



**Smith**institute

for Industrial Mathematics and System Engineering

**2nd IMA and OR Society Conference on**

**Mathematics of Operational Research**

*Innovating Mathematics for New Industrial Challenges*

25 - 26 April 2019, Aston University, Birmingham, UK

**Thursday 25 April 2019**

Rooms	08:30	09:00	09:50	10:00	10:30	11:00	11:15	11:45	12:15	12:45	13:15	13:45	14:15	14:45	15:15	15:45	16:15	16:45	17:15	17:45	18:15	18:20								
MR	Registration		Welcome	Plenary I: Rob Solly		Break	The Mathematics of Cyber Security				Lunch		Plenary II: Jeremy Bradley		Break	Applications of Integer Programming			Plenary III: Shane Henderson		Posters and Drinks Reception in the Litchfield Lounge - Sponsored by the Smith Institute									
R1	Coffee/Tea on arrival																							19:30 Speech by John Hopes - Dinner at the Aston Conference Centre and Hotel						
R2																										Applications of Optimisation			Challenges in Simulation when Little Input Data is available	
R3																										Mathematical Optimization in Data Science				
R4																										Optimization for machine learning and big data I				
R5																										Academic OR I				
R6																										Vehicles, Government and Academia I				
R7																										Combinatorial optimisation I				

Thursday 25 April 2019			
MR	10:00 – 11:00 Plenary I: Rob Solly (Dstl) <i>Designing the Future</i>	14:15 – 15:15 Plenary II: Jeremy Bradley (Royal Mail) <i>Solving at scale and making it work</i>	17:45-18:45 Plenary III: Shane Henderson (Cornell University) <i>Under the Hood of Bike Sharing</i>
	11:15-13:15	15:45-17:45	
MR	<p><b>The Mathematics of Cyber Security</b> Session Organiser: Dan Tilley</p> <p><i>Machine Learning in Cyber Security</i> Harsha Kalutarage (University of Belfast)</p> <p><i>Bayesian new edge prediction and anomaly detection in computer networks</i> Silvia Metelli (Imperial College London)</p> <p><i>Workshop on Cyber Security Capability Gaps and Analytical Solutions</i> Dan Tilley (CyberOwl Ltd)</p>	<p><b>Applications of Integer Programming</b> Session Organisers: Sergio Garcia and Kerem Akartunali</p> <p><i>Mathematical Models and Exact Algorithms for the Hospitals/Residents Problem with Couples and Ties.</i> Maxence Delorme (University of Edinburgh)</p> <p><i>A Branch-and-Price Algorithm for the Reliability Growth Problem.</i> Ashwin Arulsevan (University of Strathclyde)</p> <p><i>The Hub Location and Pricing Problem</i> Gunes Erdogan (University of Bath)</p> <p><i>Maximal coverage with ellipses</i> Sergio García Quiles (University of Edinburgh)</p>	
R1		<p><b>Defence in OR</b></p> <p><i>Wide wet gap crossing: an assessment of military vehicle capability</i> Nick Walmsley (Dstl PDW)</p> <p><i>The application of mathematical approaches to scenario discovery for Robust Decision Making in the Ministry of Defence</i> Meghan Brady (Dstl)</p> <p><i>Genetic Algorithms for Force Structure Analysis</i> Thomas Baynes (Dstl)</p> <p><i>An Incomplete Information Sequential Attacker-Defender Game - is Playing Dead Optimal?</i> Krishna Kalyanam (PARC)</p>	

R2	<p><b>Applications of Optimisation</b> Session organiser: Kevin Glazebrook</p> <p><i>Branch and Price for Real-time Railway Rescheduling</i> Edwin Reynolds (STOR-i Centre for Doctoral Training, Lancaster University Management School, Leeds University, Network Rail)</p> <p><i>New Valid Inequalities for the Fixed-Charge Polytope</i> Georgia Souli (STOR-i Centre for Doctoral Training, Lancaster University Management School)</p> <p><i>An Optimisation Framework for Airline Fleet Maintenance Scheduling and Tail Assignment</i> David Torres Sanchez (STOR-i Centre for Doctoral Training, Centre for Transport and Logistics (CENTRAL), Lancaster University Management School)</p> <p><i>Evaluating the quality of radiotherapy treatment plans under uncertainty</i> Emma Stubington (STOR-i Centre for Doctoral Training, Lancaster University Management School)</p>	<p><b>Challenges in Simulation when Little Input Data is available</b> Session Organiser: Lucy Morgan</p> <p><i>Advances in Direct Bootstrap Resampling for Input Model Uncertainty</i> Russell Barton (Pennsylvania State University)</p> <p><i>Dynamic Pricing for a New Product</i> Christine Currie (Southampton University)</p> <p><i>Bayesian Optimisation with Input Uncertainty Reduction</i> Juan Ungredda (University of Warwick)</p> <p><i>A Spline-based method for Modelling and Generating Nonhomogeneous Poisson Process Inputs to Simulation Models</i> Lucy Morgan (Lancaster University)</p>
R3	<p><b>Mathematical Optimization in Data Science</b> Session Organiser: Vanesa Guerrero</p> <p><i>Smart Grids Observability using Bilevel Programming</i> Sonia Toubaline (Paris Dauphine University)</p> <p><i>Graphs of intermediate size</i> Patrick De Causmaecker (Department of Computer Science, CODES &amp; ImeckU)</p> <p><i>On mixed integer nonlinear optimization to gain insight into data features</i> Vanesa Guerrero (Carlos III University of Madrid)</p> <p><i>Mathematical Modelling and Hybrid Heuristics for Product Bundling</i> Daniel Garter (Cardiff University)</p>	

R4	<p><b>Optimization for machine learning and big data I</b>  Session Organisers: Stefania Bellavia and Daniela di Serafino</p> <p><i>A fast method for community detection via total variation optimization</i>  Francesco Tudisco (University of Strathclyde)</p> <p><i>High-order multilevel optimization methods and training of artificial neural networks</i>  Elisa Riccietti (University of Toulouse -INPT-IRIT)</p> <p><i>Unfolding a Proximal Interior Point Method in a Neural Network for Image Deconvolution</i>  Carla Bertocchi (University of Modena and Reggio Emilia)</p>	<p><b>Optimization for machine learning and big data II</b>  Session Organisers: Stefania Bellavia and Daniela di Serafino</p> <p><i>Image Fusion via a Plug-and-Play ADMM Algorithm</i>  Afonso Teodoro (Instituto de Telecomunicações, Instituto Superior Técnico)</p> <p><i>A subspace-accelerated method for the minimization of TV-regularized functions with application to machine learning on fMRI data.</i>  Marco Viola (Sapienza University of Rome)</p> <p><i>Reconstruction of low sampled 3D CT images by a Scaled Gradient projection algorithm</i>  Elena Morotti, (DISI, University of Bologna)</p>
R5	<p><b>Academic OR I</b></p> <p><i>Re-optimization in Semidefinite Programming</i>  Alemseged Gebrehiwot Weldeyesus (University of Edinburgh)</p> <p><i>Sensitivity Analyses of Point Processes</i>  David F. Percy (University of Salford)</p>	<p><b>Academic OR II</b></p> <p><i>Efficient Computation of the Prokhorov Metric for Discrete Distributions</i>  Christian Drescher (University of Augsburg)</p> <p><i>A tropical implementation of the Analytical Hierarchy Process</i>  Sergey Sergeev (University of Birmingham)</p> <p><i>Coopetition Games</i>  Tri-Dung Nguyen (University of Southampton)</p>
R6	<p><b>Vehicles, Government and Academia I</b></p> <p><i>Efficiency Analysis of Hometown Tax with Two-Stage SWOT-DEA</i>  Jing Fu (Fukuoka Institute of Technology)</p> <p><i>Airline Disruption Management using Multi-fidelity Simulation Optimisation</i>  Luke Rhodes-Leader (Lancaster University)</p> <p><i>Range Anxiety in HGVs: an agent based model identifying optimal energy infrastructure for road freight powered by alternative fuels</i>  Adam Gripton (Heriot-Watt University)</p> <p><i>Bilevel Programming: An application to London congestion pricing and a trust-region algorithm</i>  Laura Murray (University of Southampton)</p>	<p><b>Vehicles, Government and Academia II</b></p> <p><i>Some Applications of Selected VE Algorithms in Operational Research Methods</i>  Sammani Danwawu Abdullahi (Qatar University)</p> <p><i>Analysis and visualisation of electric demand for small businesses</i>  Danica Vukadinovic Greetham (The Open University)</p> <p><i>Optimal scheduling for the decommissioning of nuclear sites</i>  Matthew Bold (Lancaster University)</p> <p><i>Benefits of pooling resources with multiple objectives</i>  Xiaodong Li (University of the West of England)</p>

R7	<p><b>Combinatorial optimisation I</b>  Session Organisers: Iskander Aliev and Adam Letchford</p> <p><i>Algorithmic questions around tropical Carathéodory</i>  Georg Loho (London School of Economics and Political Science)</p> <p><i>On compact representations of Voronoi cells of lattices</i>  Matthias Schymura (EPFL)</p>	<p><b>Combinatorial optimisation II</b>  Session Organisers: Iskander Aliev and Adam Letchford</p> <p><i>Integrality gaps for knapsack problems</i>  Iskander Aliev (Cardiff University)</p> <p><i>Finding Happiness in Graphs: Analyses and Algorithms</i>  Rhyd Lewis (Cardiff University)</p> <p><i>Progress on Posets and Polytopes.</i>  Adam Letchford (Lancaster University)</p>
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Poster Session – 18:20 Thursday 25 April:

*Uniform consistency and uniform in bandwidth consistency for nonparametric regression estimates and conditional U-statistics involving functional data (Joint work with Salim Bouzebda)*  
Boutheina Nemouchi (University of Technology of Compiègne)

*Dynamic Allocation Subject to Failure and Replenishment*  
Stephen Ford (Lancaster University)

*A modification to the Gittins Index*  
Livia Stark (Lancaster University)

*Simulation-Optimization for Staffing a Hospital Sterilization and Decontamination Unit*  
Eleni Sofroniou (Cardiff University)

*Benchmarking Metaheuristic Optimization for High-Dimensional Graphical Models*  
Daniel Garter (Cardiff University)



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Main Room	Plenary IV: Vicky Pope		Posters and Break				Break	Plenary V: Sven Leyffer		Lunch		Plenary VI: Milan Vojnovic		Applications of Multi-Armed Bandits		Close	
R1				Vehicles, Government and Academia III										Optimization of Airport Slot Scheduling Decisions			
R2				Advances in Nonlinear Optimization Methods										Optimisation of Electric Vehicle Operations			
R3																	
R4				Software for Linear and Nonlinear Optimization										Applications of Nonlinear and Derivative-Free Optimization			
R5				Optimization in 3D printing													
R6																	
R7				Optimization for machine learning and big data III										Recent advances in first-order methods			

Friday 26 April 2019

MR	8:30-9:30 Plenary IV: Vicky Pope (Met Office, UCL) <i>Achievements and challenges in weather and climate modelling</i>	12:00-13:00 Plenary V: Sven Leyffer (Argonne National Laboratory) <i>Mixed-Integer PDE-Constrained Optimization</i>	14:00-15:00 Plenary VI: Milan Vojnovic (LSE) <i>Optimisation for Inference and Machine Learning</i>
	10:00-11:30	15:00-16:30	
MR		<p><b>Applications of Multi-Armed Bandits</b> Session Organiser: Kevin Glazebrook</p> <p><i>Speed or Accuracy? Optimal Search with Fast and Slow Speeds</i> Jake Clarkson (Lancaster University)</p> <p><i>Dynamic Pricing with Logistic Demand</i> James Edwards (Lancaster University)</p> <p><i>Bandit Algorithms for Sequential Sensor Placement</i> James Grant (Lancaster University)</p>	
R1	<p><b>Vehicles, Government and Academia III</b></p> <p><i>Robust location-transportation problems for integer low-demand items</i> Ahmadreza Marandi (Eindhoven University of Technology)</p> <p><i>Approximate policy iteration using neural networks for storage problems</i> Trivikram Dokka (Lancaster University)</p> <p><i>Referral propensity of out-of-hours doctors: simulation of the Oxfordshire service</i> Honora Smith (University of Southampton)</p>	<p><b>Optimization of Airport Slot Scheduling Decisions</b> Session Organiser: Konstantinos Zografos (Lancaster University)</p> <p><i>Incorporating the value of slots in airport slot scheduling decisions</i> Fotios A. Katsigiannis (Lancaster University)</p> <p><i>Optimising the trade-off between scheduling and operational delays at congested airports</i> Robert Shone (Lancaster University)</p> <p><i>Optimum Scheduling of Series of Slots with Scheduling Season Segmentation</i> Jamie Fairbrother (Lancaster University)</p>	
R2	<p><b>Advances in Nonlinear Optimization Methods</b> Session Organiser: Sven Leyffer</p> <p><i>Dynamic primal-dual regularization in interior point methods</i> Spyros Pougkakiotis (University of Edinburgh)</p> <p><i>Make FISTA Faster Again</i> Jingwei Liang (University of Cambridge)</p> <p><i>Complexity estimates of the steepest descent method for multiobjective optimisation</i> Jörg Fliege (University of Southampton)</p>	<p><b>Optimisation of Electric Vehicle Operations</b> Session Organiser: Konstantinos Zografos</p> <p><i>Introducing Partial Customer Based Vehicle Relocation in one Way Electric Carsharing Systems</i> Seyma Bekli (Lancaster University)</p> <p><i>Implementing Fast Chargers to One-way Electric Car-sharing Systems</i> Seyma Bekli (Lancaster University)</p> <p><i>On-the-fly battery swapping synchronisation in electric vehicle routing problems with time windows</i> Ramin Raeesi (Lancaster University)</p>	

R3		
R4	<p><b>Software for Linear and Nonlinear Optimization</b> Session Organiser: Sven Leyffer</p> <p><i>Solving MIQPs and MIQCQPs: a comparison of solution methods</i> Pietro Belotti (FICO)</p> <p><i>HiGHS: a high-performance linear optimizer</i> Julian Hall (University of Edinburgh)</p> <p><i>Solution of quadratic programming problems for fast bounds in combinatorial optimization</i> Ivet Galabova (University of Edinburgh)</p>	<p><b>Applications of Nonlinear and Derivative-Free Optimization</b> Session Organiser: Sven Leyffer</p> <p><i>A geometric integration approach to nonsmooth, nonconvex optimisation</i> Erlend Skaldehaug Riis (University of Cambridge)</p> <p><i>Optimization Challenges in the Commercial Aviation Sector</i> Jaroslav Fowkes (University of Oxford)</p> <p><i>Improving the efficiency and robustness of black-box optimisation</i> Lindon Roberts (University of Oxford)</p>
R5	<p><b>Optimization in 3D printing</b> Session Organiser - Ismael Vaz</p> <p><i>Global Direct Search and an application to Additive Manufacturing (3D Printing)</i> Ismael Vaz (University of Minho)</p> <p><i>Optimal 3D printing of complex objects in a 5-axis printer</i> Daniela Martins (University of Minho)</p> <p><i>On optimal inspection trajectories for 3D printed complex objects</i> Bruna Silva Ramos (University of Minho)</p>	
R6		
R7	<p><b>Optimization for machine learning and big data III</b> Session Organisers: Stefania Bellavia and Daniela di Serafino</p> <p><i>Adaptive Cubic Regularisation Methods with Dynamic Inexact Hessian Information</i> Gianmarco Gurioli, (Università di Firenze)</p> <p><i>Distributed optimization in solving systems of linear equations</i> Natasa Krklec Jerinkic, (University of Novi Sad)</p> <p><i>Optimisation of vessel routing for offshore wind farm maintenance tasks</i> Toby Kingsman (Lancaster University)</p>	<p><b>Recent advances in first-order methods</b> Session organiser: Immanuel Bomze (University of Vienna)</p> <p><i>First-order methods for the impatient: support identification in finite time with convergent Frank-Wolfe variants</i> Immanuel Bomze (University of Vienna)</p> <p><i>First-order methods for optimization problems over the l1-ball</i> Francesco Rinaldi (University of Padova)</p> <p><i>The Hessian Barrier Algorithm for non-convex optimization</i> Mathias Staudigl (Maastricht University)</p>



