

**Fifth International Conference on
Intelligent Sensors, Sensor Networks and Information Processing
ISSNIP 2009**

*December 7-10, 2009
Langham Hotel, Melbourne, Australia*

Program

7th December 2009 - Monday		
8:30 AM	Registration	
9:00 AM	ISSNIP Collaboration Day Opening + 4 talks (Ballroom C)	
10:30 AM	Coffee/Tea Break	
11:00 AM	ISSNIP Collaboration Day 3 talks (Ballroom C)	
12:30 PM	Lunch	
1:30 PM	ISSNIP Collaboration Day Demo + Posters (Yarra)	
3:00 PM	Coffee/Tea Break	
3:30 PM	Conference opening Dr. D. Nandagopal (DSTO) Executive Chair of the ARC Research Network on ISSNIP Opening Key Note Prof David Karoly (University of Melbourne) (Ballroom A and B)	
5:30 PM	Program Closes	
6:00 PM	Welcome Reception - Alto Room, Langham Hotel	

8th December 2009 – Tuesday			
8:00 AM	Registration		
8:30 AM	Key Note - 1 Prof Guanrong (Ron) Chen (City University of Hong Kong) (Ballroom A and B)		
9:30 AM	Coffee/Tea Break		
10:00 AM	Key Note - 2 Prof Anthony Burkitt (University of Melbourne) (Ballroom A and B)		
11:00 AM	Session 1A: Middleware for Sensor Systems - 1 (4 Papers) (Ballroom C)	Session 1B: Radio Frequency identification (RFID) Technology (4 Papers) (Yarra 1 & 2)	
12:20 PM	Lunch		
1:20 PM	Key Note - 3 Prof Mohan Kumar (University of Texas, Arlington, USA) (Ballroom A and B)		
2:20 PM	Session 2A: Theoretical and practical aspects of large-scale WSN - 1 (3 Papers) (Ballroom C)	Session 2B: Adaptive Sensing, Control and Optimization in Sensor Networks - 1 (3 Papers) (Yarra 1 & 2)	
3:20 PM	Coffee/Tea Break		
3:50 PM	Session 3A: Control theory and optimization for mobile adhoc networks (5 Papers) (Ballroom C)	Session 3B: Autonomous Systems (5 Papers) (Yarra 1 & 2)	
5:30 PM	Program Closes		

9th December 2009 - Wednesday			
8:00 AM	Registration		
8:10 AM	Session 4A: Information Driven Spatial Representation - 1 (4 Papers) (Ballroom C)	Session 4B: Adaptive Sensing, Control and Optimization in Sensor Networks - 2 (4 Papers) (Yarra 1 & 2)	
9:30 AM	Key Note - 4 Prof S. S. Iyengar (Louisiana State University, USA) (Ballroom A and B)		
10:30 AM	Coffee/Tea Break		
11:00 AM	Session 5A: Theoretical and practical aspects of large-scale WSN - 2 (4 Papers) (Ballroom C)	Session 5B: Information Processing and Sensor Technologies in Healthcare (4 Papers) (Yarra 1 & 2)	
12:20 PM	Lunch		
1:20 PM	Key Note - 5 Prof Paul Havinga (University of Twente, Netherlands) (Ballroom A and B)		
2:20 AM	Session 6A: Middleware for Sensor Systems - 2 (4 Papers) (Ballroom C)	Session 6B: Multimedia Processing in Sensor Networks (4 Papers) (Yarra 1 & 2)	
3:40 PM	Coffee/Tea Break		
3:40 PM	Conference Poster Session (Along with coffee and tea) Ballroom A and B		
5:30 PM	Program Closes		
7:00 PM	Conference Dinner Eureka89		

10th December 2009 - Thursday			
8:00 AM	Registration		
8:10 AM	Session 7A: Information Driven Spatial Representation - 2 (4 Papers) (Ballroom C)	Session 7B: Sensor Network Security (4 Papers) (Yarra 2)	
9:00 AM			CREON Workshop: Application of sensor networks to Coral Reef Systems - towards an International system of systems (Yarra 1)
9:30 AM	Key Note - 6 Prof John Langford (University of Melbourne) (Ballroom A and B)		
10:30 AM	Coffee/Tea Break		
11:00 AM	Session 8A: Theoretical and practical aspects of large-scale WSN - 3 (5 Papers) (Ballroom C)	Session 8B: Integration of the digital and physical world in the network of the future (5 Papers) (Yarra 2)	CREON Workshop (Yarra 1)
12:40 PM	Lunch		
1:40 PM	PhD/ECR Forum - Panel Session (Ballroom B)		CREON Workshop (Yarra 1) (including coffee/tea break)
2:50 PM	Session 9A: Theoretical and practical aspects of large-scale WSN - 4 (4 Papers) (Ballroom C)	Session 9B: PhD Forum - Poster presentation (20 posters) (Ballroom A)	
4:10 PM	Coffee/Tea Break		
4:40 PM	Program Closes		
5:30 PM			CREON close

7th December, 2009 – Monday

8.30 am: Registration

9.00am-10.30am

Session name: ISSNIP Collaboration Day (Opening & 4 Talks)

Speakers:

M. Palaniswami (University of Melbourne, Australia) – Opening & ISSNIP Research Network

Ron Johnstone (University of Queensland, Australia) – Smart Environmental Monitoring Analysis Technologies

Subhash Challa (NICTA/University of Melbourne) - University-Industry collaboration - SenSen Networks

Laurent Herault (CEA-LETI, France) – Development of a Future Internet – EU-Australian initiatives

Room: Ballroom C

10.30am- 11.00am: Coffee Break

11.00am-12.30pm

Session name: ISSNIP Collaboration Day (3 Talks)

Speakers:

Stuart Milner (University of Maryland, USA) – US-Australian sensor networks collaborations

Cal Anderson (RFIDAA, Australia) – Outstanding challenges for RFID development

Jorge Pereira (European Commission) – Aspects of Large Scale Sensor Networks and EU Engagement

Room: Ballroom C

12.30pm-1.30pm: Lunch

1.30pm-3.00pm

Session name: ISSNIP Collaboration Day (Posters)

Room: Ballroom C

Demo. Presentation - Pubudu Pathirana (Deakin University, Australia)

Poster presenters:

Soft Clustering and Support Vector Machine based Technique for the Classification of Abnormalities in Digital Mammograms.

Peter Noel McLeod

Sensor Network Testbed for Plug-and-Play Sensors

Samitha Ekanayake

Monitoring IAQ Parameters of Built Environments using CO₂ Sensor Network

Swarnendu Kar

Novel Techniques for Dynamical Heart Rate Variability Analysis Using Poincare Plot

Chandan Karmakar

Image Restoration Using Lagrangian Minimization and Bound Selection

Mathew Andrew Kitchener

Use of forearm sEMG in identification of low-level finger movements; features based on ICA and Fractal theory

Sridhar Poosapadi Arjunan

Fast 2 Dimensional Velocity Estimation from Insect Inspired Motion Detection

Mickael Quelin

Contrast Measure-based Automated Regularization Parameter Selection for Radar Image Restoration

Cher Hau Seng

A New Approach to Sparse Image Representation Using Compressed Sensing

Jie Yang

Attack-resistant secure network reprogramming

Yee Wei Law

Polysomnographic Characteristics of Submental Surface EMG Signals in Sleep Apneic Patients

Mak Daulatzai

Intelligent Task Allocation in Multi-hop Wireless Networks

Yichao Jin

Handling inelastic traffic in wireless sensor networks

Jiong Jin

Optimal flow control for multi-service networks

Jiong Jin

Anomaly Detection in Wireless Sensor Networks

Masud Moshtaghi

Automated Tumour Extraction from PET Images

Jayavardhana Gubbi

Directional Multi-scale Modeling of High-Resolution Computed Tomography (HRCT) Lung Images for Diffuse Lung Disease Classification

Kiet Tuan Vo

Automated Identification of Abnormal Fetuses Using Fetal ECG and Doppler Ultrasound Signals

Ahsan Khandoker

Support Vector Regression Model for Assessing Respiratory Effort during Central Apnea Events Using ECG Signals

Ahsan Khandoker

Distributed anomaly detection in wireless sensor networks

Sutharshan Rajasegarar

Bio-Inspired Cameras

Russell S A Brinkworth

3.00pm- 3.30pm: Coffee Break

3.30pm-4.00pm: Conference Opening

Dr. D. Nandagopal, DSTO, Executive Chair of the ARC Research Network on ISSNIP

4.00pm-5.30pm

Session name: Opening Key Note

Speaker: Prof. David Karoly (University of Melbourne)

Room: Ballroom A-B

Climate change science and solutions: The role of sensor networks for monitoring and mitigation

Climate change will be the focus of attention this week in Copenhagen. A brief review will be presented of the science of climate change, the scale of the problem, and the emission reductions that are needed to minimise dangerous climate change. Modern sensor networks play an important role in monitoring changes in the climate system and in providing early warning of impacts of climate change. They are also important in helping to combat climate change through monitoring energy use and monitoring emissions from burning fossil fuels, from agriculture and land clearing and other sources of greenhouse gases.

Bio: Professor David Karoly is an ARC Federation Fellow and Professor of Meteorology at the University of Melbourne, Australia.

He is an internationally-recognised expert in climate change and climate variability, including greenhouse climate change, stratospheric ozone depletion and interannual climate variations due to El Niño-Southern Oscillation.

He was heavily involved in preparation of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) released in 2007, in several different roles. Professor Karoly was Chair of the Premier of Victoria's Climate Change Reference Group during 2008 and 2009, and is a member of the Wentworth Group of Concerned Scientists and the Australian Academy of Sciences' National Committee on Earth System Science.

Professor Karoly joined the School of Earth Sciences in May 2007 as a Federation Fellow funded by the Australian government. From 2003, he held the Williams Chair in the School of Meteorology at the University of Oklahoma. During 2001-2002, he was Professor of Meteorology and Head of the School of Mathematical Sciences at Monash University. From August 1995, he was Director of the Cooperative Research Centre for Southern Hemisphere Meteorology at Monash University until it closed in June 2000.

5.30pm: Program Closes

6.00pm: Welcome Reception, Venue: Alto Room, Langham Hotel

8th December, 2009 – Tuesday

8.00 am: Registration

8.30am-9.30am

Session name: Key Note 1

Speaker: Prof. Guanrong (Ron) Chen (City University of Hong Kong)

Room: Ballroom A-B

Flocking Control of Mobile Agents on Complex Networks

This presentation offers a brief overview of some recent progress in sensor-based control of multi-agent systems, with some discussions on related topics such as flocking modelling, swarming dynamics, and control algorithms. Background and motivation will be introduced, and main ideas and key techniques will be discussed. As a specific example for illustration, the so-called small-world networking structure is introduced to a flock of mobile agents, so as to facilitate their internal communications thereby achieving effective global synchronization. To that end, a couple of successful simulation examples will be demonstrated.

Bio: Professor Chen received the MS degree in Computer Science from Sun Yat-sen University, China in 1981 and the PhD degree in Applied Mathematics from Texas A&M University, USA in 1987, with Post-Doctorate research experience in nonlinear dynamics and controls thereafter. He currently is a Chair Professor and the founding director of the Centre for Chaos and Complex Networks at the City University of Hong Kong, prior to which he was a tenured Professor at the University of Houston, USA.

Professor Chen is an IEEE Fellow (since January 1997). He is currently serving as the Editor-in-Chief of the IEEE Circuits and Systems Magazine (since 2008), Deputy Editor-in-Chief of the International Journal of Circuit Theory and Applications (since 2008) and the IEEE Transactions on Circuits and Systems, Part II (2004-05) and Part I (2006-07), among others, and is Honorary Professor at different ranks of twenty some universities worldwide.

9.30am- 10.00am: Coffee Break

10.00am-11.00am

Session name: Key Note 2

Speaker: Prof. Anthony Burkitt (The University of Melbourne)

Room: Ballroom A-B

The Bionic Eye - the quest to build a retinal implant for the blind

The success of the cochlear implant in providing hearing to the deaf has recently led to the application of this technology to provide sight to the blind. Electrical stimulation of the retina has been demonstrated to generate visual precepts, but much remains to be done to transform this into a fully functioning visual prosthesis. This talk will outline the challenges faced in building a retinal implant, as well as the approaches to their solution being pursued by researchers in Australia.

Bio: Director of Bionic Vision Australia, head of the Neuro –Engineering group in the Department of Electrical and Electronic Engineering at the University of Melbourne and Assistant Director of the Bionic Ear Institute.

Prof. Burkitt's research is in the area of neuro-engineering and he has worked in cochlear implant speech processing and computational auditory neuroscience for over a decade. This work has involved the investigation of various mechanisms of information processing specialised to the auditory system and associated with speech perception. He has published papers on physiological neural processing mechanisms associated with speech that involve specialized networks within the auditory brainstem. This research has been instrumental in his development of new cochlear implant speech processing strategies that have been patented and currently undergoing pilot clinical trials. His recent research interests have involved extending these concepts from the auditory system to the visual system in order to develop visual stimulation paradigms for retinal implants.

Prof. Burkitt's research in neural modelling of biological systems has had an impact upon the development and understanding of neural models of information processing, i.e., how information is encoded, transmitted and decoded within neural systems. In addition, he has carried out work on understanding the neural basis of epileptic seizures and methods for detecting and predicting seizures. He is currently also involved in research to use electrical stimulation for seizure abatement in epilepsy.

Parallel Session 1

Session Name: Middleware for Sensor Systems - I
Session Chair: Mohan Kumar
Room: Ballroom C

11.00am-11.20am

A Metaheuristic Algorithm for Wireless Sensor Network Design in Railway Structures
Akio Hada and Ryuji Tsuchiya

11.20am-11.40am

Evolutionary design of wireless sensor networks based on complex networks
Andre S. Ruela, Raquel S. Cabral, Andre L.L. Aquino and Frederico G. Guimaraes

11.40am-12.00pm

Digital Moorea Cyberinfrastructure for Coral Reef Monitoring
Tony Fountain, Sameer Tilak, Peter Shin, Sally Holbrook, Russell J. Schmitt, Andrew Brooks, Libe Washburn and David Salazar

12.00pm-12.20pm

TB-MAC: Efficient MAC-Layer Broadcast for Underwater Acoustic Sensor Networks
Diba Mirza, Feng Lu, Curt Schurgers

Session Name: Radio Frequency identification (RFID) Technology
Session Chair: Robin Doss
Room: Yarra I

11.00am-11.20am

Design of Short Range Chipless RFID Reader Prototype
Stevan Preradovic and Nema C. Karmakar

11.20am-11.40am

A Fusion of Data Analysis and Non-Monotonic Reasoning to Restore Missed RFID Readings
Peter Darcy, Bela Stantic and Abdul Sattar

11.40am-12.00pm

Virtualisation of RFID supply chain
William Lorchirachoonkul and John P.T. Mo

12.00pm-12.20pm

Tyrell: A RFID Simulation Platform
Luke Mirowski, Jacqueline Hartnett and Raymond Williams

12.20pm-1.20pm: Lunch

1.20pm-2.20pm

Session name: Key Note 3

Speaker: Prof. Mohan Kumar (University of Texas, Arlington, USA)

Room: Ballroom A-B

Opportunistic Sensing Opportunities and Applications

Opportunistic networks have evolved from mobile ad hoc networking and the delayed tolerant networking paradigms and have quickly gained popularity in research and industry. In opportunistic networking, when pairs of devices come within each others' communication range, opportunistically, short-lived links (or opportunistic links) are created. Opportunistic computing exploits opportunistic links created by pair-wise contacts, to share information content, resources and services, leading to a wide variety of applications. In this talk we investigate research challenges and issues in exploiting opportunistic sensing opportunities and their applications. Further more, the impact of social computing and networking paradigms for such problems as synchronization and trust will be investigated.

Bio: Since Spring 2001, Kumar has been with CSE@UTA. He is also an adjunct professor at the Curtin University of Technology, Perth Australia. His current research interests are in pervasive computing, opportunistic networks and computing, wireless networks and mobility, mobile agents and distributed computing. He initiated pervasive

computing research activities at CSE@UTA in 2001 and directs the Pervasive and Invisible Computing (PICO) lab. He is the lead PI in two recently funded NSF awards: Collaborative virtual observation in dynamic, heterogeneous environments; and Distributed Opportunistic Computing. He is a Co-PI in a recently funded project by the AFRL on Middleware for Dynamic Distributed Repositories and the NSF funded ARCADIA project. He was the lead PI in the NSF funded PICO project on the development of middleware services for pervasive computing. Current research work includes the application of pervasive computing into such areas as telemedicine, manufacturing and security. He has published over 150 refereed articles in journals and conference proceedings. He co-founded the IEEE International Conference on Pervasive Computing (PerCom) and the Elsevier's Pervasive and Mobile Computing Journal. He served as the Program Chair, PerCom 2003 and the General Chair, PerCom 2005, and he is currently the Chair of the PerCom Steering Committee. Mohan is a senior member of the IEEE. He received the Vice-Chancellor's Excellence Award in 1999.

Parallel Session 2

Session Name: Theoretical and practical aspects of large-scale WSN – I (Localisation and target tracking)

Session Chair: Paul Havinga

Room: Ballroom C

2.20pm-2.40pm

Trade-off Between Mobile Node Density and Detection Performance in Hybrid Sensor Networks with Random Node Mobility

Thakshila Wimalajeewa and Sudharman K. Jayaweera

2.40pm-3.00pm

COM-LOC: A Distributed Range-Free Localization Algorithm in Wireless Networks

B.J. Dil and Paul J.M. Havinga

3.00pm-3.20pm

A Novel Approach Towards Source-to-Destination Distance Estimation in Wireless Sensor Networks

Di Ma, Meng Joo Er, Bang Wang and Hock Beng Lim

Session Name: Adaptive Sensing, Control and Optimization in Sensor Networks – 1

Session Chair: I-Jeng Wang

Room: Yarra I

2.20pm-2.40pm

Algorithms for closed-loop feedback based distributed adaptive beamforming in wireless sensor networks

Stephan Sigg and Michael Beigl

2.40pm-3.00pm

An Adaptive Algorithm for Sensor Activation in Renewable Energy based Sensor Systems

Sandeep Reddy Mereddy, Neeraj Jaggi and Ravi Pendse

3.00pm-3.20pm

Sensor Scheduling for Bearings-Only Tracking with A Single Sensor

Xuezhi Wang, Mark Morelande and Bill Moran

3.20pm-3.50pm: Coffee Break

Parallel Session 3

Session Name: Control theory and optimization for mobile adhoc networks

Session Chair: Stuart Milner and Sylvie Perreau

Room: Ballroom C

3.50pm-4.10pm

Invited Talk

Title: A Graph-Theory Approach to Network Synchronizability Analysis ()

Speaker: Prof. Guanrong (Ron) Chen (Centre for Chaos and Complex Networks, City University of Hong Kong)

4.10pm-4.30pm

Delivery Packets Reliably and Efficiently over Error Prone Channel of WSNs

Bin-bin Xiong and Jia Liu

4.30pm-4.50pm

Compensating for the Latency of Data Acquisition for Localization in Mobile Wireless Sensor Networks

M. Amin Rahimian and Shinji Ohyama

4.50pm-5.10pm

**Bounded Degree Energy Aware Topology
Discovery and Reconfigurations in Ad hoc
Wireless Sensor Networks**

Mehwish Nasim, Yasir Fayyaz and Muhammad
Younus Javed

5.10pm-5.30pm

**Resource Allocation in Adhoc Networks using
Markov Random Fields**

Sylvie Perreau and Sanjeev Naguleswaran

Session Name: Autonomous Systems

**Session Chair: Jaime Valls Miro and Alen
Alempijevic**

Room: Yarra I

3.50pm-4.10pm

Invited Talk

Title: TBC

Speaker: TBC

4.10pm-4.30pm

**Centralized Path Planning for Unmanned Aerial
Vehicles with A Heterogeneous Mix of Sensors**

Kutluyıl Doğançay, Hatem Hmam, Samuel P.
Drake and Anthony Finn

4.30pm-4.50pm

Mutual Information Based Data Association

Alen Alempijevic, Sarath Kodagoda and Gamini
Dissanayake

4.50pm-5.10pm

**Detection of the tau-margin and application to
autonomous control of a flying robot**

Yasuhiro Shimada, Rei Seto and Kazuyuki Ito

5.10pm-5.30pm

**Multiple Sensors and Artificial Neural Networks
in a Cognitive Technical System for Laser
Welding**

Ingo Stork genannt Wersborg, Konstantin Schorp,
Thibault Bautze and Klaus Diepold

5.30pm: Program Closes

9th December, 2009 – Wednesday

8.00 am: Registration

Parallel Session 4

Session Name: Information Driven Spatial Representation - I
Session Chair: Pubudu Pathirana
Room: Ballroom C

8:10am-8:30am

Invited Talk

Title: Challenges for real world sensor networks

Speaker: Dr Michael.Brueinig

8:30am-8:50am

Collinearity Problems in Passive Target Localization Using Direction Finding Sensors

Baris Fidan, Samuel P. Drake, Brian D.O. Anderson, Guoqiang Mao and Anushiya A. Kannan

8:50am-9:10am

An Optimality Analysis of Sensor-Target Geometries for Signal Strength Based Localization

Adrian N. Bishop and Patric Jensfelt

9:10am-9:30am

Designing Sensor Networks for Spatial Interpolation

Periklis Liaskovitis and Curt Schurgers

Session Name: Adaptive Sensing, Control and Optimization in Sensor Networks - II

Session Chair: Amy Vaduthalakuzhy

Room: Yarra I

8:10am-8:30am

Formation Control of Robotic Swarms Based on Sonar Sensing

Na Cen, Kaiyu Cheng and Baris Fidan

8:30am-8:50am

Control of Unmanned Aerial Vehicles Performing Multiple Target Passive Detection and Tracking

Peter W. Sarunic and Robin J. Evans

8:50am-9:10am

Exploring Energy-Efficient Human Probes for High-Fidelity Sensing in Urban Environments

Niwat Thepvilojanapong, Shin'ichi Konomi, Jun'ichi Yura, Takeshi Iwamoto, Susanna Pirttikangas, Yasuyuki Ishida, Masayuki Iwai, Yoshito Tobe, Hiroyuki Yokoyama, Jin Nakazawa and Hideyuki Tokuda

9:10am-9:30am

PMHT for Multiple Platform Path Exploration Planning

Brian Cheung, S. Davey and Douglas Gray

9.30am-10.30am

Session name: Key Note 4

Speaker: Prof. S. S. Iyengar (Louisiana State University, USA)

Room: Ballroom A-B

Algorithmic and Graph Problems in Wireless Sensor Networks

This is an overview of the progress made in the recent past in the application of graph algorithms and various similar techniques to solve interesting and unique problems of wireless sensor networks such as scheduling, topology control, data structure for data aggregation, routing etc. In the course of solving such problems, we tend to treat the deployed network as different kinds of graphs such as Unit Disc Graph, Planar Graph, Doubling-Dimension Graph, Arbitrary Graphs etc with appropriate distance metric associated with them. Many solutions call for reducing a complex, unruly graph type to some form that is more conducive to our desired characteristics and solution. In doing so, we notice some undesirable properties such as longer stretch, larger node degree, greater total edge weight, larger diameters etc. We explore many of these, see how they are applied, what issues lie beyond them.

Bio: Prof. S.S. Iyengar is the Chairman and Roy Paul Daniels Chaired Professor of Computer Science at Louisiana State University, Baton Rouge, and is also the Chaired Professor at various institutions around the world. His publications include 6 textbooks, 5 edited books and over 380 research papers. His research interests include high-performance algorithms, data structures, sensor fusion, data mining, and intelligent systems. He is a world class expert

in computational aspects of Distributed Sensor Networks.

He is a Fellow of IEEE, Fellow of ACM, Fellow of AAAS and Fellow of SDPS. He is a recipient of IEEE awards, best paper awards, the Distinguished Alumnus award of the Indian Institute of Science, Bangalore and other awards. He has served as the editor of several IEEE journals and is the founding editor-in-chief of the International Journal of Distributed Sensor Networks.

His research has been funded by National Science Foundation (NSF), Defense Advanced Research Projects Agency (DARPA), Multi-University Research Initiative (MURI Program), Office of Naval Research (ONR), Department of Energy/OakRidge National Laboratory (DOE/ORNL), Naval Research Laboratory (NRL), National Aeronautics and Space Administration (NASA), US Army Research Office (URO) and various state agencies and companies. He has served on US National Science Foundation and National Institute of Health Panels to review proposals in various aspects of computational science and has been involved as an external evaluator (ABET-accreditation) for several computer science and Engineering departments.

Dr. Iyengar had 40 doctoral students under his supervision and the legacy of these students can be seen in prestigious Laboratories (JPL, Oak Ridge National Lab, Los Alamos National Lab, Naval Research Lab) and universities round the world. He has been the program Chairman of various international conferences.

10.30am- 11.00am: Coffee Break

Parallel Session 5

Session Name: Theoretical and practical aspects of large-scale WSN - II (Data management and applications)

Session Chair: Paul Havinga

Room: Ballroom C

11:00am-11.20am

Error Analysis for Optimal Distributed Detection in Multi-Hop Sensor Networks

Xusheng Sun and Edward J. Coyle

11.20am-11.40am

An Efficient Approach Using Domain Knowledge for Evaluating Aggregate Queries in WSN

Chi Yang and Rachel Cardell-Oliver

11.40am-12.00pm

Use of Event Detection Approaches for Outlier Detection in Wireless Sensor Networks

Majid Bahrepour, Yang Zhang, Nirvana Meratnia and Paul J.M. Havinga

12.00pm-12.20pm

Free Space Optical Sensor Networking for Underwater Sensing Applications

Navik Agrawal, Christopher C. Davis and Stuart D. Milner

12.20pm-12.30pm

Networks of Chemical Sensors: A Simple Mathematical Model for Optimisation Study

Alex Skvortsov, Branko Ristic and Mark Morelande

Session Name: Information Processing and Sensor Technologies in Healthcare

Session Chair: Daniel Lai

Room: Yarra I

11:00am-11.20am

A Versatile Body Sensor Network for Health Care Applications

Saim Kim, Lisa Beckmann, Moritz Pistor, Linda Cousin, Marian Walter and Steffen Leonhardt

11.20am-11.40am

Lateral Decubitus Posture during Sleep: Sub-Groups of Obstructive Sleep Apnea Patients - Positional Therapy for Most But Not for All OSA Patients

Mak Adam Daulatzai, Neela Khan, Chandan Karmakar, Ahsan H. Khandoker and M. Palaniswami

11.40am-12.00pm

Soft Clustering Support Vector Machine for the Classification of Abnormalities in Digital Mammograms

Peter McLeod, Brijesh Verma and Minyeop Park

12.00pm-12.20pm

Wearable Biosensor for Monitoring Tear Glucose on Rabbit Eye as Novel Device of Body Sensor Network

M.K. Chu, S. Iguchi, D. Takahashi, T. Arakawa, H. Kudo and K. Mitsubayashi

12.20pm-1.20pm: Lunch

1.20pm-2.20pm

Session name: Key Note 5

Speaker: Prof. Paul Havinga (University of Twente, Netherlands)

Room: Ballroom A-B

Distributed wireless sensor networks beyond the hype.

Rapid advances in technology have enabled a new generation of tiny, inexpensive, networked sensors. These massively distributed sensor networks communicate with one another and summarize the immense amounts of low-level information to produce data representative of the overall environment. This enormous potential triggered many to start working in this domain.

The past ten years of wireless sensor network research have resulted in advancements in many areas. Commercial takeoff however is still progressing slower than the hype predicted. This talk will highlight some of the reasons and the challenges as we are advancing this technology from academic prototypes to broad commercial usage. Finally, some directions for future research in sensing systems are addressed. Abstract

Bio: Paul J.M. Havinga is professor in the Computer Science department at the University of Twente in the Netherlands, and CTO of Ambient Systems B.V., in Enschede, the Netherlands. His research interests are in the area of large-scale, heterogeneous wireless systems, sensor networks, energy-efficient architectures and protocols, ubiquitous computing, and wireless communication networks. Research questions cover architectures, protocols, programming paradigms, algorithms, and applications. This research has resulted in over 200 scientific publications in journals and conferences. He has a significant experience as project manager in several international research projects on wireless sensor networks and ubiquitous computing. In 2001 he initiated the first European project on wireless sensor networks (2001 - 2004). In 2004 he founded the company Ambient Systems B.V., partly based on the results of that project. In May 2007 he received the "ICT Innovation Award" for the successful transfer of knowledge from university to industrial use. In June 2007 he received the "van den Kroonenberg award" for being a successful innovative entrepreneur.

Parallel Session 6

Session Name: Middleware for Sensor Systems - II

Session Chair: Jadwiga Indulska

Room: Ballroom C

2:20pm-2.40pm

Fusing Sensors with Uncertain Detection Performance

S. Davey, J. Legg and E. El-Mahassni

2.40pm-3.00pm

A Flexible Binding Mechanism for ZigBee Sensors

Yueh-Feng Lee, Hsin-Sheng Liu, Ming-Shyan Wei and Chun-Hao Peng

3.00pm-3.20pm

Passive House Sensor Networks: Human Centric Thermal Comfort Concept

Mohd Izani Mohamed Rawi and Adnan Al-Anbuky

3.20pm-3.40pm

Sensewrap: A Service Oriented Middleware with Sensor Virtualization and Self-Configuration

Pål Evensen and Hein Meling

Session Name: Multimedia Processing in Sensor Networks

Session Chair: Tim Wark

Room: Yarra I

2:20pm-2.40pm

Power Aware Communication in Wireless Pervasive Smart Camera Networks

Thomas Winkler and Bernhard Rinner

2.40pm-3.00pm

Characterization of a Neuromorphic Motion Detection Chip Based On Insect Visual System

Russell S.A. Brinkworth, Patrick A. Shoemaker and David C. O'Carroll

3.00pm-3.20pm

A 3D Laser and Vision Based Classifier

Bertrand Douillard, Alex Brooks and Fabio Ramos

3.20pm-3.40pm

Camera Calibration in Wireless Multimedia Sensor Networks

Junbin Liu, Damien O'Rourke, Tim Wark, Ruan Lakemond and Sridha Sridharan

Poster Session (Along with Coffee & Tea)

3.40pm-5.30pm

Session Chair: Prof. Meng Joo Er (Nanyang Technological University, Singapore)

Room: Ballroom B

Evolving discriminative features robust to sensor displacement for activity recognition in body area sensor networks

Kilian Förster, Pascal Brem, Daniel Roggen and Gerhard Tröster

Adaptive synchronization for duty-cycling in environmental wireless sensor networks

Sebastian Bader and Bengt Oelmann

An Improved Cluster-head Selection Approach in Wireless Sensor Networks

Peng Hao, Wanzhi Qiu and Robin J. Evans

Sensor network for real-time vehicle tracking on road networks

Zoltan Papp, Joris Sijs and Michele Lagioia

Distributed Control of Triangular Sensor Formations with Angle-Only Constraints

Meysam Basiri, Adrian N. Bishop and Patric Jensfelt

Robocentric Mapping and Localization in Modified Spherical Coordinates with Bearing Measurements

Anders Boberg, Adrian N. Bishop and Patric Jensfelt

Networks of Chemical Sensors: A Simple Mathematical Model for Optimisation Study

Alex Skvortsov, Branko Ristic and Mark Morelande

Data Monitoring Sensor Network for BigNet Research Testbed

Aravinda S. Rao, Davood Izadi, Reuben F. Tellis, Samitha W. Ekanayake and Pubudu N. Pathirana

Cardiac Abnormalities Detection from Compressed ECG in Wireless Telemonitoring using Principal Components Analysis (PCA)

Ayman Ibaida, Ibrahim Khalil and Fahim Sufi

Simulink-based Sleep Apnea Screening Model for Portable Diagnosis

Kian H. Ang, Yuanda Xu and Ahsan H. Khandoker

Low Cost ECG Monitor for Developing Countries

Brian A. Walker, Ahsan H. Khandoker and Jim Black

Optimized Network Layer Protocol for Sensor Driven Autonomous Real-Time Data Fusion in a Star BSN

M. Schlösser, L. Rzezniczek, F. Akgün, H. Ying, A. Seyrafi and M. Schiek

Accurate Estimation of Indoor Occupancy using Gas Sensors

Swarnendu Kar and Pramod K. Varshney

A Multi-Scale Strategy in Wireless Sensor Networks for Structural Health Monitoring

Xuefeng Liu, Jiannong Cao, Youlin Xu, Hejun Wu and Yang Liu

WSN-HM: Energy-Efficient Wireless Sensor Network for Home Monitoring

Youssef Zatout, Eric Campo and Jean-François Llibre

Distributed Optical Fibre Smart Sensors for Structural Health Monitoring: A Smart Transducer Interface Module

Graham Wild and Steven Hinckley

An Energy Efficient Wireless Communication Mechanism for Sensor Node Cluster Heads

Edoardo Regini and Tajana Simunic Rosing

S-Sensors: Integrating Physical World Inputs with Social Networks using Wireless Sensor Networks

M. Baqer and Adel Kamal

5.30pm: Program Closes

10th December, 2009 – Thursday

8.00 am: Registration

Parallel Session 7

Session Name: Information Driven Spatial Representation - II

Session Chair: Adrian Bishop

Room: Ballroom C

8:10am-8.30am

The effect of data collection geometry on radiological source localisation

Ajith Gunatilaka, Branko Ristic, Champake Mendis, Shanika Karunasekera and Alex Skvortsov

8.30am-8.50am

Experimental Verification of Evolutionary Estimation algorithms for Radioactive Source localisation

Champake Mendis, Ajith Gunatilaka, Branko Ristic, Shanika Karunasekera and Alex Skvortsov

8.50am-9.10am

Multi-pass Maximum Likelihood Technique for Self Localisation in Wireless Sensor Networks

Travis J. Bessell and Mark G. Rutten

9.10am-9.30am

Tracking of Multiple Mobile Agents Using Single Frequency Continuous Wave Radar

Sanvidha C.K. Herath, Chatura V.D. Nagahawatte and Pubudu N. Pathirana

Session Name: Sensor Network Security

Session Chair: Yee Wei Law

Room: Yarra II

8:10am-8.30am

Anomaly Detection by Clustering Ellipsoids in Wireless Sensor Networks

Masud Moshtaghi, Sutharshan Rajasegarar, Christopher Leckie and Shanika Karunasekera

8.30am-8.50am

A Low-Complexity Algorithm for Intrusion Detection in a PIR-Based Wireless Sensor Network

Abu Sajana R., Ramanathan Subramanian, P. Vijay Kumar, Syam Krishnan, Bharadwaj Amrutur, Jeena Sebastian, Malati Hegde and S.V.R. Anand

8.50am-9.10am

Secure Group Formation Protocol for a Medical Sensor Network Prototype

Jacob Andersen

9.10am-9.30am

TinyIBE: Identity-Based Encryption for Heterogeneous Sensor Networks

Piotr Szczechowiak and Martin Collier

9.30am-10.30am

Session name: Key Note 6

Speaker: Prof John Langford (University of Melbourne)

Room: Ballroom A-B

Smart Water supply chains in irrigation networks

Bio: Professor John Langford, Director of Uniwater, a joint initiative of Monash University and the University of Melbourne, is a leader in urban and rural water management reform.

Professor Langford chose water as a career field because, he says, it is one where it is possible to make a strategic contribution. Internationally recognised for his expertise in water resource and catchment management and urban and irrigation water supply and research management, he plays a prominent role in the wider water debate, including speaking at major internationally sponsored forums.

Professor Langford chaired the Boards of the highly successful Cooperative Research Centre (CRC) for Catchment Hydrology (in which the University was a core partner) and the CRC for Freshwater Ecology for more than a decade, and also the Advisory Board of Sydney University's Special Research Centre on the Environmental Impact of Coastal Cities during its nine-year life. Currently he is chair of the Murray Darling Freshwater Research Centre.

From 1994 to 2003 he was inaugural Executive Director of the Water Services Association of Australia (WSAA), the peak body of the Australian urban water industry, and was Managing Director of the Rural Water Corporation, Victoria's state-wide irrigation and rural water authority, from 1989 to 1994.

In 2004 the inaugural Engineers Australia listing of Australia's 100 most influential engineers included Professor Langford.

A Melbourne graduate (BEAgr 1967, PhDEng 1972) he is a Churchill Fellow, a Fellow of the Australian Academy of Technological Sciences and Engineering and a recipient of the Peter Hughes Award for his contribution to the Australian water industry, the 2003 Centenary Medal and the Order of Australia (2005).

10.30am- 11.00am: Coffee Break

Parallel Session 8

Session Name: Theoretical and practical aspects of large-scale WSN – III (Networking I)

Session Chair: Supriyo Chatterjea

Room: Ballroom C

11:00am-11.20am

Invited Talk

Title: Reliable Data Collection in Wireless sensor networks Design of a low-overhead energy-efficient streaming reliable transport protocol

Speaker: Wouter van Kleunen (Ambient Systems)

11.20am-11.40am

A Simplified Protocol for Energy Self-Sufficient Sensors in an IEEE 802.15.4/ZigBee WSN

Lukasz Niestoruk, Johannes Schmid, Peter Boll, Wilhelm Stork and Klaus Mueller-Glaser

11.40am-12.00pm

Impact of Link Quality Estimation Errors on Routing Metrics for Wireless Sensor Networks

Martin Krogmann, Tian Tian, Guido Stromberg, Mike Heidrich and Mario Huemer

12.00pm-12.20pm

Modeling and Throughput Analysis for SMAC with a Finite Queue Capacity

Ou Yang and Wendi Heinzelman

12.20pm-12.40pm

K-hop Statistics in Wireless Sensor Networks

Di Ma, Meng Joo Er, Bang Wang and Hock Beng Lim

Session Name: Integration of the digital and physical world in the network of the future

Session Chair: Laurent Herault and Srdjan Krco

Room: Yarra I

11:00am-11.20am

Invited Talk

Title: SENSEI framework architecture and the key design solutions

Speaker: Dr. Alex Gluhak (University of Surrey)

11.20am-11.40am

Invited Talk

Title: SENSEI framework architecture and the key design solutions

Speaker: Dr. Srdjan Krco (Ericsson Ireland Research Centre)

11.40am-12.00pm

Invited Talk

Title: Sensor network testbed deployments and experiments

Speaker: Sutharshan Rajasegarar (The University of Melbourne)

12.00pm-12.20pm

Passive Acoustic Sensing of Walking

Masanari Shoji

12.20pm-12.40pm

Implementation and Evaluation of a Swarming Sensor Network for Intrusion Detection

A. Vaduthalakuzhy, A.B. Dalton, J.A. Krill, K.W. O'Haver, M.J. O'Driscoll and R.A. Nichols

12.40pm-12.50pm

S-Sensors: Integrating Physical World Inputs with Social Networks using Wireless Sensor Networks

M. Baqer and Adel Kamal

12.40pm-1.40pm: Lunch

1.40pm-2.50pm

Session name: PhD Forum Panel Session

Speaker:

Prof. Mohan Kumar (University of Texas at Arlington, USA)

Prof. Subhash Challa (NICTA/The University of Melbourne, Australia)

Prof. Paul Havinga (The University of Twente, Netherlands)

Assoc. Prof. Richard Baker (Murdoch Childrens Research Institute, Australia)

Dr. Jorge Pereira (Principal Scientific Officer, European Commission)

Room: Ballroom B

Successful Research Collaboration in a Competitive World

Collaborative research involves people/organisations working together to achieve a particular research outcome. This helps converge different ideas and expertise from different disciplines to yield a synergetic research output. Nowadays, collaboration plays an important role not only in winning competitive grants but addressing critical interdisciplinary challenges. Initiating collaboration between researchers, research organisations and industry, evolving and sustaining such links can be challenging, especially for early career researchers. The ISSNIP PhD/ECR forum features a panel session consisting of leading international researchers, who will share their experience on initiating, sustaining and managing such collaboration from the unique perspectives of the different disciplines.

Parallel Session 9

Session Name: Theoretical and practical aspects of large-scale WSN – IV (Networking II)

Session Chair: Ozlem Durmaz Incel

Room: Ballroom C

2:50pm-3:10pm

Throughput and Delay in Wireless Sensor Networks using Directional Antennas

Hong-Ning Dai

3:10pm-3:30pm

Algorithmic approaches to distributed adaptive transmit beamforming

Stephan Sigg and Michael Beigl

3:30pm-3:50pm

Feasible Bounds for Multi-hop Routing in Sensor Networks with Mobile Sinks

Jayanthi Rao and Subir Biswas

3:50pm-4:10pm

Limitations, performance and instrumentation of closed-loop feedback based distributed adaptive transmit beamforming in WSNs

Stephan Sigg, Rayan Merched El Masri, Julian Ristau and Michael Beigl

Session Name: PhD/ECR Forum - posters

Session Chairs: Sutharshan Rajasegarar (The University of Melbourne), Tharshan Vaithianathan (The University of Melbourne)

Room: Yarra I

A Sensor System of Seat Sensor Network for Adaptive Aircraft Passenger Seat System

CheeFai Tan, Wei Chen, Matthias Rauterberg

Improved Application of Wireless Sensor Network in Fighting Bushfires

Farhad Goodarzy, Mohammad Amin Dallaali

Context Assisted Automatic Fuel Price Collection in Mobile Phone based Participatory Sensor Networks

Yi Fei Dong, Ren P. Liu, Salil Kanhere, ChunTung Chou

Low Cost ECG Monitor for Developing Countries

Brian A. Walker, Ahsan H. Khandoker, Jim Black

Real-Time Demonstration of a Bio-Inspired Motion Detection Sensor

Russell S.A. Brinkworth

Contrast Measure-based Automated Regularization Parameter Selection for Radar Image Restoration

Cher Hau Seng, Abdesselam Bouzerdoum and Son Lam Phung

A New Approach to Sparse Image Representation using Compressed Sensing

Jie Yang, Abdesselam Bouzerdoum, Son Lam Phung

Pervasive Visual Sensor Networks for Elderly Care
Özlem Durmaz Incel

SenseSIM: Sensor Network Simulator
S.S.Iyengar, Vasanth Iyer

**Implementation of GNU Radio as a Software
Defined Radar Sensor Network Node**
Shivvaan Sathasilvam, Bevan D. Bates

**Image Restoration Using Lagrangian Minimization
and Bound Selection**
M. A. Kitchener, A. Bouzerdoum, S. L. Phung

Distributed beamforming with software radios
Stephan Sigg

**Telecollaboration Opportunities of Sensor-based
Networks**
Venkatesh Mahadevan

**Programming Wireless Sensor Networks using
UML2 Activity Diagrams**
Gerhard Fuchs, Christoph Damm, Reinhard German

**Using Behaviour Trees to Verify Protocols in
Complex Sensor Networks**
Kalvinder Singh, Vallipuram Muthukkumarasamy

**Fast 2 Dimensional Velocity Estimation from Insect
Inspired Motion Detection**
Mickael Quelin, Abdesselam Bouzerdoum , Son Lam
Phung

**Performance Analysis of a Mobile Phone Serving as
a Gateway in a Body Sensor Network**
Patrick Crilly, Vallipuram Muthukkumarasamy

**Efficient Design of Harmonic Transponder for UAV
Based Harmonic Tracker**
Nazifa Tahir

4.10pm- 4.40pm: Cofee Break

**CREON one day workshop on the application of sensor networks to Coral Reef Systems:
towards an International system of systems**

10th December, 2009 – Thursday

9:00-9:10am **Welcome and house-keeping**
9:10-9:30am **Status of Australian Activities [Scott Bainbridge]**
9:30-9:50am **Status of Moorea Activities [Sally Holbrook]**
9:50-10:10am **Status of Taiwan Activities [Fang-Pang Lin]**
10:10-10:30am **US NOAA / ICON Activities [Lew Gramer]**

10:30 – 11:00am **Morning Tea**

11:00-11:20am **Keynote Talk: The I-CREOS vision [Scott Bainbridge for Rusty Brainard]**
11:20-12:00pm **Round Table Discussion: an international coral reef sensor network of networks,
how does this vision fit with what is being done and what do we need to do at the
local level to facilitate this?**

12:00-1:30pm **Lunch**

1:30-2:00pm **Keynote: Data Turbine and the digital Moorea project [Tony Fountain]**
2:00-2:30pm **Keynote: MBARI and the Puck: past, present, future [Kent Headley]**
2:30-3:00pm **Keynote: New approaches to underwater communications [Stu Milner]**
3:00-3:30pm **Integrating modelling and coral reef sensor data [Ron Johnstone]**

3:30-4:00pm **Afternoon Tea**

4:00-5:00pm **Round Table Discussion: How to go from where we are now to where we need to be
to realise the vision?**
5.00-5:30pm **Development of an outcomes document, what form and by whom?**

5:30pm **Close**
