An-Shun Tai (戴安順)

Assistant Professor at
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Update: 2025/1/23

1. Education

Sept. 2012 ~ Apr. 2019, Ph.D. in **Institute of Statistics**, **National Tsing-Hua University**, Taiwan.
Thesis: Statistical deconvolution models for inferring cellular heterogeneity
Advisor: Wen-Ping Hsieh Ph.D.

Sept. 2009 ~ Jun. 2011, M.S. in **Institute of Statistics**, **National Tsing-Hua University**, Taiwan.
Thesis: Consistency of QTLs underlying the same gene regulatory modules
Advisor: Wen-Ping Hsieh Ph.D.

2004 ~2009, B.S. in **Department of Mathematics**, **National Tsing-Hua University**, Taiwan.

2. Research interests

- Biostatistics
- Bioinformatics (Statistical Genomics)
- Bayesian Inference (Bayesian variable selection)
- Causal Inference
- Mediation Analysis (Multiple Mediators)
- Mendelian Randomization (Instrumental Variable Analysis)
- Robust Estimation

3. Professional experience

- **Adjunct Assistant Professor** Feb. 2025 ~ Now
  Institute of Statistics and Data Science, National Tsing Hua University, Taiwan
- **Assistant Professor** Aug. 2022 ~ Now
  Department of Statistics, National Cheng Kung University, Taiwan
- **Postdoctoral Fellow** Apr. 2019 ~ Jul. 2022
  Institute of Statistics, National Chiao Tung University, Taiwan
- **Predoctoral Visiting Scholar** Feb. 2017 ~ Jul. 2017
  Department of Biostatistics, University of Pittsburgh

4. Publications

(A) Major work († indicates co-first author; * indicates corresponding author)

Published or in press:

1. Yan-Lin Chen, Yan-Hong Chen, Pei-Fang Su, Huang-Tz Ou, and **An-Shun Tai*** (2024). Robust inference for causal mediation analysis of recurrent event data. ***Statistics in Medicine***. 43(16): 3020-3035. doi: 10.1002/sim.10118.

2. **An-Shun Tai** and Sheng-Hsuan Lin* (2024). Multiply robust estimation of natural indirect effects with multiple ordered mediators. ***Statistics in Medicine***. 43(4):656-673. doi: 10.1002/sim.9977

3. **An-Shun Tai** and Sheng-Hsuan Lin* (2023). Complete effect decomposition for an arbitrary number of multiple ordered mediators with time-varying confounders: A method for generalized causal multi-mediation analysis. ***Statistical Methods in Medical Research***. 32(1), 100-117.

4. **An-Shun Tai**, Sheng-Hsuan Lin*, Yu-Cheng Chu, Tsung Yu, Milo A. Puhan, and Tyler VanderWeele (January 2023). Causal mediation analysis with multiple time-varying mediators. ***Epidemiology***. 34(1):p 8-19

5. **An-Shun Tai**, Ro-Ting Lin*, Yi-Chun Lin, Chung-Hsing Wang, Sheng-Hsuan Lin, Seiya Imoto (2022 Aug 25). Genome-wide causal mediation analysis identifies genetic loci associated with uterine fibroids mediated by age at menarche. ***Human Reproduction***. 37(9):2197-2212. doi: 10.1093/humrep/deac136. (IF=6.353, Rank=4/31)

6. **An-Shun Tai**, Pei-Hsuan Lin, Yen-Tsung Huang, and Sheng-Hsuan Lin* (2022). Path-specific effects in the presence of a survival outcome and causally ordered multiple mediators with application to genomic data. ***Statistical Methods in Medical Research***. 31(10):1916-1933. doi:10.1177/09622802221104239

7. **An-Shun Tai**, Le-Hsuan Liao, and Sheng-Hsuan Lin* (2022). On the conventional definition of path-specific effects - fully mediated interaction with multiple ordered mediators. ***Epidemiology***. 33(6): p 817-827. DOI: 10.1097/EDE.0000000000001520

8. **An-Shun Tai**, Chun-Chao Wang, and Wen-Ping Hsieh* (2022). Detection of cell separation-induced gene expression via a penalized deconvolution approach. ***Statistics in Biosciences***. https://doi.org/10.1007/s12561-022-09344-8.

9. **An-Shun Tai** and Sheng-Hsuan Lin* (2022). Identification and robust estimation of swapped direct and indirect effects: Mediation analysis with unmeasured mediator–outcome confounding and intermediate confounding. ***Statistics in Medicine***. https://doi.org/10.1002/sim.9501.

10. **An-Shun Tai**, Yi-Juan Du, and Sheng-Hsuan Lin* (2022). Robust inference on effects attributable to mediators: A controlled-direct-effect-based approach for causal effect decomposition with multiple mediators. ***Statistics in Medicine***. https://doi.org/10.1002/sim.9329.

11. **An-Shun Tai**, Yen-Tsung Huang, Hwai-I Yang, Lauren V. Lan, and Sheng-Hsuan Lin* (2022). G-computation to causal mediation analysis with sequential multiple mediators – investigating the vulnerable time window of HBV activity for the mechanism of HCV induced hepatocellular carcinoma. ***Frontiers in Public Health***. doi: 10.3389/fpubh.2021.757942.

12. **An-Shun Tai** and Sheng-Hsuan Lin* (2021). Integrated multiple mediation analysis: A robustness–specificity trade-off in causal structure. ***Statistics in Medicine***. https://doi.org/10.1002/sim.9079.

13. **An-Shun Tai**, Chun-An Tsai, and Sheng-Hsuan Lin* (2021). Survival mediation analysis with the death-truncated mediator: The completeness of the survival mediation parameter. ***Statistics in Medicine***. https://doi.org/10.1002/sim.9008.

14. **An-Shun Tai**, George C. Tseng and Wen-Ping Hsieh* (2021). BayICE: A Bayesian hierarchical model for semi-reference-based deconvolution of bulk transcriptomic data. ***Annals of Applied Statistics***. 15(1) 391 - 411. https://doi.org/10.1214/20-AOAS1376.

15. **An-Shun Tai**, Chien-Hua Peng*, Shih-Chi Peng, and Wen-Ping Hsieh* (2018). Decomposing the subclonal structure of tumors with two-way mixture models on copy number aberrations. ***PLOS ONE***. 13(12): e0206579.

Papers in review or in revision:

1. **An-Shun Tai*** (2024+). Robust and flexible high-dimensional causal mediation model for DNA methylation studies. In preparation.

2. **An-Shun Tai*** (2024+). Robust semiparametric estimation of average causal effects in Mendelian randomization under an intermediate variable intervention. In preparation.

3. **An-Shun Tai**, Yu-Cheng Chu, and Sheng-Hsuan Lin* (2024+). Causal mediation analysis of non-mortality outcomes with follow-up truncated by death: Survivor natural direct and indirect effect. Revision in ***Journal of the Royal Statistical Society, Series C (Applied Statistics)***.

(B) Collaborative work

Published or in press:

1. Pei-Shan Chien, Tzu-Jung Wong, **An-Shun Tai**, Yau-Huo Shr, Tsung Yu* (2024). Examining the causal association between moderate alcohol consumption and cardiovascular risk factors in the Taiwan Biobank: a Mendelian randomization analysis. ***Frontiers in Cardiovascular Medicine***, 11, 1456777.

2. Hyunman Sim, **An-Shun Tai**, Whanhee Lee, Woojoo Lee (2024). Sensitivity analysis for attributable fraction in the presence of unmeasured confounding. ***American Journal of Epidemiology***. kwae409.

3. Yi-Hsuan Lin, Chia-Hung Lin, Yu-Chih Lin, Yu-Yao Huang, **An-Shun Tai**, Shih-Chen Fu, Sheng-Hsuan Lin* (2024). Sodium-Glucose Cotransporter 2 Inhibitors Reduce the Risk of Hospitalization for Heart Failure and Amputation Rate Compared with Incretin-Based Therapy in Patients With Diabetic Foot Disease: A Nationwide Population-Based Study. ***Endocrine Practice***, 30.5: 424-430.

4. Jui-Hsiang Lin, **An-Shun Tai**, and Sheng-Hsuan Lin* (2022). Population Attributable Fraction based on sufficient causal framework for mediation settings. ***Annals of Epidemiology***. 75:57-66. doi: 10.1016/j.annepidem.2022.08.050.

5. Tanbin Rahman, Hsin-En Huang, Yujia Li, **An-Shun Tai**, Wen-Ping Hsieh, Colleen McClung, and George C. Tseng* (2022). A sparse negative binomial classifier with covariate adjustment for RNA-seq data. ***Annals of Applied Statistics***. 16(2), 1071-1089.

6. Tzu-Yen Huang, Wing-Hei Viola, Feng-Yu Chiang, Che-Wei Wu, Shih-Chen Fu, **An-Shun Tai**, Yi-Chu Lin, Hsin-Yi Tseng, Ka-Wo Lee, Sheng-Hsuan Lin (2021). Correlation between Objective and Subjective High-Pitched Voice Impairment in Patients after Thyroid Surgery. ***Frontiers in Endocrinology***.

7. Tzu-Yen Huang, Wing-Hei V. Yu, Feng-Yu Chiang, Che-Wei Wu, Shih-Chen Fu, **An-Shun Tai**, Yi-Chu Lin, Hsin-Yi Tseng, Ka-Wo Lee, and Sheng-Hsuan Lin (2021). How the Severity and Mechanism of Recurrent Laryngeal Nerve Dysfunction during Monitored Thyroidectomy Impact on Postoperative Voice. ***Cancers*** 13, no. 21: 5379. https://doi.org/10.3390/cancers13215379.

8. Yu-Hsuan Lin, Si-Yu Chen, Pei-Hsuan Lin, **An-Shun Tai**, Yuan-Chien Pan, Chang-En Hsieh, and Sheng-Hsuan Lin* (2020). Assessing User Retention of a Mobile App: Survival Analysis. ***JMIR Mhealth Uhealth***. 2020;8(11):e16309. DOI: 10.2196/16309

9. Yen-Tsung Huang, **An-Shun Tai**, Meng-Ying Chou, Geng-Xian Lin, and Sheng-Hsuan Lin* (2020) Six-way decomposition of causal effects: Unifying mediation and mechanistic interaction. ***Statistics in Medicine***. 1– 18. https://doi.org/10.1002/sim.8708.

10. Chien-Hua Peng, Chun-Ta Liao, Ka-Pou Ng, **An-Shun Tai**, Shih-Chi Peng, Jen-Pao Yeh, Shu-Jen Chen, Kuo-Chien Tsao, Tzu-Chen Yen*, and Wen-Ping Hsieh* (2015). Somatic copy number alterations detected by ultra-deep targeted sequencing predict prognosis in oral cavity squamous cell carcinoma. ***Oncotarget***, 6(23), 19891.

11. Chien-Hua Peng, Yi-Zhi Jiang, **An-Shun Tai**, Chun-Bin Liu, Shih-Chi Peng, Chun-Ta Liao, Tzu-Chen Yen*, and Wen-Ping Hsieh* (2013). Causal inference of gene regulation with subnetwork assembly from genetical genomics data. ***Nucleic Acids Research***.

Papers in review or in revision:

1. Jiwoong Yu and Chanhee Kim and Jaeseong Oh and **An-Shun Tai** and Woojoo Lee (2024+). On the robustness of truncated negative binomial regression model: application to field epidemiology. Submitted.

2. Pei-Hsuan Hsia, **An-Shun Tai**, Chu-Lan Micheal Kao, Yu-Hsuan Lin, and Sheng-Hsuan Lin* (2024+). Causal Mediation Analysis for Difference-in-Difference Design and Panel Data.

(C) Other work

1. **An-Shun Tai**, Shih-Wen Lin, and Sheng-Hsuan Lin* (2020) Sample Size Calculations for the Multiple Mediation Model (in Chinese). ***JCSA***. Vol. 58, 199–220.

2. **An-Shun Tai**, Yen-Tsung Huang, Wen-Chung Lee, and Sheng-Hsuan Lin* (2020) Conceptualization of agonistic interaction under marginal sufficient component cause model – an alternative interpretation for subadditive interaction. ***JCSA***. Vol. 58, 168–198.

3. **An-Shun Tai** and Sheng-Hsuan Lin* (2022) Book review: “Fundamentals of Causal Inference With R” by Babette A. Brumback. ***Biometrics***. https://doi. org/10.1201/9781003146674

5. Journal Referee

(Statistics Journals)

- Journal of the American Statistical Association (JASA) (2024)
- Statistica Sinica (2021, 2022, 2023, 2024)
- Statistics in Medicine (2024)
- Lifetime Data Analysis (2024)
- Australian & New Zealand Journal of Statistics (2022)

- Journal of Data Science, Statistics, and Visualisation (2022)

(Bioinformatics Journals)
- BMC Medical Research Methodology (2023)
- Frontiers in Genetics (2022)
- BMC Bioinformatics (2022, 2024)
- Briefings in Bioinformatics (2021*3)
- PLOS Computational Biology (2021)

(Epidemiology Journals)
- Journal of Clinical Epidemiology (2024)
- Archives of Public Health (2024)
- International Journal of Epidemiology (2022)

(Scientific Journals)
- BMC Musculoskeletal Disorders (2024)
- IEEE Transactions on Neural Networks and Learning Systems (2023)
- Frontiers in Endocrinology (2023)
- Contemporary Clinical Trials Communications (2023)
- Human reproduction (2023)
- Microbiome (2023)
- PLOS one (2022)
- Scientific reports (2020)

6. Grant Referee

- National Science and Technology Council (2023*1, 2024*2)
- NSTC Research Grant for University Students (2023*2)

7. Honors and Awards

- 2024 Outstanding Research Award (National Cheng Kung University - College of Management)
- 2024 Outstanding Research Award for Young Scholars, Taiwan Comprehensive University System (臺灣綜合大學系統 113 年度年輕學者創新研發成果 傑出獎)
- 2021 MOST Postdoctoral Researcher Academic Research Award (科技部 110 年度博士後研究人員學術研究獎)
- 2019 Travel grant award from Ministry of Science and Technology (MOST) to attend ASHG 2019 (國內專家學者出席國際學術會議)
- 2018 Honorary member of the Phi Tau Phi Scholastic Honor Society, Taiwan
- 2018 Travel grant award for PhD students from Ministry of Science and Technology (MOST) to attend JSM 2018 (科技部國內研究生出席國際學術會議)

- 2016 Travel grant award for PhD students from Ministry of Science and Technology (MOST) to attend ASHG 2016 (科技部國內研究生出席國際學術會議)
- 2015 Travel grant award for PhD students from Ministry of Science and Technology (MOST) to attend ASHG 2015 (科技部國內研究生出席國際學術會議)
- 2012 Recipient of President Scholarship granted by National Tsing-Hua University

8. Grants

- NCKU Sustainable Integrated Interdisciplinary Project 成功大學永續跨領域整合型計畫
  PI, 2023/04/01 ~ 2024/12/31, $1,850,000
  Project Title: An integrative causal statistical framework applied to exploring the effects of non-invasive ultrasonic nerve stimulation on the hematopoietic system.

- NCKUH Smart Healthcare Interdisciplinary Project 智慧健康照護跨領域計畫 (NCKUH-11310014)
  Co-PI, 2024/01/01 ~ 2024/12/31, $706,800
  Project Title: To investigate the germline genetic variants and immunotherapeutic resistance in colorectal cancers with mismatch repair deficiency by next-generation sequencing, analysis of tumor heterogeneity and deep learning model.

- National Science and Technology Council, Taiwan (NSTC 111-2118-M-006 -010 -MY3)
  PI, 2022/09/01 ~ 2025/07/31, $3,034,000
  Project Title: Statistical methods of causal mediation analysis by using instrumental variables: Application to genomic studies.

9. Presentations

(A) Invited Oral Presentation

1. *The 7th International Conference on Econometrics and Statistics (EcoSta 2024)* July 2024.

   --- Robust and Flexible High-Dimensional Causal Mediation Model for DNA Methylation Studies.

2. *2024 International Conference for Statistics and Data Science (Taiwan)*. July 2024.

   --- Robust and Flexible High-Dimensional Causal Mediation Model for DNA Methylation Studies.

3. *2023 International Conference for Statistics and Data Science (Taiwan)*. July 2023.

   --- Robust semiparametric estimation of average causal effects in Mendelian randomization under an intermediate variable intervention.

4. *2023 KSS-CSA-JSS Young Researcher's Session (Korea)*. July 2023.

   --- Robust semiparametric estimation of average causal effects in Mendelian randomization under an intermediate variable intervention.

5. *The 32th South Taiwan Statistics Conference (Taiwan).* June 2023.

   --- Causal mediation analysis for recurrent event using additive rate models: generalizations from the Baron and Kenny method.

6. *The Asian Regional Section of the International Association for Statistical Computing (IASC- ARS) 2022 (Kyoto, JAPAN).* February 2022.

   --- Robust inference on effects attributable to mediators: A controlled-direct-effect-based approach for causal effect decomposition with multiple mediators.

7. *The 30th South Taiwan Statistics Conference (Kaohsiung city, Taiwan).* October 2021.
   --- Survival mediation analysis with the death-truncated mediator: The completeness of the survival mediation parameter

8. *The 29th South Taiwan Statistics Conference (Chiayi city, Taiwan).* August 2020.
   --- A unified framework for causal multi-mediation analysis of tumor heterogeneity by gene expression profiling

9. 108 年中國統計學社社員大會暨 統計學術研討會. December 2019.
   --- Generalized interventional approach for causal mediation analysis with causally ordered multiple mediators.

10. Institute of Statistical Science, Academia Sinica, Taipei, Taiwan. September 2019
    --- General approach of causal mediation analysis for survival outcome under sequential mediators.

(B) Contributed Oral Presentation and Poster

1. *Joint Statistical Meetings (JSM) 2024 (US)*. August 2024.
   --- Robust and Flexible High-Dimensional Causal Mediation Model for DNA Methylation Studies.

2. *Joint Statistical Meetings (JSM) 2023 (Canada)*. August 2023.
   --- Robust Semiparametric Estimation of Average Causal Effects in Mendelian Randomization under an Intermediate Variable Intervention.

3. *The 31th South Taiwan Statistics Conference (Taichung City, Taiwan)*. July 2022
   --- Multiply robust estimation of natural indirect effects with multiple ordered mediators

4. *The American Society of Human Genetics (ASHG) 2019 Annual Meeting (Houston, US)*. October 2019
   --- The investigation of cell separation-induced gene expression via a penalized deconvolution approach

5. *The 28th South Taiwan Statistics Conference (Taichung City, Taiwan)*. June 2019
   --- Causal mediation analysis with the mediator truncated by death in the survival study.

6. *Joint Statistical Meetings (JSM) 2018 (Vancouver, Canada)*. July 2018
   --- A Hierarchical Bayesian Deconvolution Model for Inferring Immune Cell Components in Tumor.

7. *The American Society of Human Genetics (ASHG) 2016 Annual Meeting (Vancouver, Canada).* October 2016
   --- Inferring evolution structure based on copy number aberration from head and neck cancer via penalized two-way mixture Poisson model.

8. *The 25th South Taiwan Statistics Conference (Kaohsiung City, Taiwan).* June 2016
   --- Copy number identification in clonal cell populations using spatially correlated two-way Poisson mixture models.

9. *The American Society of Human Genetics (ASHG) 2015 Annual Meeting (Baltimore, US).* October 2015
   --- Reconstructing clonal evolutionary process among copy number variants in tumor.