

Nolan Willoughby

Curriculum Vitae

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PERSONAL DETAILS

MSc Operational Research

University of Edinburgh – School of Mathematics

September 2025 - August 2026 | Edinburgh, UK

B.S. Industrial Engineering

Worcester Polytechnic Institute – The Business School

Graduated with Distinction

September 2022 - December 2024 | Worcester, MA, USA

Academic Interests: Discrete Optimization, Stochastic Optimization, Fairness, Social Good, Public Infrastructure, Transit, Sustainability

EMPLOYMENT HISTORY

Management Engineering Co-op

Saint Luke's University Health Network – Management Engineering

Jan. 2025 - Jun. 2025 | Bethlehem, PA, USA

Began development of a whole-hospital simulation model of the network's main campus in Bethlehem focusing on patient flow. The model was developed to help executives at Bethlehem better understand current flow within the campus and the potential effects of the upcoming expansion of a nearby campus. Work mostly focused on input analysis and feedback from unit managers, and involved extensive data analysis using Microsoft SQL Server Management Studio, Excel, and VBA.

PROJECTS

MSc Dissertation: Pairing Carers for Home Healthcare Routing and Scheduling

Jun. 2026 - Aug. 2026

Currently exploring the synchronization problem in the context of pairing carers for the day in a home healthcare context. Constraints such as time windows, skill matching, continuity of care, synchronization, labor regulations, and specific healthcare-related constraints are being considered while attempting to ensure solutions which are cost-efficient and result in satisfactory patient and staff outcomes. Both exact and heuristic methods are being considered, as is the context of this problem as the first step in home healthcare planning.

Major Qualifying Project: Improving Job Matching Through Skill Elicitation

Aug. 2023 - Mar. 2024 | Sponsor: Intrare

Worked within a group of four on a capstone project developing a skills assessment and skills consideration for an Integer Programming-based job-matching algorithm. Special attention was paid during development to the needs of the user base, which consisted of people from marginalized demographics such as refugees, migrants, single mothers, people recently released from incarceration, and members of the LGQTQI+ community.

Interactive Qualifying Project: Urban Waste Management: Lyonnais Lessons

Mar. 2024 - Jul. 2024

Collaborated with an interdisciplinary team to conduct a case study on the urban waste management system in Lyon, France. Findings were synthesized into a framework of best practices and presented on the group's project website clean-lyon.eu. Was personally responsible for all communications in French including expert interviews and site visits.

Topics in Applied OR: University Timetable Optimization

Jan. 2026 - Apr. 2026

Developed an integer programming-based model with a genetic algorithm to optimize university timetables at the University of Edinburgh. Our team advised the university's timetabling office on time-related aspects of the timetable, including potential reductions to core teaching hours and the implementation of a lunch hour. Worked on data analysis using Excel and Pandas and model implementation in Python and Gurobi.

Methodology, Modelling, and Consulting Skills: Optimization for a Potential Cycle Hire Scheme

Oct. 2025 - Nov. 2025 | Collaboration with Sopra Steria

Used a dataset of >33,000 points of interest in Edinburgh and an ESG framework to develop an optimization model recommending the location and size of stations in a potential new cycle hire scheme in the city. The model was implemented in FICO Xpress, and results were presented to representatives of Sopra Steria and Edinburgh City Council.

WRITTEN WORK

Sasha Daraskevich, Ben Erwin, Mikaela Milch, & **Nolan Willoughby** (2024)

Equitable Employment Solutions: Enhancing Skills Matching for Marginalized Groups

Digital WPI

Casey LaMarca, Conner Olsen, Ming Tang, & **Nolan Willoughby** (2024)

Urban Waste Management: A Case Study of Lyon, France

Digital WPI

SOCIETIES

Institute of Industrial and Systems Engineers (IISE)

Institute for Operations Research and the Management Sciences (INFORMS)

OR Society

University of Edinburgh Cycling Club

SKILLS AND OTHER INTERESTS

Programming: Python, Java, VBA, C, SQL, R, Matlab, Mosel

Languages: English (native), French (B2), Dutch

Other Interests: Cycling, Languages, Coffee, Competitive Pokémon, Hiking, Baking, Tree Climbing