Matt Barth

PRESIDENT'S MESSAGE

# Vehicle Electrification and Intelligent Transportation Systems

As a means to reduce environmental impacts and to improve energy independence, we have seen a surge in recent years towards an increase of electric, hybrid electric, and plug-in hybrid electric vehicles. Currently these vehicles only have a small market share, but if the price of gasoline continues to increase or if there are major shifts in world energy, environmental, and climate policies, the number of electric vehicles we see on the road will likely increase.

The IEEE has been closely monitoring vehicle electrification for years. In fact, a *Transportation Electrification Initiative* was started over three years ago as part of the IEEE's Future Directions Committee (see http://www.ieee.org/about/technologies/index.html). Because the field of vehicle electrification covers many different areas of electrical engineering, many different IEEE societies have been involved in this initiative, including power electronics, vehicular technology, intelligent transportation systems, consumer electronics, and industrial electronics, to name a few...

Earlier this year, IEEE has transitioned this initiative to a formal ***Transportation Electrification Community*** (TEC, see http://electricvehicle.ieee.org/). This TEC has a vision of "providing a neutral forum of exchange and collaboration to build professional networks, foster relationships, and encourage participation among the Transportation Electrification community worldwide". The TEC is now a permanent part of IEEE and is made up of seven core IEEE societies that provide the leadership to meet the challenge of providing the technical expertise, finances, and governance of the TEC. The seven societies include: Power Electronics (PELS), Industry Applications (IAS), Intelligent Transportation Systems (ITSS), IEEE Standards Association, Power and Energy (PES), Consumer Electronics (CES), and Industrial Electronics (IES). In addition, a number of other IEEE "affiliates" have joined this important effort.

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The leadership of our ITS society felt that it was important to be engaged in the TEC since it touches on a number of important ITS research topics. I have been going to our various ITSS conferences now for many years, and there are often a number of ITS papers dealing with electric vehicle technology. Examples include publications on the topic of EV controls and sensing, optimal battery charging algorithms, real-time

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*(continued on page 85)*

*many years of significant leadership and outstanding scientific contributions*"; while in 2013 he became a Fellow of IFAC (International Federation of Automatic Control) "*for seminal contributions to modelling, control and optimization of transport systems and water networks*". In 2014, Prof Papageorgiou was the recipient of the Highest Cited Author Award by the Committee of Traffic Flow Theory and Characteristics of TRB; and the Research Excellence Award by the Technical University of Crete.

### Other Activities and Achievements

Starting in 1999, Prof Papageorgiou established the 5-day "Short Course on Traffic Flow Modelling and Control" that he taught 11 times since then in Chania. The course became very popular with international researchers and has attracted a total of 219 participants from 24 countries. He was also invited and taught the Short Course in other countries repeatedly (Netherlands, Italy, USA, China).

Members of DSSL have received numerous invitations for conference IPC membership; for plenary and keynote presentations at international conferences; for seminars at universities, companies or authorities; and for lecturing at international courses. Since 1994, DSSL has published 3 books, 137 articles in scientific journals or book chapters and 214 articles in conference proceedings.

On the occasion of completing its first 10 years, IEEE Transactions on ITS published in June 2010 a bibliographic analysis (http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5467214) for its 405 published articles. The article by M. Papageorgiou and A. Kotsialos "Freeway ramp metering: an overview" ranked 5th in ISI citations. Both authors ranked 7th and 8th, respectively, in the top ten of authors with most citations per published article in the journal. Technical University of Crete ranked 7th in the top ten of institutions with most citations per published article in the journal.

"Coordinated ramp metering for freeways" (M. Papageorgiou, I. Papamichail) was included in the Milestone Report "The Impact of Control Technology" (May 2011) of IEEE Control Systems Society as one out of 23 selected Success Stories in Control.

The article by M. Papageorgiou and A. Kotsialos, "Freeway ramp metering: an overview," IEEE Transactions on ITS, vol. 3, no. 4, pp. 271–281, December 2002, won an award as one of the top 3 Best Survey Papers in the decade 2000-2009 in the journal (http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6585827).

ITS

## PRESIDENT'S MESSAGE *(continued from page 3)*

in-vehicle energy management, EV route planning, and even energy pricing. In addition, we are now starting to see papers dealing with not only electric vehicles and transportation systems, but also those dealing with smart grids and intelligent energy systems.

I believe that transportation electrification will be an increasingly important part of ITS for many years. Transportation systems as a whole greatly affect the operation of electric vehicles, and vice versa. Because today's EVs often suffer from range limitations, we need to be able to identify the transportation systems where they can best operate. We need to know how and where to place distributed public charging infrastructure. Further, roadway electrification may be a common thing in the future. Specific EV routing algorithms will likely be commonplace. Hybrid energy management based on transportation factors will also be critical. Lastly, wireless communication with electric vehicles will be increasingly valuable, since real-time operational data will help in the design and improvement of these vehicles as they emerge as a larger sector of our vehicle fleet.

This year, at ITS Conference in September, we will have a keynote talk on this TEC effort, provided by Professor Philip Krein from the University of Illinois. I look forward to seeing the IEEE Transportation Electrification Community grow, and I am proud that the ITS Society is part of it.

*Matt Barth*
*IEEE ITSS President, 2014–2015*

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