

# Abhay Sobhanan

PH.D. CANDIDATE · INDUSTRIAL ENGINEERING

University of South Florida College of Engineering  
Department of Industrial and Management Systems Engineering  
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## Research Interests

*Applications:* Transportation, Warehouse Operations, Supply Chain Management

*Methodology:* Integer Programming, Neural Combinatorial Optimization, Heuristics, Machine Learning

## Education

### University of South Florida

Tampa, United States

PH.D. IN INDUSTRIAL ENGINEERING

August 2020 - July 2025

- Thesis: Optimization Approaches for Large-Scale Last-Mile Delivery Problems
- Major Advisor : Dr. Hadi Gard (Charkhgard)
- Co-Advisor : Dr. Changhyun Kwon
- GPA: 4.0/4.0

### National Institute of Technology Agartala

Tripura, India

BS-MS MATHEMATICS

August 2014 - May 2019

- Thesis: Multi Criteria Decision Making using Interval Type-2 Fuzzy Sets
- GPA: 8.45/10.0

## Professional Experience

January 2021 -  
Present

**Graduate Research/Teaching Assistant**, University of South Florida, United States

July 2019 - June  
2020

**Research Associate**, Area of Production & Quantitative Methods, Indian Institute of Management  
Ahmedabad, India

May 2016 -  
August 2016

**Mitacs Globalink Research Intern**, Department of Mathematics & Statistics, University of Regina, Canada

## Publications

### JOURNAL ARTICLES

1. **Sobhanan, A.**, Park, J., Park, J., & Kwon, C. (2024). Genetic Algorithms with Neural Cost Predictor for Solving Hierarchical Vehicle Routing Problems. *Transportation Science*, to appear.  
<https://doi.org/10.1287/trsc.2023.0369>
2. Golui, S., Pal, C., Manikandan, R., & **Sobhanan, A.** (2024). Optimal control of a dynamic production-inventory system with various cost criteria. *Annals of Operations Research*, 337(1), 75-103.

### ARTICLES UNDER REVIEW

1. [Major Revision, Production and Operations Management]  
**Sobhanan, A.**, Charkhgard, H., & Dayarian, I. (2024). Equity-Driven Workload Allocation for Crowdsourced Last-Mile Delivery. *Optimization Online preprint* 27199.
2. [Major Revision, Computers & Operations Research]  
Mahmoudinazlou, S., **Sobhanan, A.**, Charkhgard, H., Eshragh, A., & Dunn, G. (2024). Deep Reinforcement Learning for Dynamic Order Picking in Warehouse Operations. *arXiv preprint arXiv:2408.01656*.

## REFEREED CONFERENCE PROCEEDINGS

1. **Sobhanan, A.**, Mahmoudinazlou, S., Charkhgard, H., & Kwon, C. (2024). A branch-and-price algorithm for emergency humanitarian logistics with a mixed truck-drone fleet. Proceedings of the IISE Annual Conference & Expo 2024. [**Best Paper Award Finalist**, Operations Research Division]

## ARTICLES IN PREPARATION

1. **Sobhanan, A.**, Charkhgard, H. & Kwon, C. Rural Postman Problem with Multiple Drones.

## Awards, Fellowships, & Grants

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| 2024 | <b>Best Paper Award Finalist</b> , Operations Research Division, Institute of Industrial and Systems Engineers Annual Conference & Expo 2024. Paper: <i>A branch-and-price algorithm for emergency humanitarian logistics with a mixed truck-drone fleet</i><br><b>International Travel Grant (\$ 1,500)</b> , Office of Graduate Studies, University of South Florida. For participation in the IISE Annual Conference & Expo 2024. |
| 2023 | <b>PhD Student Travel Grant (\$ 1,000)</b> , INFORMS TSL Conference 2023 & United States National Science Foundation.  |
| 2020 | <b>USF Graduate Fellowship (\$ 9,923)</b> , University of South Florida. Awarded to selected first year graduate students.   |
| 2018 | <b>Mitacs Globalink Research Internship (\$ 6,000 CAD)</b> , Mitacs, Canada. Scholarship promoting research among undergraduate students.  |

## Conference Presentations

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1. *Towards Equitable Workload Distribution in Last-Mile Delivery for the Gig Economy: The Dispatch Zone-Wave Problem*  
INFORMS Annual Conference, Seattle, U.S.A. during October 20-23, 2024.
2. *A branch-and-price algorithm for emergency humanitarian logistics with a mixed truck-drone fleet*  
IISE Annual Conference & Expo 2024, Montreal, Canada during May 18 - 21, 2024.
3. *Optimizing Fairness and Efficiency in Heterogeneous Fleet Open Vehicle Routing Problem*  
34th Annual POMS Conference, Minneapolis, U.S.A. during April 25 - 29, 2024.
4. *Solving Large-Scale Multi-Depot Vehicle Routing Problems via Decomposition and Deep Learning*  
INFORMS Transportation and Logistics Society Triennial Conference, Chicago, U.S.A. during July 23 – 26, 2023.
5. *Solving the Multi-Depot Vehicle Routing Problem by a Genetic Algorithm with Learning to Evaluate Individuals*  
INFORMS Annual Conference, Indianapolis, U.S.A. during October 16-19, 2022.
6. *Dynamic Allocation of E-commerce Orders to Order-fulfillment Centers under Disruptions*  
Operational Research Society of India Annual Conference held at IIM Ahmedabad, India during December 15-18, 2019.
7. *Integrated TOPSIS-AHP MCDM using possibility mean and variance in type-2 fuzzy environment*  
International Conference on Applied and Computational Mathematics 2018 held at IIT Kharagpur, India during November 23-25, 2018.

## Teaching Experience

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### TEACHING ASSISTANT, UNIVERSITY OF SOUTH FLORIDA

*Facilitated weekly practice sessions and discussions, developed exams and assignments, provided constructive feedback on student work, and held regular office hours to support student learning in the following courses:*

1. **Deterministic Operations Research / Foundations of Optimization** - ESI 4312 (Fall 2021, Fall 2022, Fall 2023)

2. **Project Management** - EIN 4142/6145 (Summer 2021, Summer 2022, Summer 2023)
3. **Applied Lean Six Sigma** - EIN 4451/6458 (Summer 2023)
4. **Production Control Systems** - EIN 4333/6336 (Spring 2022, Spring 2025)
5. **Probability and Statistics for Engineers** - EGN 3443 (Spring 2021)

## TUTORIAL TALKS

1. *Introduction to Machine Learning Models*  
Data Science Bootcamp 2024 by INFORMS Student Chapter at University of South Florida on April 19, 2024.
2. *Attention Networks for Combinatorial Optimization*  
Presentation for INFORMS Student Chapter at University of South Florida during Fall 2023.

## Outreach & Professional Development

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### CONSULTATION

- **Cobblestone Milk Cooperative** during Summer 2021.  
Developed an optimization software for milk transportation logistics using Julia in collaboration with Sasan Mahmoudinazlou and Changhyun Kwon.

### SERVICE AND OUTREACH

- Tutor for Giunta Middle School, Tampa, through Bright Young Minds Alliance at University of South Florida during Fall 2023 - Spring 2024.
- Session Chair for Routing and Consolidation Issues in Logistics at 2022 INFORMS Annual Meeting, Indianapolis.
- Student Officer, INFORMS Student Chapter at USF during Fall 2021 - Summer 2023.
- Professional Chair, Tau Beta Pi - Florida Gamma Chapter during Fall 2022.

### PEER REVIEW

Optimization Letters  
 Transportation Research Record  
 Socio-Economic Planning Sciences  
 Transportation Research Board Annual Meetings  
 IISE Annual Meeting 2024

### PROFESSIONAL MEMBERSHIPS

INFORMS  
 POMS  
 IISE

## References

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1. Dr. Hadi Gard (Charkhgard)  
Associate Professor  
Industrial & Management Systems Engineering  
University of South Florida  
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2. Dr. Changhyun Kwon  
Associate Professor  
Industrial and Systems Engineering  
Korea Advanced Institute of Science and Technology  
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3. Dr. Reza Ebrahimi  
Assistant Professor  
School of Information Systems and Management  
Muma School of Business  
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ebrahimim@usf.edu