

# Orkun İrsoy

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## Education

**Carnegie Mellon University**, Pittsburgh, PA *Anticipated May 2028*  
Doctor of Philosophy in Electrical and Computer Engineering GPA: 3.97 / 4.00  
Advisor: Osman Yağan

**Boğaziçi University**, Istanbul, Turkey *June 2022*  
Master of Science in Industrial Engineering GPA: 3.86 / 4.00  
*Selected Coursework: Data Mining, Optimization Techniques, Statistical Inference*

**Boğaziçi University**, Istanbul, Turkey *June 2019*  
Bachelor of Science in Industrial Engineering GPA: 3.43 / 4.00  
*Selected Coursework: Forecasting & Time Series, Operations Research, Stochastic Modeling for OR*

## Skills

**Programming Languages:** Python, C, C++, R, GAMS  
**ML / Data Frameworks:** PyTorch, TensorFlow, scikit-learn, Transformers (Hugging Face)  
**Modeling & Simulation:** NetworkX, NumPy, Stella, Vensim, NetLogo  
**Languages:** Turkish (Native), English (Fluent), German (Intermediate)

## PhD Research

**Carnegie Mellon University – Electrical & Computer Engineering** *Pittsburgh, PA*  
*PhD Researcher – Robustness of Multiplex Flow Networks* *Aug 2023 – Present*

- Developed scalable simulation framework to model cascading failures and global redistribution in multiplex flow systems under coupled overload conditions.
- Proposed optimization strategies for enhancing network resilience; results submitted to *IEEE Transactions on Network Science and Engineering*.

## Professional Experience

**Technolera Venture Builder** *Istanbul, Turkey*  
*Junior Business Analyst* *Apr 2018 – Oct 2019*

- Conducted market and strategic research for early-stage ventures, including *Vahaa*, an agritech startup, to evaluate competitive positioning and go-to-market strategy.
- Developed data-driven methods to automate and optimize team-formation processes for *Ventourage Diversity Program* using psychometric assessments.
- Performed technology and trend analysis across health-tech, fintech, and agritech domains; co-organized the *Ventourage Diversity Program* funded by the European Fund for Southeast Europe.

## Additional Research Experience

**Knight Fellowship Project – Social Network & Sentiment Analysis** *Pittsburgh, PA*  
*Knight Fellow – Online Harm & Community Dynamics* *Aug 2024 – Present*

- Built cross-platform network and NLP pipeline (Reddit, Voat, Parler) to analyze temporal evolution and sentiment in conspiratorial communities.
- Integrated GPU-accelerated Transformers for fear/violence/conspiracy sentiment tracking.

**Chain-of-Thought Sentiment Classification – 10-701 Intro to ML (PhD)** *Pittsburgh, PA*  
*Reasoning Frameworks for NLP* *Spring 2024*

- Applied THOR-based multi-hop reasoning to Yelp Reviews using Flan-T5 models to enhance implicit sentiment classification.
- Achieved approximately 10% accuracy gain on long reviews via structured CoT prompting and model-size tuning.

- Conducted Master's thesis “*Dynamic Analysis of False Information Spread Over Social Media: 5G-COVID-19 Conspiracy Theory*” using system-dynamics modeling.
- Co-authored works on health-care policy simulation and social mobilization (*System Dynamics Review, New Media & Society*).

## Publications

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İrsoy, O., & Yağan, O. (2025). *Analysis and Optimization of Robustness in Multiplex Flow Networks Against Cascading Failures*. *IEEE Transactions on Network Science and Engineering*.

Taraktas, B., İrsoy, O., Duran, C., & Üsküdarlı, S. (2024). *A Comparative Analysis of Online Mobilization Through Slogan Specificity: The Case of Countermovements to #BlackLivesMatter*. *New Media & Society*.

İrsoy, O., Güz, Ş., Akan, N. B., & Yücel, G. (2021). *Dynamic Trade-offs in G-CSF Administration During Chemotherapy*. *System Dynamics Review*.

## Conferences / Presentations

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İrsoy, O., & Yağan, O. (2025). *Analysis and Optimization of Robustness in Multiplex Flow Networks Against Cascading Failures*. Annual INFORMS Meeting, Atlanta, GA.

İrsoy, O., & Yağan, O. (2025). *Early Warning Signals of Online Harms: Phase Transitions in Textual and Network Characteristics*. 18th International Conference on Social Computing, Behavioral-Cultural Modeling, & Prediction and Behavior Representation in Modeling and Simulation, Pittsburgh, PA.

İrsoy, O., Barlas, Y. (2022). *Dynamic Analysis of False Information Spread Over Social Media: 5G-COVID 19 Conspiracy Theory*. International System Dynamics Conference, Frankfurt.

Taraktas, B., Duran, C., İrsoy, O., Üsküdarlı, S., Karaduman, D. (2022). *What Differentiates Countermovements of Black Lives Matter?* Sunbelt Conference 2022, Cairns.

Karanfil, Ö., Güz, Ş., İrsoy, O., & Hashemian, M. (2021). *Stakeholder Effect in the Formation of Policy/Practice Guidelines: An Experimental Study for Medical Screening*. 40th National Operations Research and Industrial Engineering Congress (ORIE 2021).

Güz, Ş., İrsoy, O., Akan, N. B., & Yücel, G. (2020). *Managing Chemotherapy-Induced Neutropenia Using Exogenous G-CSF*. International System Dynamics Conference, Bergen, Norway.

## Invited Talks

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KAVE – 5th Workshop on Complex Systems and Data Science.

Biomedical Modeling Seminar Series – System Dynamics Society.

Security, Stability & Resilience SIG Monthly Meeting – System Dynamics Society.

## Teaching Assistant Experience

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**Carnegie Mellon University – Electrical & Computer Engineering**

Pittsburgh, PA

Teaching Assistant – Networks in the Real World

Fall 2024

**Boğaziçi University – Industrial Engineering Department**

Istanbul, Turkey

Teaching Assistant

2020 – 2023

Courses: Agent-Based Modeling & Simulation, Systems Science & Engineering, Graph Theory & Applications, Dynamics of Socio-Economic Systems, Operations Research I-II.

## Leadership / Awards & Honors

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### Awards & Fellowships

Marija Ilić Endowed Fellowship (CMU, 2024–2025)

Knight Fellowship (CMU IDEaS Center, 2024–2025)

Lupina Young Researchers Award – Honorable Mention (ISDC 2020)

Outstanding Success Scholarship – Prime Ministry of Turkey

### Leadership & Activities

Vice President, Boğaziçi University Drama Club (2014–2016)

Member, CMU Volleyball Club (2023–Present)