

Vrishabh Patil

Ph.D. Candidate in Operations Research | Carnegie Mellon University

vmpatil@andrew.cmu.edu | (412) 954-7412 | vmpatil.github.io | Google Scholar | GitHub

Research Profile

I uncover algebraic and geometric structure that makes optimization methods exact, scalable, and reliable. My research joins **exact computation and discrete optimization**, **cutting-plane geometry and hierarchies**, and **data-driven optimization** for consequential decisions in healthcare, finance, and large-scale logistics. Across these settings, I turn structural properties into implementable algorithms and theoretical guarantees.

Education

Carnegie Mellon University, Tepper School of Business

Pittsburgh, PA

Ph.D. Candidate, Operations Research

Expected May 2027

Dissertation: *Algorithms and Geometry in Optimization*

Advisor: Gérard Cornuéjols

M.S., Operations Research

May 2024

University of Wisconsin–Madison

Madison, WI

B.S., Industrial Engineering, GPA: 4.00/4.00

May 2022

Undergraduate research advisor: Yonatan Mintz

Publications and Manuscripts

Peer-reviewed journal articles

J1. Addressing Estimation Errors on Expected Asset Returns through Robust Portfolio Optimization.

Gérard Cornuéjols, Özgün Elçi, and **Vrishabh Patil**.

Quantitative Finance, 2026.

J2. Healthcare Applications of 0-1 Neural Networks in Prescriptive Problems with Observational Data.

Vrishabh Patil, Kara K. Hoppe, and Yonatan Mintz.

Health Care Management Science, 29(1), Article 6, 2026.

J3. Reducing the Chvátal Rank through Binarization.

Gérard Cornuéjols and **Vrishabh Patil**.

Operations Research Letters, 54, 107119, 2024.

Preprints

P1. Computing a Nonnegative Dyadic Solution to a System of Linear Equations.

Gérard Cornuéjols, Anthony Karahalios, and **Vrishabh Patil**.

Accepted with minor revisions, *Mathematical Programming Computation*, 2026.

P2. A Hereditary Property of Cutting Plane Procedures.

Gérard Cornuéjols and **Vrishabh Patil**.

Submitted to *Mathematics of Operations Research*, 2026.

P3. The Lasserre Rank of the Cropped Cube.

Gérard Cornuéjols, **Vrishabh Patil**, and Jiaye Wei. Preprint, 2026.

Conference Publications

C1. The Chvátal Rank of 2-Dimensional Integer-Free Polyhedra.

G  rard Cornu  jols and **Vrishabh Patil**.

Proceedings of the 9th International Symposium on Combinatorial Optimization, 2026.

C2. Simple and Effective Inventory Hedging for Delivery Promise Optimization.

Cristiana Lara, Arash Haddadan, and **Vrishabh Patil**.

13th Annual Consumer Science Summit, 2026. Amazon internal conference.

Industry Research Experience

Amazon, Modeling and Optimization

Bellevue, WA

Applied Scientist Intern

May–August 2026

- Developed optimization models and algorithms for rapid-delivery network design, jointly addressing facility location and service-region planning.
- Deployed an integer programming model as an end-to-end pipeline supporting long-term network planning.

Research Scientist Intern

May–August 2025

- Designed and implemented online assignment algorithms for delivery-speed optimization that outperformed the baseline approach by 8%.
- Translated operational questions into computational methods in collaboration with scientists, engineers, and business teams.

Teaching Experience

Carnegie Mellon University, Tepper School of Business

Primary Instructor, 70-257 Optimization for Business

Spring 2027

- Appointed to assume responsibility for section-wide instruction, assessment, pacing, and student support in an undergraduate course of approximately 60 students.

Teaching Assistant, 70-257 Optimization for Business

Spring 2024–2026

- Led recitations for approximately 60–80 undergraduate students in each of three offerings and developed instructional material, homework problems, and examinations.
- Taught optimization modeling, the simplex method, and linear, nonlinear, integer, network-flow, and traveling-salesman formulations using Excel Solver.

Teaching Assistant, 46-886 Machine Learning Fundamentals

Spring 2024

- Led recitations for master’s students from varied undergraduate backgrounds using Python and real datasets.

University of Wisconsin–Madison, Department of Computer Sciences

Teaching Assistant, Data Science Programming I

Fall 2020; Spring and Summer 2021

- Facilitated discussion sections, designed exercises and quizzes, and guided students in diagnosing and debugging Python code.

Selected Talks and Presentations

- **Simple and Effective Inventory Hedging for Delivery Promise Optimization.**
INFORMS Annual Meeting, San Francisco, CA. November 2026 (scheduled)
- **Computing a Nonnegative Dyadic Solution to a System of Linear Equations.**
Amazon Modeling and Optimization Seminar. July 2026
- **Computing a Nonnegative Dyadic Solution to a System of Linear Equations.**
Young Researchers Workshop, Cornell University, Ithaca, NY. Poster. October 2025
- **Reducing the Chvátal Rank through Binarization.**
Amazon Modeling and Optimization Seminar. July 2025
- **Reducing the Chvátal Rank through Binarization.**
INFORMS Annual Meeting, Seattle, WA. October 2024
- **Addressing Estimation Errors on Expected Asset Returns through Robust Portfolio Optimization.**
Young Researchers Workshop, Cornell University, Ithaca, NY. Poster. October 2024
- **Prescriptive 0-1 Neural Networks for Personalized Medicine.**
INFORMS Optimization Society Conference, Houston, TX. March 2024

Academic Service and Leadership

CMU INFORMS Student Chapter

- **President** 2024–2026
Organized research seminars and professional and community-building events for operations research students across Carnegie Mellon.
- **Treasurer** 2023–2024

YinzOR Student Conference

- **Conference Co-chair** 2024
Co-led the organizing committee for a two-day operations research conference with more than 70 attendees, 10 research talks, and 21 poster and flash-talk presentations.
- **Flash-Talk and Poster Competition Co-chair** 2023

INFORMS Optimization Society Conference

- Session Co-chair, *Applications of Optimization to Learning in Healthcare* 2024

Awards and Honors

- **William Larimer Mellon Fellowship**, Carnegie Mellon University 2022–2024
- Dean's Honors List, University of Wisconsin–Madison 2018–2022
- Anthony and Alice Thistlethwaite Scholarship for Industrial Engineers 2019, 2021
- Robert A. Ratner Scholarship in Industrial Engineering 2020
- Dorothy Marshall Frawley Scholarship to Honor Charles J. Marshall Frawley 2018

Computing

Programming: Python, C++, R, SQL

Optimization software: Gurobi, CPLEX, Xpress