Wei-Ning Chen

BL-524, National Taiwan University, Taipei, Taiwan
wnchen1994@gmail.com • weiningchen.github.io

Education

National Taiwan University **Taipei, Taiwan**
Master of Science in Graduate Institute of Communication Engineering (GICE) *2016–present*

- Overall GPA: 4.23/4.3
- Thesis: Fundamental Limits of Anonymous Statistical Inference: Privacy-Preserving Crowdsourcing

National Taiwan University **Taipei, Taiwan**
Bachelor of Science in Electric Engineering and Mathematics (double major) *2012–2016*

- Overall GPA: 3.96/4.3 (EE: 4.05/4.3, Math: 3.96/4.3)

Research Interests

I am interested in information-theoretic and algorithmic aspects of data science, and currently focus on the generalizability of deep neural networks. My research adopts tools mainly from *information theory*, *statistical machine learning* and *theoretical statistics*.

Publications

[1] Wei-Ning Chen and I-Hsiang Wang, "Anonymous Heterogeneous Distributed Detection: Optimal Decision Rules, Error Exponents, and the Price of Anonymity", arXiv:1805.03554 (submitted to *IEEE Transaction on Information Theory*), Feb 2018

[2] Wei-Ning Chen, Ho-Chun Chen, and I-Hsiang Wang, "On the Fundamental Limits of Heterogeneous Distributed Detection: Price of Anonymity", *IEEE International Symposium on Information Theory* (ISIT), Vail, June 2018

[3] Wei-Ning Chen and I-Hsiang Wang, "Partial Data Extraction via Noisy Histogram Queries: Information Theoretic Bounds", *IEEE International Symposium on Information Theory* (ISIT), Aachen, June 2017

Honors and Awards

GICE Best Master Thesis Award
Graduate Institute of Communication Engineering, National Taiwan University *Jan. 2019*

The First Prize of CIEE Best Master Thesis Award
Chinese Institute of Electrical Engineering *Oct. 2018*

TIEEE Best Master Thesis Award
Taiwan Institute of Electrical and Electronic Engineering *Oct. 2018*

ISIT Student Travel Grant
IEEE Symposium on Information Theory (ISIT) *Jun. 2018*

Outstanding Students Conference Travel Grant
Foundation for the Advancement of Outstanding Scholarship *Jun. 2018*

Funding for Participation at International Conferences by Domestic Graduate Students
Ministry of Science and Technology (MOST) *Jun. 2017*

Silver Medal in Macronix Science Awards (with scholarship about US $6500)
Macronix Science Foundation *Sep. 2011*

Academic Activities

IEEE International Conference on Communications (ICC)
Reviewer *Oct. 2018*

IEEE East Asian School of Information Theory and Communication (EASITC)
Student Volunteer *Aug. 2018*

2017 Summer School on Information Theory, Communication Theory and Technologies
Attendee *Aug. 2017*

IEEE Taiwan/Hong Kong Joint Workshop on Info. Theory and Communications
Attendee *Aug. 2016, Aug. 2017*

Selected Research Experiences

Anonymous Parameter Estimation from Heterogeneous Sources
Networked Information and Communication Lab, Advisor: I-Hsiang Wang *Oct. 2018 – Jan. 2019*

- Studied parameter estimation problem with an unknown permutation on joint samples
- Characterized the performance decrease, in terms of Fisher information, due to anonymity
- Submitted to ISIT 2019, preprint available upon request

Fundamental Limits of Privacy Preserving Crowdsourcing
Networked Information and Communication Lab, Advisor: I-Hsiang Wang *Feb. 2018 – Jul. 2018*

- Proposed optimal label recovery algorithm when crowds' relaibilities are anonymous
- Evaluated asymptotic probability of errors under Neyman-Pearson regime and Chernoff regime
- Master thesis, online version available at `https://weiningchen.github.io/paper/thesis_v4.pdf`

Anonymous Hypothesis Testing
Networked Information and Communication Lab, Advisor: I-Hsiang Wang *Sep. 2017 – Jul. 2018*

- Proved *optimal decision rules* and specified rates of detection errors for anonymous hypothesis testing
- Presented in ISIT 2018, Vail. Full version available at `https://weiningchen.github.io/paper/isit18_AHD.pdf`
- Submitted to *IEEE Transactions on Information Theory* (under revision), preprint available at arXiv

Data Extraction via Noisy Pooling
Networked Information and Communication Lab, Advisor: I-Hsiang Wang *Sep. 2016 – Jun. 2017*

- Characterized phase transitions between data recovery ratio and noise magnitude for the pooled data problem
- Presented at ISIT 2017, Aachen. Full version available at `https://weiningchen.github.io/paper/isit17_NHQ.pdf`

Differential Private Distributed Estimation
Undergraduate Research Project, Advisor: I-Hsiang Wang *Sep. 2015 – Jun. 2016*

- Proposed an statistical-efficient differential private point estimator for distributed system
- Technical report available at `https://weiningchen.github.io/paper/project_DPE.pdf`

Direct Anonymous Attestation
Undergraduate Research Project, Advisor: Chen-Mou Cheng *Sep. 2014 – Jun. 2015*

- Implemented "Direct Anonymous Attestation" protocol in C++
- Source codes available at `https://github.com/WeiningChen/DAA`

Optimal Grid Partition via Buffon's Needle
High School Research Project, Advisor: Lee-Fu Mou *Sep. 2010 – Feb. 2012*

- Extended Buffon's approach to find optimal geological grid partition which maximizes spatial resolving power
- Won silver medal in *Macronix Science Awards* with scholarship $200,000 (about US $6500) and excellent work award in *International Science Exhibition*

Teaching Experiences

Mathematical Principle of Machine Learning (CommE5051) — **GICE , NTU**
Teaching Assistant — *Spring 2018*

- Instructed lecture on concentration inequalities

Information Theory (EE5028) — **GICE , NTU**
Teaching Assistant — *Fall 2016, Fall 2017*

- Led recitation sessions (in English)

Calculus (MATH1202) — **EE , NTU**
Teaching Assistant — *Spring 2016*

- Led recitation sessions

Related Courses

Analysis	Advanced Calculus (I)(II)/ Linear Algebra (I)(II)/ Complex Analysis/ Partial Differential Equation/ Nonlinear Programing
Probability and Statistics	Probability and Statistics/ Mathematical Principle of Machine Learning/ Statistical Foundation of Data Science/ Stochastic Calculus/ Information Theory
Computer Science	Discrete Mathematics/ Operating System/ Cryptography/ Artificial Intelligence/ Advanced Algorithms/ Computation Theory

Reading Group: (Organized by Prof. I-Hsiang Wang)

- Studied "Prediction, Learning, and Games" by N. Cesa-Bianchi and G. Lugosi — *Fall 2017*
- Studied "High-Dimensional Probability" by R. Vershynin — *Spring 2017*

Technical Strengths

Programming Skills	C/C++, Python, Javascript, Matlab, LaTeX
GRE Subject Math	910 (97%)
GRE General	334/340 (V164, Q170, AW 3.5)
TOEFL iBT	106/120 (R29, L30, S21, W26)

References

I-Hsiang Wang (Master Advisor)
website · available upon request
Associate Professor
Department of Electrical Engineering
National Taiwan University

Shih-Chun Lin
website · available upon request
Associate Professor
Department of Electronic and Computer Engineering,
National Taiwan University of Science and Technology