UNIVERSITY OF DELAWARE

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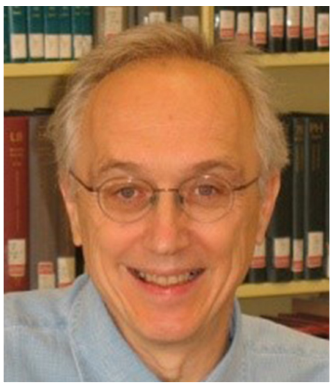
# CENTER FOR CATALYTIC SCIENCE & TECHNOLOGY and CHEMICAL & BIOMOLECULAR ENGINEERING



## George C. A. Schuit Lecture

## Nenad Markovic

ARGONNE NATIONAL LABORATORY

**Date:** Friday, November 17, 2017
**Time:** 10:00 AM
**Location:** 102 Colburn Lab

Nenad M. Markovic is a Distinguished Fellow, Group Leader, and Chief Scientist for the Joint Center for Energy Storage Research at Argonne National Laboratory. Prior to joining ANL he was a Staff Scientist and Principal Investigator at Lawrence Berkeley National Laboratory from 1991-2005. He received his BSc, Ms.D. and Ph.D. degrees all from the University of Belgrade, and served as Group Leader at the Institute of Electrochemistry, University of Belgrade from 1985 to 1991. He is one of the pioneers of the development of electrocatalyst materials for fuel cells and electrolyzers. More recently he has advanced a surface science-based approach to advance lithium ion battery technologies. Dr. Markoic's major research interest is understanding surface processes at the electrified metal-solution interfaces. Utilizing ex-situ (AES, LEED, UPS, XPS) and in-situ (SXS, STM/AFM) surface sensitive probes in combination with vibrational spectroscopy (FTIR, ATR) and classical electrochemical methods he established relations between the microscopic surface atomic/electronic structures of mono-metallic and multi-metallic single crystal surfaces and the macroscopic kinetic rates of (electro)chemical reactions.

## ➢ The Renaissance of Electrochemistry

Developing and deploying renewable energy technologies will require the application of knowledge, concepts, and tools from a variety of fields including chemistry, materials science, physics and, in particular, electrochemistry. Electrochemistry is, in the broadest sense, the study of relationships between the transformation of electrical energy in chemical bonds and, in the reverse process, the energy stored in chemical bonds back to electrons that can power electrochemical energy storage and conversion systems Central to this presentation will be to introduce - at atomic and molecular levels - electrochemical interfaces in aqueous and organic environments and to argue that we are witnessing the renaissance of electrochemistry. Key correlations will be discussed, including structure-function relationships, functional links between covalent and non-covalent interactions, the role of pH values, and key descriptors that control functional links between activity, stability, sensitivity and conductivity of the interface. Fundamental understanding of critical electrochemical processes at interfaces will provide ample opportunities (and challenges) to further improve the current landscape of sustainable energy production and utilization. We will conclude by asking us what we don't know but we would like to know about electrochemical interfaces.