School of Data Science
香港城市大學
City University of Hong Kong

SDSC SEMINAR

From Predictive to Prescriptive Analytics in Airport Capacity Management

Date: 19 June 2024 (Wednesday)

Time: 3:00pm - 4:00pm

Venue: Rm 6-209, Lau Ming Wai Academic Building, City University of Hong Kong

Professor Nuno Ribeiro

GUEST SPEAKER'S PROFILE

Nuno Ribeiro is an Assistant Professor in the Engineering Systems and Design Pillar at the Singapore University of Technology and Design (SUTD). Before joining SUTD, he earned his Ph.D. in Transport Systems from the University of Coimbra in Portugal (2019). During his doctoral studies, he gained valuable insights through visiting research positions at prestigious institutions such as MIT (2016) and Carnegie Mellon University (2017). Recently, he has served as visiting faculty at the University of Bergamo in Italy (2022). In SUTD, Asst. Prof. Nuno Ribeiro teaches courses on: (i) 40.015 Simulation Modeling and Analysis, (ii) 40.614 Metaheuristic Optimization, (iii) 10.022 Modeling Uncertainty, and (iv) 40.321 Airport Systems Modeling and Simulation.

His specialization in the field of Operations Research methods applied to aviation studies has garnered recognition from both academia and industry. His contributions have been honored with several awards, such as: (i) the Ana Valicek Silver Medal from the AGIFORS in 2018 for his work on Airport Slot Scheduling ; (ii) the Best Paper Runner-Up award from the ATRS in 2022 for his work on Passenger Demand Modeling in Air Transportation; (iii) the Best PhD dissertation (2019), Best Research Paper (2021), and Best Presentation (2023) awards from INFORMS-AAS for his work on Airport Capacity Management and Optimization of Terminal Airspace Operations.

ABSTRACT

Air traffic congestion occurs when there is an imbalance between demand and capacity. This is often due to various factors, such as overestimating airport capacity, flight over-scheduling, inefficient air traffic flow management, and weather disturbances. These combined factors exacerbate congestion and increase costs for airlines, airports, and passengers. The role of Airport Capacity Management (ACM) is to ensure a safe, orderly, and efficient flow of air traffic while maximizing airport capacity utilization. Efficient ACM involves three fundamental steps: (1) assessing the capacity of airport and airspace resources, (2) identifying and predicting potential capacity overloads, and (3) implementing ACM strategies to resolve or mitigate the effects of congestion. This research explores the application of operations research methods in supporting these steps at various levels of ACM, including the analysis and setting of airport declared capacities (one year before operations), the optimization of airport slot allocation (six months before operations), and the planning of terminal airspace operations (day to hours before operations). An overview of various models will be provided, along with results from analyses conducted in collaboration with airports from Portugal, Singapore, and Brazil.

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All are welcome