver, BC
  Software Engineer Intern (The Garage) — *May 2018 – August 2018*
  - **Earth Lens**: With a team of 7 interns, developed an iPad app that identifies, tracks and analyzes objects in aerial imagery with local machine learning models to assist in disaster relief and environmental conservation. Released as an open source project by Microsoft to external users (52 stars and 17 forks on GitHub as of August 1, 2023).

Selected Awards and Fellowships

MIT Mathematics Department Fellowship (2021–2022, summer 2022, summer 2023). Work Learn International Undergraduate Award, UBC (2021). Trek Excellence Scholarship, UBC (2018, 2019, 2020). Silver Medal, National Olympiad in Informatics Top Competition, China (2015). Bronze Medal, Asia-Pacific Informatics Olympiad (2015). First Prize, National Olympiad in Informatics in Provinces, China (2013, 2014).

Professional Services

SIAM Journal on Discrete Mathematics (referee). ACM-SIAM Symposium on Discrete Algorithms (referee).

Programming Skills

Python, Julia, Java, C#, SQL, MATLAB, Go, JavaScript, C++, LaTeX.