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10h15 - 12h,

salle des thèses,

Université des Sciences et Technologies de Lille,

59 655 Villeneuve d'Ascq (Métro ligne 1, arrêt Cité Scientifique)



## Plug-in Hybrid Electric Vehicles: Sustainable Solution for Transportation

**Prof. Ali EMADI,**

Professor, Ph.D, Illinois Institute of Technology

Founder and President, Hybrid Electric Vehicle Technologies, Inc. Chicago, USA

### Abstract:

One of the biggest challenges of our time is in the area of energy and power. Transportation is at the heart of this challenge and electrification of vehicles is the best sustainable solution. Therefore, the electrification level of propulsion systems should be increased to move towards all-electric in the long term. Plug-in hybrid electric technology is the best practical solution to move forward. The proposed long-term sustainable solution includes (1) integrating the transportation industry with the electric power industry, (2) using electricity as the carrier, and (3) generating electricity from renewable energy sources.

In this presentation, different plug-in hybrid electric vehicle (PHEV) configurations and business models will be presented with a focus on engineering fundamentals as well as state-of-the-art research and development in the areas of PHEV components and system integration. In addition, this presentation is focused on hybrid electric vehicle (HEV) drive train configurations and presents a review of conversion strategies to hybridize different vehicles. The motivation for the research, development, and commercialization of hybrid and plug-in hybrid conversion technologies will be explained.

The presentation concludes that hybrid and plug-in hybrid electric vehicles are emerging at a rapidly growing rate and there will be a sustained exceptional market share growth for them in the long term. Economic issues, performance improvements, as well as environmental concerns are the main driving forces. Power electronics and motor drives have an unprecedented commercialization opportunity. There is a dire need for (1) hybrid/plug-in hybrid controllers, i.e., "brain" of the system, (2) low-cost power electronics/motor drives, and (3) advanced drive trains and system integration.

### About the Speaker



**Prof. A. Emadi** received the B.S. (1995) and M.S. (1997) degrees in electrical engineering with highest distinction from Sharif University of Technology, Tehran, Iran. He also received his Ph.D. degree (2000) in electrical engineering from Texas A&M University, College Station, TX. He is currently a professor of electrical engineering and the director of the Electric Power and Power Electronics Center and Grainger Laboratories at Illinois Institute of Technology (IIT), where he has established research and teaching facilities as well as courses in power electronics, motor drives, and vehicular power

systems. Dr. Emadi is the Founder and Chief Technical Officer of Hybrid Electric Vehicle Technologies, Inc. (HEVT). In addition, he is the founder, director, and chairman of the board of the Industry/Multi-university Consortium on Advanced Automotive Systems (IMCAAS). Dr. Emadi is the principal author/co-author of over 200 journal and conference papers as well as several books.

More info: <http://hybrid.iit.edu/>