

## **Abstract**

This keynote presentation provides an overview of the current status and future trends in the transportation industry. It begins with the history of the automotive industry and explains the need for a paradigm shift toward a sustainable solution. Parallels with other industries such as the telecommunications industry are highlighted and it is explained how providing greater levels of empowerment for consumers is a powerful driving force for the next generation of electrified vehicles. This empowerment is part of a new paradigm in energy integrated with renewable energy sources, distributed generation systems, and smart grid. The presentation is then focused on the transportation electrification and how the paradigm shift began with more electric vehicles (MEVs), established by hybrid electric vehicles (HEVs), is gaining momentum by plug-in hybrid electric vehicles (PHEVs), and will be completed by electric vehicles (EVs). The motivation for the research, development, and commercialization of EVs, HEVs, and PHEVs will be explained and role of power electronics will be highlighted. Powertrain configurations and powertrain components will also be presented. Throughout the presentation, related component-level as well as system-level challenges are explained and possible solutions are recommended. Unprecedented opportunities in the areas of power electronics and electric drives will be highlighted.