

Sigma Delta ($\Sigma\Delta$) Architecture Integration with Digital Pre-Distortion to Enhance Optimal Switch Mode Power Amplification (OSMPA) in FEMTO Cell Transceiver Design

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Abstract— The work presented in this paper aims to develop an optimized switch mode power amplifier (OSMPA) using existing techniques in sigma delta ($\Sigma\Delta$) architecture that will lead to the design of low cost, low power consumption transceivers with flexible frequency transmission. This design will allow all digital tunability and eliminate the need for cascaded analog components. The implementation will improve the output spectrum using the Cartesian $\Sigma\Delta$ structure by removing unwanted spectral components when the carrier frequency of the transmitted signal is changed. In addition, the new approach will improve the bandwidth and carrier frequency range by removing the noise and distortion products. Simulation results show that the new approach enables operation in the cellular frequency bandwidth with improved spectral efficiency.

Keywords— component; Optimised Switch Mode Power Amplifier (OSMPA); Sigma Delta Architecture; Low power; Spectral efficiency

I. INTRODUCTION

Existing network providers find it difficult to provide high data rates for indoor wireless coverage due to low spectral efficiency and uncontrollable channel conditions. As a result, this has motivated the recent emergence of Femtocell architectures [1-5]. According to [6], the mobile traffic generated in the indoor locations is expected to reach 81% (55% of all mobile traffic will occur at home and 26% will occur in the office). This percentage has been increasing over time and is expected to increase further. If a user has a home base station at his/her home (and office), then the existing macrocell networks need only carry the remaining 19% of traffic which is generated at outdoor locations. Femtocell networks rely on sharing frequencies with other similar networks [1][2] while enhancing the capacity and coverage indoors, consequently this activity may cause interference to other users in surrounding networks [3-5]. Therefore, Femtocell transceivers need to be low powered to

reduce their interference footprints. They should also have frequency flexibility to change channel quickly and avoid interference from other Femtocells. Next Generation Femtocell Base Stations (BS) will need to be small, low cost, power efficient, and frequency flexible if they are to meet the key challenges of achieving cost-efficient provision of coverage and capacity [7] [8]. This has led to renewed interest in transceiver architectures based on Pulse Width/Position Modulated signals (PWM/PPM) in Figure 1 where these signals can be generated from a polar representation of the transmitted signals. It is normal to quantise the phase and magnitude components of the modulation such that the pulse edges align with the digital clock (for synchronous digital design). Sigma Delta ($\Sigma\Delta$) modulation techniques applicable in Figure 2 can be used to suppress the quantisation noise but can generate unwanted spectral components when the carrier frequency of the transmitted signal is changed. Unacceptable noise and distortion occurs when the transmission is not centred on the nominal carrier frequency. Transmitters based on this technique are not qualified for frequency flexibility. The proposed work will therefore focus on methods to eliminate the noise and distortion products.

II. ANALYSIS OF EXISTING ARCHITECTURE

Existing 3G Base Stations require high efficiency linear radio RF-PAs. All nonlinear classes can be operated with a switching input waveform hence RF pulse width/position modulation (RF PWM/PPM) is an important technique in switched mode transmitter architectures. A novel all-digital approach to generate a pulse train to drive switch mode power amplifiers was proposed by [9]. In this work, it shows a better adjacent channel noise performance through the output with 1-bit drive signal from SMPAs. [10] Developed a system model to generate an appropriate binary signal in the pulse width and the pulse

position products to correct the amplitude and phase of the RF signal. [11] RF PWM/PPM enables the usage of highly efficient SMPA. Therefore, this concept makes RF PWM/PPM topologies feasible for GHz frequency band allowing usage for wireless application. $\Sigma\Delta$ Techniques shape the noise away from the band of interest where they operate by subtracting the current quantised error signal from subsequent samples [12]. This error feedback causes the $\Sigma\Delta$ system to act as a filter with separate transfer function for the noise and the signal. Higher $\Sigma\Delta$ orders have greater noise shaping capabilities. [13] and [14] simulated the 3rd order Lowpass $\Sigma\Delta$ scheme to improve the noise shaping for high frequency application. Noise in the band of interest is lower but out-of-band noise is larger. The latter must be removed by an analog output bandpass filter (Figure 1). In order to keep the BPF's insertion loss and complexity at a reasonable level, low $\Sigma\Delta$ orders (first/ second) are preferred Figure 2 and 3. There are three basic $\Sigma\Delta$ architectures that have been proposed in previous work namely Bandpass, Polar, and Cartesian.

III. COMPARATIVE DESIGN TECHNIQUE ANALYSIS

A bandpass filter (BPF) is used to remove the switching harmonics, leaving the required RF output (Figure 1). [15] Proposed a bandpass $\Sigma\Delta$ modulator used to produce a two-level (digital) signal representing an analog RF input. Subsequently, a switching-mode amplifier and bandpass filter are used to amplify the signal and remove unwanted spectral components. The BPF is used to remove unwanted spectral components from the output with a different approach that used the implementation of GaAs heterojunction bipolar transistor (HBT) technology.

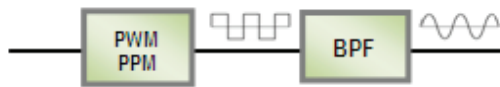


Figure 1. BPF for RF PWM/PPM output.

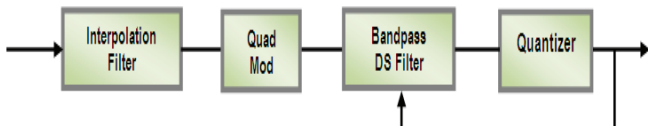


Figure 2. Bandpass $\Sigma\Delta$ Architecture [16].

This design allows the input baseband signal to be sample rate interpolated to a sampling frequency that is four times the required RF carrier frequency.

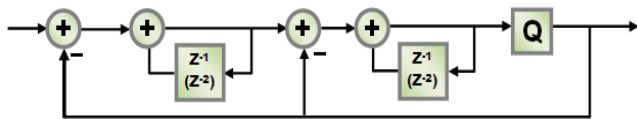


Figure 3. 2nd order low-pass $\Sigma\Delta$ (Bandpass uses Z^{-2} instead of Z^{-1}).

The quadrature modulation block upconverts the baseband signal to the RF carrier. The $\Sigma\Delta$ filter uses a bandpass structure, which is obtained by replacing Z^{-1} with Z^{-2} in traditional the low pass $\Sigma\Delta$ structures.

One problem is that the output signal can have more than one pulse per half period of the RF carrier. This can potentially increase switching losses. To solve this problem, the polar $\Sigma\Delta$ structure was proposed in [10, 17, and 18]. Authors in [10], [17], and [18] have studied the Polar $\Sigma\Delta$ structure in Figure 4. The $\Sigma\Delta$ filters for the phase signal must be modified to handle the phase wrap-around. The polar components have a wider bandwidth than the I-Q components, and this limits the modulation bandwidth of this structure.

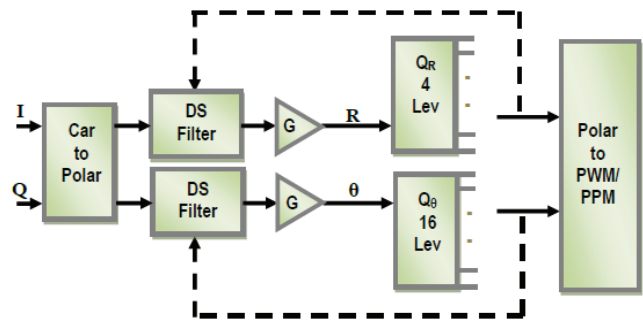


Figure 4. Polar $\Sigma\Delta$ Architecture.

Another problem is unwanted spectral components which arise when baseband polar signals are upconverted to RF using PWM/PPM techniques as in Figure 6. [17] Investigated that the dominant distortions are shown to be 3rd order harmonic and image components generated in the PPM circuit ('Polar to PWM/PPM' block). Cartesian filtering has been introduced in [18-20] to solve these problems.

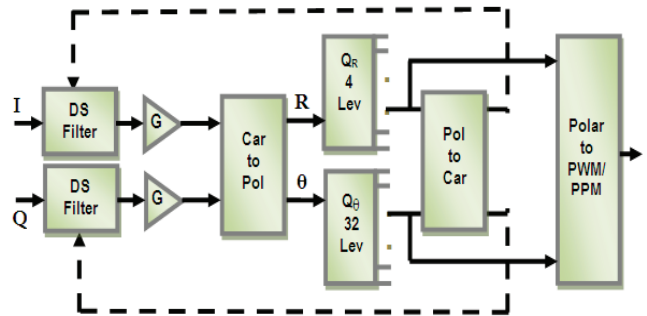


Figure 5. Cartesian $\Sigma\Delta$ Architecture.

The Cartesian $\Sigma\Delta$ structure [19] can be seen in Figure 5. It consists of second-order modulation (MOD2) lowpass $\Sigma\Delta$ [12] for the Cartesian I and Q input signals. After $\Sigma\Delta$ filtering I and Q signals are converted to polar co-ordinates [R, θ] and separately quantised in the Q_R and Q_θ blocks. The Gain block (normally set

to $G \leq 1$) works to improve efficiency (by reducing the number of switching edges) at the expense of a degraded spectrum [10]. The output of the quantisers are converted back to Cartesian coordinates (removing bandwidth expansion) and fed as feedback to the $\Sigma\Delta$ filters. The outputs of both quantisers are also upconverted to RF using PWM/PPM techniques in the ‘polar to PWM/PPM’ block.

While reducing the bandwidth expansion, the Cartesian $\Sigma\Delta$ may still cause unwanted spectral components (Figure 5 and 6). [20] Established that in a single carrier environment, an increase in offset frequency increases the unwanted spectral components. The 3rd order harmonic and image components are the dominant distortions as shown in Figure 6. The PPM block is responsible for these distortions.

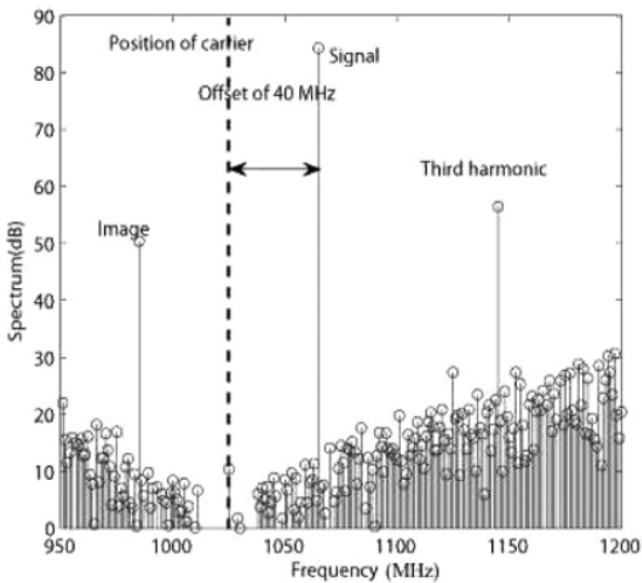


Figure 6: SSB output spectrum from a Cartesian $\Sigma\Delta$ where the distortions are from the PWM/PPM. The image and harmonic products are also shown ($f_c=1024$ MHz and $f_{ssb}=40$ MHz) [20].

IV. DESIGN PROPOSAL OF OSMPA WITH DPD CASCADE AND ACHIEVED RESULTS

Based on previous work by [20], one possible solution is to introduce digital pre-distortion based on the rate of phase change of the input signal as in Figure 7. This approach is to try and eliminate noise and distortion products.

This structure will allow all digital tunability and eliminate the need for analog components. The design improves the output spectrum of switched mode RF-PAs using the Cartesian technique. This involves removing unwanted spectral components when the carrier frequency of the transmitted signal is changed. To improve the bandwidth and carrier frequency range by removing the noise and distortion products.

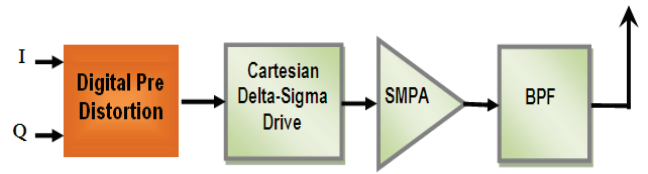


Figure 7. Proposed system design.

This will enable operation in the cellular frequency bandwidth, increasing the applicability of the scheme and will improve spectral efficiency. To demonstrate the scheme viability, a prototype is implemented in digital hardware using a field-programmable gate array (FPGA). The quantization noise in the signal spectra is shaped by the $\Sigma\Delta$ noise transfer function (NTF) where the noise power spectral density (PSD) increases as the frequency deviates from the nominal centre frequency. Pre-emphasis of the input signal can be used to boost signals that are offset from the nominal carrier frequency (Figure 8 and Figure 9). This will then compensate the increased noise and distortion products in this region. Such a scheme is commonly used for frequency modulation (FM) transmission, but the accuracy of this technique in this application is yet to be tested.

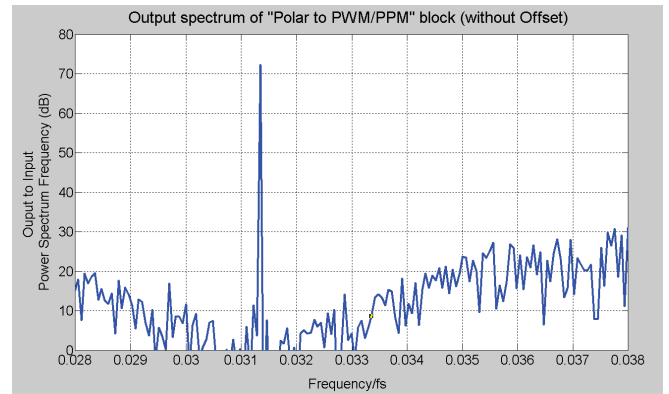


Figure 8. Output of Polar to PWM/PPM block without offset

V. CONCLUSION

So far simulation results have shown that the approach we have taken will lead to determining where the image and harmonic products are located in the given bandwidth and hence eliminate them using the architecture depicted in Figure 7. The quantization noise in the signal spectra is shaped by the $\Sigma\Delta$ noise transfer function (NTF). The noise power spectral density (NPSD) increases as the frequency deviates from the nominal centre frequency. Pre-emphasis of the input signal can be used to boost signals that are offset from the nominal carrier frequency. This will then compensate the increased noise and distortion products in this region. More work will need to be done to fully optimise the proposed architecture.

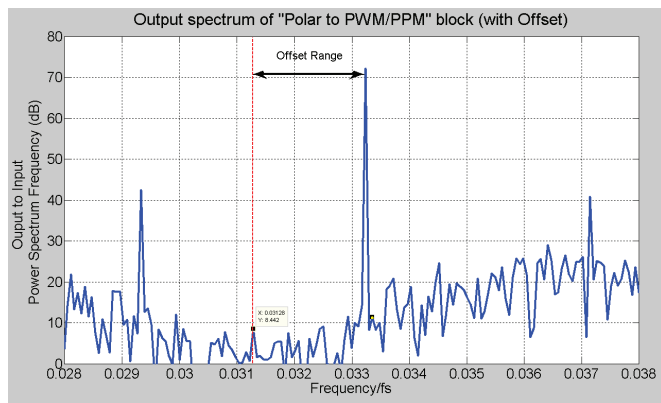


Figure 9. Output of Polar to PWM/PPM block without offset

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ICICS 2011 – PROGRAM AT A GLANCE

Wednesday, 14 December 2011	0900 - 1030	Opening Ceremony Keynote Speech 1: Internet for the social beings - The future of the Internet? by <i>Dr. Rajiv LAROIA</i> , Senior Vice President and Chief Technology Officer, Sonus Networks, USA					
	1030 - 1100	Tea and Coffee Break					
	1100 - 1230	Technical Sessions - WA					
		Pink Azalea	White Azalea	Red Azalea	Green Orchid	Yellow Orchid	Red Gardenia
		WA1 Biomedical Signal Processing I	WA2 Image and Information Retrieval	WA3 Direction of Arrival	WA4 (Special Session) Emerging Technologies in Cooperative Communication Networks	WA5 MIMO and Space Time Communication	WA6 Optical Communication I
	1230 - 1330	Lunch					
	1330 - 1530	Technical Sessions - WM					
		WM1 (Special Session) Human Centered Systems	WM2 Object Recognition	WM3 Speech Signal Processing	WM4 Wireless Communication I	WM5 Equalization and Detection	WM6 Communication Networks
1530 - 1600	Tea and Coffee Break						
1600 - 1800	Technical Sessions - WP						
	WP1 (Special Session) Large Scale Visual Object Search and Categorization	WP2 Image Processing	WP3 Statistical & Array Processing	WP4 Signal Processing for Communication I	WP5 Coding and Modulation	WP6 Ad-Hoc Networks	

Thursday, 15 December 2011	0900 - 1000	Keynote Speech 2: Personal audio and active control of sound in the environment by <i>Prof. Steve ELLIOTT</i> , Institute of Sound and Vibration Research, University of Southampton, United Kingdom					
	1000 - 1030	Tea and Coffee Break					
	1030 - 1230	Technical Sessions - TA					
		TA1 Data Mining & Databases	TA2 Image Analysis	TA3 Audio Signal Processing	TA4 Signal Processing for Communication II	TA5 Mobile Communication	TA6 (Special Session) Recent Advances of Green Optical Networks
	1230 - 1330	Lunch					
	1330 - 1500	Technical Sessions - TM					
		TM1 Biomedical Signal Processing II	TM2 Image/Video Analysis	TM3 (Special Session) Recent Advances on Adaptive Filtering	TM4 System Identification & Modeling	TM5 Antennas & Propagation	TM6 Optical Communication II
	1500 - 1530	Tea and Coffee Break					
1530 - 1900	Visit to Images of Singapore, Sentosa						
1900 - 2130	Conference Banquet						

Friday, 16 December 2011	0900 - 1030	Panel Session: Smart Device Communications/M2M In Support of A Sustainable Future - Opportunities & Challenges moderated by <i>Mr. Anil KRIPALANI</i> , President, WirefreeCom Inc., USA; Ex - Senior VP, Qualcomm, USA					
	1030 - 1100	Tea and Coffee Break					
	1100 - 1230	Technical Sessions - FA					
		FA1 Transforms & Spectrum	FA2 Watermarking and Authentication	FA3 Acoustic Signal Processing	FA4 Signal Processing Architecture	FA5 Cooperative Relay Communication	FA6 Wireless Sensor Networks
	1230 - 1330	Lunch					
	1330 - 1530	Technical Sessions - FM					
		FM1 Filters and Filter Bank	FM2 (Special Session) Computer Vision	FM3 (Special Session) Recent Advances in Multimedia & Human Computer Interfaces	FM4 Wireless Communication II	FM5 Network Applications	FM6 Optical Networks
	1530 - 1600	Tea and Coffee Break					
1600 - 1800	Technical Sessions - FP						
	FP1 Biomedical Signal Processing III	FP2 Visualization & Imaging	FP3 Intelligent and Cloud Computing	FP4 Network Coding & Cognitive Radio	FP5 Microwave Circuits & Systems	FP6 Wireless Communication III	

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Session Listing

Session WA1Date : **Wednesday, 14 December 2011**Time : **11:00 - 12:30**Venue : **Pink Azalea****Biomedical Signal Processing I**Chair : **Syed Muhammad G MONIR**
Karachi Institute of Economics
and Technology

WA1.1 (Invited) **11:00 - 11:30****Feedback Active Noise Control System
and Its Application to MRI Noise***Yoshinobu KAJIKAWA*
Kansai University**WA1.2** **11:30 - 11:50****Data-Driven Analysis of Functional MRI
Time-Series using a Region-Growing
Approach***Syed Muhammad G MONIR, *Mohammed
Yakoob SIYAL*
Karachi Institute of Economics and
Technology
*Nanyang Technological University**WA1.3** **11:50 - 12:10****Spread Spectrum for Chaotic
Compressed Sensing Techniques in
Parallel Magnetic Resonance Imaging***Tan TRAN DUC, Vu-Ha LE, Linh Trung
NGUYEN*
Vietnam National University**WA1.4** **12:10 - 12:30****Introduction Of C/A (Covariance/Area)
with Applications to Tooth
Segmentation in Dental CT Image***Yohei KUROIWA*

Session WA2Date : **Wednesday, 14 December 2011**Time : **11:00 - 12:30**Venue : **White Azalea****Image and Information Retrieval**Chair : **Christian PLATZER**
Vienna University of Technology

WA2.1 (Invited) **11:00 - 11:30****Biased Subspace Learning for SVM
Relevance Feedback in Content-Based
Image Retrieval***Lining ZHANG, Lipo WANG, Weisi LIN*
Nanyang Technological University**WA2.2** **11:30 - 11:50****Multi-Feature Content-Based Product
Image Retrieval Based on Region of
Main Object***Lunshao CHAI, Honggang ZHANG, *Zhen
QIN, Jie YU, Yonggang QI*
Beijing University of Posts and
Telecommunications
*University of California, Riverside**WA2.3** **11:50 - 12:10****Fast Music Information Retrieval Using
PAT Tree Based Dynamic Time Warping***ZongChao CHENG, ChingShun LIN,
YiHen CHEN*
National Taiwan University of Science and
Technology**WA2.4** **12:10 - 12:30****Sequence-Based Bot Detection in
Massive Multiplayer Online Games***Christian PLATZER*
Vienna University of Technology

Session WA3Date : **Wednesday, 14 December 2011**Time : **11:00 - 12:10**Venue : **Red Azalea****Direction of Arrival**Chair : **Hon Tat HUI**
National University of Singapore

WA3.1 (Invited) **11:00 - 11:30****Direction-of-Arrival (DOA) Estimation in
the Presence of Array Signal Coupling***Hon Tat HUI*
National University of Singapore**WA3.2** **11:30 - 11:50****Direction of Arrival Tracking in
Impulsive Noise Using Particle Filtering
with Fractional Lower Order Moment
Likelihood***Xionghu ZHONG, A. B. PREMKUMAR, A.
S. MADHUKUMAR*
Nanyang Technological University**WA3.3** **11:50 - 12:10****Optimal Sensor Pairing for TDOA Based
Source Localization in Sensor Networks***Wei MENG, *Wendong XIAO, Lihua XIE*
Nanyang Technological University
*Institute for Infocomm Research, A*STAR

Session WA4 - Special Session

Date : **Wednesday, 14 December 2011**
Time : **11:00 - 12:30**
Venue : **Green Orchid**

Emerging Technologies in Cooperative Communication Networks

Chair : **Wee Peng TAY**
Nanyang Technological University

WA4.1 (Invited) **11:00 - 11:30**

A Preliminary Study on Lifetime Maximization in Clustered Wireless Sensor Networks with Energy Harvesting Nodes

*Pengfei ZHANG, Gaoxi XIAO, *Hwee-Pink TAN*
Nanyang Technological University
*Institute for Infocomm Research, A*STAR

WA4.2 **11:30 - 11:50**

Co-existence with ARQ-Based Primary System through Cooperate-and-Access Spectrum Sharing

*Qiang LI, See Ho TING, *Ashish PANDHARIPANDEY, **Mehul MOTANI*
Nanyang Technological University
*Philips Research, High Tech Campus
**National University of Singapore

WA4.3 **11:50 - 12:10**

Cooperative and Distributed Localization for Wireless Sensor Networks in Multipath Environments

*Mei LENG, Wee Peng TAY, *Tony Q.S. QUEK*
Nanyang Technological University
*Institute for Infocomm Research, A*STAR

WA4.4 **12:10 - 12:30**

A Home-Oriented IPTV Service Platform on Residential Gateway

Pyung-Soo KIM, Soo Ho AHN
Korea Polytechnic University

Session WA5

Date : **Wednesday, 14 December 2011**
Time : **11:00 - 12:30**
Venue : **Yellow Orchid**

MIMO and Space Time Communication

Chair : **Marc A ARMAND**
National University of Singapore

WA5.1 (Invited) **11:00 - 11:30**

Capacity and BER Performance Considerations on Single-Carrier Frequency-Domain Equalization

Fumiyuki ADACHI, Tatsunori OBARA, Tetsuya YAMAMOTO
Tohoku University

WA5.2 **11:30 - 11:50**

Novel Node Pair Selection Algorithms for Sum-Rate Enhancement in MIMO Interference Channel

*Myeong-Jin KIM, Hyun-Ho LEE, Young-Chai KO, *Seungkeun PARK*
Korea University
*Electronic and Telecommunications Research Institute

WA5.3 **11:50 - 12:10**

Novel Block Construction using Tail Sequences for Space Time Block Coded CPM

Wenwen WANG, Saman S ABEYSEKERA
Nanyang Technological University

WA5.4 **12:10 - 12:30**

Keyhole and Multi-Keyhole MIMO Channels: Modeling and Simulation

Hieu Duy NGUYEN, Xuan WANG, Hon Tat HUI
National University of Singapore

Session WA6

Date : **Wednesday, 14 December 2011**
Time : **11:00 - 12:30**
Venue : **Red Gardenia**

Optical Communication I

Chair : **Xiaoke YI**
The University of Sydney

WA6.1 (Invited) **11:00 - 11:30**

Wavelength-Agile Hybrid Passive Optical Networks with Dynamic ONU Re-Grouping Functionality

Xiaofei CHENG, Zhaowen XU, Yong-kee YEO, Xu SHAO, Luying ZHOU
Institute for Infocomm Research, A*STAR

WA6.2 **11:30 - 11:50**

Integration of a Modified Distributed Coordination Function (DCF) in Wireless LAN using IEEE 802.11n to Mitigate Interference and Optimise Transmission Capacity in Full Duplex Gigabits Passive Optical Network (GPON)

Wan Hafiza WAN HASSAN, Horace KING, Mike FAULKNER
Victoria University

WA6.3 **11:50 - 12:10**

Passive Q-Switching in 25-km Ultra Long Cavity All-Fiber Ring Laser

Nanxi LI, Jin XUE, Jia Haur WONG, Kan WU, Chunmei OUYANG, Sheel ADITYA, Perry Ping SHUM
Nanyang Technological University

WA6.4 **12:10 - 12:30**

Dynamic Decision Threshold and Adaptive Coherent Detection in FSO Communication Systems

*Zixiong WANG, Wen-De ZHONG, *Changyuan YU*
Nanyang Technological University
*National University of Singapore / Institute of Infocomm Research, A*STAR

Session WM1 - Special SessionDate : **Wednesday, 14 December 2011**Time : **13:30 - 15:50**Venue : **Pink Azalea****Human Centered Systems**

Chair : **Carlos Antonio ACOSTA CALDERON**
Singapore Polytechnic
Rajesh Elara MOHAN
Singapore University of Technology and Design

WM1.1 **13:30 - 13:50****Automating the Assessment of Rehabilitative Grasping and Reach**

*Tracey K. M. LEE, *Kee Hao LEO, *Sen ZHANG*
Singapore Polytechnic / Monash University
*Singapore Polytechnic

WM1.2 **13:50 - 14:10****Intelli-Sense Bed Patient Movement Sensing and Anti-Sweating System for Bed Sore Prevention in a Clinical Environment**

*Jaichandar Kulandaidasan SHEBA, *Edgar Alonzo Martinez GARCIA*
Singapore Polytechnic
*Universidad Autonoma de Ciudad Juarez

WM1.3 **14:10 - 14:30****An Approach to Design a Robust and Intelligent Multi-Agent System**

Asadollah NOROUZI, Carlos Antonio ACOSTA CALDERON, Changjiu ZHOU
Singapore Polytechnic

WM1.4 **14:30 - 14:50****Virtual Game Approach for Rehabilitation in Autistic Children**

*Weilun LOO, *Rajesh Elara MOHAN, **Edgar Alonzo Martinez GARCIA*
Singapore Institute of Management University
*Singapore University of Technology and Design
**Universidad Autonoma de Ciudad Juarez

WM1.5 **14:50 - 15:10****Extended Neglect Tolerance Model & Human Robot Teams**

*Rajesh Elara MOHAN, *Carlos Antonio ACOSTA CALDERON, *Changjiu ZHOU*
Singapore University of Technology and Design
*Singapore Polytechnic

WM1.6 **15:10 - 15:30****Software Framework for a Humanoid Robotic Arm**

*Jörg WIEDEMANN, Maximilian BARO, Paul SEYBOLD, *Carlos Antonio ACOSTA CALDERON, *Liandong ZHANG*
Munich University of Applied Sciences
*Singapore Polytechnic

WM1.7 **15:30 - 15:50****Development of an Autonomous Service Robot for Social Interactions**

*Carlos Antonio ACOSTA CALDERON, Changjiu ZHOU, *Rajesh Elara MOHAN*
Singapore Polytechnic
*Singapore University of Technology and Design

Session WM2Date : **Wednesday, 14 December 2011**Time : **13:30 - 15:30**Venue : **White Azalea****Object Recognition**

Chair : **Ce ZHU**
Nanyang Technological University

WM2.1 **13:30 - 13:50****A Low Complexity JPEG Domain Face Recognition Approach Using Low Frequency Coefficients**

*M. Shahram MOIN, Alireza SEPASMOGHADDAM, *Hamidreza RASHIDY KANAN*
Islamic Azad University Qazvin Branch
*Bu-Ali Sina University

WM2.2 **13:50 - 14:10****Content and Context Information Fusion for Mobile Landmark Recognition**

Tao CHEN, Kim-Hui YAP, Lap-Pui CHAU
Nanyang Technological University

WM2.3 **14:10 - 14:30****A Soft Relevance Method for Content-Based Scene Categorization in the BoW Framework**

Zhen LI, Kim-Hui YAP, Ce ZHU
Nanyang Technological University

WM2.4 **14:30 - 14:50****Online Structural Analysis for Handwritten Chemical Expression Recognition**

Peng TANG, Siu Cheung HUI, Chi-Wing FU
Nanyang Technological University

WM2.5 **14:50 - 15:10****A Static Hand Gesture Recognition Algorithm using K-Mean Based Radial Basis Function Neural Network**

Dipak Kumar GHOSH, Samit ARI
National Institute of Technology Rourkela

WM2.6 **15:10 - 15:30****Object Recognition by Combined Invariants of Orthogonal Fourier-Mellin Moments**

Qian LIU, Hongqing ZHU, Qian LI
East China University of Science and Technology

Session WM3Date : **Wednesday, 14 December 2011**Time : **13:30 - 15:30**Venue : **Red Azalea****Speech Signal Processing**

Chair : **Eliathamby AMBIKAI RAJAH**
The University of New South Wales

WM3.1 **13:30 - 13:50****Preferred Frame Length for the Short-Time Magnitude Spectrum on Speech Intelligibility and Speech Quality**

Bin JIANG, Jun YANG
Institute of Acoustics, Chinese Academy of Sciences

WM3.2 **13:50 - 14:10****An Adaptive Soft Voice Activity Detector for Automatic Speech Recognition System**

Peng DAI, Ing Yann SOON
Nanyang Technological University

WM3.3 **14:10 - 14:30****Investigation of the Robustness of a Non-Uniform Filterbank for Cognitive Load Classification**

Phu Ngoc LE, Vidhyasaharan SETHU, Eliathamby AMBIKAI RAJAH, Jia Min Karen KUA
The University of New South Wales

WM3.4 **14:30 - 14:50****A Nested Superdirective Generalized Sidelobe Canceller for Speech Enhancement**

Parinaz KHAYERI, Hamid Reza ABUTALEBI, Vahid ABOOTALEBI
Yazd University

WM3.5 **14:50 - 15:10****Complexity Scalability Design in Coding of the Adaptive Codebook for ITU-T G.729 Speech Coder**

*Fu-Kun CHEN, Guan-Ming CHEN, *Yue-Dar JOU*
Southern Taiwan University
*R. O. C. Military Academy

WM3.6 **15:10 - 15:30****Data Fusion for Text-Independent Speaker Identification: Application to NTIMIT**

*Imen TRABELSI, *Dorra Ben AYED*
Institute of Computer Science of Tunis
*National School of Engineering of Tunis-ENIT

Session WM4Date : **Wednesday, 14 December 2011**Time : **13:30 - 15:20**Venue : **Green Orchid****Wireless Communication I**Chair : **Sheng-Chou LIN**
Fu-Jen Catholic University

WM4.1 13:30 - 13:50**Dual Band M-Shaped UWB Patch Antenna for Wireless Body Area Networks***Sunil H. KARAMCHANDANI, Shubham SHUKLA, H. D. MUSTAFA, Shabbir N. MERCHANT, Uday B. DESAI*
Indian Institute of Technology Bombay**WM4.2** 13:50 - 14:10**Combination of Code Orthogonalized Transmitted Reference and Energy Detection in UWB Systems***Salar BYBORDI, *Said NADER-ESFAHANI*
Islamic Azad University South Tehran Branch
*University of Tehran**WM4.3** 14:10 - 14:30**Analysis and Optimization of PAPR in SC-FDMA Systems***Chung Him (George) YUEN, Behrouz FARHANG-BOROJENY*
University of Utah**WM4.4** 14:30 - 14:50**An Improved Synchronization System for OFDM Communications***Jui-Yuan LIN*
Southern Taiwan University**WM4.5 (Invited)** 14:50 - 15:20**Debugging Ants: How Ants find the Shortest Route***Jayadeva ., Sameena SHAH, *Ravi KOTHARI, Suresh CHANDRA*
IIT Delhi
*IBM India Research

Session WM5Date : **Wednesday, 14 December 2011**Time : **13:30 - 15:30**Venue : **Yellow Orchid****Equalization and Detection**Chair : **Hon Tat HUI**
National University of Singapore
Saman S ABEYSEKERA
Nanyang Technological University

WM5.1 13:30 - 13:50**Blind Reconstruction of a Helical Scan Interleaver***Jeonghun JEONG, Dongweon YOON, Jubyung LEE, Sunghwan CHOI*
Hanyang University**WM5.2** 13:50 - 14:10**Adaptive Single-Carrier Transmission Using QRM-ML Block Signal Detection***Tetsuya YAMAMOTO, Fumiyuki ADACHI*
Tohoku University**WM5.3** 14:10 - 14:30**Robust Threshold Compressed Sensing Based Sparse Multipath Channel Estimation in OFDM System***Hui XIE, *Andrieux GUILLAUME, *Yide WANG, *Jean-francois DIOURIS, **Suili FENG*
South China University of Technology / University de Nantes
*University de Nantes
South China University of TechnologyWM5.4** 14:30 - 14:50**Non-invasive, Reflection Coefficient Based Channel Estimation on PLC Systems***H. D. MUSTAFA, Singh ASHUTOSH, Sunil H. KARAMCHANDANI, Shabbir N. MERCHANT, Uday B. DESAI*
Indian Institute of Technology Bombay**WM5.5** 14:50 - 15:10**Blind Robust Multiuser Detection in Asynchronous Chaotic Communication Systems***Raju B. V. S. S. N., *Deergha Rao KORRAI*
S.R.K.R. Engineering College
*Osmania University**WM5.6** 15:10 - 15:30**MMSE Space-Time Multiuser Decision-Feedback Detection in Multiple-Antenna SDMA Systems over Dispersive Fading Channels***Sheng-Chou LIN, Chi-Wei WU*
Fu-Jen Catholic University

Session WM6Date : **Wednesday, 14 December 2011**Time : **13:30 - 15:10**Venue : **Red Gardenia****Communication Networks**Chair : **Peter Han Joo CHONG**
Nanyang Technological University

WM6.1 13:30 - 13:50**Theoretical Analysis of The Modified Binary Countdown Scheme***Koichiro HASHIURA, Hiromasa HABUCHI*
Ibaraki University**WM6.2** 13:50 - 14:10**Research on QoS-Guaranteed Multi-Path Routing Protocol for WVSNS***Zhixing LIU, Jing ZHANG, Li ZHUO, Lei SU*
Beijing University of Technology**WM6.3** 14:10 - 14:30**An Object-Centric Name System for Mobile-Oriented Future Internet***Pyung-Soo KIM, Soo Ho AHN*
Korea Polytechnic University**WM6.4** 14:30 - 14:50**Improving Congestion Control for Concurrent Multipath Transfer through Bandwidth Estimation based Resource Pooling***Samar SHAIENDRA, Ratnajit BHATTACHARJEE, Sanjay Kumar BOSE*
Indian Institute of Technology Guwahati**WM6.5** 14:50 - 15:10**Packet Classification with Filter Categorization***Pi-Chung WANG*
National Chung Hsing University

Session WP1 - Special SessionDate : **Wednesday, 14 December 2011**Time : **16:00 - 18:00**Venue : **Pink Azalea****Large Scale Visual Object Search and Categorization**Chair : **Gang WANG**
Nanyang Technological University**WP1.1** 16:00 - 16:20**Topic Level Sampling Towards Optimized Locality Sensitive Vocabulary Coding***Jie CHEN, Ling-Yu DUAN, *Bing LI, Rongrong Ji, Wen GAO*Peking University
*Peking University / Chinese Academy of Sciences**WP1.2** 16:20 - 16:40**Multiple Instance Boosting with Global Smoothness Regularization***Chaoqun WENG, *Gang HUA, Junsong YUAN*Nanyang Technological University
*Stevens Institute of Technology**WP1.3** 16:40 - 17:00**Multilinear Locality Preserving Canonical Correlation Analysis for Face Recognition***Jiwen LU, *Gang WANG, *Yap-Peng TAN*Advanced Digital Sciences Center
*Nanyang Technological University**WP1.4** 17:00 - 17:20**Fast Kernel Machines for Image Categorization***Gang WANG*

Nanyang Technological University

WP1.5 17:20 - 17:40**Towards Large Scale Land-Cover Recognition of Satellite Images***Noel C. F. CODELLA, *Gang HUA, **Apostol NATSEV, **John R. SMITH*

IBM T.J. Watson Research Center / Stevens Institute of Technology

*Stevens Institute of Technology

**IBM T.J. Watson Research Center

WP1.6 17:40 - 18:00**Non Linear and Dynamic Time Warping Classification of Morphological Patterns Identified from Plethysmographic Observations in the Radial Pulse***Sunil H. KARAMCHANDANI, Mahadesh PANJU, H. D. MUSTAFA, Shabbir N. MERCHANT, Uday B. DESAI, *G. D. JINDAL*Indian Institute of Technology Bombay
*Bhabha Atomic Research Center

Session WP2Date : **Wednesday, 14 December 2011**Time : **16:00 - 18:00**Venue : **White Azalea****Image Processing**Chair : **Lap-Pui CHAU**
Nanyang Technological University**WP2.1** 16:00 - 16:20**Image Denoising using Sparse Approximation with Adaptive Window Selection***Sujit Kumar SAHOO, Wenmiao LU*
Nanyang Technological University**WP2.2** 16:20 - 16:40**An Improved Contrast-Tone Mapping Algorithm for Image Contrast Enhancement***Zhiyuan ZHOU, Xiaokang YANG, Li CHEN, Guangtao ZHAI, Wenjun ZHANG*
Shanghai Jiao Tong University**WP2.3** 16:40 - 17:00**Class-Specific Object Contour Detection by Iteratively Combining Context Information***Cong YAO, Wei SHEN, Xiang BAI, Wenyu LIU*
Huazhong University of Science and Technology**WP2.4** 17:00 - 17:20**Image Interpolation Using a Variation-Based Approach***Jinglun SHI, *Zhilong SHAN*
South China University of Technology
*South China Normal University**WP2.5** 17:20 - 17:40**A Low Complexity Embedded Image Coding Algorithm Using Hierarchical Listless DTT***Ranjan K SENAPATI, Umesh C PATI, Kamala Kanta MAHAPATRA*
National Institute of Technology Rourkela**WP2.6** 17:40 - 18:00**Finite Field DWT and MCKBA for Image Encryption and Its VLSI Realization***Deergha Rao KORRAI, Gangadhar CH*
Osmania University

Session WP3Date : **Wednesday, 14 December 2011**Time : **16:00 - 18:00**Venue : **Red Azalea****Statistical & Array Processing**Chair : **Jie ZHUANG**
University of Electronic Science and Technology of China**WP3.1** 16:00 - 16:20**Source Localization on Solids Using Kullback-Leibler Discrimination Information***Kattukandy Rajan ARUN, Eunice ONG, Andy W. H. KHONG*

Nanyang Technological University

WP3.2 16:20 - 16:40**Handling Missing Data in Medical Questionnaires Using Tensor Decompositions***Justin DAUWELS, Lalit GARG, *Arul EARNEST, **Leong Khai PANG*
Nanyang Technological University*Duke-NUS Graduate Medical School
Tan Tock Seng HospitalWP3.3** 16:40 - 17:00**Matched Subspace Beamforming Using Signal Subspace***Jie ZHUANG, Wei HUANG*

University of Electronic Science and Technology of China

WP3.4 17:00 - 17:20**Transmit Beampattern Synthesis Using Eigenvalue Decomposition In MIMO Radar***Kamal SHADI, Fereidoon BEHNIA*
Sharif University of Technology**WP3.5** 17:20 - 17:40**Extension of the Signal-Subspace Projection Method to Multi-Dimension Using CCA***Jie ZHUANG, Wei HUANG, Hong PANG*
University of Electronic Science and Technology of China**WP3.6** 17:40 - 18:00**An Alternative Approach to Generalized ESPRIT with a better Performance***Aye Su YEE, Boon Poh NG*

Nanyang Technological University

Session WP4Date : **Wednesday, 14 December 2011**Time : **16:00 - 18:00**Venue : **Green Orchid****Signal Processing for Communication I**Chair : **Saman S ABEYSEKERA**
*Nanyang Technological University***WP4.1** 16:00 - 16:20**Multitone Interference Detection after Dehopping Process in Slow FH/BFSK Systems over Rayleigh Fading Channels***Aye AUNG, Kah Chan TEH, Kwok Hung LI*
Nanyang Technological University**WP4.2** 16:20 - 16:40**Detection and Classification of Unknown MTI and PBNI in Slow FH/BFSK Systems over Rayleigh Fading Channels***Aye AUNG, Kah Chan TEH, Kwok Hung LI*
Nanyang Technological University**WP4.3** 16:40 - 17:00**Spectrum Sensing of Wireless Microphone Signals Based on LHT***Shan LUO, Guoan BI*
Nanyang Technological University**WP4.4** 17:00 - 17:20**Low Complexity M-ary Continuous Phase Modulation Receiver Design using the Instantaneous Frequency***Saman S ABEYSEKERA*
Nanyang Technological University**WP4.5** 17:20 - 17:40**Broadband Interference Suppression in Fractional Fourier Domain Communication System***Haixin SUN, *Shan LUO, Yaowu SHI*
Jilin University
*Nanyang Technological University**WP4.6** 17:40 - 18:00**Optimizing Sensing Matrix for Compressed Sensing Systems***Lifeng YU, Gang LI, Liping CHANG*
Zhejiang University of Technology

Session WP5Date : **Wednesday, 14 December 2011**Time : **16:00 - 18:00**Venue : **Yellow Orchid****Coding and Modulation**Chair : **Marc A ARMAND**
*National University of Singapore***WP5.1** 16:00 - 16:20**On Reed-Solomon Codes as Outer Codes in the Davey-MacKay Construction for Channels with Insertions and Deletions***Tong WU, Marc A ARMAND, Xiaopeng JIAO*
National University of Singapore**WP5.2** 16:20 - 16:40**Iterative Symbol Decoding of Convolutionally-Encoded Variable-Length Codes***Chun-Feng WU, Tzu-Fan HSU, Wen-Whei CHANG*
National Chiao-Tung University**WP5.3** 16:40 - 17:00**Low-Complexity Architecture Design for Modified WiMAX Low-Density Parity-Check Codes***Kuang-Hao LIN, Meng-Yi LIN, Jan-Dong TSENG*
National Chin-Yi University of Technology**WP5.4** 17:00 - 17:20**Effect of Unequal Transmission Power Allocation In Turbo-Coded Optical Wireless Communication System***Tomoaki MURATA, Hiromasa HABUCHI*
Ibaraki University**WP5.5** 17:20 - 17:40**A Lower-Complexity Iterative Trellis-based Factor Search Algorithm and Blind Detector for PTS-Based OFDM Systems***Yen-Ming CHEN, Yeong-Luh UENG, Jhong-Jheng SU, *Jen-Yuan HSU, *Pangan TING*
National Tsing Hua University
*Industrial Technology Research Institute**WP5.6** 17:40 - 18:00**Manifold Signal Receiver for Powerline Communication Systems***H. D. MUSTAFA, Sunil H. KARAMCHANDANI, Shabbir N. MERCHANT, Uday B. DESAI*
Indian Institute of Technology Bombay

Session WP6Date : **Wednesday, 14 December 2011**Time : **16:00 - 17:40**Venue : **Red Gardenia****Ad-Hoc Networks**Chair : **Sanjay Kumar BOSE**
*Indian Institute of Technology Guwahati***WP6.1** 16:00 - 16:20**Real-Life Experiments of Multi-Radio Multi-Channel Wireless Mesh Networks: 802.11n is not any better than 802.11a!***Ivan Wang-Hei HO, Patrick P. LAM, *Peter Han Joo CHONG, **Soung Chang LIEW*
P2 Mobile Technologies Limited
*Nanyang Technological University
The Chinese University of Hong KongWP6.2** 16:20 - 16:40**CPN Validation of Neighbor Detection Protocol for Ad Hoc Networks***Suchismita CHINARA, Santanu Kumar RATH*
National Institute of Technology Rourkela**WP6.3** 16:40 - 17:00**An Improvement of Guarantee Time Slot Allocation in IEEE 802.15.4 Low-Rate Wireless Sensor Networks***Chi-Ming WONG, *Hsun-Hung CHAN*
Jinwen University of Science and Technology
*Technology and Science Institute of Northern Taiwan**WP6.4** 17:00 - 17:20**Routing Performance of Mobile Ad Hoc Network in Urban Street-Grid Environment Using Non-Line-of-Sight Propagation Model***Pengty NGOR, Soon Yim TAN, Peter Han Joo CHONG*
Nanyang Technological University**WP6.5** 17:20 - 17:40**Study of Effect of Timeout Settings on Energy Saving of Lighting Systems using Queueing Model***Xue Jun LI, Xuguang SHAO, Maode MA*
Nanyang Technological University

Session TA1Date : **Thursday, 15 December 2011**Time : **10:30 - 12:30**Venue : **Pink Azalea****Data Mining & Databases**Chair : **Lihui CHEN***Nanyang Technological University*

TA1.1 **10:30 - 10:50****Context Aware M-Commerce Services: C-JOB Model Approach***Pushpa P.V., Pallapa VENKATARAM*
Indian Institute of Science**TA1.2** **10:50 - 11:10****QBE: A Queriable Binary Encoding Index for XML Document***Wararat JAKAWAT, Sirirut VANICHAYOBON*
Prince of Songkla University**TA1.3** **11:10 - 11:30****MUTE: Majority Under-Sampling Technique***Chumphol BUNKHUMPORNPAT, Krung SINAPIROMSARAN, Chidchanok LURSINSAP*
Chulalongkorn University**TA1.4** **11:30 - 11:50****A Hybrid Solving Algorithm for DCSP-Based Configuration System***Lin WANG, Wee Keong NG*
Nanyang Technological University**TA1.5** **11:50 - 12:10****Label-Based Semi-Supervised Fuzzy Co-Clustering for Document Categoriization***Yang YAN, Lihui CHEN*
Nanyang Technological University**TA1.6** **12:10 - 12:30****Document Clustering Around Weighted-Medoids***Jian-Ping MEI, Lihui CHEN*
Nanyang Technological University

Session TA2Date : **Thursday, 15 December 2011**Time : **10:30 - 12:30**Venue : **White Azalea****Image Analysis**Chair : **Zhiqi SHEN***Nanyang Technological University*

TA2.1 **10:30 - 10:50****Unconstrained Iris Recognition using F-SIFT***Hunny MEHROTRA, Banshidhar MAJHI, Pankaj Kumar SA*
National Institute of Technology Rourkela**TA2.2** **10:50 - 11:10****Utilizing Region Cardinality and Dependency for Object Categorization in Non-Parametric Bayesian Framework***K KRISTO, Chin Seng CHUA*
Nanyang Technological University**TA2.3** **11:10 - 11:30****Semantic Image Segmentation Using Oriented Pattern Analysis***Hui Ting ONG, Kai-Kuang MA*
Nanyang Technological University**TA2.4** **11:30 - 11:50****Fast Face Detection and Localization from Multi-Views using Statistical Approach***Seyed Mohammad Hassan ANVAR, *Wei-Yun YAU, Eam Khwang TEOH*
Nanyang Technological University
*Institute for Infocomm Research, A*STAR**TA2.5** **11:50 - 12:10****Local Sensitive Frontier Analysis Based Facial Expression Recognition***Chao WANG, Zhiqi SHEN*
Nanyang Technological University**TA2.6** **12:10 - 12:30****High Resolution Vehicle License Plate Reconstruction Using Soft Recognition Learning***Yushuang TIAN, Kim-Hui YAP, Yu HE*
Nanyang Technological University

Session TA3Date : **Thursday, 15 December 2011**Time : **10:30 - 12:30**Venue : **Red Azalea****Audio Signal Processing**Chair : **Saeid SANEI***University of Surrey*

TA3.1 **10:30 - 10:50****Robustness Analysis of Time-Domain and Frequency-Domain Adaptive Null-Forming Schemes***Xiaohu HU, Shiwei WANG, Yi ZHOU, Xiaodong LI, Chengshi ZHENG*
Institute of Acoustics, Chinese Academy of Sciences**TA3.2** **10:50 - 11:10****A Particle Swarm Optimization Based Audio Watermarking Scheme***Baiying LEI, Ing Yann SOON, Zhen LI, Peng DAI*
Nanyang Technological University**TA3.3** **11:10 - 11:30****A Spatial Notch Filtering Approach for Improving Frequency Domain Complex BSS of Audio Signals***Amran ABDUL HADI, Saeid SANEI*
University of Surrey**TA3.4** **11:30 - 11:50****Noise Power Estimation Based on a Sequential Hidden Markov Model***Dongwen YING, Yonghong YAN, *Jianwu DANG, **Frank K. SOONG*
Institute of Acoustics, Chinese Academy of Sciences
*Tianjin University
Microsoft Research AsiaTA3.5** **11:50 - 12:10****Empirical Mode Decomposition Based Near-Field Equivalence Source Imaging System for Sound Identification***ChingShun LIN, YungCheng CHAO*
National Taiwan University of Science and Technology**TA3.6** **12:10 - 12:30****Audiovisual Speaker Localization in Medium Smart Meeting Room***Andrey RONZHIN, Alexander RONZHIN, Viktor BUDKOV*
St. Petersburg Institute for Informatics and Automation

Session TA4Date : **Thursday, 15 December 2011**Time : **10:30 - 12:30**Venue : **Green Orchid****Signal Processing for Communication II**Chair : **Kah Chan TEH**
*Nanyang Technological University***TA4.1** **10:30 - 10:50****Fusion of Multiple Positioning Algorithms***Lei WANG, Wai Choong WONG*
National University of Singapore**TA4.2** **10:50 - 11:10****Multiple Peer-to-Peer Communications for Two-Way Relay Networks***Tao WANG, Boon Poh NG, *Ying ZHANG, Meng Hwa ER*
Nanyang Technological University
*University of Electronic Science and Technology of China**TA4.3** **11:10 - 11:30****Source Localization by Collaborating Multiple Measurements with inaccurate Sensor Positions***Zhen XU, Jing WANG*
Beihang University**TA4.4** **11:30 - 11:50****Parameters Measurement of Marine Power System Based on Multi-Sensors Data Fusion Theory***Jianxin CHU, Wei GU, Hui HUANG*
Shanghai Maritime University**TA4.5** **11:50 - 12:10****Cooperative Non-Line-of-Sight Localization Technique for Indoor Wireless Network***Si Wen CHEN, Soon Yim TAN*
Nanyang Technological University**TA4.6** **12:10 - 12:30****Collocated MIMO Radar Waveform Coding Using Costas and Quadratic Congruence Arrays***Guang HUA, Saman S ABEYSEKERA*
Nanyang Technological University

Session TA5Date : **Thursday, 15 December 2011**Time : **10:30 - 12:30**Venue : **Yellow Orchid****Mobile Communication**Chair : **Hidekazu MURATA**
Kyoto University
Jui-Yuan LIN
*Southern Taiwan University***TA5.1** **10:30 - 10:50****Investigation of PUCCH Structure with SRS Transmission Based on BS-CDMA for LTE-Advanced Carrier Aggregation***Kazuaki TAKEDA, Yoshihisa KISHIYAMA, *Teruo KAWAMURA, *Takehiro NAKAMURA*
NTT DoCoMo Inc.
*NTT DOCOMO INC.**TA5.2** **10:50 - 11:10****Distributed Pricing-Based Power Control for Multicell Downlink Communication Systems***Qian (Clara) LI, *Kah Chan TEH, *Kwok Hung LI*
Utah State University
*Nanyang Technological University**TA5.3** **11:10 - 11:30****Distributed Power Allocation for Network MIMO with a Bayesian Game-Theoretic Approach***Yong ZENG, Erry GUNAWAN, Yong Liang GUAN*
Nanyang Technological University**TA5.4** **11:30 - 11:50****Performance Analysis for Optimum Transmission and Comparison with Maximal Ratio Transmission for MIMO Systems with Cochannel Interference***Sheng-Chou LIN, Ya-Chen CHIANG*
Fu-Jen Catholic University**TA5.5** **11:50 - 12:10****An Energy Efficient Hybrid MAC Protocol for WSN containing Mobile Nodes***Srikanth BHAVANA, Harish MUSTHYALA, Ratnajit BHATTACHARJEE*
Indian Institute of Technology Guwahati**TA5.6** **12:10 - 12:30****Pseudo Noise Sequence Combining Logic for Ranging of Near Earth Satellites***Jeonghun JEONG, Dongweon YOON, Sunghwan CHOI, Seounghun JEE*
Hanyang University

Session TA6 - Special SessionDate : **Thursday, 15 December 2011**Time : **10:30 - 12:00**Venue : **Red Gardenia****Recent Advances of Green Optical Networks**Chair : **Gangxiang SHEN**
Soochow University
Debasish DATTA
*Indian Institute of Technology Kharagpur***TA6.1** (Invited) **10:30 - 11:00****Green Backbone Optical Networks: the Way Forward***Gangxiang SHEN, Jing DENG, Pin-Han HO*
Soochow University**TA6.2** **11:00 - 11:20****Analysis of Sleep-Mode Downlink Scheduling Operations in EPON Systems***Ying YAN, Lars DITTMANN*
Technical University of Denmark**TA6.3** **11:20 - 11:40****Low Power Consumption Routing and Spectrum Allocation in Optical OFDM Networks***Siwei QIANG, Xuan LUO, Yaohui JIN*
Shanghai Jiao Tong University**TA6.4** **11:40 - 12:00****Sustainable Next Generation Networks Design - A New BlueGreen Approach***William LIU*
Auckland University of Technology

Session TM1Date : **Thursday, 15 December 2011**Time : **13:30 - 14:50**Venue : **Pink Azalea****Biomedical Signal Processing II**Chair : **Vijayan K. ASARI**
*University of Dayton***TM1.1** 13:30 - 13:50**Investigation of Temporal Variability of Sleep EEG***Suparek JANJARASJITT*
Ubon Ratchathani University**TM1.2** 13:50 - 14:10**A Wavelet-CSP Method to Classify Hand Movement Directions in EEG based BCI System***Neethu ROBINSON, A. P. VINOD, *Cuntai GUAN, *Kai Keng ANG, *Tee Keng PENG*
Nanyang Technological University
*Agency for Science, Technology and Research**TM1.3** 14:10 - 14:30**Wavelet-Based Fractal Analysis of Sleep EEG***Suparek JANJARASJITT*
Ubon Ratchathani University**TM1.4** 14:30 - 14:50**Log Power Representation of EEG Spectral Bands for the Recognition of Emotional States of Mind***Theus H. ASPIRAS, Vijayan K. ASARI*
University of Dayton

Session TM2Date : **Thursday, 15 December 2011**Time : **13:30 - 14:50**Venue : **White Azalea****Image/Video Analysis**Chair : **Toshihisa TANAKA**
Tokyo University of Agriculture and Technology
Lap-Pui CHAU
*Nanyang Technological University***TM2.1** 13:30 - 13:50**Vision-Based Attention in Maritime Environments***Thomas ALBRECHT, Tele TAN, Geoff A.W. WEST, *Thanh LY, Simon MONCRIEFF*
Curtin University of Technology
*DSTO Australia**TM2.2** 13:50 - 14:10**Motion Capture Keyframing by Motion Change Manipulation***Ming-Hwa KIM, Lap-Pui CHAU, *Wan-Chi SIU*
Nanyang Technological University
*The Hong Kong Polytechnic University**TM2.3** 14:10 - 14:30**Fast Intra Mode Decision of HEVC Based on Hierarchical Structure***Jaehwan KIM, Jungyoun YANG, Hoyoung LEE, Byeungwoo JEON*
Sungkyunkwan University**TM2.4** 14:30 - 14:50**An Objective Criterion for the Comparison of Reconstructed Images***Rachel Mabanag CHONG, Toshihisa TANAKA*
Tokyo University of Agriculture and Technology

Session TM3 - Special SessionDate : **Thursday, 15 December 2011**Time : **13:30 - 14:50**Venue : **Red Azalea****Recent Advances on Adaptive Filtering**Chair : **Masahiro YUKAWA**
*Niigata University***TM3.1** 13:30 - 13:50**Rank-Selection Criterion for Krylov-Subspace-Based Adaptive Filtering Techniques***Masahiro YUKAWA*
Niigata University**TM3.2** 13:50 - 14:10**Detection of Periodic Signals Using a New Adaptive Line Enhancer Based on Singular Spectrum Analysis***Saeid SANEI, *Tracey K. M. LEE*
University of Surrey
*Singapore Polytechnic / Monash University**TM3.3** 14:10 - 14:30**Exponential Normalized Sign algorithm for System Identification***Jae Jin JEONG, Sang Woo KIM*
Pohang University of Science and Technology (POSTECH)**TM3.4** 14:30 - 14:50**An Adaptive Subspace Based Multichannel Equalization Algorithm for Room Acoustics Equalization with Sparseness Constraint***Rajan S. RASHOBH, Di LIU, Andy W. H. KHONG*
Nanyang Technological University

Session TM4Date : **Thursday, 15 December 2011**Time : **13:30 - 14:50**Venue : **Green Orchid****System Identification & Modeling**Chair : **Andy W. H. KHONG**
*Nanyang Technological University***TM4.1** 13:30 - 13:50**A MEMS Inertial Sensor and AMR
Magnetic Sensor Calibration Method***Wenming LI, Qingxiu DU, Peng MI*
Institute of Automation, Chinese Academy
of Sciences**TM4.2** 13:50 - 14:10**A Robust Deterministic Method for
Blind Multiple Channel Identification***Chengpu YU, *Cishen ZHANG, Lihua XIE*
Nanyang Technological University
*Swinburne University of Technology**TM4.3** 14:10 - 14:30**Existence and Uniqueness of Solution
to Second-Order Interpolation Problem
via Topological Degree Theory***Yohei KUROIWA***TM4.4** 14:30 - 14:50**An Image-Based Video Copy Detection
using Ordinal Bitmap Signature***Janya SAINUI, Ladda
PREECHAVEERAKUL, *Lekha
CHAIORN*
Prince of Songkla University
*Institute for Infocomm Research, A*STAR

Session TM5Date : **Thursday, 15 December 2011**Time : **13:30 - 14:30**Venue : **Yellow Orchid****Antennas & Propagation**Chair : **Soon Yim TAN**
*Nanyang Technological
University***TM5.1** 13:30 - 13:50**A Wideband High Gain Double EBG
Reflector Antenna***Pui-Yi LAU, *Kenneth Kin-On YUNG, Zhi-
Ning CHEN*
Institute for Infocomm Research, A*STAR
*City University of Hong Kong**TM5.2** 13:50 - 14:10**Design of Wideband Fractal Antenna
with Combination of Fractal Geometries***Yogesh Kumar CHOUKIKER, Santanu
Kumar BEHERA*
National Institute of Technology Rourkela**TM5.3** 14:10 - 14:30**The Characteristics of Multipath
Propagation by Antenna Directivity at
60 GHz***Jong Ho KIM, Myoung-Won JUNG,
YoungKeun YOON*
Electronic and Telecommunications
Research Institute

Session TM6Date : **Thursday, 15
December 2011**Time : **13:30 - 15:00**Venue : **Red Gardenia****Optical Communication II**Chair : **Shilin XIAO**
*Shanghai Jiao Tong
University*
Vinod CHANDRA
Indian Institute of
Technology Delhi**TM6.1** (Invited) 13:30 - 14:00**Photonic Approaches for Processing
High Frequency Microwave Signals***Xiaoke Yi, Robert MINASIAN*
The University of Sydney**TM6.2** 14:00 - 14:20**Photonic Generation of Microwave
Signals with Tunable Frequency***Jia Haur WONG, Sheel ADITYA, *Peng
Huei LIM, Perry Ping SHUM, Huy Quoc
LAM, *Kenneth Eng Kian LEE, *Vincent
WONG*
Nanyang Technological University
*Temasek Laboratories @ NTU**TM6.3** 14:20 - 14:40**An Optical MPPM-PSM Scheme for
Increasing Data Transmission Rate***Takayoshi NUMATA, Hiromasa HABUCHI*
Ibaraki University**TM6.4** 14:40 - 15:00**A Novel LED Arrangement to Reduce
SNR Fluctuation for Multi-User in
Visible Light Communication Systems***Zixiong WANG, Wen-De ZHONG,
*Changyuan YU, **Jian CHEN*
Nanyang Technological University
*National University of Singapore / Institute
of Infocomm Research, A*STAR
**Nanjing University of Posts and
Telecommunications

Session FA1Date : **Friday, 16 December 2011**Time : **11:00 - 12:20**Venue : **Pink Azalea****Transforms & Spectrum**Chair : **Yoshifumi UKITA**
*Yokohama College of Commerce***FA1.1** 11:00 - 11:20**Substitution Coder – A Reversible Data Transform for Lossless Text Compression***Rexline S. JERARD, *Robert LOURDUSAMY*
Loyola College, Chennai
*Shaqra University, KSA**FA1.2** 11:20 - 11:40**A Note on Relation between the Fourier Coefficients and the Effects in the Experimental Design***Yoshifumi UKITA, *Toshiyasu MATSUSHIMA*
Yokohama College of Commerce
*Waseda University**FA1.3** 11:40 - 12:00**Relationship between the Haar Transform and the MRT***Rajesh Cherian ROY, *R. GOPIKAKUMARI*
FISAT, Angamaly
*CUSAT, Cochin, Kerala**FA1.4** 12:00 - 12:20**Estimation of Spectral Correlation Function Based on Evolutionary Spectral***Seyed Mohammad Ali TAYARANIAN HOSSEINI, Hamidreza AMINDAVAR*
Amirkabir University of Technology

Session FA2Date : **Friday, 16 December 2011**Time : **11:00 - 12:20**Venue : **White Azalea****Watermarking and Authentication**Chair : **Yoshinobu KAJIKAWA**
*Kansai University***FA2.1** 11:00 - 11:20**An Untraceable and Server-Independent RFID Authentication Scheme***Bin WANG, Maode MA*
Nanyang Technological University**FA2.2** 11:20 - 11:40**Generalized Binned Linear Binary Codes as Dirty-Paper Codes for Digital Watermarking Application***Xiaoli XU, Xiaotian XU, Yong Liang GUAN*
Nanyang Technological University**FA2.3** 11:40 - 12:00**Biometrics Authentication Method Using Lip Motion in Utterance***Atsushi SAYO, Yoshinobu KAJIKAWA, Mitsuji MUNEYASU*
Kansai University**FA2.4** 12:00 - 12:20**Quantization Index Modulation Audio Watermarking System Using a Psychoacoustic Model***Xuemin ZHAO, *Yuhong GUO, *Jian LIU, **Yonghong YAN*
Key Laboratory of Speech Acoustics and Content Understanding, Chinese Academy of Sciences
*Key Laboratory of Speech Acoustics and Content Understanding, Chinese Academy of Science
**Institute of Acoustics, Chinese Academy of Sciences

Session FA3Date : **Friday, 16 December 2011**Time : **11:00 - 12:20**Venue : **Red Azalea****Acoustic Signal Processing**Chair : **Jun YANG**
*Institute of Acoustics, Chinese Academy of Sciences***FA3.1** 11:00 - 11:20**A Study of the Ambiguity Problem in Footstep Bearing Estimation Using Tri-Axial Geophone***Divya VENKATRAMAN, Vinod REDDY, Andy W. H. KHONG*
Nanyang Technological University**FA3.2** 11:20 - 11:40**Environmental Sound Classification using Spectral Dynamic Features***Mahdie KARBASI, Seyed Mohammad AHADI, Meysam BAHMANIAN*
Amirkabir University of Technology**FA3.3** 11:40 - 12:00**Spectrally Correlated Sound Source Localization in a Noisy Environment Based on A New Mask for DUET***Ali POURMOHAMMAD, Seyed Mohammad AHADI*
Amirkabir University of Technology**FA3.4** 12:00 - 12:20**Calibration of Parametric Acoustic Array***Chuang SHI, Woong-Seng GAN, Yong-Kim CHONG*
Nanyang Technological University

Session FA4Date : **Friday, 16 December 2011**Time : **11:00 - 12:30**Venue : **Green Orchid****Signal Processing Architecture**Chair : **Dake LIU**
Beijing Institute of Technology
Gang LI
*Zhejiang University of Technology***FA4.1** (Invited) **11:00 - 11:30****ePUMA Embedded Parallel DSP Processor with Unique Memory Access***Dake LIU, *Andreas KARLSSON, *Joar SOHL, *Jian WANG, *Magnus PETERSSON, Wenbiao ZHOU*
Beijing Institute of Technology
Linkoping University*FA4.2** **11:30 - 11:50****An Improved Lattice IIR Digital Filter Structure***Chaogeng HUANG, Zhixing XU, Gang LI, Hong XU, Liping CHANG*
*Zhejiang University of Technology***FA4.3** **11:50 - 12:10****A High Resolution Temperature Detection Circuit***Shu-Xian LIAO, Zhi-Ming LIN*
*National Changhua University of Education***FA4.4** **12:10 - 12:30****An 8-bit 1.42GS/s 0.54mW CMOS Flash ADC***You-Yi HSIEH, Zhi-Ming LIN*
National Changhua University of Education

Session FA5Date : **Friday, 16 December 2011**Time : **11:00 - 12:30**Venue : **Yellow Orchid****Cooperative Relay Communication**Chair : **Kah Chan TEH**
*Nanyang Technological University***FA5.1** (Invited) **11:00 - 11:30****Experimental Results of Two-Way Channel Estimation Technique for Coordinated Multi-Point Transmission***Hidekazu MURATA, Koji YAMAMOTO, Susumu YOSHIDA, *Satoshi DENNO, **Daisuke UMEHARA, Masahiro MORIKURA*
Kyoto University
**Okayama University*
Kyoto Institute of TechnologyFA5.2** **11:30 - 11:50****Interference Alignment for Degrees of Freedom Improvement in 3-Relay Half-Duplex Systems***Seong-Ho PARK, Young-Chai KO, *Ki-Hong PARK, *Mohamed-Slim ALOUINI*
Korea University
KAUST*FA5.3** **11:50 - 12:10****Multi-User Transmission Scheduling for a Hybrid of Full- and Half-Duplex Relaying***Makoto MIYAGOSHI, Koji YAMAMOTO, *Katsuyuki HANEDA, Hidekazu MURATA, Susumu YOSHIDA*
Kyoto University
Aalto University*FA5.4** **12:10 - 12:30****On the DMT of Symmetric Two-User Interference Channel with Full-Duplex Multiple-Antenna Relay***Qian (Clara) LI, *Kah Chan TEH, *Kwok Hung LI, *Yongxu HU*
Utah State University
**Nanyang Technological University*

Session FA6Date : **Friday, 16 December 2011**Time : **11:00 - 12:20**Venue : **Red Gardenia****Wireless Sensor Networks**Chair : **Suchismita CHINARA**
National Institute of Technology
*Rourkela***FA6.1** **11:00 - 11:20****Application of Model Predictive Control in Wireless Sensor Networks***Xue Jun LI, Xuguang SHAO, Keck Voon LING, Boon Hee SOONG*
*Nanyang Technological University***FA6.2** **11:20 - 11:40****Distributed Transmit Power Control for Distributed Antenna Systems Using MRC***Shigemasa KUMAGAWA, Koji YAMAMOTO, Hidekazu MURATA, Susumu YOSHIDA, *Daisuke UMEHARA, **Satoshi DENNO, Masahiro MORIKURA*
Kyoto University
**Kyoto Institute of Technology*
Okayama UniversityFA6.3** **11:40 - 12:00****EnergySim – A Novel, Fast, Extensible Wireless Sensor Network MAC Protocol Simulator for Evaluating Energy Efficiency***Adnan NASIR, Boon Hee SOONG*
*Nanyang Technological University***FA6.4** **12:00 - 12:20****Combining Channel Estimation and Sensor Fault Protection in Wireless Sensor Networks***Si-Yao HUANG, *Chia-Lung WU, Po-Ning CHEN, **Tsang-Yi WANG, ***Yunghsiang S. HAN*
National Chiao-Tung University
**Mobile Devices Inc.*
***National Sun Yat-sen University*
****National Taiwan University of Science and Technology*

Session FM1Date : **Friday, 16 December 2011**Time : **13:30 - 15:30**Venue : **Pink Azalea****Filters and Filter Bank**Chair : **Tian-Bo DENG**
*Toho University***FM1.1** **13:30 - 13:50****Unsupervised Design of Stack Filters by Tree Structure Optimization***Tatsuya SUZUKI, Yoshiko HANADA, Mitsuji MUNEYASU*
Kansai University**FM1.2** **13:50 - 14:10****Spectrum Sensing in Cognitive Radios: Design of DFT Filter Banks Achieving Maximal Time-Frequency Resolution***Thomas HUNZIKER, Ubaid Ur REHMAN, Dirk DAHLHAUS*
University of Kassel**FM1.3** **14:10 - 14:30****Odd-Order Variable Fractional-Delay Filters with Generalized Polygonal Constraints***Tian-Bo DENG*
Toho University**FM1.4** **14:30 - 14:50****Reduction of Transients During Lifting Based Spatial Adaptation of Filter Banks***Dakala JAYACHANDRA, Anamitra MAKUR*
Nanyang Technological University**FM1.5** **14:50 - 15:10****An Analytical Expression of FIR Filters with Derivative Constraints at Two Frequencies***Peng-Hua WANG*
National Taipei University**FM1.6** **15:10 - 15:30****Design of Equiripple FIR Digital Differentiators Using Neural Weighted Least-Squares Algorithm***Yue-Dar JOU, *Fu-Kun CHEN*
R. O. C. Military Academy
*Southern Taiwan University

Session FM2 - Special SessionDate : **Friday, 16 December 2011**Time : **13:30 - 15:30**Venue : **White Azalea****Computer Vision**Chair : **Hyeran BYUN**
*Yonsei University***FM2.1** **13:30 - 13:50****Visual Tracking with Online Discriminative Learning***Se-In JANG, Kwontaeg CHOI, Youngsung KIM, Beom-Seok OH, Kar-Ann TOH*
Yonsei University**FM2.2** **13:50 - 14:10****Person Independent Facial Expression Analysis using Gabor Features and Genetic Algorithm***Seyedehsamaneh SHOJAEILANGARI, *Wei-Yun YAU, Eam Khwang TEOH*
Nanyang Technological University
*Institute for Infocomm Research, A*STAR**FM2.3** **14:10 - 14:30****Signal and Feature Domain Enhancement Approaches for Robust Speech Recognition***Jinkyu LEE, Soonho BAEK, Hong-Goo KANG*
Yonsei University**FM2.4** **14:30 - 14:50****Automatic Head Pose Estimation from a Single Camera Using Projective Geometry***Woo Won KIM, Sangheon PARK, Jinkyu HWANG, Sangyoun LEE*
Yonsei University**FM2.5** **14:50 - 15:10****Human Interaction Recognition in YouTube Videos***Sunyoung CHO, Seongho LIM, Hyeran BYUN, *Haejin PARK, **Sooyeong KWAK*
Yonsei University
*Miss Potter's School
Hanbat National UniversityFM2.6** **15:10 - 15:30****Detail-Enhanced Fusion of Differently Exposed Images***Zhengguo LI, Jinghong ZHENG, Susanto RAHARDJA*
Institute for Infocomm Research, A*STAR

Session FM3 - Special SessionDate : **Friday, 16 December 2011**Time : **13:30 - 15:10**Venue : **Red Azalea****Recent Advances in Multimedia & Human Computer Interfaces**Chair : **Huaqun GUO**
*Institute for Infocomm Research, A*STAR*
Ying WEI
*Shandong Unviersity***FM3.1** **13:30 - 13:50****Balancing Safety and Danger in Gaming for Better User Engagement***Qin En LOOI, Swee Lan SEE*
Institute for Infocomm Research, A*STAR**FM3.2** **13:50 - 14:10****A Design of Digital FIR Filter Banks with Adjustable Subband Distribution for Hearing Aids***Ying WEI, Debao LIU*
Shandong Unviersity**FM3.3** **14:10 - 14:30****Depth Camera Based Hand Gesture Recognition and its Applications in Human-Computer-Interaction***Zhou REN, Jingjing MENG, Junsong YUAN*
Nanyang Technological University**FM3.4** **14:30 - 14:50****Design and Implementation of Sub-Cover Difference Broadcast Encryption Algorithm***Qingqing YI, *Huaqun GUO, Wai Choong WONG*
National University of Singapore
*Institute for Infocomm Research, A*STAR**FM3.5** **14:50 - 15:10****Known-Item Search (KIS) in Video: Survey, Experience and Trend***Lekha CHAISORN, Yan-Tao ZHENG, Kelvin SIM*
Institute for Infocomm Research, A*STAR

Session FM4Date : **Friday, 16 December 2011**Time : **13:30 - 15:30**Venue : **Green Orchid****Wireless Communication II**Chair : **Kwok Hung LI**
*Nanyang Technological University***FM4.1** 13:30 - 13:50**Theoretical Analysis of Parallel Combinatory Spread-Spectrum Communication System for Optical Wireless Communications***Yusuke KOZAWA, Hiromasa HABUCHI*
Ibaraki University**FM4.2** 13:50 - 14:10**Effects of Composite PBNJ and MTJ on FFH/MFSK Systems with Maximum-Likelihood Receiver over Frequency-Selective Fading Channels***Ly-Minh-Duy LE, Kah Chan TEH, Kwok Hung LI*
Nanyang Technological University**FM4.3** 14:10 - 14:30**Frequency Dependency of Propagation along a Lift Shaft on board a Merchant Ship***Xiao Hong MAO, Yee Hui LEE*
Nanyang Technological University**FM4.4** 14:30 - 14:50**Sigma Delta Architecture Integration with Digital Pre-Distortion to Enhance Optimal Switch Mode Power Amplification (OSMPA) in FEMTO Cell Transceiver Design***Sirmayanti SIRMAYANTI, Horace KING, Vandanna BASSO, Mike FAULKNER*
Victoria University**FM4.5** 14:50 - 15:10**Tracking Markov Targets in Binary Sensor Networks: Source Coding and Large Deviation Limits on the Required Number of Queries***Mohammad REZAEIAN, Jonathan H. MANTON, Bill MORAN*
University of Melbourne**FM4.6** 15:10 - 15:30**Indoor Localization System using Wireless Sensor Networks for Stationary and Moving Target***Panarat CHERNTANOMWONG, Dwi Joko SUROSO*
King Mongkut's Institute of Technology Ladkrabang

Session FM5Date : **Friday, 16 December 2011**Time : **13:30 - 15:00**Venue : **Yellow Orchid****Network Applications**Chair : **Boon Hee SOONG**
*Nanyang Technological University***FM5.1** (Invited) 13:30 - 14:00**Adaptive Algorithm and Relay Selection for Decode-and-Forward Cooperative Multiple-Antenna Terminals***Weixiao MENG, *Yuhui HAN, Ye ZHANG*
Harbin Institute of Technology
*Harbin Institute of Technology; Harbin University of Science and Technology**FM5.2** 14:00 - 14:20**Performance Study of ENUM Service Based in Modeling and Simulation***Saulo Henrique DA MATA, Paulo Roberto GUARDIEIRO, *Alexandre CARDOSO, *Edgard LAMOUNIER, *Luiz C. THEODORO*
Federal University of Uberlândia
*Federal University of Uberlândia**FM5.3** 14:20 - 14:40**Pilot-Assisted Channel Estimation for Coexisting Heterogeneous Wireless Personal Area Networks***Abolfazl MEHBODNIYA, Fumiyuki ADACHI, Gui GUAN*
Tohoku University**FM5.4** 14:40 - 15:00**MC-OR: Opportunistic Routing Based Multicast Protocol for Wireless Mesh Networks***Vicky CHHEDA, Sanjay Kumar BOSE, *Wen-De ZHONG*
Indian Institute of Technology Guwahati
*Nanyang Technological University

Session FM6Date : **Friday, 16 December 2011**Time : **13:30 - 15:10**Venue : **Red Gardenia****Optical Networks**Chair : **Xiaofei CHENG**
*Institute for Infocomm Research, A*STAR*
Horace KING
*Victoria University***FM6.1** (Invited) 13:30 - 14:00**Evolution Scenarios for Passive Optical Access Networks***Shilin XIAO, Zhao ZHOU, Meihua BI, Min ZHU, He CHEN*
Shanghai Jiao Tong University**FM6.2** 14:00 - 14:20**4x4 Optical Data Vortex Switch Fabric: Fault Tolerance and Network Reliability Analysis***R.G. SANGEETHA, Devi CHADHA, Vinod CHANDRA*
Indian Institute of Technology Delhi**FM6.3** 14:20 - 14:40**Heuristic Algorithms for Multicast Traffic Grooming in WDM Mesh Networks***Rongping LIN, Wen-De ZHONG, *Sanjay Kumar BOSE, **Moshe ZUKERMAN*
Nanyang Technological University
*Indian Institute of Technology Guwahati
City University of Hong KongFM6.4** (Invited) 14:40 - 15:10**Design Methodologies for Optical WDM Networks with Awareness of Transmission Impairments***Debasish DATTA*
Indian Institute of Technology Kharagpur

Session FP1Date : **Friday, 16 December 2011**Time : **16:00 - 17:40**Venue : **Pink Azalea****Biomedical Signal Processing III**Chair : **Hsien-Tsai WU**
*National Dong Hwa University***FP1.1** **16:00 - 16:20****A Signal-Noise Separation Algorithm for the Estimation of Respiratory Rate from Breath Sound***Ian LIN, Wee SER, Jianmin ZHANG, *Daniel GOH*Nanyang Technological University
*National University of Singapore**FP1.2** **16:20 - 16:40****A New Markovian Approach Towards Neural Spike Sorting***Soheila SAMIEE, Mohammad Bagher SHAMSOLLAHI, *Vincent VIGNERON*Sharif University of Technology
*University of Evry**FP1.3** **16:40 - 17:00****Ensemble Empirical Mode Decomposition for Atherosclerosis in High-Risk Subjects***Ching-Shuen CHEN, Cyuan-Cin LIU, Hsien-Tsai WU, *An-Bang LIU*National Dong Hwa University
*Buddhist Tzu Chi General Hospital and Buddhist Tzu Chi University**FP1.4** **17:00 - 17:20****Quasi-Static Field Modeling with Bone and Joint Effects in Intra-Body Communication***Xi Mei CHEN, Sio Hang PUN, Ze-tian WANG, Peng-un MAK, Mang I VAI*

University of Macau

FP1.5 **17:20 - 17:40****A Morphological Approach to Pulse Feature Extraction from the Digital Volume Pulse***Dae-Geun JANG, Minsoo HAHN, *Umar FAROOQ, *Jae-Keun JANG, *Seung-Hun PARK*Korea Advanced Institute of Science and Technology
*Kyung Hee University

Session FP2Date : **Friday, 16 December 2011**Time : **16:00 - 18:00**Venue : **White Azalea****Visualization & Imaging**Chair : **Jeehong LEE**
LGE
Stefan WINKLER
*Advanced Digital Sciences Center (ADSC)***FP2.1** **16:00 - 16:20****Saliency Guided Image-Driven Simplification***Cheon-Hau TAN, Lap-Pui CHAU*
Nanyang Technological University**FP2.2** **16:20 - 16:40****Stereoscopic Image Quality Compendium***Stefan WINKLER, Dongbo MIN*
Advanced Digital Sciences Center (ADSC)**FP2.3** **16:40 - 17:00****A Research on Controlling Three-Dimensional Effect of The Video Frames Obtained from Stereo Camera***Jeehong LEE, Kyu-yeol CHAE, Simon Ji LGE***FP2.4** **17:00 - 17:20****Visualization of Multispectral Video with Moving Background Based on Background Extraction and Fusion***B Chandra Sekhar REDDY, Parul SHAH, Shabbir N. MERCHANT, Uday B. DESAI*
Indian Institute of Technology Bombay**FP2.5** **17:20 - 17:40****Efficient Hierarchical Fusion using Adaptive Grouping Techniques for Visualization of Hyperspectral Images***Parul SHAH, *Maxime DRUMETZ, Shabbir N. MERCHANT, Uday B. DESAI*
Indian Institute of Technology Bombay
*Enseirb Metmecha Bordeaux**FP2.6** **17:40 - 18:00****Edge-Based Image Interpolation Approach for Video Sensor Network***Jinglun SHI, Kang CAI, Shangkun XIONG, Gang WEI*
South China University of Technology

Session FP3Date : **Friday, 16 December 2011**Time : **16:00 - 18:00**Venue : **Red Azalea****Intelligent and Cloud Computing**Chair : **Tele TAN**
*Curtin University of Technology***FP3.1** **16:00 - 16:20****Vehicle Simulation and Interception for Military Command and Control Systems***Stuart SPEIDEL, Justin PERRIE, Aneesh KRISHNA, Tele TAN, *John WIESE*
Curtin University of Technology
*Thales Australia**FP3.2** **16:20 - 16:40****A Study on the Effectiveness of Biometrics Based Alternative Communication Tool***Chin Ann ONG, Bee Theng LAU*
Swinburne University of Technology**FP3.3** **16:40 - 17:00****A Review of Some Bayesian Belief Network Structure Learning Algorithms***Sangeeta MITTAL, Shankar Lal MASKARA*
Jaypee Institute of Information Technology, Noida**FP3.4** **17:00 - 17:20****Development of a Navigation System for the Blinds***Zi-ying YU, Yong XU, Jun YANG, *Ran Bi*
Institute of Acoustics, Chinese Academy of Sciences
*Xicheng District Disabled Persons Federation**FP3.5** **17:20 - 17:40****Adaptive Traffic Signal Control System with Cloud Computing Based Online Learning***Dilip K. PRASAD*
Nanyang Technological University**FP3.6** **17:40 - 18:00****Towards Security in Sharing Data on Cloud-Based Social Networks***Duc H. TRAN, Hai-Long NGUYEN, Wei ZHA, Wee Keong NG*
Nanyang Technological University

Session FP4Date : **Friday, 16 December 2011**Time : **16:00 - 18:00**Venue : **Green Orchid****Network Coding & Cognitive Radio**Chair : **Weixiao MENG**
*Harbin Institute of Technology***FP4.1** **16:00 - 16:20****A Real-Time and High Coding Opportunity Discovery Scheme In Multi-Hop Wireless Network***Yunlong ZHAO, Zhao DONG, *Masayuki IWAI, *Kaoru SEZAKI, **Yoshito TOBE*
Harbin Engineering University
*The University of Tokyo
Tokyo Denki UniversityFP4.2** **16:20 - 16:40****Joint Network Coding for Interfering Wireless Multicast Networks***Jalaluddin QURESHI, Chuan Heng FOH, Jianfei CAI*
Nanyang Technological University**FP4.3** **16:40 - 17:00****Adaptive Power Allocation for Bi-Directional Single-Carrier Relay Using Analog Network Coding***Hiroyuki MIYAZAKI, Masayuki NAKADA, Tatsunori OBARA, Fumiyuki ADACHI*
Tohoku University**FP4.4** **17:00 - 17:20****An Energy Detector for Cognitive Radios in Channels at Low SNR Using Adaptive Threshold***Prashob R NAIR, A. P. VINOD, *Anoop Kumar KRISHNA*
Nanyang Technological University
*EADS Innovation Works**FP4.5** **17:20 - 17:40****Cognitive Spectrum Sensing with the Aid of Location Information***Muhammad Sibtain HAMAYUN, Yi GONG, *Junhui ZHAO*
Nanyang Technological University
*Beijing Jiaotong University**FP4.6** **17:40 - 18:00****Cognitive Beamforming Exploiting Stiefel Manifold for Sum-Transmit Power Minimization***Sheng-Ming CAI, Yi GONG*
Nanyang Technological University

Session FP5Date : **Friday, 16 December 2011**Time : **16:00 - 18:00**Venue : **Yellow Orchid****Microwave Circuits & Systems**Chair : **Pui-Yi LAU**
*Institute for Infocomm Research, A*STAR*
Santanu Kumar BEHERA
*National Institute of Technology Rourkela***FP5.1** **16:00 - 16:20****Bandstop Filter Based on Composite Right/Left Handed Transmission Line at Dual WLAN Bands***Cheng JIN, Arokiaswami ALPHONES*
Nanyang Technological University**FP5.2** **16:20 - 16:40****Dual Bandpass Filter using MIM based Composite Right/Left Handed Transmission Line***George Francis ROSHAN, Cheng JIN, Arokiaswami ALPHONES*
Nanyang Technological University**FP5.3** **16:40 - 17:00****Planar Helix Slow-Wave Structure With Straight-Edge Connections in the Presence of Coplanar Ground Planes***Ciersiang CHUA, Sheel ADITYA, Zhongxiang SHEN, *Julius M. TSAI*
Nanyang Technological University
*Agency for Science, Technology and Research**FP5.4** **17:00 - 17:20****A Novel Multiple-Tunable Millimeter-Wave Frequency Synthesizer***Yuanwang YANG, Jingye CAI, Lianfu LIU*
University of Electronic Science and Technology of China**FP5.5** **17:20 - 17:40****System Study of a 60 GHz Wireless-Powered Monolithic Sensor System***Yan WU, J.P.M.G. LINNARTZ, Hao GAO, P.G.M. BALTUS, *J.W.M. BERGMANS*
Eindhoven University of Technology
*Eindhoven University of Technology**FP5.6** **17:40 - 18:00****Fast and Accurate Prediction of Reverberation Chambers' Resonant Frequencies Using Time-Domain Integral Equation and Matrix Pencil Method***Huapeng ZHAO, Zhongxiang SHEN*
Nanyang Technological University

Session FP6Date : **Friday, 16 December 2011**Time : **16:00 - 18:00**Venue : **Red Gardenia****Wireless Communication III**Chair : **Xuguang SHAO**
Nanyang Technological University**FP6.1** **16:00 - 16:20****An Efficient and Secured Multi-Server Authentication Scheme***Bin WANG, Maode MA*
Nanyang Technological University**FP6.2** **16:20 - 16:40****A Low Complexity Linear Regression Approach to Time Synchronization in Underwater Networks***Tarik-UI Islam KHANDOKER, Defeng (David) HUANG, Victor SREERAM*
University of Western Australia**FP6.3** **16:40 - 17:00****Performance of Frequency-Domain Oversampling Based Receiver for MIMO-OFDM in Doubly Selective Fading Channels***Qinghua SHI, Y. KARASAWA*
University of Electro-Communications**FP6.4** **17:00 - 17:20****Data-Aided Joint Symbol Timing and CFO Estimation for OFDM/OQAM Systems***Gang YANG, Hao CHEN, Su HU, Gang WU, Shaoqian LI*
University of Electronic Science and Technology of China**FP6.5** **17:20 - 17:40****A Forward-Parsing Randomness Test Based on the Expected Codeword Length of T-Codes***Ulrich SPEIDEL*
The University of Auckland**FP6.6** **17:40 - 18:00****Packet Flow Histograms to Improve Firewall Efficiency***Zouheir TRABELSI, Liren ZHANG, Safaa ZEIDAN*
UAE University

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Yao, Cong	WP2.3	Zhuang, Jie	WP3.3, WP3.5
Yap, Kim-Hui	WM2.2, WM2.3, TA2.6	Zhuo, Li	WM6.2
Yau, Wei-Yun	TA2.4, FM2.2	Zukerman, Moshe	FM6.3
Yee, Aye Su	WP3.6		
Yeo, Yong-kee	WA6.1		
Yi, Qingqing	FM3.4		
Yi, Xiaoke	TM6.1		
Ying, Dongwen	TA3.4		
Yoon, Dongweon	WM5.1, TA5.6		
Yoon, YoungKeun	TM5.3		
Yoshida, Susumu	FA5.1		
Yoshida, Susumu	FA5.3, FA6.2		
Yu, Changyuan	WA6.4, TM6.4		
Yu, Chengpu	TM4.2		
Yu, Jie	WA2.2		
Yu, Lifeng	WP4.6		
Yu, Zi-ying	FP3.4		
Yuan, Junsong	WP1.2, FM3.3		
Yuen, Chung Him (George)	WM4.3		
Yukawa, Masahiro	TM3.1		
Yung, Kenneth Kin-On	TM5.1		
Z			
Zeidan, Safaa	FP6.6		
Zeng, Yong	TA5.3		
Zha, Wei	FP3.6		
Zhai, Guangtao	WP2.2		
Zhang, Cishen	TM4.2		
Zhang, Honggang	WA2.2		
Zhang, Jianmin	FP1.1		
Zhang, Jing	WM6.2		
Zhang, Liandong	WM1.6		
Zhang, Lining	WA2.1		
Zhang, Liren	FP6.6		

Welcome Message from General Chairs



Sheel ADITYA



Anamitra MAKUR

Welcome to Singapore – a garden city that uniquely combines the charms of the East and the West. On behalf of the Organizing Committee, it is our pleasure to welcome you to the Eighth International Conference on Information, Communications and Signal Processing (ICICS 2011).

An event like this is not possible without the efforts from many dedicated volunteers. The Organizing Committee of ICICS 2011 has made strenuous efforts for more than a year to ensure a successful conference. We are grateful to the members of the Organizing Committee and are particularly indebted to the Technical Program Chairs who have strived to put together a rich and stimulating program that includes tutorials, keynote speeches, and special sessions, in addition to the regular sessions.

Beginning in 1997, ICICS is a biennial event which has evolved into a premium conference for the international community. Eighth conference in this series, ICICS 2011 has a few notable features. These include a conference theme, namely *Sustainable Infocomm Systems*, and a special panel session on the final day of the conference, addressed by reputed experts from industry who will provide perspectives on the sustainability of the currently proposed pervasive network of billions of connected devices for a multitude of applications. Another departure from the past practice is to hold the conference banquet in an informal setting where the delegates can enjoy the ambience of East Coast Park and some signature seafood dishes of Singapore. The banquet, to be held on the evening of 15th December, 2011, will be preceded by a social outing to visit *Images of Singapore* in Sentosa. We hope that all conference delegates will enjoy these and other events of ICICS 2011.

We take this opportunity to thank the many organizations that have extended sponsorship to ICICS 2011 in some form or the other. These organizations include the IEEE Communications Society, IEEE Singapore Section, Contact Singapore, National Instruments, Agilent Technologies, Texas Instruments, several local chapters of IEEE, and exhibitors. Without the support from these organizations, it would not have been possible to give the present shape to ICICS 2011.

We thank you for joining us in this conference. We wish you a great time in this conference and also an enjoyable stay in Singapore.

Sincerely,

Sheel ADITYA and Anamitra MAKUR
General Chairs

Welcome Message from Program Chairs



Woon Seng GAN



Wen-de ZHONG

On behalf of the Technical Program Committee, we would like to warmly welcome all of you to the eighth International Conference on Information, Communications and Signal Processing (ICICS 2011). The theme of ICICS 2011 is *Sustainable Infocomm Systems*, which reflects the current technological thrust towards green and energy-efficient society.

From the 381 papers that were received in the regular category, we have selected 249 high quality papers for presentations. In addition, we have 15 invited papers, and 29 papers in special sessions. We are delighted to note that the keynote speeches will be delivered by two world-renowned researchers and inventors, Dr Rajiv Laroia of Sonus Networks and Professor Steve Elliott of University of Southampton. Dr Rajiv Laroia, co-inventor of orthogonal frequency division multiplexing, will speak on the Internet for the social beings - the future of the Internet. Professor Steve Elliott, inventor of minimum power personal audio, will address on the topic of personal audio and active control of sound in the environment. We would like to thank them for participating and sharing their knowledge and expertise with the signal processing and communications community.

The Technical Program Committee has put together an exciting and diverse conference program for you. The technical papers are arranged in six parallel sessions, covering the main technical areas of the conference – Signal Processing, Computer Systems and Applications, Communications and Networking. A special panel session on the final day of the conference, addressed by reputed experts from industry, will provide perspectives on the sustainability, opportunities, and challenges of the pervasive network of billions of intelligent and connected devices that are slated to realize the "Connected Planet" in the not-too-distant future. We have also organized 3 tutorial sessions, which are delivered by distinguished researchers, in the areas of next-generation communication system, sensor networks, and 4G wireless mesh networks.

We would like to express our greatest appreciation to the members of our technical program committee, organizing committee, and other colleagues for their tireless effort in reviewing papers, organizing them into various sessions, making arrangements for the conference venue and publication of the conference proceedings. We would also like to thank the session chairs for their assistance in making the technical sessions and presentations a success.

We hope that you will find the technical program interesting and inspiring. In addition to serious work, we also hope that many of you will be able to take advantage of the many sightseeing and gastronomic opportunities that Singapore has to offer. Enjoy your stay in Singapore!

Woon-Seng GAN and Wen-De ZHONG
Program Chairs