Pingbang Hu

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Education

- **University of Michigan – College of Engineering** — Michigan, U.S.A.
  Bachelor of Computer Science; Majored GPA – 4.0/4.0 — *Aug. 2021 - May. 2023*
- **University of Michigan – College of Literature, Science, and the Arts** — Michigan, U.S.A.
  Math Minor; Real/Complex/Stochastic Analysis, Optimization Theory, Algebraic Topology, etc. — *Aug. 2021 - May. 2023*
- **Shanghai Jiao Tong University – UM-SJTU Joint Institute** — Shanghai, China
  Bachelor of Electrical and Computer Engineering; GPA – 3.6/4.0 — *Aug. 2019 - May. 2023*

Research Experience

- **Network Failure Detection** — CoE, UMich, Michigan, U.S.A.
  Undergraduate Researcher — *Mar. 2022 - Present*
  - **General**: Understanding the compact cuts representation and their implication on network failure detection.
  - **Balanced Separator**: An improved algorithm on finding small balanced separator in almost linear time.
- **A Universal Law of Separability via GCN** — SI, UMich, Michigan, U.S.A.
  Undergraduate Researcher — *Feb. 2022 - Present*
  - **General**: Theoretical analysis on linear separability ability of non-i.i.d. semi-supervised node-level tasks.
  - **Separability**: Toward understanding the success of 1-layer GCN on worst case real-world data the very first time.
- **Deep Learning Foundation** — CoE, UMich, Michigan, U.S.A.
  Undergraduate Researcher — *Mar. 2022 - Present*
  - **General**: Fundamental understanding of deep neural network with theoretical analysis supported by SURE Program.
  - **Manifold Hypothesis**: Characterizing the interplay between intrinsic dimension and the isoperimetry assumptions.
- **Travel the Same Path: A Novel Approach** — CoE, UMich, Michigan, U.S.A.
  Independent Researcher — *Jan. 2022 - Apr. 2022*
  - **General**: Using imitation learning to speed up deterministic algorithm while maintaining the exactness of the solution.
  - **Derandomized**: Demonstrate a potential next step of using AI to solve combinatorial optimization without approximation.

Teaching Experience

- **EECS475 Introduction to Cryptography** — CoE, UMich, Michigan, U.S.A.
  Instructional Aide — *Jan. 2023 - May. 2023*
  - **General**: Collaborated with the teaching staff as an instructional aide of an 70+ student course on the main CS track. Hold discussion & office hour weekly.
  - **Topics**: Upper-level CS course focuses on historic ciphers, symmetric encryption (pseudo-random generators, stream ciphers, pseudo-random functions/permutations), message authentication, cryptographic hash functions, and public key encryption.
- **EECS572 Randomness and Computation** — CoE, UMich, Michigan, U.S.A.
  Instructional Aide — *Aug. 2022 - Dec. 2022*
  - **General**: Collaborated with the teaching staff as an instructional aide of an 70+ student course on the M.S. theory CS track. Hold discussion & office hour weekly.
  - **Topics**: A graduate-level theory course focuses on randomness and computation, e.g., randomized algorithm, randomized complexity, pseudo-random generator, applications in cryptography.
- **VV285 Honor Mathematics III** — UM-SJTU JI, SJTU, Shanghai, China
  Instructional Aide — *Mar. 2021 – Aug. 2021*
  - **General**: Collaborated with the teaching staff as an instructional aide of a 150+ student course on the main B.S. ECE track. Hold discussion & office hour weekly.
  - **Topics**: The third proved-based math course in the series of rigorous mathematical analysis courses. Focuses on multi-variables real analysis, e.g., finite dimensional linear algebra theory, topology of normed spaces, potentials and vector fields, higher derivatives, Riemann integral in $\mathbb{R}^n$, integration on curves and surfaces, Green, stokes and Gauß theorem.
  - **Competition**: Hold the 1^{st} UM-SJTU JIntegration Bee competition.
- **VV186 Honor Mathematics II** — UM-SJTU JI, SJTU, Shanghai, China
  Instructional Aide — *Sep. 2020 – Dec. 2020*
  - **General**: Collaborated with the teaching staff as an instructional aide of a 200+ student course on the main B.S. ECE track. Hold discussion & office hour weekly.
  - **Topics**: The second proved-based math course in the series of rigorous mathematical analysis courses. Focuses on one-variable real analysis, e.g., set theory, construction of $\mathbb{R}$, ϵ-δ definitions, uniform continuity, etc.

Honors and Awards

- **Hong Kong, Macao and Taiwan Overseas Chinese Student Scholarship** — SJTU, Shanghai, China
  First Price (Ranked 2) among all HK, MC and TW students in SJTU — *Oct. 2021*
- **Undergraduate Excellent Scholarship** — SJTU, Shanghai, China
  Third Price among all students in UM-SJTU JI — *Nov. 2020*
- **Bao Gang Excellent Scholarship** — SJTU, Shanghai, China
  Second Price (Ranked 3) among all Taiwan students in SJTU — *Jun. 2020*
- **Hong Kong, Macao and Taiwan Overseas Chinese Student Scholarship** — SJTU, Shanghai, China
  First Price (Ranked 1) among all HK, MC and TW students in UM-SJTU JI — *Dec. 2019*