**Estimation in Li-ion Batteries for sustainable energy:  Challenges and Opportunities**

**Abstract**

Battery Management Systems (BMSs) manage the charging and discharging of the battery providing estimates of state of charge and health during its use to protect the battery from misuse, ensure safety and longer duration. In this talk, we discuss Stanford Energy Control lab’s recent research on advanced BMS using control theory tools, electrochemistry and hardware validation. Specifically, we will discuss state of health estimation using advanced observer design and its battery-in-the-loop validation.

**Biography**

Simona Onori received her Laurea Degree, summa cum laude, (Electrical and Computer Engineering) in 2003, her M.S. (Electrical Engineering) in 2004, her Ph.D. (Control Engineering) in 2007, from University of Rome ‘Tor Vergata’, University of New Mexico, Albuquerque, USA, and University of Rome ‘Tor Vergata’, respectively.



She is an Assistant Professor at Stanford University in Energy Resources Engineering, and Director of the Stanford Energy Control Lab since 2017. Previously, she was an Assistant Professor at Clemson University-International Center for Automotive Research (CU-ICAR) from 2013 to 2017 where she also held a courtesy appointment in Electrical Engineering. In 2007 she held a control research position at Thales-Alenia Space, in Rome, Italy where she worked on developing control algorithms for satellite control attitude stability. She was a Research Scientist with the Center for Automotive Research and lecturer in the Mechanical Engineering Department at The Ohio State from 2007 until 2013.  
She held visiting professor positions at the University of Trento (2014, Italy), Beijing Institute of Technology (2015, China), and University of Orleans (2016, France) and she is a distinguished visiting professor at PSG College of Technology (2018, India).  
She is the recipient of the 2019 Award for Excellence from the Board of Trustee, Clemson University, 2018 Global Innovation Contest by LG Chem, 2018 Ralph R. Teetor Educational Award, by the Society of Automotive Engineers, 2017 NSF CAREER award, 2017 Clemson University College of Engineering and Science Dean’s Faculty Fellows Award, 2017 Clemson University Esin Gulari Leadership & Service Award, 2016 Energy Leadership Award in the category Emerging Leader (for the Carolinas), the 2015 Innovision Award (South Carolina), and 2012 Lumley Interdisciplinary Research, 2011 Outstanding Technology Team Award, TechColumbus. She was Chair of the IEEE CSS Technical Committee of Automotive Controls from 2015-2017, she is vice-chair of the IFAC TC on Automotive Control TC7.1 since 2015, and associate editor of the SAE International Journal of Alternative Powertrains since 2012 and IEEE Intelligent Vehicle Transactions since 2019. She has co-authored a book, 2 book chapters and more than 120 peer-reviewed papers on hybrid electric vehicles simulation, optimization and control, estimation and control of electrochemical processes and catalytic conversion devices, such as batteries and after-treatment devices.