

# BURAK VARICI

## Current Position

- 07.2024 – **Carnegie Mellon University, Machine Learning Department**, Pittsburgh, PA.  
present
  - Postdoctoral Research Associate
  - Supervisor: Prof. Pradeep Ravikumar

## Education

- 08.2020– **Rensselaer Polytechnic Institute**, Troy, NY.  
05.2024
  - Ph.D. in Electrical Computer, and Systems Engineering
  - Advisor: Prof. Ali Tajer
  - Dissertation: Causal Learning via Interventions: Estimation and Design

08.2018– **Rensselaer Polytechnic Institute**, Troy, NY.  
05.2020
  - M.S., in Electrical Computer, and Systems Engineering
  - Advisor: Prof. Ali Tajer

09.2013– **Bogazici University**, Istanbul, Turkey.  
06.2018
  - B.S., in Electrical and Electronics Engineering
  - Advisor: Prof. Murat Saraclar

## Work Experience

- 09–12.2022 **MIT-IBM Watson AI Lab**, Cambridge, MA.
  - Visiting Research Scholar
  - Collaborators: Dr. Dmitriy A Katz, Dr. Prasanna Sattigeri, Dr. Dennis Wei
  - Worked on causal discovery of a mixture of DAGs, published our results for observational data [TMLR-2024] and interventional data [NeurIPS-2024].

05–08.2020 **IBM Research**, remote.
  - Research Intern
  - Mentors: Dr. Prasanna Sattigeri, Dr. Karthikeyan Shanmugam
  - Project: Disentangled generative modeling with an induced causal latent space.

06–08.2017 **Speech Enabled Smart Technologies**, Istanbul, Turkey.
  - Research Intern
  - Project: Built neural networks for a speaker identity verification system.

## Selected Publications

- JMLR'25 **Score-based Causal Representation Learning: Linear and General Transformations**,  
**B. Varici**, E. Acartürk, K. Shanmugam, A. Kumar, and A. Tajer.  
*Journal of Machine Learning Research (accepted for publication), 2025*
- AISTATS'24 **General Identifiability and Achievability for Causal Representation Learning**,  
**B. Varici**, E. Acartürk, K. Shanmugam, and A. Tajer.  
*International Conference on Artificial Intelligence and Statistics, May 2024 (oral presentation)*
- JMLR'23 **Causal Bandits for Linear Structural Equation Models**,  
**B. Varici**, K. Shanmugam, P. Sattigeri, and A. Tajer.  
*Journal of Machine Learning Research, 2023*

- ICML'25 **Contextures: Representations from Contexts**,  
R. Zhai, K. Yang, **B. Varici**, CP. Tsai, and P. Ravikumar.  
*International Conference on Machine Learning, 2025*
- NeurIPS'24 **Interventional Causal Discovery in a Mixture of DAGs**,  
**B. Varici**, D. Katz-Rogozhnikov, D. Wei, P. Sattigeri, and A. Tajer.  
*Conference on Neural Information Processing Systems, 2024*

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## Additional Publications

- NeurIPS'24 **Linear Causal Representation Learning from Unknown Multi-node Interventions**,  
**B. Varici**, E. Acartürk, K. Shanmugam, and A. Tajer.  
*Conference on Neural Information Processing Sytems, 2024*
- NeurIPS'24 **Sample Complexity of Interventional Causal Representation Learning**,  
E. Acartürk, **B. Varici**, K. Shanmugam, and A. Tajer.  
*Conference on Neural Information Processing Sytems, 2024*
- preprint **Score-based Causal Representation Learning with Interventions**,  
**B. Varici**, E. Acartürk, K. Shanmugam, A. Kumar, and A. Tajer.  
*arXiv:2301.08230, 2023*
- TMLR'24 **Separability Analysis for Causal Discovery in Mixture of DAGs**,  
**B. Varici**, D. Katz-Rogozhnikov, D. Wei, P. Sattigeri, and A. Tajer.  
*Transactions on Machine Learning Research, 2024*
- UAI'22 **Intervention Target Estimation in the Presence of Latent Variables**,  
**B. Varici**, K. Shanmugam, P. Sattigeri, and A. Tajer.  
*The Conference on Uncertainty in Artificial Intelligence, 2022*
- NeurIPS'21 **Scalable Intervention Target Estimation in Linear Models**,  
**B. Varici**, K. Shanmugam, P. Sattigeri, and A. Tajer.  
*Conference on Neural Information Processing Systems, 2021*
- AISTATS'25 **On the Consistent Recovery of Joint Distributions from Conditionals**,  
M. Majid, R. Pukdee, V. Agrawal, **B. Varici**, and P. Ravikumar.  
*International Conference on Artificial Intelligence and Statistics, 2025*
- JSAT'24 **Robust Causal Bandits for Linear Models**,  
Z. Yan, A. Mukherjee, **B. Varici**, and A. Tajer.  
*IEEE Journal on Selected Areas in Information Theory, 2024*
- ISIT'24 **Improved Bound for Robust Causal Bandits with Linear Models**,  
Z. Yan, A. Mukherjee, **B. Varici**, and A. Tajer.  
*International Symposium on Information Theory, 2024*
- AISTATS'21 **Learning Shared Subgraphs in Ising Model Pairs**,  
**B. Varici**<sup>\*</sup>, S. Sihag<sup>\*</sup>, and A. Tajer.  
*International Conference on Artificial Intelligence and Statistics, 2021*

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## Honors & Awards

- 2020–2024 Rensselaer-IBM AI Fellowship
- 2024 Allen B. Dumont Prize (RPI ECSE doctoral dissertation award)
- 2023 NeurIPS Top Reviewer
- 2023 UAI Top Reviewer
- 2022 Belsky Award for RPI Computational Sciences and Engineering

- 2022 Jerry Dziuba ECSE Graduate Student Service Award
- 2013–2018 Undergraduate Science Fellowship of Government of Turkey
- 2012 Silver Medal, Turkish National Mathematical Olympiad
- 2012 Silver Medal, International Balkan Mathematical Olympiad
- 2010 Gold Medal, International Junior Balkan Mathematical Olympiad

## Organizing

- 02.2025 **Causal Representation Tutorial at AAAI.**
  - Co-organizers: Ali Tajer, Emre Acartürk, Karthikeyan Shanmugam

## Invited Talks

### Causal Representation Learning

- 03.2025 Artificial Intelligence with Causal Techniques Workshop at AAAI
- 02.2025 Booth School of Business at University of Chicago – Aragam Group
- 03.2024 Carnegie Mellon University - Statistical & Symbolic Learning Group
- 12.2023 Causal Representation Learning Workshop at NeurIPS

### Causal Bandits

- 02.2023 IBM Causal Reinforcement Learning Group

## Teaching Experience

- 2024–2025 **Guest Lecturer**, Carnegie Mellon University.
  - CMU 10716: Advanced Machine Learning - Clustering
  - CMU 10716: Advanced Machine Learning - Causality
  - CMU 10741: Representation Learning - Causal Representation Learning
- 2018–2020 **Teaching Assistant**, Rensselaer Polytechnic Institute.
  - ECSE 2410: Signals and Systems
  - ECSE 2610: Computer Components and Operations
  - ECSE 1010: Introduction to Electrical, Component and Systems Engineering

## Review Services

- Journals IEEE Transactions on Signal Processing (2022–), Transactions on Machine Learning (2024–)
- Conferences NeurIPS (2020–2025), ICML (2024), AISTATS (2023–2025), AAAI (2023), UAI (2023–2024), CLeaR (2025)