Dear colleagues,

The IISE Data Analytics and Information Systems (DAIS) Division and the Quality Control and Reliability Engineering (QCRE) Division will jointly organize a webinar series after the break. The webinar titled "**Advancing and Accelerating Qualification and Characterization through Stochastic Inverse Modeling**" will be given by **Dr. Ashif Iquebal** on Tuesday November 28 from 1pm-2pm EST.

To register for this event, please visit:
https://us06web.zoom.us/webinar/register/WN_bdP93N7YTYGZJl6liPjbUg
More webinars and recordings can be found on: https://www.iise.org/details.aspx?id=643

Bio of presenter: Dr. Ashif Iquebal is an assistant professor of Industrial Engineering in the School of Computing and Augmented Intelligence at ASU. Prior to this, he obtained his B.S in Industrial Engineering from IIT Kharagpur, India and M.S. in Statistics and Ph.D. in Industrial Engineering from Texas A&M University. His research aims to bridge the gap between advanced manufacturing and statistical learning. More specifically, he is interested in stochastic inverse problems, active learning, and graphical models for accelerating materials characterization, discovering process physics, and generating causal inference. He received the NIH Trailblazer Award 2023, Finalist for NSF Blue Sky Competition 2022, Pritzker Doctoral Dissertation Award from the Institute of Industrial and Systems Engineering in 2021. His research papers have been winners/finalists for six best student paper/poster awards at INFORMS, IISE, IEEE and the American Statistical Association conferences. His research is funded by MxD-DoD, NIH, and industry.

Short description of webinar:
A wide range of problems in science and engineering necessitates estimating critical quantities of interest (QoIs) through indirect measurements. A pertinent example lies within advanced manufacturing, where pursuing comprehensive structure (including microstructure and geometrical dimensions) and properties for part qualification and certification involves either exorbitantly expensive experiments limited to laboratories or costly destructive testing. For instance, the definitive method for appraising elastoplastic properties entails destructive tensile testing, while microstructure characterization demands intricate electron backscatter diffraction with high fidelity. These challenges fueled the research on estimating QoIs using indirect measurements, leading to developments in solving ill-posed inverse problems. Yet, a fundamental limitation of classical inverse problems is that they consider material properties to be deterministic, lacking uncertainty quantification. Bayesian inverse models attempt to overcome this issue but assume that the variability in the indirect measurements arises from measurement noise, thereby failing to account for the variability in the QoIs.
In this talk, we will explore the existing research on inverse problems and how they are limited in accurately estimating the QoIs and their variabilities. Subsequently, we will present our research on stochastic inverse problems that reformulates the classical inverse problem by considering the variability in the QoIs. This new approach leads to accurately estimating not just the QoIs but also the variabilities therein. Advances in stochastic inverse problems also open venues beyond material

characterization, such as discovering the physics of complex processes via indirect measurements. We will show examples to demonstrate these applications.

For more information about this webinar, please feel free to contact the event organizers:

Yu (Chelsea) Jin: yjin@binghamton.edu
Syed Hasib Akhter Faruqui: shf006@shsu.edu
Xiaowei Yue: yuex@tsinghua.edu.cn
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Thank you!