International Network Optimization Conference INOC 2024

Dublin, 11-13 March 2024

Conference Handbook

All times are Greenwich Mean Time (GMT)

Contents

Please check the website for updates

https://inoc2024.sciencesconf.org/

WLAN access:

- The Wi-Fi network **eduroam** can be used for internet access, provided your home organisation participates in the eduroam federation.

- Alternatively, you can connect to the public UCD Wireless network which does not require a password.

Foreword

Welcome to INOC 2024 in University College Dublin, Ireland!

The International Network Optimization Conference (INOC) series provides a forum for researchers in the broad field of network optimization to present and publish their latest results and ongoing research. INOC is the conference of the EURO working group on Network Optimization (ENOG). The biennial INOC conferences have run since 2003. Previous editions were held in Paris (2003), Lisbon (2005), Spa (2007), Pisa (2009), Hamburg (2011), Tenerife (2013), Warsaw (2015), Lisbon (2017) Avignon (2019), and after a brief Covid-19 interruption, ran in hybrid form in Aachen (2022).

We are delighted to resume in-person activities and welcome you to INOC 2024 at the College of Business in University College Dublin (UCD). INOC 2024 is organized by researchers across UCD in the College of Business, School of Computer Science and School of Mechanical Engineering.

INOC 2024 has two types of submissions: full research papers (4-6 pages long) and extended abstracts (at most 2 pages). Out of 23 submitted research papers, 13 have been selected to be published at OpenProceedings: `http://openproceedings.org`. In addition, 39 (out of 44) extended abstracts have been selected to be presented at the conference. All contributions can be found in the electronic book of abstracts, where they are sorted by their session.

In addition to the accepted papers, three invited speakers will present keynote talks: Bernardetta Addis (Université de Lorraine, France), *From green networking to network virtualization: some interesting problems arising from telecommunication applications*, Stefan Schmid (TU Berlin, Germany), *Self-adjusting networks*, and Ivana Ljubic (ESSEC Business School, France), *Benders Adaptive-Cuts Method Applied to Network Design and Facility Location Problems Under Uncertainty*. Abstracts of their talks are included in this booklet.

We are also pleased to present two tutorial sessions: Scott McDonald and Kanika Sharma (Eaton) on *Buildings as Smart Grid Network Components*, and Nam Tran (UCD) on *Optimization Methods for Large-scale Cell-free Massive MIMO*.

INOC relies on the support and assistance from many people and organisations. We would like to thank the steering committee for their valuable advice, and all the members of the program committee for their active participation in the review process. A big thank you to the members of the organising committee, their creativity and flexibility have contributed to making INOC 2024 a unique experience. In particular, we thank Maura Mulvey for her support in navigating administrative systems, and for her patience with us.

We would like to thank our sponsors for their support, and last but not least we are grateful to all participants who make INOC a special place to come together and exchange ideas.

<div align="center">

Enjoy the conference!

Paula Carroll

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Sustainability statement

ENOG and the INOC 2024 local organising committee have taken care to minimise our carbon footprint and to foster inclusion and diversity.

Our conference pack contains organic, locally sourced or recycled materials as much as possible. If there is any content in the pack you do not want, we invite you to leave it at the registration desk for re-distribution.

You will have come across the Wood turner problem in your Integer Linear Programming work: a wood turner has limited locally sourced wood - white thorn, oak and beech. Come along to the keynote talks to hear what happens next!

Our social and cultural activities all take place on campus which minimises travel. All coffees and lunches take place in the e UCD Lochlann Quinn School of Business. A reusable cup is included in your conference bag. You can use the water fountains (marked as tear drops in Fig.2) for drinking water.

We aimed for as much gender balance as possible on our committees and speaker invitations, and are delighted to support, empower and encourage the participation of all genders in Operational Research within EURO and ENOG.

European Network Optimization Group - Steering committee

Edoardo Amaldi (Politecnico di Milano)
Walid Ben Ameur (Télécom SudParis)
Bernard Fortz (HEC Liège - Université de Liège, Belgium)
Luis Gouveia (Universidade de Lisboa)
Arie Koster (RWTH Aachen University)
Adam Ouorou (Orange Labs Research)

Organizing committee

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Cristina Requejo (ISEG, Portugal)
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Eric Gourdin (Orange Labs, France)
Jannik Matuschke (KU Leuven, Belgium)
Juan José Salazar-Gonzalez (Universidad de La Laguna, Spain)
Luis Gouveia (Universidade de Lisboa, Portugal)
Maria Grazia Scutellà (Università di Pisa, Italy)
Maria Teresa Godinho (Instituto Politécnico de Beja)
Markus Leitner (VU Amsterdam, Netherlands)
Markus Sinnl (Johannes Kepler University, Austria)
Marta Pascoal (Politecnico di Milano, Italy & University of Coimbra, Portugal)
Michael Poss (LIRMM, Montpellier, France)
Michał Pióro (Warsaw University of Technology & Gdansk University of Technology, Poland)
Nancy Perrot (Orange Labs, France)
Paula Carroll (University College Dublin, Ireland)
Walid Ben Ameur (Telecom Sudparis, France)

Schedule at a Glance

The conference takes place on the ground floor of the Quinn School of Business, Belfield, University College Dublin, see Fig. 1 for directions to the Quinn School. A floor plan is provided in Fig.2.

Monday 11 March 2024

9 : 00 – 9 : 30	Registration
9 : 30 – 9 : 40	Welcome in Q014
9 : 40 – 10 : 30	Keynote by Bernardetta Addis, Room Q014
10 : 30 – 11 : 00	Coffee break
11 : 00 – 12 : 30	Parallel Sessions 1A, 1B, 1C in Rooms Q011, Q012, Q013
12 : 30 – 14 : 00	Lunch and social activities
14 : 00 – 15 : 00	Tutorial 1 by Eaton in Room Q014
15 : 00 – 15 : 30	Coffee break
15 : 30 – 17 : 00	Parallel Sessions 2A, 2B, 2C in Rooms Q011, Q012, Q013
17 : 30 – 19 : 30	Welcome event in the foyer and contemplative space

Tuesday 12 March 2024

9 : 00 – 9 : 30	Registration
9 : 30 – 10 : 30	Keynote by Stefan Schmidt, Room Q014
10 : 30 – 11 : 00	Coffee break
11 : 00 – 12 : 30	Parallel Sessions 3A, 3B, 3C in Rooms Q011, Q012, Q013
12 : 30 – 14 : 00	Lunch and social activities
14 : 00 – 15 : 00	Tutorial 2 by Nam Tran in Room Q014
15 : 00 – 15 : 30	Coffee break
15 : 30 – 17 : 00	Parallel Sessions 4A, 4B, 4C in Rooms Q011, Q012, Q013
17 : 30 – 18 : 30	Social event in Room Q043
19 : 00 – 22 : 00	Conference Dinner in the University Club

Wednesday 13 March 2024

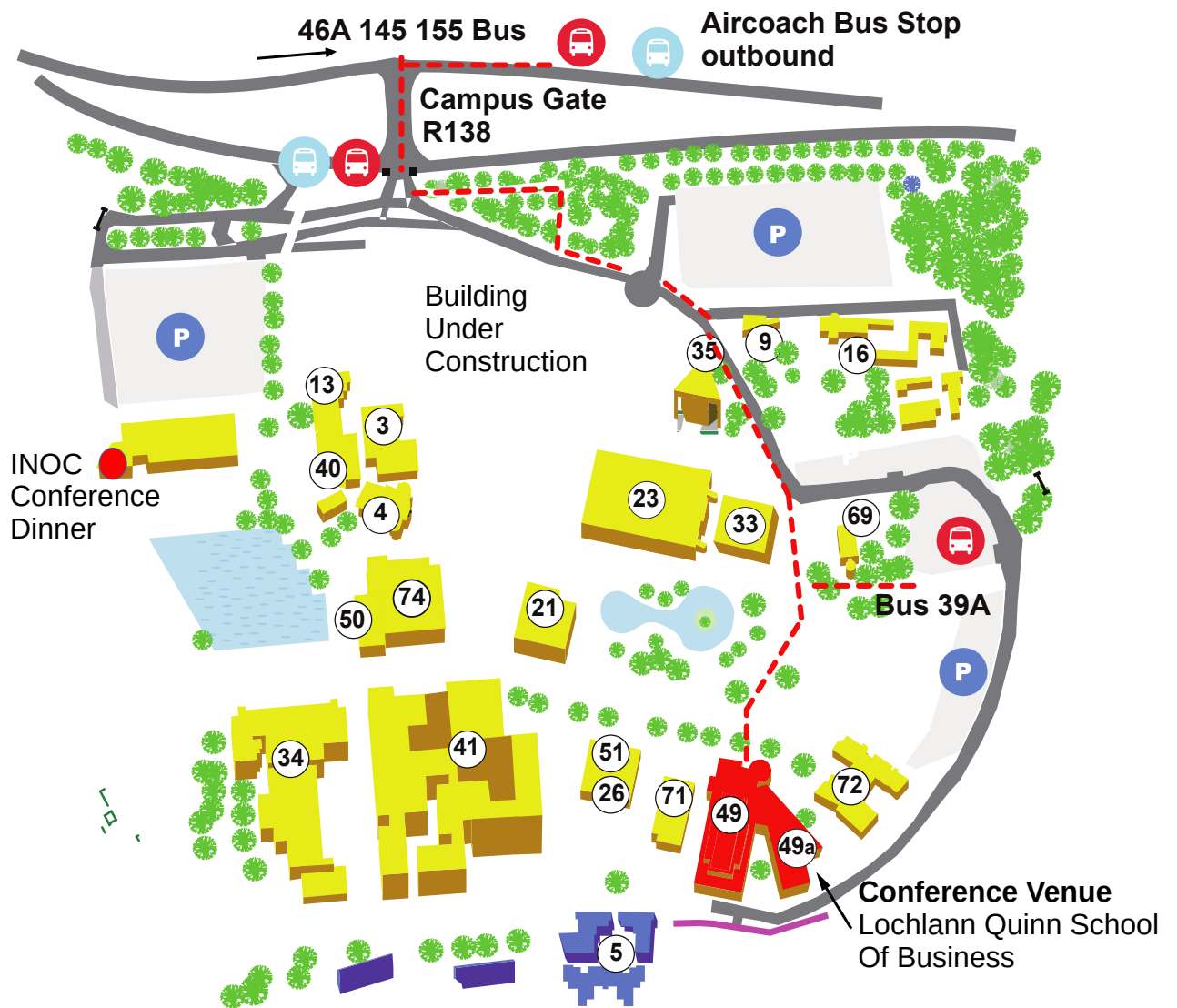|	
9 : 00 – 9 : 30	Registration
9 : 30 – 10 : 30	Keynote by Ivana Ljubic, Room Q014
10 : 30 – 11 : 00	Coffee break
11 : 00 – 12 : 30	Parallel Sessions 5A, 5B, 5C in Rooms Q011, Q012, Q013
12 : 30 – 14 : 00	Lunch and social activities
14 : 00 – 15 : 00	Parallel Sessions 6A, 6B, 6C in Rooms Q011, Q012, Q013
15 : 00 – 15 : 30	Closing session in Room Q014

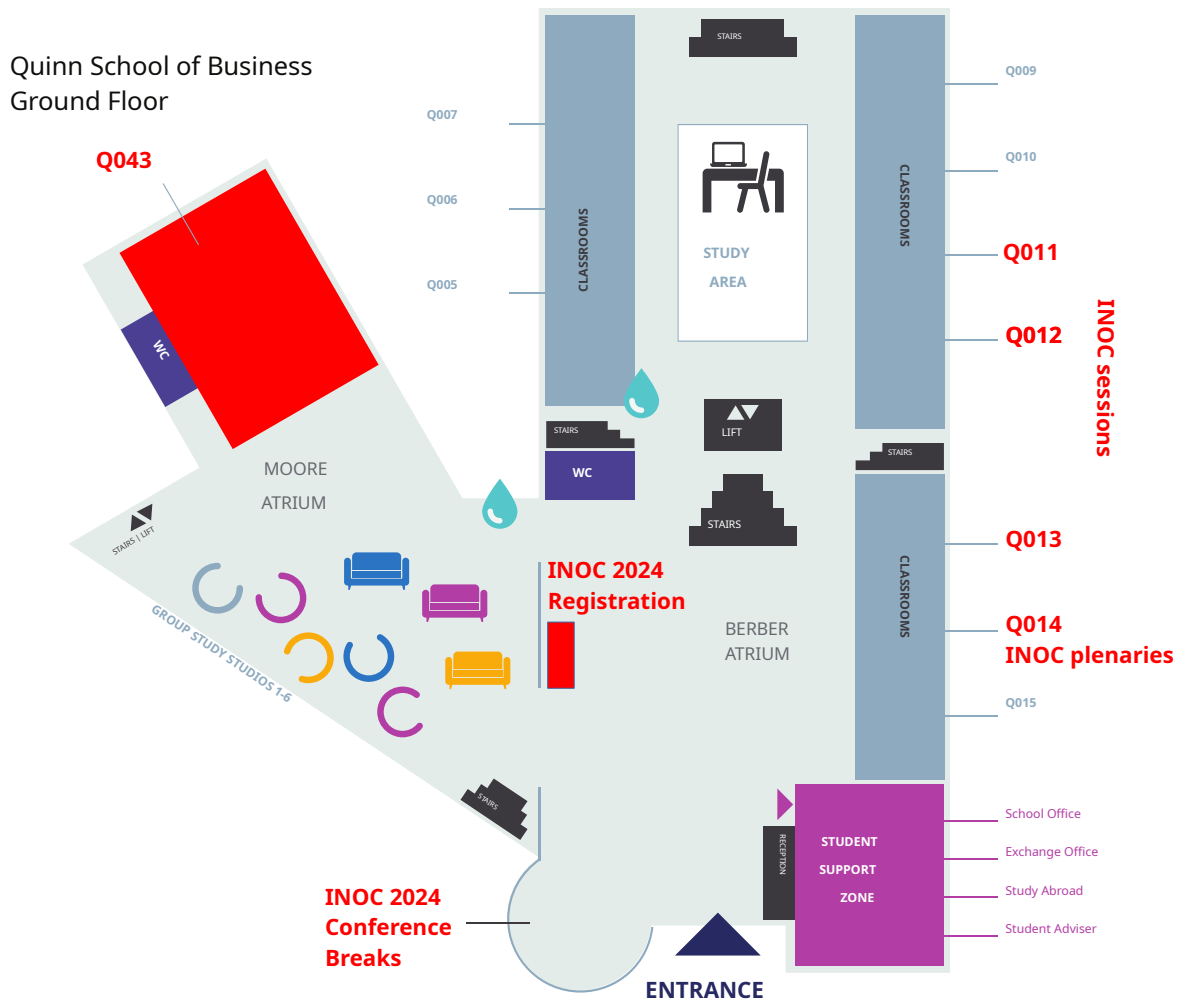Figure 1: Directions to the Quinn School of Business on the UCD Belfield campus.

Figure 2: Quinn School of Business floor plan.

Social and Cultural Program

We invite you to explore and enjoy the UCD Belfield campus during the INOC 2024 conference. Participants are welcome to explore the campus and enjoy self-guided walking tours of the grounds: `https://www.ucd.ie/healthyucd/activities/walkingatucd/`.

To minimise our carbon footprint, we have arranged a set of on-campus social and cultural activities. We have arranged tours of:

- A Medieval Roundhouse reconstructed by the UCD School of Archeology, see
  `https://www.ucd.ie/newsandopinion/news/2022/february/09/ucdarchaeologybuildsnewearlymedievalroundhouseafterarsonfire/`;

- the UCD Classical Museum, see
  `https://www.ucd.ie/classics/about/classicalmuseum/exhibitions/`;

- the UCD District Heating Network, see
  `https://ucdestates.ie/about/sustainability/energy-management/`;

- the Irish Folklore collections, see
  `https://www.ucd.ie/irishfolklore/en/`.

The tours will take during the lunch breaks on Monday 11th and Tuesday 12th March. Participants who responded to our email invitation to indicate a tour preference will be notified which tours they have been assigned to during registration. You can check at the registration desk if there is still space on a tour you would like to join.

Monday 11th September, Welcome Event, 17.30, UCD Lochlann Quinn School of Business

We invite you to participate in an informal get together at the Welcome Event! Connect with old friends and make new ones. The Welcome Event takes place in the foyer of the UCD Lochlann Quinn School of Business.

Tuesday 12th September, Cultural Event and Dinner, 17.30, Q034 & University Club

Traditional Irish Music Performance

We are delighted to include a performance of traditional Irish music at INOC 2024. We welcome traditional Irish musicians Méin, Éamonn, Sorcha and Caoilte. The group will perform some

jigs, reels, hornpipes and polkas. They will treat us to some solo pieces with Méin on concertina, Éamonn on the uileann pipes, Caoilte on flute, and Sorcha on fiddle. As a special treat we will also hear a sean nós song from Méin.

Conference Dinner

The conference dinner takes place on Tuesday evening in the UCD University Club on the UCD Belfield campus, see `https://www.ucd.ie/universityclub/clubdining/clubrestaurant/`.

`Wednesday 13`th` March, 15.00`   `Q014`

Farewell Lunch and Conference Closing Session

On Wednesday, after a small farewell lunch, we'll close the INOC 2024 conference in lecture theatre Q014. We'll distribute certificates to thank our student volunteers, and announce the location of INOC 2026!!!

Plenaries

Chair: Luis Gouveia

From green networking to network virtualization: some interesting problems arising from telecommunication applications.

Bernardetta Addis

Universitè de Lorraine

Abstract

Telecommunication networks and, more broadly, information and communication technology (ICT), are integral components to the optimization community.

In this talk, we introduce optimization problems we have tackled in collaboration with telecommunication experts over the past decade. The first half focuses on energy-aware network management, highlighting the importance of efficient routing and dynamic device switching. This approach is crucial for reducing energy consumption without compromising quality of service (QoS).

The second part of the presentation explores a problem arising from the convergence of network and computing systems: the placement and routing of Virtual Network Functions (VNFs). This second application involves a novel combination of network design and facility location optimization. Our contributions include mathematical programming models, a comprehensive analysis of their performance in a realistic setting, and a comparative analysis of its computational complexity compared to current state-of-the-art formulations.

Biography

Bernardetta Addis has been a Full Professor in Computer Science at Polytech Nancy - Universitè de Lorraine and responsible for the "Networks, Systems and Services" department at LORIA (Computer Science laboratory of Lorraine) since September 2023. Before, she was an Assistant Professor at Ecole de Mines de Nancy - Universitè de Lorraine for 10 years.

Her research interests are Network Optimization, Discrete and Global Optimization, and Mathematical Programming Modelling and Metaheuristics to solve real-life applications (telecommunications, healthcare management, and process synthesis.

Self-adjusting networks

Stefan Schmid

TU Berlin

Abstract

In this talk, I will present the vision of self-adjusting networks: networks ("graphs") which are optimized towards, and "match", the traffic workload they serve. These networks find applications for example in datacenters: Over the last years, the bandwidth and latency requirements of modern datacenter applications have led researchers to propose various datacenter topology designs using static, dynamic demand-oblivious (rotor), and/or dynamic demand-aware switches. However, given the diverse nature of datacenter traffic, there is little consensus about how these designs would fare against each other. We will discuss information-theoretic metrics to quantify the structure in communication traffic as well as the achievable performance in datacenter networks matching their demands, present network optimization principles accordingly, and identify open research challenges. I will also show how the notions of self-adjusting networks and demand-aware graphs relate to classic optimization problems in theoretical computer science

Biography

Stefan Schmid is a Professor at the Technical University of Berlin, Germany. MSc and PhD at ETH Zurich, Postdoc at TU Munich and University of Paderborn, Senior Research Scientist at T-Labs in Berlin, Associate Professor at Aalborg University, Denmark, Full Professor at the University of Vienna, Austria, and Sabbatical as a Fellow at the Israel Institute for Advanced Studies (IIAS), Israel. Stefan Schmid received the IEEE Communications Society ITC Early Career Award 2016 and an ERC Consolidator Grant 2019.

Chair: Arie Koster

*Benders Adaptive-Cuts Method Applied to Network Design
and Facility Location Problems Under Uncertainty*

Ivana Ljubic

ESSEC Business School

Abstract

Benders decomposition is one of the most applied methods to solve two-stage stochastic problems (TSSP) with a large number of scenarios. The main idea behind the Benders decomposition is to solve a large problem by replacing the values of the second-stage subproblems with individual variables and progressively forcing those variables to reach the optimal value of the subproblems, dynamically inserting additional valid constraints, known as Benders cuts. Most traditional implementations add a cut for each scenario (multicut) or a single cut that includes all scenarios. In this talk, we present a novel Benders adaptive-cuts method, where the Benders cuts are aggregated according to a partition of the scenarios, which is dynamically refined using the LP-dual information of the subproblems. This scenario aggregation/disaggregation is based on the Generalized Adaptive Partitioning Method, which has been successfully applied to TSSPs. Our new method can be interpreted as a compromise between the Benders single-cuts and multicuts methods, drawing on the advantages of both sides, by rendering the initial iterations faster (as for the single-cuts Benders) and ensuring the overall faster convergence (as for the multicuts Benders). We will demonstrate how Benders adaptive-cuts can be applied to the Stochastic Multi-Commodity Network Design Problem and the conditional value-at-risk (CVaR) Facility Location Problem. The new method outperforms the other implementations of Benders methods, as well as other standard methods for solving TSSPs, in particular when the number of scenarios is very large. Moreover, our study demonstrates that the method is not only effective for the risk-neutral decision makers, but also that it can be used in combination with the risk-averse CVaR objective.
Reference: C. Ramirez-Pico, I. Ljubic, E. Moreno: Benders Adaptive-Cuts Method for Two-Stage Stochastic Programs, Transportation Science, online first, (2023),
`https://doi.org/10.1287/trsc.2022.0073`

Biography

Ivana Ljubic is Professor of Operations Research at the ESSEC Business School of Paris. She holds a PhD degree in computer science from the Vienna University of Technology (2004). Prior to joining ESSEC in 2015, she was appointed at the University of Vienna, where she also received her habilitation in Operations Research in 2013. Research interests of Ivana Ljubić include combinatorial optimization, optimization under uncertainty and bilevel optimization, with applications in network design, telecommunications, and logistics. She is member of the Editorial Board of the European Journal of Operational Research, Computers & Operations Research and she is currently an Associate Editor for Operations Research, Transportation Science and Networks.
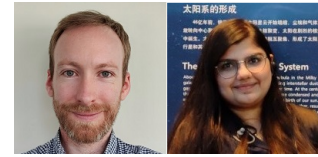
Tutorials

Chair: Deepak Ajwani

Buildings as Smart Grid Network Components

Scott McDonald and Kanika Sharma

Eaton

Abstract

Tutorial Abstract: Buildings are becoming energy hubs. Building owners and operators need to be prepared for the future and meet new regulations – design future buildings, integrate EV chargers or leverage renewable energy produced on-site while managing the energy flows and planning power capacity. Reducing emissions to mitigate climate change is fast becoming law across Europe. The switch to electric vehicles and on-site energy generation are part of the response, and this means integrating assets such as EV chargers, solar PV, and energy storage systems into buildings.

As buildings become energy hubs, Building Energy Management Software is needed to help the building manager reduce energy costs and CO_2 emissions by collecting and analyzing data, and predicting and managing energy flows. This talk will specifically focus on analyzing the available data from hardware assets and using an optimizer to solve for the best control strategy of the controllable assets including battery energy storage system and diesel generators. We will discuss the modeling process of forecasting building load, PV production and EV load along with the design of the optimizer. The optimizer produces an optimized schedule for a customised horizon (e.g., next 24 hours) by constructing and solving mathematical models while still meeting energy demands and the objectives.

Biography

Scott McDonald is a Lead Data Scientist within Eaton's Centre for Intelligent Power, based in Dublin. As part of the Buildings as a Grid team, he works on forecasting and optimisation problems related to commercial buildings and microgrids. He graduated from Ulster University in 2016 with a PhD in Machine Learning. His PhD work focused on applying computational intelligence approaches to financial time series problems. Prior to that, he graduated with an MSc in Financial and Industrial Maths and BSc in Quantitative Finance from Dublin City University. Before joining Eaton, Scott worked as a model developer in an Irish bank, working on stress testing and financial risk models.

Kanika Sharma is working as a Senior Data Scientist at the Centre of Intelligence Power (CIP) in Eaton, Ireland. She works on the "Building-as-a-grid project" which focuses on optimization of energy usage in commercial buildings. Her work includes optimizing the scheduling of different assets in the building to reduce the energy bills in commercial buildings. She was awarded her PhD degree from the South East Technological University, Waterford, Ireland in Dec 2022. She works on theoretical computer science with a focus on building new computing paradigms like scaling and deploying distributed and flexible services on moving infrastructure. In her PhD, she worked on building predictive models to detect vehicular density and initiate vehicular clusters that can be used to deploy both distributed data collection and processing applications. She

modelled the distributed service scaling and placement problem as a constrained optimization problem. She also secured funding from a European Commission programme to visit universities in USA to extend her project on federated learning for pedestrian detection to reduce the risk of vulnerable road users. She also worked with Huawei Research Labs on SMT-based constrained optimization for configuration synthesis in complex networks.

Chair: Paula Carroll

*Optimization Methods for Large-scale Cell-free Massive
MIMO*

Nam Tran, University College Dublin, University College Dublin

Abstract

The speedy rollout of 5G networks across the globe over the past two years simply means now is the right time to envision what 6G looks like. Although 5G networks can support high data rates, beyond-5G/6G networks will need a paradigm shift in wireless access technologies to keep pace with the anticipated traffic explosion. In this talk I will introduce some fundamentals of cell-free massive multiple-input multiple-output (CFmMIMO) technology, which has been proposed as a solution to the inherent limitations of cellular systems and is considered to be a disruptive technology for beyond-5G/6G wireless networks. Without cell boundaries, CFmMIMO can offer uniformly good service for all users across the network.

This presentation will specifically focus on the design of CFmMIMO system from an optimization perspective. Due to the relatively small number of antennas per access point (AP), CFmMIMO typically requires a substantially large number of APs. This leads to large-scale resource allocation problems, calling for novel scalable methods to make CFmMIMO more practically feasible. In this context, I will introduce specific power control problems arising from CFmMIMO, describe associated challenges, and then showcase some of the current methodologies developed to achieve high-performance solutions.

Biography

Nam Tran is an associate professor in the School of Electrical and Electronic Engineering in University College Dublin. His research interests are primarily on applications of optimization techniques in wireless communications design. Some recent topics include energy-efficient communications, physical layer security, cloud radio access networks, cell-free massive MIMO, and re-configurable intelligent surfaces. Dr. Tran is an Associate Editor for EURASIP Journal on Wireless Communications and Networking and IEEE Communications Letters. He was the Symposium Co-Chair of Cognitive Computing and Networking Symposium of International Conference on Computing, Networking and Communication (ICNC 2016) and was the Co-Chair of the Workshop on Scalable Massive MIMO Technologies for Beyond 5G at IEEE ICC 2020. He has also served on the Technical Program Committees of several IEEE major conferences. Dr. Tran was a recipient of the Career Development Award from Science Foundation Ireland in 2018. He is a co-recipient of an IEEE GLOBECOM 2021 Best Paper Award and an IEEE PIMRC 2020 Best Student Experimental Paper Award.

Parallel Sessions

The parallel sessions take place in lecture halls Q011, Q012, Q013 on the ground floor of the Lochlann Quinn School of Business. See Fig. 2.

Instructions for speakers and session chairs:

- Please make sure you arrive at least 15 minutes before the start of your session in the lecture hall.

- A session consists of three presentations of 30 minutes. Allow 25 minutes for your presentation and 5 minutes for discussion and change of speaker. Session 5C has four talks - please adjust the times per speaker accordingly.

- The session chair keeps track of the time and moderates the talks.

- In case of a no-show, do not continue with the next talk, but wait until the next time slot starts.

- Each lecture room is equipped with a desktop and audio visual equipment. To ensure a smooth flow, all presentations will be made from the lecture room desktop. Please bring your presentation slides on a USB-stick, and load them onto the desktop in advance of your session. Student volunteers will be available to assist. Note that the desktops are wiped each evening, and all presentations in the desktop will be deleted.

Parallel Sessions 1: Monday 11 March, 11:00-12:30

	Session 1A: Telecommunication Networks	Session 1B: Robust Optimization	Session 1C: P-Median
	Q011	Q012	Q013
Chair:	Maria Teresa Godinho	Bernard Fortz	Cristina Requejo
11:00	Enhancing the resilience of telecommunication networks through geodiversification *José Alves, Maria Teresa Godinho and Marta Pascoal*	Robust optimization for the Segment Routing Traffic Engineering Problem *Hugo Callebaut, Jérôme De Boeck and Bernard Fortz*	On the nested p-center problem *Christof Brandstetter and Markus Sinnl*
11:30	Survivable Traffic Grooming with Practical Constraints in Large-Scale Optical Network *Jianwei Niu, Junyan Liu, Fan Zhang, Fabo Sun, Kerong Yan and Junqi Ma*	Two-Stage Robust b-matchings under uncertain capacities *Jenny Segschneider and Arie M.C.A. Koster*	Revisiting a Cornuéjols-Nemhauser-Wolsey formulation for the p-median problem *Cristina Requejo and Agostinho Agra*
12:00	Feasibility of Near Term Quantum Optimisation of Communication Networks *Catherine White*	Mixed-integer linearity in nonlinear optimization: a trust region approach *Alberto De Marchi*	Extensions of Node-Depot Assignment Formulations for the Hamiltonian p-Median Problem *Francisco Canas and Luis Gouveia*

Parallel Sessions 2: Monday 11 March, 16:00-17:30

	Session 2A: Smart Grids	Session 2B: Fairness and Decision Trees	Session 2C: Sustainable Mobility and Transportation
	Q011	Q012	Q013
Chair:	Cristian Aguayo	Edoardo Amaldi	Lukas Dijkstra
16:00	Unit Commitment problem with uncertain demand and renewable energy availability	Resource Planning and Equitable Work Assignment for On-site Services	Digraphs and k-Domination Models for Facility Location Problems in Road Networks: Greedy Heuristics
	Cristian Aguayo and Bernard Fortz	*Yash Kumar, Anantaram Balakrishnan and Prakash Mirchandani*	*Lukas Dijkstra, Andrei Gagarin, Padraig Corcoran and Rhyd Lewis*
16:30	A Model for Local Energy Community Management in the Presence of Distribution Network Time-of-use Tariffs	Cardinality and fairness constrained clustering using k-means	Heuristics for improving bicycle networks
	James Fitzpatrick, Juan Sepúlveda, Hélène Le Cadre, Luce Brotcorne, Victor Astapov, Paula Carroll and Anna Mutule	*Antoine Obled and Marta Pascoal*	*Félix Repusseau, Tifenn Rault and Emmanuel Néron*
17:00	Risk Measures in Equilibrium Energy Markets	Soft regression trees: a model variant and a decomposition training algorithm	A Guided Insertion Mechanism for Solving the Dynamic Large-Scale Dial-a-Ride Problem
	Dáire Byrne and Mel T. Devine	*Edoardo Amaldi, Antonio Consolo and Andrea Manno*	*Chijia Liu, Alain Quilliot, Hélène Toussaint and Dominique Feillet*

Parallel Sessions 3: Tuesday 12 March 2024, 11:00-12:30

	Session 3A: Combinatorial Optimization	Session 3B: Network Optimization	Session 3C: Exact Approaches
	Q011	Q012	Q013
Chair:	Seán McGarraghy	Heletjé van Staden	Cole Smith
11:00	Ensemble pruning via an integer programming approach with diversity constraints *Marcelo António Mendes Bastos, Humberto Brandão and Cristiano Arbex Valle*	Optimizing *K*-level facility location problem:a bipartite boolean quadratic programming model solved by tabu Search with random-key sequence *Bahram Alidaee, Haibo Wang, Jun Huang and Lutfu Sua*	Cutting-plane algorithms for the stochastic diversion path problem *Cole Smith, Orkun Baycik and Di Nguyen*
11:30	Learning to Prune Instances of Steiner Tree Problem in Graphs *Jiwei Zhang, Dena Tayebi, Saurabh Ray and Deepak Ajwani*	Bayesian Optimisation for Facility Location Problems *Niyati Seth and Michael Fop*	A cutting-plane-based method for solving fixed-charge transportation problems using new valid inequalities for single-node flow polytope *Guneshwar Anand, Sachin Jayaswal and B Srirangacharyulu*
12:00	Utilizing Graph Sparsification for Preprocessing in Max Cut QUBO Solver *Vorapong Suppakitpaisarn and Jin-Kao Hao*	Optimizing Charging Station Locations for Electric Vehicles: Catering to Diverse Driver Profiles *Jingyu Xiang, Paula Carroll and Annunziata Esposito Amideo*	Valid Inequalities to Solve the Train Stop Scheduling Problem *Faiz Hamid and Yogesh Agarwal*

Parallel Sessions 4: Tuesday 12 March 2024, 16:00-17:30

	Session 4A: Routing Algorithms	Session 4B: Telecommunication Networks	Session 4C: Routing
	Q011	Q012	Q013
Chair:	Debajyoti Biswas	Adam Ouorou	Antonio Frangioni
16:00	A Triple Bottom Line optimization model for assignment and routing of on-demand home services	In-Band Network Telemetry for Efficient Congestion Mitigation	A nested Benders-Lagrange Approach to Delay Constrained Routing
	Debajyoti Biswas, Laurent Alfandari and Claudia Archetti	*Youcef Magnouche, Sébastien Martin, Jeremie Leguay and Paolo Medagliani*	*Antonio Frangioni, Laura Galli and Enrico Sorbera*
16:30	Exploring varied average speeds to assess energy consumption and charging profiles in EVRP benchmark instances	Exploring quantum optimization for solving the PCI planning problem in 5G networks	Addressing demand uncertainty in the pickup and delivery problem with time windows via robust optimisation
	Chodhna Ní Shé, Damian Flynn and Paula Carroll	*Erico Teixeira, Adriano Borges and Pamela Bezerra*	*Alex Abreu, Maria Battarra and Pedro Munari*
17:00	An Improved Single-Commodity Flow Formulation for the Vehicle Routing Problem with a Heterogeneous Fleet	Generation of Industrial Protocol Traffic via Enhanced Wasserstein GAN	Addressing nurse preference in nurse assignment and routing problem in dynamic environment
	Devanand Devanand	*Mikel Moreno Moreno, Lander Segurola, Francesco Zola, Arantza Del Pozo and Iker Pastor López*	*Md Samiullah Ansari and Avijit Khanra*

Parallel Sessions 5: Wednesday 13 March 2024, 11:00-13:00

	Session 5A: infrastructure networks	Session 5B: communication networks 1	Session 5C: location problems
	Q011	Q012	Q013
Chair:	Di Nguyen	Peter Keenan	Walid Ben-Ameur
11:00	Adaptive Partition-based Methods in an Asymmetric Shortest-path Network Interdiction Problem	Solving the Team Orienteering Arc Routing Problem: A Biased-Randomised Iterated Local Search Approach	On the k-slow Burning Conjecture
	Di Nguyen and Yongjia Song	*Xabier A. Martin, Peter Keenan, Javier Panadero, Sean McGarraghy and Angel A. Juan*	*Arie Koster, Michaela Hiller, Jonas Kreyer and Philipp Pabst*
11:30	Assessing the Robustness of Projects via Longest-Path Network Interdiction with Failure Groups	A Multi-Swap Heuristic for Rolling Stock Rotation Planning with Predictive Maintenance	Solving the multi-color Travelling Salesman Problem
	Fei Wu, Jannik Matuschke and Erik Demeulemeester	*Felix Prause*	*Juan Jose Salazar Gonzalez and Roberto Wolfler-Calvo*
12:00	An all-pairs shortest path coloring model to optimize network intrusion detection systems	An improved variant of the Iterated Inside Out algorithm for solving the optimal transport DOTmark Instances	Compact and non-compact formulations for the Dominated Coloring Problem
	Edoardo Scalzo, Floriano De Rango, Francesca Guerriero, Antonio Iera and Mattia Giovanni Spina	*Roberto Bargetto, Federico Della Croce and Rosario Scatamacchia*	*Dilson Lucas Pereira, Abilio Lucena and Alexandre Salles da Cunha*
12:30			When will the first collision occur?
			Walid Ben-Ameur and Alessandro Maddaloni

Parallel Sessions 6: Wednesday 13 March 2024, 14:00-15:00

	Session 6A: Q011	Session 6B: Q012	Session 6C: Q013
Chair:			
14:00	Multi-depot split delivery of batches *Criston Souza and Andréa Santos*	Multi-Objective Multi-Commodity Flow Optimization for Wartime Planning with Cyber-Effects *Alex Hoffendahl, Chancellor Johnstone, Alex Stephens, Richard Dill and Lance Champagne*	Instantaneous and limiting behavior of an n-node blockchain under cyber attacks from multiple hackers *Liang Hong and Xiufeng Xu*
14:30	Integer Linear Programming for energy-efficient scheduling with time-dependent consumption functions *Mirko Mucciarini, Giulia Caselli, Daniele De Santis, Manuel Iori and Juan José Miranda Bront*	A combinatorial flow-based formulation for temporal bin packing problems *John Martinovic, Nico Strasdat, José Valério de Carvalho and Fabio Furini*	Identification of reaction chains in metabolic and genomic networks for species comparison *Florent Cabret, Ronan Bocquillon and Emmanuel Néron*

Notes

In the tradition of the INOC conference series, a special issue of the journal "Networks" (published by Wiley) is planned following the International Network Optimization Conference 2024 in Dublin. We invite all INOC 2024 conference particpants to submit a full journal paper based on their research presented at INOC 2024.

Papers submitted for the special issue will be fully peer reviewed and must follow the Networks journal guidelines: `https://onlinelibrary.wiley.com/page/journal/10970037/homepage/forauthors.html`

Papers have to submitted via `https://wiley.atyponrex.com/journal/NET` - select the special issue submission type. Please note INOC 2024 as additional information at the end of the process.

Guest editors for the special issue are:

- Paula Carroll, University College Dublin

- Luis Gouveia, CIO, Universidade de Lisboa

The deadline for paper submission is September 1st, 2024.

For more information, please see the INOC 2024 conference website `https://inoc2024.sciencesconf.org/`

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