

**Title: Issues and Opportunities in Sustainable Fuel and Vehicle Technologies**

**Speaker:**

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**Time:** 11:00 am

**Venue:** Room 603, Chow Yei Ching Building

**Abstract:**

The ever expanding use of personal vehicles in the world is associated with the following major problems.

- **Fuel Consumption:** Most vehicles require liquid fuel, typically derived from petroleum, which is a finite resource. Worldwide petroleum production is expected to decline starting in 2004 (Deffeyes, Hubbert's Peak). The engines in current vehicles are only about 15–20% efficient.
- **Pollution:** In cities, the tailpipe emissions of vehicles degrade air quality. Also, the combustion of fossil fuels is implicated in global warming. In the United States, 20% of carbon dioxide emissions come from automobiles and 10% from trucks ([http://www.ecobridge.org/content/g\\_cse.htm](http://www.ecobridge.org/content/g_cse.htm)).

These problems with vehicles have long been known. There has been substantial progress in reducing tailpipe emissions using advanced catalytic converters; however, air quality is still unacceptable in many cities, primarily due to vehicle emissions.

Unless we take a revolutionary approach, the problems with vehicles will only get worse. By 2050, the number of vehicles is expected to increase by 5 times. Currently, the world has 9 people per vehicle, but by 2050 it is expected to have 2.6

people per vehicle.

In this presentation, new technology trends of the present and near future will be presented, leading to the need for a viable automobile and fuel technologies that are sustainable. I will propose an integrated approach to the automobile that focuses both on fuel production and vehicle power train technologies. The result is a new automobile and energy industry with the following properties: sustainable fuel supply into the indefinite future, higher efficiency, better performance, and no net carbon dioxide emissions to the atmosphere.

I will also review some of the technical, commercial, and social problems and issues that are on the forefront at the present. The presentation will conclude with comments about the technical realities versus the public knowledge of these issues.

**Biography of the speaker:**

Professor M. Ehsani received the Ph.D. degree from the University of Wisconsin-Madison in electrical engineering. In 1981 he founded the power electronics and motor drives program of teaching and research at Texas A&M University, College Station, Texas where he is now the Robert M. Kennedy Endowed Chair Professor of electrical engineering and Director of Advanced Vehicle Systems Research Program and the Power Electronics and Motor Drives Laboratory. Dr. Ehsani has been a founding member of IEEE Power Electronics Society (PELS) AdCom and has been the chairman of numerous IEEE committees. He was the General Chair of IEEE Power Electronics Specialist Conference for 1991. He is the founder of IEEE International Vehicle Power and Propulsion Conference. In 2002 he was elected to the Board of Governors of VTS. He also serves on the editorial board of several technical journals. He is a Fellow of IEEE, a Fellow of SAE, an IEEE Industrial Electronics Society and Vehicular Technology Society Distinguished Speaker, IEEE Industry Applications Society and Power Engineering Society Distinguished Lecturer. In 2001 he received the IEEE-VTS Avant Garde Award for "Contributions to the theory and design of hybrid electric vehicles" and in 2003 he received the IEEE Field Award for undergraduate Teaching. He is the author of over 300 publications, 13 books, over 20 US and EU patents, numerous international seminars and short courses, and has been a consultant to over 60 international companies. He is also a registered professional engineer in the State of Texas.

**Organizer:** Prof. K.T. Chau