# Sait Tunc

211 Durham Hall (MC 0118)
1145 Perry Street
Blacksburg, VA 24061

(608) 886 6426 (phone)
*sait.tunc@vt.edu*
*www.ise.vt.edu/stunc*

## Academic Employment

**Grado Department of Industrial and Systems Engineering, Virginia Tech**, Blacksburg, VA
    Assistant Professor     2019 - Current

**Booth School of Business, University of Chicago**, Chicago, IL
    Postdoctoral Research Associate     2017 - 2019

## Education

| | | |
|---|---|---|
| **Ph.D.**, | Industrial and Systems Engineering, University of Wisconsin-Madison | 2017 |
| **M.S.**, | Industrial and Systems Engineering, University of Wisconsin-Madison | 2015 |
| **M.S.**, | Electrical and Electronics Engineering, Koc University, Istanbul, Turkey | 2012 |
| **B.S.**, | Electrical and Electronics Engineering, Bogazici University, Istanbul, Turkey | 2010 |

## Honors and Awards

| | |
|---|---|
| Gustafson, Rea C & David H Scholarship | 2016 |
| Finalist for the Doing Good with Good OR Student Paper Competition | 2016 |
| The Scientific and Technological Research Council of Turkey (TUBITAK) | |
|     Graduate Fellowship | 2010 - 2012 |
|     Undergraduate Scholarship | 2005 - 2010 |
| International Mathematical Olympiads (IMO) | Silver Medal (2005), Bronze Medal (2004) |
| National Mathematical Olympiads of Turkey | Gold Medal (2004), Silver Medal (2003) |

## Research Interests

**Methodologies**:   Stochastic modeling and simulation, Queueing theory, Game theory, Dynamic programming, Machine learning, Information theory

**Applications**:   Healthcare operations, Incentive mechanism design, Medical decision making, Portfolio investment

## Publications

(* indicates one of my students)

1. S. Tunc, B. Sandikci, B. Tanriover, "A Simple Incentive Mechanism to Alleviate the Burden of Organ Wastage in Transplantation," *Management Science*, 68(8):5980-6002, 2022

2. M. J. Rabil*, S. Tunc, D. R. Bish, E. K. Bish, "Effective Screening Strategies for Safe Opening of Universities under Omicron and Delta Variants of COVID-19," *Nature Scientific Reports*, 12(1):21309, 2022

3. M. J. Rabil*, S. Tunc, D. R. Bish, E. K. Bish, "Benefits of Integrated Screening and Vaccination for Infection Control," *PLOS One*, 17(4):e0267388, 2022

4. S. Tunc, O. Alagoz, E. B. Burnside, "A New Perspective on Breast Cancer Diagnostic Guidelines to Reduce Overdiagnosis," *Production and Operations Management*, 31(5):2361-2378, 2022
– *Finalist for the Doing Good with Good OR Student Paper Competition*

5. B. Sandikci, S. Tunc, B. Tanriover, "A New Simulation Model for Kidney Transplantation in the United States," In *Proceedings of the 2019 Winter Simulation Conference*, edited by N. Mustafee et al., pp. 1079–1090, 2019

6. N. D. Vanli, S. Tunc, M. A. Donmez, S. S. Kozat, "Growth Optimal Investment in Discrete-time Markets with Proportional Transaction Costs," *Digital Signal Processing*, 48:226-238, 2016

7. H. Ozkan, M. A. Donmez, S. Tunc, S. S. Kozat, "A Deterministic Analysis of an Online Convex Mixture of Experts Algorithm," *IEEE Transactions on Neural Networks and Learning Systems*, 26(7):1575-1580, 2015

8. S. Tunc, O. Alagoz, E. B. Burnside, "Opportunities for Operations Research in Medical Decision Making," *IEEE Intelligent Systems* -invited paper, 29(3):59-62, 2014

9. S. Tunc, M. A. Donmez, S. S. Kozat, "Optimal Investment Under Transaction Costs: A Threshold Rebalanced Portfolio Approach," *IEEE Transactions on Signal Processing*, 61(12):3129-3142, 2013


## REFEREED BOOK CHAPTERS

1. S. Tunc, O. Alagoz, J. Chhatwal, E. B. Burnside, "Using Finite-Horizon Markov Decision Processes for Optimizing Post-mammography Diagnostic Decisions," In N. Kong & Shengfan Zhang (Eds.), *Decision Analytics and Optimization in Disease Prevention and Treatment*, John Wiley & Sons, 2018


## PAPERS UNDER REVIEW

1. M. J. Rabil*, S. Tunc, D. R. Bish, E. K. Bish, "Optimal Integration of Screening Strategies and Incentive Mechanisms for the Effective Mitigation of COVID-19," under review at *Management Science*

2. R. Wang*, S. Tunc, B. Sandikci, M. J. Ellis, "Targeted Priority Mechanisms: Nudging, Not Enforcing, Efficient Matching of Organs," under review at *Management Science*

3. X. Li, S. Tunc, O. Ozaltin, M. J. Ellis, "Dynamic Discard Risk Estimation for Timely Interventions in Transplantation," under review at *Manufacturing & Service Operations Management*

4. S. Tunc, J. Tarasewicz*, B. Sandikci, M. J. Ellis, "From Wastage to Wellness: A Warranty Mechanism for High-Risk Transplant Returnees," under review at *Production and Operations Management*

5. R. Li, S. Tunc, O. Ozaltin, M. J. Ellis, "Improving Kidney Utilization: Predicting Discard Risk with Interpretable Models," under review at *Transplantation*


## WORKING PAPERS

1. S. Tunc, B. Sandikci, P. Afeche, "Treating to the Priority in Heart Transplantation," Target journal: *Operations Research*, Target submission date: December 2023

2. H. Shin*, S. Tunc, X. Chen, D. Kreisel, V. Puri, "Unveiling Hidden Impacts: A Comprehensive Simulation Analysis of Lung Allocation Policy Changes in the US", Target journal: *Health Care Management Science*, Target submission date: December 2023

3. S. Berry, S. Tunc, B. Gorgulu, M. Cevik. "Optimizing Transplantation Interventions: A Machine Learning Approach to Center Ranking," Target journal: *Health Care Management Science*, Target submission date: December 2023

4. H. Shin*, S. Tunc, P. Afeche, M. Begen, B. Sandikci, F. Murillo, B. Hansen, M. Claasen, G. Sapisochin, "Deciphering Organ Offer Decisions: An In-depth Analysis of the Canadian Liver Transplant System," Target journal: *Transplantation*, Target submission date: January 2024

5. T. Chen, S. Tunc, K. Tsui, D. Kreisel, V. Puri, "Discrepancies in Lung Allocation Policy Impact Across Different Centers", Target journal: *Transplantation*, Target submission date: February 2024

6. S. Berry, B. Gorgulu, S. Tunc, M. Cevik. "Interpretable Breast Cancer Screening Recommendations using Time Series Forecasting," Target journal: *IISE Transactions on Healthcare Systems Engineering*, Target submission date: February 2024

7. H. Shin*, S. Tunc, X. Chen, D. Kreisel, V. Puri, "Temporal Analysis of Organ Allocation: Forecasting Dynamic Scores," Target journal: *Production and Operations Management*, Target submission date: February 2024

8. S. Tunc, P. Afeche, M. Begen, B. Sandikci, H. Shin*, F. Murillo, B. Hansen, M. Claasen, G. Sapisochin, "The Canadian Liver Transplant Landscape: Insights from a Detailed Simulation," Target journal: *Naval Research Logistics*, Target submission date: February 2024

9. A. S. Zadeh, D. R. Bish, S. Tunc, E. K. Bish, "Optimal Assay Selection for Screening, Considering Biomarker Dynamics and Population Heterogeneity," Target journal: *Production and Operations Management*, Target submission date: February 2024

10. E. K. Bish, S. Tunc, D. R. Bish, "Strategies for Optimized Pooled Testing: Understanding the Dilution Effect of Pooling in Infectious Disease Control" Target journal: *INFORMS Journal on Computing*, Target submission date: April 2024

## Teaching

### Virginia Tech

Summary of course evaluations [Scale: 1 (Strongly disagree) — 6 (Strongly agree)]

| Term | Section | Teaching Effectiveness[1] | Instructor Preparation[2] | Theory & Practice[3] | Deeper Understanding[4] | Independent Thinking[5] | Problem Solving[6] |
|---|---|---|---|---|---|---|---|
| **ISE 3424: Discrete-Event Simulation** (Required for the ISE BS degree ∼ 180 students per semester) | | | | | | | |
| Spring 2023 | 1 | 4.9 | 5.3 | 5.3 | 4.9 | 5.0 | 5.1 |
| Spring 2023 | 2 | 4.6 | 5.0 | 5.2 | 4.7 | 4.9 | 4.9 |
| Spring 2021 | 1 | 4.9 | 5.2 | 5.4 | 5.0 | 5.0 | 5.2 |
| Spring 2021 | 2 | 4.6 | 5.2 | 5.1 | 4.9 | 5.0 | 5.0 |
| **ISE 5414: Random Processes** (Required for the OR MS and PhD degrees) | | | | | | | |
| Spring 2022 | | 5.6 | 5.6 | 5.9 | 5.5 | 5.6 | 5.9 |
| Spring 2020 | | 5.8 | 6.0 | 5.7 | 5.7 | 5.8 | 5.8 |
| **ISE 6464: Queueing Networks** | | | | | | | |
| Spring 2022 | | 5.8 | 6.0 | 5.8 | 6.0 | 5.8 | 5.8 |
| Spring 2020 | | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |

1. Overall, the instructor's teaching was effective.
2. The instructor was well prepared.
3. The instructor related theories and concepts to practical issues.
4. I have a deeper understanding of the subject matter as a result of this course.
5. I improved my ability to think independently about the course material.
6. I improved my ability to problem solve.

### University of Chicago Booth School of Business
> ***Assisted in teaching*** BUSN 36106: Managerial Decision Modeling (MBA Curriculum)
> Oversaw 9 sections comprising a total of 375 MBA students
> Conducted weekly review sessions to enhance student understanding
> Assisted in the development and refinement of course materials                                    Spring, Fall 2017-2018

### University of Wisconsin-Madison
> ISyE 517: Decision Making in Health Care                                                                              Fall 2014

## Grant Proposals

1. National Science Foundation (NSF), "CAREER: Optimizing Healthcare Operations through Incentive Mechanism Design" (Role: PI, *Pending*, Tunc Portion: $600,000)
2. National Health Institute (NIH) R01, "Effective Intervention Mechanisms to Save Kidneys at Risk of Discard" (Role: PI, *Resubmission - Previous Impact Score: 44*, Target Date: 11/05/2023, Tunc Portion: $1,200,000)
3. National Science Foundation (NSF), "The Competitive Landscape of Transplant Centers: Strategies for Fairer and More Efficient Organ Allocation" (Role: PI, Target Date: 12/01/2023, Tunc Portion: $450,000)

4. National Health Institute (NIH) R34, "Beyond Traditional Risk Factors: Machine Learning and Mathematical Modeling for Youth Suicide Intervention" (Role: PI, *Resubmission*, Target Date: 02/20/2024, Tunc Portion: $250,000)

5. National Health Institute (NIH) R21, "Integrating Data-Driven Risk Prediction and Mathematical Modeling for Infectious Disease Screening, with Application to COVID-19" (Role: PI, *Resubmission*, Target Date: 03/16/2024, Tunc Portion: $400,000)

6. National Health Institute (NIH) R01, "Towards a Fairer Future: Mathematical and Simulation Modeling for Improved U.S. Lung Organ Allocation" (Role: PI, Target Date: 06/05/2024, Tunc Portion: TBD)


## REFEREED CONFERENCE PUBLICATIONS

(Regularly presented at INFORMS Annual Meetings since 2014.)

1. P. Afeche, S. Tunc, B. Sandikci, "Treating to the Priority in Heart Transplantation," *MSOM Conference*, 2023

2. R. Wang*, S. Tunc, B. Sandikci, M. J. Ellis, "Targeted Priority Mechanisms in Organ Transplantation," *MSOM Conference*, 2023

3. S. Tunc, B. Sandikci, P. Afeche, "Treating to the Priority in Heart Transplantation," *MSOM Conference*, 2021

4. S. Tunc, B. Sandikci, P. Afeche, W. F. Parker, "Treating to the Priority in Heart Transplantation," *MSOM Conference*, 2020 [conference canceled due to COVID-19 pandemic]

5. B. Sandikci, S. Tunc, B. Tanriover, "Reducing Organ Discard Rate in Transplantation," *Stochmod 2020: 8th Stochastic Modeling Meeting*, 2020 [accepted, but conference canceled due to COVID-19 pandemic]

6. S. Tunc, B. Sandikci, B. Tanriover, "Nudging to Accept," *Cutting Edge of Transplantation (CEoT) 2020: Balancing Equity and Utility in the Face of an Organ Shortage*, 2020

7. S. Tunc, B. Sandikci, B. Tanriover, "Expanding the Donor Pool: The use of Marginal Organs for Transplantation," *MSOM Conference*, 2018

8. S. Tunc, O. Alagoz, E. B. Burnside, "Identifying Mammography Findings and Risk Factors to Reduce Overdiagnosis in Women over 65," *36th Annual North American Meeting of SMDM*, 2014

9. S. Tunc, M. A. Donmez, S. S. Kozat, "Growth Optimal Investment with Threshold Rebalancing Portfolios under Transaction Costs," *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2013

10. M. A. Donmez, S. Tunc, S. S. Kozat, "Growth Optimal Portfolios in Discrete-time Markets Under Transaction Costs," *IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, 2012

11. M. A. Donmez, S. Tunc, S. S. Kozat, "Optimal Portfolios Under Transaction Costs in Discrete-time Markets," *IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*, 2012


## TECHNICAL REPORTS

1. S. Tunc, Y. Altug, S. S. Kozat, M. K. Mihcak, "Information Theoretic Analysis of the Fundamental Limits of Content Identification," Technical Report, arXiv:1810.03255


## STUDENT SUPERVISION

**Ph.D. Students**

1. Umur Kose, August 2023 – present

2. Ruochen Wang, August 2022 – present

3. Hyunwoo Shin, August 2021 – present

4. Marie Jeanne Rabil (co-advise with Ebru Bish and Douglas Bish), August 2020 – present

## M.S. Students

1. Jack Tarasewicz, Fall 2020 – Spring 2022
2. Ahmed Khalifa, Spring 2020 – Spring 2022

## Undergraduate Students

1. Baasim Kazi, Fall 2021
2. Chongren Sun, Fall 2020
3. Adeet Deshmukh, Fall 2020
4. Kayla Castro, Fall 2020

## Thesis or Dissertation Committees

1. Nan Jiang (Virginia Tech ISE)
2. Sumin Kang (Virginia Tech ISE)
3. Seonghun Park (Virginia Tech ISE)
4. Qing Ye (Virginia Tech ISE)
5. Armin Zolfaghari (Virginia Tech CEE)
6. Jingtao Zhang (Virginia Tech ISE)

## Other Professional Experience

### Associate Editor

Naval Research Logistics                                                                                     2023-present

### Reviewer

Management Science, Operations Research, Manufacturing & Service Operations Management, Production and Operations Management, Health Care Management Science, Naval Research Logistics, Omega, IISE Transactions, Service Science, European Journal of Operational Research, Annals of Operations Research, Decision Sciences, Journal of Healthcare Informatics Research, IEEE Transactions on Signal Processing, IEEE Transactions on Neural Networks and Learning Systems, PLOS One, Nature Scientific Reports, AMIA

### Committees

| | |
|---|---|
| *Judge*, INFORMS Public Sector Operations Research (PSOR) Best Paper Award | 2023 |
| *Organizer*, Health Applications Society (HAS) Online Seminar Series | 2021 & 2022 |
| *Council Member*, INFORMS Health Applications Society (HAS) | 2021 & 2022 |
| *Judge*, INFORMS Health Applications Society (HAS) Student Paper Competition, | 2021 |
| *Coordinator*, 17th Junior Balkan Mathematical Olympiad, Antalya, Turkey | 2013 |
| *Coordinator*, 29th Balkan Mathematical Olympiad, Antalya, Turkey | 2012 |

### Session Organizer/Chair

| | |
|---|---|
| *Co-organizer and -chair*, Health Applications Society (HAS) Job Talk Flash Session | 2021 & 2022 |
| *Co-chair and moderator*, INFORMS Junior Faculty Interest Group (JFIG) Panel discussion on "Medical/Clinical Collaborations in Healthcare: A Guide for Junior Faculty" | 2021 |
| INFORMS Healthcare Conference, Toronto, ON | 2023 |
| INFORMS Annual Meeting, Indianapolis, IN | 2022 |
| INFORMS Annual Meeting, Anaheim, CA | 2021 |
| INFORMS Healthcare Conference, Virtual | 2021 |
| INFORMS Annual Meeting, Virtual | 2020 |
| INFORMS Annual Meeting, Seattle, WA | 2019 |
| INFORMS Annual Meeting, Phoenix, AZ | 2018 |

INFORMS Annual Meeting, Houston, TX                                                    2017
INFORMS Annual Meeting, Philadelphia, PA                                                2015

## Memberships

Institute for Operations Research and the Management Sciences (INFORMS)
Health Applications Society (HAS)
Manufacturing & Service Operations Management (MSOM)
Production and Operations Management Society (POMS)
Institute of Industrial and Systems Engineers (IISE)
American Society of Transplantation (AST)