# Pingbang Hu

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## Education

- **University of Illinois Urbana-Champaign** — Illinois
  *Ph.D. Student in Information Science, School of Information Science* — *Aug. 2023 – Present*
  - **Advisor**: Jiaqi Ma
  - **Research Area**: Theoretical Artificial Intelligence & Theoretical Computer Science
- **University of Michigan** — Michigan
  *B.Sc. in Computer Science, College of Engineering* — *Aug. 2021 – May 2023*
  - Graduate with ***Summa Cum Laude***
  - **Minor**: Mathematics, College of Literature, Science, and the Arts
- **National Yang Ming Chiao Tung University** — Hsinchu, Taiwan
  *Visiting Scholar* — *Jan. 2020 – Jul. 2020*
- **Shanghai Jiao Tong University** — Shanghai, China
  *B.Eng. in Electrical and Computer Engineering, UM-SJTU Joint Institute* — *Aug. 2019 – Aug. 2023*
  - **Minor**: Computer Science, UM-SJTU Joint Institute

## Research Experience

- **Finding Minimal Balanced Separators with Detection Sets** — Michigan
  *College of Engineering, University of Michigan* — *Mar. 2022 – Present*
  - **Advisor**: Thatchaphol Saranurak
  - Design the first almost linear time algorithm on finding minimal balanced separator.
- **Deep Learning Foundation** — Michigan
  *SURE Program , College of Engineering, University of Michigan* — *May 2022 – Apr. 2023*
  - **Advisor**: Wei Hu
  - Theoretical analysis on intrinsic dimension under isoperimetry assumptions.
- **Theory of Graph Neural Networks** — Michigan
  *School of Information, University of Michigan* — *Dec. 2021 – Jan. 2023*
  - **Advisor**: Jiaqi Ma
  - Prove the asymptotic separability of a 1-layer GCN on node classification tasks.

## Pre-prints and Technical Reports

(* denotes equal contribution)

[P1] **Pingbang Hu**, Thatchaphol Saranurak, "Finding Minimal Balanced Separators with Detection Sets". *Manuscript*

[P2] **Pingbang Hu**, "Travel the Same Path: A Novel TSP Solving Strategy". *Preprint*

## Teaching Experience

- **EECS475 Introduction to Cryptography** — Michigan
  *Instructional Aide, College of Engineering, University of Michigan* — *Jan. 2023 – May 2023*
  - An upper-level 100+ student course on the main CS track.
  - Hold discussion and office hour weekly, design assignment and exam problems, grade and guide projects.
  - **Topics**: *Historic ciphers*, *perfect secrecy*, *symmetric encryption*, *message authentication*, *cryptographic hash functions*, and *public key encryption*.
- **EECS572 Randomness and Computation** — Michigan
  *Instructional Aide, College of Engineering, University of Michigan* — *Aug. 2022 – Dec. 2022*
  - A graduate-level 70+ student course on the M.S. CS theory track.
  - Hold discussion and office hour weekly, design assignment and exam problems, grade and guide projects.
  - **Topics**: *Randomized algorithms*, *randomized complexity*, *Markov chains*, *random walks*, *expander graphs*, *pseudo-random generators*, and *hardness v.s. randomness*

- **VV285 Honor Mathematics III** Shanghai, China
  *Teaching Assistant, UM-SJTU Joint Institute, Shanghai Jiao Tong University* *Mar. 2021 – Aug. 2021*
  - An undergraduate-level 150+ student course on the main B.Eng. ECE track.
  - Hold discussion and office hour weekly, design and grade assignments and exams.
  - **Topics**: *Linear systems of equations*, *vector spaces*, *Gram-Schmidt orthonormalization*, *topology of normed spaces*, *vector fields*, *higher derivatives*, *integration on curves and surfaces*; *Stokes theorem*, *the inverse and implicit function theorems*
  - **Competition**: Hold the $1^{st}$ UM-SJTU JIntegration Bee competition .
- **VV186 Honor Mathematics II** Shanghai, China
  *Teaching Assistant, UM-SJTU Joint Institute, Shanghai Jiao Tong University* *Sep. 2020 – Dec. 2020*
  - An undergraduate-level 200+ student course on the main B.Eng. ECE track.
  - Hold discussion and office hour weekly, design and grade assignments and exams.
  - **Topics**: *Logic*, *set theory*, *sequences*, *convergence*, *completeness of metric spaces*, *convergence and continuity*, *derivative*, *normed vector spaces*, *sequences of functions*, *series and power series*, *Darboux and Riemann integrals*

## Honors and Awards

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