

## ADVANCED VEHICLES AND MOBILITY

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This session is focused on **green** and **intelligent vehicle technologies**, with the objective of meeting the needs of personal mobility in the face of dwindling fossil fuels and the increasingly complex issues in urban mobility. As urban population densities approach and exceed 20000 people per square mile in the megacities of the future, there will be increased congestion and pollution, reduced driving speeds, increased risk of traffic-related accidents, and significant energy waste as drivers look for parking.

In response to these trends, we are forced to re-think the DNA of the automobile. In recent times, vehicle electrification and electrified vehicles have become the megatrend. Electrification provides a framework for creating vehicles with intelligence, safety, comfort and convenience, and performance, in addition to fuel saving and environment protection. One possible vision of the automobile of the future is a vehicle that is electrically driven, electronically controlled, connected, highly maneuverable, and possibly capable of autonomous driving. This highly maneuverable vehicle should be capable of operating with zero emissions and may be powered by fully renewable energy sources. On the other hand, electrification brings with it an architectural cost that is seemingly prohibitive for entry level products and cost-conscious consumers. Therefore, another thrust in the vision for future mobility is to pursue radical light-weighting as a means to reducing fuel consumption and being more eco-friendly.

This session will bring together presentations on several novel concepts showcasing the above technological capabilities. To start the session, Paul Rybski will talk about the challenges in autonomous driving systems and describe key technical breakthroughs achieved by his team (Carnegie-Mellon's Tartan Racing) to win the DARPA Urban Challenge. Next, Brad Jaeger will share the story of Edison2 and how they won the Progressive Insurance Automotive X Prize by designing and building a real world vehicle that gets over 100 MPGe. Our third speaker, Bo-Chiuan Chen will present a new approach to designing a forward collision warning systems with the aim of further improving vehicle safety on the road. Finally, Tianle Zhang will propose a new routing protocol and the so-called Ubiquitous Query for Travel Information (UQTI) System over the Mobile Relay Network (MRN), to facilitate the required information access for improved mobility.