

2008-2009 Graduate Seminar Series

The Department of
Mechanical Engineering – Engineering Mechanics
and the **Multi-Scale Technologies Institute**
Electrical and Computer Engineering

Proudly Presents

Professor John F. Conley, Jr.
Oregon State University



John F. Conley, Jr. earned his B.S. in Electrical Engineering in 1991 and Ph.D. in Engineering Science and Mechanics in 1995 from The Pennsylvania State University where he won a 1996 Xerox Prize for his Ph.D. dissertation. Dr. Conley was at Dynamics Research Corporation from 1995 to 2000 and at the Jet Propulsion Laboratory from 2000-2001, where he received an achievement award. In 2001, Dr. Conley became a senior member of the technical staff at Sharp Laboratories of America (SLA) and from 2005-2007 was leader of the Novel Materials and Devices Group, leading MEMS biosensor and silicon nanowire for displays projects. In 2002-03, he served as an adjunct professor at the Vancouver campus of Washington State University. Since 2007, Dr. Conley has been a professor and an ONAMI Signature Faculty Fellow at

Oregon State University in both the School of Electrical Engineering and Computer Science and the Department of Materials Science. His research interests include atomic layer deposition, high- κ dielectrics for transparent electronics, directed integration of nanomaterials and nanodevices, defects, reliability, and radiation effects in novel electronic materials. Dr. Conley has authored or co-authored over 90 technical papers (including several invited) and over 90 conference presentations. He holds thirteen U.S. patents. He has presented tutorial short courses on high- κ dielectrics at two international conferences and was an editor of three special issues of IEEE Transactions on Device and Material Reliability. He has also served on the technical and management committees of the IEEE IRPS, the IEEE SOI Conference, and the IEEE Nuclear and Space Radiation Effects Conference, and was technical program chair of the 2000 IEEE Microelectronics Reliability and Qualification Workshop and general program chair of the 2006 IEEE International Integrated Reliability Workshop.

Thursday, Nov. 13, 2008 3:00 – 4:00 p.m. Room U115, M&M Bldg.

Atomic Layer Deposition (ALD) Assisted Surface Modification and Directed Growth of Nanomaterials

Atomic layer deposition (ALD) is a highly conformal deposition technique in which precursors are introduced alternately, rather than simultaneously, into a reaction chamber. Self terminating reactions of the precursors with the surface allow films to be deposited one monolayer at a time. The presentation will focus on high surface area applications of ALD including two recent projects highlighting the application of ALD to surface modification and directed growth of nanomaterials for integrated nanodevices. In the first highlighted project, ALD was used to modify the surface of carbon nanotubes (CNTs) with a thin coating of ZnO that ultimately led to improved field emission properties. In the second, ALD was used to deposit a conformal seed layer on island structures patterned onto silicon-on-insulator substrates. The conformal seed layer led to the selective growth and directed integration of vertical and horizontal ZnO nanobridge devices that could be operated as simple sensors. Finally, an overview of some newly funded projects will be presented including dielectrics for transparent thin film transistors, graphene for spin-FET devices, and nanowires on flexible substrates for nano-piezo energy harvesting.

Funding for the ME-EM Graduate Seminar Series is provided by Professional Plating, Inc. of Anoka, MN www.proplate.com
and the Department of Mechanical Engineering – Engineering Mechanics www.me.mtu.edu/seminar
and the Michigan Technological University MuSTI Multi-Scale Technologies Institute (MuSTI)