

Heng-Chien 'Leo' Liou

ALGORITHMIC FAIRNESS · INFORMATION THEORY · NETWORK AND DATA SCIENCE

✉ liouhengchien@gmail.com

"Philosophers have hitherto only interpreted the world in various ways; the point is to change it."-Karl Marx

Research Statement

I study the theoretical foundation of network and data science, using information-theoretical method; furthermore, I investigate and mitigate their societal impacts.

Keywords: *Algorithmic Fairness, Information Theory, Network and Data Science*

Education

National Taiwan University

Taipei, TW

M.S. in Communication Engineering

ongoing

Certificate in Women's and Gender Studies


- Thesis Advisor: Prof. I-Hsiang Wang
- Courses (^Ggraduate-level; ^Eentirely in English)
 - **Information and Decision Systems**
Intro to Mathematical Analysis (I)^G, Intro to Mathematical Analysis (II)^G, Graph Theory (I)^{GE}, Advanced Algorithms^G
 - **Social Sciences**
Queer Theory^G, Science & Technology Studies^G, Gender Issues in the Eyes of Psychologists^G, Sociology of Gender^{GE}, Intro to Women's & Gender Studies^G
 - **Professional and Intercultural Communications**
Fundamentals of English Writing^G, German I (1)-(2), German II (1)-(2)

National Taiwan University

Taipei, TWN

B.S.Eng. in Electrical Engineering 

2021

- Cumulative **GPA: 4.26/4.30** and **Ranking: 1/259** , cumulative to Jan 2021
- Research Advisor: Hung-Yun Hsieh, Hsuan-Wei Lee, Ho-Lin Chen
- Selected Courses (all A+; ^Ggraduate-level)
 - **Information and Decision Systems**
Eng Math-Linear Algebra, Eng Math-Differential Equation, Probability & Statistics, Signals & Systems, Data Structure & Programming, Control Systems, Design & Analysis of Algorithms^G, Game Theory^G, Information Theory^G, Convex Optimization^G
 - **Social Sciences**
Economics I-II, Sociological Theory (1)-(2), Social Psychology, Psychology of Personality, Abnormal Psychology, Neural and Behavioral Modeling^G
- Honors: Phi Tau Phi Honor Fellow, Mr. Chien Shih-Liang Memorial Scholarship, Irving T. Ho Memorial Scholarship, Research Creativity Award Twice

University of British Columbia

Vancouver, BC, CAN

Summer Program, Design Thinking

2017

- Received training on design thinking with group project and presentation experience.

Taipei Municipal Chien Kuo High School

Taipei, TWN

High School Diploma, Math and Natural Science

2016

- Recipient of **Taipei City Mayor Award** (for the students with highest GPA in class)
- One of the 138 who scored full marks (75/75), out of 133905 examinees, in General Scholastic Ability Test 2016. [\[CNA News\]](#) [\[Web Archive\]](#)

Research Experience

Networked Information and Communication Lab, NTU

Taipei, TWN

Graduate Research on Information Theory and Learning, advised by Prof. I-Hsiang Wang

Sep. 2022 -

- Fairness in Learning

Collective Algorithms Lab, NTU

Undergrad Research on Algorithms, advised by Prof. Ho-Lin Chen

- Fairness for Vaccine Allocation on Networks

Taipei, TWN

Sep. 2019 - Jul. 2021

Institute of Sociology, Academia Sinica

Undergrad Research on Computational Sociology, advised by Prof. Hsuan-Wei Lee

Taipei, TWN

Jan. 2020 - Dec. 2020

- Social Consensus and Cultural Variation: Modeling and Theorizing for Social Dynamics
 - Proposal admitted by MOST Research Grant for University Students
 - Presented in 2020 Conference on Computational Sociology poster track and 2020 Taiwanese Sociological Association Annual Meeting
 - Received MOST Research Creativity Award

Mobile Networks& Wireless Communications Research Group, NTU

Undergrad Research on Network Science, advised by Prof. Hung-Yun Hsieh

Taipei, TWN

Sep. 2018 - Apr. 2020

- Formation of Friendship Networks among Agents with Personality Traits
 - Proposal admitted by MOST Research Grant for University Students
 - Received MOST Research Creativity Award

Teaching Experience

EE5028 Information Theory, NTU

Taipei, TWN

Teaching Assistant

Sep. 2023 - Dec. 2023.

- Responsible for a graduate-level course with approximately 45 students
- Grade and comment assignments and the exam, and provide rigorous solution
- Hold recitation sessions and office hours

Online Education

MITx

Online

MicroMasters Program in **Statistics and Data Science**

Ongoing

- Completed four graduate level courses, at a similar pace and level of rigor as on-campus courses at Massachusetts Institute of Technology; waiting to complete the capstone exam.
- Credentials: Probability [↗](#), Data Analysis in Social Science [↗](#), Fundamentals of Statistics [↗](#), Machine Learning [↗](#)

Coursera & edX

Online

Online Courses

Indefinite

- **Information and Decision Systems**
Probability [↗](#), Fundamentals of Statistics [↗](#), Machine Learning [↗](#), Quantum Machine Learning [↗](#)
- **Social and Behavioral Science**
Data Analysis in Social Science [↗](#), Game Theory [↗](#), Moral Foundations of Politics [↗](#), Introduction to Social Research Methods [↗](#), Classical Sociological Theory [↗](#), Network Dynamics of Social Behavior [↗](#), Anthropology of Current World Issues [↗](#)

Honors & Awards

RESEARCH GRANTS

2020 MOST RESEARCH GRANT FOR UNDERGRADUATE STUDENTS, Ministry of Science and Technology

TWN

2019 MOST RESEARCH GRANT FOR UNDERGRADUATE STUDENTS, Ministry of Science and Technology


TWN

FELLOWSHIP



2021 PHI TAU PHI HONOR FELLOW [↗](#), The Phi Tau Phi Scholastic Honor Society

TWN

SCHOLARSHIP

2020	DELTA ELECTRONICS SCHOLARSHIP, Delta Electronics	TWN
2019	MR. CHIEN SHIH-LIANG MEMORIAL SCHOLARSHIP, National Taiwan University	TWN
2018	DELTA ELECTRONICS SCHOLARSHIP, Delta Electronics	TWN
2018	NTUHK SCHOLARSHIP, Hong Kong Alumni Association of National Taiwan University	TWN
2018	IRVING T. HO MEMORIAL SCHOLARSHIP  , Irving T. Ho Memorial Foundation	TWN

AWARDS

2021	RESEARCH CREATIVITY AWARD , Ministry of Science and Technology	TWN
2020	RESEARCH CREATIVITY AWARD  , Ministry of Science and Technology	TWN
2017-19	PRESIDENTIAL AWARD (TOP 5% OF CLASS) FOR 4 SEMESTERS  , National Taiwan University	TWN
2016	MAYOR OF TAIPEI AWARD, Chien Kuo High School and Taipei City Government	TWN

OTHERS

2020	DIPLOMA CONFERMENT REPRESENTATIVE, Department of Electrical Engineering, NTU	TWN
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Skills

Software Systems	\LaTeX
Programming	Python, C++, MATLAB, R
Python Library	NetworkX, graph-tool
Language	Taiwanese Mandarin, English, German (A2)