The 2nd EWG/DSO EURO PhD School "Data Science Meets Combinatorial Optimisation"
Eindhoven University of Technology, The Netherlands

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Organized by the EURO working group DSO "Data Science meets Optimization", the second EURO PhD school (https://sites.google.com/view/phd-school-dso-2025) was held at Eindhoven University of Technology, from 25 August to 29 August.

The PhD school welcomed over 40 PhD candidates, from 30 universities over 9 countries, to explore the interface between data science, machine learninig, and combinatorial optimization.

Combinatorial optimisation problems (COPs) are often NP-hard. Recent advances in machine learning (ML) have begun transforming how these problems are addressed, by identifying patterns in problem instances, predicting algorithm performance, and learning to generate high-quality solutions. At the same time, optimisation techniques play a key role in making AI systems more transparent, robust, and fair. The school's primary goal was therefore to equip early career researchers with state-of-the-art integrated methods and tools from both fields, and create networking opportunities for future collaboration. Over five days, participants engaged in a combination of lectures**,** hands-on exercises and student presentations.

Day 1: Black-Box Optimisation & Student Presentations

Professor Carola Doerr from Sorbonne University opened the school with a lecture on Black-Box Optimisation. In the afternoon, Dr. Diederick Vermetten (Sorbonne University) led a hands-on lab where students implemented algorithms on benchmark problems and competed in an MA-BBOB challenge. Afterwards, five PhD students presented their own research.

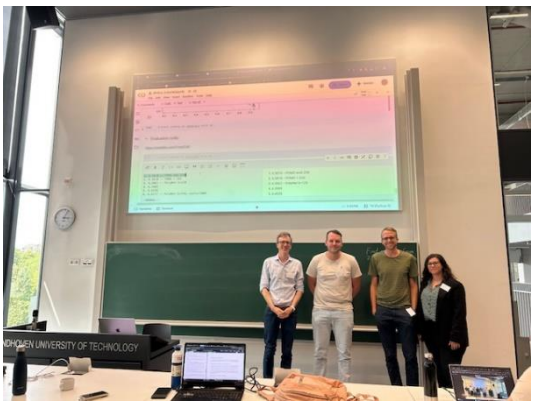
Students working hard on the lab assignment, given by Prof. Carola Doerr and dr. Diederick Vermetten

The winners of the MA-BBOB competition!

Day 2: Deep Reinforcement Learning & Student Presentations

Professor Kevin Tierney from Bielefeld University gave a lecture on “Deep Reinforcement Learning for Vehicle Routing Problems”, followed by a lab session with again a competition! Before heading to a Chinese restaurant for a group dinner, eight PhD researchers presented their work and received feedback from lecturers and peers.

Prof. Kevin Tierney is giving a lecture.



The winners of the VRP competition!

Day 3: Instance-Space Analysis, Uncertainty in Optimisation, Social Event

The morning featured a lecture by Professor Kate Smith-Miles from University of Melbourne on “Instance-Space Analysis”. In the afternoon, Dr. Pieter Smet from KU Leuven discussed “Uncertainty in Optimisation”. After these two lectures, a social event was organized. The participants of the school and the teachers were split into three groups to join a guided city tour of Eindhoven. In the evening, the official school dinner was at a cozy restaurant.

Prof. Kate Smith-Miles is giving her lecture.

1City tour of Eindhoven

School Social Dinner

Day 4: Symposium “AI meets Optimisation”

A symposium “AI meets Optimisation” was held on campus, where invited speakers from academia and industry discussed state-of-the-art research and applications at the intersection of AI and OR. The symposium welcomed over 60 attendees, including PhD students from the school. The EURO President Professor Frits Spieksma (TU Eindhoven) and the Chair of EWG/DSO Professor Patrick de Causmaecker (KU Leuven) opened the symposium.

Prof. Wim Nuijten presenting a research project on learning and explaining supply chain optimization

The invited speakers include:
Wim Nuijten (Eindhoven AI Institute): EAISI and Solving Hard OR Problems with AI
Kate Smith-Miles (University of Melbourne): Quantum Optimisation: beyond the hype
Ilker Birbil (University of Amsterdam): Scratching the Surface of Explainable Optimization: Counterfactual Explanations
Zaharah Bukhsh (TU Eindhoven): Offline Reinforcement Learning for Machine Scheduling
Michael Römer (Bielefeld University): Combining Graphical Optimization Models and Machine Learning for Scheduling under Uncertainty
Neil Yorke-Smith (TU Delft): Robust Decision-Focused Learning
Yaoxin Wu (TU Eindhoven): Graph Learning for Solving Integer (Non)linear Programming
Pavel Troubil (Dassault Systèmes): Bridging Optimization and Reality: Predicting Schedule Execution with ML
Cynthia Luijkx (ORTEC): The Last Mile in Routing Optimization: Tackling Real-World Challenges with AI
Two students from the school also had a nice opportunity to deliver research talks.

Day 5: Learning Optimal & Robust Decision Trees

At the last day of the school, Professor Sicco Verwer, together with Dr. Daniel Vos (TU Delft), delivered the final lecture on building transparent and fair machine-learning models using optimization-based decision trees. The school concluded after lunch.

Prof. Sicco Verwer and Dr. Daniel Vos discuss how to learn decision trees with optimization techniques

Besides generous support of EURO (the European Association of Operational Research Societies), the school also received financial support from several local organizations and companies, including NWO (Dutch Research Council), SIKS (Dutch Research School for Information and Knowledge Systems), VVSOR (Netherlands Society for Statistics and Operations Research), TU/e EAISI (Eindhoven AI Institute), Dassault Systèmes, and Ortec. The local organization team includes Yi-Ming Yong, Xia Jiang, Igor Smits.

Students were immersed into a variety of advanced subjects largely covering interaction between the research domains. Young PhD students met in discussions on science as well as on research culture at different universities, in close interaction with experienced researchers, while lecturing or presenting, during the guided tour through Eindhoven, at the social dinner or simply at a coffee break, making the school an experience for life.

The School also attracted some attention on LinkedIn, where several posts highlighting its programs and achievements.

Yingqian Zhang • You
Associate Professor of AI for decision making @ TU/e | Chair of Benelux Ass...
3mo •

We kicked off the #EURO PhD School "Data Science Meets Combinatorial Optimization" yesterday at Eindhoven University of Technology!
Over 40 PhD students from across Europe joined us for this school.

EURO - The Association of European Operational Research Societies
Patrick De Causmaecker Carola Doerr Kevin Tierney Kate Smith-Miles AO Pieter Smet Sicco Verwer

Douniel Lamghari-Idrissi and 239 others 3 comments · 7 reposts

Chair of Business Management, esp. Industr... + Follow
368 followers
3mo •

#EURO PhD School "Data Science Meets Combinatorial Optimization"

From 25 to 29 August 2025, our colleague Daniel Zähringer took part in the second PhD School of the EURO working group "Data Science meets Optimisation". PhD candidates from all over Europe gathered at Eindhoven University of Technology to learn modern research methods at the interface between OR & ML from renowned lecturers, and also had the opportunity to present their own research.

In addition to a great mix of theory and hands-on tutorials on black-box optimisation ⬛, reinforcement learning for VRPs 🚚, instance space analysis, decision-focused learning and optimal robust decision trees 🌴, this year's programme also included a one-day symposium. In addition to further research presentations, companies also presented practical planning problems that are always subject to a number of uncertainties and benefit from the integration of modern ML techniques into classic OR solution methods.

A big Thank You goes to the great organisation of the phd school, lead by Yingqian Zhang, and all the great lecturers. 😀

#EURO #PhDSchool #OR #ML #Eindhoven

Baha Uluğ • 1st
Senior Data Scientist
3mo •

Just wrapped up an incredible week at the 2nd EURO PhD School "Data Science Meets Combinatorial Optimisation" hosted at Eindhoven University of Technology, The Netherlands.

The program was an eye-opening deep dive into how machine learning and combinatorial optimisation can be combined to tackle real-world, NP-hard problems. For me, the biggest takeaway was how these methods can inspire and enrich my own research in retail operations, dynamic routing, demand forecasting, and recommendation systems — all of which deal with large solution spaces and require scalable, intelligent optimisation.

A big thanks to the organizers: Prof. Patrick de Causmaecker, Prof. Yingqian Zhang, Yi-Ming Yong, Igor Smit, and Xia Jiang for putting together such a rich and inspiring program.

I am especially grateful to my Prof. Süreyya Akyüz for encouraging me to attend, and to my PhD colleague VOLKAN BAKIR for the great discussions and shared learning throughout the week.

It was a fantastic mix of theory, hands-on sessions, and networking that I'm excited to carry into my future work at the intersection of data science, operations research, and machine learning.

#EURO #PhDSchool #Optimization #MachineLearning #CombinatorialOptimization #Eindhoven

Ashkan Fouladi • 1st
Transportation Research Associate at TUD
3mo •

I was glad to attend the 2nd EURO PhD School: Data Science meets Combinatorial Optimization at Eindhoven University of Technology. It was an insightful week, and I am very grateful to the organizers – especially Yingqian Zhang – for the excellent organization.

I also had the opportunity to present our ongoing research on "Deep Reinforcement Learning for train rescheduling under disruptions", conducted under the supervision of Nikola Bešinović at Technische Universität Dresden.

Looking forward to continuing discussions and collaborations inspired by this event.

#datascience #optimization #reinforcementlearning #railway #transportation #EURO #Eindhoven #TUDresden

You and 37 others 1 comment

List of participants funded by EURO
(Students from dutch universities also received support from SIKS; Students from TU/e were supported by TU/e EAISI)

First name	Last name	Institution
Henrik	Abgaryan	PSL Dauphine, Paris
Mohsen	Nafar	Bielefeld University
Irene	Trigueros	University of Granada
Mina	Farajiamiri	Operations Management at RWTH Aachen University
Ashkan	Fouladi	Technische Universität Dresden
Zhenyu	LEI	Université d'Angers
Ann-Kathrin	Meyer	University of Münster
Jan-Niklas	Doerr	Technische Universität Munich
Dimitrios	Tsakoumis	University of Piraeus
Ebru	Geçici Birkan	Yildiz Technical University
Nicolò	Italiano	DTU Wind and Energy Systems
Alireza	Yazdani	Eindhoven University of Technology
Ali	Nikseresht	Rotterdam School of Management, Erasmus University
Akram Badreddine	Laissaoui	INSA Lyon
Alessandro	Minoli	Università della Svizzera italiana (USI)
Hamza	CHOKRI	Artois University
Deniz	Nasir	University of Edinburgh Business School
Lara	Schneider	University of Hildesheim
Michael	Perk	TU Braunschweig, Germany
Nayeli	Gast Zepeda	Universität Bielefeld
Jeroen	Laarman	University of Groningen
Oliver Rise	Thomsen	The Technical University of Denmarj
Casper	Bazelmans	Eindhoven University of Technology
Gerben	Ouwersloot	Eindhoven University of Technology
Mark	Lyngesen	Aarhus University
Carolin	Mensendiek	Paderborn University
Mısra	Şimşir Güneş	Yildiz Technical University
Ling	Li	Eindhoven University of Technology
Daniel	Zähringer	TU Dresden
Gevher	Yesevi Keskin	Centrum Wiskunde & Informatica
Mahekha	Dahanayaka	University of Twente
Alexandros	Arnogiannakis	University of Twente
Tilman	Hinnerichs	TU Delft
Baha	Uluğ	Bahcesehir University
Thomas	Dubach	ETH Zurich
Gabriel Berk	Pereira	University of Oxford
Dimitri	Rusin	University of Manchester
Darius	Arbabha	Aarhus university
Xinyu	Tang	TU Delft

Volkan	Bakır	Bahcesehir University
Yunus Emre	Yilmaz	CWI and TU/e
Janik	Bischoff	Karlsruhe Institute of Technology
Islam	Momtaz A. Sadek	Tilburg University