Human Machine Functionality: Failure Analysis and Augmented Repair

From an engineering prospective, mechanical failure can often be defined as any change in the size, shape or material properties of a structure that renders the functionality of that structure/machine incapable of acceptable performance. This failure can be caused by external forces, corrosion or wear. Similarly, electrical failure can result from soft errors, failure in time and electromigration. From a human-machine perspective, failure has been defined by the Americans with Disabilities Act of 1990 (and more recently by ADA Amendments Act of 2008) as “… a physical or mental impairment that substantially limits one or more major life activities…" These 'impairments' are generally caused by trauma, degenerative disease or aging and are analogous to the mechanical and electrical failure modes. By approaching the field of bioengineering from a failure analysis perspective, new research paradigms can be generated in the areas of human-machine functionality, preventative maintenance, and augmented repair methodologies. This presentation will explore this emerging field of bioengineering and identify current activities that are funded by the National Science Foundation-General & Age Related Disabilities Engineering Program. Future areas of research related to human-machine failure analyses will also be discussed.

ABOUT THE SPEAKER

Dr. Ted Conway is currently the Program Director for the:
1. General & Age Related Disabilities Engineering Program (GARDE),
2. CBET-National Robotics Initiative (NRI)
3. CBET-Broadening Participation Research Initiation Grant in Engineering Program (BRIGE)

in the Chemical, Bioengineering, Environmental and Transport Systems Engineering (CBET) Division of the Engineering Directorate at the National Science Foundation (NSF).

Before returning to NSF he was a Professor and Associate Dean for Research Services in the School of Education at Virginia Commonwealth University. Prior to his appointment at VCU he was the Program Director for the Research in Disabilities Education (RDE) Program in the Education and Human Resources (EHR) Directorate at NSF while he maintained his tenured position as Associate Professor in Mechanical, Materials and Aerospace Engineering at the University of Central Florida (UCF) in Orlando, FL. Before arriving at UCF, he accepted the tenure-track position of Assistant Professor in Mechanical Engineering at the University of Akron (U of A) in Akron, OH. He was promoted to Associate Professor and held a joint appointment in Biomedical Engineering at the U of A.

Dr. Conway received his B.S. degree in Chemistry from Florida State University and the M.S. and Ph.D. degrees in Theoretical and Applied Mechanics in the College of Engineering at the University of Illinois at Urbana-Champaign. While a Ph.D. student, he was a Summer Federal Employee for the Department of the Navy at the Naval Underwater Systems Center in Newport, RI and the Naval Research Laboratory in Washington, DC.

Prior to attending graduate school, Dr. Conway worked in the industrial sector as a Research Scientist with Olin Corporation in St. Marks, FL, Quality Control Director with Oil-Dri Corporation in Ochlocknee, GA and a Polymer Engineer with Michelin Americas Research and Development Corporation in Greenville, SC. He has had over 34 years of experience working in the government, academic and industrial sectors.

THURSDAY, NOV. 29
10:30 - 11:45 am, ICTAS room 310