Curriculum Vitae

Tzu-Chi Yen

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Contact Information

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Current Position

Department of Artificial Intelligence, Global Healthcare Exchange — Dec 2024–present
Senior Software Engineer

Education

Ph.D. in Computer Science — Aug 2023
University of Colorado Boulder, USA
"Structure, Inference, and Optimization in Complex Networks"
Advisors: Joshua A. Grochow and Daniel B. Larremore

B.S. in Biology — Jun 2011
National Taiwan University, Taiwan
"Quantum Coherence and Optimal Chromophore Organization for Light Harvesting"
Advisor: Yuan-Chung Cheng (Chemistry)

Research Interests

Complex systems — network modeling & analysis, computational topology, neuroscience
Optimization — first-order methods, randomized algorithms, signal processing, Bayesian optimization
Generative modeling — statistical inference, sampling, diffusion models

Awards

- **NeuroData Discovery Award**, The Kavli Foundation — 2023
- **Outstanding TA Award**, Department of Computer Science — 2022
- **Second Prize**, in the inaugural Taipei City Open Data Hackathon — 2015
- **Excellent Poster Award**, Department of Chemistry — 2011

Peer-Reviewed Publications

♥ See my Google Scholar and Web of Science for citations and referee records.

Journal Papers

1. Tzu-Chi Yen, "Construction of simplicial complexes with prescribed degree-size sequences," Phys. Rev. E **104**, L042303 (2021).
2. Tzu-Chi Yen and Daniel B. Larremore, "Community detection in bipartite networks with stochastic block models," Phys. Rev. E **102**, 032309 (2020).

3. Hsiao-Mei Wu, Ying-Hsiu Lin, Tzu-Chi Yen, and Chia-Lung Hsieh, "Nanoscopic substructures of raft-mimetic liquid-ordered membrane domains revealed by high-speed single-particle tracking," Sci. Rep. **6**, 20542 (2016).
4. Jeong Min Lee, Jung A Kim, Tzu-Chi Yen, In Hwan Lee, Byungjun Ahn, Younghoon Lee, Chia-Lung Hsieh, Ho Min Kim, and Yongwon Jung, "A Rhizavidin Monomer with Nearly Multimeric Avidin-Like Binding Stability Against Biotin Conjugates," Angewandte Chemie **55**, 3393 (2016).
5. Qing Ai, Tzu-Chi Yen, Bih-Yaw Jin, and Yuan-Chung Cheng, "Clustered Geometries Exploiting Quantum Coherence Effects for Efficient Energy Transfer in Light Harvesting," J. Phys. Chem. Lett. **4**, 2577, (2013).

Conference Proceedings

1. Hsun-Ping Hsieh, Tzu-Chi Yen, and Cheng-Te Li, "What Makes New York So Noisy? Reasoning Noise Pollution by Mining Multimodal Geo-Social Big Data," ACM international conference on Multimedia (2015).
2. Tzu-Chi Yen and Yuan-Chung Cheng, "Electronic Coherence Effects in Photosynthetic Light Harvesting," 22nd Solvay Conference on Chemistry (2011).

Other Publications

Workshop Papers

1. Tzu-Chi Yen, Tzu-Yun Lin, Ching-Yuan Yeh, Hsun-Ping Hsieh, and Cheng-Te Li, "An Interactive Visualization System to Analyze and Predict Urban Construction Dynamics," ACM SIGKDD International Workshop on Urban Computing (2015).

Translations (English → Chinese)

1. Chia-Hung Yang and Tzu-Chi Yen, "Complexity Explained," 2019.
2. Tzu-Chi Yen and Cheng-Te Li, "Network Literacy: Essential Concepts and Core Ideas," 2016.

Funding

Mapping Functional Neuronal Networks to Behavioral States 2023–2024
PI. LS-2023-GR-04-2746, NeuroData Discovery Award, The Kavli Foundation
$50,000 to Yen.
With Co-PI Yi-Yun Ho (Massachusetts Institute of Technology).

Contributed or Submitted Talks and Presentations

- Aspiration of prestige in the selection of peer institutions
  - Talk: International Conference for Computational Social Science, Copenhagen, Denmark — Jul 2023
- Active learning strategies in community reconstruction
  - Poster: North American School of Information Theory at UCLA, Los Angeles — Aug 2022
- Simpliciality testing and related topics
  - Talk: project Tyra, online — Jul 2020
  - Talk: Student Symposium in Combinatorics, online — Jun 2022
  - Talk: Conference on Dynamics of Social Interactions, Aspen Center for Physics, Aspen — Mar 2022
- Community detection in bipartite networks with stochastic block models
  - Talk: project Tyra, online — Nov 2020
  - Poster: NetSci Conference, Indy — Jun 2017
  - Talk: Statistical Inference on Network Models symposium, NetSci Conference, Indy — Jun 2017
- Social customer relationship management system to analyze large on-line social networks
  - Poster: NetSci Conference, Seoul — May 2016
- Dissecting urban noises from heterogeneous geo-social media and sensor data
  - Talk & Poster: ACM Multimedia Conference, Brisbane — Oct 2015
- An interactive visualization system to analyze and predict urban construction dynamics
  - Talk: Urban Computing Workshop, ACM SIGKDD Conference, Sydney — Aug 2015

Affiliations, Accreditations

- National Outdoor Leadership School "Wilderness First Responder" – certification 2023–present
- IEEE Information Theory Society – Member 2021–present
- American Physical Society – Member 2020–present
- Society of Industrial and Applied Mathematics – Member 2020–present
- Python Software Foundation – Contributing Member 2018–present
- Network Science Society – Member 2017–present
- Society of Young Network Scientists – Event Officer 2019–2023
- Strauch Family Graduate Fellowship, College of Engineering & Applied Sciences 2018–2019

Travel Grants

- Allen Institute (NeuroDataReHack workshop) Oct 2022
- North American School of Information Theory, UCLA Aug 2022
- Aspen Center for Physics (Winter conference) Mar 2022
- Graduate and Professional Student Government, CU Boulder Mar 2022
- SciPy Conference, Austin Jul 2019
- NetSci Conference, UVM Mar 2019

Teaching Experience

University of Colorado Boulder (*lecturer*)
CSCI 5352: Network Analysis and Modeling Spring 2024

University of Colorado Boulder (*teaching assistantship*)
CSCI 2270: Data Structures Spring 2022
CSCI 3308: Software Development Methods and Tools Fall 2021
CSCI 5822: Probabilistic Models Spring 2021 & Spring 2023

National Cheng Kung University, Taiwan (*guest lecturer: short workshop*)
STAT 1021: Introduction to Data Science Spring 2018 & Spring 2019

Advising

Undergraduate Students
Wan-Ju Lee, National Taiwan University 2014

Referee Work

Journals
- Advances in Complex Systems
- Communications Physics
- EPL (formerly Europhysics Letters)
- Journal of Complex Networks
- Network Science
- Physical Review Letters (PRL)
- Physical Review E (PRE)
- Physical Review Research (PRResearch)
- PLoS ONE
- PLoS Computational Biology

Conferences

- Program Committee, International School and Conference on Network Science (NetSci 2025)
- Reviewer, International Conference on Machine Learning (ICML 2025)
- Reviewer, International Conference of Learning Representations (ICLR 2025)
- Reviewer, Conference on Neural Information Processing Systems (NeurIPS 2024)
- Program Committee, Python Conference (PyCon 2020, 2021, 2025)
- Program Committee, Scientific Computing with Python Conference (SciPy 2018, 2019, 2020, 2021)

Synergistic Activities

Network Science Education in Taiwan 2016–present

- Website: https://www.netscied.tw
- Publicly accessible network science materials in traditional Chinese

Public release of working algorithms or systems

Typically licensed under GPL-3.0-or-later or LGPL-3.0-or-later.

- Algorithm for the simplicial complex realization problem (Python) 2021
- Model selection heuristic for bipartite stochastic block models (Python) 2020
- MCMC inference for bipartite stochastic block models code (C++) 2020
- BP inference for stochastic block models code (C++; re-implementation) 2017
- Frontend of the Network Science Education Initiative in Taiwan project (JavaScript) 2016

Selected Projects

Map of the projected air pollution. (at Greenpeace Japan) 2018

Built a map to show how the pollution (such as $PM_{2.5}$, NO_2, and SO_2) would spread, if the Government of Japan were to build the coal power plants as planned.

- Petition homepage: https://act.greenpeace.org/page/21550/petition/1.
- URL to map: https://netscied.tw/greenpeace/jp/index.html.

Text mining of customer complaints. (at Dai Ke Network Technology) 2016

Designed a Python toolkit for short-text data mining, with modules about noise reduction, documents labelling, topic modeling, and token-to-token similarity.

- Code on GitHub: https://github.com/junipertcy/nick.

System to identify influential customers in a business network. (at Sensoro) 2015–2016

Made an Angular widget to collect, rank, and visualize WeChat users as a dynamic social network.

- Video demo (1 min): https://netscied.tw/sensoro/network.m4v.
- Demo of a related D3.js exploratory data analysis system: https://netscied.tw/sensoro/label.m4v.

System to analyze urban construction dynamics. (w/ Tzu-Yun Lin and Ching-Yuan Yeh) 2015

Made a predictive system for citizens and government agencies to understand, track, and predict the construction dynamics in urban area.

- Code on GitHub: https://github.com/junipertcy/uConstruction.
- Demo in Chinese: https://netscied.tw/data_taipei/view-cht/index.html.
- Demo in English: https://netscied.tw/data_taipei/view-eng/index.html.

Skills

Language

- Mandarin Chinese (Native)
- English (Full professional proficiency)
- German (Limited professional proficiency)

Academic Positions

Department of Applied Mathematics, University of Colorado Boulder — Aug 2024–Dec 2024
Postdoctoral Research Associate

BioFrontiers Institute, University of Colorado Boulder — Sep 2023–May 2024
Postdoctoral Research Associate (*independent scholar*)

Department of Computer Science, University of Colorado Boulder — Jan 2024–May 2004
Lecturer: Teaching CSCI 5352, Network Modeling and Analysis

Industry Positions

♥ See the Selected Projects section for my work during 2015–2018.

Greenpeace (Air Pollution Sector) — Beijing, China; 2017–2018
Data Analyst w/ Lauri Myllyvirta

Sensoro Co., Ltd. — Beijing, China; 2015–2016
Software Engineer, Full Stack

Other Positions or Experience

Northwestern University (Kellogg School of Management) — Remote; 2017
Software Engineer (contractor, 1 month) w/ Hyejin Youn

Santa Fe Institute — Santa Fe, NM, USA; 2017
Visiting Scholar (1 week) w/ Daniel Larremore

Chinese Academy of Sciences (Institute of Theoretical Physics) — Beijing, China; 2017
Visiting Scholar (6 months) w/ Pan Zhang

Tsinghua University (Department of Computer Science and Technology) — Beijing, China; 2016
Research Software Engineer (contractor, 7 months) w/ Jie Tang

Dai Ke Network Technology Co., Ltd. — Remote; 2016
Software Engineer (natural language processing, contractor, several months)

Academia Sinica (Institute of Atomic and Molecular Sciences) — Taipei, Taiwan; 2013–2014
Research Assistant w/ Chia-Lung Hsieh

National Taiwan University (Department of Chemistry) — Taipei, Taiwan; 2012–2013
Research Assistant w/ Yuan-Chung Cheng

Military Service — Taiwan; 2011–2012