

# Curriculum Vitae

## Tzu-Chi Yen

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### CONTACT INFORMATION

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### RESEARCH INTERESTS

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Complex systems — network modeling & analysis, computational topology, neuroscience  
Optimization — splitting methods, randomized algorithms, signal processing  
Generative modeling — statistical inference, sampling, diffusion models

### ACADEMIC POSITIONS

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BioFrontiers Institute, University of Colorado Boulder Sep 2023–present  
Postdoctoral Scholar

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

### EDUCATION

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**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)

### AWARDS

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- **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

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♥ 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, “Nanosopic 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

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#### 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

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#### 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

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- 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

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#### 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

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#### 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

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#### TEACHING EXPERIENCE

- University of Colorado Boulder** (*lecturer*) Spring 2024  
 CSCI 5352: Network Analysis and Modeling
- University of Colorado Boulder** (*teaching assistantship*) Spring 2022  
 CSCI 2270: Data Structures Fall 2021  
 CSCI 3308: Software Development Methods and Tools Spring 2021 & Spring 2023  
 CSCI 5822: Probabilistic Models
- National Cheng Kung University, Taiwan** (*guest lecturer: short workshop*) Spring 2018 & Spring 2019  
 STAT 1021: Introduction to Data Science

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#### REFeree WORK

##### Journal Review

- 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, Python Conference (PyCon 2020, 2021)

- Program Committee, Scientific Computing with Python Conference (SciPy 2018, 2019, 2020, 2021)

## SYNERGISTIC ACTIVITIES

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### 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

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

2018

Built a map to show how the pollution (such as PM<sub>2.5</sub>, NO<sub>2</sub>, and SO<sub>2</sub>) 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](https://netscied.tw/data_taipei/view-cht/index.html).
- Demo in English: [https://netscied.tw/data\\_taipei/view-eng/index.html](https://netscied.tw/data_taipei/view-eng/index.html).

## SKILLS

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### Language

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

## ACADEMIC EXPERIENCE

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### Academia Sinica (Institute of Atomic and Molecular Sciences)

Taipei, Taiwan; 2013–2014

Research Assistant w/ Chia-Lung Hsieh

**National Taiwan University** (Department of Chemistry)  
Research Assistant w/ Yuan-Chung Cheng

Taipei, Taiwan; 2012–2013

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## INDUSTRY EXPERIENCE

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♥ See the [Selected Projects](#) section for my work during 2015–2018.

**Greenpeace** (Air Pollution Sector)  
Data Analyst w/ Lauri Myllyvirta

Beijing, China; 2017–2018

**Sensoro Co., Ltd.**  
Software Engineer, Full Stack

Beijing, China; 2015–2016

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## OTHER EXPERIENCE

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**Northwestern University** (Kellogg School of Management)  
Software Engineer (contractor, 1 month) w/ Hyejin Youn

Remote; 2017

**Santa Fe Institute**  
Visiting Scholar (1 week) w/ Daniel Larremore

Santa Fe, NM, USA; 2017

**Chinese Academy of Sciences** (Institute of Theoretical Physics)  
Visiting Scholar (6 months) w/ Pan Zhang

Beijing, China; 2017

**Tsinghua University** (Department of Computer Science and Technology)  
Research Software Engineer (contractor, 7 months) w/ Jie Tang

Beijing, China; 2016

**Dai Ke Network Technology Co., Ltd.**  
Software Engineer (natural language processing, contractor, several months)

Remote; 2016

**Military Service**

Taiwan; 2011–2012

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## REFERENCES

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### **Stephen Becker**

Associate Professor  
Department of Applied Mathematics,  
University of Colorado Boulder, USA  
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### **Aaron Clauset**

Professor  
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### **Josh Grochow**

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University of Colorado Boulder, USA  
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### **Dan Larremore**

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