College of Engineering
Department of
Mechanical & Industrial Engineering

The Sidney E. Fuchs Seminar Series

3:00-4:00pm, Friday, October 13, 2017
1100 Patrick F Taylor Auditorium

Evaluating the Mechanical Integrity of Coating/ Substrate Interfacial Regions: an Experimental Effort

by Yang Mu*

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Experimental testing protocols for solid/solid interfacial mechanical integrity are discussed. A new micro-pillar compression testing protocol for metal/ceramic interfacial regions is described and demonstrated. Shear and compression failures of the interfacial regions of CrN/Cu/Si and CrN/Cu/CrN/Si ceramic-coating/metal-adhesion-layer/substrate systems were measured quantitatively ex-situ through instrumented compression and in-situ through instrumented compression and concurrently scanning electron microscopy (SEM) observations on cylindrical micro-pillar specimens fabricated with focused ion beam (FIB) micromachining. Results on other metal/ceramic interfacial regions (CrN/Ti/Si, CrN/Cr/Si) are discussed as well.

* Dr. Yang Mu is currently a research associate in the Department of Mechanical & Industrial Engineering at Louisiana State University. He received his Ph.D. from LSU MIE in 2015 and served as a research associate under the NSF EPSCoR Consortium for Innovation in Manufacturing and Materials (CIMM) program since 2015, focusing on micro mechanical testing, materials characterization, and materials synthesis. He is also designing and building a custom, ultra-high-vacuum (UHV), plasma assisted vapor deposition system for thin film ceramics and metals, as a part of the CIMM effort to build and expand materials and manufacturing research capabilities within the state of Louisiana.