

HAO CHUNG (鍾豪)

haochung@ntu.edu.tw

I am an enthusiastic learner and researcher in theoretical computer science, especially in cryptography and quantum information.

CURRENT POSITION

Academia Sinica

Research Assistant

09/2019 - Present

Taipei, Taiwan

- Advisor: Dr. Kai-Min Chung
- Research Topics: Quantum Cryptography and Blockchain
- This position is funded by National Taiwan University

WORK EXPERIENCE

DEXON Foundation

Blockchain Researcher

09/2018 - 05/2019

Taipei, Taiwan

DEXON is the first blockchain that achieves *low-energy consumption*, *1 sec latency* and *built-in randomness* in the world

- Main contributor for designing the algorithm and constructing a mathematical security proof for DEXON [3]
- Analyzed the different random sources on blockchain (the result is presented in Financial Cryptography 2019) [2]
- Provided technical support for marketing and business development

Summer School for Cryptography in Academia Sinica

Teaching Assistant

07/2017 - 08/2017

Taipei, Taiwan

This school is a six-week intensive course, including Basic Cryptography / Elliptic Curve Cryptography / Lattice-based Cryptography / fully homomorphic encryption, FHE / Blockchain

- Led the discussion class and checked students' homework

EDUCATION

National Taiwan University

MS in Electrical Engineering

09/2016 - 08/2018

Taipei, Taiwan

- Advisors: Dr. Kai-Min Chung and Prof. Chen-Mou Cheng (co-advised)
- Master's thesis: *Analysis and Comparison of Security Proofs of Quantum Key Distribution*
- GPA 4.15/4.3

National Taiwan University

BS in Physics

09/2012 - 08/2016

Taipei, Taiwan

- Minor in Philosophy
- Undergraduate research projects in dark matter and cosmic ray

Outstanding Courses: Cryptanalysis (A+), Advanced Algorithm (A), Machine Learning (A)

KEY SKILLS

Research in Theoretical Computer Science

- Created computational models for blockchain and quantum information
- Assisted in reviewing 6 papers in Asiacrypt2017, Qcrypt2018 and TCC2019
- Familiar with quantum information, cryptography and complexity theory

Oral Presentation

- Delivered a presentation in Financial Cryptography (1-tier conference in cryptography) in English
- Taught 7th-grade students about binary representation in 6 minutes
- Created a 3 minutes animation with Microsoft PowerPoint

Programming: Python (especially for scientific computing), C/C++, LaTeX

Languages: Mandarin (native), English (fluent)

RESEARCH EXPERIENCE

Blockchain

- Improved the existing consensus algorithm to achieve 1 sec latency and resist to network fluctuation
- Proposed a new metric for evaluating the fairness of blockchain systems [1]
- Constructed the security proof for DEXON blockchain algorithm [3]

Quantum Key Distribution

- Improved the current security proof of quantum key distribution protocol (BB84), supervised by Dr. Kai-Min Chung and Dr. Ching-Yi Lai
- Surveyed the current progress of different quantum key distribution systems in the world, funded by National Chung-Shan Institute of Science and Technology

High-Energy Physics

- Conducted an experiment for measuring the reflective signal of seawater, supervised by Prof. Pisin Chen and Prof. Jiwoo Nam [4]
- Assisted in assembling astroparticle detectors and antennas of *Askaryan Radio Array (ARA)*, supervised by Prof. Pisin Chen and Prof. Jiwoo Nam
- Participated in data analysis of *Taiwan EXperiment On Neutrino (TEXONO)*, supervised by Dr. Tsz-King Wong

MANUSCRIPT

- [1] Tzu-Wei Chao, **Hao Chung**, and Po-Chun Kuo. Fair byzantine agreements for blockchains. 2019. <https://arxiv.org/abs/1907.03437>.
- [2] Tzu-Wei Chao, **Hao Chung**, and Po-Chun Kuo. Secure randomness on blockchain. *manuscript*, 2019.
- [3] Tai-Yuan Chen, Wei-Ning Huang, Po-Chun Kuo, **Hao Chung**, and Tzu-Wei Chao. DEXON: A highly scalable, decentralized DAG-based consensus algorithm. 2018. <https://eprint.iacr.org/2018/1112>.
- [4] **Hao Chung**, Bing-Song Gu, and Zong-You Lou. Reflection signal measurement with LPDA / horn antenna. *manuscript*, 2015.

EXTRACURRICULAR EXPERIENCE

Academic Group Leader of Physics Camp

09/2014 - 01/2015

NTU Physics Camp is a one-week program for 100 high school students

- Arranged 3 professional speeches and 10 experiments accross different fields in physics
- Collaborated with 20+ group members

Volunteer Tutor

10/2016 - 06/2017

- One-to-one tutoring for children in underprivileged families every Friday

Traveller

07/2014 - 08/2014

- Walked around Taiwan in 40 days (944km)