



School of Data Science

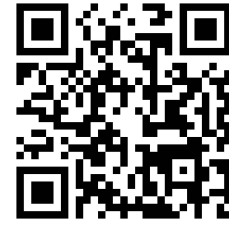
香港城市大學
City University of Hong Kong

Predictive and Prescriptive Analytics for Offshore Wind Energy: Uncertainty, Quality, and Reliability

Date: 25 October 2023 (Wednesday)

Time: 10:00am - 11:00am

Seminar Link: <https://cityu.zoom.us/j/98465487204>



ABSTRACT

The rising U.S. offshore wind sector has the potential to unlock vast supplies of renewable energy. To harness this valuable resource, Gigawatt (GW)-scale offshore wind projects are already under way at several locations off of the U.S. coastline and are set to host wind turbines that are larger than many of the world's tallest buildings. Realizing this promise, however, is contingent on innovative solutions to several challenges related to the optimal management of such ultra-scale offshore wind turbines, which are set to operate under harsh environmental and operational conditions, in relatively under-explored territories, and at unprecedented scales. In this talk, I will review our research group's progress in formulating tailored machine learning (ML) and operations research (OR) solutions aimed at mitigating some of those operational uncertainties and enabling the reliable and cost-effective integration of those soon-to-be-operational wind farms. I will primarily focus on ML/OR methods which address two key challenges: (i) Uncertainty: how can we develop ML-based solutions that can make use of the multi-source, multi-resolution data in offshore wind energy regions to probabilistically and accurately predict the offshore wind power output at high spatial and temporal resolutions; and (ii) quality/reliability: how can we translate those probabilistic forecasts into operations and maintenance (O&M) decisions through offshore-tailored optimization models that consider the multi-source uncertainties and the complex multi-scale decision dependencies in offshore wind farms. Our models and analyses are tailored and tested using real-world data from the NY/NJ Bight—where several GW-scale wind projects are currently under development.



Dr Ahmed Aziz Ezzat

GUEST SPEAKER'S PROFILE

Dr. Ahmed Aziz Ezzat is an Assistant Professor of Industrial & Systems Engineering at Rutgers University, where he leads the Renewables & Industrial Analytics (RIA) research group. Before joining Rutgers, Dr. Aziz Ezzat received his Ph.D. from Texas A&M University in 2019, and his B.Sc. degree from Alexandria, Egypt, in 2013, both in Industrial & Systems Engineering. His broad research interests are in the areas of spatio-temporal data and decision sciences, probabilistic forecasting and machine learning, quality and reliability engineering, with focus on renewable energy analytics and industrial/materials informatics. Dr. Aziz Ezzat is the recipient of the 2022 Data Analytics Teaching Award from the IISE DAIS Division, the 2020 IIF-SAS® research award from the Institute of International Forecasters and SAS corporation, the 2020 Rutgers OAT Teaching Award, and the 2014 IISE Sierleja Fellowship. He currently serves as the 2023-2024 president of the IISE Energy Systems (ES) Division, and has served in the past as a board member at the IISE Quality Control & Reliability Engineering (QCRE) division. His research has been supported by the National Science Foundation (NSF), The National Offshore Wind Research and Development Consortium (NOWRDC), The NJ Economic Development Authority, The Rutgers Energy Institute, as well as industry. He is a member of INFORMS, IEEE-PES, and IISE.

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All are welcome