

Tessa Swanson



Profile

Contact:

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Research Group: <https://guikema.engin.umich.edu>

Summary:

I am Data Engineer with experience in machine learning and transportation modeling seeking to apply my operations research background to systems planning and engineering for community resilience. I research and model complex systems to understand and address community resilience, particularly via transportation and mobility applications. I believe equitable access to opportunities and resources is key to climate change adaptation, disaster mitigation, sustainability, and resiliency. I aspire to research, evaluate, and design innovative infrastructure solutions that promote equitable access to resources and opportunities, thus enabling resilient communities.

Skills:

Methods: Simulation, Optimization, Machine learning, Econometrics, Travel demand modeling, Risk Analysis, Stated preference surveys, Scenario planning, GIS, Data visualization, Database management
Software: Python, R, STATA, TransCAD, ArcGIS, Tableau, PostgreSQL, Linux, Slurm, Git, Keras, Gurobi
Professional: Trans-disciplinary research, Project management, Design thinking

Education

University of Michigan, Ann Arbor, Michigan (expected) 2023
Ph.D. Candidate in Industrial and Operations Engineering
Advisor: Seth Guikema, Ph.D.
Taubman College of Urban Planning Graduate Certificate in Urban Informatics
Master of Science in Industrial and Operations Engineering 2020

Northwestern University, Evanston, Illinois
B.S. Industrial Engineering and Management Sciences
Minors in Transportation and Logistics, Religious Studies
Murphy Institute Scholar

2016

Professional Experience

Steer, Boston, MA

Aug 2016-Aug 2018

Consultant

- Produced ridership and revenue forecasts using network and econometric modelling techniques for intercity and regional rail, toll facilities, and ferries for both public and private sector clients
- Developed software tools for rail clients to run their own ridership, cost, and revenue forecasts for new and existing corridors and networks
- Collected and analyzing large sets of origin-destination, toll transaction, rail ridership, and economic data
- Communicated analysis, model, and forecast results using data visualization including maps and network models

Volpe National Transportation Systems Center, Cambridge, MA

Summer 2015

Operations Research Analyst Student Trainee

- Consulted the Federal Aviation Administration on the implementation of NextGen Air Transportation System technologies and procedures
- Researched impacts of large-scale GPS failure disasters on US air traffic control systems
- Performed predictive analysis for planning and construction of aviation facilities
- Developed and reviewed federal aviation business reporting software

American Red Cross, Chicago, IL

June 2013-Dec 2014

Volunteer Dispatcher and Data Analyst

- Collected and analyzed incident data for organization responding to 1,200 local disasters annually
- Communicated with volunteers, local first responders, and disaster victims to provide appropriate assistance

Teaching Experience

Simulation Design and Analysis (IOE 574) Graduate Student Instructor
College of Engineering, University of Michigan

Fall 2021

Publications

Swanson, T., Zelner, J., & Guikema, S. (2022). COVID-19 has illuminated the need for clearer AI-based risk management strategies. *Journal of Risk Research*, 1-16.

DOI: 10.1080/13669877.2022.2077411.

Swanson, T., Guikema, S. D., Bagian, J., Schemanske, C., & Payne, C. (2021). COVID-19 aerosol transmission simulation-based risk analysis for in-person learning. *medRxiv*.

DOI: 10.1101/2021.10.04.21263860. (preprint).

Swanson, T., Guikema, S. D., Bagian, J., & Payne, C. (2021). Modeling COVID-19 aerosol transmission in elementary schools.

DOI: 10.1101/2021.12.08.21267499. (preprint).

Swanson, T., Guikema, S. D. (2021). Using mobile phone data to evaluate access to essential services surrounding disruptive events. *Risk Analysis*. (accepted).

Presentations

Swanson, T., Guikema, S. D. "Using mobile phone data to evaluate access to essential services surrounding disruptive events." Oral presentation, Michigan University-wide Sustainability and Environment Annual Conference, Virtual, 2022.

Swanson, T., Guikema, S. D., Bagian, J., Schemanske, C., & Payne, C. "Simulating Covid-19 Risks Associated With Returning To In-person College Classes." Oral presentation, Society for Risk Analysis Annual Meeting, Virtual, 2021.

Swanson, T., Guikema, S. D. "Using mobile phone data to evaluate access to essential services surrounding disruptive events." Oral presentation, Society for Risk Analysis Annual Meeting, Virtual, 2021.

Swanson, T., Guikema, S. D., Bagian, J., Schemanske, C., & Payne, C. "Simulating Covid-19 Risks Associated With Returning To In-person College Classes." Oral presentation, INFORMS Annual Meeting, Anaheim, CA 2021.

Swanson, T., Guikema, S. D. "Using mobile phone data to evaluate access to essential services surrounding disruptive events." Oral presentation, Natural Hazards Researchers Meeting, Virtual, 2021.

Swanson, T. "Big data for Evaluating Urban Resiliency." Workshop, Michigan University-wide Sustainability and Environment Initiative, Virtual, 2020.

Swanson, T., Guikema, S. D. "Travel mode classification of cell phone data in dense urban environments." Oral presentation, IEEE International Conference on Intelligent Transportation Systems, Auckland, New Zealand 2019.

Swanson, T., Fox, A., Smilowitz, K. "Volunteer Engagement in the Age of Analytics: A Study with the American Red Cross, Greater Chicago Region." Oral presentation, INFORMS Annual Meeting, San Francisco, CA 2014.

Awards and Recognition

- **Rackham Predoctoral Fellowship** 2022
Rackham Graduate School at University of Michigan
- **2nd Place - Student Merit Award** 2021
Engineering and Infrastructure Specialty Group
Society for Risk Analysis
- **Graduate Research Fellowship** 2018-2021
National Science Foundation
- **Young Professionals Travelling Fellowship** 2019
IEEE Intelligent Transportation Systems Conference
- **IEMS Department Award** 2016
Northwestern University McCormick School of Engineering
- **2nd Place - Doing Good with Good OR Student Paper Competition** 2014
INFORMS Annual Meeting
- **Murphy Scholar** 2012-2016
Northwestern University McCormick School of Engineering

Leadership and Service

- **President** 2020-2022
Student Leadership Board, UM IOE Department
- **Department Steward** 2021-2022
Graduate Employees' Organization labor union
- **Abstracts and Registration Coordinator** 2021
Attendee Logistics Coordinator 2020
Michigan University-wide Sustainability and Environment Conference
- **Mentorship Chair** 2020
INFORMS Student Chapter, University of Michigan
- **Co-President** 2019-2020
University of Michigan Grad Student Outdoors Club
- **Graduate Student Mentor** 2019
University of Michigan College of Engineering
- **Global Healthcare Technologies Program** 2015
Northwestern Center for Innovation in Global Health Technologies,
Cape Town, South Africa