

Curriculum Vitae

Tzu-Chi Yen

tzuchi.yen@colorado.edu

CONTACT INFORMATION

A481 (Larremore Lab)
BioFrontiers Institute
3415 Colorado Ave.
Boulder, CO 80303, USA

voice: 720.900.9245
web: <https://junipertcy.info>
Twitter: @oneofyen
GitHub: @junipertcy

RESEARCH INTERESTS

Network science — methods, data, theories, applications
Neuroscience — complex systems, statistical inference, computational topology
Optimization — signal processing, sampling, proximal algorithms, recursive methods

ACADEMIC POSITIONS

BioFrontiers Institute, University of Colorado Boulder
Postdoctoral Scholar

Sep 2023–present

EDUCATION

Ph.D. in Computer Science

Aug 2023

University of Colorado Boulder, USA

Advisors: Joshua A. Grochow and Daniel B. Larremore

Thesis: Structure, Inference, and Optimization in Complex Networks

B.S. in Biology

Jun 2011

National Taiwan University, Taiwan

Advisor: Yuan-Chung Cheng (Chemistry)

Thesis: Quantum Coherence and Optimal Chromophore Organization for Light Harvesting

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, "Nanoscale 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

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|---|--------------|
| • 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

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| • 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** (*instructor*)
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 instructor*)
STAT 1021: Introduction to Data Science Spring 2018 & Spring 2019

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

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}, NO₂, and SO₂) 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 EXPERIENCE

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

INDUSTRY EXPERIENCE

♥ 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

OTHER EXPERIENCE

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

REFERENCES

Stephen Becker

Associate Professor

Department of Applied Mathematics,

University of Colorado Boulder, USA

stephen.becker@colorado.edu

Aaron Clauset

Professor

BioFrontiers Institute & Department of Computer Science,

University of Colorado Boulder, USA

aaron.clauset@colorado.edu

Josh Grochow

Assistant Professor

Department of Computer Science & Department of Mathematics,

University of Colorado Boulder, USA

jgrochow@colorado.edu

Dan Larremore

Associate Professor

BioFrontiers Institute & Department of Computer Science,

University of Colorado Boulder, USA

daniel.larremore@colorado.edu

Orit Peleg

Assistant Professor

BioFrontiers Institute & Department of Computer Science,
University of Colorado Boulder, USA
orit.peleg@colorado.edu