

Wei-Ning Chen

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Education

Stanford University	California, USA
PhD in Electrical Engineering	2019–Now
• Advised by Prof. Ayfer Özgür.	
• Funded by a Stanford Graduate Fellowship	
National Taiwan University	Taipei, Taiwan
MS in Communication Engineering	2016–2018
National Taiwan University	Taipei, Taiwan
BS in Electric Engineering and Mathematics (double major)	2012–2016

Work Experience

Meta AI Research	
Research Intern (hosted by Graham Cormode and Akash Bharadwaj)	Summer. 2022
• Topic: Federated Experiments under Differential Privacy	
Google Research	
Student Researcher	Fall. 2021
Google Research	
Research Intern (hosted by Peter Kairouz)	Summer. 2021
• Topic: Communication-Efficient Federated Learning with Secure Aggregation and Differential Privacy	

Research Interests

I am broadly interested in information-theoretic and algorithmic aspects of data science, with a current focus on federated learning and differential privacy. My research adopts tools from information theory, theoretical machine learning and high-dimensional and nonparametric statistics.

Publications (Google Scholar)

Preprints

- [1] [Wei-Ning Chen](#), Graham Cormode, Akash Baharadwaj, Ayfer Özgür, and Peter Romov, “Federated Experiment Design under Distributed Differential Privacy”, in submission.
- [2] Daria Reshatova, [Wei-Ning Chen](#), and Ayfer Özgür, “Training generative models from privatized data”, in submission.
- [3] Berivan Isik, [Wei-Ning Chen](#), Ayfer Ozgur, Tsachy Weissman, and Albert No, “Exact Optimality of Communication-Privacy-Utility Tradeoffs in Distributed Mean Estimation ”, in submission.
- [4] [Wei-Ning Chen](#), Dan Song, Ayfer Özgür, and Peter Kairouz, “Privacy Amplification via Compression: Achieving the Optimal Privacy-Accuracy-Communication Trade-off in Distributed Mean Estimation”, in submission.
- [5] [Wei-Ning Chen](#), Peter Kairouz and Ayfer Özgür, “Breaking The Dimension Dependence in Sparse Distribution Estimation under Communication Constraints”, submitted to Journal of Machine Learning Research.

Journal Articles

- [1] Surin Ahn, Wei-Ning Chen and Ayfer Özgür, “Adaptive Group Testing on Networks with Community Structure”, at IEEE Transaction on Information Theory.
- [2] Wei-Ning Chen, Peter Kairouz and Ayfer Özgür, “Breaking the Communication-Privacy-Accuracy Trilemma”, to appear in IEEE Transaction on Information Theory.
- [3] Wei-Ning Chen and I-Hsiang Wang, “Anonymous Heterogeneous Distributed Detection: Optimal Decision Rules, Error Exponents, and the Price of Anonymity”, IEEE Transaction on Information Theory, November 2019
- [4] Leighton Pate Barnes, Wei-Ning Chen and Ayfer Özgür, “Fisher information under local differential privacy”, IEEE Journal on Special Areas in Information Theory, arXiv.

Conference Proceedings

- [1] Surin Ahn, Wei-Ning Chen, and Ayfer Özgür “Noisy Adaptive Group Testing for Community-Oriented Models”, to appear at IEEE International Symposium on Information Theory (ISIT), June, 2023.
- [2] Wei-Ning Chen, Ayfer Özgür, Graham Cormode, and Akash Bharadwaj, “The Communication Cost of Secure and Private Frequency Estimation”, International Conference on Artificial Intelligence and Statistics (AISTATS), April 2023.
- [3] Wei-Ning Chen*, Christopher A. Choquette-Choo, Peter Kairouz, and Ananda Theertha Suresh, “The Fundamental Price of Secure Aggregation in Differentially Private Federated Learning”, International Conference on Machine Learning (ICML), July 2022 (acceptance rate = 20%).
- [4] Wei-Ning Chen, Ayfer Özgür, and Peter Kairouz, “The Poisson Binomial Mechanism for Unbiased Federated Learning with Secure Aggregation”, International Conference on Machine Learning (ICML), July 2022 (oral presentation, top 2%).
- [5] Surin Ahn, Wei-Ning Chen, and Ayfer Özgür “Estimating Sparse Distributions Under Joint Communication and Privacy Constraints”, IEEE International Symposium on Information Theory (ISIT), July, 2022.
- [6] Abhin Shah, Wei-Ning Chen, Lucas Theis, Peter Kairouz and Johannes Ballé, “Optimal Compression of Locally Differentially Private Mechanisms”, International Conference on Artificial Intelligence and Statistics (AISTATS), March 2022 (acceptance rate = 29%).
- [7] Wei-Ning Chen*, Christopher A. Choquette-Choo and Peter Kairouz, “Communication Efficient Federated Learning with Secure Aggregation and Differential Privacy”, Neural Information Processing Systems (NeurIPS Workshop), December 2021.
- [8] Wei-Ning Chen, Peter Kairouz and Ayfer Özgür, “Pointwise Bounds for Distribution Estimation under Communication Constraints”, Neural Information Processing Systems (NeurIPS), December 2021 (acceptance rate = 26%).
- [9] Wei-Ning Chen, Peter Kairouz and Ayfer Özgür, “Breaking The Dimension Dependence in Sparse Distribution Estimation under Communication Constraints”, The 34th Annual Conference on Learning Theory (COLT 2021), Boulder, August 2021 (acceptance rate = 35%).
- [10] Surin Ahn, Wei-Ning Chen and Ayfer Özgür, “Adaptive Group Testing on Networks with Community Structure”, IEEE International Symposium on Information Theory (ISIT), July, 2021.
- [11] Shahab Asoodeh, Wei-Ning Chen, Flavio P. Calmon and Ayfer Özgür, “Differentially Private Federated Learning: An Information-Theoretic Perspective”, IEEE International Symposium on Information Theory (ISIT), July, 2021.
- [12] Wei-Ning Chen, Peter Kairouz and Ayfer Özgür, “Breaking the Communication-Privacy-Accuracy Trilemma”, Neural Information Processing Systems (NeurIPS), December 2020 (acceptance rate = 20%).
- [13] Wei-Ning Chen and I-Hsiang Wang, “ On the Price of Source Anonymity in Heterogeneous Parametric Point Estimation ”, IEEE International Symposium on Information Theory (ISIT), July 2019.
- [14] 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), June 2018.
- [15] Wei-Ning Chen and I-Hsiang Wang, “Partial Data Extraction via Noisy Histogram Queries: Information Theoretic Bounds”, IEEE International Symposium on Information Theory (ISIT), June 2017.

Academic Activities

- Reviewer for ITCS 2021, ICML 2021/2023, ALT 2021, NeurIPS 2021-2022, ISIT 2021-2023, ICC 2018/2022, WCNC 2022, AISTATS 2022-2023
- Reviewer for IEEE Transactions on Knowledge and Data Engineering, IEEE Transaction on Information Theory, IEEE Journal on the Selected Area of Communication
- Area chair for ICML 2021 ITR3 workshop, ICML 2023 FL workshop

Selected Honors and Awards

Communication Efficient Distributed Optimization Workshop Best Poster Award Workshop on Communication Efficient Distributed Optimization	Apr. 2021
Stanford Graduate Fellowship (2019 – 2022) Stanford University	Feb. 2019
• Named as National Semiconductor Corporation Fellow	
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

Teaching Experiences

Information Science and Engineering (ENGR 76) Teaching Assistant	Stanford University Spring 2022
Mathematical Principle of Machine Learning (CommeE5051) Teaching Assistant	GICE , NTU Spring 2018
Information Theory (EE5028) Teaching Assistant	GICE , NTU Fall 2016, Fall 2017
Calculus (MATH1202) Teaching Assistant	EE , NTU Spring 2016

References

Ayfer Özgür (PhD Advisor)
🌐 website · ✉ available upon request
Associate Professor
Department of Electrical Engineering
Stanford University

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

Peter Kairouz (Internship Host)
🌐 website · ✉ available upon request
Research Scientist
Google Research

Graham Cormode (Internship Host)
🌐 website · ✉ available upon request
Research Scientist/ Professor
Facebook AI Research/ University of Warwick