Bo-Yu Yang | 楊博宇

boyu.brian.yang@gmail.com Google Scholar

Research Interests

Quantum Information Theory, Privacy and Security, and Network Information Theory.

Education

National Taiwan University — Taipei, Taiwan
B.S., Electrical Engineering — Sep. 2020 – present

Relevant coursework: Quantum Information and Computation, Network Information Theory, Information Theory, Principles of Wireless Communications, Convex Optimization, Online Convex Optimization, Advanced Algorithms, and Error Correction Code.

Publications (Google Scholar)

[1] Bo-Yu Yang, Hsuan Yu, and Hao-Chung Cheng. Maximal α-leakage for quantum privacy mechanisms. *arXiv preprint*, 2024.

[2] Bo-Yu Yang, Hsuan Yu, and Hao-Chung Cheng. Maximal α-Leakage for Quantum Privacy Mechanisms and Operational Meaning of Measured Rényi Capacity. *IEEE International Symposium on Information Theory (ISIT)*, pp. 3308–3313, 2024.

Research Experience

Quantum Security and Privacy — Jan. 2023 – Mar. 2024

- Led a research *Maximal α-Leakage for Quantum Privacy Mechanisms* (*arXiv:2403.14450*), advised by Prof. Hao-Chung Cheng
- Major works completed:
  - Characterized a quantum adversary's maximal expected α-gain (Thm.1) using optimal measurement by measured conditional Rényi entropy, which can be viewed as parametric generalization of König's famous guessing probability formula
  - Proved that α-leakage (Thm.2) and maximal α-leakage (Thm.3) for quantum privacy mechanisms are determined by measured Arimoto information and measured Rényi capacity
  - Derived the composition property (Thm.5) of maximal α-leakage
  - Proved that regularized maximal α-leakage (Thm.7) can be characterized by both sandwiched Rényi capacity and sandwiched Rényi divergence radius

Conference

- **The 2024 IEEE International Symposium on Information Theory (ISIT)** — Athens, Greece
  Presenter — Jul. 2024
  "Maximal α-Leakage for Quantum Privacy Mechanisms and Operational Meaning of Measured Rényi Capacity"

Academic Activities

- Reviewer for ISIT 2024, ITW 2024, IEEE Transaction on Information Theory, Quantum Information Processing Journal
- Volunteer for ISIT 2023, QIP 2024
- The NCTS Student/Young Researcher Event — Taipei, Taiwan
  Coordinator — Sep. 2023 – present
  - Directed a quantum paper study group
  - Helped invite young researchers to give talks

Teaching Experience

- **Undergraduate Summer Research Program** — National Center for Theoretical Sciences (NCTS)
  Teaching Assistant — Jul. 2024 - Aug. 2024
  - Taught students to understand basic knowledge in quantum information theory
  - Provided some research directions for students
- **Quantum Information and Computation** — National Taiwan University
  Teaching Assistant — Spring 2024
  - Set a question about quantum entanglement for midterm exam
  - Graded students' homework

Awards

- ISIT Student Travel Grant — Athens, Greece
  IEEE International Symposium on Information Theory (ISIT) — Jul. 2024

Skills

- **Natural Languages**: Mandarin (Native), English (C1/Proficient: TOEFL 102/120, GRE 326/340), French (Moderate), German (Beginner)
- **Programming Languages**: C/C++, Matlab, Python, Go