Pei-Shan Yen

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SUMMARY
A proactive and passionate statistician with 18 years of combined professional and volunteering experience in statistical consulting, biomedical research, and marketing strategy. Highly competent in problem-solving, strategic planning, and interdisciplinary collaboration. Author of Book 'Big Data' and contributor to 15 journal papers (1 under review/4 preparation) and 10 conference proceedings.

SKILLS

Statistics: Causal Inference, Statistical Consultation, Data Science, Marketing Research, Survey Methodology

R packages: HDMAADMM, copulaSim, oneMKL.MatrixCal, oneMKL

Software: R/Shiny/Markdown, SAS/SAS macro, WinBUGS, SPSS, Stata, Minitab, SQL, Linux

EDUCATION

University of Illinois at Chicago (UIC)   **Chicago, USA**
Ph.D. Candidate in Biostatistics (GPA: 4.00)   2018 - 2024 Fall
- *Research*: Biomarker Detection, Causal Mediation, Neuroimaging Study
- *Honor*: 2021 Paul Levy Memorial Scholarship, Founder and 2022 Vice President of UIC Biostatistics Student Association, 2024 UIC SPH Student Travel Award.

National Chengchi University   **Taipei, Taiwan**
M.S. in Statistics (GPA: 3.86)   2010
- *Research*: An International Study of 2010 Population Census Methods
- *Honor*: Invited Paper to the Journal of Population Studies

University of Taipei   **Taipei, Taiwan**
B.S. in Mathematics (GPA: 3.55)   2005
- *Honor*: Ranked top 3% in the national mathematics undergraduate student competition

DOCTORAL
RESEARCH

High-Dimensional Causal Mediation Model for Neuroimaging Biomarker Detection
Advisor: Dr. Dulal Bhaumik
- **Statistical Modeling**: Depicted the neural pathway between pharmacological interventions and behavioral outcome with high-dimensional human brain connectivity mediators.
- **Feature Selection**: Developed an innovative penalization technique termed "Pathway Network" tailored for biomarker discovery. This technique introduces a convex penalty that conceptualizes as an amalgamation of the Pathway LASSO and Network-constrained penalties. Bootstrapping approach will be proposed to verify the significance of connectivity.
- **Model Validation**: Evaluating and validating the proposed model using both statistical simulations and real-world application for individuals diagnosed with internalizing psychopathology.

PROFESSIONAL
EXPERIENCES

Graduate Research/Teaching Assistant   Aug 2018 - May 2024
University of Illinois at Chicago, USA
- **Graduate Teaching Assistant**   Aug 2018 - May 2024
  Division of Epidemiology and Biostatistics, School of Public Health
  1. Tutored the Graduate Courses "Biostatistics I/II (Spring 2024/Fall 2023, Spring 2019)" and "Analytic and Research Methods (Fall 2018)" .
- **Statistical Consultant (Graduate Research Assistant)**   Oct 2023 - May 2024
  Biostatistics Research Center, Department of Psychiatry, College of Medicine
  1. Assisted the director with 7 consultation projects, involving statistical modeling analysis and grant proposal preparation (Coding: R).
  2. Consultation Projects: False Discovery Rate (FDR) control in Suicidal Medication, Abnormal Pattern Detection for Intracardiac electrophysiology study, Genetic Biomarker Discovery for Alcohol Use Disorder, Neuroimaging Biomarker Discovery and Bayesian FDR control for Traumatic Brain Injury.

- **Statistical Consultant (Graduate Research Assistant)** Jul 2019 - Dec 2022
  Biostatistics Core, Center for Clinical and Translational Science

  1. Collaborated on 20 medical research projects with professionals from UIC, Rush University, Northwestern University, and the VA Office of Research and Development.

     - Assisted 4 principal statisticians in providing consultation services. Contributed to the preparation of 4 grant proposals, 4 manuscripts, and 2 conference abstracts.

     - Developed modeling strategies and executed statistical analysis, generating customized results (Coding: SAS, R).

  2. Created *Recruitment Tracker*, an R Shiny app for visualizing Research Electronic Data Capture database projects, featuring clinical trial recruitment tracking, descriptive statistical results, and interactive plots. (Coding: R Shiny/JSON)(See Source Code).

     - Authored a user manual and led three training sessions for medical teams and principal investigators to streamline the adoption and effective usage of the app.

- **Statistical Consultant (Graduate Research Assistant)** Nov 2018 - Jul 2019
  Department of Emergency Medicine, College of Medicine, UIC, USA

  1. Conducted 5 statistical consulting projects for academic and medical professionals and authored 1 grant proposal and conference article (Coding:R).

Biostatistician/Experiential Summer Intern 2022 May- Jun 2023
AbbVie , USA

- **Biostatistician (Student Worker)** Feb 2023 - Jun 2023
  Eyecare Clinical Statistics, Data & Statistical Sciences

  1. Spearheaded copula modeling for a glaucoma project, performing statistical simulations and serving as the first author on two manuscripts, highlighting leadership in research and academic writing.

  2. Directed a network meta-analysis for the ABBV-RGX-314 program, assessing phase 2 clinical trials to evaluate therapy effectiveness and sample size determination in patients with wet AMD and diabetic retinopathy.

  3. *Honor*: Grant for UIC tuition.

- **Experiential Summer Intern** May 2022 - Aug 2022
  Eyecare Clinical Statistics, Data & Statistical Sciences

  1. Applied innovative statistical techniques, such as copula invariance property, for virtual patient simulation using small-size trial data, enhancing the model accuracy of longitudinal correlated composite outcomes. (Coding: R).

  2. Developed and introduced *copulaSim* , an R package for simulating joint distribution from small datasets, minimizing reliance on strong parametric assumptions and enhancing the robustness of statistical models in clinical research (See Source Code).

  3. *Honor*: Third Place prize in student poster competition, 2022 NIC-ASA and ICSA Midwest Chapter Joint Fall Meeting.

Senior Research Data Scientist, Acquisition and Loyalty Division Apr 2014 - Apr 2016
Taiwan Mobile, Taiwan (2nd largest telecom company in Taiwan)

- Designed and conducted marketing analytic projects to locate and prioritize customer churn behavior. Proposed strategy options. Monitored marketing plans and sales performance.
- Led the data science team (a group of 8 data engineers & data scientists) in projects involving 7,000,000 users to predict churn behavior.

  1. Constructed a proprietary machine learning model reducing annual churn rate reduced by 3%. Proposed 3 natural language processing projects to prevent daily churn behavior by monitoring real-time user behavior, cutting daily churn by by 28%.

  2. Analyzed the behavior of 800,000 long-term iPhone users, executed mystery shopper surveys, and designed promotional plans for new iPhones sales.

Senior Data Analyst, Energy Research Center   Nov 2011 - Feb 2014
NCKU Research and Development Foundation, Taiwan
(*The leading institute to perform solar-heating subsidy program sponsored by Taiwan government*)

- Led 7 large-scale field surveys, constructed cost-benefit analysis models, and analyzed the payback period with a team of 12 engineers in the poultry & butchery industry, hospitality industry, and schools in rural areas. Successfully motivated 5 large-scale system installations.
- Analyzed 130,000 solar heater user behavior in Taiwan. Evaluated lifetime of solar systems with cost-benefit analysis for the subsidy policy adjustments.
- Prepared 2 grant proposals, 3 annual reports, and 8 manuscripts for solar heater development.

Senior Data Analyst, 104 Web Survey Center   May 2010 - Apr 2011
104 Group, Taiwan (*The largest human resource company in Taiwan*)

- Proposed new research plans, executed 15 online survey research projects involving 2,000,000 customers and composed reports.
- Collaborated with international clients including Philips (Healthcare), Shiseido (Cosmetics), Kanebo (Cosmetics), and Carat (Global Media & Marketing Agency).

Data Analyst, Graduate Research/Teaching Assistant   Jun 2005 - Oct 2010
National Chengchi University, Taiwan (*Best College of Commerce in Taiwan*)

- **Statistical Consultant (Graduate Research Assistant)**   Sep 2007 - Oct 2010
  Department of Statistics, College of Commerce

  1. Provided 3 projects involving statistical consulting service and used the GeneSpring software to perform human genetic clustering for Academia Sinica.

  2. Conducted user behavior and pricing studies to help design an innovative mobile device "ORBI" for interactive exhibitor information, map guide and the exchange of digital business cards. The project was sponsored by IBM and HTC.

  3. Led a team of 6 software engineers in project to redesign the computer-assisted telephone surveying system and added visualization and tracking functions. Retained the ownership of the newly designed product copyright.

  4. Associated Statistician at Statistical Consulting Center: Performed 6 consulting projects for Hennessy, Farglory Construction, and researchers from local universities.

- **Graduate Teaching Assistant**   Jan 2007 - Jun 2009
  Department of Statistics, College of Commerce

  1. Tutored the Undergraduate Courses "Mathematical Statistics I&II," Sampling Survey, and "Statistical Software".

- **Data Analyst**   Jun 2005 - Aug 2007
  Market Survey Research Center, College of Commerce

  1. Led a team of 26 interviewers and conducted 29 research projects.

  2. Prepared research proposals, conducted analyses, composed reports, and offered feasible solutions to various government agencies, industries, and research institutes.

SELECTED
PUBLICATIONS

Book

1. C.S. Yue and **P.S. Yen**. "Big data: The data wisdom and knowledge-based economics." *Tsang Hai Publishing*, Taiwan, 2016.

Journal Publications

1. **P.S. Yen**, S. Sahu, D. Nandi, O.A. Ajilore, and D.K. Bhaumik. " Pathway Network: Penalty Strategies for Neuroimaging Biomarker Detection in High-Dimensional Mediation Models." *Biometrics* (Prepared. Anticipated Submission Date: Nov 2024).

2. **P.S. Yen** and C.C. Chen. "HDMAADMM: High-dimensional Causal Mediation Model." *R Journal* (Prepared. Anticipated Submission Date: Aug 2024).

3. **P.S. Yen**, S. Sahu, D. Nandi, O.A. Ajilore, and D.K. Bhaumik. " Strategic Refinement for Enhanced Mediator Detection in High-Dimensional Mediation Models." *IEEE Transactions on Medical Imaging* (Prepared. Anticipated Submission Date: Apr 2024).

4. **P.S. Yen**, J. Zhang, and X.M. Gu. "Individual Patient Data based Copula Approach for Modeling and Simulation to Support Decision-Making in Clinical Development." *PLUS One* (Prepared).

5. C.C. Li, A.K. Matthews, **P.S. Yen**, Y.F. Chen, and X.Q. Dong."Demographic Predictors of Psychological Distress among a Diverse Sample of Older Asian Americans." *Journal of Immigrant and Minority Health* (Under Review).

6. **P.S. Yen**, W. Zhao, and D.K. Bhaumik. "How to Develop a Quality Strategy to Detect Abnormal Brain Connectivity using Multimodal Neuroimaging Data." *Mathematics* (Invited Paper. Major Revision. Anticipated Publication Date: Jun 2024).

7. **P.S. Yen**, W. Zhao, and D.K. Bhaumik. "Bivariate Mixed-effect Model to Detect Abnormal Brain Connectivity using Multimodal Neuroimaging Data." *IAPQR Transactions* (Accepted. Anticipated Publication Date: May 2024).

8. Y. Wang, **P.S. Yen**, O.A. Ajilore, and D.K. Bhaumik. "Selection of biomarkers using multimodal neuroimaging data for late-life depression." *PLUS one*, 19(4): p.e0289401, 2024.

9. D.K. Bhaumik, Y. Wang, **P.S. Yen***, and O.A. Ajilore. "Development of a Bayesian multimodal model to detect biomarkers in neuroimaging studies." *Frontiers in Neuroimaging*, 2:1147508, 2023.

10. D.K. Bhaumik, Y.B. Song, **P.S. Yen**, and O.A. Ajilore. "Power Analysis for High Dimensional Neuroimaging Studies." *Psychiatric Annals*, 53(3): 137-144, 2023.

11. I. Imayama, A. Gupta, **P.S. Yen**, Y.F. Chen, B. Keenan, R. R. Townsend, J. A. Chirinos, F. M. Weaver, D. W. Carley, S. T. Kuna, and B. Prasad. "Socioeconomic status impacts blood pressure response to positive airway pressure treatment." *Journal of Clinical Sleep Medicine*, 18(5): 1287-1295, 2021.

12. C.C. Li, A.K. Matthews, **P.S. Yen**, Y.F. Chen, and X.Q. Dong. "Intimate partner violence and Its Relationship with Psychological Distress Among Older Asian Americans: Results from the California Health Interview Survey." *Asian Journal of Psychiatry*, 63: 102798, 2021.

13. C.C. Li, A.K. Matthews, **P.S. Yen**, Y.F. Chen, and X.Q. Dong. "The Influence of Perceived Discrimination in Healthcare Settings on Psychological Distress Among a Diverse Sample of Older Asian Americans." *Aging & Mental Health*, 26(9): 1874-1881, 2021.

14. C.W. Kuo, **P.S. Yen**, W.C. Chang and K.C. Chang. "The design and optical analysis of compound parabolic collector." *Procedia Engineering*, 79:258-262, 2014.

15. **P.S. Yen** and C.S. Yue. "An international study of 2010 population census methods." *Journal of Population Studies*, 40:203-229, 2010.

Conference Proceedings (Selected)

1. **P.S. Yen**, S. Sahu, D. Nandi, and D.K. Bhaumik. " Strategic Refinement for Enhanced Mediator Detection in High-Dimensional Mediation Models." *2024 Joint Statistical Meetings*, Portland, OR, USA, 2024.

2. **P.S. Yen**. X. Gu, J. Jiao, J. Zhang. "Individual Patient Data based Copula Approach for Modeling and Simulation to Support Clinical Development Team Decision Making." *NICASA & ICSA Midwest Joint Fall Meeting*, Chicago, IL, USA, 2022. **Honor**: Third Place prize in student poster competition

3. J. Li, K. Qin, P.B. Doshi, X.D. Zhu, P. Kotini-Shah, M. Granado, H. Kim, **P.S. Yen**, R. Gordon, H.E. Wang, and T. Hoek. "Novel Blood Biomarker Taurine and Glutamate for Early Predicting Outcomes After Out-of-hospital Cardiac Arrest." *AHA Resuscitation Science Symposium*, Virtual Event, USA, 2020.

4. P. Kotini-Shah, R. Gordon, B. Karfunkle, J. Li, H. Kim, **P.S. Yen**, M. Granado, P. Doshi, H. Wang and T.Hoek. "Optic Nerve Sheath Diameter Differences by Sex, Rhythm, and Neurological Outcome After Out-of-hospital Cardiac Arrest." *AHA Resuscitation Science Symposium*, Virtual Event, USA, 2020.

5. Y.F. Wang, K. Schachtschneider, Y.H. Huang, R. Gaba, P. Nguyen, **P.S. Yen**, M. Sverdlov, G. Guzman, and R. Lokken. "Infiltration of T-cell subpopulations in hepatocellular carcinoma is associated with tumor size, BCLC stage, and transplant-free survival." *Society of Interventional Radiology Conference*, Seattle, WA, USA, 2020.

6. **P.S. Yen** and C.W. Kuo. "Policy for solar water heaters in Taiwan: An International Perspective." *Grand Renewable Energy*, Tokyo, Japan, 2014.

Invited Talks

1. **P.S. Yen** and S. Konda. "Clustering Depression Data." *Department of Epidemiology and Biostatistics, University of Illinois at Chicago*, Nov, 2019.

2. **P.S. Yen**. "Future Statistical Application - Data Science in Mobile Industry." Department of Mathematics, University of Taipei, Taiwan, Sep 2018.

3. **P.S. Yen**. "Statistical Application for Market Research." Department of Mathematics, University of Taipei, Taiwan, May, 2012. **Honor**: Outstanding Alumni Nomination

VOLUNTEER EXPERIENCES (SELECTED)

Freelance Statistician & Volunteering Statistician Jul 2006 - Present
Self-Employed, Taipei, Taiwan

- Provided statistics tutoring and consulting sessions for a total of 66 clients from various professional fields, including medical doctors, nurses, pharmaceutical scientists, researchers, students.
- Provided pro-bono statistics sessions for 7 underprivileged students in Taiwan & USA.

Founder, Vice President and Treasurer Jan 2022 - May 2024
UIC Biostatistics Student Association, Chicago, IL, USA

- Led the establishment of the UIC student association (ASA Student Chapter), initiating strategic meetings and planning. Organized biostatistics journal club to deepen biostatistics knowledge and foster faculty and expert alumni interaction.
- Organized 12 diverse events including social gatherings, internship panels, and academic and industry career talks with invited alumni and guest speaker, successfully bolstering networking opportunities and career discovery among students.

President and Organizer of the Millennials Sector May 2021 - Oct 2023
American Beiyinu Alumnae Foundation, Walnut, CA, USA

- Resigned the alumnae database and questionnaire, significantly increasing the network size from 328 to 1,397 members in 5 months.
- Guided and mentored a 45-member team across projects analyzing alumnae profiles, organizational structure, and marketing strategies. Coordinated various alumnae events like career consultations, monthly workshops, and fundraising activities.
- Mentored a team of 7 PhD-level data scientists, providing guidance in job interviews, networking, career exploration, and career transition skills.

Data Analyst and Assistant Lecturer for Mental Crisis Response Oct 2009 - Sep 2021
Asian Mental Health Association (AMHA), Taipei, Taiwan
(*The leading Taiwanese organization that provides crisis response and mental health service*)

- Resigned PTSD questionnaires for COVID-19 first responders and conducted statistical analysis for the evaluation of crisis response training courses.
- Provided data collection and study design ideas for AMHA, the Ministry of Health and Welfare of Taiwan, and the Red Cross Society of Taiwan. Executed 18 crisis response training for the disaster victims, first responders, the Army of the Republic of China, and various NGOs.
- Assisted the director of AMHA in the proposal and execution of the 2009 Typhoon Morakot Project to reduce the suicide rates of 247 victims. Developed a model to rank the suicidal tendency of victims and demonstrated statistical applications for 82 NGO directors. The results contributed to the initiation of a national-wide emergency plan.