

# June En-Yu Lai Ph.D.

## Contact Information

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## Education

Ph.D. Bioinformatics, National Yang Ming University & Academia Sinica, TIGP\*, 2017.  
B.S. Biotechnology and Laboratory Science in Medicine, National Yang Ming University, 2008.

## Research

### AREAS OF INTEREST

*Bioinformatics* — Quantitative Proteomics and Genomics, NGS Sequence Analysis especially in Structural Variation, Development of Bioinformatic Algorithms, Networks and Pathways Analysis, Annotation and Enrichment Analysis.  
*Biostatistics* — Causal Inference and Mediation Analysis, Statistical Genetics, Clinical Meta Analysis.  
*Analytic Philosophy* — Metaphysical Causation and Causal Models, Epistemology.

### DOCTORAL DISSERTATION

*Functional Analysis for Quantitative Proteomic Data.*  
Advisor: Kun-Pin Wu.  
Committee: Hsuan-Cheng Huang, Yi-Hau Chen, Wailap Victor Ng, Hsin-Chou Yang, and Kun-Pin Wu.

### PUBLICATIONS IN REFEREED JOURNALS

*Causal mediation analysis for integrating exposure, genomic and phenotype data.*  
Haoyu Yang, Zhonghua Liu, Ruoyu Wang, **En-Yu Lai**, Joel Schwartz, Andrea A. Baccarelli, Yen-Tsung Huang, and Xihong Lin  
— Annual Review of Statistics and Its Application (2024), accepted.

*Identifying pleiotropic genes via the composite test amidst the complexity of polygenic traits.*  
**En-Yu Lai** and Yen-Tsung Huang.  
— Briefings in Bioinformatics (2024), accepted.

*Causal inference in the multiverse of hazard.*  
**En-Yu Lai** and Yen-Tsung Huang.  
— Communications in Computer and Information Science, 6<sup>th</sup> Pacific Causal Inference Conference proceeding (2024), accepted.

*Genome-wide multimediator analyses using the generalized Berk–Jones statistics with the composite test.*  
**En-Yu Lai** and Yen-Tsung Huang.  
— Bioinformatics (2023), Volume 39, Issue 9, btad544.

*Hypertension as a novel link for shared heritability in age at menarche and cardiometabolic traits.*  
Hsien-Yu Fan, Kuo-Liong Chien, Yen-Tsung Huang, Justin BoKai Hsu, Yun-Yu Chen, **En-Yu Lai**, Jia-Ying Su, Tzu-Pin Lu, Hung-Yuan Li, Shih-Yuan Hsu, Yang-Ching Chen.  
— The Journal of Clinical Endocrinology & Metabolism (2023) Volume 108, Issue 9, Pages 2389-2399.

*NK cell receptor and ligand composition influences the clearance of SARS-CoV-2*  
Wan-Chen Hsieh, **En-Yu Lai**, Yu-Ting Liu, Yi-Fu Wang, Yi-Shiuan Tzeng, Lu Cui, Yun-Ju Lai, Hsiang-Chi Huang, Jia-Hsin Huang, Hung-Chih Ni,

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\*Taiwan International Graduate Program by Academia Sinica.

Dong-Yan Tsai, Jian-Jong Liang, Chun-Che Liao, Ya-Ting Lu, Laurence Jiang, Ming-Tsan Liu, Yao-Ming Chang, Gerlinde Wernig, Chia-Wei Li, Kuo-I Lin, Yi-Ling Lin, Huai-Kuang Tsai, Yen-Tsung Huang, and Shih-Yu Chen  
 – Journal of Clinical Investigation (2021) Volume 131, Issue 21, e146408.

*Estimating the causal effect of embryo transfer day on clinical in vitro fertilization outcomes using propensity score matching*  
 Han-Chih Hsieh, Chun-I Lee, **En-Yu Lai**, Jia-Ying Su, Yi-Ting Huang, Wei-Lin Zheng, Chien-Hong Chen, Chun-Chia Huang, Pin-Yao Lin, Maw-Sheng Lee, Mark Liu and Yen-Tsung Huang  
 – BMC Pregnancy and Childbirth (2021) Volume 21, Issue 1, Article number: 554, <https://doi.org/10.1186/s12884-021-04013-y>

*A mediator analysis for a binary non-rare outcome with sequentially ordered multiple mediators*  
**En-Yu Lai**<sup>†</sup>, Stephannie Shih<sup>†</sup>, Yen-Tsung Huang, and Shunping Wang.  
 – Statistics in Medicine (2020) Volume 39, Issue 10, Pages 1415-1428.

*Drug class, renal elimination, and outcomes of direct oral anticoagulants in Asian patients: A meta-analysis.*  
 Kang-Ling Wang, Chun-Chih Chiu, Robert Giugliano, Doreen Tan, Chun-Yi Lin, **En-Yu Lai**, Shinya Goto, and Chern-En Chiang.  
 – Journal of Stroke and Cerebrovascular Diseases (2018) Volume 27, Issue 4, Pages 857-864.

*A knowledge-based  $T^2$ -statistic to perform pathway analysis for quantitative proteomic data.*  
**En-Yu Lai**, Yi-Hau Chen, and Kun-Pin Wu.  
 – PLoS Computational Biology (2017) Volume 13, Issue 6, e1005601.

*Once- or twice-daily mon-vitamin K antagonist oral anticoagulants in Asian patients with atrial fibrillation: A meta-analysis of randomized controlled trials.*  
 Kang-Ling Wang, Chun-Chih Chiu, Doreen Su-Yin Tan, Chun-Yi Lin, **En-Yu Lai**, Shinya Goto, Robert P. Giugliano, and Chern-En Chiang.  
 – Journal of the Formosan Medical Association (2017) Volume 116, Issue 8, Pages 591-598.

*Extracranial arterial and venous thromboembolism in patients with atrial fibrillation: A meta-analysis of randomized controlled trials.*  
 Kang-Ling Wang, Harry R. Büller, Shinya Goto, Chun-Yi Lin, **En-Yu Lai**, Chun-Chih Chiu, Chern-En Chiang, and Robert P. Giugliano.  
 – Heart Rhythm (2017) Volume 14, Issue 4, Pages 599-605.

*Standard versus low dose non-Vitamin K antagonist oral anticoagulants in asian patients with atrial fibrillation: A meta-analysis of contemporary randomized controlled trials.*  
 Kang-Ling Wang, Robert P. Giugliano, Shinya Goto, Chun-Chih Chiu, Chun-Yi Lin, **En-Yu Lai**, and Chern-En Chiang.  
 – Heart Rhythm (2016) Volume 13, Issue 12, Pages 2340-2347.

*A linear-time algorithm for reconstructing zero-recombinant haplotype configuration on a pedigree.*  
**En-Yu Lai**, Wei-Bung Wang, Tao Jiang, and Kun-Pin Wu.  
 – BMC Bioinformatics (2012) Volume 13, Supplement 17, S19.

## BOOK CHAPTERS

因果之間 《中國統計學報》因果專刊  
 賴恩語, 黃彥棕

因果模型與因果推理 《邏輯哲學的重要論題》第六篇  
 賴恩語, 王文方

## INVITED TALKS / CONFERENCE TALKS

*Reframing crossworld independence for identifying path-specific effects.*  
 – South Taiwan Statistics Conference (STSC) 2024 in Kaohsiung, oral presentation

*Identifying pleiotropic genetic factors associated with multiple cancers in the TPMI cohort.*  
 – South Taiwan Statistics Conference (STSC) 2023 in Hualien, oral presentation

*Causal inference in the multiverse of hazard.*  
 – The 6<sup>th</sup> Pacific Causal Inference Conference proceeding (PCIC) 2024 in Shanghai, oral presentation  
 – The 14<sup>th</sup> HOPE meeting (HOPE) 2023 in Tsukuba, oral presentation

*Identifying pleiotropic genes via the composite test amidst the complexity of polygenic traits.*  
 – ISI-ISM-ISSAS Joint Conference 2024 in Kolkata, oral presentation  
 – GIW 2023 and ISCB-Asia VI Joint Conference in Singapore, poster presentation

<sup>†</sup>Equally contributed.

- ISI-ISM-ISSAS Joint Conference 2023 in Taipei, oral presentation
- South Taiwan Statistics Conference (STSC) 2022 in Taichung, oral presentation

*Genome-wide multimediator analyses using the generalized Berk–Jones statistics with the composite test.*

- South Taiwan Statistics Conference (STSC) 2021 in Kaohsiung, oral presentation
- ISMB/ECCB 2021 virtual conference, poster presentation
- South Taiwan Statistics Conference (STSC) 2020 in Chiayi, oral presentation

*A mediator analysis for a binary non-rare outcome with sequentially ordered multiple mediators.*

- Chinese Statistical Association Taiwan (CSAT) Annual Meeting 2019 in Hsinchu, oral presentation

*Mediation analyses of ultraviolet, air pollution, and structural variations using the Taiwan Biobank.*

- ICSA International Conference 2019 in Hangzhou, oral presentation
- South Taiwan Statistics Conference (STSC) 2019 in Taichung, oral presentation
- ISI-ISM-ISSAS Joint Conference 2019 in Taipei, oral presentation
- Program in Quantitative Genomics (PQG) 2018 in Boston, poster presentation

*A genetic algorithm to locate responsive subpathways for time-course proteomic data.*

- HUPO 2016 in Taipei, oral presentation

*A knowledge-based  $T^2$ -statistic to perform pathway analysis for quantitative proteomic data.*

- ISMB/ECCB 2017 in Prague, poster presentation
- Taiwan Proteomics Society (TPS) Annual Meeting 2014 in Taipei, poster presentation
- RECOMB 2013 in Beijing, poster presentation

*A linear-time algorithm for reconstructing zero-recombinant haplotype configuration on a pedigree.*

- InCoB 2012 in Bangkok, oral presentation
- ISMB 2010 in Boston, poster presentation

## SCIENTIFIC SOFTWARE

**PGCtest:** Identifying pleiotropic genes under a composite null. [Briefings in Bioinformatics, 2024]

<https://github.com/roqe/PGCtest> [R-package]

**MACTest:** Multi-mediator analyses under a composite null. [Bioinformatics, 2023]

<https://github.com/roqe/MACTest> [R-package]

**SOMM:** Mediation analysis with sequentially ordered multiple mediators. [Statistics in Medicine, 2020]

<https://github.com/roqe/SOMM> [R-package]

**T2GA:** Pathway analysis under a self-contained null. [PLoS Computational Biology, 2017]

<https://github.com/roqe/T2GA> [R-package]

**KCHI:** A linear-time algorithm for haplotype inference. [BMC Bioinformatics, 2012]

<https://github.com/roqe/KCHI> [C-source]

## Experiences

### POSTDOCTORAL FELLOW

*Algorithm development under multi-mediator models, bioinformatic analysis of Taiwan Biobank/TPMI data.*

- In Dr. Huang’s lab at Institute of Statistical Science, Academia Sinica, 2017 – present.

### CONSULTANT

*Cooperation Center of Statistics and Data Science at Academia Sinica, Nov 2019 – present.*

*General Clinical Research Center at Taipei Veterans General Hospital, Jan 2016 – Sept 2017.*

### LECTURER

TIGP-MBAS/MCB/MM 2019-2023: Biostatistics

Summer 2018: Introduction to statistical learning with applications in R

## TEACHING ASSISTANT

Autumn 2015: Introduction to statistical learning and data mining

Spring 2014: Bioinformatic algorithms; Machine learning and statistical inference

Autumn 2012: An overview of computer science

Autumn 2010: Basic molecular biology; Algorithms and data structures

## RESEARCH ASSISTANT

*Algorithm development of gene ontology, network module and pathway analysis for quantitative proteomic data.*

– In Dr. Wu’s lab at Institute of BioMedical Informatics, National Yang Ming University, 2015 – 2017.

– In Dr. Chen’s lab at Institute of Chemistry, Academia Sinica, 2012 – 2015.

*Algorithmic studies of protein identification with glycosylation.*

– In Dr. Wu’s lab at Institute of BioMedical Informatics, National Yang Ming University, 2008 – 2009.

## VISITING RESEARCHER

*A linear-time algorithm for reconstructing zero-recombinant haplotype configuration on a pedigree.*

– In Dr. Jiang’s lab at Bioinformatics Division, TNLIST<sup>†</sup>, Beijing, Summer 2009.

## INTERNSHIP

Medical Technologist at *Taipei Veterans General Hospital*, July 2007 – January 2008.

## MISCELLANEOUS

Translator at *Research Ethics Education*, Jun 2014 – Mar 2015.

Database developer at *MSI Taiwan*, Jan 2013 – Mar 2014.

## Honors &amp; Awards

## FELLOWSHIPS

Academia Sinica Postdoctoral Fellowship, July 2020 – June 2022 (proposal acceptance rate: ~30%).

Academia Sinica Postdoctoral Fellowship, December 2018 – June 2020 (proposal acceptance rate: ~30%).

NSC and ISCB Travel Grant for attending *RECOMB 2013*.

NSC and APBioNET Travel Grant for attending *InCoB 2012*.

NSC Travel Grant for attending *ISMB 2010*.

TIGP Doctoral Fellowship, September 2009 – August 2012.

NYMU Student Exchange Fellowship for internship at *TNLIST* during 2009 summer.

## OTHERS

HOPE 2023, 14<sup>th</sup> HOPE Fellow, as the representative of Academia Sinica, Taiwan.

GYSS 2021, Attendee, as the representative of Academia Sinica, Taiwan.

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<sup>†</sup>Tsinghua National Laboratory for Information Science and Technology

## References

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