Wichita State University
Department of Industrial, Systems, and Manufacturing Engineering
ISME Colloquium Presentation

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Title: Reliability Analysis of Advanced High Strength Steel by Utilizing Material Microstructures

Date: Friday – January 25, 2018

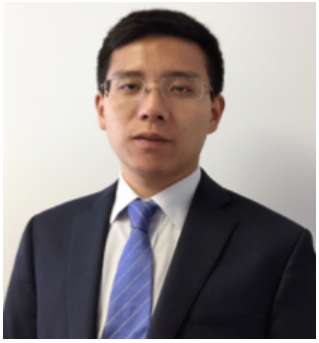
Time: 11:00 am – 12:00 noon

Location: Engineering Building, 211

Abstract

The microstructure of a material is well known to strongly influence its macroscopic properties, such as strength, hardness, toughness, and wear resistance, which in turn affect material failure. In the reliability literature, most existing research conducts reliability analysis based on either lifetime data or degradation data. However, none of these studies take the material microstructure information into account. In this talk, I will present a novel reliability analysis of advanced high strength steel by utilizing its microstructure image information. Statistical models are proposed for the analysis, and statistical inferences of the proposed methodologies will be discussed. Simulation studies and designed physical experiments on advanced high strength steel will be shown to validate and demonstrate the proposed models. Results show that significant improvements can be achieved for reliability analysis by utilizing material microstructure information compared with existing methods that ignore the microstructures.

Speaker Biography



Wujun Si is an assistant professor in the Department of Industrial, Systems and Manufacturing engineering at Wichita State University. He received his Ph.D. degree in Industrial engineering from Wayne State University in 2018, and a B.Eng. degree in mechanical engineering from the University of Science and Technology of China in 2013. His research interests include data analytics and system informatics with applications in energy, manufacturing and production. His work has been published in *Technometrics, IISE Transactions, IEEE Transactions on Reliability, Journal of Quality Technology, Computers & Operations Research* etc. He is the awardee of the 2016 ISERC best student paper competition in the Quality Control & Reliability Engineering (QCRE) division, and the recipient of the finalist award of 2017 INFORMS best refereed paper competition in the Quality, Statistics and Reliability (QSR) division.