YONGHAN JUNG

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RESEARCH AREAS

Causal data science methods to understand causal effects in complex and imperfect data, with broad applications in trustworthy AI and healthcare science. Specifically,

- **Inference under real-world complexities**: Inferring causal effects despite unmeasured confounding, limited overlap, or complex data.
- **Robust and scalable estimation**: Developing variance-stable, efficient methods for high-dimensional and large-scale datasets.
- **Trustworthy inference**: Ensuring transparent, fair, and interpretable inference in high-stakes applications.
- **Causal decision-making**: Designing algorithms that leverage causal reasoning for robust, generalizable decisions.
- **Causal AI for multimodal data**: Integrating causal reasoning with AI across images, text, temporal, and other modalities.

ACADEMIC POSITIONS

University of Illinois Urbana-Champaign (UIUC) *Aug. 2025 -*
Assistant Professor, School of Information Science

Purdue University
Graduate Student, Department of Computer Science *Aug. 2018 - June 2025*

Amazon Causality Team *Jun. 2021 - Sep. 2021*
Applied Scientist Intern

EDUCATION

Purdue University *2018 - June 2025*
Ph.D. in Computer Science
Advisor: Elias Bareinboim
Thesis: *Causal Data Science: Estimating Identifiable Causal Effects*

KAIST *2016*
M.S., Department of Industrial and Systems Engineering
Advisor: Heeyoung Kim
Thesis: *Detection of premature ventricular contraction using wavelet-based statistical ECG monitoring*

KAIST (Korea Advanced Institute of Science and Technology) *2014*
B.S., Mathematical Sciences
B.A., Business and Technology Management

PUBLICATIONS

16. Kevin Zhang, Yonghan Jung, Divyat Mahajan, Karthikeyan Shanmugam, Shalmali Joshi (2025)
Path-specific effects for pulse-oximetry guided decisions in critical care
[NeurIPS-25] *Proceedings of the 39th Annual Conference on Neural Information Processing Systems (NeurIPS), 2025.*

15. Taero Kim, Subeen Park, Sungjun Lim, Yonghan Jung, Krikamol Muandet, Kyungwoo Song (2025)
Sufficient Invariant Learning for Distribution Shift
[CVPR-25] *The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2025 (CVPR-25)*

14. Yonghan Jung, Min Woo Park, Sanghack Lee (2024)
Complete Graphical Criterion for Sequential Covariate Adjustment in Causal Inference
[NeurIPS-24] *Proceedings of the 38th Annual Conference on Neural Information Processing Systems (NeurIPS), 2024.*

13. Yonghan Jung, Alexis Bellot (2024)
Efficient Policy Evaluation Across Multiple Different Experimental Datasets
[NeurIPS-24] *Proceedings of the 38th Annual Conference on Neural Information Processing Systems (NeurIPS), 2024.*

12. Yonghan Jung, Jin Tian, Elias Bareinboim (2024)
Unified Covariate Adjustment for Causal Inference
[NeurIPS-24] *Proceedings of the 38th Annual Conference on Neural Information Processing Systems (NeurIPS), 2024.*

11. Yonghan Jung, Iván Díaz, Jin Tian, Elias Bareinboim (2023)
Estimating Causal Effects Identifiable from a Combination of Observations and Experiments
[NeurIPS-23] *Proceedings of the 37th Annual Conference on Neural Information Processing Systems (NeurIPS), 2023.*

10. Yonghan Jung, Jin Tian, Elias Bareinboim (2023)
Estimating Joint Treatment Effects by Combining Multiple Experiments
[ICML-23] *Proceedings of the 40th International Conference on Machine Learning (ICML), 2023.*

9. Yonghan Jung, Shiva Kasiviswanathan, Jin Tian, Dominik Janzing, Patrick Bloebaum, Elias Bareinboim (2022)
On Measuring Causal Contributions via do-interventions
[ICML-22] *Proceedings of the 39th International Conference on Machine Learning (ICML), 2022.*

8. Yonghan Jung, Jin Tian, Elias Bareinboim (2021)
Double Machine Learning Density Estimation for Local Treatment Effects with Instruments
[NeurIPS-21] *Proceedings of the 35th Annual Conference on Neural Information Processing Systems (NeurIPS), 2021.*
Spotlight Presentation (Less than 3% of submissions)

7. Yonghan Jung, Jin Tian, Elias Bareinboim (2021)
Estimating Identifiable Causal Effects on Markov Equivalence Class through Double Machine Learning
[ICML-21] *Proceedings of the 38th International Conference on Machine Learning (ICML), 2021.*

6. Yonghan Jung, Jin Tian, Elias Bareinboim (2021)
Estimating Identifiable Causal Effects through Double Machine Learning
[AAAI-21] *Proceedings of the 35th AAAI Conference on Artificial Intelligence, 2021.*

5. Yonghan Jung, Jin Tian, Elias Bareinboim (2020)
Learning Causal Effects via Weighted Empirical Risk Minimization

[NeurIPS-20] *Proceedings of the 34th Annual Conference on Neural Information Processing Systems (NeurIPS), 2020.*

4. Yonghan Jung, Jin Tian, Elias Bareinboim (2020)
   Estimating Causal Effects Using Weighting-Based Estimators
   [AAAI-20] *Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI), 2020.*

3. Mohammad Adibuzzaman, Yonghan Jung, Yuehwern Yih, Elias Bareinboim (2018)
   Regenerating Evidence from Landmark Trials in ARDS Using Structural Causal Models on Electronic Health Record
   American Thoracic Society (ATS) Conference, 2018

2. Yao Chen, Xiao Wang, Yonghan Jung, Vida Abedi, Ramin Zand, Marvi Bikak, Mohammad Adibuzzaman (2018)
   Classification of short single-lead electrocardiograms (ECGs) for atrial fibrillation detection using piecewise linear spline and XGBoost
   Physiological measurement 39.10, 2018

1. Yonghan Jung and Heeyoung Kim (2017)
   Detection of PVC by using a wavelet-based statistical ECG monitoring procedure
   Biomedical Signal Processing and Control 36: 176-182

TALKS, SEMINARS, TUTORIALS

15. Seminar on "Causal Data Science: Estimating Identifiable Causal Effects", KAIST. *Apr. 2025*
14. Seminar on "On Measuring Causal Contributions via do-interventions", AI Seminar, Samsung Electronics. *May 2024*
13. Seminar on "Estimating Joint Treatment Effects from Marginal Experiments", Quantitative Methods Research Seminars, Purdue Business Department. *Nov. 2023*
12. Tutorial on "Estimating Identifiable Causal Effects and its Application toward Interpretable ML/AI", Korea Summer Session on Causal Inference. *Jul. 2022*
11. Lecture Series on (1) Tutorial on Structural Causal Model, (2) Estimating Any Identifiable Causal Effects, (3) Application of Causality for Human-Centered AI/ML, University of Seoul, Korea. *Jul. 2022*
10. Tutorial on "Estimating Identifiable Causal Effects and its Application toward Interpretable ML/AI", Graduate School of Data Science, Seoul National University, Korea. *Jul. 2022*
9. Tutorial on Double/Debiased Machine Learning, Naver Clova AI, Korea. *Jul. 2022*
8. Tutorial on "Shortcut learning in Machine Learning: Challenges, Analysis, Solutions", FAccT-22, Seoul, Korea. *Jun. 2022*
7. Tutorial on "Tutorial on Double/Debiased Machine Learning", AWS Causality Lab, Amazon. *Mar. 2022*
6. Lecture on "Double/Debiased Machine Learning for causal effect estimation", Causal Inference II (COMS W4775/Spring 2022) in Columbia University, USA. *Mar. 2021*
5. Seminar on "Causal Inference under the rubric of Structural Causal Model", Korea Summer Session on Causal Inference. *Aug. 2021*
4. Lecture on "Causal effect estimation for arbitrary causal functionals", Causal Inference II (COMS W4775/Spring 2021) in Columbia University, USA, *Mar. 2021*
3. "Tutorial: Causal Inference", Industrial Statistics Lab, KAIST, Korea. *Jul. 2018*

2. "Regenerating Evidence from Landmark Trials in ARDS Using Structural Causal Models on Electronic Health Record", American Thoracic Society International Conference, USA. *May 2018*

1. "Structural Causal Model (SCM) to Identify Causation from Observational Data", Regenstrief Center for Healthcare Engineering, Purdue University, USA. *Jun. 2017*

ACADEMIC SERVICE

- **Reviewers**:
  - *Journals*: Statistical Science, Journal of Royal Statistical Series B, Statistics in Medicine, Journal of Causal Inference, Statistical Science, Biostatistics, Epidemiology, Transactions on Machine Learning Research, Journal of Machine Learning
  - *Conferences*: AAAI, UAI, IJCAI, ICML, NeurIPS, ICLR, CLeaR, AISTAT.

TEACHING

- **Graduate Teaching Assistant**: CS182 - Foundations Of Computer Science *Spring 2025*
- **Graduate Teaching Assistant**: CS243-AI Basics *Fall 2024*
- **Graduate Teaching Assistant**: CS253-Data Structure *Spring 2024*
  - I was honored with the Graduate Teaching Award for the 2023-2024 academic year.
- **Graduate Teaching Assistant**: CS448-Introduction to Database System *Fall 2023*
- **Graduate Teaching Assistant**: CS490-DSC Data Science Capstone *Spring 2023*
- **Graduate Teaching Assistant**: CS408 Software Testing *Fall 2022*
- **Graduate Teaching Assistant**: CS490-DSC Data Science Capstone *Spring 2022*
- **Graduate Teaching Assistant**: CS573 Data Mining *Fall 2021*
- **Graduate Teaching Assistant**: CS471 Introduction to Artificial Intelligence *Spring 2021*
- **Graduate Teaching Assistant**: CS573 Data Mining *Fall 2020*
- **Graduate Teaching Assistant**: IE383 Integrated Production Systems *Spring 2017*
- **Graduate Teaching Assistant**: IE383 Integrated Production Systems *Fall 2016*