

**IEEE-VTS (Vehicular Technology Society)**

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**Mon. May. 19. 2025 12:00 Noon - Light Refreshments Provided**

**Maker Nexus, 1330 Orleans Dr, Sunnyvale, CA 95089**

## **Decision-Aid Tools and Fast Charging Strategies for EV-Based Evacuations**

**Abstract:** California is rapidly transitioning to electric vehicles (EVs) as part of its efforts to decarbonize the transportation sector. However, the state is highly vulnerable to extreme weather events, including wildfires, floods, and earthquakes. Between 2017 and 2019, more than one million residents were ordered to evacuate due to wildfires alone. Such large-scale emergencies can disrupt the power grid, causing blackouts that limit EV charging availability. In the worst-case scenario, insufficient charging infrastructure and limited access to power could hinder the safe evacuation of EV users, particularly in situations requiring rapid departure. This highlights the urgent need for robust planning strategies to integrate EVs into emergency response frameworks.

This talk will first introduce decision-aid tools designed to assist communities and government officials in planning EV-based evacuations. Our tool provides recommendations for mobile charging placement, congestion-aware routing, and recharging strategies aimed at minimizing evacuation time. The second part of the presentation will focus on fast EV charging strategies during emergencies. These strategies are designed to reduce charging time while ensuring electro-chemical and thermal safety of battery-based EVs.

**Biography:** Ricardo de Castro received his Licenciatura and Ph.D. degrees in Electrical and Computer Engineering from the University of Porto, Portugal, in 2006 and 2013, respectively. From 2007 to 2008, he was the co-founder of the startup WeMoveU, focusing on developing powertrain control solutions for lightweight electric vehicles. From 2013 to 2020, he was with the German Aerospace Center (DLR), Institute of System Dynamics and Control (SR), where he worked on enabling technologies for electric mobility and automated driving. In 2021, he joined the University of California, Merced, as an Assistant Professor in the Department of Mechanical Engineering.

His current research focuses on controls and optimization for zero-emission and robotic vehicles. Ricardo holds four patents and has authored over 100 papers in international journals, conferences, and book chapters. He is a recipient of three best paper awards from IEEE and ASME, as well as the Hellman Fellowship Award, which recognizes outstanding early-career faculty within the University of California system.

Ricardo serves as an Associate Editor for *IEEE Transactions on Vehicular Technology* and *IEEE Access*. He is also the Vice President for Motor Vehicles at the IEEE Vehicular Technology Society, the founding Chair of the IEEE Automated Vehicles Standards Committee (AVSC), and the General Chair of the 2022 IEEE Vehicle Power and Propulsion Conference (VPPC).

