Yaren Bilge Kaya, Ph.D. | Lecturer

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Research and Teaching Interests

- **Methodological:** Large-scale deterministic and stochastic optimization, queuing theory, simulation modeling, machine learning, and reinforcement learning

- **Application Areas:** Healthcare operations research, humanitarian logistics, and capacity allocation and expansion models for public service access

Education

Northeastern University — Boston, MA
PhD in Industrial Engineering — 01/2019–05/2023

- **Adviser:** Dr. Kayse Lee Maass
- **Dissertation:** Operations Research and Analytics Methods to Improve Equitable Access to Public Services
- Developed mathematical models (mixed integer linear and stochastic programs) to reduce racial and ethnic disparities in public services by alleviating current capacity limitations and reducing queue abandonment

University of South Florida — Tampa, FL
MSc in Industrial Engineering — 08/2017–12/2018

- **Adviser:** Dr. Devashish Das
- **Master's Thesis:** Statistical Monitoring of Queuing Networks
- Proposed control charts based on likelihood ratios to monitor change in service rates of queuing networks

Ozyegin University — Istanbul, TR
BSc in Industrial Engineering — 09/2013 –06/2017

- **Adviser:** Dr. Okan Orsan Ozener
- **Senior Design Project:** Inventory Management under Stochastic Demand
- Developed an inventory management plan for Henkel Beauty Care Company using (Q,r) models

Accepted/Published Peer Reviewed Publications

1. **Yaren Bilge Kaya**, Kayse Lee Maass, Geri L. Dimas, Renata Konrad, Andrew C. Trapp, and Meredith Dank (2022) "Improving Access to Housing and Supportive Services for Runaway and Homeless Youth: Reducing Vulnerability to Human Trafficking in New York City", *IISE Transactions*, https://www.tandfonline.com/doi/abs/10.1080/24725854.2022.2120223

2. **Yaren Bilge Kaya**, S. Mantell, Kayse Lee Maass, Geri L. Dimas, Renata Konrad, and Andrew C. Trapp (2022) "Discrete Event Simulation to Evaluate Shelter Capacity Expansion Options for LGBTQ+ Homeless Youth", *Proceedings of Winter Simulation Conference*, https://informs-sim.org/wsc22papers/106.pdf

3. **Yaren Bilge Kaya** (2018) "Statistical Monitoring of Queuing Networks", *University of South Florida, Graduate Theses and Dissertations*, Available at: https://scholarcommons.usf.edu/etd/7534.

Manuscripts Under Review

1. Frederick I. Miller, **Yaren Bilge Kaya**, Andrew C. Trapp, Geri L. Dimas, Renata Konrad, Kayse Lee Maass, and Meredith Dank (2022) "On the Optimization of Benefit to Cost Ratios for Public Sector Decision Making", Preprint available at: https://arxiv.org/abs/2212.04534

2. **Yaren Bilge Kaya**, and Kayse Lee Maass (2023) "Queue Routing Strategies to Improve Equitable Housing Coordination in New York City", Preprint available at: https://arxiv.org/abs/2304.12487

Working Papers

1. Geri L. Dimas, Meredith Dank, Andrea Hughes, **Yaren Bilge Kaya**, Kayse Lee Maass, Renata Konrad, Andrew C. Trapp (2023) "Understanding the Needs of Youth Human Trafficking Victims in New York City", *working paper*

2. **Yaren Bilge Kaya**, and Kayse Lee Maass (2023) "Leveraging Priority-Thresholds to Improve Equitable Housing Access for Unhoused-at-Risk Youth", Preprint available at: https://arxiv.org/abs/2212.03777

3. **Yaren Bilge Kaya**, Kayse Lee Maass, and Kalyan Pasupathy (2023) "Improving Emergency Department Access to Computed Tomography Resources", *working paper*

4. Jessie Finocchiaro, Mackenzie Jorgensen, **Yaren Bilge Kaya**, Matthew Olckers, Mayra Russo, Kristen Scott, Wendy Xu (2023) "Bridging Research and Practice Through Conversations with Practitioners", *working paper*

White Papers

1. James C. Benneyan, Micheal Rosenblatt, Basma Bargal, Shane Yap, and **Yaren Bilge Kaya** (2020) "A hospital surge capacity bed, equipment, and staff demand planning model", Preprint available at: https://www.hsye.org/covid-19-capacity-mgmt

Scholarships and Awards

- INFORMS 2023 Conference "The Committee's Choice" Session: "Exploring Equity and Fairness in Public Services Administration" — 10/2023
- Northeastern University College of Engineering Outstanding Graduate Research Award — 04/2023
- ACM EAAMO 2022 Conference The Best Paper with Student Presenter Award — 10/2022
- ACM EAAMO 2022 Conference Doctoral Consortium Travel Grant — 09/2022
- ACM EAAMO 2022 Conference Doctoral Consortium Participant — 09/2022
- IISE Annual 2022 Conference Doctoral Colloquium Nominee of Northeastern University — 05/2022
- INFORMS 2021 Conference "The Committee's Choice" Session: "OR and Vulnerable Populations" — 10/2021
- Northeastern University College of Engineering Outstanding Graduate Teaching Award — 04/2021
- Yaman Yener Memorial Graduate Scholarship — 09/2019-06/2020
- Tau Beta Pi - National Engineering Honor Society Member — 09/2018-Present

Presentations

1. Hao Lin, Leo Hu, Jack Weissman, Tejas Raj, Ziyu Zhao, and **Yaren Bilge Kaya** "The National Platform for Outage, Welfare, and Energy Resilience (N-POWER)", *Justice Week 2023: US Department of Energy* (November, 2023)

2. **Yaren Bilge Kaya**, and Kayse Lee Maass "A Simulation-Based Approach to Improve Equitable Housing Coordination in New York City", *INFORMS Annual* (October, 2023)

3. Renata A. Konrad, Geri L. Dimas, **Yaren Bilge Kaya**, Andrew C. Trapp, Kayse Lee Maass, Meredith Dank, and Andrea Hughes "Collecting Data in the Human Trafficking Domain: Youth-Informed and Data-Driven Recommendations for Runaway and Homeless Youth in NYC", *INFORMS Annual* (October, 2023)

4. Renata A. Konrad, Geri L. Dimas, **Yaren Bilge Kaya**, Andrew C. Trapp, Kayse Lee Maass, Meredith Dank, and Andrea Hughes "Collecting Data in the Human Trafficking Domain: Youth-Informed and Data-Driven Recommendations for Runaway and Homeless Youth in NYC", *INFORMS Annual* (October, 2023)

5. Frederick I. Miller, **Yaren Bilge Kaya**, Geri L. Dimas, Renata Konrad, Kayse Lee Maass, and Andrew C. Trapp "Optimizing the Benefit-to-Cost Ratio for Public Sector Decision Making", *Joint Mathematics Meeting* (January, 2023)

6. Sophia Mantell, **Yaren Bilge Kaya**, Kayse Lee Maass, Geri L. Dimas, Renata Konrad, and Andrew C. Trapp "Discrete Event Simulation to Evaluate Shelter Capacity Expansion Options for LGBTQ+ Homeless Youth", *Winter Simulation Conference* (December, 2022)

7. **Yaren Bilge Kaya**, and Kayse Lee Maass, "Priority Thresholds for Equitable Housing Service Coordination", *INFORMS Annual* (October, 2022).

8. Frederick I. Miller,**Yaren Bilge Kaya**, Geri L. Dimas, Andrew C. Trapp, Renata Konrad, and Kayse Lee Maass, "Optimizing The Benefit-to-Cost Ratio For Effective Capacity Deployment For New York City's Homeless Youth Shelter System", *INFORMS Annual* (October, 2022).

9. **Yaren Bilge Kaya**, Kayse Lee Maass, Geri L. Dimas, Renata Konrad, and Andrew C. Trapp, "Improving Access to Housing and Supportive Services for Runaway and Homeless Youth: Reducing Vulnerability to Human Trafficking in New York City", *ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization* (October, 2022).

10. **Yaren Bilge Kaya**, Kayse Lee Maass, and Kalyan Pasupathy, "Improving Emergency Department Access to Computed Tomography Resources: A Multi-Step Approach ", *IISE Annual* (May, 2022).

11. Geri L. Dimas, **Yaren Bilge Kaya**, Renata Konrad, Andrew C. Trapp, Kayse Lee Maass, and Meredith Dank, "Collecting Data in the Human Trafficking Domain: Lessons Learned from Runaway and Homeless Youth in NYC", *IISE Annual* (May, 2022).

12. **Yaren Bilge Kaya**, Kayse Lee Maass, Geri L. Dimas, Renata Konrad, and Andrew C. Trapp, "Reducing Vulnerability to Human Trafficking by Improving Access to Housing and Support Services ", *INFORMS Annual* (October, 2021).

13. **Yaren Bilge Kaya**, Kayse Lee Maass, Geri L. Dimas, Renata Konrad, and Andrew C. Trapp, "Reducing Risks of Human Trafficking: Improving Access to Housing and Supportive Services for Runaway and Homeless Youth in NYC", *INFORMS Healthcare*(July, 2021).

14. Geri L. Dimas, **Yaren Bilge Kaya**, Renata Konrad, A. Trapp, K. L. Maass, and Meredith Dank, "Identifying Run Away Homeless Youth's Needs: A First Step to Disrupt the Supply of HT Networks ", *IISE Annual* (May, 2021).

15. **Yaren Bilge Kaya**, Kayse Lee Maass, Geri L. Dimas, Renata Konrad, and Andrew C. Trapp, "Increasing Access to Homeless Shelter Services for Youth At Risk of Human Trafficking", *Equity and AI*(April, 2021).

16. Theresa Fuller, Mohit Shukla, **Yaren Bilge Kaya**, Joe East, Daniel Meyer, Samir Haydar, Jorden Peck, Nicole Nehls and James C Benneyan, "Evaluating the Impacts of Geographic Cohorting and Patient Rooming on Hospital Efficiency", *Costas T. Lambrew Research Retreat* (April, 2020).

17. **Yaren Bilge Kaya**, Basma Bargal, and James C Benneyan, "Model-Based Analysis of Screening Policies for Trauma Experienced by Children in Foster Care", *Improving Primary Care Through Industrial and Systems Engineering (I-PRACTISE)* (June, 2019).

RESEARCH EXPERIENCE

Columbia University   New York City, New York
Lecturer   07/2023 - Present

- **The National Platform for Outage, Welfare, and Energy Resilience (N-POWER):** This is a comprehensive data-driven dashboard designed to present complex energy data in an accessible format for a diverse range of users. Datasets from multiple publicly available federal sources undergo detailed processing and formatting within N-POWER to effectively highlight the effects of electricity outages across the US and their impacts on various demographics

- **Understanding the Needs of Youth Human Trafficking Victims in New York City:** We conducted structured interviews and surveys with runaway and homeless youth (RHY) and organizations that fund, support, and provide services to them in New York City. Through these surveys we aim to understand the service needs of RHY and how these needs change based on different experiences and demographic characteristics

- **Mayo Clinic Computed Tomography Access:** Using a multi-step approach that involves a queuing model and an integer linear program to improve computed tomography access for emergency department patients

Operations Research and Social Justice Lab, Northeastern University — Boston, MA
Graduate Research Assistant — 01/2021-07/2023

- **Capacity Expansion of New York City Shelters:** To disrupt human trafficking networks by decreasing future vulnerability and recidivism for those at-risk of trafficking, we guide a long-term, cost-effective intervention approach by developing an optimal policy for capacity deployment to shelters and associated rehabilitative services in New York City
- **Equitable Housing Access for New York City Shelters:** To improve equitable access to housing services for at-risk unhoused youth, we propose expanding the current housing capacity, while utilizing priority thresholds that guide decisions regarding which youth should start receiving service based on the number of beds idle in the system
- **Routing Strategies for Equitable Service Coordination:** In an attempt to achieve equitable housing coordination, we evaluate various queue routing strategies that are previously introduced to operations research and analytics literature as housing and support service coordination strategies
- **Modeling Effective Network Disruptions:** Modeling effective network disruptions to sex trafficking while understanding how the interventions leading to disruptions impact the victims and survivors of these networks
- **Mayo Clinic Computed Tomography Access:** Using a multi-step approach that involves a queuing model and an integer linear program to improve computed tomography access for emergency department patients

Healthcare Systems Engineering Institute, Northeastern University — Boston, MA
Graduate Research Assistant — 01/2019-12/2020

- **COVID-19 Hospital Surge Capacity Planning:** Developed a tool to help health systems estimate and visualize 1-to-30 day ahead hospital-specific demand for medical and ICU beds, ventilators, PPE, medications, and available staff on a rolling basis
- **Boston Children's Hospital Complex Care Process Redesign:** Installed a reliable preoperative pathway for children undergoing spinal fusion surgery with the help of predictive models, simulation modeling, and FMEA
- **Trauma Screening of Foster Care Children:** Developed a probability and a simulation model to improve efficiency of the trauma screening process for foster care children in 12 states

University of South Florida — Tampa, FL
Graduate Research Assistant — 01/2018 - 12/2018

- **Statistical Monitoring of Queuing Networks:** Monitored service rate change in queuing networks with the help of statistical process control charts. The aim of this work was to be able to detect the point in time where the servers slow down

TEACHING EXPERIENCE

Columbia University — New York, NY
Lecturer in the Discipline of Industrial Engineering and Operations Research — 07/2023 - Present

Fall 2023 Semester
- Optimization Models and Methods (IEOR4004) - In-Person (**202 students**)
- Undergraduate Research (IEOR3900) - In-Person (**5 students**)

Spring 2024 Semester
- Analytics in Practice (IEOR4524) - In-Person (**187 students**)
- Operations Research and Public Policy (IEOR4505) - In-Person (**50 students**)
- Undergraduate Research (IEOR3900) - In-Person (**3 students**)

Northeastern University — Boston, MA
Graduate Teaching Assistant — 08/2019 - 12/2020

- Northeastern University College of Engineering Outstanding Graduate Teaching Award recipient
- Stochastic Modeling (IE 4520) - Remote Learning Environment (**46 students**)
- Stochastic Modeling (IE 4520) - In-Person (**35 students**)

Service to the Profession

- **EAAMO Development and Fundraising Committee: Member**   10/2023 - Present
  I co-lead development by building strong, long-term relationships for future funding, while also managing fundraising activities for immediate financial needs for the EAAMO Community. This approach ensures our organization's financial stability both now and in the future.

- **INFORMS Early Career Teaching Network (ECTN): Co-chair of ECTN 2024**   11/2023 - 11/2024
  The ECTN Workshop is a pre-conference workshop prior to the INFORMS Annual Meeting. During the ECTN Workshop, participants meet their fellow ECTN participants to begin forming a teaching community and learn the basics of constructing high-quality learning experiences for students.

- **MD4SG Conversations with Practitioners Working Group: Member**   02/2023 - 01/2024
  This working group (CwP) aims to bring together practitioners and researchers by conducting in-depth interviews with practitioners to understand their challenges and concerns. We author and disseminate informative blog posts based on these interviews, providing valuable insights into handling prevalent issues in interdisciplinary research. https://www.md4sg.com/workinggroups/practitioners.html

- **EAAMO 2022 Conference: Volunteer**   10/2022
  Helped with the conference logistics such as preparing social media posts, working at the registration desk, and facilitating social events.

- **INFORMS 2022: Session Chair**   10/2022
  Chaired a session on Equity, Fairness, and Improving Access to Public Services.

- **The ExplOR High School Outreach Program: Mentor**   12/2021
  This program gave STEM Academy of Hollywood students exposure to operations research and machine learning methods in social justice setting.

- **INFORMS 2021: Session Chair**   10/2021
  Chaired a session on OR and Vulnerable Populations.

- **ORSJ Lab PhD Journal Club: Organizer**   06/2021 - 01/2023
  The PhD Journal Club is an informal monthly meeting that reviews a healthcare, human trafficking or industrial engineering publication and discusses its strengths, weaknesses, implications, and/or connections to our work.

Service to the Community

- Volunteer at Community Servings (Boston, MA)   05/2022-06/2023
  Helping the kitchen team prepare food to critically and chronically ill clients from poor communities to help them improve and maintain their health

- Volunteer at Strong Girls-Guclu Kizlar (Zurich, Switzerland)   01/2021-05/2023
  Tutoring Turkish female students to improve their English skills

- Volunteer at Ozyegin University (Istanbul,Turkey)   02/2016-06/2017
  Tutoring Turkish female students to improve their English skills

- Volunteer at Flühtling Ubergang Einrichtung Adler Haus (Dortmund, Germany)   07/2015-08/2015
  Helped refugee children adapt to new lifestyles

- Volunteer at Bornova Anatolian High School (Izmir, Turkey)   09/2011-06/2012
  Tutored middle school students to help them learn Turkish literature

Skills

- **Programming:** Python, Gurobi, Matlab, R, VBA, Java, Arena Simulation Software

- **Tools/Techs:** LaTeX, Microsoft Office, Canva, Lucid Chart

Languages

- **English:** Fluent
- **Turkish:** Mother tongue, native speaker
- **German:** Elementary
- **Spanish:** Elementary

Professional Affiliations

- Mechanism Design for Social Good (MD4SG)   Member
  - Development and Fundraising Committee   06/2021 - Present
  - Conversations with Practitioners Group

- Institute for Operations Research and the Management Sciences (INFORMS)   Member
  - Early Career Teaching Network   11/2020 - Present
  - Public Sector Operations Research
  - Women in Operations Research and Management Science (WORMS)

- Institute of Industrial and Systems Engineers (IISE)   Member
      10/2018 - Present

- The Tau Beta Pi Association – Engineering Honor Society   Member
      09/2018 - Present

Mentoring - Graduate

Burcu Ozek	06/2019-Present
Nicole Nehls	06/2019-01/2020
Theresa Fuller	06/2019-01/2020
Yang Yang	01/2019-06/2019

Mentoring - Undergraduate

Jordan Shiff	01/2024 - Present
Hao Lin	08/2023 - Present
Tejas Raj	08/2023 - Present
Leo Hu	08/2023 - Present
Molly Hodsden	01/2023-Present
Ziyu Zhao	08/2023 - 02/2024
Jack Weissman	08/2023 - 02/2024
Nathan Willemsen	05/2023-08/2023
Eliza Macaulay	09/2022-06/2023
Frederick Miller	02/2022-06/2023
Sophia Mantell	06/2021-06/2022
Christopher Gehrke	09/2021-06/2022
Laurel O'Malley	09/2021-06/2022
Klara Juliusson	09/2021-06/2022
Matthew Dzwil	09/2021-06/2022
Isabel Cusack	01/2021-05/2021
Chia-Hsiang Hsu Tai	01/2021-05/2021
John Hooper	01/2021-05/2021
Thomas Minutella	01/2021-05/2021
Ana Sosa	01/2021-05/2021
Caroline T. Retzios	06/2019-08/2019
Cassie Boutelle	06/2019-08/2019
Nicholas Cooper	01/2019-05/2019

References

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