

Swarm on the Edge of the Cloud Workshop

SEC 2015, April 13, 2015 http://www.terraswarm.org/swec15/	
7:30 am to 8:15 am	Registration and Continental Breakfast (provided)
8:25 am to 8:30 am	Opening Remarks
8:30 am to 10:00 am	Session 1: Modeling and Programming the Swarm
8:30 am to 9:00 am	Laisa Costa, Pablo Calcina, Jan Rabaey, Marcelo Zuffo and Adam Wolisz. (UC-Berkeley and TU Berlin) Semantic Swarm
9:00 am to 9:30 am	Werner Damm (Universität Oldenburg) A Conceptual Model of System of Systems
9:30 am to 10:00	Terrell R. Bennett, Nicholas Gans, Roozbeh Jafari, (UT-Dallas) A Data-driven Synchronization Technique for Cyber-Physical Systems
10:00 am to 10:30 am	Coffee break
10:30 am to 12:00 am	Session 2: Apps for the Swarm
10:30 am to 11:00 am	Raja Sengupta (UC Berkeley) NextGen Intelligent Transportation: Measuring People, Controlling Things
11:00 am to 11:30 am	Hasan Esen, Masakazu Adachi, Daniele Bernardini, Alberto Bemporad, Dominik Rost, Jens Knodel, Christian Peper, Hideaki Tanaka and Akihito Iwai. (Denso) Control as a Service (CaaS) : Cloud-based Software Architecture for Automotive Control Applications
11:30 am to 12:00 am	Sergio Pequito and George J. Pappas. (U-Penn) Smart Building: A Private Cyber-Physical System Approach
12:00 am to 1:00 pm	Lunch (provided)
1:00 pm to 2:30 pm	Session 3: Controlling the Swarm
1:00 pm to 1:25 pm	Jaeyeon Jung (Microsoft Research) The Home-Surveillance State: Parents and Teenagers React to Internet-Connected Locks and Cameras in the Home
1:25 pm to 1:50 pm	Daniel Graff, Daniel Röhrig and Jan Rabaey. (UC-Berkeley) Operating System Support for Mobile Robot Swarms
1:50 pm to 2:15 pm	Bradford Campbell, Prabal Dutta and Pat Pannuto. (Univ. of Michigan) Interfacing the Internet of a Trillion Things
2:15 pm to 2:40 pm	Eloi Pereira, Clemens Krainer, Pedro M. Silva, C. Kirsch and R. Sengupta. (UC Berkeley) A Runtime System for Logical-Space Programming
2:40 pm to 3:30 pm	Poster Session, Networking and Coffee break
3:30 pm to 4:30 pm	Panel: Enabling the Swarm: What are the obstacles in the way?
4:30 pm to 4:35 pm	Concluding Remarks

Invited Papers/Talks

Invited Speaker: Werner Damm (Universität Oldenburg)

A Conceptual Model of System of Systems

Abstract: We propose a meta-model for systems of systems which is rich enough to model realistic applications and at the same time can be used as a blue print for identifying typical trouble spots in SoS design (and consequently also for IoT, IoE, networked CPS and swarm systems) as well as guiding the development of distributed strategies for the coordination and orchestration of their constituent system. The talk highlights typical pitfalls in SoS design and explains countermeasures based on the underlying conceptual model.

Invited Speaker: Raja Sengupta (UC Berkeley)

NextGen Intelligent Transportation: Measuring People, Controlling Things

Abstract: The field of Intelligent Transportation Systems, now well established in standards, trade associations, and academia, represent 30 years of computational impact on the supply-side. Can it also revolutionize demand? The highway pavement is sensed every 30 seconds every quarter mile, but the California Travel Household survey, the bulwark of demand sensing, operates once every 10 years with 10,000 people – 1 person every 40 California square km. While 3000 lights are actuated at scale with feedback every minute in Los Angeles, the actuators of demand like prices or incentives for parking and roads, adjust once in years through planning and policy. Through the lens of our studies with travelers in the mobile cloud, we show how the rising ubiquity of computation is revolutionizing the sensors and actuators of demand, while opening a new computational paradigm for social science.

Invited Speaker: Jaeyeon Jung (Microsoft Research)

The Home-Surveillance State: Parents and Teenagers React to Internet-Connected Locks and Cameras in Home

Abstract: Sensing and inference data captured in the home could be highly sensitive and can impose privacy risks and social tensions. I first present two user studies that we conducted to understand possible conflicts and tensions among the household members around the use of so called Internet of Things (IoT) devices in the home. The first study allowed us to identify various perceived privacy concerns reported by 22 participants from 11 households who lived with sensor proxies for four weeks. In the second study, we delved into a pair of stakeholders (parents and teenagers) and specific devices (Internet connected door locks and security cameras) and showed how these home security devices could impact the balance between household security and teenagers' privacy. I conclude the talk with a discussion of potential technical mechanisms and interfaces that enable users to fully utilize the benefits of in-home sensing devices while reducing privacy risks.

Panel: Enabling the Swarm: What are the obstacles in the way?

Abstract: In the past two decades, the ongoing trend to disperse a large number of sensors in the environment has enabled a marvelous potential to monitor and act on the information acquired in and around us. Swarms indicate aggregations of smart systems that process this sensory information with a varying degree of autonomy and automation. The research on the Swarm is prospering. Swarm technologies are getting more and more mature and ready to deploy. This panel explores how the insights from research will be transferred to the users. It will discuss the biggest obstacles that have to be overcome by the Swarm for its useful realization and to gain acceptance by a large group of users.

Proposed Panelists

Monika Sturm, Siemens Jaeyeon Jung, Microsoft

George Pappas, UPenn Alberto Sangiovanni-Vincentelli, UC-Berkeley