ORAHS BATH 2017

EURO Working Group on Operational Research Applied to Health Services (ORAHS)

Welcome to the 43rd annual meeting of the EURO Working Group on Operational Research Applied to Health Services. The ORAHS 2017 Conference is organised by the Centre for Healthcare Innovation & Improvement (CHI^2) of the prestigious University of Bath School of Management.

EURO is the 'Association of European Operational Research Societies' within IFORS, the 'International Federation of Operational Research Societies'. Its aim is to promote Operational Research throughout Europe. ORAHS was formed in 1975 and is essentially a network of persons involved in the application of systematic, quantitative analysis in support of planning and management in the health services sector. The group has at present 242 members from more than 30 countries, mainly in Europe but also from overseas (USA, Canada, Brazil and other countries).

EWG ORAHS
OR APPLIED TO HEALTH SERVICES

EURO
THE ASSOCIATION OF EUROPEAN OPERATIONAL RESEARCH SOCIETIES

Bath Centre for Healthcare Innovation + Improvement

Bath Centre for Healthcare Innovation and Improvement

The Bath Centre for Healthcare Innovation and Improvement (CHI^2) was founded in Jan 2015. It is a multi-disciplinary research centre that is focused on solving the practical challenges of health and care. Researchers working within the Centre lead and participate in applied health research projects using a mixed methods approach while adopting a flexible and collaborative outlook to the choice and framing of the research problems and to the research methods and modelling techniques used.

Members of the Centre work closely with health and care managers and professionals drawing on a wide range of research expertise including:

- operational research/management science,
- operations management,
- advanced analytics,
- information systems,
- other quantitative and qualitative research methods and models,
- experience from different industries.

Example projects include a joint research with the West of England Academic Health Science Network (WEAHSN) to model the impacts of atrial fibrillation management on the health and care system, a number of researcher-in-residence programmes with regional NHS Trusts, examining social value creation and relational coordination in public-private collaborations, investigating the impact of public sector audit in the NHS in a period of austerity and reform, and two different projects around the organisation of emergency services in the context of mass casualty events. In addition, the Centre has produced and is delivering the first Massive Open Online Course in the UK in Quality Improvement in Healthcare three times a year through Future Learn.

For more information please see **www.bath.ac.uk/chi2/**

UNIVERSITY OF BATH
SCHOOL OF MANAGEMENT

University of Bath School of Management

The University of Bath School of Management is one of the UK's leading business schools with highly ranked programmes and a strong record of internationally recognised research. We equally value research, teaching and citizenship and offer a strongly supportive environment for all our students to deliver a first-class student experience.

Placed 8th in the UK in the government's 2014 Research Excellence Framework (REF), we have an excellent reputation for the quality of our research which covers all areas of management. Our research is organised into cross-functional research centres which focus our initiatives and funding. Our research income averages around £2 million a year.

We are currently ranked 1st for Marketing, 2nd for Business and Management Studies (the Complete University Guide 2018) and 3rd for Business Studies (The Times and Sunday Times University Guide 2017).

EQUIS, the European Foundation for Management Development's quality inspectorate, have granted us five-year accreditation. Only around 1% of business schools worldwide have successfully achieved this recognition.

EFMD
EQUIS
ACCREDITED

UNIVERSITY OF BATH
Established 1966

University of Bath

The University of Bath celebrates its 50th anniversary this year as one of the UK's leading universities both in terms of research and our reputation for excellence in teaching, learning and graduate prospects.

The University is rated Gold in the Teaching Excellence Framework (TEF), the Government's assessment of teaching quality in universities, meaning its teaching is of the highest quality in the UK.

In the government's 2014 Research Excellence Framework (REF) 87 per cent of our research was defined as 'world-leading' or 'internationally excellent'. From making aircraft more fuel efficient, to identifying infectious diseases more quickly, or cutting carbon emissions through innovative building solutions, research from Bath is making a difference around the world. Find out more: **www.bath.ac.uk/research/**

Well established as a nurturing environment for enterprising minds, Bath is ranked highly in all national league tables. We are ranked 5th in the UK by The Guardian University Guide 2018 and 6th for graduate employment. According to the Times Higher Education Student Experience Survey 2017, we are in the top 5 universities students would recommend to a friend.

TEF Gold Teaching Excellence Framework

Sunday 30th July 2017

18:00-20:00	**Welcome Reception - Museum of Bath Architecture**

Monday 31st July 2017

09:00-10:30	**Registration and Coffee - CB Level 1 Foyer**
10:30-12:30	**MO1.1 Opening session and Plenary**
	Plenary speaker: *Professor Margaret Brandeau – Stanford University*
	Other speakers: *Professor Sally Brailsford – University of Southampton* *Emeritus Professor Ruth Davies – Warwick Business School* *Professor Veronica Hope Hailey – Dean and Head of School, School of Management, University of Bath*
Chair	*Professor Christos Vasilakis – University of Bath*
12:30-14:00	**Lunch - The Lime Tree**
14:00-15:30	
CB 3.9	**MO2.1 Parallel session: Simulation studies in health and care** An agent based simulation of Hepatitis C transmission and treatment *Dr Rudabeh Meskarian (CLAHRC Wessex / University of Southampton*
	Using bootstrapping to reflect variance in resource demand in simulation modeling of patient flow; the case of stroke treatment in Norway *Kim Rand-Hendriksen (Akershus University Hospital)*
	Simulation of multi-appointment scheduling problems in hospitals *Joren Marynissen (KU Leuven)*
	Using a combined discrete event simulation agent based model to improve drug production at the Radium Hospital, Norway
Chair	*Dr Joe Viana (Health Services Research Centre, Akershus University Hospital)*
CB 3.15	**MO2.2 Parallel session: Diagnostic and screening management** A review of demand and capacity for diagnostic services in Wessex *Richard Guerrero-Ludueña (University of Southampton)*
	A hybrid approach using forecasting and discrete-event simulation for modelling endoscopy services in healthcare *Alison Harper (University of Exeter)*

	Assessing the impact of different diabetic retinopathy screening policies using agent-based modelling *Dr Steffen Bayer (University of Southampton)*
Chair	Modelling the Irish radiology service – A clinical perspective *Mary Conlon (National University of Ireland, Galway)*
CB 3.16	**MO2.3 Parallel session: Workforce scheduling and allocation** Optimal time allocation of an orthopedic surgeon *Eline Tsai (University of Twente)*
	Preference-based staff scheduling at hospitals *Kjartan Kastet Klyve (Norwegian University of Science and Technology)*
	Physician staffing and scheduling in an emergency department using optimization under uncertainty *Janaina Marchesi (PUC-Rio)*
Chair	An optimization model for staff scheduling at a Portuguese EMS *Inês Marques (Universidade de Lisboa)*
16:00-17:30	
CB 3.9	**MO3.1 Parallel session: Geography, networks and resource allocation** Measuring inequalities in the geographic distribution of multiple health resources *Martin Dlouhy (University of Economics Prague)*
	Designing a regional-based healthcare logistics network *Prof Valérie Bélanger (HEC Montréal)*
	Optimization approaches to the ambulance dispatching and relocation problem *Ana Sofia Carvalho (Universidade de Lisboa)*
Chair	A geospatial analysis of the Nova Scotia emergency care network *Dr Peter Vanberkel (Dalhousie University)*
CB 3.15	**MO3.2 Parallel session: Costing and measurement** Prediction of patient activation during technology enabled continuity of care intervention *Carrie Queenan (University of South Carolina)*
	Segmentation of primary care patients by annual cost *Palvannan Rk (National Healthcare Group)*

	Simulation modelling and optimisation techniques in health technology assessment *Syed Salleh Abdul Rahman (University of Sheffield)*
Chair	Portable, transparent Markov modeling for medical cost-effectiveness *Prof Gordon Hazen (Northwestern University)*
CB 3.16	**MO3.3 Parallel session: Policies and decision support** Alternative policies to streamline the treatment of chronic patients in public hospitals *Prof Mario Jorge Ferreira de Oliveira (Federal University of Rio de Janeiro)*
	Stratified breast cancer follow-up using a continuous-state POMDP. *Maarten Otten (University of Twente)*
	Evaluating the sustainability of complex health system transformation in the context of population ageing: a system dynamics approach *Dr Gozdem Dural-Selcuk (Hacettepe University)*
Chair	Clinical ambiguity and conflicts of interest in interventional cardiology decision-making *Prof Tinglong Dai (Johns Hopkins University)*
18:30-20:30	**Walking tour of Bath**

Above: Royal Crescent, Bath

Mini Conference

Tuesday 1st August 2017

08:30-09:00	**Mini Conference Registration and Coffee - CB Level 1 Foyer**
09:00-10:30	**TU1.1 Plenary session**
CB 1.10	Plenary speakers: *Professor Erwin Hans – Professor of Operations Management in HealthcareUniversity of Twente* *Professor Ken Stein - Deputy Director, PenCLAHRC* Prof Erwin Hans will discuss the research activities of the Center of Healthcare Operations Improvement & Research (CHOIR) he co-founded in the Netherlands, a center of expertise in healthcare logistics. Prof Ken Stein will talk about the Peninsula Collaboration for Operational Research and Development (PenCHORD) that has been active since 2008.
Chair	*Professor Christos Vasilakis – University of Bath*
10:30-11:00	**Coffee - CB Level 1 Foyer**
11:00-12:30	
CB 3.9	**TU2.1 Parallel session: Primary and community care** Referral propensity of out-of-hours doctors: analysis of Oxfordshire data *Dr Honora Smith (University of Southampton)* Modelling patient flow in community healthcare - a fluid approximation with patient health *Ryan Palmer (University College London)* Towards a concept for collaborative GP practices *Melanie Reuter-Oppermann (Karlsruhe Institute of Technology)* Simulation model of complex continuing care in a rural community hospital *Prof Alexander Rutherford (Simon Fraser University)*
Chair	
CB 3.15	**TU2.2 Parallel session: Location analysis and visualisation** Optimization methods to handle uncertainty in healthcare location-allocation problems: a literature review. *Vittorio Nicoletta (Laval University)* Simulating hospitals' patient transit systems *Thomas Adams (University of Auckland)*

	Centralising neonatal intensive care units in England *Dr Emma Villeneuve (NIHR PenCLAHRC)*
Chair	Home care hospitalization for newborn infants in Ile de France (IDF) region *Dr Catherine Crenn-Hebert (Assistance Publique Hôpitaux de Paris)*
CB 3.16	**TU2.3 Parallel session: Demand, capacity and resource allocation** Mathematical and practical challenges in scheduling medical residents *Dr Amy Cohn (University of Michigan)*
	A resource allocation model as a vehicle for translating research into practice in postnatal care *Prof John Bowers (University of Stirling)*
	The affine accumulating priority queue: a model which prioritises based upon acuity and waiting time *Prof David Stanford (Western University)*
Chair	Waiting times in outpatient clinics: what needs to be understood to match demand and capacity *Dr Doris Behrens (Cardiff University)*
12:30-14:00	**Lunch - CB Level 1 Foyer**
14:00-15:30	
CB 3.9	**TU3.1 Parallel session: ED attendance and flow models** Statistical analysis of routinely collected and openly reported NHS Trust data, to explain the decline in Accident & Emergency 4-hour target performance *Brad Keogh (University of Southampton)*
	Using real-time data in nudging patients' emergency department (ED) attendance behaviour *Navonil Mustafee (University of Exeter)*
	Using OR to help hospitals reduce emergency department waiting times: examples and impact *Dr Thomas Monks (University of Southampton)*
Chair	What is the required size of a Clinical Decision Unit for an Emergency Department? - Insights from a knowledge transfer project *Dr Sebastian Rachuba (NIHR PenCLAHRC)*

CB 3.15	**TU3.2 Parallel session: Obesity and dementia** Modelling the future of dementia care in Wessex *Dave Evenden (University of Southampton)* Modelling the increase in BMI (obesity) in England since the early 1990s *Dr Roger Brooks (Lancaster University)* Using hybrid simulation to model the spread of obesity through social networks *Mark Tuson (Cardiff University)* The use of telecare to support people with dementia to remain living within their own homes
Chair	*Katherine Penny (University of Southampton)*
CB 3.16	**TU3.3 Parallel session: Stroke care modelling** Supporting decisions around the organisation of anticoagulation services for patients with atrial fibrillation with operational research *Dr Neophytos Stylianou (University of Bath)* Optimising the stroke pathway through discrete event simulation: Assessing the credibility of a centralised hyper-acute stroke unit *Dr Richard Wood (Bristol, North Somerset, and South Gloucestershire NHS CCGs)* Survival of the fittest? Frailty modelling of stroke incidence. *Dr Mathias Barra (Akershus University Hospital)* Operations research modelling to understand patient progression in stroke rehabilitation
Chair	*Leonid Churilov (Florey Institute of Neuroscience and Mental Health)*
15:30-16:00	**Coffee - CB Level 1 Foyer**
16:00-17:30	**TU4.1 Panel discussion**
CB 1.10	Breaking through: Achieving impact in health & care with operational research An interactive panel session to explore and debate the factors central to the application of operational research to improve health delivery on the international stage. Participation will be actively encouraged.
Chair	*Prof Martin Pitt - Director of PenCHORD, University of Exeter and PenCLAHRC*
18:00-19:30	**TU5.1 Posters and buffet supper - The EDGE**

Wednesday 2nd August 2017

08:00-20:00	Visit Longleat and Stonehenge
20:00-21:30	BBQ supper - The EDGE

Top: Stonehenge; above left: Longleat House and gardens; above right: The EDGE

Thursday 3rd August 2017

08:30-09:00	**Coffee - CB Level 1 Foyer**
09:00-10:30	
CB 3.9	**TH1.1 Parallel session: General issues and methods in health OR** Objectives, objectives – developing reflections *Prof Penelope Mullen (Independent)* Modelling patient flows through municipal acute units in South-Eastern Norway *Meetali Kakad (Akershus University Hospital)* A research agenda for Operations Research Applied to Health Services (ORAHS) in South Africa *Prof Liezl Van Dyk (North-West University)* Teaching modelling & simulation to medical students Chair *Prof Sally Brailsford (University of Southampton)*
CB 3.15	**TH1.2 Parallel session: Scheduling applications** Scheduling interval planning considering no-shows and cancellations *Gréanne Leeftink (University of Twente)* Dynamically accepting and scheduling patients for home healthcare *Mustafa Demirbilek (University of Warwick)* A mathematical programming model for efficient resource allocation in radiotherapy with uncertain demand *Bruno Vieira (NKI-AVL)* Scheduling surgical instrument decontamination: reducing lead times for high priority contaminated goods Chair *Daniel Gartner (Cardiff University)*
CB 3.16	**TH1.3 Parallel session: Demand and capacity management** System dynamic models by estimates the needed number of beds for each ward of the hospital *Dr Paula Andrea Velásquez Restrepo (IPS Universitaria / Universidad de Antioquia)* Online discrete event simulation for the management of inpatient beds *Dr Dave Worthington (Lancaster University)*

	Restructuring existing ward structures at a public hospital *Dr Sebastian Rachuba (NIHR CLAHRC South West Peninsula (PenCLAHRC))*
Chair	Capacity planning for a healthcare network with outsourcing *Dr Nalan Gulpinar (Warwick Business School)*
10:30-11:00	**Coffee - CB Level 1 Foyer**
11:00-12:30	
CB 3.9	**TH2.1 Parallel session: Routing, transit and tele-health** Operations -based healthcare service innovation: an example of tele-health *Dr Jiun-Yu Yu (National Taiwan University)*
	Benchmarking online dispatch algorithms for Emergency Medical Services *Pieter van den Berg (Rotterdam School of Management)*
	Comparison between alternative decomposition methods to solve the assignment and routing problems in home health care *Semih Yalçındağ (Yeditepe University)*
Chair	Stochastic routing for relief efforts *Dr Maria Elena Bruni (University of Calabria)*
CB 3.15	**TH2.2 Parallel session: Workforce allocation** Pooling nursing staff in an intensive care setting with two units *June Lau (University of Auckland)*
	A stochastic knapsack approach for the individual surgeon loading problem *Troels Martin Range (University of Southern Denmark / NTNU)*
	Reconstructing disrupted nurse rosters *Toni Ismael Wickert (KU Leuven)*
Chair	Effects of stroke on labour force participation for patients and family caregivers *Dr Fredrik A. Dahl (Akershus University Hospital)*
CB 3.16	**TH2.3 Parallel session: Patient appointment scheduling** Outpatient appointment scheduling Eduardo López Aguilar (Polytech Tours)
	A new appointment-scheduling policy: a case study in a bariatric surgery clinic. *Igor Peres (PUC-Rio)*

	Analysis of indirect waiting times for medical practices considering different patient types and appointment policies *Anne Zander (Karlsruhe Institute of Technology)*
Chair	Decision support for appointment scheduling of MRI examinations *Dr Anders N. Gullhav (Norwegian University of Science and Technology)*
12:30-14:00	**Lunch - The Lime Tree**
14:00-15:30	**TH3.1 Plenary session**
CB 1.10	Presented by: *Prof Martin Utley – University College London* Prof Martin Utley leads a session dedicated to the work and life of the late Prof Steve Gallivan, who was a long-standing member of ORAHS.
15:30-16:00	**Coffee - CB Level 1 Foyer**
16:00-17:30	
CB 3.9	**TH4.1 Parallel session: Modelling blood and transplant services** A simulation-optimization approach to single-cycle inventory policies between one blood center and multiple hospitals *Prof David Barrera-Ferro (Pontificia Universidad Javeriana)*
	UK living kidney sharing scheme *Dr Matthew Robb (NHS Blood and Transplant)*
	Blood type specific issuing policies to improve inventory management *Joost van Sambeeck (University of Twente)*
Chair	Modelling the impact of extended shelf life platelets *Dr John Blake (Dalhousie University)*
CB 3.15	**TH4.2 Parallel session: Surgery and operating room scheduling 1** Optimizing the master surgery schedule in a private hospital *Prof Maria Eugénia Captivo (Universidade de Lisboa)*
	Approximate dynamic programming for the surgery room allocation problem under uncertainty *Elvan Gokalp (University of Warwick)*
	Optimal allocation and evaluation of operating room hours *Lisa Koppka (Ruhr University Bochum)*
Chair	Using buffer capacity in operating room planning: a good idea? *Carla Van Riet (KU Leuven)*

CB 3.16	**TH4.3 Parallel session: Disaster and emergency planning** Assessment of physicians stress in emergency departments *Marta Cildoz (Public University of Navarre)* Emergency event forecasting: a spatial-temporal approach *Niki Matinrad (Linköping University)* Emergency Readmission for Integrated Care (ERIC) model - using an automated feature generation and a multi-task learner *Thierry Chaussalet (University of Westminster)* Improving interoperability of major disasters: main tasks, materials, equipment, EU civil protection modules and responders: a decision support system
Chair	*Prof Marion Rauner (University of Vienna)*
19:00-19:50	**Drinks reception - The Victoria Art Gallery**
20:00-23:30	**Gala dinner - The Pump Room**

Left: The Victoria Art Gallery

Friday 4th August 2017

09:00-09:30	**Coffee - CB Level 1 Foyer**
09:30-10:30	**FR1.1 Plenary session**
CB 1.10	Plenary speaker: *Paul Mears - Chief Executive, Yeovil District Hospital* Chaired by: *Prof Christos Vasilakis – University of Bath*
10:30-11:00	**Coffee - CB Level 1 Foyer**
11:00-12:30	
CB 3.9	**FR2.1 Parallel session: Surgery and operating room scheduling 2** Admission control in an intensive care unit with readmission *Faruk Akın (Koç University)* Surgical procedure type scheduling incorporating semi urgent patients *Nardo Borgman (University of Twente)* Parametric and nonparametric models for next day operating room scheduling *Prof Enis Kayis (Ozyegin University)* A generic simulation model for operating room scheduling and planning Chair *Prof Michael Carter (University of Toronto)*
CB 3.15	**FR2.2 Parallel session: ED optimisation and performance** Synchronisation and optimisation of emergency department patient flow *Guvenc Dik (Queensland University of Technology)* Sequentially assigning and prioritizing patients at emergency departments *Dr Maartje van de Vrugt (Universtiy of Twente / Leiden University)* Using the “floating patients” method to balance crowding between the hospital emergency department and other departments *Guy Wachtel (Bar Ilan University)* Using discrete event simulation with Coxian phase-type regression models to understand patient flow through emergency departments Chair *Laura Boyle (Queen’s University Belfast)*

CB 3.16	**FR2.3 Parallel session: Model validation and participation** Overcoming common critical mistakes in building composite indices through the MACBETH socio-technical approach *Monica Oliveira (Universidade de Lisboa)* A novel participatory approach to scenario building: application to the evolution of population health inequalities in Europe *Liliana Freitas (Universidade de Lisboa)* Validating clinical hybrid OR models: what can go wrong (and probably will)? *Hannah Johns (RMIT University)* Opening the door: inviting patient and family perspectives on pediatric mental health emergency department use in Nova Scotia Chair *Dr Leslie Anne Campbell (Dalhousie University)*
12:30-14:00	**FR3.1 Closing session and ORAHS business meeting**
CB 1.10	Join us for the annual ORAHS business meeting where we will debrief this year's ORAHS, learn more about the 2018 edition in Norway and get to choose the hosts of 2019.
14:00	**End of conference**

Poster Presentations

1 Modelling mental health care pathways and services for capacity planning and policy decisions
Sarie Brice (Cardiff University)

2 Development of a scorecard for measuring care home quality
Prof Thierry Chaussalet (University of Westminster)

3 Emergency Readmission for Integrated Care (ERIC) Model: Using an automated feature generation & a multi-task learner
Prof Thierry Chaussalet (University of Westminster)

4 Progression modelling of clinically-determined severity for dementia patient care planning
Dave Evenden (University of Southampton)

5 An exploration of standardised processes in a knowledge-intensive (healthcare) operation: Implementing the acute stroke care pathway
Marianna Frangeskou (University of Bath)

6 Discrete event simulation of a complex continuing care ward with bed blocking
Sergei Gassan (Simon Fraser University)

7 Evaluating the cost benefit of a remote cancer patient monitoring system in a single NHS Institution
Dr Penny Kechagioglou (University Hospital Coventry and Warwickshire)

8 Decision making under uncertainty: A health care infrastructure scenario
Dr Rudabeh Meskarian (CLAHRC Wessex / University of Southampton)

9 Novel mapping methods to visualise and understand referral data within community healthcare
Ryan Palmer (University College London)

10 Modelling the benefits of radiographer-led discharge in emergency departments
Dr Sebastian Rachuba (NIHR PenCLAHRC)

11 Generating virtual patients for discrete-event simulation from a small sample with categorical characteristics
Christina Saville (University of Southampton)

12 Is it possible to plan and improve patient flow in a post term pregnancy clinic?
Tone Breines Simonsen (Akershus University Hospital)

13 Are medical outliers associated with worse patient outcomes? An analysis of routinely collected data within a regional NHS hospital
Dr Neophytos Stylianou (University of Bath)

14 Modelling the TB epidemic in South Africa
Riley Wishart (Simon Fraser University)

15 Interactions between naturalistic decision making and computer simulation modelling in managing patient flow in hospitals
Matthew Woodward (University of Bath)

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Further information

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