

Department Lecture Series



New Functionalities for Edge Computing in IoT-Edge-Cloud Era

Dr. Klara Nahrstedt

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Thursday, April 4th

4:30 pm Scott Hall 6142

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Abstract:

Edge (cloudlet) computing is becoming an integral part of our cyber-infrastructure, enabling IoT (Internet of Things) devices to perform computation close to them before connecting and forwarding data to the cloud. For example, image and video applications benefit from edge nodes to (a) perform on-edge visual data analytics and provide fast feedback to viewers, (b) decrease latency and bandwidth to the cloud, and (c) automatically annotate other contextual sensory information to the visual information. However, many service providers (content, communication, IoT/cloud service providers) assume narrow functionalities for their edge nodes. In this talk, I argue for broadening the functionalities in edge nodes and consider new functionalities that will take into account the distributed nature of computing and networking over IoT applications with stream data as well as the age of IoT devices. I will discuss (a) distributed operator placement functions for IoT (video) applications across edge and cloud infrastructure to improve significantly IoT-to-Cloud end-to-end latency, and (b) edge-based security functions to assist aging IoT devices. I will sketch potential approaches and present results to support the argument for new functionalities in edge computing.

Bio:

Klara Nahrstedt is the Ralph and Catherine Fisher Professor in the Department of Computer Science at the University of Illinois at Urbana-Champaign and is the Director of the Coordinated Science Laboratory. Her research interests are directed toward trustworthy multimedia distributed systems and networking, quality of service (QoS) and resource management in Internet and mobile systems, real-time security in wireless networks for trustworthy power grids, edge-cloud systems, cyber-physical system security for electric vehicles, health systems, and 3D tele-immersive systems.

She is the recipient of an NSF Early Career Award, a Junior Xerox Award, the IEEE Communication Society Leonard Abraham Award for Research Achievements, the 2008 University Scholar Award, the 2009 Humboldt Research Award, the 2012 IEEE Computer Society Technical Achievement Award, and the 2014 ACM Special Interest Group on Multimedia (SIGMM) Technical Achievement Award.

She has been the editor-in-chief of the ACM/Springer *Multimedia Systems* journal; associate editor of the *ACM Transactions on Multimedia Computing, Communications and Applications*; associate editor of the *IEEE Transactions on Multimedia*; associate editor of the *IEEE Transactions on Information Forensics & Security*; general co-chair of ACM Multimedia 2006; general chair of IEEE PerCom 2009, and program co-chair of IEEE IoTDI 2018. She was the chair of the ACM SIGMM between 2007 and 2013.

Nahrstedt received her Diploma in mathematics – numerical analysis from Humboldt University, Berlin, Germany, in 1985. In 1995, she received her Ph.D. from the Department of Computer and Information Science at the University of Pennsylvania. She is ACM Fellow, IEEE Fellow, and member of the Leopoldina German National Academy of Sciences.

(REFRESHMENTS SERVED AT 4:00 PM)