Hongyi Brian Hu

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124 S. 19th St., Pittsburgh, PA 15203 ∘ U.S. Citizenship

EDUCATION

Carnegie Mellon University — Pittsburgh, PA
B.S. in Mathematical Sciences — May 2024
Courses (graduate level):
- 21484 – Graph Theory
- 21623 – Complex Analysis
- 21849 – Arithmetic Statistics
- 36700 – Probability and Mathematical Statistics

Budapest Semesters in Mathematics — Virtual
Courses (non-credit): — May 2021
- MATH 331 – Topics in Analytic Number Theory
- MATH 369 – Discrete and Convex Geometry

RESEARCH EXPERIENCE

Tepper School of Business — Pittsburgh, PA
Independent Research — Summer 2024
Advisor: Alan Scheller-Wolf
- Studied optimization problems in inventory models using stochastic programming.
- Explored extensions of classic models by incorporating procurement via options contracts.

Williams College — Williamstown, MA
SMALL NSF REU — Summer 2021
Advisor: Steven J. Miller, Eyvindur A. Palsson, Charles Wolf
- Proposed angle variants of the Erdös distinct distance problem in combinatorial geometry.
- Proved that any n points in general position admits $O(n^{\log_2 7})$ distinct angles and its largest subset without repeated angles is $\Omega(n^{1/5})$.
- Collaborated with other research teams on problems in combinatorial number theory and geometric measure theory.

Rutgers, The State University of New Jersey — Virtual
DIMACS NSF REU — Summer 2020
Advisor: Atefeh Mohajeri
- Studied edge coloring problems on multi-trees with two related objectives: minimum edge chromatic sum (MECS) and optimum cost chromatic partition (OCCP).

- Corrected the proof in former literature that MECS on multi-trees is NP-hard.
- Demonstrated the explicit polynomial runtime of OCCP on multi-trees using linear programming.

Carnegie Mellon University Pittsburgh, PA
CMU SURA Summer 2019
Advisor: William Hrusa

- Determined the pricing formula for two perpetual financial options using the Black-Scholes equation.
- Proved that the option has a nonzero price only if price and volatility are positively correlated.

EMPLOYMENT

Mathematical Association of America Pittsburgh, PA
Residential Director Jun 2023 – Jul 2023
Supervisor: Nicole Goberdhan

- Managed residential logistics, events, budget, and shift responsibilities for the Math Olympiad Program.

Carnegie Library of Pittsburgh Pittsburgh, PA
Clerk Nov 2022 – May 2023
Supervisor: Ian Eberhardt

- Performed circulation duties, assisted patrons in using library and computing resources
- Partnered with local nonprofits (Brashear Association, The Lighthouse, Voices Against Violence) to improve community welfare

Mathnasium of Squirrel Hill Pittsburgh, PA
Instructor Jan 2022 – May 2022
Supervisor: Emily Duque

- Delivered K–12 math instruction in a small group settings, graded worksheets, administered exams.

PUBLICATIONS

- Fleischmann, H.L., **Hu, H.B.**, Jackson, F. et al. Distinct Angle Problems and Variants. *Discrete Comput Geom* 70, 1715–1740 (2023). arxiv.org/pdf/2108.12015

PRESENTATIONS

- "Sum Coloring Problems on Multi-graphs." DIMACS REU, Virtual, 2020.
- "Perpetual Bounded Option with Variable Volatility." Meeting of the Minds, CMU, 2020.

AWARDS

- Third place, Steel Hacks, 2019.
- Third place, IMO Hack-A-Song, 2019.
- Dean's List, CMU, Fall 2018 and Spring 2021.

SKILLS

Computing: Python, R, SQL, C, LaTeX
Language: English, Mandarin