IEEE INDIN 2014 - Industry Forum

Organized by

Michael Condry – Intel, USA

Alécio Binotto – IBM Research, Brazil

Preliminary Program

	July 29
09:00-10:00	Keynote Prof. Toshio Fukuda, Nagoya University – Multi-scale Robotics
11:30	1 – Intel
12:00	2 – IBM Research
12:30	3 – Samsung Research
13:00-14:00	Lunch break
14:00-15:00	Keynote Prof. Anuradha Annaswamy, MIT – Smart Grid
15:00	4 – CEITEC
15:30	5 – Philips Research
16:00	6 – GE Research
16:30	7 – dSpace
17:00-17:30	Coffee-break
17:30	8 – National Instruments
18:00	9 – SAP Labs
18:30	10 – HT Micron
19:00	11 – Beckhoff
19:30	Transfer to conference dinner
19:30-22:00	Conference banquet (included in the conference registration fee – separate tickets are also available at secretariat desk)

Keynotes

Prof. Toshio Fukuda, Nagoya University

Title: Mutli-scale Robotics

This talk is an overview of the Multi-scale robotics, based on the Cellular Robotics System, which is the basic concept of the emergency of intelligence in the multi-scale way from Cell Level to the Organizational Level, proposed 30 years ago. It consists how the system can be structured from the individual to the group/society levels in analogy with the biological system. It covers with the wide range of challenging topics:

1. Individual robot level, Brachiation Robots and Multi-locomotion robots, Medical robotics and simulator;
2. Cooperation and competition of the multiple robotics system;
3. Distributed autonomous robotic system;
4. Micro and nano robotics system;
5. Bio analysis and synthesis: bio-robotics system.

Bio: Dr. Toshio Fukuda graduated from Waseda University, Tokyo, Japan in 1971 and received the Master of Engineering degree and the Doctor of Engineering degree both from the University of Tokyo, in 1973 and 1977, respectively. He joined the National Mechanical Engineering Laboratory in Japan in 1977, the Science University of Tokyo in 1981, and then joined Department of Mechanical Engineering, Nagoya University, Japan in 1989.

He is currently one thousand talented foreign Professor at BIT. He is Professor Emeritus of Nagoya University, having worked as Professor of Dept. of Micro and Nano System Engineering and Dept. of Mechano-Informatics and Systems, Nagoya University, Japan and as director of Center for Micro and Nano Mechatronics. He has been working as Professor of Shenyang University of Technology, Institute of Automation, Chinese Academy of Science, Russell Springer Chaired Professor at UC Berkeley, Seoul National University, Advisory Professor of Industrial Technological Research Institute and etc. He is mainly engaging in the research fields of intelligent robotic system, micro and nano robotics, bio-robotic system, and technical diagnosis and error recovery system.

He was the President of IEEE Robotics and Automation Society (1998-1999), Director of the IEEE Division X, Systems and Control (2001-2002), the Founding President of IEEE Nanotechnology Council (2002-2005), and Region 10 Director (2013-2014). He was Editor-in-Chief of IEEE/ASME Trans. Mechatronics (2000-2002). He was the Founding General Chairman of IEEE International Conference on Intelligent Robots and Systems (IROS) held in Tokyo (1988). He was Founding Chair of the IEEE Workshop on Advanced Robotics Technology and Social Impacts (ARSO, 2005), Founding Chair of the IEEE Workshop on System Integration Internatioal (SII, 2008), Founding Chair of the International Symposium on Micro-Nano Mechatronics and Human Science (MHS, 1990-2012). He has received many awards such as IEEE Eugene Mittelmann Achievement Award (1997), IEEE Third Millennium Medal (2000) , IEEE Robotics and Automation Pioneer Award (2004), IEEE Transaction Automation Science and Engineering Googol Best New Application Paper Award (2007), George Saridis Leadership Award in Robotics and Automation (2009), IEEE Robotics and

Automation Technical Field Award (2010). He received the IROS Harashima Award for Innovative Technologies (2011) and Friendship Award of Liaoning Province PR China (2012). IEEE Fellow (1995). SICE Fellow (1995). JSME Fellow (2002), RSJ Fellow (2004), VRSJ Fellow (2011) and member of Science Council of Japan (2008-), and Academy of Engineering of Japan (2013-).

Prof. Anuradha Annaswamy, MIT

Title: Smart Grid – A Quintessential Illustration of an Energy Cyberphysical System

The 21st century is witnessing a prodigious change in energy landscape with the arrival of renewable sources such as wind and solar, global concerns of sustainability and greenhouse gas emissions, and dwindling resources of fossil fuels. The obvious advantages of reduced operational costs and emissions, obtainable with renewables such as off-shore wind-farms and solar-panels on individual buildings, are accompanied with the challenges of intermittency and distributed availability. Smart Grid is a transformative global imperative that can meet these challenges via using a cyber-physical infrastructure that plans, controls, and delivers power to meet demand over an entire region.

This talk will present the key features of the cyberphysical infrastructure that can engender such a transformation. These features include (a) Transactive Control, an architecture that enables efficient participation of various heterogeneous stakeholders in the process including the renewable energy producers, demand response constituents, and aggregators while ensuring reliable power delivery, (b) Demand Response, an emerging paradigm where consumers dial-in their demand in response to strategically placed incentives, (c) Heterogeneous Storage mechanisms with varying authority, constraints, and ramp-rates , and (d) Cyber-physical Resilience, the ability to provide optimal recovery in the presence of natural and cyber anomalies. In this talk, various scenarios that exemplify the CPS infrastructure, the associated research challenges, and recent illustrations will be presented.

Bio: **Dr. Anuradha Annaswamy** received the Ph.D. degree in Electrical Engineering from Yale University in 1985. She has been a member of the faculty at Yale, Boston University, and MIT where currently she is the director of the Active-Adaptive Control Laboratory and a Senior Research Scientist in the Department of Mechanical Engineering. Her research interests pertain to adaptive control theory and applications to aerospace and automotive control, active control of noise in thermo-fluid systems, control of autonomous systems, decision and control in smart grids, co-design of control and distributed embedded systems, and CPS-design of transportation systems. She is the author of a graduate textbook, over a hundred journal publications, and numerous conference publications. She is the co-editor of the IEEE CSS report on Impact of Control Technology: Overview, Success Stories, and Research Challenges, 2011, and the coeditor of the IEEE publication "IEEE Vision for Smart Grid Control: 2030 and Beyond," 2013.

Dr. Annaswamy has received several awards including the George Axelby and Control Systems Magazine best paper awards from the IEEE Control Systems Society, the Presidential Young Investigator award from the National Science Foundation, the Hans Fisher Senior Fellowship from the Institute for Advanced Study at the Technische Universität München in 2008, and the Donald Groen Julius Prize for 2008 from the Institute of Mechanical Engineers. Dr. Annaswamy is a Fellow of the IEEE and a member of AIAA. She is currently serving as the Vice President for Conference Activities in the Executive Committee of the IEEE Control Systems Society.

Industry Talks and Short Bio

1- Intel

Title: Intel Engagements on Informatics impact Oil, Gas and other Industries in Brazil

Intel is strongly engaged in developing technologies that are the basis for informatics infrastructures from servers to IoT devices. This presentation reviews the broad technologies that Intel is developing to meet these needs and discusses the challenges we are facing in Brazil in transportation and Oil & Gas as "computing everywhere" becomes the standard.

Speaker: Max Leite is currently Director of Innovation in Brazil and has worked for sixteen years at Intel. He is responsible for technology innovation in areas such as oil and gas, education, and transport, including sensors and new business in which Intel could expand its sales in emerging markets. His career includes positions at Intel as Global Director of Platforms Group for Emerging Markets, Engineering Manager at Intel Labs, and Director of Marketing Programs for Channel. In Latin America, his career includes positions such as Technology Programs Director, Products Director, and Director of Business Development. Leite has an MBA from the University of Texas and holds a degree in Industrial Engineering from the University of Oklahoma and the Federal University of Rio de Janeiro. Leite was a speaker at many major events worldwide such as the TED Singularity University/FIAP, United Nations World Summit on Information Society (WSIS), FCC's Wireless Communication Association (WCA), Intel Developer Forums, United Nations International Telecom Union (ITU), United Nations World Wireless Initiative, Voice on the Net (VON), Supercomm, Institute of Americas, Business Week Forum Latin America, Ibero American Convention on Digital Societies, Telexpo, Comnet, ADIAT Mexico, Brazilian Pay TV Association (ABTA), AbineeTec, among others.

2- IBM Research

Title: The New Era of Industry Computing: Cognitive, Cloud, Big Data, IoT

This presentation will focus on the requirements of an HPC infrastructure, the tools to support such an environment and how researchers and industry customers can generate value from simulation and data analysis based on the new era of computing developed by IBM called Cognitive Computing. Those tools can also reduce costs while supporting Big Data and HPC Cloud environments on several industries, like Oil & Gas, Mining, Energy, Healthcare, etc. It will also be presented the activities being developed by the Brazilian IBM Research Lab and how they are making a difference in the marketplace.

Speaker: Dr. Alécio Binotto is a researcher of the Natural Resources Solutions Engineering and Industry Cloud groups since 2013. Holds bachelor's degree (2000), master's (2003), and Ph.D. in Computer Science (2011) from UFRGS - Federal University of Rio Grande do Sul, Brazil, in collaboration with Technische Universitat Darmstadt, Germany. Between 2007 and 2010, worked at Fraunhofer IGD (Germany) developing solvers for PDEs focused on CPU and GPU, as well as scheduling heuristics to assign tasks over these PUs. Has also experience with scientific visualization of large data and project management. Before joining IBM Research, started a post-doc at UFRGS (2011) that further led to a guest position at LBNL

(Lawrence Berkeley National Laboratory) till 2013, in Berkeley, USA. Besides, has participated in several international telemedicine research projects since 2003. In 2011, Alécio was awarded the **2011 IEEE Humanitarian Supreme Prize** winning the annual IEEE Presidents' Change the World Competition with a solution and pilot for tele-ultrasound. This solution is incorporated in the iCare Platform, the most complete web-based tele- diagnosis and monitoring platform available in Brazil. He co-founded 2 startups in this area and also provided talks to IEEE students on how a research project can make impact in changing the world.

3- Samsung Research

Title: Building a Lab to Launch People

SAMSUNG Research Institute Brazil is part of SAMSUNG's global R&D network. Our research pushes the boundaries of science and technology to create new experiences that redefine how people perceive technology. In Brazil, our research revolves around the following technologies:
- **Intelligent Systems**, involving agent-based computing, adaptive systems, knowledge extraction, social analytics, and others.
- **Perceivable security**, involving data encryption and protection, secure services, anti-hacking techniques, and others.
- **Perceptible Computing**, involving new techniques for video and image, computer vision, machine learning, image processing, augmented reality, signal processing, and others.

One of our research lines is around Smarter Education. We are seeking new technologies to improve learning performance ensuring the best education experience for all. We aim at enhancing teaching capabilities and students' experience, as well as providing new tools for planning and recommendation. It involves the instrumentation of the education ecosystem to collect multidimensional sensor data and new models to classify and understand this information, sustaining continuous adaptation of the learning environment. During this talk, we will be presenting some of our current research and development trends around technology, intelligent systems, education, and more.

Speaker: Dr. Fernando Koch is a Director R&D at Samsung Research Institute Brazil. He was a Research Scientist at IBM Research Brazil (2011-2013) where he received the IBM Eminence and Excellence Award (2012) and the IBM Outstanding Contributor Award (2013) for leadership in research. He has over 20 years of IT Industry experience with practice in R&D, product development, and business development with companies in the Silicon Valley, Europe, Brazil, and Australia. He received the Ph.D in Computer Sciences (2009) from Utrecht University in collaboration with The University of Melbourne. He participated in the PostDoc (2010) in Computer Sciences at Utrecht University. He also holds M.Sc. (1997) and B.Sc. (1993) degrees in Computer Sciences by the Federal University of Santa Catarina, Brazil. He has over 50 papers published and more than 20 patents. He is also IEEE Senior Member and ACM Distinguished Speaker. His research interests include Artificial Intelligence, Mobile Computing, Computational Social Sciences, Social Analytics, and Cognitive Computing.

4 - CEITEC

Title: Semiconductor Solutions for the Development of The IoT in Brazil

Understand how the Internet of Things (IoT) is changing the people's life and becoming the new driver of semiconductor industry. Know the business opportunities that are being created from IoT and how CEITEC S.A. – a state-owned company controlled by Brazilian government – is preparing itself to be recognized as a global semiconductor player for the IoT industry.

Speaker: Dr. Marcelo Lubaszewski – Chief Design and Institutional Relations Officer and Interim Chief Executive Officer – CEITEC S.A. Marcelo Lubaszewski has a Ph.D. in microelectronics from the Polytechnical Institute of Grenoble, France. He is a professor of UFRGS, the Federal University of Rio Grande do Sul. Lubaszewski is a former coordinator of the Special Committee of Design of Integrated Circuits of the Brazilian Computer Society, Advisor of the Brazilian Society of Microelectronics and former coordinator of the Microelectronics Advisory Committee of CNPQ. Currently, he is a member of the management board of the IC-Brazil Program and of the board of the Brazilian Forum on Internet of Things. Since 2011, first as Superintendent of the Design Division and more recently as its Director, he heads the team that develops the CEITEC's integrated circuits. Since July 2013, he is also the interim chief executive officer of the company.

5- Philips Research

Title: Philips helps healthcare providers deliver high-quality healthcare

There is growing demand for high-quality, yet affordable healthcare to people all around the globe, be it in urban, densely populated countries like China and India to growing markets in Latin America or the Middle East.

Within Philips, a number of healthcare businesses and research groups strive to support healthcare providers in their transition from traditional to modern, newer models of people-centric healthcare. To achieve this goal Philips Research works closely with Philips Healthcare. The corporate research organization is positioned at the forefront of the innovation process and has over 1,500 research scientists and engineers working across different continents. Today it is one of the world's premier research labs, delivering engineering innovations that enhance health and well-being in both developed and emerging markets.

Philips Research has recently established an innovation presence in São Paulo, Brazil, called Philips Research Brazil, to work on spotting trends and ideation, to proof-of-concept and first-of-a-kind product development tailored to our local and global customers' needs.

Speaker: Dr. Carsten Oliver Schirra, Senior Manager at Philips Research Brazil who is leading the innovation center in São Paulo, will take you through Philips Healthcare's business strategies and its Research activities, and illustrate the growing importance of connected data in the healthcare eco-system: how it can enable better collaboration and optimize healthcare workflows, and how giving people control of their personal health - such as self-measurement and monitoring - can increase access to quality healthcare and motivate patients to play a role in creating better outcomes.

6- GE Research

Title: Industrial Internet: Pushing the Boundaries of Minds and Machines

The world is on the threshold of a new era of innovation and change with the rise of the Industrial Internet. It is taking place through the convergence of the global industrial system with the power of advanced computing, analytics, low-cost sensing and new levels of connectivity permitted by the Internet. The deeper meshing of the digital world with the world of machines holds the potential to bring about profound transformation to global industry, and in turn to many aspects of daily life, including the way many of us do our jobs. These innovations promise to bring greater speed and efficiency to industries as diverse as aviation, rail transportation, power generation, oil and gas development, and health care delivery. It holds the promise of stronger economic growth, better and more jobs and rising living standards, whether in the US or in China, in a megacity in Brazil or in a rural area in Kazakhstan.

Speaker: Paulo Gallotti graduated from Pontifical Catholic University of Rio de Janeiro in 2007 and received the Master in Computer Science in 2011. After spending many years in the software development industry, he joined GE Global Research in 2012, where currently he is Program Leader for Analytics and Visualization in the Systems Integration Center of Excellence. His current research interests are in the fields of pervasive computing, internet-of-things (IoT) and data analytics.

7- dSpace

Title: Consistent Reuse of Environment Models for Seamless and Efficient ECU Development

Model-based development and testing is used throughout the development process for modern electronic control units (ECUs). The need to reuse models and use best-in-class modeling tools makes it necessary to interconnect models from different modeling tools provided by different tool vendors. The Functional Mock-up Interface (FMI) was developed as an open standard to enable and simplify the exchange and integration of environment models from different tool vendors. This talk outlines standardization initiatives and the use of FMI-based environment models for developing and validating controller functionalities seamlessly and efficiently throughout different stages of the development process

Speaker: **Stefan Walter** holds a diploma degree in electrical engineering from the Muenster University of Applied Sciences/Germany and he completed his master's degree in embedded systems engineering at the University of Hagen/Germany. He has in-depth knowledge in software engineering and requirements engineering for safety-related embedded software.

Since 2005 he is employed at dSPACE GmbH, Germany. During the first years he worked on several development and research projects regarding embedded real-time services for hardware-in-the-loop systems and rapid control prototyping systems. In his current position as a Sales Engineer at dSPACE GmbH he is responsible for sales and consultancy in various regions, including South America, the Middle East and South-East Asia. During the past 7 years he has collected comprehensive experience with dSPACE tools for model-based development and testing.

8 – National Instruments

Title: An Advanced Software Designed Intelligent Electronic Device Platform

Technology progress combined with aging infrastructure and a use case model that evolved and changed completely over the years is a common external force affecting energy companies worldwide. As a result, the idea of a "smart grid" has taken center stage – an evolution of advanced technologies that make the availability of a smarter, more efficient electrical power grid possible. Whether this is providing an abundant supply of electricity, deploying distributed intelligence at the measurement nodes or improving overall reliability, monitoring, and safety, energy companies are realizing the importance of technology to address the complex challenges facing grid systems today. As a result, a new generation of instruments, also known as Software Designed Intelligent Electronic Devices (SD-IEDs) are rapidly being deployed throughout the power system. Utilizing computer-based remote control and automation, these devices can be efficiently controlled and adjusted at the node level as changes and disturbances on the grid occur. In another example, utilities could use a generic SD-IED platform, and define the instrument functionality and algorithms executed completely in software using graphical design tools. At the heart of these advanced SD-IEDs lies the powerful technology of the FPGA, yielding additional flexibility and reliability that allows convergence of multiple functional devices into a single unit, which in turn lowers the cost of smart grid systems as a whole. Because FPGAs can be reprogrammed in the field, as requirements and standards for the smart grid mature, functional enhancements can be deployed to SD-IEDs without the need to modify the hardware layout or replace the entire device. SD-IEDs represents a fundamental shift from traditional hardware-centric instrumentation systems to software-centric systems that explore computing power, productivity, and connectivity capabilities of popular desktop computers. This paper describes how to apply the virtual instrumentation approach to create advanced SD-IEDs and illustrates it with two deployment examples: (1) smart switches for a leading energy delivery utility in the USA, and (2) advanced PMU research for distribution grids.

Speaker: André Oliveira received your graduated in Control Engineering and Industrial Automation in Federal University of Santa Catarina (UFSC) and a Master's degree in Scientific and Industrial Metrology. He began his career in 2001 as an Application Engineer at National Instruments headquarters in Texas, where you can work for 2 years supporting and helping customers apply technology from National Instruments in various fields, from industrial applications to automated testing. He devoted himself for five years following the specific area of development of automated testing manufacturing exercising expertise in hardware and software development of global testing solutions to NI's own factories, experiencing the application of technology and its positive impact on various areas of the business such that R & D, manufacturing and repair. In 2008 he returned to Brazil and since then acts as Sales Engineer (Consultant and Solutions Architect).

9- SAP Labs

Title: Big Data and the Sports Industry

The pace of change in business is accelerating at a rate the world has never seen before. Advances in mobile, cloud and Big Data technologies require companies to analyze data, make decisions and innovate faster. SAP's answer to that is a platform called SAP HANA.

This lecture covers many topics around this SAP platform for Big Data, discussing its high speed data access, scalability, efficiency, costs, and the innovation process to generate new solutions using the platform. In order to establish a connection with the real needs of enterprises, Daniel will speak about the sports industry, specifically discussing the reality of soccer today, where there's a big demand for players' performance, relationship and interaction with teams supporters, and management of modern arenas.

Speaker: Daniel Duarte Head of Innovation and Customer Experience - SAP Labs Latin America. He has over 15 years of experience with multiple SAP solutions, has worked in major global companies, such as Mars Inc, United Technology and Gerdau, and has lived in more than 7 countries. Daniel is graduated in Business Management and specialized in System Analysis, Project Management and Design Thinking. Also worked as a MBA professor in Strategy, Leadership and Innovation at ESPM.

10- HT Micron

Title: Difficulties and the necessary level of semiconductors to support the progress of new product innovations like tablets and smartphones

The talk will explore the semiconductor development in Brazil by HT Micron.

Speaker: Leandro Profes is Manager to Strategic Marketing at HT Micron. He worked as an international manager of Altus and as coordinator of products. His an Electronic engineer at UFRGS, with MBA in management of technology-based companies in Unisinos and Marketing at UFRGS.

11- Beckhoff

Title: PC Based Control: highly efficient control technology – current applications and future trends

Beckhoff implements open automation systems based on PC Control technology plus a high speed control network. How it is implemented and what will come next will be covered in this presentation.

Speaker: Marcos Giorjiani is graduated in Electronics Engineering with MBA in Marketing. More than 25 years of experience in R&D, application and sales of Automation Products. He is currently the Managing Director of the Brazilian subsidiary of the German company Beckhoff Automation GmbH.