Electric vehicles and plug-in hybrid vehicles have attracted major attention worldwide due to their capabilities to reduce usage of petroleum usage, decrease air pollution and improve energy and environment sustainability. To enable ubiquity of electric vehicles (EVs) ranging from cars, busses, trucks to trains, multiple industrial sectors are coming together, including automotive, transportation, power grid, and the information communication and technology (ICT) industries. These industries are predicting and anticipating major advances in energy storage, wireless charging, and autonomous driving by 2050 which will have tremendous impact on the next generation cyber-physical systems, to acquire, manage, coordinate, direct and secure all the digital information around resources involved in electromobility. In this talk, I will present the impact of the expected EV advances on the cyber-physical systems to enable trusted relation between EVs, roads, and power grid utility companies. Especially, I will discuss challenges and solutions for (a) effective placement of EV charging devices, and (b) real-time authentication framework between EVs, roads and power grid utilities to ensure EVs’ high acceptability, and avoid cyber-attacks.

Brief Bio – Klara Nahrstedt is the Ralph and Catherine Fisher Professor in the Computer Science Department, and Director of the Coordinated Science Laboratory in the College of Engineering at the University of Illinois at Urbana-Champaign. Her research interests are directed toward trustworthy power grid, 3D teleimmersive systems, mobile systems, Quality of Service (QoS) and resource management, Quality of Experience in multimedia systems, and real-time security in mission-critical systems. She is the co-author of widely used multimedia books ‘Multimedia: Computing, Communications and Applications’ published by Prentice Hall, and ‘Multimedia Systems’ published by Springer Verlag. She is the recipient of the IEEE Communication Society Leonard Abraham Award for Research Achievements, University Scholar, Humboldt Award, IEEE Computer Society Technical Achievement Award, and the former chair of the ACM Special Interest Group in Multimedia. She was the general chair of ACM Multimedia 2006, general chair of ACM NOSSDAV 2007 and the general chair of IEEE Percom 2009.

Klara Nahrstedt received her Diploma in Mathematics from Humboldt University, Berlin, Germany in numerical analysis in 1985. In 1995 she received her PhD from the University of Pennsylvania in the Department of Computer and Information Science. She is ACM Fellow, IEEE Fellow, and Member of the Leopoldina German National Academy of Sciences.