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### **Future of mobility with autonomous and connected vehicles**

The promise of autonomous and connected vehicles is primarily to improve the safety of the passengers and the public on the road. It is estimated that over 40,000 individuals lose their lives due to vehicle accidents. Major automotive manufacturers have invested in the range of \$1 billion each to prepare for the future of mobility. Autonomous and connected vehicle technologies are being developed at a rapid pace. Even several of the ride share companies have invested their own finances or have developed joint partnership with automotive manufacturer to get a head start. The main components of such vehicles are the vehicle its, the huge number of electric and electronic devices and sensors, and the application of artificial intelligence through various forms of embedded software. The technologies are being developed across the board to improve the electrical power systems, the automotive communication CANBUS and the sophisticated telematics required for the self-driving cars. The advances and changes in the future of mobility environment are being made possible, in particular, related to sensors such as LiDAR, camera, radar, and sonar to name a few, to the vast required high speed processors, memories and software. Human Machine Interaction (HMI) must be maintained at various levels of autonomy. In this presentation, a brief overview of the autonomous and connected vehicles and its various levels of related autonomy will be presented. Various types of sensors are currently being developed to improve the self-driving autonomy of transportation environment. Challenges and ever-increasing opportunities related to future of mobility and inclusion of such technologies as autonomous and connected will be presented.

### **Biography**

Fred Barez is a Professor of Mechanical Engineering at San Jose State University (SJSU). His research involves smart vehicles, advanced transportation, machine learning, cyber security, smart home and energy efficiency. He is also Director of the Hybrid and Electric Vehicle Technology Laboratory where he is engaged in research related to advanced transportation including electric drive propulsion system, collision avoidance sensors and application, smart and driverless vehicles, vehicle mobile connectivity, vehicle cyber security, virtual driving, distracted driving, and autonomous vehicles through collaboration with industry. He teaches dynamic systems vibration and control, electronics packaging and design, hybrid and electric vehicle fundamentals, he has authored over 60 journal and conference publications, four book manuscripts and two book chapters. He has supervised 180 graduate student projects and theses. He is an active reviewer for several national and international publications related to energy, battery storage, energy efficiency and management, and smart sensors and devices. Prior to joining San Jose State University, he worked in Disk Drive Storage industry and was co-founder and founder of two successful start-ups. He is a Member and Fellow of the American Society of Mechanical Engineers (ASME), a Member of the Society of Automotive Engineers (SAE), and Institute of Electrical and Electronics Engineers.

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