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THE FRANZ EDELMAN AWARD  
*Achievement in Operations Research*

# Introduction: 2025 Franz Edelman Award for Achievement in Advanced Analytics, Operations Research, and Management Science

Irvin Lustig,<sup>a</sup> Pelin Pekgün,<sup>b,\*</sup> Manoj Chari<sup>c</sup>

<sup>a</sup>Princeton Consultants, Princeton, New Jersey 08540; <sup>b</sup>School of Business, Wake Forest University, Winston-Salem, North Carolina 27109;

<sup>c</sup>Kenan-Flagler Business School, University of North Carolina, Chapel Hill, North Carolina 27599

\*Corresponding author

Contact: [irv@princeton.com](mailto:irv@princeton.com) (IL); [pekguncp@wfu.edu](mailto:pekguncp@wfu.edu),  <https://orcid.org/0000-0001-7223-9801> (PP); [manojchari64@gmail.com](mailto:manojchari64@gmail.com) (MC)

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**Abstract.** This special issue of the *INFORMS Journal on Applied Analytics* (formerly *Interfaces*) is devoted to the finalists of the 2025 annual competition for the Franz Edelman Award for Achievement in Advanced Analytics, Operations Research, and Management Science, the profession's most prestigious award for deployed work. As in previous years, the finalists this year cover a wide range of industries and functions.

**Keywords:** OR practice • business analytics • OR implementation • OR success stories • Edelman Award

## Introduction

It is an honor for us to serve as chair and special issue coeditors of the 2025 annual international competition for the Franz Edelman Award for Achievement in Advanced Analytics, Operations Research, and Management Science. The 2025 competition was held on April 7, 2025, at the INFORMS Analytics+ Conference in Indianapolis, Indiana. Six finalist teams described how they applied operations research (OR) and advanced analytics to solve diverse and difficult decision problems. The problem domains include data-driven race strategy optimization for Olympic cycling; regionalized network design and optimization for online retail; forecasting and supply chain optimization for e-commerce; joint optimization of aircraft, passengers, and crew for airline schedule recovery facing disruptions; and dynamic route optimization for industrial waste collection.

These entries highlight not only the high-impact models the proponents have created but also the remarkable and diverse ways these proponents have made advanced analytics modeling and analysis a part of strategic thinking and operational practice at their organizations. The finalist teams represented four countries—the United States, Germany, China, and India.

on Practice. The purpose of the competition is to bring forward and recognize outstanding examples of advanced analytics, OR, and management science (MS) practice. The award is named in honor of Franz Edelman, who established one of the earliest industrial analytics and OR/MS groups in North America at RCA. He worked at RCA for more than 30 years and is counted among the fathers of innovation in analytics and OR/MS.

The Edelman finalist awards are for implemented work that has had significant, verifiable, and measurable impact. The impact may be beneficial to the organization winning the award (e.g., by increasing its revenues or reducing its costs) or to others (e.g., by improving their customer service or reducing overall environmental impact). In 2025, the prize money totaled \$15,000, with \$10,000 going to the winner. More importantly, the finalists have the honor and satisfaction of knowing their work has been recognized by their peers as the best in the profession. All finalists have their efforts described in this special issue of the journal; in addition, all finalists have their presentations available on the INFORMS YouTube channel: <https://www.youtube.com/playlist?list=PLuvtfhwcPzCQ41H6kRhdqnF-YoahNlx13>.

## About the Edelman Award Competition

The Franz Edelman Award competition is jointly sponsored by INFORMS and the INFORMS Section

## The Process

The Edelman Award process begins with a call for entries in the summer prior to the scheduled competition

date (in 2024 for this competition). The selection committee reviews all entrants and selects a set of semifinalists. Verifiers then work behind the scenes to validate the claims made by each semifinalist and to convey this information to the rest of the selection committee. Verification is performed by a mix of practice-oriented academics and full-time practitioners. The verifiers communicate directly with the entrant's team, the users of the work, and client management. Support from client executives is important. Verification is a crucial element of the competition because it ensures that only the highest-achieving OR/MS and advanced analytics work makes it to the Edelman Award finals. All verifiers are provided with written guidelines and sample verification reports.

The selection committee studies and discusses the verification reports to select six finalists. Coaches are assigned to each finalist team; these coaches help the finalists improve their papers and presentations for the competition. Typically, multiple iterations of paper and presentation drafts are required to clearly convey the work to a general INFORMS readership and audience within a limited number of pages and presentation lengths.

Judges study the papers, listen to the presentations, and then discuss the finalists' accomplishments until they reach a decision on which finalist is most deserving of the Franz Edelman Award for Achievement in Advanced Analytics, Operations Research, and Management Science. Relevant factors include the overall impact and value of the application, the level of technical innovation, the difficulty of the obstacles surmounted, and the work's portability to other application contexts.

## The Banquet

The Edelman finalists were honored at a Gala banquet on the evening of the competition. At an Edelman Honors Reception preceding the banquet, authors of the Edelman finalist papers were designated as Franz Edelman Laureates and presented with medals in recognition of their achievements. At the banquet, organizations that were significantly involved in the analytics development and application were inducted into the Franz Edelman Academy, and high-ranking representatives from these organizations were honored onstage. The culmination of the evening was the announcement of the 2025 first-place team from USA Cycling.

## The Finalists and the Papers in This Issue

Here is a summary of the finalists listed in the sequence in which their papers appear in this special issue, beginning with the 2025 first-place team.

### USA Cycling for Project 4:05: Optimizing USA Cycling's Women's Team Pursuit Gold

USA Cycling, the national governing body for competitive cycling in the United States, set an ambitious goal following the women's team pursuit's sixth-place finish at the 2023 World Championships: win a gold medal in the Paris 2024 Olympics with an analytically derived goal of nearly a seven-second reduction in time in one year. Constrained by limited funding compared with rival teams such as Great Britain, Australia, and New Zealand, USA Cycling launched Project 4:05, a data-driven initiative to optimize every aspect of race strategy. The project integrated OR, machine learning, simulation, and real-time performance monitoring to inform decisions related to athlete selection, rider order, rotation timing, and aerodynamic positioning. A mixed-integer programming framework and goal-time prediction models guided these decisions, whereas wind-tunnel tests and pilot trials helped validate model recommendations on the track, establishing trust among coaches and riders. The result was a significant improvement: a finish time of 4:04.306 in Paris, an eight-second reduction relative to 2023, which secured Olympic gold. The success of the initiative also helped attract new sponsorships and additional U.S. Olympic & Paralympic Committee funding and established a replicable analytics framework that is now being extended to other Olympic disciplines.

### Amazon for Regionalize and Scale: Amazon's Fulfillment Network Design for Faster and Cheaper Delivery

By 2021, Amazon's fulfillment network in the United States spanned hundreds of facilities and delivered more than a billion items annually, reaching a scale where the nonlinear growth in network complexity started generating inefficiencies and resulted in increased costs and reduced delivery speeds. To address these challenges, Amazon launched a transformative initiative referred to as regionalization, which restructured its national fulfillment network into eight interconnected yet largely self-sufficient regions. The initiative employed various OR methodologies to help with region design and fulfillment center mapping, network design and optimization, and inventory-speed tradeoff analysis. It also incorporated what-if simulation capabilities, using discrete event simulation to evaluate alternative operational configurations and validate the large set of network changes required for regionalization. Implemented across the network in early 2023, regionalization enabled a 15% reduction in distance between customers and fulfillment sites, a 12% decrease in middle-mile touchpoints, and an increase in in-region fulfillment from 62% to 76%. The initiative also helped reduce cost-to-serve per unit by \$0.45 in the United States alone while

enabling more than nine billion items to be delivered same or next day globally through 2024.

### **Flipkart for *Faster, Smarter, Leaner: How Flipkart Optimized Its Supply Chain to Unlock Growth***

Serving more than 500 million customers across India and offering more than 150 million products from 1.4 million sellers, the Flipkart Group faced growing challenges in scaling its supply chain to meet surging e-commerce demand and evolving consumer expectations. In 2021, Flipkart launched an overhaul of its planning technology through a unified, end-to-end supply chain planning platform built on machine learning and OR. The platform integrated two core layers, forecasting and optimization, to generate multilevel demand forecasts and convert them into actionable decisions across inventory management, capacity planning, and network flow planning. The solution utilized commercial solvers and specialized heuristics developed to solve problems efficiently given the large scale of Flipkart's operations. Extensive backtesting and user acceptance testing were used to validate its recommendations and build management confidence. The results have been remarkable with manpower utilization improved by 10%, unhealthy inventory reduced by 50%, and one-day deliveries increased by 50%. The platform has also changed planning workflows, reducing planning cycles from 10 days to 1 day, delivered significant cost savings and incremental net sales, and enabled a more agile and efficient supply chain.

### **Lufthansa Group for *Decision Support for Schedule Recovery at Lufthansa Group Airlines***

The Lufthansa Group, one of the largest airline groups in Europe, faced a challenge common to commercial carriers: recovering efficiently from disruptions, where delays, unplanned maintenance, and crew scheduling conflicts can quickly propagate across the network. In 2019, Lufthansa launched a collaboration with Google to develop a comprehensive optimization and decision support system for disruption recovery, the Operations Decision Support Suite (OPSD). Using optimization, large neighborhood search heuristics, and decomposition techniques, OPSD integrated aircraft, crew, and passenger recovery decisions within a unified framework. The system comprised two key solvers: the IrrOptimizer for near-real-time disruption recovery and the Schedule Optimizer for subsequent reoptimization to mitigate any suboptimal assignments introduced during recovery phase. Since its deployment at Swiss International Air Lines in 2022, OPSD has been used daily across more than 1,000 operational days, automating more than 220,000 recovery decisions, which correspond to approximately one-quarter of all schedule changes made by operations controllers. It has enabled €12 million in annual cost savings and a

reduction of 14 kilotons in CO<sub>2</sub> emissions, with projected groupwide savings exceeding €30 million and 50 kilotons of CO<sub>2</sub> annually.

### **SF Express for *SF Express Revolutionizes Its Operations Planning Strategy Using Operations Research***

SF Express, China's largest integrated logistics service provider and one of the world's top four carriers by revenue, realized the need to redesign its logistics network planning as its highly manual processes became increasingly difficult to scale with rising express delivery parcel volumes. In 2018, SF launched a multiyear project to optimize its intercity air, intercity ground, and intracity networks using advanced OR techniques. The effort devised a centralized planning framework that balanced flexibility, where planners could interact with models in various scenarios, with accuracy so that key decisions could be made using the models. Given the large scale of its network, SF adopted a sequential approach that decomposed the overall planning problem into several subproblems and employed efficient heuristics and metaheuristics. Since its launch in 2018, the project has resulted in more than \$1 billion in cost savings, shorter delivery times for more than one billion parcels, and reductions of millions of tons of CO<sub>2</sub> emissions. It has also reduced the decision-making period for planners from weeks to hours and supported the launch of SF's half-day delivery service in 2022, now serving more than 270 cities and 10 million customers.

### **WM for *Dynamic Route Optimization and Automation of Industrial Routes at WM***

WM, North America's largest provider of recycling solutions, operates about 18,000 collection trucks across the United States and Canada, providing collection, recycling, and disposal services to millions of customers. Following the COVID-19 pandemic, its industrial (roll-off) waste collection operations faced growing inefficiencies due to highly variable daily demand, same-day service requests, and manual route planning practices. To address these challenges, in 2021, WM started the development of a dynamic route optimization program that integrates demand forecasting, capacity planning, and route optimization. Given the large scale of the problem, with thousands of customer services processed daily across all sites, and run-time constraints due to business requirements, a heuristic-based approach was employed to solve the roll-on/roll-off vehicle routing problem with time windows. In 2024, the use of the solution in WM's industrial line of business led to a 1.24% year-over-year efficiency improvement, translating to \$11 million in annual savings, along with a 50% reduction in bridge-overhead-strike incidents and a

10% improvement in on-time service reliability within four-hour windows. These gains contributed to a 157-basis-point operating margin improvement year over year, which was the highest reported in the division's history.

## Conclusion

The Edelman finalists' papers make this issue of the journal special for both practitioners and academics. Practitioners can benefit in at least four ways. First, they will find better ways of accomplishing their work using advanced analytics models in a diverse group of organizations in both the private and public sectors. Second, they will find better ways to advocate their ideas to others within their organizations by pointing out the impact of adopting analytics approaches. Third, they will learn how to bring about change in an organization to make OR-based modeling and analysis an integral part of its culture. Finally, they can be inspired to tackle challenging problems and make the modeling choices necessary for their effective solution and deployment.

Academics will find validation of the advanced methodologies they teach and will be able to demonstrate what can be achieved with OR/MS and advanced analytics. Furthermore, these examples illustrate how model customization is often required to suit the problem context.

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