

# Connected and automated vehicles and advances in powertrain control to achieve unprecedented fuel economy gains

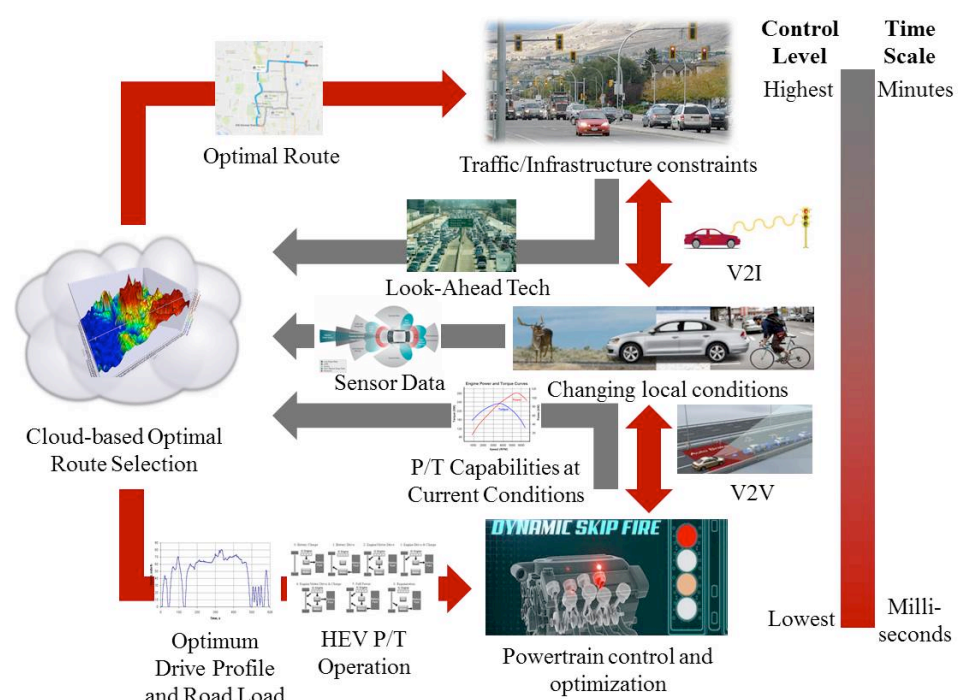
*Giovedì 30/11/17, ore 16:30-18:30 aula D Podere La Grande, Campus Universitario*

**prof. Giorgio Rizzoni**

**Ford Motor Company Chair in ElectroMechanical Systems**

**Director of the Center for Automotive Research (CAR), Ohio State University**

Mobility is undergoing dramatic transformations that will radically change the way we move and access work and leisure time. This presentation presents a broad **overview of the technologies and challenges** ahead of us in the medium and long term, touching on various topics related to **Smart cities and Smart mobility**. The lecture also presents a hierarchical control approach that exploits **vehicle connectivity and automated driving capabilities** to enhance the fuel economy capability of a light-duty passenger car. The use of **cloud-based route optimization**, coupled with adaptation to local traffic conditions via **machine learning algorithms**, and with the use of level 2 and 3 automation, to shape the expected short-term vehicle load, permits the **integration of engine combustion and powertrain electrification functions** to achieve near-optimal fuel economy thanks to the ability to predict the near-term future. The ability to realize such capabilities in production vehicles is around the corner, and the control community is playing a key role in shaping the future of personal and commercial mobility.



**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 vehicles, energy efficiency, alternative fuels, the interaction between vehicles and the electric power grid, vehicle safety and intelligence, and policy and economic analysis of alternative fuels and vehicle fuel economy**. He is currently serving as PI on a 2017-2020 ARPA-E NEXTCAR program that aims to tie vehicle automation and connectivity to powertrain control and fuel economy. 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. 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 numerous other technical and teaching awards.