Keynote Speaker-------Prof. Dr. Esteban Broitman

Prof. Dr. Esteban Broitman, SKF Research & Technology Development, 3430 DT Nieuwegein, The Netherlands

Biography: Esteban Broitman holds a Ph.D. degree in Physics from the University of Buenos Aires (Argentina), and a Docent degree in Tribology from Linköping University (Sweden). He has been doing research and teaching at the University of Buenos Aires (Argentina), The College of William and Mary (USA), Carnegie Mellon University (USA), Linköping University (Sweden), and has been invited Professor by the University of Sao Pablo (Brazil), and by th Chinese Academy of Sciences (China). His research activities focus on the nanomechanical and nanotribological properties of hard coatings of carbon-based coatings, nanocomposites, and softer materials like soft metals and polymers.

Speech Title: The Characterization of Polymers and Composite Materials by Nanoindentation: A Critical Overview

Abstract: During the last decade, novel polymers and nanocomposite materials have been developed for applications as micro- and nanodevices. In these applications, conventional mechanical characterization techniques like tensile, compression and bending tests are inapplicable due to the size of the samples. Nanoindentation technique, widely used to characterize the mechanical properties of hard metals and ceramics has started to be used also to characterize polymers and composite materials. Recently, a review has been published by the author comparing mechanical measurement techniques at different scales: "Indentation Hardness Measurements at Macro-, Micro-, and Nanoscale," Tribology Letters 65 (2017) 23.

In this talk, the application of indentation techniques to measure the hardness, elastic modulus, and creep of polymers and composite materials is discussed. A comparison between nanoindentation results and macroscopic properties is offered. Finally, indentation size effects and typical mistakes in the measurements of these materials are also critically examined. Challenges and future perspectives in the application of nanoindentation to characterize mechanical properties of polymers and composite materials are suggested.

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