



# **5th IMA and OR Society Conference on Mathematics of Operational Research**

**PROGRAMME  
30 April – 2 May 2025**



INSTITUTE OF  
**MATHEMATICS &  
ITS APPLICATIONS**



**OPERATIONAL  
RESEARCH  
SOCIETY**

## Welcome to the 5<sup>th</sup> joint Institute of Mathematics (IMA) and Operational Research Society (ORS) conference

We are delighted that you are able to join us for the 5<sup>th</sup> joint IMA and ORS conference in Aston, Birmingham. Welcome!

In response to extremely positive feedback in recent years, this year the conference spans two and a half days, as opposed to one and a half. We hope this will go some way to satisfying our community's demand for more operational research and management mathematics related events in the UK – and of course we are delighted to welcome colleagues from across the globe. There has never been a greater need for our research. Indeed, the thematic diversity of the research we shall be sharing and discussing over the days demonstrates the relevance of operational research in these turbulent times we are living through. The range of approaches adopted highlights the scope for going beyond traditional methodologies and/or application areas.

As many of us are all too aware, this has been another challenging year for the UK academic sector, with the financial viability of UK public Universities once again being put to the test. Many colleagues who had hoped to join us have simply not been able to. Whilst we will certainly miss them, the silver lining is that we have been able to design a more streamlined programme that allows for longer presentations and larger audiences. We shall surely all benefit from this set up.

We hope that this will be an exciting two and a half days of learning together and that it will provide you with an important opportunity to meet colleagues and peers, to develop new relationships as well as catch up with old friends. In addition to the presentations – which cover an impressive range of subjects and adopt an exciting variety of methodologies – we have five terrific keynotes. Collectively, these keynotes cover the broad spectrum of management mathematics. We can also look forward to some exciting panel discussions, an ECR event and a poster session.

Do please note that there will be a special issue of the IMA Journal of Management Mathematics (IMAMAN, Oxford University Press) dedicated to the conference. All presenters are welcome to submit their papers for peer review for IMAMAN by the end of June 2025.

If you have any questions or queries, don't hesitate to get in touch with me or another member of the organizing committee. There is an IMA desk at the conference and I'm also happy to help if you need anything, just get in touch at [Aris@cardiff.ac.uk](mailto:Aris@cardiff.ac.uk)

Before signing off, I would like to extend a huge thanks to Pam Bye, Liz Norfolk and Oliver Colquhoun-Driscoll from the IMA, who have done tremendous work to ensure a successful conference. Thank you very much. Many Thanks also to the Smith Institute for supporting the best poster award, and to the following Universities for their various financial and in kind contributions: Brunel, Cardiff, Durham, Northumbria and Lancaster.

We hope you will enjoy the conference as much as we enjoyed putting it together. Here's to an excellent scientific event!

Aris

and on behalf of the organizing committee.

Paresh Date, Adam Letchford, Dilek Onkal, Anna-Lena Sachs (programme chair), Aris Syntetos (conference chair)

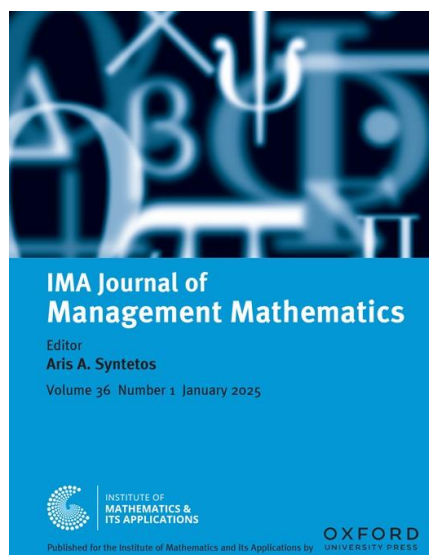
## IMAMAN Submission

Presenters are encouraged to submit their full paper to the IMA Journal of Management Mathematics (IMAMAN). Deadline for submission of full papers to IMAMAN is the 30th June 2025 (i.e. 2 months after the conference). We welcome papers in any of the six major Areas covered by the journal.

- Decision Analysis
- Finance
- Health and Society
- Multidisciplinary management mathematics
- Operations
- Sport

Please reach out to the journal's editors, many of whom will be attending the conference, to discuss your work and its possible submission to IMAMAN.

All submission details can be found on the website <https://academic.oup.com/imaman>



***IMA Journal of Management Mathematics (IMAMAN, published by Oxford University Press)***

We look forward to your submission.

## DAY ONE- Wednesday 30<sup>th</sup> April

| Start time | Rooms:                                                                                                                                                                              | Stream 1<br>FIRST FLOOR<br>Meeting Room 123                                                                                                                                | Stream 2<br>FIRST FLOOR<br>Meeting Room 134                                                                          | Stream 3<br>FIRST FLOOR<br>Meeting Room 127                                                                                   | Stream 4<br>FIRST FLOOR<br>Meeting Room 139                                                                                                                                  | Stream 5<br>FIRST FLOOR<br>Meeting Room 141                                                         | Stream 6<br>FIRST FLOOR<br>Meeting Room 122                                                        |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| 08:45      | Registration. Tea, coffee and pastries on arrival                                                                                                                                   |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 10:30      | Welcome from the organising committee (GROUND FLOOR - Conference Room 1)                                                                                                            |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 10:45      | Keynote 1 (Conference Room 1)<br>Ruud Teunter – Service Level Differentiation<br>Chair: Anna-Lena Sachs, Lancaster University                                                       |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 11:45      | Parallel Sessions (90 min)                                                                                                                                                          | Accreditation and Chartership for Mathematicians and Operations Researchers<br>(Panel: Gavin Blackett, Caroline Irwin, Karrie Liu, Daniel Tilley, Chair: James Van Yperen) | Behaviour-led Approaches in Sustainable Transportation<br>(Organiser and chair: Selin Ahipasaoglu)                   | Responsible OR in the Era of AI and New Economic Models (Organiser and chair: Xishu Li)                                       | Topics in Optimisation I (Chair: Erindi Allaj)                                                                                                                               | OR applications I (Chair: Xuan Vinh Doan)                                                           | Forecasting (Chair: Manuel Muth)                                                                   |
|            |                                                                                                                                                                                     |                                                                                                                                                                            | Integrating pricing, routing and scheduling decisions in the optimization of demand responsive transport (C. Currie) | Optimizing workforce dynamics on gig platforms: the role of forecast sharing and trust (Y. Yin)                               | What’s new in FICO Xpress (T. Gally)                                                                                                                                         | The ‘je ne sais quoi’ of algorithms that foster human centric analytics design (C. Phillips)        | Forecast congruence: a quantity to align forecasts and inventory decisions (K. Pritularga)         |
|            |                                                                                                                                                                                     |                                                                                                                                                                            | Towards flexible multi-mode travel planning via Markov models and traffic equilibrium (W. Su)                        | Trust and fairness in platform-supplier contracts: navigating supplier concerns in the sharing economy (X. Li)                | Category captains, assortment decisions and exclusion: A game-theoretical model (K. Patel)                                                                                   | Federated learning with sample selection: a robust optimization approach (X. V. Doan)               | Forecasting demand during and after supply chain disruptions using a shock smoother ETS (R. Arora) |
|            |                                                                                                                                                                                     |                                                                                                                                                                            | Enhancing carsharing pricing and operations through integrated choice models (S. Ahipasaoglu)                        | The hidden supply chains of AI: ethical sourcing, recycling, and geopolitical implications (X. Li)                            | A four-objective mean-variance-CVaR-ESG model for portfolio selection problem (E. Allaj)                                                                                     | A network DEA two-stage model for efficiency evaluation of wind power plants in India (J. Luhanial) | Economic indicators to optimise sales forecast accuracy in the consumer goods sector (M. Muth)     |
| 13:15      | Lunch                                                                                                                                                                               |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 14:15      | Parallel Sessions (120 min)                                                                                                                                                         | Integer Optimisation: Theory and Applications<br>(Organiser and chair: Iskander Aliev)                                                                                     | Industrial Applications of Optimisation<br>(Organiser and chair: Jeremy Bradley)                                     | OR Applications II<br>(Organiser and chair: Thu Dang)                                                                         | Inventory and Supply chains (Organiser and chair: Christos Papanagnou)                                                                                                       |                                                                                                     |                                                                                                    |
|            |                                                                                                                                                                                     | Strongly connected orientations and integer lattices (A. Abdi)                                                                                                             | On robust inventory optimization for bike sharing. (H. Wang)                                                         | Constrained Markov decision processes for response-adaptive procedures in clinical trials with binary outcomes (S. Baas)      | Dancing to the rhythm of demand: Inventory control for compound renewal demand (S. Van der Auweraer)                                                                         |                                                                                                     |                                                                                                    |
|            |                                                                                                                                                                                     | Sparsity and proximity transference in integer programming (I. Aliev)                                                                                                      | Algorithms for shipping container delivery scheduling. (D. Letsios)                                                  | Exact statistical analysis for response-adaptive clinical trials: A general and computationally tractable approach (P. Jacko) | A fractional-order inventory model for deteriorating items with dynamic demand, trade credit, and hybrid payment policies: A meta-heuristic optimization strategy (V. Yadav) |                                                                                                     |                                                                                                    |
|            |                                                                                                                                                                                     | A tutorial on dual ascent (A. Letchford)                                                                                                                                   | Creating a cross-sector vehicle route optimiser for heavy freight (A. Rahman)                                        | Optimizing packaging for an eCommerce business (J. Fairbrother)                                                               | On managing the dynamics of pure remanufacturing systems (T. Goltsos)                                                                                                        |                                                                                                     |                                                                                                    |
|            |                                                                                                                                                                                     | New bounds for the integer Caratheodory rank (M. Hogan)                                                                                                                    | Optimising warehouse picking with simulation (Y. Tan)                                                                | Revolutionizing production scheduling: optimized multi-constraint solutions for sustainable manufacturing (J. Liu)            | Dynamic Impacts of Rationing in Supply Chains: Analysing the Bullwhip Effect and Inventory Fluctuations (C. Papanagnou)                                                      |                                                                                                     |                                                                                                    |
| 16:15      | Afternoon tea and coffee break                                                                                                                                                      |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 16:45      | Keynote 2 (Conference Room 1)<br>Simge Küçükyavuz – Mixed-Integer Convex Optimization for Statistical Learning, Lancaster University<br>Chair: Adam Letchford, Lancaster University |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 17:45      | Comfort break                                                                                                                                                                       |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 18:00      | ECR Event (Conference Room 1)<br>(Chair: Luke Rhodes Leader)                                                                                                                        |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |
| 19:30      |                                                                                                                                                                                     |                                                                                                                                                                            |                                                                                                                      |                                                                                                                               |                                                                                                                                                                              |                                                                                                     |                                                                                                    |

DAY TWO – Thursday 1<sup>st</sup> May

| Start time | Rooms:                                                                                                                                                                            | Stream 1<br>FIRST FLOOR<br>Meeting Room 123                                                                                           | Stream 2<br>FIRST FLOOR<br>Meeting Room 134                                                             | Stream 3<br>FIRST FLOOR<br>Meeting Room 127                                                                                                                                  | Stream 4<br>FIRST FLOOR<br>Meeting Room 139                                                                                  | Stream 5<br>FIRST FLOOR<br>Meeting Room 141                                                                            |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 08:00      | Registration. Tea, coffee and pastries on arrival                                                                                                                                 |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 08:45      | <b>Keynote 3 (Conference Room 1)</b><br>Banu Lokman – Multi-Objective Optimization for Better Decisions: Methods and Applications<br>Chair: Paresh Date, Brunel University London |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 09:45      | Morning tea and coffee break                                                                                                                                                      |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 10:00      | Parallel Sessions<br>(120 min)                                                                                                                                                    | <b>Maths &amp; OR in Healthcare I</b> (Organisers and chairs: Karrie Liu and James Van Yperen)                                        | <b>Behavioural OR I</b> (Organiser and chair: Ayse Kocabiyikoglu)                                       | <b>Simulation</b> (Organiser and chair: Luke Rhodes-Leader)                                                                                                                  | <b>OR Applications II</b> (Organiser and chair: Johannes Schmidt)                                                            | <b>Logistics and Inventory Management</b> (Organiser and chair: Ben Lowery)                                            |
|            |                                                                                                                                                                                   | Operational decision support in hospital care: scheduling patients and predicting pathways with Patient Catalyst (E. Watkinson-Deane) | Analytical tools for hostility prediction: a case study for fire and rescue services (C. Richardson)    | Mutual validation of discrete-event simulation and system dynamics models (S. Naumov)                                                                                        | Simulation and optimization of an emergency medical service system under heavy rainfall conditions (S. Zell)                 | Decomposable impulsive Markov decision processes with application to series-parallel systems in logistics (L. Fairley) |
|            |                                                                                                                                                                                   | Wait time forecasts in NHS mental health hospitals: a success story with discrete event simulation (J. Mills)                         | Randomized bundle pricing with patient customers: theory and experiment (A. Kocabiyikoglu)              | Sequential optimisation of stochastic systems using streaming simulation (R. Lambert)                                                                                        | Sports league scheduling with mini-tournaments (J. Schmidt)                                                                  | Semi-Lagrangian relaxation for the simple plant location problem (L. Durrell)                                          |
|            |                                                                                                                                                                                   | Discrete-time vs flow-based: the multi-mode resource constrained project scheduling problem in telemedicine (C. Marshall)             | Harnessing behavioural nudges to reduce food waste: an experimental approach (K. Tüzün)                 | Derivative-free and black-box stochastic optimisation solvers for simulation optimisation under fixed oracle budgets (B. Rees)                                               | Supply chain Stackelberg differential game for a manufacturer with cheap innovation (V. Turetsky)                            | Inventory management for preventive and corrective maintenance under supply chain risks (J. Rutherford)                |
|            |                                                                                                                                                                                   | Geospatial route-planning: an algorithmic approach (P. Carroll)                                                                       |                                                                                                         | Digital twin validation with multi-epoch, multi-variate output data (L. Rhodes-Leader)                                                                                       | Can machine learning models better volatility forecasting? A combined method (J. Chen)                                       | Periodic review inventory control for an omnichannel retailer under partial lost-sales (B. Lowery)                     |
| 12:00      | Lunch                                                                                                                                                                             |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 13:00      | Parallel Sessions<br>(90 min)                                                                                                                                                     | <b>Maths &amp; OR in Healthcare II</b> (Organiser and chair: Karrie Liu and James Van Yperen)                                         | <b>Behavioural OR II</b> (Organiser and chair: Ayse Kocabiyikoglu)                                      | <b>Forecasting and Predictive Analytics</b> (Organiser and chair: Huijing Chen)                                                                                              | <b>Supply Chains and Operations Excellence</b> (Organiser and chair: Alireza Shokri)                                         |                                                                                                                        |
|            |                                                                                                                                                                                   | Queue&A&E: what mathematical modelling can tell you about your waiting times (J. Van Yperen)                                          | A behavioural study on telemedicine acceptance (N. Ayvaz-Çavdaroğlu)                                    | Triple-loop learning in retail demand forecasting: a systematic evaluation of benchmarking and reproducibility of Machine Learning models and roadmap for research (H. Chen) | Industry 5.0: technology adoption to support data-driven decision-making in a hybridised working environment (C. Richardson) |                                                                                                                        |
|            |                                                                                                                                                                                   | Mathematical modelling for decision-making in healthcare: a case study on hospital mergers (K. Liu)                                   | Balancing advice: decision-making with multiple forecasting inputs under asymmetric loss (B. Moghtader) | Why do zeroes happen? A model-based view on demand classification (I. Svetunkov)                                                                                             | Challenges and expectations of utilising a digital testbed for supply chain optimisation (A. Shokri)                         |                                                                                                                        |
|            |                                                                                                                                                                                   | <b>Discussion Panel:</b> Bridging the gaps between the NHS, universities, and consultancies in healthcare (J. Van Yperen)             | Bridging the gap: behavioral Insights into human-machine collaborative decision-making (A. Gurler)      | Alternative approaches to bootstrapping for intermittent demand forecasting (Z. Babai)                                                                                       | Algorithmic foundations and applications of a digital testbed for supply chain optimization (O. Ada-Ibrama)                  |                                                                                                                        |
| 14:30      | Afternoon tea and coffee break                                                                                                                                                    |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 15:00      | <b>Keynote 4 (Conference Room 1)</b><br>James Reade – Systems of rating players<br>Chair: Dilek Onkal, Northumbria University                                                     |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 16:00      | Comfort break                                                                                                                                                                     |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 16:15      | <b>EDI in Maths Sciences (Conference Room 1)</b><br>(Organizer and chair: Howard Haughton<br>Panel: Anastasia Sofroniou, Madeleine Hall, Ejay Nsugbe)                             |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 17:45      | Comfort break                                                                                                                                                                     |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 18:00      | <b>Poster session (Includes cash bar) Please Note: Drinks are not paid for by the IMA.</b>                                                                                        |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |
| 19:30      | Dinner (with speeches and best poster award)                                                                                                                                      |                                                                                                                                       |                                                                                                         |                                                                                                                                                                              |                                                                                                                              |                                                                                                                        |

## DAY Three – Friday 2<sup>nd</sup> May

[illegible]

Poster Session Thursday 1st May 18:00

|                                                                                                                      |                |
|----------------------------------------------------------------------------------------------------------------------|----------------|
| Smoothness-aware tabular reinforcement learning in pricing for revenue management                                    | A. Page        |
| Forecasting of inventory record inaccuracies                                                                         | A. Syntetos    |
| A novel stochastic derivative-free trust-region algorithm with adaptive sampling and moving ridge functions          | B. Rees        |
| Fermatean fuzzy fairly aggregation operators with multi-criteria decision-making                                     | I. Aldayel     |
| Statistical analysis of intermediate level waste to support the waste management strategy in nuclear decommissioning | K. Harper      |
| Real-time simulation for improving patient flow in emergency departments                                             | N. Amarasinghe |
| Sustainable measures are inherently lean                                                                             | S. Pathak      |

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