

# Heng-Chien (Leo) Liou

NETWORK SCIENCE · TOPOLOGICAL DATA ANALYSIS · GRAPH SIGNAL PROCESSING

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

## Research Statement

My goal is to use engineering and computational methods to understand complex social and natural systems, and to even solve the associated problems.

Keywords: *Network Science, Computational Social Science, Algorithmic Fairness*

## Education

### National Taiwan University

Taipei, Taiwan

Bachelor of Science in Engineering, **Electrical Engineering**

Sep. 2016-June. 2021 (exp.)

- Also completed partial requirement toward Bachelor of Science, Psychology
- One of the ten Diploma Conferment Representatives in commencement of class 2020, Dept. of Electrical Engineering
- **GPA: 4.26/4.30** and **Ranking: 1/259** 📈, cumulative to Spring 2020
- Selected Courses 📖 (all with letter grade **A+**; † denotes graduate-level courses)
  - **Information and Decision Systems**  
Engineering Mathematics-Linear Algebra and Differential Equation, Probability and Statistics, Signals and Systems, Data Structure and Programming, Design and Analysis of Algorithms†, Control Systems, Information Theory†, Convex Optimization†
  - **Social and Behavioral Science**  
Economics I-II, Game Theory†, Introductory Sociology (d), Sociological Theory (1)-(2), General Psychology, Social Psychology, Psychology of Personality, Abnormal Psychology, Neural and Behavioral Modeling†

## Research Experience

### Institute of Sociology, Academia Sinica

Taipei, Taiwan

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

Jan. 2020 - PRESENT

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

### Collective Algorithms Lab, National Taiwan University

Taipei, Taiwan

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

Sep. 2019 - PRESENT

- Fairness for Vaccine Allocation on Networks
  - Introduced the concern of fairness into the vaccine allocation problem

### TONIC Research Group, National Taiwan University

Taipei, Taiwan

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

Sep. 2018 - Apr. 2020

- Formation of Friendship Networks among Agents with Personality Traits
  - Proposal admitted by MOST Research Grant for University Students
  - Developed computational network models to incorporate psychological concept into network science research
  - Received MOST Research Creativity Award

## Publications

### 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]

## Professional Development and Certification

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### MITx

Online

MicroMasters Program in **Statistics and Data Science**

Feb. 2019 -

- 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

Feb. 2019 -

- **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 [↗](#)

### University of British Columbia

Vancouver, BC, Canada

Vancouver Summer Program, Design Thinking

July. 2017 - Aug. 2017

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

## Honors & Awards

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### AWARDS

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|--------|---|
| 2020   | RESEARCH CREATIVITY AWARD <a href="#">↗</a> , Ministry of Science and Technology                    |
| 2017-9 | PRESIDENTIAL AWARD (TOP 5% OF CLASS) FOR 4 SEMESTERS <a href="#">↗</a> , National Taiwan University |
| 2017   | INSTRUCTOR RECOMMENDATION, Critical Writing on Chinese Classics                                     |

### RESEARCH GRANTS

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|------|---|
| 2020 | MOST RESEARCH GRANT FOR UNIVERSITY STUDENTS, Ministry of Science and Technology |
| 2019 | MOST RESEARCH GRANT FOR UNIVERSITY STUDENTS, Ministry of Science and Technology |

### SCHOLARSHIP

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|------|--|
| 2020 | DELTA ELECTRONICS SCHOLARSHIP, Delta Electronics                             |
| 2019 | MR. CHIEN SHIH-LIANG MEMORIAL SCHOLARSHIP, National Taiwan University        |
| 2018 | DELTA ELECTRONICS SCHOLARSHIP, Delta Electronics                             |
| 2018 | NTUHKAA SCHOLARSHIP, National Taiwan University Hong Kong Alumni Association |
| 2018 | IRVING T. HO MEMORIAL SCHOLARSHIP, Irving T. Ho Memorial Foundation          |
| 2017 | FOLK COMMITTEE SCHOLARSHIP, Office of Zhongshan District, Taipei City        |

## Extracurricular Activity

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### Global Initiatives Symposium Organizing Committee

Taipei, Taiwan

Officer of Academics and Curation

Oct. 2016 - July. 2017

- Organized and host Pre-Symposium Speech: Revolution of Sustainable Life.
- Was responsible for one of the academic topics- Low Carbon Economy in annual symposium.

### Viking Bar

Taipei, Taiwan

Writer for Technology and Business Section

Sep. 2016 - Jan. 2018

- Analyzed several topics in modern technology development.
- Also wrote articles about personal growth, interdisciplinary learning, gender equality.

### NTU Musical Club

Taipei, Taiwan

Club Member & Main Actor in Annual Performance

Sep. 2016 - Jun. 2017

- Learned how to act and sing like a musical actor.
- Participated in annual musical performance as one of the main actors.