



## **GDRR Program Opening Workshop August 5-9, 2019**

### **SPEAKER TITLES/ABSTRACT**

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“Variance Reduction for Reliability Assessment with Stochastic Computer Models”

Importance sampling has been widely used to improve the efficiency of deterministic computer simulations where the simulation output is uniquely determined, given a fixed input. To represent complex system behavior more realistically, however, stochastic computer models are gaining popularity. Unlike deterministic computer simulations, stochastic simulations produce different outputs even at the same input. This extra degree of stochasticity presents a challenge for reliability assessment in engineering system designs. Our study tackles this challenge by providing a computationally efficient method to estimate a system's reliability. Specifically, we derive the optimal importance sampling density and allocation procedure that minimize the variance of a reliability estimator. The application of our method to a computationally intensive, aeroelastic wind turbine simulator demonstrates the benefits of the proposed approaches.