THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

PRESENTS

Operando Methods for Mechanistic Studies of Energy Systems

Dr. Héctor D. Abruña
Cornell University

Monday, A 14, 2022, 10:00 AM (Houston Time)
ZOOM meeting room (Meeting ID: 976 269 9678 | Passcode: K91Bwy):
https://zoom.us/j/9762699678?pwd=RUp5ZmN3cHUyQ1FvUExVQjVsc1hVUT09

LECTURE ABSTRACT

This presentation will deal with the use of operando methods for mechanistic studies energy systems with emphasis on fuel cells and battery materials and technologies. The presentation will begin with a brief overview of the methods employed with emphasis on the use of X-ray based methods, transmission electron microscopy (TEM) under active potential control and confocal Raman spectroscopy. The utility of these methods will be illustrated by case studies focusing on non-precious metal electrocatalysts for the oxygen reduction reaction (ORR) in alkaline media, Li/S batteries and the reduction of carbon dioxide. The presentation will conclude with an assessment of future directions.

SPEAKER BIOSKETCH

Professor Abruña, Émile M. Chamot Professor of Chemistry, is Director of the Center for Alkaline Based Energy Solutions (CABES), the Energy Materials Center at Cornell (emc^2) and the Abruña Energy Initiative. He completed his graduate studies with Royce W. Murray and Thomas J. Meyer at the University of North Carolina at Chapel Hill in 1980 and was a postdoctoral research associate with Allen J. Bard at the University of Texas at Austin from 1980-81. After a brief stay at the University of Puerto Rico, he joined Cornell in 1983. He was Chair of the Department of Chemistry and Chemical Biology from 2004-2008. His research is focused on the development and *oerando* characterization of energy materials for batteries, fuel cells and electrolyzers.

Prof. Abruña is a member of the National Academy of Sciences (2018), the American Academy of Arts and Sciences (2007) and Fellow of the American Association for the Advancement of Science (2007). He has been the recipient of numerous awards including a Presidential Young Investigator Award, A. P. Sloan Fellowship, J. S. Guggenheim Fellowship and J. W. Fulbright Senior Fellow. He is the recipient of the Electrochemistry Award for the American Chemical Society (2008), the C.N. Reilley Award in Electrochemistry for 2007 and Fellow of the International Society of Electrochemistry in 2008. He received the D. C. Grahame Award from the Electrochemical Society in 2009, the Faraday Medal of the Royal Society in 2011, the Brian Conway Prize from the International Society of Electrochemistry in 2013, was named Fellow of the Electrochemical Society in 2013 and in 2017 was the recipient of the Gold Medal of the International Society of Electrochemistry. He was awarded the A. J. Bard Award of the Electrochemical Society (2019) the Frumkin Medal of the International Society of Electrochemistry (2019) and the American Chemical Society Award in Analytical Chemistry (2021). Prof. Abruña is the co-author of over 589 publications (h-index = 108) and has given over 690 invited lectures world-wide. He considers his 65 Ph.D. students and 70 Post-Doctoral associates, to date, as his most important professional achievement.