Program of the 4th International Conference on the Internet of Things

October 6-8, 2014
Cambridge, Massachusetts USA

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Program at a Glance

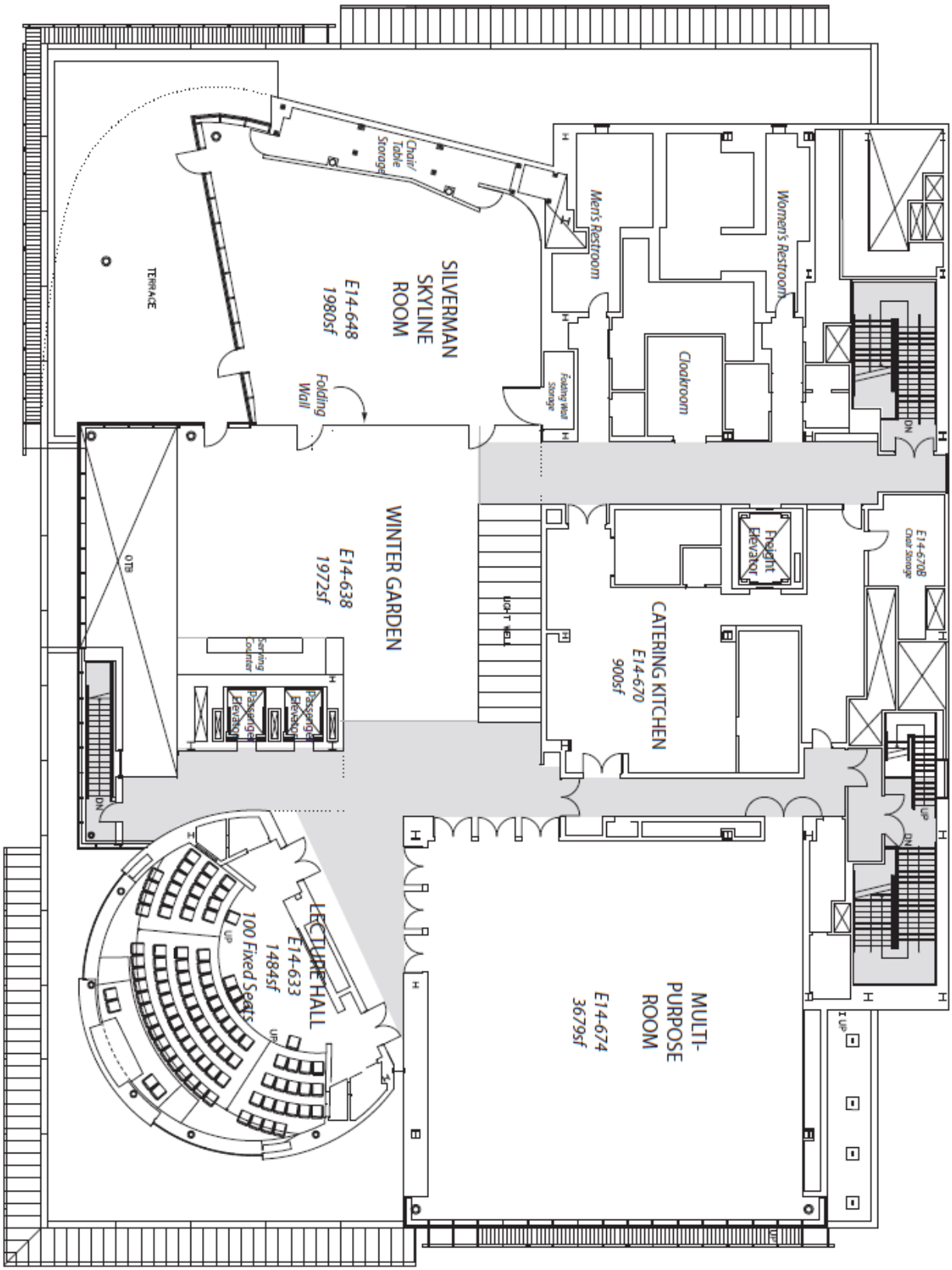
Monday October 6, 2014	
08:00	**Breakfast** & Speaker Briefing
08:30	Welcome & Opening Plenary
	INDUSTRIE 4.0 – The Fourth Industrial Revolution Dr. Kurt D. Bettenhausen (Siemens)
09:30	Technical Sessions: *IoT Architecture & System Design I* | *Interface & Control Systems*
10:30	**Coffee Break**
10:45	Demo Session I | Demo Session II
13:00	**Networking Lunch**
14:30	Technical Session: *IoT Analytics*| Workshop: *Open Data Standards*
16:30	**Coffee Break**
16:45	Tutorial: *Chain API Tutorial* | Poster Session

Tuesday October 7, 2014	
07:15	**Breakfast** & Speaker Briefing
07:45	Plenary Session
	Not Making the Same Mistakes Again Dr. David Clark (MIT)
08:45	**Coffee Break**
09:00	Tech. Sessions: *IoT Apps & Services* | *Cloud Comp & Semantic Web* | Tutorial *Industrial IoT*
10:30	Workshops: *IoT Thought Leadership*| *IoT Apps & Value Creation for Industry*
12:30	**Networking Lunch**
13:00	Workshops: *Industrial IoT* | *IoT Apps & Value Creation for Industry* (cont.)
16:30	**Coffee Break**
16:45	Workshops: *Industrial IoT* (cont.)
18:30	**Conference Banquet**

Wednesday October 8, 2014	
07:30	**Breakfast** & Speaker Briefing
08:00	Plenary Session
	Smart Networked Systems & Societies: Towards Smart Healthcare Dr. Ram D. Sriram (NIST)
08:45	Technical Sessions*: IoT Arch & System Design II* | *IoT Device & Circuit Design*
09:45	Technical Sessions: *IoT Arch & System Design II* | Workshop: *Privacy, Trust & IoT*
10:15	**Coffee Break**
10:30	Workshops: *Web of Things* | *Privacy, Trust & IoT*(cont.)
12:00	**Networking Lunch**
13:00	Workshop: *Web of Things* (cont.)
14:30	Closing Plenary
	Paradox to Paradigm Catalyzed by IoT Dr. Shoumen Palit Austin Datta (IIC and MIT)
15:30	Open Demo Session | Workshop: *EU/US Workshop Promoting Global IoT Success*
17:00	**Coffee Break**
17:15	Open Demo Session (cont.)| Workshop: *EU/US Workshop Promoting Global IoT Success* (cont.)

Conference Venue

MIT Building E-14 Floor 6



Chairs' Welcome

Dear Colleagues and Friends,

On behalf of the organizing committee, it is our great pleasure and honor to invite you to attend the 4th International Conference on Internet of Things at MIT in Cambridge, MA from October 6th to 8th 2014. We have assembled an exciting set of events and we hope that you will have a very productive time during this conference.

Instrumenting and connecting devices has massive potential to deliver value, but there is need for a coordinated effort for rolling out the next generation of self-reporting devices. We hope that during the 2014 Internet of Things Conference you will have an opportunity to share, discuss and witness cutting edge research in all areas of development for the Internet of Things.

Boston is one of the oldest cities with many sites of historic, cultural and educational importance. We hope that in your free time you will have an opportunity to explore MIT, its surrounding areas and important Boston landmarks. We are confident that you will leave this conference enriched both technically and culturally. We look forward to welcoming you to the 4th International Conference on the Internet of Things.

Elgar Fleisch, ETH

Soundar Kumara, Penn State

Sanjay Sarma, MIT

Keynote Speaker

INDUSTRIE 4.0 – The Fourth Industrial Revolution

Dr. Kurt D. Bettenhausen
Technology Field Leader, Automation and Control Technology, Siemens Corporate Technology
Monday, October 6 at 8:30

The Manufacturing of the Future must change: The objective is to achieve a highly flexible, individualized, efficient and resource-friendly production at a cost position similar to today's mass production. The vision of tomorrow's manufacturing, already declared to become the "Fourth Industrial Revolution" is as follows: products organize and find their way independently through the production process. In smart factories, smart machines, smart materials and smart products communicate with each other, alternately driving production, being interconnected and traceable at all times within an "Internet of things".

The U.S. government is inching closer making this Fourth Industrial Revolution reality. It understands the importance of developing innovative manufacturing strategies and plans to provide up to $1 billion in funding for the establishment of a national network of research institutes and businesses. Public authorities are responsible for making ubiquitous broadband networks available, and industry needs to put data standardization and transmission protocol systems into place in a timely manner. In Germany, the corresponding initiative is called "Industrie 4.0" and a joint approach of businesses, academia and research institutes supported by government agencies to further strengthen the power of German engineering and production. This keynote will provide a comprehensive summary of the German initiative and a first comparison to the activities in the U.S.

Kurt D. Bettenhausen is the Automation and Control Technology Field Leader (AUC TF) for Siemens Corporate Technology. Headquartered in Siemens Corporate Technology's Princeton, New Jersey office in the USA, the AUC TF is one of 12 technology fields within Siemens Corporate Technology chartered with developing technologies with a broad impact for Siemens divisions worldwide. Based on deep experience in signal processing, robotics, lifecycle engineering, data analytics and mathematics, the AUC team provides methods and software modules to simulate, optimize, operate and control systems and processes. Before joining Corporate Technology, Dr. Bettenhausen headed up the Engineering and Consulting Business of Siemens' Industrial Automation Division based in Frankfurt, Germany. He began his career in the corporate research and technology department of Hoechst. Later, he held senior positions in marketing, sales and product management at Axiva. Dr. Bettenhausen attained a master's degree and a Ph.D. in electrical engineering from the University of Darmstadt and is a member of the advisory board at the University of California-Berkeley's College of Engineering.

Keynote Speaker

Not Making the Same Mistakes Again

Dr. David Clark

Computer Science and Artificial Intelligence Laboratory, MIT

Tuesday, October 7 at 8:00

The Internet has lived through several phase changes in computing: from large time-shared mainframes to personal computers to mobile devices. The next phases are pretty clear today: they include IoT, networked vehicles, and implanted devices. Having lived through all of these, I see a painful tendency to repeat the same assumptions at each phase change. First, Internet protocols are (not suitable/too complex/etc.). Second, we can deal with network management later. Third, we cannot afford to think about details like security at first. For any of these future phases, any or all of these assumptions might be true, but past history would suggest otherwise. With respect to security, for example, we now have both cars and pacemakers that can be remotely hacked to induce death or bodily harm.

In this talk I will draw on some painful lessons from history in order to suggest ways to avoid pain going forward.

David Clark is a Senior Research Scientist at the MIT Computer Science and Artificial Intelligence Laboratory, where he has worked since receiving his Ph.D. there in 1973. Since the mid 70s, Dr. Clark has been leading the development of the Internet; from 1981-1989 he acted as Chief Protocol Architect in this development, and chaired the Internet Activities Board. His current research looks at re-definition of the architectural underpinnings of the Internet, and the relation of technology and architecture to economic, societal and policy considerations. He is helping the U.S. National Science foundation organize their Future Internet Design program. He is past chairman of the Computer Science and Telecommunications Board of the National Academies, and has contributed to a number of studies on the societal and policy impact of computer communications. He is co-director of the MIT Communications Futures Program, a project for industry collaboration and coordination along the communications value chain.

Keynote Speaker

Smart Networked Systems and Societies: Towards Smart Healthcare

Dr. Ram D. Sriram,
Chief, Software and Systems Division, Information Technology Lab, NIST
Wednesday, October 8 at 8:00

We are witnessing a new revolution in computing and communication. The Internet, which has spanned several networks in a wide variety of domains, is having a significant impact on every aspect of our lives. The next generation of networks will utilize a wide variety of resources with significant sensing capabilities. Such networks will extend beyond physically linked computers to include multimodal-information from biological, cognitive, semantic, and social networks. This paradigm shift will involve symbiotic networks of people (social networks), smart devices, and smart phones or mobile personal computing and communication devices that will form net-centric societies or cyber-physical social systems. These devices – and the network — will be constantly sensing, monitoring, and interpreting the environment; this is sometimes referred to as the Internet of Things (IOT). The symbiosis of IOT and social networks will have significant implications for both the market for advanced computing and communication infrastructure and the future markets – for nearly 4.5 billion people — that net-centric societies will create. In this talk I will discuss a future vision for healthcare, which will involve smart phones, smart devices, and social networks, and research challenges associated with the emergence of such a smart networked society.

Ram D. Sriram is currently the chief of the Software and Systems Division, Information Technology Laboratory, at the National Institute of Standards and Technology. Before joining the Software and Systems Division, Sriram was the leader of the Design and Process group in the Manufacturing Systems Integration Division, Manufacturing Engineering Laboratory, where he conducted research on standards for interoperability of computer-aided design systems. He was also the manager of the Sustainable Manufacturing Program. Prior to joining NIST, he was on the engineering faculty (1986-1994) at the Massachusetts Institute of Technology (MIT) and was instrumental in setting up the Intelligent Engineering Systems Laboratory. Sriram has co-authored or authored more than 250 publications, including several books. Sriram was a founding co-editor of the International Journal for AI in Engineering. In 1989, he was awarded a Presidential Young Investigator Award from the National Science Foundation. In 2011, Sriram received the ASME Design Automation Award. Sriram is a Fellow of ASME and AAAS, a member (life) of ACM, a Senior Member of the IEEE, a member (life) of AAAI, and a member (life) of the Washington Academy of Sciences. Sriram has a B.Tech. from IIT, Madras, India, and an M.S. and a Ph.D. from Carnegie Mellon University, Pittsburgh, USA.

Keynote Speaker

Paradox to Paradigm Catalyzed by IoT

Dr. Shoumen Palit Austin Datta
Research Affiliate, School of Engineering, MIT
Senior Vice President, Industrial Internet Consortium
Wednesday, October 8 at 14:30

The broad spectrum of disruption anticipated by the increasing diffusion of connectivity is likely to reshape the "nature of the firm" through its influence on transaction cost economics. The networked physical world may connect known atoms to bits and unknown unknowns to spur non-obvious relationship analysis and trigger socio-economic disequilibrium. Sometimes the period of change is an age of hope, sometimes it is an age of despair. The fall of the Roman empire occurred in a prolonged age of despair. Steam, Democracy and IoT belongs to an age of hope.

Shoumen Palit Austin Datta is a Senior Vice President for the Industrial Internet Consortium (IIC) and a Senior Vice President for the Object Management Group (OMG). Prior to joining the IIC he was the Co-Founder and Executive Director of the MIT Forum for Supply Chain Innovation at the School of Engineering, Massachusetts Institute of Technology (MIT). He co-taught Strategy and Management at the Alfred P. Sloan School of Management, MIT. He was a Member of the Auto ID Center at MIT and Research Scientist in the Engineering Systems Division at the School of Engineering, MIT. He has lectured worldwide on technology innovation and offered courses for executive education at MIT and several other institutions in Europe and Asia. He has authored papers and articles related to evolution of the industrial internet, intelligent software agents, framework for predictive analytics, operations and supply chain management, sensors in healthcare systems and energy for a sustainable global economy. He has also worked as an independent consultant and advisor for a variety of major corporations and governments, including the US Department of Defense (DoD), United Nations (UNDP), the World Customs Organization (WCO) and the President's Science and Technology Advisory Group (PSTAG) for the President of Taiwan, Government of Taiwan. He is a lifetime champion of STEM in public K-16 education.

Shoumen earned his PhD from Rutgers University. He was a Research Fellow in Medicine at the Massachusetts General Hospital and Instructor in Medicine at Harvard Medical School, Harvard University. He was a Research Associate at the Whitehead Institute at MIT and a member of the Human Genome Project at MIT. He was a Research Scientist at the University of California School of Medicine. His self-guided convergence of medicine into engineering was precipitated by a trinity of events which germinated during his research in neuro-endocrinology at Harvard followed by auditing AI courses at MIT and network engineering lectures at the University of California at Berkeley.

Technical Sessions

IoT Architecture and System Design I

Monday, October 6	09:30 – 10:30	Multipurpose Room
9:30 – 10:00	Californium: Scalable Cloud Services for the Internet of Things with CoAP *Kovatsch, Matthias (ETH Zurich, Switzerland); Lanter, Martin (ETH Zurich, Switzerland); Shelby, Zach (ARM Inc., USA)*	
10:00 – 10:30	The relevance and impact of IPv6 multicasting for Wireless Sensor and Actuator Networks based on 6LoWPAN and Constrained RESTful Environments *Jung, Markus (Vienna University of Technology, Austria); Raich, Philipp (Vienna University of Technology, Austria); Kastner, Wolfgang (TU Vienna (Wien), Austria)*	

Interface and Control Systems

Monday, October 6	09:30 – 10:30	Silverman Skyline
9:30 – 10:00	VeCure: A Practical Security Framework to Protect the CAN bus of Vehicles *Wang, Qiyan (Symantec Research Labs, USA); Sawhney, Sanjay (Symantec Research Labs, USA)*	
10:00 – 10:30	End-User Installation of Heterogeneous Home Automation Systems Using Pen and Paper Interfaces and Dynamically Generated Documentation *Miclaus, Andrei (TECO, Karlsruhe Institute of Technology, Germany); Riedel, Till (TecO, Karlsruhe Institute of Technology, Germany); Beigl, Michael (KIT, Germany)*	

IoT Analytics

Monday, October 6	14:30 – 16:30	Silverman Skyline
14:30 – 15:00	Look twice: Uncover hidden information in room climate sensor data *Wörner, Dominic (ETH Zürich, Switzerland); von Bomhard, Thomas (University of St. Gallen, Switzerland); Röschlin, Marc (ETH Zürich, Switzerland); Wortmann, Felix (University of St. Gallen, Switzerland)*	
15:00 – 15:30	Data Driven Quantitative Trust Model for the Internet of Agricultural Things *Han, Weili (Fudan University, P.R. China); Gu, Yun (Fudan University, P.R. China); Zhang, Yin (Fudan University, P.R. China); Zheng, Lirong (Fudan University, P.R. China)*	
15:30 – 16:00	Human-object Interaction Reasoning using RFID-enabled Smart Shelf *Melià-Seguí, Joan (Universitat Pompeu Fabra, Spain); Pous, Rafael (Universitat Pompeu Fabra, Spain)*	
16:00– 16:30	Content-based Query for Class-level Tagged Items via the EPC Network *Wang, Zhijun (Donghua University, P.R. China); Jiang, Keyuan (Purdue University – Calumet, USA); Du, Ming (Donghua University, P.R. China); Le, Jiajin (Donghua University, P.R. China)*	

Technical Sessions

IoT Applications and Services

Tuesday, October 7	**09:00 – 10:00**	**Multipurpose Room**
09:00 – 09:30	Using machine-to-machine/"Internet of Things" communication to simplify medical device information exchange *Görges, Matthias (University of British Columbia, Canada); Petersen, Christian (University of British Columbia, Canada); Dumont, Guy (University of British Columbia, Canada); Ansermino, J Mark (University of British Columbia, Canada)*	
09:00 – 10:00	How IoT will change the design and operation of logistics systems *ten Hompel, Michael (TU Dortmund, University of Technology, Germany); Nettsträter, Andreas (Fraunhofer Institute for Material Flow and Logistics, Germany); Prasse, Christian (Fraunhofer Institute for Material Flow and Logistics, Germany)*	

Cloud Computing and Semantic Web Technologies

Tuesday, October 7	**09:00 – 10:30**	**Silverman Skyline**
9:00 – 9:30	Configuration of Smart Environments Made Simple – Combining Visual Modeling with Semantic Metadata and Reasoning *Mayer, Simon (ETH Zürich, Switzerland); Inhelder, Nadine (ETH Zurich, Switzerland); Verborgh, Ruben (Ghent University – iMinds, Belgium); Van de Walle, Rik (Ghent University – iMinds, Belgium); Mattern, Friedemann (ETH Zürich, Switzerland)*	
9:30 – 10:00	Semantic Data Provisioning and Reasoning for the Internet of Things *Maarala, Altti Ilari (University of Oulu, Finland); Su, Xiang (University of Oulu, Finland); Riekki, Jukka (University of Oulu, Finland)*	
10:00 – 10:30	Jade: A Unified Programming Framework for Things, Web, and Cloud*Ghosh, Debashish (McGill University, Canada); Jin, Fan (McGill University, Canada); Maheswaran, Muthucumaru (McGill University, Canada)*	

IoT Device and Circuit Design

Wednesday, October 8	**8:45 – 9:45**	**Silverman Skyline**
8:45 – 9:15	Subcarrier Index Coordinate Expression (SICE): An Ultra-low-power OFDM-compatible Wireless Communications Scheme Tailored for Internet of Things *Kuo, Ping-Heng (Industrial Technology Research Institute, Taiwan); Kung, Ht (Harvard University, USA)*	
9:15 – 9:45	Near-Field RFID Tag Antenna Based Sensing: A New Sensing Approach Using UHF RFID *Hattori, Wataru (NEC Corporation, Japan); Ohashi, Keishi (Waseda University, Japan); Fukuda, Hiroshi (NEC Corporation, Japan)*	

Technical Sessions

IoT Architecture and System Design II

Wednesday, October 8	**8:45 – 10:15**	**Multipurpose Room**
8:45 – 9:15	IoT Interoperability: A Hub-based Approach *Blackstock, Michael A (University of British Columbia, Canada); Lea, Rodger J (University of British Columbia, Canada)*	
9:15 – 9:45	Game Theoretic Secure Localization in Wireless Sensor Networks *Jha, Susmit (Intel Strategic CAD Labs, USA); Tripakis, Stavros (University of California at Berkeley, USA); Seshia, Sanjit A (University of California, Berkeley, USA); Chatterjee, Krishnendu (Institute of Science and Technology, Austria)*	
9:45 – 10:15	Dragon: Data Discovery and Collection Architecture for Distributed IoT *Kolcun, Roman (Imperial College London, United Kingdom); McCann, Julie A (Imperial College, United Kingdom)*	

Poster Session

Monday, October 6	**16:45**	**Winter Garden**
6Lo Bluetooth Low Energy for Patient-Centric Healthcare Service on the Internet of Things *Wondeuk Yoon, Minkeun Ha, Kiwoong Kwon, and Daeyoung Kim KAIST, Korea*		
Location-based and Private IoT Messaging platform in Home Network Environments *Hyeong Gon Jo, Seolyoung Jeong, Sunghee Lee, Soon Ju Kang Kyungpook National University, Korea*		
Low-Cost Intelligent Prepaid Energy Meter *Rishikanth C, Akshaya Ravishankar, Anand Vignesh V, S Vikram Vel, Vineeth Vijayaraghavan, Dhiwaakar Purusothaman S R R Solarillion Foundation/Solarillion Foundation/Shree Motilal Kannhayalal Fomra Institute of Technology, India*		
Computing Cloud or Cloud Computing? *Stanislav Bratanov Intel, Russian Federation*		
Trustworthy and Secure Service-Oriented Architecture for the Internet of Things *Ahmad W. Atamli, Andrew J. Paverd, Andrew P. Martin University of Oxford, UK*		
Bigdata based Approach to Internet of Things in Agriculture *Meonghun Lee, Hyun Yoe Sunchon National University, Korea*		
An approach to enable real-time stream data processing with EPCglobal based Internet of Things *Tuan Dinh Le, Seonghoon Kim, Janggwan Im, Minh Hoang Nguyen, Sehyeon Heo, Sungpil Woo, Daeyoung Kim KAIST, Korea*		
A Novel Solution to Link Physical Products with Digital Services *Runhua Xu, Remo Frey and Alexander Ilic ETH Zurich/University of St. Gallen, Switzerland*		
Making Security Available for Everyone – Towards a Community-Based Smart Home Security System *Marcus Köhler, Felix Wortmann, University of St. Gallen, Switzerland*		
Enabling Mobile-IoT Driven Marketing with High Resolution Analytic Models *Edward Ho, Alexander Ilic ETH Zurich/University of St. Gallen, Switzerland*		

Workshops

Open Data Standards

Monday October 6 **14:30-16:30** **Multipurpose Room**

Without open standards for data exchange, IoT development will be wrought with duplicated efforts and isolated development. The open data standards workshop will bring together professionals from diverse industries from green energy and oil services to national weather data services and fisheries all of whom will speak on one common theme – how in their experience the availability of open data standards for information exchange has benefited their individual industry segment. The theme of the workshop showcases how open data standards foster the intra and inter industry connectivity that will help drive the growth of IoT.

Workshop Agenda	
14:30-15:00	Driving Value by Open Data in the IoT *Jonathan Clark (Sine-Wave Technologies Inc.)*
15:00-15:30	Driving Big Data: How 'Open' Connects Cars *Joshua Siegel (MIT Field Intelligence Lab & CarKnow LLC)*
15:30-16:00	Applying Web Standards to the Internet of Things *Spencer Russell (MIT Media Lab, Responsive Environments Group)*
16:00-16:30	How Open Standards Have Helped The Sensor Industry Grow *Brenden McSheffy (en-Gauge Inc.)*

Moderator: Jonathan Clark (Sine-Wave Technologies)

Workshops

IoT Thought Leaders Panel

Tuesday October 7 **10:30 – 12:30** **Multipurpose Room**

The term "Internet of Things" was coined by the Auto-ID Center in 1999. Since then, many things have changed and several organizations now consider the Internet of Things an important part of their strategy. Research around the Internet of Things has evolved significantly and there are several terms to express different perspectives on the bigger idea of the Internet of Things such as Cyber-Physical Systems, Industrial Internet, Internet of Everything, Industry 4.0, Web of Things, Web 3.0, M2M, Internet of Objects, etc.

But the question remains: why hasn't the Internet of Things as envisioned happened yet? After more than fifteen years of hype and predictions, what can we learn from the past? What does the future for the whole concept of the Internet of Things look like? And what priorities should we tackle first to enable a broad adoption? These questions and more related to the bigger vision on the IoT will be discussed by leading minds from academia and industry in this panel session.

The Panel: Prof. Sanjay Sarma (MIT), Prof. Jun Murai (Keio), Prof. Elgar Fleisch (ETH Zurich & University of St. Gallen)joined by thought leaders and visionaries from industry including Scott Jenson (Google), Veena Pureswaran (IBM) and Adam Burns (Intel).

Moderator:
Dr. Alexander Ilic, ETH Zurich/HSG, Switzerland.

The goal of the session is to critically review and discuss what it takes to bring the Internet of Things to the next level. The first half of the panel is includes a position statement by each of the panelists on the challenges and key priorities that a research agenda for the Internet of Things should address. The second half of the session is dedicated to an open panel discussion. Results of this workshop will be disseminated through academic as well as general media outlets.

Workshops

IoT Applications and Value Creation for Industry

Tuesday October 7 **10:30-16:30** **Silverman Skyline**

IoT is a wide and rapidly developing area with expected strong and growing implications for the industry. Numerous IoT research and application projects have been done by universities or in joint industry-university consortia in recent years. However an important question is on value creation for industry. IoT applications in the sense of this industry workshop are solutions using IoT technologies to improve industrial manufacturing processes, enable new and efficient ways to do operate production plants, create new service or supervision means for industrial installations, offer an optimized infrastructure, reduce operational cost or improve human safety in industrial areas.

From an industry point of view value creation form IoT applications and sustainability are essential. How these problems will be addressed and solved will influence the use of IoT technologies in the industry, on a larger scale, in the coming years. The workshops intents to bring together experts from around the world to discuss and stimulate ideas, share experience on IoT applications and value creation for industry and to address and highlight with priority two major topics: 1) IoT in industry: challenges, trends, experience 2) IoT creating value in industrial applications. The workshop is intended to contribute to an IoT supported paradigm change in manufacturing, industrial service and over life sustainable industrial activities

Workshop Agenda	
10:30-11:00	Challenges, potential and value of IoT applications for industry *Dr. Nicolaie L. Fantana (chair) (ABB)*
11:00-11:30	From IoT to CloudThink: An Evolution *Prof. Sanjay Sarma (MIT)*
11:30-12:00	The Era of Internet of Things - On Distributed Systems to a Distributed Intelligence *Prof. Sabina Jeschke and Dr. Tobias Meisen (RWTH)*
12:00-12:30	Smart Data Innovation Lab: An Open Research Infrastructure for Mining Value from IoT Applications *Dr. Till Riedel (co-chair) KIT*
13:30-13:50	IoT for the Oil and Gas Industry *Dr. Stefan Svensson (ABB)*
13:50-14:10	Best Practices Industrie 4.0 in Production *Dr. Schlick Jochen Dr. Peter Stephan (Wittenstein)*
14:10-14:30	Industrie 4.0. - Factories based on the IoT *Prof. Detlef Zühlke (DFKI)*
14:30-14:50	IoT applications from IoT Research Cluster projects *Philippe Cousin (EC IoT RC)*
14:50-15:10	IoT-based Information Services - A Service Engineering Approach *Prof. Alexander Pflaum*
15:10-15:30	Social Physical Sensing and Behavioral Consensus Computation *Prof. Lin Zhang (Tsing Hua)*
15:30-15:50	Security in the Internet-of-Things -- or the Plural of Anecdotes *Dr. Andreas Kind (IBM Research)*
15:50-16:10	Application agnostic supply chain visibility platform *Prof. Jin Mitsugi (Keio, AutoID Japan)*
16:10-16:30	Makes sense – Semantics in IoT *Dr. Florian Michahelles (Siemens)*

Workshops

Workshop on Industrial IoT

Tuesday October 7 **13:00** **Multipurpose Room**

In a recent TED lecture, GE economist Marco Annunziata noted that in the next decade the U.S. GDP will double from the growth in what is known as Industrial Internet of Things (IIoT). IIoT refers to smart machines with pervasive sensing, networked to the Cloud, and is distinct from M2M communication. It deals with connectivity in industrial networks, warehousing infrastructure and building systems to enable the delivery of software services, data analytics and autonomous control from the Cloud.

Simple pilot projects implemented in the industry over the last five years have demonstrated both the viability and economic impact of IIoT in verticals such as logistics and healthcare. What will be needed to bring forth a more ubiquitous transformation of our industrial infrastructure is a period of technological innovation pioneered by academia and industry. The purpose of the proposed Workshop is to lay the groundwork for accelerating advances in IIoT technologies. To maximize its impact, the Workshop will be organized into three focus areas: (i) tutorial talks that provide a balanced view of history and where the field of IIoT is at present, (ii) presentations that review ongoing research in IIoT, and (iii) visionary lectures that discuss challenges and predict future technology inflection points for industrial infrastructure.

Workshop Agenda		
Name	**Affiliation**	**Topic**
Paul Brooks	Rockwell Automation	IIoT in Factory Automation
Don Bartusiak	Exxon-Mobil	IIoT in Process Control
Greg Turner	Honeywell	IIoT in Building Systems
Rick Dries	Siemens	IIoT in Factory Automation
Venkat Shastri(Chair)	PCN Technologies	Transformation of Fieldbus Infrastructure to Industrial IP
(TBA)	IHS/IMS Research	IIoT Market Forcasts
Scott MacDonald	McRock Capital	IIoT Market Dynamics and Opportunities

Workshops

Workshop on Privacy, Trust and the Internet of Things

Wednesday October 8 **9:45** **Silverman Skyline**

With this workshop we aim to draw together academics and professionals of all disciplines and backgrounds to discuss the key problems of privacy and trust in the IoT, and explore methodologies, technologies and tools for addressing them. We seek contributions that highlight/discuss challenges in IoT and solutions that may benefit from knowledge driven approaches.

Workshop Agenda	
9:45-10:30	Introduction & Keynote Policy Controlled Access in IoT: Current and Future Trends *Seraphin Calo (Cloud-based networking, IBM)*
10:30-10:45	Private.iot: IoT Privacy Notice using ONS *Edward Wang, Richard Chow (University of Washington Ubiquitous Computing Lab, Intel Corporation)*
10:45-11:00	RIPPLE: Scalable Medical Telemetry System for Supporting Combat Rescue *Sanjay Kumar Boddhu (Qbase LLC)*
11:00-11:15	Localizing Computation for IoT: a Cloud-based Approach *Jorge Ortiz (IBM)*
11:15-11:30	Coffee Break
11:30-11:45	Model-Based Simulation Systems for Adaptive Training in Time-Critical Decision Making *Subhashini Ganapathy (Wright State University)*
11:45-12:00	Towards a Secure and Trusted Physical Object Model for Context Aware Computing *Andrew Gowing, Siliang Qian, Alexandru Verzea, Minjoo Cha & Muthucumaru Maheswaran (McGill University)*
12:00-12:30	Lunch and Discussion (boxed lunches provided)

Moderator: Geeth de Mel (IBM TJ Watson Research)

Workshops

Fifth International Workshop on the Web of Things (WoT 2014)

Wednesday October 8 **10:30** **Multipurpose Room**

Continuing the successful Web of Things workshop series, this workshop aims at further exploring the use of technologies and principles at the core of the Web to provide methods for a seamless integration of physical devices. In particular, our goal is to foster discussion on systems towards a real-time Web of Things and the discovery, search, and composition of services provided by Web-enabled things as well as the interaction of users with such devices. The Web of Things workshop solicits contributions in all areas related to the Web of Things, and we invite application designers to think beyond sensor networks and Web applications, and to imagine, design, build, evaluate and share their thoughts and visions on what the future of the Web and networked devices will be.

Workshop Agenda			
10:30-11:00	Opening and Keynote Dave Raggett, W3C	13:00-13:20	Keynote Florian Michahelles, Siemens USA
11:00-12:00	Paper Presentations	13:20-14:10	Paper Presentations
12:00-13:00	Lunch	14:10-14:30	5 Year WoT Recap - Dominique Guinard, EVRYTHNG Inc.
12:30-13:00	Demos		

Paper Presentations
Virtual Things for Machine Learning Applications *Gérôme Bovet, Antonio Ridi and Jean Hennebert. (Telecom ParisTech)*
Semantic Web Based Context-Adaptable Generation of Product Specific Documentation *Andrei Miclaus, Till Riedel, Jack Unseld and Michael Beigl (TecO, Karlsruhe Institute of Technology)*
glue.things – a Mashup Platform for wiring the Internet of Things with the Internet of Services *Robert Kleinfeld, Lukasz Radziwonowicz and Charalampos Doukas (Fraunhofer FOKUS)*
A Scalable Cloud Storage for Sensor Networks *Gérôme Bovet, Gautier Briard and Jean Hennebert (Telecom ParisTech)*
Bet and Energy - From Load Forecasting to Demand Response in a Web of Things *Yong Ding, Martin Alexander Neumann, Ömer Kehri, Geoff Ryder, Till Riedel and Michael Beigl (TecO, Karlsruhe Institute of Technology)*
Toward a Distributed Data Flow Platform for the Web of Things *Michael Blackstock and Rodger Lea (University of British Columbia)*

Organizers:
- Simon Mayer, ETH Zurich, Switzerland
- Dr. Vlad Trifa, EVRYTHNG Ltd., UK
- Dr. Dominique Guinard, EVRYTHNG Ltd., UK
-Dr. Erik Wilde, Siemens, USA

Workshops

EU/US Workshop Promoting Global IoT Success

Wednesday October 8 **15:30** **Multipurpose Room**

Analysts predict that the rising Internet of Things (IoT) will grow exponentially and drive our future smart lives in areas such as transport, energy, health, environment, and our cities! With products and services brought to market by SMEs and large market stakeholders, innovators and researchers are focused on realizing the promise of this transformative industry.

Yet, many factors are keeping the global market fragmented, and impeding growth. This EU-US workshop brings together leaders in the IT community to initiate a policy framework where industry can identify challenges or barriers in current policies in order to maximize EU-US research cooperation and optimize the IoT economy. Workshop goals include:

- Spotlight IoT research and operational strategies to promote innovation and stimulate IoT ecosystems
- Provide room for policy discussions and identify areas of cooperation
- Promote research and operational market-driven projects like open platforms
- Establish an EU-US IoT liaison group

Workshop Agenda	
3:30-4:00	Keynote Speeches *EU: Andrea Glorioso, ICT & Digital Economy Counselor, EU Delegation to the US* *US: Dr. Chris Greer, Cyber Physical Systems & Smart Grid Program Office, NIST*
4:00-4:40	IoT Research Strategies to Promote Innovation & Ecosystems *EU: Philippe Cousin, IERC & CEO, Easy Global Market* *US: Sanjay Sarma, Professor of Mechanical Engineering, MIT*
4:40-5:00	Addressing Global Challenges to Enable Market Take-up and IoT Economy *EU: Dr. Srdjan Krco, IERC AC1, SocioTal, IoT Lab, Citi-sense & Smartie projects* *US: Shoumen Datta, SVP, Industrial Internet Consortium (IIC) & SVP OMG*
5:00-5:15	Coffee break
5:15-5:45	Spotlighting Market Innovation with Open Platforms: EU and US open platforms ensuring openness and semantic interoperability *EU: Dr. Martin Serrano, National University of Ireland Galway, Open IoT Project* *EU: Dr. Levent Gürgen, CEA-LETI, Butler Project* *US: Dr. Neeli Prasad, Dir. of Center for TeleInfrastructure, (CTIF-USA), Princeton*
5:45-6:45	EU & US Success Stories and IoT Business Cases *EU: Pedro Marrón, Planet, SMART-ACTION; Martin Serrano & Antonio Jara/HOPU; Srdjan Krco, Nicolae Fontana, ABB* *US: Florian Michaeles, Siemens US*
6:45 -7:00	Discussions, Conclusions and Next Steps for an EU-US IoT Liaison Group *Moderated by Pedro Marron*

About BILAT USA 2.0: BILAT USA 2.0 is a project funded by the European Commission under FP7 (GA N° 312081). BILAT USA 2.0 aims to enhance Science, Technology & Innovation collaboration between the EU and the US.

Demonstrations

Demo Session I	**Monday October 6 10:45**	**MultiPurpose Room**
Demo Session II	**Monday October 6 10:45**	**Silverman Skyline**
Open Demo Session	**Wednesday October 8 15:30**	**Winter Garden & Silverman Skyline**

Demo Session I – Multipurpose Room	
1	HeartSense: Photoplethysmography to Estimate Physiological Vitals *Rohan Banerjee, Anirban Dutta Choudhury, Aishwarya Visvanathan & Aditi Misra (Tata Consultancy Services Ltd. Innovation Labs, Kolkata, India)*
2	Understanding the Capabilities of IoT Devices *Stanislav Beran, Edoardo Pignotti & Peter Edwards (Computing Science & dot.rural Digital Economy Hub University of Aberdeen, UK)*
3	SnapSense: The Modular Sensing Platform for the Internet of Things *Aidan Boran, Alan Leddy & Edmond O'Connor (Bell Labs, Alcatel-Lucent, Dublin, Ireland)*
4	Appliance Recognition on Internet-of-Things Devices *Gérôme Bovet, Antonio Ridiyz & Jean Hennebert (Institut Mines-Telecom, Telecom ParisTech, France; University of Fribourg, Switzerland)*
5	The GS1 code based Web of Things Service Architecture with Healthcare Scenario *Jongseok Choi, Minkeun Ha, Nam K Giang, Wondeuk Yoon, Kiwoong Kwon & Daeyoung Kim (Department of Computer Science, KAIST)*
6	CANthings: Context-Aware Networks for the Design of Connected Things *Maryam Davoudpour, Stefan Despot, Mridul Kumar Tiwari & Hossein Rahnama (Ryerson University Toronto, Canada; RTA School of Media)*
7	DasData *Marius Dima & Dhivya Kumar (Data Land SRL, Romania)*
8	SmartJoyn - a software platform to facilitate the Internet of Things *Jineet Doshi (DA-IICT Gandhinagar, India)*
9	IoTified Platform for Constructing IPv6-based Embedded Web of Things Systems *Khaled Elsayed, Sherif Khattab, Mina Yousif, Muhammad Farag, Khaled Qorany, Mohammed Selim & Bassam Sharkawi (Dept. of Electronics and Communications Engineering, Cairo University, Egypt)*
10	Solar-Powered Password Theft - Turning a Raspberry Pi into an Automated Data Sequestration System *Hisham Hijjawi & Hyeong-Ah Choi (George Washington University, USA)*
11	A Human Centric Intelligent Society powered by the Cloud Computing and the Web of Everything: Demonstrating how a bike accident is solved in an hyperconnected world *Antonio J. Jara, Ian Thomas & Lou Fedon (University of Applied Sciences Westen Switzerland (HES-SO); HOP Ubiquitous, Spain; Fujitsu RunMyProcess, Paris, France)*
12	Interoperability between IoT Data Silos? OpenIoT Middleware in Action! *Prem Prakash Jayaraman, Doug Palmer, Arkady Zaslavsky, Martin Serrano, Manfred Hauswirth & Stefan Decker (CSIRO, Australia; Insight Centre for Data Analytics (former DERI), Galway, Ireland)*

Demonstrations

Demo Session II – Silverman Skyline	
1	Lightweight IoT System for Private and Specific User Space *Kyuyeong Jeon, Hyojin Park, Jinhong Yang, Yongrok Kim & Jun Kyun Choi (Department of Information and Communications, Institute for IT Convergence, KAIST, Korea)*
2	Microsoft, Azure and the IoT - How Microsoft supports the Internet of Things *Ivan R. Judson & Josh Holmes (Microsoft, Redmond, WA, USA)*
3	IoTSyS: an integration middleware for the Internet of Things *Markus Jung, Jomy Chelakal, Jürgen Schober, Wolfgang Kastner, Luyu Zhou, Nam Ky Giang (Institute of Computer Aided Automation Vienna University of Technology, Austria; Management Information System University of Technology of Troyes, France; Department of Electrical and Computer Engineering University of British Columbia Vancouver, Canada)*
4	Testing Platform for IoT Network Devices *Zbynek Kocur , Lukás Kypus , Lukás Vojtech , Marek Neruda, Pavel Stasay & Ondrej Vondrous (Department of Telecommunication Engineering, Faculty of Electrical Engineering, Czech Technical University in Prague, Czech Republic)*
5	Universal Data Analyser for Internet of Things Measurement Tools *Lukás Kypus , Zbynek Kocur , Lukás Vojtech , Marek Neruda, Jakub Unuckay & Milos Kozák (Department of Telecommunication Engineering, Faculty of Electrical Engineering, Czech Technical University in Prague, Czech Republic)*
6	An home power energy monitoring and actuating system based on 6LoWPAN over both IEEE 802.15.4 and Power Line networks *Luís M. L. Oliveira, Amaro F. de Sousa, João Reis & Sérgio Soldado (Instituto de Telecomunicações, Portugal; Instituto Politécnico de Tomar, Portugal; Universidade de Aveiro, Portugal; Withus Inovação e Tecnologia, Aveiro, Portugal)*
7	Demonstration of Reliable Powerline Network Communications in Harsh Industrial Environments, Enabling the Internet of Things in an Industrial Environment *Michael Propp (Adaptive Networks Needham, MA, USA)*
8	Cognitive Load Measurement on Commercial EEG Headsets Connected to IoT *Diptesh Das, Rajat Das, Debatri Chatterjee, Arijit Sinharay & Aniruddha Sinha (Tata Consultancy Services Ltd. Innovation Labs, Kolkata, India)*
9	Beyond the Implant *Sasha Smiljanic & Arun Venkat (Cambridge Consultants Ltd, MA, USA)*
10	PlanetOS *Rainer Sternfeld & Christopher Kalima (Planet OS, Inc., Sunnyvale, CA, USA)*
11	Analyzing Weather Data from an Arduino-based Weather Station Connected to ThingSpeak *Eric Wetjen, Wael Hemdan, Mark Jones & Rob Purser (The MathWorks, Inc., Natick, MA, USA)*
12	Victory: Versatile Internet of Things Application on Mobile Dynamic Service Composition Framework *Sungpil Woo, Sehyun Heo, Janggwan Im & Daeyoung Kim (Deparment of Computer Science, KAIST, Daejeon, South Korea)*

Tutorial Sessions

Linking your Sensor Data: An Introduction to ChainAPI

Spencer Russell, *MIT Media Lab's Responsive Environment Group*
Monday, October 6 16:45 Multipurpose Room

Come learn about ChainAPI, a hypermedia API that aims to create a distributed network of browsable sensor data servers. ChainAPI is a project developed by Spencer Russell in the Responsive Environments group enabling clients to store their sensor data so it can be easily browsed, discovered, and streamed. We'll go over the basic system architecture and data formats and help attendees get up and running building applications that interface with the API. Attendees can work our sensor data, or start pushing data of their own. Please come prepared with a laptop and your development environment of choice. We'll provide examples in Python, but anything that can speak HTTP, JSON, and websockets will do.

Spencer Russell is a Masters candidate at the MIT Media Lab's Responsive Environment Group, led by Joe Paradiso. His research interests include sensor data infrastructure, audio spacialization, and Music Information Retrieval. Before joining the Media Lab Spencer worked as a musician and as a freelance hardware and firmware developer until he became Chief Engineer at BuLogics, Inc., a mesh networking and building automation company in Philadelphia. Spencer holds a BA from Oberlin College and a BS in Electrical Engineering from Columbia University.

Enabling the Internet of Things over Industrial Powerline Networks: Applications, Requirements, and Technology Solutions

Michael Propp, *Adaptive Networks Inc.*
Tuesday, October 7 09:00 E14-633

In an industrial environment, cabling or wireless communications often cannot be successfully deployed and the most pervasive communications medium is the electrical low or medium voltage powerline. Industrial deployment of the IoT over the powerline requires continuous reliable communications to every node and fast response times for condition monitoring and control of each industrial device. The powerline as a communications medium suffers from noise and severe signal attenuation, especially in industrial environments. Additionally, lower layer (PHY, MAC and Link) approaches to simply achieve point-to-point communications bandwidth do not successfully translate into a multipoint network supporting large node populations with the required performance. Industrial deployment of the IoT over the powerline consequently requires a reexamination of what is needed at the lower layers. A reliable powerline communications solution meeting the requirements of the IoT in industrial environments is achieved through signal processing and protocols optimized for network communications in, and rapid adaptation to, the harsh, changing industrial powerline conditions. Such performance will be demonstrated in a setup of such conditions.

Michael Propp co-founded Adaptive Networks with his brother David to develop technology and products for reliable network communications over industrial powerlines. He is the co-inventor of the technology, has co-authored 15 key patents in this area, has been active in and co-authored both ISO and IEC standards related to powerline communications, and currently manages the company. He has been responsible for the wide deployment of powerline networks on ships, in mines, and in subsea oil and gas production. His areas of interest include complex dynamic systems and the relationship of stochastic systems theory to thermodynamics and statistical and quantum physics, as well as powerline communications. Dr. Propp holds SB/SM EE (1981) and Ph.D. EE (1985) from the Massachusetts Institute of Technology.

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Speaker Bios

Seraphin B. Calo received the M.S., M.A., and Ph.D. degrees in electrical engineering from Princeton University, Princeton, New Jersey. He has worked, published, and managed research projects in a number of technical areas, including: queueing theory, data communications networks, multi-access protocols, expert systems, complex systems management, and policy-based computing. Dr. Calo is a Research Staff Member at IBM Research and currently manages the Policy Lifecycle Technologies group within that organization. This research group is involved in studies of architectural issues in the design of complex software systems, and the application of advanced technologies to systems management problems. He was instrumental in establishing the importance of this research area, and was a key contributor to the IBM Research Division strategy for systems software. Based on seminal work on the automation of the management of complex computing systems, he helped formulate the use of policies as a mechanism to adapt the behavior of management software. He has been very active in international conferences, particularly in the systems management and policy areas. His recent involvements include serving on the Organizing Committee of Policy 2004 (IEEE 5th International Workshop on Policies for Distributed Systems and Networks) and serving as the General Chair of IM 2005 (The Ninth IFIP/IEEE International Symposium on Integrated Network Management). He is the only person to have been General Chair of four separate IM symposia (1997, 1999, 2005, and 2009), and is currently a member of the Steering Committee for IM and NOMS (10th IEEE/IFIP Network Operations and Management Symposium). Dr. Calo has authored more than sixty technical papers and has several United States patents (four issued and four pending). He has received four IBM Research Division awards, and five IBM Invention Achievement awards. His current research interests include: distributed applications, services management, and policy based computing. In a research career that has spanned more than twenty five years, Dr. Calo has been involved in the transition of research technologies to the IBM product divisions on numerous occasions. He was the key research staff member responsible for the design work that led to the development of the Resource Object Data Manager (RODM), an in-memory, information manager incorporating object oriented technology for real time management of large systems, and a component of the IBM Z-series Sysplex. He worked with the IBM systems management group on the SystemView specifications, and subsequently helped form a joint program that was aimed at Division sponsored work in Research. He currently manages a group that has been very successful at getting policy-based technologies incorporated into IBM products.

Philippe Cousin is the CEO of Easy Global Market and is currently chairing the WG Market Confidence within the IoT Forum. He is involved in the IoT European Research Cluster (IERC) as coordinator of the Interoperability Activity Chain (AC4), as well as on Dissemination and International matters (thanks also to the Smart Action project). Since 2011, he has been rapporteur of EU-China IoT expert Group. He is project manager of the EU-China Fire project and named ECIAO. He is also involved in Future internet FI-PPP programme in the Use Case FI-STAR project where he is leading the Quality and Validation WP, as well as addressing IoT related Generic Enablers. Philippe Cousin has 30 years of experience in ICT and has worked since 2001 in +20 EU Research projects. He is an expert in ICT Standardisation, Validation and Interoperability issues and has spent 20+ years working in Orange/France Telecom R&D. He also worked as Project Officer at the European Commission in Standardisation, Quality and CE Marking. After 4 years as Test house General Manager he joined ETSI in 2011 where he worked on ICT testing and validation issues as the Interoperability Service Director. There, he launched the Plugtests Service. He also founded Easy Global Market in 2010, which is successfully involved in many FP7 projects and looking towards future Horizon 2020 projects.

Dr. Ing. Nicolaie Laurentiu Fantana, graduated 1974 in Electrical Engineering and received 1985 his Ph.D. from University Politehnica Timisoara Romania, where he was an associate professor until 1991. He got a European Research Grant 1991 and has been visiting at the Karlsruhe Institute of Technology, KIT, Germany form 1991 to 1992. Since 1992 he has been with ABB Corporate Research Germany. Has has been involved in various national and international projects, university cooperation and working groups on industrial condition monitoring, equipment life assessment and service, lifetime data management, as well as pursuing the use of IoT technologies, mobile devices, ICT for industrial field service activities. He has received the CIGRE Technical Committee Award 2006. He has published papers and authors US, EU patents. Also, he has initiated the industry workshop series "IoT applications value creation for industry" during 3rd IoT conference 2012. Nicolaie is a Senior Member IEEE and member CIGRE and ACM.

Elgar Fleisch is Professor of Information and Technology Management at ETH Zurich and University of St. Gallen (HSG). In his research, Elgar Fleisch and his team aim at understanding and designing the ongoing merge between the physical and digital world. His work focuses on applications, social & economic impacts, and infrastructures of mobile and ubiquitous computing. Elgar Fleisch is chairing several industry-specific labs including the ETH/HSG Auto-ID Lab (retail & FMCG), the Bits-to-Energy Lab (energy), the BOSCH IOTS Lab (home automation & mobility), the Health-IS Lab (digital therapeutics) as well as the Mobiliar Analytics Lab (insurance). All research projects are joint efforts of industry and academia; its results have been published in more than 300 scientific journals and books in both disciplines: management and technology. Elgar Fleisch is a co-founder of several university spin-offs and serves as a member of multiple management boards as well as academic steering committees.

Dr. Chris Greer is NIST Senior Executive for Cyber Physical Systems and National Coordinator for Smart Grid Interoperability. In these positions, he is responsible for strategic planning, program implementation and coordination with partners across the public and private sectors. Prior to joining NIST, Dr. Greer served as Assistant Director for Information Technology R&D in the White House Office of Science and Technology Policy and Cybersecurity Liaison to the National Security Staff. His responsibilities there included networking and information technology research and development, cybersecurity, and digital scientific data access. Dr. Greer has also served as Director of the National Coordination Office for the Federal Networking and Information Technology Research and Development (NITRD) Program. This program coordinates IT R&D investments across the Federal government.

Dr. Levent Gürgen is R&D project manager in CEA-LETI and currently coordinating 2 European collaborative projects on the Internet of Things. He is the technical coordinator of the BUTLER project, a large scale European project (15M€ budget, 20 partners). The main goal of this project is to develop a horizontal IoT platform where context aware IoT applications from different verticals can be plugged in. He is also the coordinator of the ClouT project, a collaborative Europe-Japan project focused on using cloud computing as an enabler for exploiting the potential of the Internet of Things in the context of smart cities. Levent obtained his PhD degree in computer science from the Grenoble Institute of Technology. After 4 years in Orange Labs in France as a researcher, and 1 year in National Institute of Informatics in Tokyo, he joined CEA-LETI in 2009. His main research interests include service-oriented platforms for the Internet of Things, on which he published more than 30 papers-including journals and book chapters. He has also been involved in standardization activities such as IETF and UPnP Forum, and participated in the program committees of several scientific conferences. He has organized workshops such as Self-IoT'12 and Self-IoT'13 in conjunction with the ICAC conference on autonomic computing. Additionally, He has been involved in several other large scale European projects related to IoT and smart cities such as OUTSMART, IoT-I, and SocIoTal.

Antonio J. Jara is Prof. PostDoc at University of Applied Sciences Western Switzerland (HES-SO) from Switzerland, vice-chair of the IEEE Communications Society Internet of Things Technical Committee, and founder of the Wearable Computing and Personal Area Networks company HOP Ubiquitous S.L. He did his Ph.D (Cum Laude) at the Intelligent Systems and Telematics Research Group of the University of Murcia (UMU) from Spain. He received two M.S. (Hons. - valedictorian) degrees. Since 2007, he has been working on several projects related to IPv6, WSNs. and RFID applications in building automation and healthcare. He is especially focused on the design and development of new protocols for security and mobility for Future Internet of things, which was the topic of his Ph.D. Nowadays, he continues working on IPv6 technologies for the Internet of Things in projects such as IoT6, and also Big Data and Knowledge Engineering for Smart Cities and eHealth. He has also carried out a Masters in Business Administration (MBA). He has published over 100 international papers and holds one patent. Additionally, he participates in several Projects about the IPv6, Internet of Things, Smart Cities, and mobile healthcare.

Andreas Kind received his PhD in Computer Science from the University of Bath, UK in 1998 and worked in the Research Laboratories of NEC Europe before joining IBM Research in 2000. Dr Kind worked in several research management positions in Switzerland and China. His current focus is on management and security of the Internet-of-Things. He is a member of the IBM Academy of Technology, holds over 20 patents and published more than 40 research publications.

Dr. Srdjan Krco is CEO of DunavNET ltd. In addition to managing general direction of the company he also drives its strategic research agenda. The main focus of research activities is on Internet of Things and applications of IoT in

various domains, of which the smart cities is the most important. Previously, Srdjan was with Ericsson (starting in 2000) where he held a number of positions (senior research engineer, system manager, project manager). He also worked in and managed various product development and research projects during his time there. Srdjan has participated in many of FP7 projects (SocIoTal, IoT Lab, SENSEI, SmartSantander, IOT-i, Exalted, etc.) and is active in the Future Internet Assembly and IoT Forum. In 2007 he received the Innovation Engineer of the Year Award in Ireland from the Institute of Engineers of Ireland. Srdjan is one of the co-founders of the IoT Forum.

Prof. Dr. Pedro José Marrón received his bachelor and master's degree in computer engineering from the University of Michigan in Ann Arbor in 1996 and 1998. At the end of 1999, he moved to the University of Freiburg in Germany to work on his Ph.D., which he received with honors in 2001. From 2003 until 2007, he worked at the University of Stuttgart as a senior researcher, leading the mobile data management and sensor network group. In 2007, he left Stuttgart to become a Professor of Computer Science at the University of Bonn, where he led the sensor networks and pervasive computing group. In 2009 he left Bonn to become a full Professor at the University of Duisburg-Essen. He is currently head of the "Networked Embedded Systems Group" (NES). Additionally, Pedro Marrón is also the initiator and president of UBICITEC, the European Center for Ubiquitous Technologies and Smart Cities, which counts over 20 institutional partners from industry and academia forming a virtual European Center with clear research and dissemination objectives. The goal of UBICITEC is to coordinate the research efforts on enabling technologies for Smart Cities, e.g. Internet of Things and to encourage the transfer of technology to industry.

Florian Michahelles is the head of research group of Web of Things at Siemens Corporation in Berkeley. Together with his team he investigates to smoothen data exchange between the devices to eventually make machines smarter and collaborative. Prior his engagement with Siemens, Florian has been working on connecting products to the internet. In Switzerland, he has developed a universally accepted standard on uniquely identifying connected devices. Following his stint as Director of the Auto-ID lab and lecturer at ETH Zurich, he came to Siemens Corporate Technology to ramp up his own team and is now looking to develop applications for semantic technologies. Florian has published 100+ academic papers in international conferences and journals and is actively supporting the research community by voluntary roles as program chair, research proposal evaluator and guest lecturer.

Jin Mitsugi is an Associate Professor in Faculty of Environment and Information Studies, Keio University Japan and also an Associate Director of Auto-ID Laboratory Japan. He received BS from Nagoya University and MS and Ph.D from University of Tokyo all from Aerospace Engineering Department. After his graduation from University of Tokyo in 1987, he joined Nippon Telegraph and Telephone Corporation as a research engineer in Radio Communications Laboratory to pursue research and development of advanced satellite communications. He joined the development of various communications and experimental satellite such as ETS-VI, N-Star, Muses-B, ETS-VIII and N-Star C particularly working in on-board antenna system. He joined Keio University in 2004 and started research on network RFID. He has been participated in international standard body (GS1 EPCglobal and ISO) and Japan radio regulations developments in Ministry of Internal Affairs and Communications for 900MHz band passive and active RFID. He has been serving various international conferences and journals related RFID and Internet of Things as technical chair (IEEE RFID 2012, 2013, 2014, International conference on Internet of things 2010, 2014) and an editor (IEEE Journal on Internet of Things, IEEE Virtual Journal on RFID). His research interests are wireless technology applications and operations research.

Jun Murai is a Dean and Professor, and member of the Faculty of Environment and Information Studies at Keio University. Jun received his Ph.D. in Computer Science, Keio University in 1987. Specialized in Computer Science, Computer Network and Computer Communication. He developed the Japan University UNIX Network (JUNET) in 1984, established WIDE Project in 1988, currently the Founder, research and development of computer networks. Jun is a member of the Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters), chairs and serves on many other governmental committees, and is active in numerous international scientific associations. He is known as the "Internet samurai" and, in Japan has also been called "the father of the Internet in Japan".

Prof. Dr. Alexander Pflaum studied electrical engineering at the University of Erlangen-Nuremberg FAU and wrote his doctoral thesis on RFID and Supply Chain Management« at the Faculty for Business Administration at FAU in 2001.

He is working for the Fraunhofer Gesellschaft since 1995. Driving RFID and Smart Object issues in 2008 he became director of the Fraunhofer Center for Intelligent Objects. In his scientific career he is director of the Chair for Business Administration especially Supply Chain Management at the Otto-Friedrich-University in Bamberg.

Dr. Neeli Prasad is Director of the Center for TeleInfrastructure USA (CTIF-USA), Princeton, New Jersey, USA and Associate Professor and Head of Research, CTIF head office, Aalborg University, Denmark. She is also Coordinator of Themantic area Network without Borders, Center for TeleInfrastruktur (CTIF) and leading IoT Testbed at Easy Life Lab (M2M and eHealth) and Secure Cognitive radio network testbed at S-Cogito Lab (Network Management, Security, Planning, etc.). She has over 16 years of management and research experience both in industry and academia. She is now leading a global team of 20+ researchers across multiple technical areas and projects in Japan, India, throughout Europe and USA. She has a Master of Science degree from Delft University, Netherlands and a PhD degree in electrical and electronic engineering from University of Rome Tor Vergata, Italy. She has been involved in projects totaling more than $120 million – many of which she has been the principal investigator. She was also an advisor to the European Commission and expert member of governmental working groups and cross-continental forums. She has more than 250 publications and published two of the first books on WLAN. She is an IEEE senior member and an IEEE Communications Society Distinguished Lecturer.

Till Riedel is research director at the TecO since 2010.He received a diploma degree from the University of Karlsruhe in 2005 and his PhD from the KIT in 2012. Since 2005 he has been actively contributing to a number of national and international research projects that work on augmenting real world processes with IoT technology (eg. CoBIs, RELATE, Aletheia). Currently he his particurly coordinating TECO's research efforts in terms of context sensing for business process preservation (TIMBUS) and the collection of novel IoT components for the Global Personal Inclusive Infrastructure (Prosperity4All). His research interests especially cover novel software architectures for integrating ubiquitous computing systems into enterprise application and technologies for bridging the gap between the real and the virtual world. He is active in the research community as member of different conference and workshop committees and is co-author of over 50 peer?reviewed publications in the area of ubiquitous computing, internet of things and wireless sensor networks.

Dr. Sanjay Sarma is the Fred Fort Flowers (1941) and Daniel Fort Flowers (1941) Professor of Mechanical Engineering at MIT. He is the first Director of Digital Learning at MIT. He co-founded the Auto-ID Center at MIT and developed many of the key technologies behind the EPC suite of RFID standards now used worldwide. He was also the the founder and CTO of OATSystems, which was acquired by Checkpoint Systems (NYSE: CKP) in 2008. He serves on the boards of GS1, EPCglobal and several startup companies including Senaya and ESSESS. Dr. Sarma received his Bachelors from the Indian Institute of Technology, his Masters from Carnegie Mellon University and his PhD from the University of California at Berkeley. Sarma also worked at Schlumberger Oilfield Services in Aberdeen, UK, and at the Lawrence Berkeley Laboratories in Berkeley, California. He has authored over 75 academic papers in computational geometry, sensing, RFID, automation and CAD, and is the recipient of numerous awards for teaching and research including the MacVicar Fellowship, the Business Week eBiz Award and Informationweek's Innovators and Influencers Award. He advises several national governments and global companies.

Dr. Jochen Schlick did his PhD in the field of production automation. After working for the Robert Bosch GmbH, he initiated and lead several national and international research projects at the German Research Centre for Artificial Intelligence, DFKI GmbH. Currently, Dr. Jochen Schlick is the head of the R&D field of Cyber Physical Systems at the WITTENSTEIN AG. Main tasks of his team include running pilot projects demonstrating the benefits of "Industrie 4.0" on the shop floor level, as well as the discovery of application fields for intelligent and networked mechatronic drive systems.

Dr. Martin Serrano is Unit Director, Coordinator and Project Leader at the Insight Centre for Data Analytics Galway (Former DERI) at the National University of Ireland Galway. He holds an MSc and a Ph.D from the Technical University of Catalonia (UPC Tech), Spain. Prior to DERI he worked at the Telecommunications Software and Systems Group (TSSG) of the Waterford Institute of Technology in Waterford, Ireland (WIT). Dr. Serrano and his team have contributed to the development of the state of the art Semantic Web and Liked Data, (Data Management and Stream Data Processing) Pervasive Computing (Modelling and Context Awareness), Knowledge Engineering (Semantic

Reasoning and Ontologies) and Autonomic Computing areas (Networks and Services). He is also investigating Cyber-Physical Systems Control, Sensor Networks and the Internet of Things (IoT) and their deployment in Cloud Environments. Dr. Serrano has a leading role at the European Research Cluster for the Internet of Things (EU-IERC) in Service Openness and Semantic Interoperability (AC4). Dr. Serrano has more than 10 years of experience in ICT architecture, solutions design and systems deployment. He is Author of the book Applied Ontology Engineering in Cloud Services, Networks and Management Systems edited by Springer Publishers.

Dr. Peter Stephan studied mechanical engineering at the University of Kaiserslautern, Germany. After that, he did his PhD at the German Research Centre for Artificial Intelligence, DFKI GmbH within the field of "Contextadaptive Automation". Currently he works for the WITTENSTEIN AG in the role of a project leader within the R&D field of Cyber Physical Systems. His responsibilities comprise the transfer of "Industrie 4.0" technology paradigms into beneficial applications within the "Urban Production" plant of the WITTENSTEIN Bastian GmbH at Fellbach, Germany.

Lin Zhang received all his degrees from Tsinghua University in Beijing (B.Sc. '98, M.Sc. '01, Ph.D. '06) and is currently an associate professor at Tsinghua University. He was a visiting professor at Stanford University and UC Berkeley between 2011 and 2014. His current research focuses on wireless sensor networks, distributed data processing, and information theory. He is a co-author of more than 60 peer-reviewed technical papers and five U.S. or Chinese patents applications. Lin and his team were also the winner of IEEE/ACM SenSys 2010 and IEEE/ACM IPSN 2014 Best Demo Awards. In 2006 Lin led a 2008 Beijing Olympic Stadium (the "Bird's Nest") structural security surveillance project, which deployed more than 400 wireless temperature and tension sensors across the stadium's steel support structure and dome. The system adopted a flexible spectrum sensing and adaptive multi-hop routing algorithm to overcome strong radio interference and long-distance transmission channel-fading, and played a critical role in the construction of the stadium. Since then he has implemented wireless sensor networks in a wide range of application scenarios, including underground mine security, precision agriculture, and industrial monitoring. Since 2008 Lin has been working in close association with CISCO to develop a Metropolitan Area Sensing and Operating Network (MASON). MASON provides a smart-city and intelligent-urbanization sensor network system for metropolitan areas. MASON has attracted the interest of several large-sized Chinese cities, including Beijing, Shenzhen, Tianjing, and Chengdu. Recently he also has led two National Science Foundation of China projects, three National High-Tech Developing (863) projects, and more than 10 research projects funded primarily by private industry in the area of wireless sensor networks.

Detlef Zühlke (*1949, Bad Prymont, Germany) started his career after finishing his Electrical Computer Engineering studies at RWTH Aachen in 1983. He received his PhD at the Machine Tools Laboratory with the topic robot programming. In 1985 he joined the Lufthansa AG where he held different positions, including head of aircraft maintenance. In 1991 he received the call form Technical University in Kaiserslautern and is since then holder of the chair of production automation (pak). In 2009, he became scientific director of the research area of Innovative Factory Systems (DFKI-IFS) at the German Research Centre for Artificial Intelligence (DFKI) GmbH. He furthermore founded a field of investigation, the so called technology initiative SmartFactory KL e.V. with well-known partners from industry and science. It represents the first manufacturer-independent demonstration and research platform, which tests and develops innovative information and communication technologies for the application in an industrial production environment, matching the vision of Industry 4.0. For his innovative and ground-breaking research, teaching and solutions Prof. Zühlke received various awards, like the Borchers Medal of RWTH Aachen in 1983, the Medal of Honour form the Association of German Engineers (VDI) in 2005 and the IFAC Outstanding Service Awards in 2011. In 2013, he was furthermore honoured with the honorary doctor from the Hermann-Oberth-Faculty from the Lucian Blaga Universidad in Hermannstadt/ Romania, for having committed his whole life to scientific work and teaching.

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The Siemens Web of Things Research Group aims to enable data exchange between connected devices to make machines smarter and more collaborative. As embedded devices become more intelligent, efficiency and performance in facilities such as hospitals, factories and the energy grid can be improved. Access to information from and about these devices can also enhance the daily operations for those who work in those facilities.

For Siemens business units, the Web of Things Research Group offers its services as a provider of semantic technologies which formalize data/information models that enable device-to-device communications. Semantic technologies are particularly useful for aggregating information into a common viewpoint.

The wearables in health care demonstration seeks to demonstrate the real-world value of linking information about disease, symptom and anatomical models with wearable devices and physical property models and repositories. Integrating these models can assist health care professionals in recommending devices to patients.

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