Sanghack Lee, Ph.D.

Contact Information

Graduate School of Data Science
Seoul National University
Seoul, Republic of Korea

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Research Interests

Causal inference and causal discovery in a propositional or relational setting. Sequential decision making problems from the aspect of causality. Practical causal modeling for common sense. Incorporating ideas from economics, game theory, and human behavior (e.g., irrationality) into a causal framework.

Employment

Seoul National University, Seoul
Assistant Professor, Data Science — **Mar. 2021–present**

Columbia University, New York
Associate Research Scientist, Computer Science — **Jul. 2019–Feb. 2021**

Investigating ranges of causality problems from classical causal inference to its application to sequential decision making.

Purdue University, West Lafayette
Postdoctoral Research Associate, Computer Science — **Apr. 2018–Jun. 2019**
Advisor: Prof. Elias Bareinboim

Education

Pennsylvania State University, University Park
Ph.D., College of Information Sciences and Technology — **2018**
Advisor: Prof. Vasant G. Honavar

Sogang University, Seoul, Republic of Korea
MS., Computer Science and Engineering — **2006**
BE., Computer Science and Engineering, *Cum Laude* — **2004**

Publications

Sanghack Lee and Elias Bareinboim (2020). Characterizing Optimal Mixed Policies: Where to Intervene and What to Observe. In *Advances in Neural Information Processing Systems 33 (NeurIPS 2020)*

Sanghack Lee and Elias Bareinboim (2020). Causal Effect Identifiability under Partial Observability. In *Proceedings of the 37th International Conference on Machine Learning (ICML 2020)*

Sanghack Lee, Juan D. Correa, and Elias Bareinboim (2020). General Transportability — Synthesizing Observations and Experiments from Heterogeneous Domains. In *Proceedings of Thirty-fourth Conference on AAAI Conference on Artificial Intelligence (AAAI 2020)*

Sanghack Lee, Juan D. Correa, and Elias Bareinboim (2020). Identifiability from a Combination of Observations and Experiments. In *Proceedings of Thirty-fourth Conference on AAAI Conference on Artificial Intelligence (AAAI 2020)*

Sanghack Lee, Juan D. Correa, and Elias Bareinboim (2019). General Identifiability with Arbitrary Surrogate Experiments. In *Proceedings of Thirty-fifth Conference on Uncertainty in Artificial Intelligence (UAI 2019)* Best Paper Award

Sanghack Lee and Vasant Honavar (2019). Towards Robust Relational Causal Discovery . In *Proceedings of Thirty-fifth Conference on Uncertainty in Artificial Intelligence (UAI 2019)*

Aria Khademi, **Sanghack Lee**, David Foley, Vasant Honavar (2019). Fairness in Algorithmic Decision Making: An Excursion Through the Lens of Causality. In *Proceedings of 2019 International Conference on World-Wide Web (WWW 2019)*

Sanghack Lee and Elias Bareinboim (2019). Structural Causal Bandits with Non-manipulable Variables. In *Proceedings of Thirty-third AAAI Conference on Artificial Intelligence (AAAI 2019)*

Sanghack Lee and Elias Bareinboim (2018). Structural Causal Bandits: Where to Intervene?. *In Advances in Neural Information Processing Systems 31 (NeurIPS 2018)*

Sanghack Lee and Vasant Honavar (2017). Self-Discrepancy Conditional Independence Test. In *Proceedings of Thirty-third Conference on Uncertainty in Artificial Intelligence (UAI 2017)*

Sanghack Lee and Vasant Honavar (2017). A Kernel Conditional Independence Test for Relational Data. In *Proceedings of Thirty-third Conference on Uncertainty in Artificial Intelligence (UAI 2017)*

Sanghack Lee and Vasant Honavar (2016). A Characterization of Markov Equivalence Classes of Relational Causal Models under Path Semantics. In *Proceedings of Thirty-second Conference on Uncertainty in Artificial Intelligence (UAI 2016)*

Kyungsik Han, **Sanghack Lee**, Jin Yea Jang, Yong Jung, and Dongwon Lee (2016). "Teens are from Mars, Adults are from Venus": Analyzing and Predicting Age Groups with Behavioral Characteristics in Instagram. In *Proceedings of Eighth International ACM Web Science Conference 2016 (WebSci 2016)*

Sanghack Lee and Vasant Honavar (2016). On Learning Causal Models for Relational Data. In *Proceedings of Thirtieth Conference on Artificial Intelligence (AAAI 2016)*

Sanghack Lee and Vasant Honavar (2015). Lifted Representation of Relational Causal Models Revisited: Implications for Reasoning and Structure Learning. In *Proceedings of the UAI 2015 Workshop on Advances in Causal Inference co-located with the 31st Conference on Uncertainty in Artificial Intelligence (UAI 2015)*

{Elias Bareinboim, **Sanghack Lee**}, Vasant Honavar, and Judea Pearl (2013). Transportability from Multiple Environments with Limited Experiments. In *Advances in Neural Information Processing 26 (NeurIPS 2013)*

Sanghack Lee and Vasant Honavar (2013). m-Transportability: Transportability of a Causal Effect from Multiple Environments. In *Proceedings of the Twenty-seventh Conference on Artificial Intelligence (AAAI 2013)*

Sanghack Lee and Vasant Honavar (2013). Causal Transportability of Experiments on Controllable Subsets of Variables: z-Transportability. In *Proceedings of the Twenty-ninth Conference on Uncertainty in Artificial Intelligence (UAI 2013)*

{Harris Lin, **Sanghack Lee**, Ngot Bui} and Vasant Honavar (2013). Learning Classifiers from Distributional Data. In *IEEE Second International Congress on Big Data*

Sanghack Lee, Jihoon Yang and Sungyong Park (2006). A New Polynomial Time Algorithm for Bayesian Network Structure Learning. In *Advanced Data Mining and Applications (ADMA 2006)*

Sanghack Lee, Jihoon Yang and Sung-Yong Park (2004). Discovery of Hidden Similarity on Collaborative Filtering to Overcome Sparsity Problem. In *Discovery Science 2004 (DS 2004)*

Talks, Tutorials, Posters

- Applied BigData Engineering Seminar at Sogang University (Jun, 2021), invited talk
- NeurIPS'2020 (Virtual), poster
- Summer AI Seminar Series at POSTECH (Aug, 2020) (Pohang, South Korea), invited talk
- ICML'2020 (Virtual), poster
- AAAI'2020 (New York, NY), talk
- AAAI'2020 (New York, NY), invited talk
- UAI'2019 (Tel Aviv, Israel), talk (*)
- IJCAI'2019 (Macau), "Causal Reinforcement Learning", tutorial (*)
- ISysE Seminar at KAIST (Apr, 2019) (Daejeon, South Korea), invited talk

- AAAI'2019 (Hawaii), talk
- NeurIPS'2018 (Montreal, Canada), poster
- Causality workshop at UAI'2017 (Sydney, Australia), talk
- UAI'2017 (Sydney, Australia), two posters
- UAI'2016 (Jersey City, NJ), talk
- AAAI'2016 (Phoenix, AZ), talk
- Causality workshop at UAI'2015 (Amsterdam, Netherlands), poster
- AAAI'2013 (Bellevue, WA), talk
- UAI'2013 (Bellevue, WA), poster

* someone else substituted for me.

Professional Service

Program Committee / Reviewers (* external, ** ongoing)

- 2022 ICLR**
- 2021 ICLR, AAAI, AISTATS, ICML, UAI, NeurIPS, Journal of Artificial Intelligence Research** (JAIR)
- 2020 NeurIPS, UAI, ICML (Top Reviewer Award), AAAI, AISTATS, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), Journal of Artificial Intelligence (AIJ), Journal of Causal Inference (JCI)**, NeurIPS Workshop on Causal Discovery and Causality-Inspired Machine Learning (CDML, Area Chair), ACM-IMS Foundations of Data Science Conference (FODS)*, Statistical Science*
- 2019 NeurIPS (Best Reviewer Award), Journal of Machine Learning Research (JMLR), WHY conference (AAAI Spring Symposium), ICML*, IJCAI*
- 2018 NeurIPS*
- 2017 Causality Workshop at UAI
- 2016 ACM CHI Conference on Human Factors in Computing Systems
- 2014 ACM Transactions on Intelligent Systems and Technology (TIST)

Industrial Experience

Senior Engineer at **Diquest, inc.**, Seoul, South Korea — **Feb. 2006 to Jun. 2009**
Development and maintenance of an enterprise search engine

Research Experience

Associate Research Scientist, Columbia University — **Jul. 2019–present**

Post-doctoral Research Associate, Purdue University — **2018–Jun. 2019**

Research Assistant, Pennsylvania State University — **2013–2014, 2015–2018**

Research Assistant, Iowa State University — **2011–2013**

Research Assistant, Sogang University — **2005**

Teaching Experience

Guest Lecture, Purdue University

Structural Causal Bandits (Advanced Machine Learning, Spring 2019), Counterfactual Bandits (Advanced Machine Learning, Spring 2019)

Graduate Teaching Assistant

(Pennsylvania State University): Discrete Mathematics, Principles of Artificial Intelligence.

(Iowa State University): Design and Analysis of Algorithms (2 times), Principles of Artificial Intelligence, Machine Learning, Object-Oriented Analysis and Design.

(Sogang University): Java Language Programming, Personal Computer Laboratory I, Discrete Structures.

References

Prof. Vasant Honavar
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Information Sciences and Technology,
Pennsylvania State University, USA
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Prof. Elias Bareinboim
Associate Professor
Computer Science,
Columbia University, USA
eb@cs.columbia.edu

Prof. Jihoon Yang
Professor
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Sogang University, South Korea
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Prof. Jin Tian
Associate Professor
Computer Science,
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