Abhay Sobhanan

Ph.D. Candidate · Industrial Engineering

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Research Interests

Applications: Transportation, Warehouse Operations

Methodology: Exact combinatorial optimization, Heuristics, Machine Learning, Reinforcement Learning

Education

University of South Florida — *Tampa, United States*
Ph.D. in Industrial Engineering — *August 2020 - May 2025*
- Thesis: Optimization Approaches for Large-Scale Last-Mile Delivery Problems
- Major Advisor: Dr. Hadi Gard (Charkhgard)
- 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. [Accepted, Transportation Science]
Sobhanan, A., Park, J., Park, J., & Kwon, C. (2023). Genetic Algorithms with Neural Cost Predictor for Solving Hierarchical Vehicle Routing Problems. arXiv preprint arXiv:2310.14157.
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. [Under review, INFORMS Journal on Computing]
Sobhanan, A., Charkhgard, H., & Dayarian, I. (2024). Equity-Driven Workload Allocation for Crowdsourced Last-Mile Delivery. Optimization Online preprint 27199.
2. [Under review, 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. Chinese Postman Problem with Drones.

Awards, Fellowships, & Grants

2024 **Best Paper Award Finalist**, Operations Research Division, Institute of Industrial and Systems Engineers Annual Conference & Expo 2024. Paper: *A branch-and-price algorithm for emergency humanitarian logistics with a mixed truck-drone fleet*
International Travel Grant ($ 1,500), Office of Graduate Studies, University of South Florida. *For participation in the IISE Annual Conference & Expo 2024.*

2023 **PhD Student Travel Grant ($ 1,000)**, INFORMS TSL Conference 2023 & United States National Science Foundation.

2020 **USF Graduate Fellowship ($ 9,923)**, University of South Florida. *Awarded to selected first year graduate students.*

2018 **Mitacs Globalink Research Internship ($ 6,000 CAD)**, Mitacs, Canada. *Scholarship promoting research among undergraduate students.*

Conference Presentations

1. [To Appear] *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

Teaching Assistant, University of South Florida

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)
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

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

1. Dr. Hadi Gard (Charkhgard)
   Associate Professor
   Industrial & Management Systems Engineering
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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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