Institute of Industrial and Systems Engineers
Quality Control & Reliability Engineering (QCRE) Division
and Manufacturing and Design (M&D) Division
2021-2022 Joint Webinar Series

IISE Quality Control & Reliability Engineering (QCRE) division and Manufacturing and Design (M&D) Division would like to invite you to attend our webinar on Tuesday, April 26, 1 PM – 2 PM, Eastern Time.

Registration Link: https://us06web.zoom.us/webinar/register/WN_DN_kg-EfQi2PbdRBpwWN7Q
Time: April 26, Tuesday, 1 PM –2 PM, Eastern Time.
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Title: The Importance of Industrial Predictive Analytics in Self-Awareness and Self-sufficiency of the Deep Space Habitats

Presenter: Dr. Nagi Gebraeel, Georgia Power Early Career Professor and Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology

Abstract: Since humans first set foot on the moon half a century ago, most of the focus has been on low-Earth orbit missions with few unmanned scientific explorations. The accelerated growth of Space industry has created a new focus towards Deep Space applications, especially ones related to habitation. Deep space mission requires new concepts and paradigms that are different from what is currently adopted by the International Space Station (ISS). The ISS is constantly occupied by astronaut crew members, maintains an extensive supply of spare parts, and is supported by a large mission-control staff. Future deep space habitats will have none of these attributes.

NASA envisions developing resilient and autonomous Smart Deep Space Habitats (aka. SmartHabs) capable of sustaining a high level of Earth-Independence. SmartHabs must be capable of utilizing on-board telemetry data for self-awareness and self-sufficiency due to the increased distance, isolation, and uncrewed periods. Future Mars orbital and surface habitats may need to function for 1-3 years between crews, will have very limited on-board spares (with resupply gaps of up to 900 days), limited communications bandwidth and high latency.

This talk will highlight ongoing research at the HOME Institute. HOME, Habitats Optimized for Missions of Exploration, is a NASA Space Technology Space Institute charged with helping NASA design future deep space SmarHabs. In this talk, I focus on novel Industrial Engineering research applications and the profound impact of "Earth Independence" when developing modeling frameworks and algorithms for self-awareness and self-sufficiency for deep space SmartHabs.

Biography: Professor Nagi Gebraeel is the Georgia Power Early Career Professor and Professor in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech. He received his MS and PhD from Purdue University in 1998 and 2003, respectively. Dr. Gebraeel leads the Predictive Analytics and Intelligent Systems (PAIS) research group at Georgia Tech. His research interests lie at the intersection of Predictive Analytics and Machine Learning for IoT-enabled repair operations, Cybersecurity of Industrial Control Systems, and service logistics. His expertise spans several application domains including manufacturing, power networks, gas turbine technologies, and applications involving deep space habitation. Dr. Gebraeel was a former associate director at Georgia Tech's Strategic Energy Institute. He is also a member of INFORMS and IISE and was the former president of the IISE Quality and Reliability Engineering Division.

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