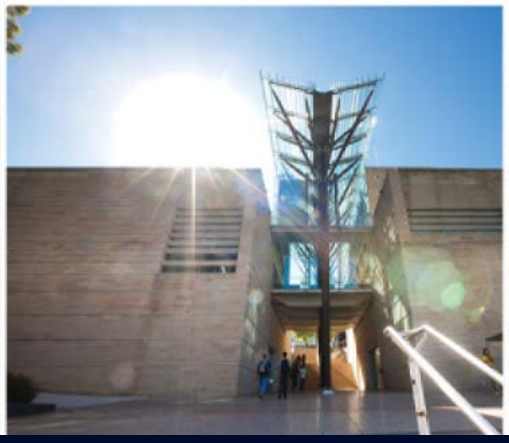
THIRD INTERNATIONAL CONFERENCE ON

INDOOR POSITIONING AND INDOOR NAVIGATION (IPIN 2012)



13-15 November 2012
University of New South Wales, Sydney, Australia

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Indoor Positioning & Indoor Navigation 2012

INVITATION FROM THE IPIN2012 ORGANISING COMMITTEE

It is with great pleasure that I invite you to attend the IPIN2012 conference, being held from 13-15 November at the University of New South Wales, Sydney, Australia.

The development of Positioning and Navigation technologies, and the applications dependent upon them, are experiencing an explosive growth, both in the R&D labs as well as in the marketplace. Global Navigation Satellite Systems (GNSS) such as GPS, GLONASS, and the soon to be deployed Galileo and BeiDou, have pioneered low-cost, ubiquitous Positioning and Navigation. The applications are myriad, ranging from land, air and maritime navigation; military and security-related operations; agriculture, mining and construction; geodesy, surveying and mapping; machine automation and robotics; transportation; emergency response and disaster management; personal location-based services; and others. The utility of GNSS is such that it can be used anywhere on (or above) the Earth's surface, under all weather conditions, 24 hours a day, provided measurements can be made simultaneously to a minimum of four GNSS satellites. However it remains a challenge for space-based Positioning and Navigation technologies to provide the necessary results when direct line-of-sight to the satellites is not possible as in the case of Indoor Positioning and Indoor Navigation (IPIN).

The IPIN2012 is the 3rd in the annual series of IEEE IPIN conferences that showcase advances in indoor positioning. Unlike outdoor environments, where GNSS is the universal technology solution, the special challenges of indoor positioning mean that as yet there is no indoor equivalent to GNSS, and hence this area of research is undergoing tremendous innovation, as different technology solutions are proposed, developed and tested. These technologies include approaches based on measurements of range using radio signals, acoustic signals, signal strength, magnetic, inertial sensors, vision, radar, and a variety of hybrid systems.

This conference will provide a strong scientific program, enjoyable social functions and, importantly, an opportunity to meet with colleagues from all over the world. IPIN2012 will feature keynote speakers, oral presentations, panel sessions, interactive poster sessions, an exhibit and technology demonstrations. Researchers from Americas, Europe, Asia and Australia will provide updates on established and emerging technologies.

On behalf of the School of Surveying & Geospatial Engineering, UNSW, and the organising committee, I look forward to welcoming you to IPIN2012.

Chris Rizos
Chair of IPIN2012

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SCHOOL OF SURVEYING AND GEOSPATIAL ENGINEERING

The UNSW School of Surveying and Geospatial Engineering (SAGE) is one of 10 Schools in Australia's largest Faculty of Engineering. Our graduates are leaders in industry, government and academia.

Our undergraduate and postgraduate programs are in Surveying and in Geoinformation Systems and our graduates have a wide range of career choices. There are also combined programs leading to the award of the BE in combination with BSc and BA degrees.

The School has a long and close relationship with the Institute of Surveyors, NSW (ISNSW), the Surveying and Spatial Sciences Institute (SSSI) and the spatial information industry in general. The School's Advisory Board provides advice on matters such as course content and student training. The undergraduate degree in Surveying is accredited by both the SSSI and Engineers Australia.

The School has an enviable research reputation, nationally and internationally, with Australia's largest concentration of academic research and development in wireless, ground-based and satellite-based positioning technology.

While the main research focus is Global Navigation Satellite Systems such as GPS, the School also has research strengths in surveying, geodesy, inertial navigation systems, pseudolites, mobilephone positioning, integrated navigation and imaging systems, and radar remote sensing. This research is conducted under the banner of Navigation and Earth Observation by School staff and postgraduate Masters and PhD students.

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KEYNOTES (Proudly sponsored by NSW Trade & Investment)

Dr. Waleed Kadous
Software Engineer,
Google,
Mountain View, California

Dr. Waleed Kadous leads Google's indoor location and indoor maps acquisition efforts. Prior to his work on indoor, he helped Google to significantly enhance the maps it serves to tens of millions of users. He completed his PhD at UNSW in 2002 and was a Senior Research Fellow at the Smart Internet Cooperative Research Centre, and then at the ARC Centre of Excellenece in Autonomous Systems.

Title: The Indoor Tipping Point: Lessons from Indoor at Scale

Abstract: For more than a decade the academic world has been producing viable solutions for indoor positioning and navigation. What then, is preventing it from reaching a tipping point, and being part of the public? One of the issues is that to deliver complete end-to-end solutions there are many parties involved: sensor manufacturers, phone makers, operating system designers, network backends and application writers. Dr Kadous will reflect on Google's experiences building end-to-end indoor positioning and navigation systems, highlighting issues and concerns that may have fallen through the cracks and suggesting some ways to move towards the tipping point.

Dr. Lauri Wirola
Nokia Location
& Commerce
Business Unit,
Tampere, Finland

Lauri Wirola, Dr.Tech., received his Master of Science degree in 2005 and Doctor of Technology degree in 2010 both from Tampere University of Technology, Finland, in electrophysics. Dr Wirola has worked with Nokia since 2001 and currently works as a system designer in Nokia Location & Commerce business unit. His current interests include distributed computing and database architectures for global GNSS and wireless positioning services. Dr Wirola has published widely on the Assisted GNSS technologies and is an inventor in tens of granted patents and patent applications in the positioning services domain.

Title: The indoor standards baby steps

Abstract: The history of the location services (LCS) standards in the wireless networks dates back to mid-90's, when the first positioning standards were drafted for GSM networks. Over the last 20 years the LCS standards have played an indispensable role in the mass-market uptake of location technologies. Just one example of the fruits of this work is laying the foundation for Assisted GPS technologies of which descendants are in every smart phone today. Over the recent years the wireless location

standards have gone through a revolution. The ever-growing GNSS family has also led to evolution in the location standards - not only in terms of new satellite systems, but also in terms of completely new GNSS-based positioning methods. Moreover, the emphasis has moved more and more towards non-satellite based technologies including those targeted at indoor positioning and related architectures. My intention is to shed light on some of these latest developments in the location services standardization with particular emphasis on those relevant for indoor positioning.

Prof. Gordon Wyeth
Queensland University of Technology
Brisbane, Australia

Professor Gordon F. Wyeth is Head of the School of Electrical Engineering and Computer Science and Professor of Robotics at the Queensland University of Technology. Prior to 2010 he was at the University of Queensland where he was co-Director of Mechatronic Engineering. Professor Wyeth's main interests are in spatial cognition and biologically inspired robotics, with more than 150 papers published in leading journals and conferences. He has served as President of the Australian Robotics and Automation Association 2004–2006, chaired the Australasian Conference on Robotics and Automation in 1999, 2004 and 2011, chaired the IEEE Robotics and Control Systems Queensland Chapter 2010-2011, and is currently a reserve member of the ARC College of Experts.

Title: From Rats to Robots: Bio-inspired Localization and Navigation

Abstract: If you see a rat scuttling through your backyard, you might want to stop and consider the superiority of the rat at creating and exploiting spatial representations compared to the most advanced robot. Chances are that the rodent you see has a nest that is many hundreds of metres, possibly kilometres, from your backyard, and yet the rodent can unerringly return to its home. If your yard has some ripe seed or fruit, the rat may return at some later date, further demonstrating the rat's ability to store and recall the spatial layout of its range. The rat runs under leaves and through drains with few clear landmarks in a world that is under constant perceptual change in terms of appearance, texture and odour. Clearly, the rat can build a map over large ranges in a real world environment under constant change, and use and maintain that map over its two to three year lifetime. In our work, we have sought to build a model of the rodent brain that is suitable for practical robot navigation. This talk will describe how our model, RatSLAM, captures ideas from biology in a fashion suitable for implementation on a robotic platform, and how its successor CAT–SLAM builds on those capabilities. I will outline the performance of both systems in difficult robot navigation challenges, demonstrating how a cognitive robotics approach to navigation can produce results that rival other state-of-the-art approaches in robotics.

IPIN2012 will be organised in close partnership with key industry players and with participation from well-known companies such as Google, Nokia and Siemens. IPIN2012 provides a fabulous opportunity to network with the world's leading experts and companies actively working on indoor positioning and navigation.

Representatives from the following companies will attend IPIN2012

Industry Session

This special session is in Day 1 (10:45-12:30, 13 November), representatives from Locata, Aeroscout, Abuzz, CSR and Siemens will expose their latest products main features and strengths, and the challenges that they face when designing such products.

Industry Panel

The Industry Panel session is in Day 2 (11:50-12:50, 14 November). Panel members from Google, Nokia, Locata, Aeroscout, SmarttrackRFID, and Siemens will discuss new technical and business opportunities with the audience during a moderated and carefully prepared debate.

The Industry Session and Industry Panel are chaired by Professor Sverre Holm from the Department of Informatics at the University of Oslo.

Monday 12 November 2012

15:00-17:00	Registration desk opens	The Pavillions
17:00-18:30	Pre-Conference Session	LG 03, Tyree Energy Technology Building
	State-of-the art of pedestrian navigation with foot mounted IMU	
	Prof. Ulrich Walder	Department of Civil Engineering, Graz University of Technology, AUSTRIA

Tuesday 13 November 2012

8:00-8:45	Registration, Welcome	Internet registration		
8:45-9:15	**Opening session Theatre A**	**Prof. Andrew G. Dempster, IPIN 2012 Conference Director**	**Prof. Mary O'Kane, NSW Chief Scientist and Engineer**	
9:15-10:15	**Session 1: Keynote 1 Theatre A**	**The Indoor Tipping Point: Lessons from Indoor at Scale**	**Dr. Waleed Kadous, Google**	
10:15-10:45	Morning Tea	Internet registration		
10:45-12:30	**Session 2A: Industry SVERRE HOLM**	**Session 2B: WSN NIMA ALAM**	**Session 2C: Optical ULRICH WALDER**	**Session 2D: Hybrid GUENTHER RETSCHER**
	A confused mess – indoor positioning in 2012, Mr. Nunzio Gambale, Locata, AUSTRALIA	56 VoroLoc: Location Estimation Using Particle Filters, Voronoi Graphs and Ambient Sensor Data, Davide Merico, Contexta Network Solutions S.r.l., ITALY	94 Image Matching Techniques for Vision-based Indoor Navigation Systems: Performance Analysis for 3D Map Based Approach, Xun Li, University of New South Wales, AUSTRALIA	63 Hybrid indoor/outdoor localisation system to support aeronautical maintenance activities, Nelly de Bonnefoy, Paul Sabatier University, FRANCE
	RTLS challenges for the location of active RFID devices, Mr. Daniel Aljadeff, Aeroscout, ISRAEL	75 Performance Evaluation of an Indoor Localization Protocol in a 802.15.4 Sensor Network, Jorge Juan Robles, Technische Universität Dresden, GERMANY	36 Indoor Positioning of Vehicles using an Active Optical Infrastructure, Sven Heißmeyer, Institut für Integrierte Produktion Hannover, GERMANY	66 Multi-Floor Map Matching in Indoor Environments for Mobile Platforms, Christian Ascher, Karlsruhe Institute of Technology, GERMANY
	Taking indoor Wayfinding mobile, Mr. Paul Pettersen, Abuzz, AUSTRALIA	133 Enabling Location-based Applications through Integration of WSNs and Smart Phones, Francescantonio Della Rosa, TUT, FINLAND	37 Mitigation of Attitude and Gyro Errors through Vision Aiding, Laura Ruotsalainen, University of Calgary, CANADA	153 Automatic 3D Calibration for a Multi-Sensor System, Enrico Köppe, Federal Institute for Materials Research and Testing, GERMANY
	218 End to End Continuous Indoor Positioning, Mr. Greg Turetzky, CSR, UNITED STATES	151 A Greedy Approach to Cooperative Indoor Localization, Heiko Will, Freie Universität Berlin, GERMANY	219 A multisensor LBS using SIFT-based 3D models, Antonio J. Ruiz-Ruiz, University of Murcia, SPAIN	14 Platform for Hybrid Positioning based on a Sensor Description Language, Moritz Kessel, Ludwig-Maximilians-University Munich, GERMANY
	Open localization scenarios at Siemens, Dr. Alejandro Ramirez, Siemens, GERMANY	221 Hybrid RSS-SOM Localization Scheme for Wireless Ad Hoc and Sensor Networks, Nyein Aye Maung Maung, Ritsumeikan University, JAPAN	17 Accurate Node Localisation with Directional Pulsed Infrared Light for Indoor Ad Hoc Network Applications, Ahmet Sekercioglu, Monash University, AUSTRALIA	
12:30-13:30	Lunch			
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	5 The Impact of LPN on Positioning measurement in LTE-A System, Yuanfeng Du, Beihang University, CHINA	77 Combining similarity functions and majority rules for multi-building, multi-floor, WiFi Positioning, Adriano Moreira, University of Minho, PORTUGAL	190 An Indoor Localization Algorithm in a Small-Cell LED-based Lighting System, Mauro Biagi , University of Roma Tre, ITALY	35 Deeply Coupled GPS/INS Integration in Pedestrian Navigation Systems in Weak Signal Conditions, Markus Langer, Karlsruhe Institute of Technology, GERMANY
	45 Robust Tracking of a Mobile Beacon using Time Differences of Arrival with Simultaneous Calibration of Receiver Positions, Johannes Wendeberg, University of Freiburg, GERMANY	89 Design and Implementation of WiFi Indoor Localization based on Gaussian Mixture Model and Particle Filter, Katsuhiko Kaji, Nagoya University, JAPAN	E001 Title: An Indoor Positioning System Based on IR Phase Measurement, David Monzu, ITALY	202 Collaborative Navigation with Ground Vehicles and Personal Navigators, Guenther Retscher, Vienna University of Technology, Vienna, AUSTRIA

	78 Time-of-flight positioning using the existing wireless local area network infrastructure, Alejandro Ramirez, Siemens AG, GERMANY	92 A Robust Room-level Localization Method Based on Transition Probability for Indoor Environments, Shinji Hotta, Fujitsu Laboratories LTD., JAPAN	188 Application of Laser Distance Measurers for the Camera and Laser-Based Indoor Positioning (CLIPS) Concep, Rainer Mautz, ETH Zurich, SWITZERLAND	164 Radio-Asissted Inertial Navigation System by Tightly Coupled Sensor Data Fusion: Experimental Results, Christian Ascher, Karlsruhe Institute of Technology, GERMANY
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		104 WiFi Fingerprinting Signal Strength Error Modeling for Short Distances, Andrew Dempster, University of New South Wales, AUSTRAILA	3 Kinect Positioning System (KPS) and its potential applications, Yoshiaki Nakano, Osaka Electro-Communication University, JAPAN	126 Multi-sensor based Surveying of House Drainage System - The current state of the art, Philipp Striegl, University of the Bundeswehr, GERMANY
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15:45-17:30	**Session 4A: LBS HEIDI KUUSNIEMI**	**Session 4B: WLAN PAUL PETTERSEN**	**Session 4C: SLAM JOSE GUIVANT**	**Session 4D: IMU JAYANTHA KATUPITIYA**
	105 RoughMaps: A Generic Platform to support Symbolic Map Use in Indoor Environments, Rainer Wasinger, The University of Sydney, AUSTRALIA	106 Benchmark Measurements for Wi-Fi Signal Strength based Positioning System, Matteo Cypriani, University of Franche-Comte, FRANCE	210 On Sensor Pose Parameterization for Inertial Aided Visual SLAM, Markus Kleinert, Fraunhofer IOSB, GERMANY	53 Evaluating MisMatch Probability of Activity-based Map Matching in Indoor Positioning, Sara Khalifa, University of New South Wales, AUSTRALIA
	109 Harmonization of Position ProviderS, Anja Bekkelien, University of Geneva, SWITZERLAND	81 Fingerprinting Based Localisation Revisited, Christian Beder, Cork I nstitute of Technology, IRELAND	20 Complexity-reduced FootSLAM for Indoor Pedestrian Navigation, Maria Garcia Puyol, German Aerospace Center (DLR), GERMANY	84 Calibration of Smartphones for the use in indoor navigation, Harald Sternberg, Hafen-City University, GERMANY
	138 A Smartphone Application for an Innovative User Supporting Location Based Shopping Experience, Martin Krammer, Graz University of Technology, AUSTRIA	154 Improving the Positioning Accuracy using Virtual Access Points in the Border Area, MyungIn Ji, Electronics and Telecommunications Research Institute, KOREA	71 ActionSLAM: Using location-related actions as landmarks in pedestrian SLAM, Michael Hardegger, ETH Zurich, SWITZERLAND	112 Pockets Mattering: Indoor Pedestrian Tracking with Commercial Smartphone, Feng Hong, Ocean University of China, CHINA
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17:30-18:30	Demos			
18:30-20:30	Demos	Reception/Ice break		

Wednesday 14 November 2012

9:00-10:00	**Session 5: Keynote 2**	**The indoor standards baby steps**	**Dr. Lauri Wirola, Nokia**	**Chair: Dr. Rainer Mautz, IPIN 2012 Conference Chair**	
10:00-10:25	Morning tea				
10:25-11:50	**Session 6A: Pseudolite JINLING WANG**	**Session 6B: WLAN MICHAL PIETRZYK**	**Session 6C: SLAM CLAUDE SAMMUT**	**Session 6D: Foot-Mounted CHRIS RIZOS**	**Session 6E: Poster session 1**
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	30 INS and GNSS Fusion Enhancement based on a Weighted Reliabilities Approach, Alexandre Patarot, CEA, LIST, FRANCE	132 802.11 Network Planning based on ESBEA Evolutionary Algorithm to Improve Location Accuracy, Philippe Canalda, CEA-Leti, FRANCE	146 A Reference System for Indoor Localization Testbeds, Simon Schmitt, Freie Universitat Berlin, GERMANY	160 A note on the limitations of ZUPTs and the implications on sensor error modeling, John-Olof Nilsson, KTH Royal Institute of Technology, SWEDEN	
11:50-12:50	Session 7: Industry panel	Chair: Prof. Sverre Holm			
12:50-13:50	Lunch				
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	16 Camera-Assisted Localization of Passive RFID Labels, Theresa Nick, TU Dortmund University, GERMANY	72 Indoor Localisation with UMTS compared to WLAN, Ulrich Birkel, Technische Hochschule Mittelhessen, GERMANY	232 Image Based Localization with Sparse Database Using Panning Query Images, Tetsuo Inoshita, NEC Corporation, JAPAN		
15:35-16:00	Afternoon Tea				
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17:25	Go to Darling Harbour
19:00-23:00	Harbour Cruise

Thursday 15 November 2012

9:00-10:00	**Session 10: Keynote 3**	**From Rats to Robots: Bio-inspired Localization and Navigation**	**Prof. Gordon Wyeth, Queensland University of Technology**	**Chair: Prof.Chris Rizos. IPIN 2012 Conference Chair**
10:00-10:25	Morning tea			
10:25-12:10	**Session 11A: Pseudolite JOEL BARNES**	**Session 11B: WLAN FILIPE MENESES**	**Session 11C: Ultrasound CHRIS RIZOS**	**Session 11D: RSS ALEXANDER BEETZ**
	25 Optical and Radio Calibration of the Repealite Based Indoor Positioning System, Ikhlas Selmi, Institut Mines-Telecom, Telecom SudParis, FRANCE	28 Automated WLAN Calibration with a Backtracking Particle Filter, Moritz Kessel, Ludwig-Maximilians-University Munich, GENRMANY	10 Ultrasound positioning based on time-of-flight and signal strength, Sverre Holm, University of Oslo, NORWAY	115 Enhancing Cooperative Localization by Exploiting Human-Induced Effects on RSS-based Ranging Measurements, Francescantonio Della Rosa, Tampere University of Technology, FINLAND
	60 Ambiguity Resolution and Validation in Precise Pseudolite Positioning, Tao Li, University of New South Wales, AUSTRALIA	54 Optimization of Rank Based Fingerprinting Localization Algorithm, Peter Brida, University of Zilina, SLOVAKIA	61 An Information Addition Technique for Indoor Self-localization System Using SS Ultrasonic Waves, Hiromichi Yoshiga, Soka University, JAPAN	118 Adding Link Quantity Information to Redundant RF Signal Strength Estimates for Improved Indoor Positioning, Andreas Fink, Rostock University, GERMANY
	111 Doppler Positioning with Orientation Estimation by Using Multiple Transmitters for High-accuracy IMES Localization, Yoshihiro Sakamoto, Waseda University, JAPAN	55 RSS-based Indoor Positioning Accuracy Improvement Using Antenna Array in WLAN Environments, Yue Rong, Curtin University, AUSTRALIA	100 Indoor Positioning for Moving Objects Using A Hardware Device with Spread Spectrum Ultrasonic Waves, Yuya Itagaki, Soka University, JAPAN	156 Multi-technology RF fingerprinting with leaky-feeder in underground tunnels, Fernando Pereira, European Organization for Nuclear Research, SWITZERLAND
	142 Calibration of Dead Reckoning with IMES for Pedestrian Navigation, Masaki Hidaka Keio University, JAPAN	69 Device Signal Strength Self-Calibration using Histograms, Christos Laoudias, University of Cyprus, CYPRUS	186 Angular Dependence of Transducers for Indoor Positioning System Using SS Ultrasonic Waves, Akimasa Suzuki, Soka University, JAPAN	59 DactyLoc: A minimally geo-referenced WiFi+GSM-fingerprint-based localization method for positioning in urban spaces, Martin Wirz, ETH Zurich, SWITZERLAND
			40 Feasibility of ultrasound positioning based on signal strength, Sverre Holm, University of Oslo, NORWAY	
12:10-13:00	Lunch			
13:00-14:20	**Session 12A: Geomagnetism BRUCE HARVEY**	**Session 12B: UWB JORG BLANKENBACH**	**Session 12C: Audio SVERRE HOLM**	**Session 12D: Blind & Visually Impaired BINGHAO LI**
	99 A Feasibility Test for Indoor Magnetic Field Prediction, Seung-Sep Kim, Chungnam National University, KOREA	68 A Constraint Approach for UWB and PDR Fusion, Isaac Skog, CSIC-UPM, SPAIN	23 Indoor localization using controlled ambient sounds, Don Kimber, University of California, UNITED STATES	67 Efficient, Authentication and Access control Implementation in Mobile Ad hoc Networks (MANET) as applied to Indoor Navigation Guidance System for Vision Impaired People, Lakmal Rupasinghe, Curtin University, AUSTRALIA
	141 A robust and precise 3D indoor positioning system for harsh environments, Abdelmoumen Norrdine, RWTH Aachen University, GERMANY	79 System Simulation for M-Sequence Radar Sensors, Markus Robens, RWTH Aachen University, GERMANY	27 Acoustic Receivers for Indoor Smartphone Localization, Joachim Hoppe, University of Freiburg, GERMANY	175 Indoor Positioning System based on Sensor Fusion for the Blind and Visually Impaired, Thomas Gallagher, University of New South Wales, AUSTRALIA
	95 Indoor Positioning Sytem Using Geomagnetic Anomalies for Smartphones, Seong-Eun Kim, Samsung Electronics, KOREA	E003 Ultra-wideband Technology-based Localization Platform - Architecture & Experimental Validation, Piotr Karbownik, Fraunhofer Institute for Integrated Circuits, GERMANY	209 Audio Beacon Providing Location-Aware Content for Low-End Mobile Devices, André M. Cavalcante, Nokia Institute of Technology (INdT), BRAZIL	98 AccessBIM model for environmental characteristics for vision impaired indoor navigation and way finding, J.A.D.C.Anuradha Jayakody, Curtin University, AUSTRALIA
	49 Geomagnetism-based indoor location estimation method for future smartphone, Eung Sun Kim, Samsung Electronics, KOREA	34 CUPID algorithm for indoor multipath-aided cooperative localization using a single anchor, Heidi Steendam, Ghent University, BELGIUM	168 Acoustic Self-calibrating System for Indoor Smartphone Tracking (ASSIST), Fabian Höflinger, University of Freiburg, GERMANY	203 Indoor navigation for the visually impaired: Where are we today?, Elyse Wise, University of New South Wales, AUSTRALIA

14:20-14:45	Afternoon tea			
14:45-15:50	**Session 13A: HSGNSS ALLISON KEALY**	**Session 13B: UWB MICHAL PIETRZYK**	**Session 13C: Requirements THOMAS GALLAGHER**	**Session 13D: Geodetic CRAIG ROBERTS**
	48 Stability Analysis of Tracking Weak GPS Signals through Non-coherent Ultra-tight GPS/INS Integration, Yong Li, University of New South Wales, AUSTRALIA	65 A Mobile Security Robot equipped with UWB-Radar for Super-Resolution Indoor Positioning and Localisation Applications, Rahmi Salman, Universität Duisburg, GERMANY	74 Requirements and Metrics for Location and Tracking for Ambient Assisted Living, Adriano Moreira, University of Minho, PORTUGAL	32 Uncertainty Estimation for Kinematic Laser Tracker Measurements, Thomas Ulrich, Karlsruhe Institute of Technology (KIT), GERMANY
	64 RRLP (LPP and LPPe) Based Open Source Mobile Multi-GNSS Assisted GNSS Assistance Model, Architecture Proposal and Test results of OSGRSv3 on LTE LBS Framework, Ali Sarwar, University of New South Wales, AUSTRALIA	183 Time-Reversal UWB positioning beacon for railway application, Bouna Fall, Univ. Lille Nord de France, FRANCE	158 Constraints for different locomotion types and their role in subspacing of indoor environments for indoor navigation, Aftab Ahmed Khan, Technical University Berlin, GERMANY	93 Indoor Localization System based on Galvanometer-Laser-Scanning for numerous Mobile Tags (GaLocate), Jan Kokert, University of Freiburg, GERMANY
	185 Seamless combination of indoor and outdoor precise positioning technology, Zhi Chen, China Aerospace Science and Industries Academy of Information Technology, CHINA	97 Proposed Regulatory Arrangements for Ultra-Wideband Services in Australia, Gabriel Phillips, Australian Communications and Media Authority, AUSTRALIA	80 MapUme: Smartphone Localisation as a Service - a cloud based architecture for providing indoor localisation services, Christian Beder, Cork Institute of Technology, IRELAND	130 Separation of Control Quality and Measurement Accuracy for Guiding Control Tasks of an Indoor Construction Machine Simulator, Alexander Beetz,University of Stuttgart, GERMANY
15:50-16:15	**Closing session**	**Best paper award, Best student paper award, announce the host organisation of IPIN 2013**	**Chair: Dr. Rainer Mautz, IPIN 2012 Conference Chair**	

Posters			
102	Adaptive Drop Beacon Algorithm to Mitigate the Border Area Effect	Jooyoung Kim, Myungin Ji, Youngsu Cho, Yang Koo Lee and Sang Joon Park	Electronics and Telecommunications Research Institute, KOREA
205	Data fusion algorithm for indoor navigation based on multi-sensor approach	Dirk Baumbach, Denis Grießbach and Sergey Zuev	German Aerospace Center (DLR), GERMANY
122	Position and Rotation Estimation for Mobile Robots Straying from a Recorded Path Using Ego-motion	Tatsuya Shoji, Yoshinobu Hagiwara and Hiroki Imamura	Soka University, JAPAN
139	Automatic change detection based on normal camera in indoor environment	Juan Shi, Jinling Wang and Yaming Xu	University of New South Wales, AUSTRALIA; Wuhan University, CHINA
230	Experimental Validation of the Ultra-wideband Technology-based Localization Platform	Piotr Karbownik, Grzegorz Krukar, Michal M. Pietrzyk, Norbert Franke and Thomas von der Gruen	Fraunhofer Institute for Integrated Circuits, GERMANY
229	An Implementation of a Sub-nanosecond UWB Pulse Generator	Piotr Karbownik, Grzegorz Krukar, Michal M. Pietrzyk, Norbert Franke and Thomas von der Gruen	Fraunhofer Institute for Integrated Circuits, GERMANY
224	Comparison of QCLS Location Algorithms Using Two-Way Ranging Measurements	Jeongmin Lim, Ji- Won Park, Tae-Kyung Sung	Chungnam National University, KOREA
124	Pedestrian indoor navigation using two foot-mounted IMUs	Tran Nhat Hung and Young Soo Suh	University of Ulsan, KOREA
90	Design of System Architecture for Indoor Location Based Services	Yang Koo Lee, Myungin Jee, Youngsu Cho, Jooyoung Kim, Sangjoon Park	Electronics and Telecommunications Research Institute, KOREA
211	Calibration of Laser Bundles for Optical Indoor Positioning Systems	Sebastian Tilch and Rainer Mautz	ETH Zurich, SWITZERLAND
47	User tracking using a wearable camera	Milan Redzic, Conor Brennan and Noel E O'Connor	Dublin City University, IRELAND
194	Precision indoor propagation of ephemerides of navigational satellites	Sergey Kudryavtsev	M.V. Lomonosov Moscow State University, RUSSIA
46	Mirror Worlds for Indoor Navigation and Awareness	Don Kimber, David Lee, Jim Vaughan, Jacob Biehl, Mathew Cooper and Jun Shingu	FX Palo Alto Laboratory, UNITED STATES; Fuji Xerox, JAPAN
106	An Algebraic Solution to the Multilateration Problem	Abdelmoumen Norrdine	RWTH Aachen University, GERMANY

SOCIAL EVENTS

All the information below is available on our website in the Main Events > Social events section.

Welcome Reception – Tuesday 13 November, 2012 (inclusive for all full symposium registrants only) 6:30pm –8:30pm - The Pavilions, UNSW – Kensington Campus

Enjoy the demonstrations; relax with a drink and canapés. Additional tickets: $40.00 per ticket

Harbour cruise - Wednesday 14 November, 2012 (Inclusive for full symposium registrants only) 7:00pm – 11:00pm – Darling Harbour, Sydney

The Harbour Cruise is the ideal opportunity to catch up with friends – old and new, in a relaxed enviroment. Enjoy the buffet, drinks, and of course the magnificent views on the world famous, Sydney Harbour. Additional tickets: $40 per ticket

The Harbour cruise will leave from the following wharf in Darling Harbour: **Pier 26 King St Wharf Darling Harbour** (next to Sydney Aquarium, in front of Wild Life World) *Be on time as the boat will not wait for you if you are late!*

If coming by car the nearest parking is:
Wilson Parking Citipark: 431 Kent Street, Sydney, NSW, 2000. For more details see link below
http://www.carparking.info/Sydney/Wilson-Parking-Citipark/431-Kent-Street.aspx

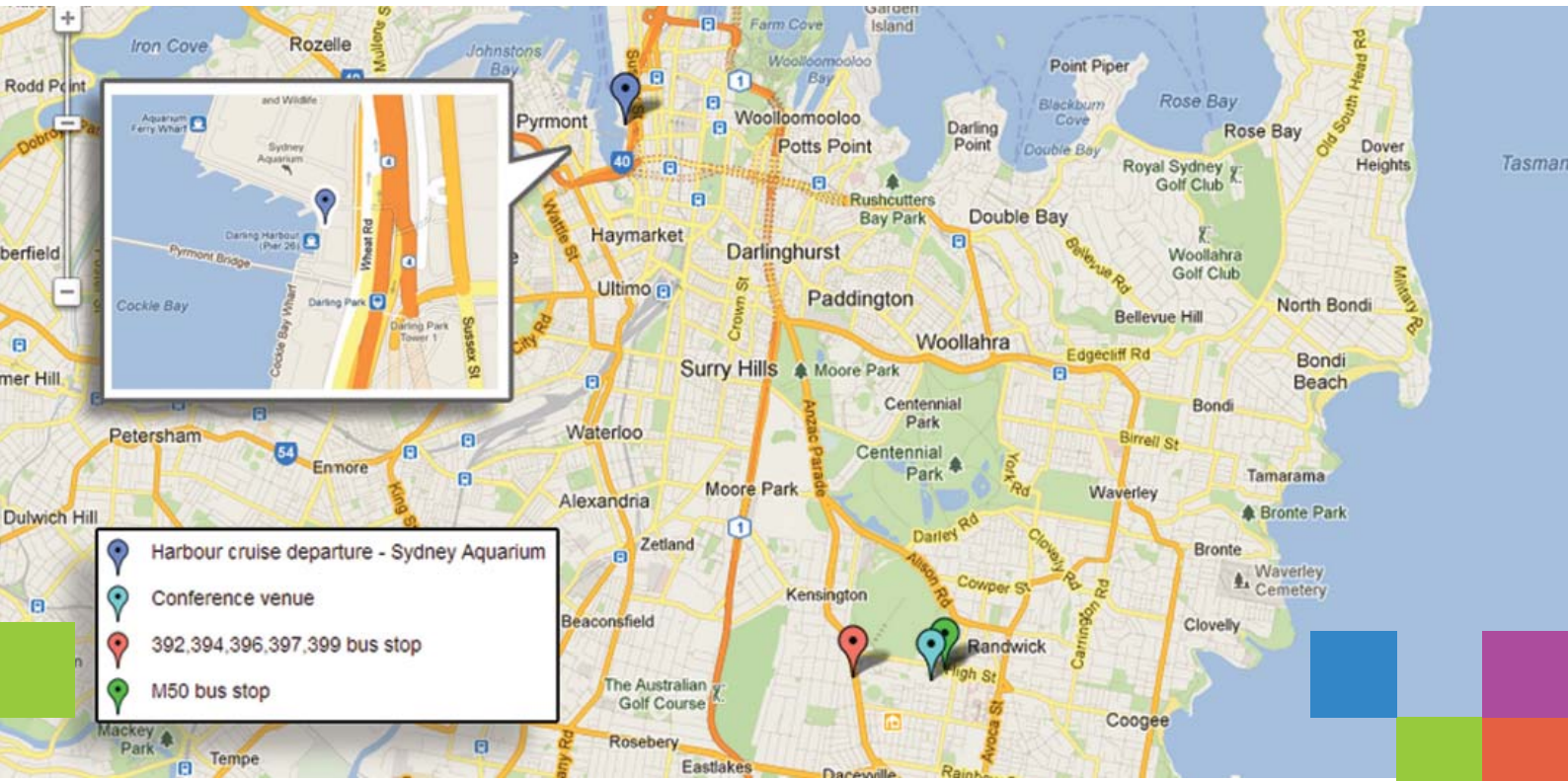
If catching public transport, you can take any of the following buses that stop near the Darling Harbour Precinct. A complete public transport map of Sydney is also available on the 131500 website
http://www.131500.com.au/maps/upload/docs/R9_eastern_region_guide_map.pdf

- **Take the M50 bus**

  Departure: High St nr Gate 9 UNSW, Randwick. This is a prepaid service. Purchase a ticket at a **PrePay** outlet before boarding.
  Arrival: Druitt St nr Kent St, Sydney, Walk to Darling Harbour (Pier 26), Sydney - 528 metres

- **Take the 392, 394, 396, 397 or 399 bus**

  Departure: Anzac Parade opposite UNSW Main Gate, Kensington.
  This is a prepaid stop between 7am and 7pm Monday to Friday. Purchase a ticket at a **PrePay** outlet before boarding.
  Arrival: Elizabeth St Nr Market St, Sydney, Walk to Darling Harbour (Pier 26), Sydney - 855 metres.



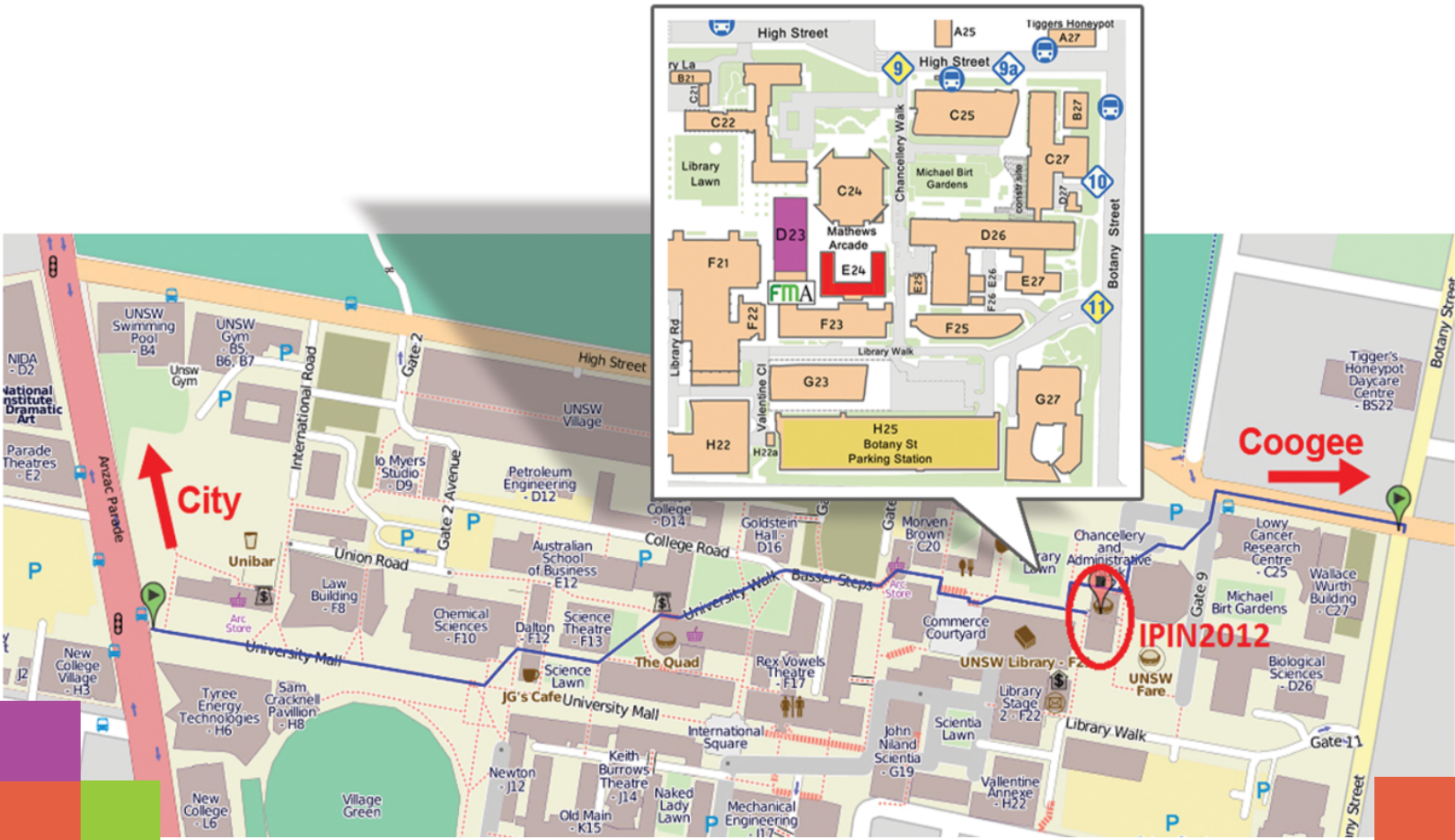
IPIN2012 Website

All the information contained in this brochure and much more is available on our website at the following address: **http://www.surveying.unsw.edu.au/ipin2012/**

The Location - University of New South Wales – Kensington Campus

The University of New South Wales (UNSW) is one of the leading teaching and research Universities in Australia. Located in Sydney, the University of New South Wales is situated near the business hub of Australia's largest city, providing easy access to a wide range of academic, cultural and social activities, and less than 5km from some of the most famous beaches in the world.

Matthews Theatre (D23) is the venue for keynotes, panel discussion and oral presentations. The Pavilions (E24) is the location for the demonstrations, exhibition and interactive poster presentations. All catering will be served in this area.



Access by Bus:

Delegates who are travelling from Coogee Beach to UNSW each day, can do so from Arden Street on Bus 370). The drop off point at UNSW is the High St. and Botany St. corner. Gate 9 is the closest pedestrian access, just a short walk to the conference venue.

At the end of the day, Bus 370 will stop at the High St. and Botany St. corner and travel to Coogee Beach, a 10-15 minute ride. Apart from accommodation advertised for delegates at Coogee Beach, there is a multitude of restaurants to choose from.

Further information can be found on the following website by entering (370) into the timetable and map search on the right hand side of the page: **www.sydneybuses.info**

Alternatively, Coogee Beach is only, 20-25 minutes walk from UNSW.

On Site Parking and Vehicular Accessibility:

All day parking is available on the upper floors of the Botany Street Parking Station – enter via gate 11. The cost for metered parking is $3 per hour, all day parking = minimum $6 for 3 hours, and $2.00/hr thereafter up to 12 hours (cash and credit card payment) Gold coins are required.

UNSW Maps for Kensington Campus, Matthews Theatre, the Pavillions and Parking Stations can be accessed by linking to
http://www.facilities.unsw.edu.au/Maps/maps.html

Temperature

During November the average temperatures in Sydney can range between 16° and 24° C (61° and 75° F)

Registration Desk Opening Hours

- Monday, 12 November 2012
  3:00pm – 5:00pm
- Tuesday, 13 November 2012
  8:00am – 5:00pm
- Wednesday, 14 November 2012
  8:30am – 5:00pm
- Thursday, 15 November 2012
  8:30am – 2:00pm

Restaurants

There are an abundant number of restaurants to suit all tastes and budgets to choose from within easy walking distance of the University at Randwick and in the Coogee Bay area.

Dress

A good standard of casual dress is required for attending the conference. Dress for the Harbour Cruise is smart casual. The weather can be very warm, so cool loose clothing is recommended for all functions. Don’t forget to bring your swimming attire for an early morning swim at the beach.

Name Badges and Tickets

Your name badge must be worn at all times, as it is your entry to all sessions and inclusive functions. Entry to social events will also not be permitted unless you present the ticket that will be given to you when you register.

THIRD INTERNATIONAL CONFERENCE ON INDOOR POSITIONING AND INDOOR NAVIGATION (IPIN 2012)

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