

March 31, 2022

Dear colleagues,

The Health Care Operational Research Special Interest Group (HCOR SIG) of the Canadian Operational Research Society (CORS) is pleased to announce the details for this year's Canadian Healthcare Optimization Workshop (CHOW). This will be a hybrid event, held on Saturday, June 4, 2022 (the day before the start of the CORS/INFORMS International Conference in Vancouver, BC). For those able to join CHOW in person, the event will take place at the Sauder School of Business, University of British Columbia, in Vancouver. For those preferring to join remotely, a Zoom link will be provided. Registration is required, but the event will be free of charge for both in-person and online attendees. You can register here:

<https://forms.gle/CxYzaia3fUb4QYBNA>

The theme of this year's CHOW is "Research meets Practice," which will feature paired presentations of OR/MS researchers and their health care collaborators. The former will speak to the modeling approaches and results, while the latter will speak to the importance and impact of the work. Our distinguished set of speakers will also discuss the origins of their work, next steps, and challenges in bridging academia and practice. There will be plenty of time for Q&A for both speakers.

We hope you can join us for this exciting new format highlighting experts in both mathematical modeling and healthcare delivery. Details of the talks and bios of our speakers appear in the pages that follow. Final details regarding the event (e.g., location, zoom link) will be circulated at a later time.

Sincerely,



Steven Shechter
Workshop Chair
Professor, Sauder School of Business, UBC
steven.shechter@sauder.ubc.ca

Schedule at-a-glance

(all times are in Pacific Time)

Time	Speakers	Title
8:50am-9am	Steven Shechter	Introduction to workshop
9am-10am	Nadia Lahrichi and Marie-Andrée Fortin	Designing decision support systems to improve cancer treatment logistics
10am-11am	Tinglong Dai and Risa Wolf	Designing AI-augmented healthcare delivery systems for physician buy-in and patient acceptance
11am-12pm	Pengyi Shi and Jason Huber	Reducing substance use disorders-related recidivism with community-based programs: Data-driven analytics for fairness and societal benefits
12pm-1pm	Lunch	
1pm-2pm	Timothy Chan and Sheldon Cheskes	Pi in the Sky: Drone-delivered defibrillators for out-of-hospital cardiac arrest
2pm-3pm	Carri Chan and Hayley Gershengorn	Optimal scheduling with customer deterioration and improvement: The use of high-flow nasal cannula and mechanical ventilators during COVID19

Abstracts and speaker bios appear in the following pages

9am-10am

Speakers: Nadia Lahrichi & Marie-Andrée Fortin (to be confirmed)



Title: Designing decision support systems to improve cancer treatment logistics

Abstract: In this talk, we present how simulation and optimization models can help improve the efficiency of cancer treatment centers. Patient flow in these centers is complex and involves multiple steps and resources. While dealing with limited resources and a number of constraints, decision makers need to ensure that patients are treated within deadlines. We provide data-driven models to achieve these goals for scheduling patients' treatments, scheduling physicians, assessing delays or the surges in demand for radiotherapy treatment. Managerial insights are shared.

Speaker Bios:

Nadia Lahrichi holds a PhD in applied mathematics from Polytechnique Montréal. She is currently a full professor at the department of Mathematics and industrial engineering at Polytechnique Montreal and the deputy director of CIRRELT. Her research is mainly focused towards applying modeling and operational research tools to improve patient flow in the healthcare system. She uses exact, metaheuristics and discrete event simulation approaches to tackle patient and resource scheduling problems. She has published more than 50 papers in peer reviewed journals and received the award for outstanding application of operational research (from the Canadian Operational research society) for solving the home health care routing and scheduling problem. She is an associate editor of Health Care Management Science, Operations research for Health Care and Flexible Services and Manufacturing. She co-organized multiple international conferences such as Optimization Days, Odysseus, NOW and ORAHS. Since 2018, she has been involved in the council of the Canadian Operational Research Society (CORS) as vice-president of the Healthcare Special Interest Group, president of the Healthcare Special Interest Group, president of the chapter of Montreal and as the Education Chair.

Dr. Fortin is the Regional Cancer Director and the Head of Department in Radiation Oncology at Centre intégré de santé et de services sociaux de Laval. She is an Associate Clinical Professor at Université de Montréal. Dr. Fortin is the Director of the Provincial cancer performance committee and a member of the Provincial Clinical Technology Information committee. She is involve in various projects for improving patient care where she developed a long term

collaboration in operational research with École Polytechnique and Gray. She is recognized for her mobilizing leadership.

10am-11am

Speakers: Tinglong Dai & Risa Wolf



Title: Designing AI-augmented healthcare delivery systems for physician buy-in and patient acceptance

Abstract: The role of artificial intelligence (AI) in augmenting healthcare is expected to grow substantially in future decades. Current research in medical AI focuses on developing, validating, and implementing point-level AI applications in an ad-hoc manner. To harness the full power of AI to improve the patient experience and outcomes at a societal scale, however, requires a gestalt shift—with systematic understanding of AI in the context of healthcare—and so results in its widespread adoption. This translates to four pillars of incorporating AI into healthcare workflow, including physician buy-in, patient acceptance, provider investment, and payer support (the “4Ps”). To achieve these 4Ps, it is imperative to design AI-augmented healthcare delivery systems in view of (1) how physicians integrate AI into their clinical practice and (2) how patients perceive the role of AI in healthcare delivery. This will in turn boost provider investment and payer support. In this joint talk, we discuss several ongoing projects aimed at understanding and overcoming barriers to the appropriate use of AI in clinical practice.

Speaker Bios:

Tinglong Dai is a Professor of Operations Management and Business Analytics at Johns Hopkins University. He serves on the leadership team of the Hopkins Business of Health Initiative and the executive committee of the Institute for Data Intensive Engineering and Science. As a leading expert in healthcare analytics and global supply chains, Dr. Dai has been extensively quoted in the media, including the Associated Press, Bloomberg, CNBC, CNN, Financial Times, Fortune, Harvard Business Review, New York Times, NPR, PBS, USA Today, Wall Street Journal, and Washington Post. In 2021, Poets & Quants named him one of the World's Best 40 Under 40 Business School Professors. His work has been published in leading journals such as Management Science, M&SOM, Marketing Science, and Operations Research, and has been recognized by Johns Hopkins Discovery Award, INFORMS Public Sector Operations Research Best Paper Award, POMS Best Healthcare Paper Award, and Wickham Skinner Early Career Award. He currently serves as an Associate Editor for M&SOM, Naval Research Logistics, and Health Care Management Science, and as a Senior Editor for Production and Operations

Management. He graduated from Carnegie Mellon University with a PhD in Operations Management and Robotics in 2013.

Dr. Risa Wolf is an Assistant Professor of Pediatric Endocrinology at the Johns Hopkins University School of Medicine. Her research focuses on clinical care innovations aimed at improving the outcomes of children with diabetes. She pioneered the use of autonomous AI for diabetic retinopathy screening in pediatrics, demonstrating the system's safety, efficacy, and equity in a diverse pediatric diabetes population. Her clinical practice focuses on pediatric diabetes care and other endocrine issues. She is the Founder and Medical Director of Camp Charm City diabetes camp in Baltimore, MD. She is the Principal Investigator of a study implementing point-of-care diabetes retinopathy screening into pediatric diabetes care, a Co-Investigator for Trialnet, and the Principal Investigator for the Pediatric Diabetes Consortium site at Johns Hopkins. Dr. Wolf received her undergraduate degree from the University of Pennsylvania, after which she attended the Mount Sinai School of Medicine where she graduated with Distinction in Research, and was inducted into the Alpha Omega Alpha Honor Medical Society. She completed her pediatric residency at the Children's Hospital of Philadelphia, followed by a fellowship in pediatric endocrinology at the Johns Hopkins Hospital. During her fellowship, Dr. Wolf was awarded prestigious grants from both the Pediatric Endocrine Society and the Endocrine Society to support her research in obesity and metabolism.

11am-12pm

Speakers: Pengyi Shi & Jason Huber



Title: Reducing substance use disorders-related recidivism with community-based programs: Data-driven analytics for fairness and societal benefits

Abstract: Recidivism, when a convicted criminal commits a new offense, is one of the most challenging and important issues facing the modern criminal justice system. Notably, many repeat offenders suffer from substance use disorders (SUD), which is a *chronic disease* that needs continuous support from the community. Rather than receiving aid and treatment from their local communities, SUD sufferers are often criminalized and incarcerated for minor offenses. The large number of individuals with SUD involved in the criminal justice system presents a unique opportunity, as well as challenges, in addressing the concerns of public safety and public health. In this talk, we first discuss the complex process flow of individuals with SUD through the criminal justice and social services support systems. We then discuss using data-driven analytics to aid community-based programs in optimally allocating their limited resources to different intervention and support services to maximize the benefit to society while reducing racial disparity in incarceration and recidivism.

Speaker Bios:

Pengyi Shi is an associate professor at the Krannert School of Management, Purdue University. Her research interests include data-driven modeling and decision-making in healthcare and service operations. She has collaborated with practitioners and faculty members from different healthcare organizations, including major hospitals in the US, Singapore, and China. Her research has won the first place of MSOM Responsible Research in OM Award in 2021, the first place of INFORMS Pierskalla Best Paper Award in 2018, and the second place of POMS CHOM Best Paper Award in 2019 and 2020. She received her Ph.D. degree in Industrial Engineering from Georgia Institute of Technology before joining Purdue in 2014.

Jason Huber is the Executive Director of Tippecanoe County Community Corrections. Prior to being appointed to his current position on 2016, Jason served 20 years with the Tippecanoe County Sheriff's Office, where he had a progressive career path, retiring as a Lieutenant. During Jason's tenure as Executive Director, Tippecanoe County Community Corrections has seen unprecedented growth and success. He leads a forward-thinking staff who are committed to providing the best in evidence-based practices for those under community supervision.

Tippecanoe County Community Corrections is dedicated to being the model of innovative solutions facing justice-involved individuals. Jason earned his B.S. in Criminal Justice/Homeland Security and Counterterrorism from Kaplan University (Purdue University Global) in 2011 and his A.S. in Criminal Justice from Vincennes University in 1995.

1pm-2pm

Speakers: Timothy Chan & Sheldon Cheskes



Title: Pi in the Sky: Drone-delivered defibrillators for out-of-hospital cardiac arrest

Abstract: This talk presents several research projects related to optimizing drone delivery of defibrillators to out-of-hospital cardiac arrest (OHCA) victims. The first project combines optimization and queuing to design a hypothetical drone network to reduce response time to OHCA in a large region surrounding Toronto, Ontario. The second project develops machine learning-based dispatch rules so drones are prioritized to cases where they are most likely to beat an ambulance. The third project describes feasibility studies of actual drone flights to deliver defibrillators.

Speaker bios:

Timothy Chan is the Canada Research Chair in Novel Optimization and Analytics in Health, a Professor in the department of Mechanical and Industrial Engineering, the Director of the Centre for Analytics and AI Engineering, the Associate Director, Research and Thematic Programming of the Data Sciences Institute, and a Senior Fellow of Massey College at the University of Toronto. His primary research interests are in operations research, optimization, and applied machine learning, with applications in healthcare, medicine, sustainability, and sports. He received his B.Sc. in Applied Mathematics from the University of British Columbia (2002), and his Ph.D. in Operations Research from the Massachusetts Institute of Technology (2007). Before coming to Toronto, he was an Associate in the Chicago office of McKinsey and Company (2007-2009), a global management consulting firm. During that time, he advised leading companies in the fields of medical device technology, travel and hospitality, telecommunications, and energy on issues of strategy, organization, technology and operations.

Dr. Sheldon Cheskes is an Associate Professor with the Division of Emergency Medicine, Department of Family and Community Medicine at the University of Toronto, and a scientist at the Li Ka Shing Knowledge Institute at St. Michael's Hospital in Toronto, Ontario, Canada. He is the Medical Director for the Regions of Halton and Peel with the Sunnybrook Centre for Prehospital Medicine. He is one of the principal investigators for the Canadian Resuscitation Outcomes Consortium (CanROC) and is a recognized international authority in the area of CPR quality and out-of-hospital cardiac arrest resuscitation. Dr. Cheskes has published over 100 manuscripts in high impact journals such as the New England Journal of Medicine, Circulation, CMAJ and Resuscitation that have changed resuscitation practice around the world. He is the

principal investigator of the DOuble Sequential External Defibrillation in Refractory Ventricular Fibrillation (DOSE VF) trial. This study will be the first cluster randomized trial to clinically evaluate two novel therapeutic defibrillation strategies (double sequential external defibrillation and vector change defibrillation) against standard practice for patients remaining in refractory ventricular fibrillation during out-of-hospital cardiac arrest. He is also studying methods to improve public access defibrillation in rural and remote areas through the use of community responder programs and drone delivery of automated external defibrillators.

2pm-3pm

Speakers: Carri Chan & Hayley Gershengorn



Title: Optimal scheduling with customer deterioration and improvement – the use of high-flow nasal cannula and mechanical ventilators during COVID19

Abstract: In healthcare settings, scarce capacity is often reserved for the most urgent customers. However, there has been a growing interest in the use of proactive service when a less urgent patient may become urgent while waiting. In this work, we consider the optimal allocation of resources to patients whose health state can improve or deteriorate while waiting. We apply the insights from our stylized queueing model to consider the use of an alternative therapy for patients in respiratory distress – High-Flow Nasal Cannula. Using simulation, we find that the use of high-flow nasal cannula coupled with early mechanical ventilation when supply is sufficient results in fewer deaths and greater ventilator availability. Using data from the 2020 COVID19 peak, we estimate that our proposed strategy resulted in 10,000–40,000 fewer deaths than if high-flow nasal cannula were not available.

Speaker Bios:

Carri W. Chan is a Professor of Business in the Decision, Risk and Operations Division and the Faculty Director of the Healthcare and Pharmaceutical Management Program at Columbia Business School. Her research is in the area of healthcare operations management. Her primary focus is in data-driven modeling of complex stochastic systems, efficient algorithmic design for queueing systems, dynamic control of stochastic processing systems, and econometric analysis of healthcare systems. Her research combines empirical and stochastic modeling to develop evidence-based approaches to improve patient flow through hospitals. She has worked with clinicians and administrators in numerous hospital systems including Northern California Kaiser Permanente, New York Presbyterian, and Montefiore Medical Center. She is the recipient of a 2014 National Science Foundation (NSF) Faculty Early Career Development Program (CAREER) award, the 2016 Production and Operations Management Society (POMS) Wickham Skinner Early Career Award, and the 2019 MSOM Young Scholar Prize. She currently serves as a co-Department Editor for the Healthcare Management Department at Management Science. She received her BS in Electrical Engineering from MIT and MS and PhD in Electrical Engineering from Stanford University.

Dr. Gershengorn is a Professor in the Division of Pulmonary, Critical Care, and Sleep Medicine at the University of Miami, Miller School of Medicine where she works as a medical intensivist. As Medical Director of Data Quality Analytics for the University of Miami Hospitals, she has co-led the creation of institution-wide protocols to standardize care for COVID-19 patients. Dr. Gershengorn's research program focuses on the allocation of ICU resources and the impact such allocation has on the outcomes of critically ill patients. In particular, she is interested in understanding how (1) ICU staffing and (2) practices which may be tied to staffing affect patient morbidity and mortality. She is Associate Editor for Critical Care of the Annals of the American Thoracic Society, serves on the planning committee for Critical Care for the American Thoracic Society, and is Chair of the Internal Medicine Section for the Society of Critical Care Medicine.