DR. GIORGIO RIZZONI

Giorgio Rizzoni, the Ford Motor Company Chair in ElectroMechanical Systems, is a Professor of Mechanical and Aerospace Engineering and of Electrical and Computer Engineering at The Ohio State University (OSU). He received his B.S. (ECE) in 1980, his M.S. (ECE) in 1982, his Ph.D. (ECE) in 1986, all from the University of Michigan.

Since 1999 he has been the director of the Ohio State University Center for Automotive Research (CAR), an interdisciplinary university research center in the OSU College of Engineering. His research activities are related to modeling, control and diagnosis of advanced propulsion systems, vehicle fault diagnosis and prognosis, electrified powertrains and energy storage systems, vehicle safety and intelligence, and sustainable mobility.

He has contributed to the development of graduate curricula in these areas, and has served as the director of three U.S. Department of Energy Graduate Automotive Technology Education Centers of Excellence: Hybrid Drivetrains and Control Systems (1998-2004), Advanced Propulsion Systems (2005-2011, and Energy Efficient Vehicles for Sustainable Mobility (2011-2016).

Between 2011 and 2016 he served as the OSU Site Director for the U.S. Department of Energy China-USA Clean Energy Research Center - Clean Vehicles. He is currently leading an ARPA-E project in the NEXTCAR program.

During his career at Ohio State, Prof. Rizzoni has directed externally sponsored research projects funded by major government agencies and by the automotive industry in approximately equal proportion.

Prof. Rizzoni is a Fellow of SAE (2005), a Fellow of IEEE (2004), a recipient of the 1991 National Science Foundation Presidential Young Investigator Award, and of many other technical and teaching awards.

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PRESENTATION

Battery life and second life estimation – data- vs model-based estimation methods

ABSTRACT

As electric vehicles are poised to gain an increasing and substantive share of the overall vehicle parc, there is increasing interest on the part of regulatory agencies and of course of the mobility industry in tools that are capable of assessing the state of health (SOH) and remaining useful life (RUL) of batteries used for ground, air and maritime vehicle use.

In this presentation, a broad overview and some technical details are presented to understand the tradeoffs and capabilities of various life estimation methods based on physics-based electrochemical models, semi-empirical models, and data-based models and estimation algorithms that enable SOH and RUL estimation in real-world use of electrochemical batteries.

The work presented in this talk is a compendium of twenty years of work on the part of the author and co-workers, as well as of the published literature.