



Joint Institutions Wellington Engineering Festival Part 2

Wireless Sensor Nodes, Smart Homes and Intelligent Buildings: From
sensors to computing

Presented by

Prof. Dr. Subhas Chandra Mukhopadhyay

and

Prof. Dr. Hans W. Guesgen

When: Tuesday, 3 November 2015 at 12 noon for light refreshments

Where: Travelodge Hotel Wellington, 2-6 Gilmer Terrace, Wellington, 6011 (Half way up Plimmer Steps)

Cost: Free to members of any of the three hosting institutions

RSVP: Essential to murray.milner@xtra.co.nz (numbers are limited so first in first served for registrations)

All members of the IEEE Central Section, IET Wellington Network and IPENZ Wellington Branch are welcomed to this event, hosted by all three institutions during lunchtime on Tuesday 3 November 2015 in Central Wellington. This is the second of a series of seminars being sponsored by the three Professional Engineering Institutions in Wellington to focus on the evolution of building design to achieve minimal environmental impact through the use of leading edge technology solutions. This seminar will focus on the use of smart sensors and computational capability to create intelligent buildings which manage their own

environment. The guest speakers for this event are Professors' Mukhopadhyay and Guesgen from Massey University who have been undertaking research in this field over several years and will provide us with their perspectives on the technologies being used and the vision for intelligent buildings in the future.

Abstract

In recent time wireless sensors and sensor networks have been widely used in many applications such as monitoring environmental parameters, monitoring and control of industrial situations, intelligent transportation, and structural health monitoring, health care and so on. The advancement of electronics, embedded controller, smart wireless sensors, intelligent computation, networking and communication have made it a possibility of the development of a low cost, low power smart wireless sensors nodes (WSN). WSN based smart home provides a safe, sound and secured living environment for the inhabitant by monitoring activities 24/7. The development of smart homes leads to intelligent buildings in a broader perspective. Though significant developments have taken place but there are still many challenges faced by the researchers to make it happen to society.

This talk will provide an overview of the research activities on Smart Home project of Massey University which lead to the backbone of Intelligent Building. The talks will cover sensors, wireless sensor networks, Internet Sensing, ambient intelligence, cloud computing including handling of Big Data based research and development activities.

An Introduction to Subhas Mukhopadhyay

Subhas holds a B.E.E. (gold medallist), M.E.E., **Ph.D.** (India) and **Doctor of Engineering** (Japan). He has over 25 years of teaching, industrial and research experience. Currently he is working as a Professor of Sensing Technology, Massey University, New Zealand. His fields of interest include Smart Sensors and sensing technology, instrumentation techniques, wireless sensors and network, numerical field calculation, electromagnetics etc. He has supervised over 30 postgraduate students and over 75 Honours students. He has examined over 40 postgraduate theses.

He has published over **300** papers in different international journals and conference proceedings, written four books and thirty book chapters and edited **Twelve** conference proceedings. He has also edited **twenty two** books with Springer-Verlag and **Twelve** journal special issues. He has organized over 20 international conferences as either General Chairs/co-chairs or Technical Programme Chair. He has delivered **246** presentations including keynote, invited, tutorial and special lectures.

He is a **Fellow** of IEEE (USA), a **Fellow** of IET (UK), a **Fellow** of IETE (India), a **Topical Editor** of IEEE Sensors journal, and an **associate editor** of IEEE Transactions on Instrumentation and Measurements. He was a **Distinguished Lecturer** of the IEEE Sensors Council from 2010 to 2013. He **chairs** the IEEE IMS Technical Committee 18 on Environmental Measurements.

More details can be available at <http://seat.massey.ac.nz/personal/s.c.mukhopadhyay/>

An Introduction to Hans Guesgen

Hans received most of his education in Germany. He holds a diploma in computer science and mathematics of the University of Bonn, a doctorate in computer science of the University of Kaiserslautern, and a higher doctorate (Habilitation) in computer science of the University of

Hamburg, Germany. During his studies, he developed an interest in artificial intelligence, which he has kept to various degrees over the years up to the present day.

He worked as a research scientist at the German National Research Center of Computer Science (GMD) at Sankt Augustin from 1983 to 1992, primarily in the area of artificial intelligence and expert systems. It was there that he developed new methods for constraint satisfaction, which is a technique for achieving and maintaining consistency in a system of mutually restricting variables. During this period he held a one-year post-doctoral fellowship at the International Computer Science Institute in Berkeley, California, where his research focus changed to spatial and temporal reasoning. His work in this area includes pioneering research in qualitative representations of space, including approaches for handling imprecise and uncertain spatial information.

In 1992 he joined the Computer Science Department of the University of Auckland, first as a lecturer and later as a senior lecturer and associate professor. For almost 15 years he led the AI research group at that department and was involved in projects on constraint satisfaction, spatio-temporal reasoning, fuzzy logic, heuristic search, computer games, health informatics and others. In 2007, he was appointed Chair of Computer Science in the Institute of Information Sciences and Technology (IIST) at Massey University, which was later merged into the School of Engineering and Advanced Technology. His research interests changed to include ambient intelligence, which involves the application of artificial intelligence to ubiquitous computing, such as smart environments. He aims at employing ambient intelligence to support people in their homes, with the ultimate goal of enabling elderly people and people with diminished mental capabilities (such as sufferers from Alzheimer's disease) to remain living independently in their own environments.

Over the years as a researcher, Hans has published more than 100 refereed papers in the areas that he has worked in. He is one of the nine inaugural senior members of the Association for the Advancement of Artificial Intelligence (AAAI) and has served on the editorial board of several international journals, including Applied Intelligence, Universal Computer Science, and the Journal of Ambient Intelligence and Smart Environments. He has been a member of the programme committees of more than 70 international conferences and workshops. He has regularly co-chaired workshops on spatial and temporal reasoning at the main international AI conferences, including IJCAI, ECAI, and AAAI, and chaired special tracks in that area at the International FLAIRS Conference. Over the years, he has served as a referee for the Australian Research Council, the US National Science Foundation, the NZ Foundation for Research Science & Technology, and more than 70 international journals and conferences.