Ruochen Wang

108 Durham Hall
1145 Perry Street
Blacksburg, VA

(540) 988 6486 (phone)
rcwangise@vt.edu
ruochenwangor.github.io

Education

Virginia Tech - Blacksburg, VA, United States *August 2021 - May 2025 (Expected)*
Ph.D. Candidate in Industrial and Systems Engineering
Focus Area: Operations Research

Advisor: Prof. Sait Tunc

Xiamen University - Fujian, China *Aug 2016 - Aug 2020*
B.S. in Applied Mathematics

Research Interests

My research interests lie at the intersection of operations research, healthcare operations, and incentive mechanism design, with a particular focus on organ allocation and transplantation. I am dedicated to developing innovative models that optimize organ allocation and utilization through carefully designed, voluntary incentive structures. My work leverages multiclass priority queueing models to capture the strategic behaviors of transplant patients, accounting for the heterogeneity in patient types and organ quality. I integrate theoretical insights with real-world clinical data, conducting simulation studies to evaluate the impact of these mechanisms on both patient welfare and organ utilization. My collaborations with leading medical experts ensure that my research is not only grounded in rigorous theory but also directly applicable to improving transplant outcomes. I aim to continue bridging the gap between theoretical research and practical healthcare solutions to enhance efficiency and equity in critical medical systems. While my earlier work primarily focused on healthcare operations, I am also keen to apply the frameworks and methodologies I have developed to other areas of operations.

Methodologies: Queueing Theory, Game Theory, Stochastic Modeling, Simulation
Applications: Healthcare Operations, Incentive Mechanism Design

Publications

1. J. Zhang, X. Chen, **R. Wang**. Asymptotic Normality of Joint Metamodel-based Sobol' Index Estimators. **Winter Simulation Conference**, 2023, 3705 - 3716.

2. F. Wang, Y. Chen, **R. Wang**, A. O. Francis, B. Emmanuel, W. Zhenh, J. Chen. An Experimental Investigation into the Hash Functions Used in Blockchains. **IEEE Transactions on Engineering Management**, 2019, 1-21, 10.1109.

Papers Under Review

1. **R. Wang**, S. Tunc, B. Sandikci, B. Tanriover, M. J. Ellis. Targeted Priority Mechanisms in Transplantation: Incentivizing, Not Enforcing, Efficient Matching of Organs.
[**Major revision**, **Management Science**].

Working Papers

1. Treating to the Priority in Heart Transplantation, with S. Tunc, P. Afeche, B. Sandikci, and W.F. Parker.
   [Paper in preparation. Target journal: **Operation Research**].

2. Targeted Incentive Mechanisms in U.S. Kidney Allocation: Lessons from the Eurotransplant Senior Program, with S. Tunc and M.J. Ellis.
   [Paper in preparation. Target journal: **American Journal of Transplantation**].

3. Strategic Patient Selection for Targeted Priority Mechanisms: Balancing Efficiency and Equity in Organ Allocation, with S. Tunc and M.J. Ellis.
   [Paper in preparation. Target journal: **Production and Operations Management**].

Selected Honors and Awards

Agee GTA Award *2021-2022*
Virginia Tech, Department of Industrial and Systems Engineering
Awarded based on superior academic achievements and teaching assistant performance

First Prize in China Undergraduate Mathematical Contest in Modeling *2018*
Fujian Province

Second Prize of Excellent Thesis in Social Practice *2017*

Referred Conference Presentations/Publications

1. **R. Wang**, S. Tunc, B. Sandikci, and M.J. Ellis. Targeted Priority Mechanisms in Organ Allocation. *MSOM Healthcare SIG*, Minneapolis, Minnesota, 2024.

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

Other Presentations

1. **R. Wang**, S. Tunc, B. Sandikci, and M.J. Ellis. Targeted Priority Mechanisms in Organ Transplantation. *INFORMS Annual Meeting*, Phoenix, Arizona, 2023.

2. **R. Wang**, S. Tunc, B. Sandikci, and M.J. Ellis. Targeted Priority Mechanisms in Organ Transplantation. *INFORMS Healthcare Conference*, Toronto, Canada, 2023.

Research & Teaching Experience

Course Instructor
Virginia Tech, Department of Industrial and Systems Engineering *Summer 2024*
ISE 2404 - Probability Foundations for Industrial and Systems Engineers
Core Sophomore-level Undergraduate Course (**Class size: 55**, Modality: Synchronous Online)

- This core undergraduate course serves as a basis for applications courses in the industrial and systems engineering undergraduate curriculum. The course provides the foundation for the study of industrial statistics and quality control as well as for the sequence of probability modeling and analysis courses, such as stochastic processes and simulation modeling/analysis, as well as human factors and ergonomics and manufacturing courses.

- Received highly positive teaching evaluations and feedback

  [Scale: 1 (Strongly disagree) — 6 (Strongly agree)]:

  5.00 for "Overall, the instructor's teaching was effective"

  5.21 for "The instructor was well prepared"

  5.26 for "The instructor seemed concerned about whether students learned the material"

  5.49 for "The instructor was open to contributions from all class members"

  5.46 for "The instructor fostered an atmosphere of mutual respect"

  "*He ensured everyone understood the material before moving on. No question was too simple or too complex for him to respond to.*"

  "*I very much enjoyed this course and it made me interested in pursuing a career in this field.*"

  "*The instructor was highly knowledgeable about the course material and always made time for any questions students had.*"

  "*He was very attentive... Very good dedication.*"

Teaching Assistant *2021-2023, Spring 2024*

Virginia Tech, Department of Industrial and Systems Engineering

ISE 2024 - Probability Foundations for Industrial and Systems Engineers
ISE 2404 - Deterministic Operations Research II
ISE 3034 - Technical Communication for Engineers
ISE 3414 - Probabilistic Operations Research
ISE 4264 - Industrial Automation
ISE 5424 - Simulation I
ISE 5024 - Mathematical Probability and Statistics

Assisted students, prepared assignments, held review sessions, held office hours, and graded student work.

Professional Organizations

Institute for Operations Research and Management Science (INFORMS), Member

Health Applications Society, Member
Manufacturing & Service Operations Management Society, Member
Virginia Tech Engineering Student Chapter, Member

Leadership and Service

Session Organizer/Chair *July 2023*

INFORMS Healthcare Conference, Toronto, ON 2023

Computer Skills

Programming Languages
Matlab, Python, R, C++

Optimization and Simulation
Gurobi, Flexsim

Other Technical and Mathematical Applications
LaTeX, SPSS, SQL