Dr. Deniz Berfin Karakoc

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RESEARCH INTERESTS

Methodology		Application
Optimization	Data analytics	Agriculture and food systems
Network science	Geographic information science	Transportation infrastructure

My research addresses the 21st century challenges against cyber-physical-social systems. I am particularly interested in ***enhancing the multi-dimensional resilience and sustainability of agri-food systems and their supporting critical infrastructure***. Please see my Google Scholar for more details.

EDUCATION

Aug 2019 – Aug 2024	**Ph.D., Civil and Environmental Engineering** Sustainable and Resilient Infrastructure Systems University of Illinois Urbana-Champaign, USA
Aug 2017 – May 2019	**M.S., Industrial and Systems Engineering** University of Oklahoma, USA
Aug 2017 – May 2019	**Grad.Cert., Industrial and Systems Engineering** University of Oklahoma, USA
Sept 2012 – July 2016	**B.S., Industrial Engineering** Bilkent University, TURKEY

PROFESSIONAL EXPERIENCE

Aug 2024 – Present	**Assistant Professor**, Arizona State University School of Computing and Augmented Intelligence
Aug 2019 – Aug 2024	**Graduate Research Assistant**, University of Illinois Urbana-Champaign
Aug 2017 – May 2019	**Graduate Research Assistant**, University of Oklahoma **Graduate Teaching Assistant**, University of Oklahoma

AWARDS and HONORS

Nature Food Cover – Volume 4 Issue 7, July 2023
Structural chokepoints determine the resilience of agri-food supply chains in the United States

Dissertation Completion Fellowship – University of Illinois Urbana-Champaign Graduate College, 2023-2024
The only awarded senior Ph.D. candidate from the Department of Civil and Environmental Engineering

CEE Rising Stars – Massachusetts Institute of Technology, 2023

ACDIS Summer Fellowship – University of Illinois Urbana-Champaign College of Liberal Arts & Sciences, 2023

Best Thesis Award - University of Oklahoma School of Industrial and Systems Engineering, 2019
The only awarded senior M.S. student from the School of Industrial and Systems Engineering

14th Industrial Engineering Senior Design Project Contest and Fair Winner - Bilkent University, 2016

The only awarded B.S. senior design project from the Department of Industrial Engineering

Undergraduate Operations Research Prize Finalist - INFORMS Annual Meeting, 2016

PUBLICATIONS

Peer-reviewed Journal Articles (published)

11. **Karakoc, D. B.,** and Konar M. 2025. Trade-off between resilience, sustainability, and cost in U.S. agri-food transportation infrastructure. *Nature Food*, 1-9. **(Impact Factor: 23.6)**

10. **Karakoc, D. B.**, and Konar M. 2024. Optimization of national grain imports to balance risk and return: A portfolio theory approach. *Environmental Research: Food Systems*, 1: 011001.

9. **Karakoc, D. B.,** Konar, M., Puma, M.J., Varshney, L.V. 2023. Structural chokepoints determine the resilience of agri-food supply chains in the United States, *Nature Food*, 4: 607–615. **(Impact Factor: 23.6) (Nature Food July 2023 Cover)**

8. Pandit, A., **Karakoc D. B.,** Konar M. 2023. Spatially detailed agricultural and food trade between China and the United States, *Environmental Research Letters,* 18: 084031. **(Impact Factor: 6.947)**

7. **Karakoc, D. B.,** Barker K. and González A. 2023. Analyzing the tradeoff between vulnerability and recoverability investments for interdependent infrastructure networks, *Socio-Economic Planning Sciences,* 87: 101508. **(Impact Factor: 4.641)**

6. Maraqa, S. N., **Karakoc D. B.,** Ghorbani-Renani N., Barker K. and González A. 2022. Project schedule compression for the efficient restoration of interdependent infrastructure systems, *Computers & Industrial Engineering,* 170: 108342. **(Impact Factor: 7.18)**

5. Wang, J. **Karakoc D. B.,** Konar M. 2022. The Carbon Footprint of Cold Chain Food Flows in the United States, *Environmental Research: Infrastructure and Sustainability,* 2: 021002.

4. **Karakoc, D. B.,** Wang J., Konar M. 2022. Food flows between counties in the United States from 2007 to 2017, *Environmental Research Letters,* 17: 034035. **(Impact Factor: 6.947)**

3. **Karakoc, D. B.,** Konar M. 2021. A Complex Network Framework for the Efficiency and Resilience Trade-off in Global Food Trade, *Environmental Research Letters,* 16: 105003. **(Impact Factor: 6.947)**

2. **Karakoc, D. B.,** Barker K., Zobel C. and Almoghathawi Y. 2020. Social-Vulnerability and Equity Perspectives on Interdependent Infrastructure Network Component Importance, *Sustainable Cities and Society,* 57: 102072. **(Impact Factor: 10.969)**

1. **Karakoc, D. B.,** Almoghathawi Y., Barker K., González A. and Mohebbi S. 2019. Community-Resilience Driven Restoration Model for Interdependent Infrastructure Networks, *International Journal of Disaster Risk Reduction,* 38: 101228. **(Impact Factor: 4.842)**

Peer-reviewed Conference Articles (published)

2. **Karakoc, D. B.,** Barker K. and Almoghathawi Y. 2019. Interdependent Infrastructure Network Restoration Optimization Problem from Community and Spatial Resilience Perspective, In INOC 2019 *Proceedings of International Network Optimization Conference, Avignon, France.*

1. Barker, K., **Karakoc D.B.** and Almoghathawi Y. 2018. Interdependent Infrastructure Network Restoration Problem from Community-Resilience Perspective, In ESREL 2018 *Proceedings of European Safety and Reliability Conference, Trondheim, Norway*.

Peer-reviewed Journal Articles (submitted and in preparation)

3. Polat S. U., Zaman M. and **Karakoc, D. B.** 2025. Low-income and food-insecure nations historically monopolize their grain imports. To be submitted to: *Nature Food*.

2. Zaman M. and **Karakoc, D. B.** 2025. Analyzing spatio-temporal food consumption trends to locate the emerging markets in the United States. Submitted to: *Environmental Science & Technology*.

1. **Karakoc, D. B.**, and Konar M. 2025. Balancing costs, emissions, and adaptability in multi-modal and multi-cereal grain transportation in the United States. Submitted to: *Environmental Science & Technology*.

ACADEMIC SERVICES

Leadership Services

- Session Chair, INFORMS Annual Meeting 2023 - 2024
- Session Convener, AGU Fall Meeting 2023 - 2024

Outreach Services

- Data production and preparation, "Food flows between U.S. counties in 2007, 2012, and 2017", foodflows.org
- K-12 instructor, "Resilient food supply chains", CEE Summer Camp 2023, wyse.engineering.illinois.edu
- Blog post preparation, "Mapping Food Flow Networks and the Food Supply Chain", farmdocdaily.illinois.edu

Peer-review Services

- **Journals:** Sustainable Cities and Society (2025), Environmental Research: Food Systems (2025), Nature Communications (2025), Physica Scripta (2024), Frontiers in Sustainable Food Systems (2024), IEEE Transaction on Network Science and Engineering (2024), Earth's Future (2023 - 2024), Journal of Industrial Ecology (2023), Nature Food (2022 - 2023), Nature Scientific Reports (2022), Food Policy (2022), Water Resources Research (2021), Economic System Research (2020), PLoS ONE (2020)
- **Proposals:** USDA Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship Grants Program (2024)

SELECTED PRESENTATIONS

Conference Talks

9. Mapping agri-food distribution onto real-world transportation infrastructure in the U.S., The Institute for Operations Research and the Management Sciences, **INFORMS Annual Meeting 2024**.

8. Optimization of national grain imports to balance risk vs. return: A portfolio theory approach, The Institute for Operations Research and the Management Sciences, **INFORMS Annual Meeting 2023**.

7. Carbon footprint of cold-chain food flows between counties in the United States, Production and Operations Management Society, **POMS Annual Conference 2023**.

6. Food flows between U.S. counties through time, The American Geophysical Union, **AGU Fall Meeting 2021**.

5. Resilience and efficiency in food trade networks, The American Geophysical Union, **AGU Fall Meeting 2020**.

4. Community-resilience driven trade-off analysis between the pre- and post-event investments for interdependent infrastructure networks, Institute of Industrial and Systems Engineers, **IISE Annual Conference & Expo 2019**.

3. A social-vulnerability driven component importance measure for interdependent infrastructure networks, The Institute for Operations Research and the Management Sciences, **INFORMS Annual Meeting 2018.**

2. Interdependent Infrastructure Network Restoration Problem from Multiple Community-Resilience Approaches, Institute of Industrial and Systems Engineers, **IISE Annual Conference & Expo 2018**.

1. Hot Sales Delivery System Logistics Optimization and Cost Analysis, The Institute for Operations Research

and the Management Sciences, **INFORMS Annual Meeting 2016**.

Invited Talks

3. Community resilience perspective on interdependent infrastructure network restoration planning and component importance analysis, Disaster Resilience Analytics Center Seminar Series, 2022, **Wichita State University**.

2. Food supply chain bottlenecks, 2022, **The MITRE Corporation**.

1. Network analysis of food supply chains, Sustainability & Resistant Infrastructure Systems Seminar Series, 2021, **University of Illinois Urbana-Champaign**.

MEDIA COVERAGE

American Council on Science and Health: "**From Farm to Fork: Our Food Supply Chain**", by Chuck Dinerstein, 01 August 2023. https://www.acsh.org/news/

New Food Magazine: "**How resilient are US food supply chains?**" by Grace Galler, 24 July 2023. https://www.newfoodmagazine.com/news/

Nature Food: "**Logistics hubs hold food supply chains together**", News & Views by Graham K. MacDonald, 20 July 2023. https://www.nature.com/articles/

Department News: "**Researchers illuminate resilience of U.S. supply chains**", by UIUC Civil and Environmental Engineering. 20 July 2023. https://cee.illinois.edu/news/