WISDOM presents YoungWomen4OR in:
"Location and Routing"
Join us for a coffee and a chat!

What: EURO WISDOM Forum YoungWomen4OR Talks[1]

Where: Zoom - Register in this Google Form https://forms.gle/MpXV7Gn1nYCcpNBB6 to receive the Zoom link - The webinar is going to be recorded and made available afterwards.

When: Friday, March 22nd, 15:00 – 16:00 (Central European Time)

Webinar Format

- Introductions/Webinar etiquette
  - o Dr. Dilek Günneç, Özyeğin University, Turkey – 5 minutes.
- Location and Routing – YoungWomen4OR Talks, each 10 minutes:
  - o *Multi-period single-allocation hub location-routing* – Afaf Aloullal
  - o *Pattern recognition meets branch-and-bound: Regional branch variable selection for the Capacitated Facility Location Problem* – Hannah Bakker
  - o *Solving the Rural Postman Problem with a fleet of drones* – Paula Segura Martinez
- Meeting the challenges - Overview/Current Challenges, synergies with existing work
  - o Prof. Sibel Alumur Alev, University of Waterloo, Canada – 10/15 minutes
- Moderated open discussion with Coffee and Networking – 15 minutes

YoungWomen4OR Speakers

Afaf Aloullal, *Polytechnic University of Hauts-de-France, France*

Title: Multi-period single-allocation hub location-routing

Abstract: The presentation will cover the use of time-dependent decisions within the hub-location routing problem. Instead of establishing the entire system in a single period, a planning horizon divided into multiple periods will be considered. General network design decisions are considered, and the origin-destination flows, and costs are assumed to be time-dependent. The proposed mathematical model and a four-phase matheuristic will be briefly presented. The matheuristic incorporates relax-and-fix principles, variable neighborhood descent, and local branching schemes. The results obtained will be discussed to illustrate the importance of integrating time into the decision-making process.

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[1] WISDOM is a forum to support, empower, and encourage the participation of all genders in Operational Research and Management Science. It is an initiative supported by EURO, the Association of European Operational Research Societies. Please visit: https://www.euro-online.org/web/pages/1654/wisdom

Hannah Bakker, *Karlsruhe Institute of Technology, Germany*

Title: Pattern recognition meets branch-and-bound: Regional branch variable selection for the Capacitated Facility Location Problem

Abstract: Ever wondered why some instances of the Capacitated Facility Location Problem (CFLP) take so much longer to solve than others despite them being of the same size? We show that for the CFLP, the combinatorial element of the mixed binary problem formulation manifests itself in subsets of facilities serving larger groups of customers optimally in combination. We call these subsets service regions and demonstrate that they can already be derived from integer-infeasible solutions by means of pattern recognition. Facilities serving customers of the same service region interdepend more strongly than those serving customers from different service regions. Acknowledging the interdependence relationships in the branch-and-bound search process by explicitly including them in the branch variable selection step may significantly speed up the search process, particularly for the "hard" CFLP instances.

Paula Segura Martinez, *Valencia Polytechnic University, Spain*

Title: *Solving the Rural Postman Problem with a fleet of drones*

Abstract: Given an undirected graph G and a subset E_R of edges of G, which are called required edges, the goal of the Rural Postman Problem (RPP) is to find a tour on G traversing each edge in E_R at least once with minimum total cost. In this talk, I will address an extension of this classical arc routing problem that considers a fleet of homogeneous drones with limited autonomy to perform the required service. The use of these aerial vehicles involves significant changes in the traditional way of modeling and solving the RPP, since drones can travel directly between any two points of the network (not necessarily vertices of the graph) and, therefore, the problem becomes a continuous optimization problem with an uncountable number of feasible solutions. I will summarize the heuristic and exact approaches we have developed for solving this new variant.

WISDOM

WOMEN IN SOCIETY:
DOING OPERATIONAL RESEARCH
AND MANAGEMENT SCIENCE

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THE ASSOCIATION OF
EUROPEAN OPERATIONAL
RESEARCH SOCIETIES

Subject matter expert:

Prof. Sibel Alumur Alev, *University of Waterloo, Canada*

Dr. Alumur Alev is a tenured Associate Professor in the Department of Management Science and Engineering at the University of Waterloo. She received her Ph.D. degree in Industrial Engineering from Bilkent University in 2009 and subsequently served as a Post-Doctoral Researcher at the Institute of Operations Research at Karlsruhe Institute of Technology, Germany. Before joining the University of Waterloo in 2014, she worked as an Assistant Professor at TOBB University of Economics and Technology in Ankara. In 2017, she received the Chuck ReVelle Rising Star Award from the Institute for Operations Research and the Management Sciences (INFORMS) as a recognition of her research accomplishments in Location Analysis. In 2020, she received an Outstanding Performance Award at the University of Waterloo and in 2023, she was awarded the Engineering Research Excellence Award in recognition of her outstanding research accomplishments in the Faculty of Engineering. She served as a Board Member for the EURO Working Group on Locational Analysis (EWGLA) and as the President of the INFORMS Section on Location Analysis (SOLA). She is the Founding President of the Transportation & Logistics Special Interest Group of the Canadian Operational Research Society (CORS) and also serves as a Councillor for CORS. She currently serves as the Senior Associate Editor for the journal Socio-Economic Planning Sciences, an Associate Editor for the journals Transportation Science and Service Science, an Editorial Board Editor for Transportation Research Part B, and an Editorial Board Member for Computers & Operations Research. Her research projects were funded by the Scientific and Technological Research Council of Turkey (TUBITAK), including a "National Young Researchers Career Development Grant", the Natural Sciences and Engineering Research Council of Canada (NSERC), and Mathematics of Information Technology and Complex Systems (MITACS). She guest-edited four separate special journal issues to date and organized clusters, streams, and sessions at several international conferences. Her research interests lie in optimizing facility locations and logistics operations, in particular, hub location, hub network design, supply chain and reverse logistics network design.