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.
- Created a Python library for inferring the brain's connectivity from neural spiking data (HDF5 structured), using tools of probabilistic modeling (e.g., *graphical models*, *regularized regression*, *cross-validation*).

Graduate Student Researcher and Teacher, University of Colorado Boulder, CO — Aug 2018–Aug 2023
- Authored 2 first-author peer-reviewed journal articles, incl. one solo; 2 more papers in preparation. Shared my results with talks at 6 international conferences.
- Invented a recursive algorithm for a NP-complete problem in higher-order network theory, characterized its solution landscape, and published a Python package for this method.
- Designed a new Bayesian prior for community detection in bipartite networks and devised the MCMC algorithm; the corresponding software has 63 stars on GitHub and the paper has 39 citations.
- Improved a convex optimization program for hierarchical ranking to handle networked datasets that are erroneous, time-varying, or have node attributes. The work highlights the development of specialized first-order solvers (e.g., dual-based proximal gradient methods) for memory-efficient computations.
- Taught 4 semesters, incl. courses on data structures (51 undergrads), software development methods and tools (62 undergrads), and 2 semesters of probabilistic models (43 & 26 grads, respectively).
- Peer-reviewed 27 papers to date, incl. Phys. Rev. Lett., PLOS Comp. Biol., & Comm. Physics.

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 built, 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].

Contractor in Research or Software, various businesses, Beijing, China & Taipei, Taiwan — 2012–2017

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
- **Excellent Poster Award,** Department of Chemistry, National Taiwan University — 2011

Technical Skills

- 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).
- Some experience with JAX (Equinox, Optax), diffusion models, VAEs, and multiprocessing in OpenMP.