# Pushpendra Singh

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## PROFESSIONAL APPOINTMENT

**Lecturer** forthcoming - January 2026
*Thayer School of Engineering,* ***Dartmouth College****, Hanover, NH*

## EDUCATION

**Dartmouth College**, Hanover, NH Sept 2020 – Present
*Doctor of Philosophy Engineering Sciences (Operations Research)* *Advisor Dr. Vikrant Vaze*
*Relevant coursework:* Operations Research, Machine Learning & Statistical Analysis, Discrete Optimization, Foundations of Biostatistics

**University of Michigan**, Ann Arbor, MI Apr 2020
*Master of Science (Industrial and Operations Engineering)* *Advisor Dr. Amy Cohn*
*Master of Science (Computational Discovery and Engineering)*
*Relevant coursework:* Linear Programming I & II, Scheduling, Time Series Analysis, Computational Data Science &Machine Learning, Manufacturing & Supply Operations, Lean Manufacturing

**Dr. APJ Abdul Kalam Technical University**, Lucknow, India May 2016
*Bachelor of Technology, Mechanical Engineering (First Class with Distinction)*

## RESEARCH EXPERIENCE

**Dartmouth College, Thayer School of Engineering** Sept 2020 – Present

- **Optimizing Shared Micromobility Service Network Design under Passenger Choice:** Developed a fast spatial decomposition heuristic solving a large-scale model, enabling $6–40M annual operator savings, up to 22% improved customer accessibility, and reducing daily $CO_2$ emissions by 100+ metric tons.
- **Choice-Based Transportation Network Design via Hybrid Reweighted $\ell_1$-Norm:** Created a generalized algorithm for mixed-integer non-convex network design with passenger choice. Achieved up to 74.43% tighter optimality gaps and significantly faster runtimes on real and simulated cases versus state-of-the-art methods.
- **Tail Assignment Problem:** Designed scalable algorithms to assign aircraft to flight legs, improving fleet utilization and lowering operational costs for airline operations and consulting.
- **Database for modeling passenger travel and delays in the National Air Transportation System in US:** Maintain and analyze the estimated passenger delays for US domestic airlines, developing insights into factors that affect the performance of the National Air Transportation System in the United States.

**University of Michigan, Center of Healthcare Engineering and Patient Safety** Aug 2019 – Sept 2020

- **Optimization and Personalization of Endoscopy Scheduling:** Developed optimization and simulation models to improve patient scheduling under uncertainty, balancing preferences and operational constraints.
- **Specialty Access:** Developed a simulation tool to evaluate scheduling policies for Specialty Care to consider patient preferences. Evaluated how scheduling policies impact access to care for rural patients with gastroesophageal reflux disease while also considering patient preference for appointment modality.

## TEACHING EXPERIENCE

**Dartmouth College**

- **Teaching Assistant:** ENGG 193: Statistical Methods in Engg. (Fall 2025, Fall 2024)
- **Teaching Assistant:** ENGS 103: Operations Research (Spring 2022 [Received Citation])

**University of Michigan**

- **Graduate Student Instructor:** IOE 565: Time Series Analysis (Fall 2019)

## PROFESSIONAL EXPERIENCE

**Dartmouth College, Thayer School of Engineering** June 2025 – August 2025

- Built a web-based scheduling system (Flask, Gurobi) that automates student–instructor slot assignment with availability, capacity and preference handling. Developed an end-to-end scheduling tool for production deployment.

**SAP BW Consultant, Woolworths Group (& TCS)**, Sydney, Australia Aug 2016 – Aug 2018

- Developed SAP BW process chains to automate data pipelines across SAP systems, reducing billing data processing time by 38%.
- Created optimized Bex Query Designer reports, cutting query runtimes by up to 3 minutes, enhancing reporting efficiency.
- Co-developed SAP BW Integrated Planning tool for inventory planning, resulting in estimated annual savings of AUD $80,000.
- Conducted root-cause analysis of reporting discrepancies and managed monthly system upgrades ensuring operational continuity.

## PUBLICATIONS

- Pushpendra Singh, Fernando Rojas, Victor Manuel, Vikrant Vaze. "Transportation Network Design Under Passenger Choice." 2024 58th Asilomar Conference on Signals, Systems, and Computers.
- *[Manuscript editing: Transportation Science ]* Pushpendra Singh and Vikrant Vaze. "Optimizing Shared Micromobility Service Network Design under Passenger Choice."
- *[Manuscript editing: Transportation Science ]* Pushpendra Singh et al. "Choice-Based Transportation Network Design Using Hybrid Reweighted $\ell_1$-Norm Minimization."
- *[In progress]* Pushpendra Singh and Vikrant Vaze. "Tail Assignment Problem for Large Scale Airline Operations."
- Jake Martin, Pushpendra Singh, et al. "Integrated Simulation Tool to Analyze Patient Access to and Flow During Colonoscopy Appointments." ACM and IEEE Winter Simulation Conference, 2020.
- Pushpendra Singh, A.K. Srivastava. "CFD Analysis on Fluidized Bed Gasification of Rice Husk and Rice Straw." Open Access Library Journal, Jan. 2017.

## LEADERSHIP/ MENTORING EXPERIENCE

- **President, Dartmouth INFORMS Student Chapter** June 2024 – May 2025
  Lead chapter activities, represent externally, and guide member engagement.
- **President, Thayer International Student Organization at Dartmouth** May 2022 – Sept 2024
- **SAP Business Warehouse Basics and Testing, Woolworths Group** 2017 – 2018
  Trained 9 employees, and 17 clients on SAP BW fundamentals and testing processes.

## HONORS AND AWARDS

- Citation for Teaching Assistant, Operations Research (ENGS 103), Dartmouth College, 2022
- 2nd Place Poster Presentation, "When can telehealth enable patients to better access specialty care?", University of Michigan, 2019
- 2nd Place Poster Presentation, "Striking a balance when scheduling colonoscopy patients," University of Michigan, 2019
- Gold Medal for Best Undergraduate Thesis: "CFD Analysis on Fluidized Bed Gasification of Rice Husk and Rice Straw," 2016

- Smt. Nirmala Agarwal Memorial Award for College Merit Holders, 2013–2016

## TECHNICAL SKILLS

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| **Programming:** | Julia, MATLAB, Python |
| **Tools/Software:** | Gurobi Optimizer, CVXPY, CPLEX, LaTeX, SAP BW/4 Hana 7.5, UC4, SAP Business Objects, Jira |
| **Methods:** | Optimization modeling, Simulation, Data analytics, Statistical analysis, Process improvement |