Tzu-Chi Yen

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Education

Ph.D. in Computer Science, University of Colorado Boulder, CO — Aug 2018–Aug 2023
- Thesis: *"Structure, Inference, and Optimization in Complex Networks"* (full text, slides, math genealogy)
- Relevant expertise: *generative network modeling*, *convex optimization*, *Bayesian statistics*, *computational topology*

B.S. in Biology, National Taiwan University, Taiwan — Sep 2007–Jun 2011
- Thesis: *"Quantum Coherence and Optimal Chromophore Organization for Light Harvesting"*

Experience

Postdoctoral Scholar and Lecturer, University of Colorado Boulder, CO — Sep 2023–present
- Taught CSCI 5352, Network Analysis and Modeling to 19 grad students.
- Engineered a Python library for inferring the brain's connectivity from neural spiking data (HDF5 structured), using probabilistic modeling (e.g., *graphical models*, *regularized regression*, *cross-validation*).

Graduate Student Researcher and Teacher, University of Colorado Boulder, CO — Aug 2018–Aug 2023
- Analyzed peer institution selection in higher education, revealing prestigious schools favor prestigious peers while others rely on non-aspirational features, suggesting the reproduction of status hierarchies.
- Invented a recursive algorithm for an NP-complete problem in network theory, characterized its solution landscape, and published a Python package, enabling statistical analysis of higher-order structures.
- Designed a new Bayesian prior for community detection in bipartite networks and devised the sampling algorithm; my software has 63 stars on GitHub and the paper has 39 citations.
- Improved a ranking method to handle datasets that are erroneous, time-varying, or have node attributes. Developed specialized first-order solvers for memory-efficient computations.
- Taught 4 semesters, incl. courses on data structures (44 undergrads), software development methods and tools (62 undergrads), and 2 semesters of probabilistic models (43 & 26 grads, respectively).
- Authored 2 first-author peer-reviewed journal articles (1 solo); 2 in preparation. Delivered 6 talks at international conferences. Peer-reviewed 27 papers for top journals, incl. Phys. Rev. Lett., PLOS Comp. Biol., & Comm. Phys.

Data Analyst, Greenpeace, Beijing, China — Dec 2017–Aug 2018
- Created a web map (*D3.js*) to show how the air pollution would spread if the coal power plants were to build, successfully stopped Japanese Government's plan. Assisted other analysts with data pipelines (*Airflow*).

Full-Stack Developer, Sensoro Co., Ltd., Beijing, China — Mar 2015–Apr 2016
- Engineering for internet-of-things solutions at a fast growing tech startup (then Series A, 40-ish employees).
- Implemented 2 core modules to collect, rank, filter, and visualize WeChat users as a dynamic social network, using *Node.js*, *AngularJS*, *MongoDB*, *Elasticsearch*, & *QingCloud*. Video demos (1 min) in Links [1] & [2].

Honors and Awards

- **NeuroData Discovery Award,** The Kavli Foundation ($50k / 1 year) — 2023
- **Outstanding TA Award,** Department of Computer Science, CU Boulder — 2022
- **Second Prize,** in the inaugural Taipei City Open Data Hackathon, Taiwan (see product & code) — 2015

Technical Skills

- Fluent in Mandarin Chinese and English; conversational proficiency in German.
- Foundational knowledge in applied math, e.g., numerical linear algebra & high-dimensional probability.
- Extensive experience with Python (NumPy, SciPy, Matplotlib, Scikit-learn), Linux, LaTeX, Git.
- Proficient with SQL, Angular, JavaScript, C++, HPC with Slurm, AWS (EC2, S3, Route 53, IAM), Docker.
- Some experience with JAX (Equinox, Optax), diffusion models, VAEs, and multiprocessing in OpenMP.