

# Heng-Chien 'Leo' Liou

ALGORITHMIC FAIRNESS · INFORMATION THEORY · GENDER STUDIES

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

## Research Statement

I study the mathematical foundation of data science from **Information Theory**, with a focus on socially critical impacts, such as privacy and **fairness**. In addition, I critically investigate the social impacts of information technology with theories and methods of the social sciences and humanities, in particular **Gender Studies** and STS (Science, Technology, & Society).

Keywords: *Algorithmic Fairness; Information Theory; Gender Studies*

## Education

### National Taiwan University

Taipei, TWN

M.S. in **Communication Engineering**

ongoing

Certificate in **Women's and Gender Studies**


- Thesis Advisor: Prof. I-Hsiang Wang
- Courses (<sup>G</sup>graduate-level; <sup>E</sup>instruction in English)
  - **Information, Systems, and Decision Science**  
Intro to Mathematical Analysis (I)<sup>G</sup>, Intro to Mathematical Analysis (II)<sup>G</sup>; Graph Theory (I)<sup>GE</sup>; Advanced Algorithms<sup>G</sup>; High-Dimensional Probability<sup>GE</sup>
  - **Social Science and Law**  
Intro to Women's & Gender Studies<sup>G</sup>; Science & Technology Studies<sup>G</sup>; Queer Theory<sup>G</sup>; Gender Issues in the Eyes of Psychologists<sup>G</sup>; Sociology of Gender<sup>GE</sup>; Feminism & Law
  - **Professional and Intercultural Communications**  
Fundamentals of English Writing<sup>G</sup>; German I (1)-(2); German II (1)-(2); French I<sup>E</sup>(1)

### 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+; <sup>G</sup>graduate-level)
  - **Information, Systems, and Decision Science**  
Eng Math-Linear Algebra; Eng Math-Differential Equation; Probability & Statistics; Signals & Systems; Data Structure & Programming; Control Systems; Design & Analysis of Algorithms<sup>G</sup>; Game Theory<sup>G</sup>; Information Theory<sup>G</sup>; Convex Optimization<sup>G</sup>
  - **Social Sciences**  
Economics I-II; Introductory Sociology; Sociological Theory (1)-(2); General Psychology; Social Psychology; Psychology of Personality; Abnormal Psychology; Neural and Behavioral Modeling<sup>G</sup>
- 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

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

- Fairness in Learning

Taipei, TWN

Sep. 2022 -

## 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

- 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

Taipei, TWN

Jan. 2020 - Dec. 2020

## Mobile Networks& Wireless Communications Research Group, NTU

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

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

Taipei, TWN

Sep. 2018 - Apr. 2020

## Teaching Experience

### EE2008 Discrete Mathematics, NTU

Teaching Assistant, supervised by Prof. Ho-Lin Chen

- Responsible for an undergraduate-level course with approximately 180 students
- Grade and comment assignments and the exam.
- Hold weekly office hours

Taipei, TWN

Feb. 2025 - Jun. 2025.

### EE4022 Data Structure, NTU

Teaching Assistant, supervised by Prof. Ho-Lin Chen

- Responsible for an undergraduate-level course with approximately 180 students
- Grade and comment assignments and the exam.
- Hold weekly office hours

Taipei, TWN

Oct. 2024 - Dec. 2024.

### EE5028 Information Theory, NTU

Teaching Assistant, supervised by Prof. I-Hsiang Wang

- 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 weekly office hours

Taipei, TWN

Sep. 2023 - Dec. 2023.

## 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 [↗](#), Statistics, Computation and Applications [↗](#)

### Coursera & edX

Online

Online Courses

Indefinite

#### • Information, Systems, and Decision Science

Probability [↗](#), Fundamentals of Statistics [↗](#), Machine Learning [↗](#), Quantum Machine Learning [↗](#), Statistical Modeling and Computation in Applications [↗](#)

#### • Social 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 [↗](#)

## Publications

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### PREPRINTS

- **Heng-Chien Liou**, and Hsuan-Wei Lee. 2020. "Social Contagion and Associative Diffusion in Multilayer Networks." *arXiv preprint arXiv:2011.07746*. [[arXiv](#)] [[TSA2020 slide](#)]
- **Heng-Chien Liou**, and Hung-Yun Hsieh. 2020. "Modeling Friendship Networks among Agents with Personality Traits." *arXiv preprint arXiv:2004.12901*. [[arXiv](#)]

## Presentations

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### CONFERENCE PRESENTATION

- **Heng-Chien Liou**. 2023. "Queer Sociology Now: Three decades of Queer Theory/Sociology dialogue in the West." *Annual Meeting of the Taiwanese Feminist Scholars Association*.
- **Heng-Chien Liou**. 2023. "Achieving Algorithmic Fairness in Algorithmic Society: A Multi-Actor and Multi-Scale Analysis." *Annual Meeting of the Taiwan Science, Technology & Society Association*
- **Heng-Chien Liou**, and Hsuan-Wei Lee. 2020. "Social Contagion and Associative Diffusion in Multilayer Networks." *Annual Meeting of the Taiwanese Sociological Association*. [[slide](#)] [[arXiv](#)]

### COURSE PROJECTS

- **Heng-Chien Liou**, Yu-Yue Cheng, Ting-Ting Hsiung, and Chia-Yin Li. 2024. "Technologization of the Legal and Its Inequality" *Prog5732: Introduction to Gender and Women's Studies*
- **Heng-Chien Liou**. 2024. "Minorities but Equal? The Intersection of Gender and Sexuality in Engineering" *Soc7094: Sociology of Gender*.
- **Heng-Chien Liou**. 2023. "What Does Queer Theory Contribute to Psychology? " *Psy5304: Gender Issues in the Eyes of Psychologists*.

### SEMINAR

- **Heng-Chien Liou**. 2024. "Gender 101 for Engineers" *GICE Student Seminar*.

## Honors & Awards

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### 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 <a href="#">🔗</a> , The Phi Tau Phi Scholastic Honor Society	TWN
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### 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 <a href="#">🔗</a> , Irving T. Ho Memorial Foundation	TWN

### AWARDS

2021	RESEARCH CREATIVITY AWARD , Ministry of Science and Technology	TWN
2020	RESEARCH CREATIVITY AWARD <a href="#">🔗</a> , Ministry of Science and Technology	TWN
2017-19	PRESIDENTIAL AWARD (TOP 5% OF CLASS) FOR 4 SEMESTERS <a href="#">🔗</a> , 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

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**Programming**

Python Library

**Language**

**Misc**

Python, C++, MATLAB, R

NetworkX, graph-tool

Taiwanese Mandarin, English, German (A2), French (A1)

LaTeX