Orkun İrsoy

oirsoy@andrew.cmu.edu — linkedin.com/in/orkunirsoy — Pittsburgh, PA

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, SQL
ML / Data Frameworks: PyTorch, TensorFlow, scikit-learn, Transformers, NumPy, SciPy
Modeling & Simulation: NetworkX, Stella, Vensim, NetLogo
Languages: Turkish (Native), English (Fluent)

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 online communities using interrupted time series analysis.
- 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.

Boğaziçi University – Socio-Economic System Dynamics Lab *Istanbul, Turkey*
Graduate Research Assistant – System Dynamics & Network Modeling *Sep 2020 – Aug 2023*
- 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

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

Taraktaş, 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

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.

Taraktaş, 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

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

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: Stochastic Models in OR, Agent-Based Modeling & Simulation, Systems Science & Engineering, Graph Theory & Applications, Operations Research I-II, Dynamics of Socio-economic Systems.

Leadership / Awards & Honors

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)