

University of Belgrade, Mechanical Engineering Faculty  
Invitation Lecture at Monday May 27. 2024. at 12:00 in room 211

Lecture Title:

**An overview of Research: Numerical Modelling and Simulation for Predictive Condition Monitoring**

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**ABSTRACT:**

This presentation provides an overview of research in predictive condition monitoring techniques. A mechanistic approach to optimise coating thickness and its parameters has been adopted. Several modes of failure to include crack opening and closing during tensile and compressive loading is studied to understand coating failure mechanisms. Nanocoating-substrate system adhesion failure modes are discussed. This presentation also includes blistering as one of failures along with its key parameters such as coating thickness and radius of a developing blister. Experimental results have been capitalised on to develop numerical models for deploying in novel prediction and prognosis framework and applied in novel sensing techniques. Failure prediction, monitoring and prognosis are discussed.

**Keyword:** condition monitoring, nanocoating, prognosis, numerical modelling, experimental techniques.

**Brief background:**

[Professor Zulfiqar Khan](#) has established NanoCorr, Energy & Modelling (NCEM) research group in 2015. He has developed and established a multidisciplinary research portfolio in Nanoengineering & Energy Systems (NES<sup>®</sup>) in collaboration with major industry and HEIs partners.

He has been awarded GB and international patents in corrosion condition monitoring, low to zero emissions energy technologies and nanofluids. Renewable energy technology and its relevant patents have been commercialised by industry partner.

He is the recipient of the Distinguished Researcher in Tribology Award, Excellence in Education in Sustainable Development Award, Albert Nelson Lifetime Achievement Award, Doctoral College Outstanding Contribution Award and Vice Chancellor staff awards in enriching society and advancing knowledge.

He is a Fellow of the Institution of Mechanical Engineers, Chartered Engineer, Senior Fellow of HEA, and a Member of the ASME Energy Storage Committee.

He is the editorial board member of several high-ranking journals.