

# FRONT PAGE

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## CONFERENCE ABSTRACTS

**2018 International Conference on Communication Engineering  
and Technology (ICCET 2018)**

**2018 6th International Conference on Communications and  
Broadband Networking (ICCBN 2018)**

**2018 6th International Conference on Network and Computing  
Technologies (ICNCT 2018)**

**Singapore | February 24-26, 2018**

**Published by**



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# AGENDA

## ♣ <Feb. 24th, 2018>

10:00-17:00	Lobby (Level 1)	Registration & Materials Collection
14:00-17:00 Campus Walking Visit	14:00	Assembly at Lobby
	14:30-16:00	Chinese Heritage Centre
	16:00-17:00	Yunnan Garden

Note:

- 1, Please gather at lobby 10 minutes earlier.
- 2, Please take your belongings with you.
- 3, The tour is free of charge. But you should give your feedback before Feb 10th, 2018.



Chinese Heritage Centre



Yunnan Garden



# AGENDA

## ♣ Morning <Feb 25th, 2018>

Keynote Speeches		
Lecture Room 2 (Level 2)		
9:00-9:10	Opening Remarks	Prof. Maode Ma Nanyang Technological University
9:10-9:50	Keynote Speech I	Prof. Dr. Shum Ping, OSA Fellow Nanyang Technological University, Singapore
		Speech Title: <i>Novel Fiber Sensing Systems</i>
9:50-10:20	 Coffee Break & Group Photo	
10:20-11:00	Keynote Speech II	Prof. Anthony (Tony) Brown, IET & IMA Fellow The University of Manchester, UK
		Speech Title: <i>Multi Octave antennas for 5G and beyond</i>
11:00-11:40	Keynote Speech III	Prof. Maode Ma Nanyang Technological University
		Speech Title: <i>Efficient and Secure Authentication Schemes for IEEE 802.11ah Networks</i>
 Lunch Time <11:40-13:30>		

Invited Speech		
13:30-14:00	Breakout Room 9	Prof. Lela Mirtskhulava, Iv. Javakhishvili Tbilisi State University, Georgia
		Speech Title: <i>Environmental Monitoring over Internet of Things using Arduino</i>






# AGENDA

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## ♣Afternoon <Feb 25th, 2018>

<b>Parallel Author Presentations</b>  <b>Lecture Room 2 (Level 2)</b>		
<b>13:30-15:30</b>	<b>Session I</b> <b>Wireless Communication and Transmission Technology</b> Session Chair--Associate Professor Dr.Sakthivel Ramachandran, VIT University, India	 <b>Lecture Room I Level 2</b>
	<b>8 presentations</b> —T018 CET025 T002 BN012 BN017 BN006 T020 BN018	
 <b>Coffee Break &lt;15:30---16:00&gt;</b>		
<b>16:00-18:15</b>	<b>Session II</b> <b>Electronic and Communication Engineering</b> Session Chair—Assistant Professor Vivek Ratnaparkhi, Shri Sant Gajanan Maharaj College of Engineering, INDIA	 <b>Lecture Room I Level 2</b>
	<b>9 presentations--</b> CET008 CET016 CET020 CET022 CET023 CET024 CET035 CET040 CET044	
	<b>Dinner &lt;18:15-19:30&gt;</b>	

# AGENDA

<b>Parallel Author Presentations</b>  <b>Breakout Room 9 (Level 3)</b>		
<b>14:00-15:30</b>	<b>Session III</b>  <b>Part I</b> -Communication and signal processing  Session Chair-- Prof. Lela Mirtskhulava, Iv. Javakhishvili Tbilisi State University, Georgia	 <b>Breakout Room 9</b> <b>Level 3</b>
	<b>6 presentations</b> —BN004 BN013 BN014 CET3003 CET043 T006	
 <b>Coffee Break &lt;15:30---16:00&gt;</b>		
<b>16:15-17:45</b>	<b>Session III</b>  <b>Part II</b> -Communication and signal processing  Session Chair—Prof. Lela Mirtskhulava, Iv. Javakhishvili Tbilisi State University, Georgia	 <b>Breakout Room 9</b> <b>Level 3</b>
	<b>6 presentations</b> -- BN009 CET034 CET007 CET009 CET010 T2002	
 <b>Dinner &lt;18:15-19:30&gt;</b>		


# AGENDA

<b>Parallel Author Presentations</b>  <b>Breakout Room 10 (Level 3)</b>		
<b>14:00-15:45</b>	<b>Session IV</b> <b>Part I</b> -Computer Science and Software Engineering Session Chair—Prof. Dr Rashid Hussain, Hamdard University, Pakistan	 <b>Breakout Room</b> <b>10</b> <b>Level 3</b>
	<b>7 presentations</b> —CET014 CET019 T016 BN005 T005 T009 T015	
 <b>Coffee Break &lt;15:45---16:15&gt;</b>		
<b>16:15-18:00</b>	<b>Session IV</b> <b>Part II</b> -Computer Science and Software Engineering Session Chair—Prof. Dr Rashid Hussain, Hamdard University, Pakistan	 <b>Breakout Room</b> <b>10</b> <b>Level 3</b>
	<b>7 presentations</b> -- T019 T2001 CET003 CET005 CET013 CET015 CET039	
 <b>Dinner &lt;18:15-19:30&gt;</b>		

# AGENDA

Poster Session		
15:45-16:15	Lecturer Room 1	CET3002, BN020, T017, BN008, BN007

## ♣ <Feb 26th, 2018>

9:00-18:00	One-day tour
<b>Assembly Point: NEC (Conference Venue)</b>	
<b>Route</b>	
	
<b>Merlion Park--Gardens by the Bay-St. Andrew's Cathedral-Little India-Chinatown</b> 鱼尾狮公园->滨海湾花园->圣安德烈教堂->小印度->牛车水	
<b>Attention:</b>	
<ul style="list-style-type: none"><li>➤ The cost of social program is 70USD per person, including the fees of bus, tourist guide and entrance tickets.</li><li>➤ Please keep your belongings with you.</li><li>➤ If you are interested, please give your feedback before or on Feb 10th. If you miss this date, we can't accept your request anymore.</li><li>➤ The bus will leave on time. Please arrive the assembly point 10 minutes earlier.</li><li>➤ If there are very few people, social program and the campus tour will be cancelled.</li></ul>	
Thanks for your kind understanding!	



# WELCOME

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Dear professors and distinguished delegates,

Welcome to the 2018 International Conference on Communication Engineering and Technology (ICCET 2018) ,and the two workshops 2018 6th International Conference on Communications and Broadband Networking (ICCBN 2018), 2018 6th International Conference on Network and Computing Technologies (ICNCT 2018) in Singapore.

We wish to express our sincere appreciation to all the Conference Chairs, Technical Program Committee Chair Members and Technical Committee members. Their high competence and professional advice enable us to prepare the high-quality program. Special thanks to the keynote speakers as well as all the authors for contributing your latest research to the conference. We hope all of you have a wonderful time at the conference and also in Singapore.

The conference is featured with keynote speeches, peer-reviewed paper presentation and social program. One best presentation will be selected from each parallel session, evaluated from: Originality, Applicability, Technical Merit, Visual Aids, and English Delivery. Wishing you all the very best of luck with your presentations!

We believe that by this excellent conference, you can get more opportunity for further communication with researchers and practitioners with the common interest in related field.

Your suggestions are warmly welcomed for the further development of the conferences in the future. Wish you have a fruitful and memorable experience in Singapore! We look forward to meeting you again next time.

Best Regards!  
Yours sincerely,

ICCET 2018 Organizing Committee  
Singapore.

# VENUE

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## **Nanyang Executive Centre in NTU**

<http://www.ntu.edu.sg/nec/Pages/default.aspx>

Add: 60 Nanyang View, Singapore 639673



## **Making Reservations**

Telephone: +65 6513 7356

Fax number: +65 6794 7860

Email: [nec-rsvn@ntu.edu.sg](mailto:nec-rsvn@ntu.edu.sg)

Add: 60 Nanyang View, Singapore 639673

# NOTES & TIPS

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## Notes:

- ✧ Your punctual arrival and active involvement in each session will be highly appreciated.
- ✧ You are welcome to register at any working time during the conference.
- ✧ Certificate of Presentation will be awarded after your presentation by the session chair.
- ✧ One *Best Presentation* will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.
- ✧ Please kindly keep your Paper ID in mind so that the staff can quickly locate your registration information onsite.
- ✧ Please kindly make your own arrangements for accommodations.
- ✧ Please keep all your belongings (laptop and camera etc.) with you in the public places, buses, metro.

## Warm Tips for Oral Presentation:

- ✧ Get your presentation PPT or PDF files prepared.
- ✧ Regular oral presentation: 15 minutes (including Q&A).
- ✧ Laptop (with MS-Office & Adobe Reader), projector & screen, laser sticks will be provided by the conference organization.

# KEYNOTES

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## **Prof. Anthony (Tony) Brown, IET & IMA Fellow The University of Manchester, UK**

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Anthony (Tony) Brown is Professor of Communication Engineering in the MCS research group . He was Head of School for Electrical and Electronic Engineering (until Sept 2015) and, prior to that, Associate Dean for Teaching and Learning in the Faculty of Engineering and Physical Sciences (until May 2012).

Tony is a Fellow of the IET and the IMA, a Senior Member of the IEEE and a Member of the IOD. He joined academia in 2003 as research group leader after a 30 year industrial career including senior Board level positions. He maintains strong industrial links and is currently CTO and Director of two companies. In addition to his discipline specific research Tony has a keen interest in student education particularly in an international context . He has been an invited lecturer on academic and student development in China and elsewhere and has been a visiting Professor at Xidian University in Xian. He serves on the editorial Panel for the International Journal of Electrical and Electronic Engineering. Tony's overall research interests are principally in antennas, electromagnetic propagation and computational electromagnetics as applied to radio astronomy instrumentation, radar and related imaging, and to communications (particularly in a indoor or complex environments). He has chaired numerous international conferences most recently the 2011 European Radar Conference , and he been a frequent invited speaker in South Africa, Australia, USA, China and across the EU. Tony has acted as a international consultant on marine safety related radar matters (including Vessel Traffic Radar) and has served on numerous international committees. This has included as a member of the Technical Advisory Commission (TAC) to the Federal Communication Commission(USA) and the EUROCAE technical working group WG-41 . Tony has lectured widely on technical and managerial topics at the invitation of such organisations as the FAA and has been UK representative on various EU COST initiatives. Professor Brown has acted as external advisor to UK Universities in course development. He has been External Examiner (Undergraduate and Masters programmes) for the University of Oxford , Cranfield, Sheffield, Surrey, Sussex, Brunel and Swansea.

Tony Brown has been involved directly with governments in Europe and the Far East as a technical advisor. He was a founder member of the EPSRC Communications College. Tony has had a career long involvement with computer based analysis techniques and was the first chairman of the UK Chapter of the Applied Computational Electromagnetics Society (1986).

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## **Prof. Dr. Shum Ping**

**Nanyang Technological University, Singapore**

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P. Shum received the B. Eng. and PhD degrees in electronic and electrical engineering from the University of Birmingham, UK, in 1991 and 1995, respectively. After PhD graduation, he stayed in the same university as an honorary postdoctoral research fellow. In 1996, he carried out research in semiconductor laser and high speed optical laser communication in the Department of Electrical and Electronic Engineering, Hong Kong University. Since July 1997, Dr. P. Shum joined the Department of Electronic Engineering, Optoelectronics Research Centre, City University of Hong Kong. In 1998, he has received the IEEE EDS/MTTS India Chapter best paper award for his paper in Photonics-98. In 2002, he received the best paper award at the 3rd International Conference on Microwave and Millimeter Wave Technology. In 1999, Dr. Shum joined the School of Electrical and Electronic Engineering, Nanyang Technological University. He is the founding member of IEEE LEOS chapter in Singapore. Since 2002, he has been appointed as the Director of Network Technology Research Centre. He received the Singapore National Academy of Science Young Scientist Award in 2002. Dr. Shum has published more than 300 international journal and conference papers. He is the technical program chair of ICOCN 2003 and committee members and international advisor of many international conferences. His research interests are concerned with optical communications, nonlinear waveguide modelling, fibre gratings and WDM communication systems.

## **Prof. Maode Ma**

**Nanyang Technological University**

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Dr. Maode Ma received his Ph.D. degree in computer science from Hong Kong University of Science and Technology in 1999. Now, he is an Associate Professor in the School of Electrical and Electronic Engineering at Nanyang Technological University in Singapore. He has extensive research interests including wireless networking and network security. He has led and/or participated in 18 research projects funded by government, industry, military and universities in various countries. He has been a general chair, technical symposium chair, tutorial chair, publication chair, publicity chair and session chair for more than 60 international conferences. He has been a member of the technical program committees for more than 150 international conferences. Dr. Ma has more than 250 international academic publications including more than 110 journal papers and over 140 conference papers. He currently serves as the Editor-in-Chief of International Journal of Computer and Communication Engineering and International Journal of Electronic Transport. He also serves as a Senior Editor for

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IEEE Communications Surveys and Tutorials, and an Associate Editor for International Journal of Security and Communication Networks, International Journal of Network and Computer Applications, International Journal of Wireless Communications and Mobile Computing and International Journal of Communication Systems. He had been an Associate Editor for IEEE Communications Letters from 2003 to 2011. Dr. Ma is a Fellow of IET and a senior member of IEEE Communication Society and IEEE Education Society. He is the Chair of the IEEE Education Society, Singapore Chapter. He is serving as an IEEE Communication Society Distinguished Lecturer.

**Prof. Lela Mirtskhulava,  
Iv. Javakhishvili Tbilisi State University, Georgia**

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Dr. Lela Mirtskhulava currently holds a position of Associate Professor at the Department of Computer Science, Faculty of Exact and Natural Sciences at Ivane Javakhishvili Tbilisi State University. She also held the position of Program Coordinator/Quality Assurance Manager/Associate Professor and a Head of Research Center for Mobile Computing at the Faculty of Computer Technologies and Engineering at International Black Sea University and Associate Professor at Sokhumi State University and Georgian Technical University in past. She also has 13 years of industry work experience as an ICT Senior Engineer at Geocell LLC, Georgia. Her research interests include: Mobile computing, mobile app development, software development, software engineering; computer networks and security, bioinformatics, biomedical engineering, artificial neural networks modeling, wireless communications, climate protection and global warming. Dr. Mirtskhulava has published over 38 refereed scientific papers, many of which appeared in IEEE and ACM digital libraries and International conferences such as UKSim, BlackSeaCom, WCECS, She has received Best Paper Award and Session Chair Certificate at UKSim 2015 in Cambridge, UK. She was a Speaker at The First SDSU – Georgia STEM WORKSHOP on Nanotechnology and Environmental Sciences in 2015. Dr. Mirtskhulava has received her PhD Degree in Computers, Complexes, Systems and Networks at the Department of Informatics at the Georgian Technical University in 1998. She is the recipient of DAAD Scholarship Certificate in scope of Academic staff exchange program, at Westsaxon University of Applied Sciences Zwickau, Germany in 2016. Dr. Mirtskhulava has participated in Professor Exchange program to San Diego State University, CA, USA in 2016.

# ABSTRACTS

## OPENING & KEYNOTE SPEECHES



### Lecture Room 2 (Level 2)

<b>Morning, Feb 25th, 2018</b> Time: 9:00-11:40	
9:00-9:10 OPENING REMARKS	<b>Prof. Maode Ma</b> <b>Nanyang Technological University</b>
9:10-9:50 KEYNOTE SPEECH I	<p style="text-align: center;"><b>Title- Novel Fiber Sensing Systems</b></p> <p style="text-align: center;"><b>Prof. Dr. Shum Ping</b> <b>Nanyang Technological University, Singapore</b></p> <p>ABSTRACT-- Optical fiber-based devices have been widely deployed in recent years. There are many advantages of using fiber as a sensor. These include electrically-passive operation, light weight, immunity to radio frequency interference and electromagnetic interference, high sensitivity, compact size, corrosion resistance, easily multiplexing and potentially low cost. Several novel fiber-based sensors and technologies developed are presented here, including fiber Bragg grating (FBG) based sensors, photonic crystal fiber (PCF) based sensors, specialty fiber-based sensors and distributed fiber sensing systems. FBGs as instinctive sensors, are ingeniously designed as two-dimensional (2D) tilt sensors, displacement sensors, accelerometers and corrosion sensors here; PCF based evanescent field absorption sensor, PCF induced Mach-Zehnder interferometer and Fabry-Perot refractometer for temperature and refractive index sensing are presented; based on localized surface Plasmon resonant (LSPR) effect, nano-sized fiber tip with gold nanoparticles are demonstrated for live cell index bio-sensing applications.</p>
 Coffee break & group photo 9:50-10:20	

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<p>10:20-11:00 KEYNOTE SPEECH II</p>	<p style="text-align: center;"><b>Title- Multi Octave antennas for 5G and beyond</b></p> <p style="text-align: center;"><b>Professor A.K.Brown</b> <b>University of Manchester UK</b></p> <p>Abstract-For many microwave applications provision of wide RF bandwidth is becoming of increasing interest. One such is of course 5G communications when the ability to use broadband systems potentially increases system flexibility and reduces complexity. To be clear, wide bandwidth here is determined by at least two octaves of rf bandwidth in the antenna. To use one potential 5G approach as an example a single antenna covering , say, 24GHz to 53GHz or even to 86GHz , will enable considerable innovative use of application and of spectrum use. Of course such structures need to support advanced features such as multi-beam forming (or electronic scanning) to provide high gain coverage over significant sectors, support for polarisation MIMO, good control of the radiation pattern shape etc. Scalability is another issue where a large number of elements in the array can be provided, for example for use in massive MIMO. It is easy to find examples at lower frequency ranges where use of such broadband structures can either provide enhanced services or lower overall costs through, as one possibility, site sharing between different services. Practical applications bring additional constraints. Low cost, physically large structures may be needed at lower frequencies whereas at high frequencies , where large electrical structures are physically small, susceptibility to production and material tolerances are extremely important. This paper will concentrate on work undertaken to realise broad bandwidth dual polarisation electrically large arrays. In particular the principles behind interconnected dual polarisation arrays will be developed and applied to multiple beam forming applications.</p>
<p>11:00-11:40 KEYNOTE SPEECH III</p>	<p style="text-align: center;"><b>Title- Efficient and Secure Authentication Schemes for IEEE 802.11ah Networks</b></p> <p style="text-align: center;"><b>Prof. Maode Ma</b> <b>Nanyang Technological University, Singapore</b></p> <p>ABSTRACT-- IEEE 802.11ah, a specification belonging to 802.11 wireless local area network (WLAN) protocol family, has been recently released to support the long-range, low-power and low-rate wireless communication among smart devices used in Internet of Thing (IoT) systems. However, security requirements of the energy-constrained devices have plenty of issues different from the traditional wireless devices. It requires that the lightweight security protocols have to support low-power and low-latency as well as the long-lasting features of quantities of IoT devices. The recently released IEEE standard, IEEE 802.11ai has specified a Fast Initial Link Setup (FILS), which is a brand-new approach aiming at establishing fast, stable and secure</p>



# ABSTRACTS

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	<p>links among smart devices. IEEE 802.11ai could be applied to other wireless systems, such as the wireless system of IEEE 802.11ah with security enhancements. In this talk, I would address the security issues of IEEE 802.11ai and IEEE 802.11ah with a new proposal to enhance the authentication process in the link setup procedure specified by IEEE 802.11ai.</p>
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# ABSTRACTS

## Session I

**Session I-Wireless Communication and Transmission Technology**

**13:30-16:30**

**Lecture Room 2**

**(Level 2)**

**Chaired by—Associate Professor Sakthivel Ramachandran,  
VIT University, India**

**Presentations:**

**T018 CET025 T002 BN012 BN017 BN019 BN006 T020 BN018**

**Note: Please arrive at the designated conference room 30 minutes earlier, in case some authors are not able to make the presentation on time.**

<p>T018 13:30-13:45</p>	<p>Obstacle Interferences on the UWB Communications for Indoor Positioning</p> <p><b>Shinheon Kim</b>, Jaemin Hong and Chonggun Kim</p> <p>Yeungnam University, South Korea</p> <p>Abstract— Ultra Wide Band (UWB) radios use very short pulse waveforms to distribute energy over a wide frequency spectrum. Due to the inherently precise time resolution of the UWB, arriving multipath components can be time-consuming in the receiver to provide accurate arrival time estimates. This feature allows the UWB to provide a more precise range of position measurements indoors than other wireless protocols. UWB position measurement technology is expected to be applicable to industrial environments such as offices and factories. Indoor positioning, however, must also consider characteristics such as severe multipath, low probability of LOS path, floor placement, moving objects and numerous reflective surfaces. In this study, we used the UWB communication to test the distance error caused by obstacles in the indoor environment.</p>
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	<p>In the indoor environment, the distances between two nodes of UWB were fixed at 5m, 10m, and 15m, respectively. Obstacles were measured for 10 seconds by moving people and steel plates in 1m increments. This experiment shows the distance between UWB nodes and the distance error when there is an obstacle.</p>
<p>CET025 13:45-14:00</p>	<p>Title: Reliability and Survivability Assessment of LTE/LTE-A Architecture and Networks</p> <p style="text-align: center;"><b>Anupam Gautam &amp; Selvamuthu Dharmaraja</b></p> <p style="text-align: center;">Indian Institute of Technology Delhi, New Delhi, India</p> <p>Abstract: Two significant attributes of Long Term Evolution (LTE)/ LTE Advanced (LTE-A) network are reliability and survivability. In the existing literature, these attributes are only studied through the simulation models for LTE/LTE-A networks. In this work, a hierarchical model is presented for the performance analysis of LTE/LTE-A networks, which is further classified into the upper-level and lower-level models. Upper-level models are Reliability Block Diagrams (RBDs) whereas lower level models are Continuous Time Markov Chains (CTMCs). This classification is performed to capture a realistic approach towards modeling, because dependent behavior and repair of failed components, etc., cannot be taken into account by an RBD model. Assuming the exponential distribution for failure and repair of components, dependability measures are investigated. Further, measures obtained, such as reliability, availability, blocking probability, etc., can be used in providing important guidelines for the improvement in network designing and Quality of Service (QoS) of the user. Also, numerical analysis is performed to study these measures.</p>
<p>T002 14:00-14:15</p>	<p>An Enhanced Temporal-Credential-Based Mutual Authentication and Key Agreement Scheme for Wireless Sensor Network</p> <p style="text-align: center;"><b>Muxi Zhang and JooSeok Song</b></p> <p>Abstract—Sometimes, people want to get real-time sensory information from many domains such as medical monitoring, disaster detection and military surveillance. To achieve this, wireless sensor network (WSN) is a useful tool. A legitimate user can login to the network and access the sensory data from legitimate sensor nodes with the aid of</p>

# ABSTRACTS

	<p>gateway node. Since WSN is an energy-constrained environment, a secure and lightweight authentication scheme among user, gateway node and sensor node is important in WSN. In this paper, a secure mutual authentication and key agreement (MAAKA) scheme for WSN which improves three related works is suggested. Compared with them, the proposed scheme is more secure. It also reduces the total computational overhead by at least 13.6% while almost maintaining the communication overhead.</p>
<p>BN012 14:15-14:30</p>	<p style="text-align: center;">Sperm Swarm Optimization Algorithm for Optimizing Wireless Sensor Network Challenges</p> <p style="text-align: center;">Hisham A. Shehadeh, <b>Ismail Ahmedy</b>, Mohd Yamani Idna Idris*</p> <p style="text-align: center;">University of Malaya ,Kuala Lumpur, Malaysia</p> <p>Abstract--This paper proposes a new meta-heuristic optimization approach, called "Sperm Swarm Optimization (SSO)". The underlying ideas and concepts behind the proposed method are inspired by sperm motility to fertilize the egg. In SSO, sperm swarm moves in forward from a low-temperature zone called Cervix. During this direction, sperm searches for a high-temperature zone called Fallopian Tubes where the egg is waiting for the swarm for fertilization in this zone, which this area is considered as the optimal solution. The SSO is tested with optimizing several objective functions that represent Wireless Sensor Network (WSN) quality of services, which is used to minimize both the end-to-end delay and end-to-end latency and also to maximize both the packet throughput and energy efficiency.</p>
<p>BN017 14:30-14:45</p>	<p style="text-align: center;">Process Calculi for Intrusion Detection System in Mobile Ad-hoc Networks</p> <p style="text-align: center;"><b>Parul Yadav</b> and Manish Gaur</p> <p style="text-align: center;">INSTITUTE OF ENGINEERING &amp; TECHNOLOGY, India</p> <p>Abstract—Security of routing protocols is one of the crucial and emerging issues in Mobile Ad-hoc Networks. A lot of secure versions of routing protocols in Mobile Ad-hoc Networks have already been proposed by eminent researchers. But most of them are tested by means of simulation. Simulation techniques have their limitations as they can only find</p>

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	<p>presence of error rather than absence of error. To overcome this situation, formal methods are used that can verify systems using theorem proving or automated model checking techniques. We are the first who propose a calculi for Intrusion Detection System (IDS) to secure routing in Mobile Ad-hoc Networks in a process algebraic framework. The proposed calculi is basically an extension of distributed pi calculus (Dpi). The novelty of the proposed calculi is to model stand-alone IDS covering both network &amp; host-based IDSs. The calculi has two syntactic categories: one for nodes and another for processes. We justify our model by providing its reduction equivalence, after abstracting away the details of IDS (implementation), to its specification calculus for energy-aware broadcast, unicast and multicast communications of MANETs (E-BUM). We believe that such modelling helps in detecting intrusion(s) in Mobile Ad-hoc Networks and that in turn will provide secure and energy efficient route.</p>
<p>BN006 14:45-15:00</p>	<p style="text-align: center;">Design of CMOS based LNA for 5G Wireless Applications</p> <p style="text-align: center;">Andrew Roobert, <b>D.Gracia Nirmala Rani</b>, M.Divya, S.Rajaram</p> <p style="text-align: center;">Thiagarajar College of Engineering, Madurai, Tamilnadu, India</p> <p>Abstract--V-Band millimeter wave communication is an evolving technology for bandwidth demanding 5G wireless application. A high gain and linear wideband cascoded two stage Low Noise Amplifier (LNA) operating at 52 to 60 GHz is presented in this paper. Proposed CMOS LNA circuit design yields high gain of 30.7dB by forming high Q-Network at the input terminal of the amplifying NMOS device and a source degenerative inductor. Noise Figure (NF) of the first cascoded stage is set as low to reduce the NF of the LNA as 3.92dB. Proper input and output impedance matching have performed to achieve the input return loss of -15.3dB and output return loss of -23.1dB. This circuit has third order input intercept point (IIP3) at -0.99dBm and requires 18.37 mW of power at 1.5V. The circuit was designed in Cadence Virtuoso 90nm technology and simulated using spectre.</p>
<p>T020 15:00-15:15</p>	<p style="text-align: center;">A Design with Mobile Agent Architecture for Refactoring a Monolithic Service into Microservices</p>

# ABSTRACTS

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	<p style="text-align: center;"><b>Masayuki Higashino</b>, Toshiya Kawato, Takao Kawamura Tottori University, Tottori, 680-8550, Japan</p> <p>Abstract: Refactoring monolithic architecture into microservice architecture is a difficult task. In many cases, a monolithic service is divided into N-tiers based on the N-tier architecture. In order to divide a monolithic service into microservices, it is necessary to redefine a model as a new microservice by extracting models across layers and integrating them. However, since different layers and architectures are used for each layer, such as a database, an application framework, server software, etc., programs and models extracted from each tier are often redesigned and re-implemented in many cases. In this paper, we focus to the mobile agent technology that builds a system only by the simple two methods of agent's migration between computers and messaging between agents; and we propose the system architecture to facilitate the migration of a monolithic service to microservices.</p>
<p>BN018 15:15-15:30</p>	<p style="text-align: center;">A new method of Cloud-based Computation Model for Mobile Devices : Energy Consumption Optimization in Mobile-to-Mobile Computation Offloading</p> <p style="text-align: center;"><b>Hossein Jamali</b>, Abbas Karimi, Mehdi Haghhighizadeh Islamic Azad University Arak Branch, Iran</p> <p>Abstract—Today, cell phones have great important role in everyday lives. They are the most effective and achievable communication and computation devices that necessitate no exact time or location. Fast development of movable calculation created an energetic power to develop a synchronous technology in the markets. Anyhow movable devices are encountering with various challenges concerning available resources such as: battery, storage, bandwidth, security, and mobility. On the other side, limitation of resources in these phones has a great effect on the quality of the services. The most important limitation is the energy consuming that leads us to use the device for calculation, in spite of the accessibility of other sources. The best suggested solutions are getting rid of computation on the cloud and use of portable cloud for computation. But If there was no</p>

# ABSTRACTS

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accessible cloud or an accurate of disconnection with the cloud, cell phones are the best to use. According to a mathematical algorithm based on Lyapunov optimization and regarding the requirement time for suitable program, we will try to introduce a dynamic way which its limitation analysis reveals that offloading the computation considering the limitation of time leads to a less spending of power and energy resembled the current algorithm.



**Coffee Break <15:30--16:00>**

# ABSTRACTS

## Session II

Session II- Electronic and Communication Engineering

16:00-18:15

Lecture Room 2

(Level 2)

Chaired by—Assistant Professor Vivek Ratnaparkhi,  
Shri Sant Gajanan Maharaj College of Engineering, INDIA

Presentations:

CET008 CET016 CET020 CET022 CET023 CET024 CET035 CET040 CET044

**Note: Please arrive at the designated conference room 30 minutes earlier, in case some authors are not able to make the presentation on time.**

<p>CET008 16:00-16:15</p>	<p>Photonics Dew Point Sensor for High Temperature Industrial Environments Lennon Yao Ting Lee, <b>Joelle Anya Yu</b>, Jifang Tao, Hong Cai, Dao Hua Zhang &amp; Yuandong Gu Nanyang Technological University, Singapore</p> <p>Abstract. Dew point is the temperature at which the rate of water vapor condensation is the same rate as liquid water evaporation. From measuring the dew point, relative humidity could be calculated. Dew point sensors are significant for applications in many sectors from food processing to materials manufacturing. Currently, existing sensors must compromise to reduce cost and size or improve accuracy, but research has been carried out into a dew point sensor based on an integrated photonics platform that is accurate, fast and small. This is a potential replacement for the industry standard, chilled mirror hygrometer. However, even that is not enough for industry applications, the dew point sensor should also work across a range of operating temperatures and function in</p>
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	<p>harsh environments with minimal performance drifts and calibrations. In this paper, we report measurement results of the packaged dew point sensor across a range of temperatures to determine its feasibility for high temperature operations for industrial applications.</p>
<p>CET016 16:15-16:30</p>	<p style="text-align: center;"><b>105W Highly Efficient Ku band GaN HEMT Power Amplifier</b></p> <p style="text-align: center;"><b>Vivek Ratnaparkhi &amp; Anil Hiwale</b></p> <p style="text-align: center;">Shri Sant Gajanan Maharaj College of Engineering, India.</p> <p>Abstract. In this paper design and simulation of Ku band 105W highly efficient GaN HEMT power amplifier is presented. A single stage design using 20 mm bare die packaged GaN HEMT device is discussed. Inductor based equivalent bondwire array model is used for this design. Simulated performance of power amplifier (PA) shows 105W output power with drain efficiency of 70% and power added efficiency (PAE) of 59% at design frequency of 11.09 GHz. Less than 0.5 dB variation in large signal gain is observed between 10.02-11.17 GHz band of frequency. Proposed GaN HEMT power amplifier can be used to replace conventional travelling wave tube amplifiers (TWTAs) used in Ku-band satellite communication.</p>
<p>CET020 16:30-16:45</p>	<p style="text-align: center;"><b>A Low power 10bit 50-MS/s Sample and Hold OTA Amplifier</b></p> <p style="text-align: center;"><b>R.Sakthivel, G.NAGAJYOTHI, DILIP KUMAR.N</b></p> <p style="text-align: center;">VIT University, India</p> <p>Abstract. This paper presents about the design of a low power 10-bit 50-Msample /sec Sample and Hold amplifier. A sample and hold amplifier (SHA) acts as a front end block for an Analog Digital Circuit (ADC). To realize a low power SHA, a power efficient Operational Trans-conductance Amplifier (OTA) is to be designed and used. In the literature, many topologies of OTA are proposed for low power. In this paper, an Improved Recycling Folded Cascade (IRFC) OTA existing in the literature is used for realizing SHA and is proposed. In addition to this the SHA includes bottom plate sampling and bootstrap switch to reduce the non-linear distortion. The IRFCOTA used in the</p>

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	<p>design of SHA is implemented using TSMC 90 nm Process. It achieves a DC gain of 73 dB, Unity Gain Bandwidth (UGB) of 70 MHz and with a phase margin of 63 degrees. The proposed SHA is designed and simulated using spectre simulator. From the simulation, it is noted that the SHA achieves a Spurious Free Dynamic Range (SFDR) of 63.44dB and SNDR of 60.6dB for a sampling frequency of 50MS/s with a peak-peak voltage of 1.2 Volts. The S/H circuit consumes 0.44mW of power.</p>
<p>CET022 16:45-17:00</p>	<p>QoS Based Routing Algorithm for Advanced Metering Infrastructure in Smart Grid</p> <p><b>Jing Gao</b>, Xuliang Guang, Yazhen Li, Lina Fan</p> <p>Northeastern University, China</p> <p>Abstract. The two-way and real-time communication network is the key component for the advanced metering infrastructure (AMI) in smart grid. This is the key component of communication networks of smart grid, which provides efficient route for the information exchange between users and distribution stations. As the "last mile" communication network for AMI, the neighborhood area network (NAN) can realize the real-time transmission of Household electricity information, power quality data and so on, video surveillance and so on. However, with the rapid development of smart grid, the quality of service (QoS) requirements for NAN are becoming more and more stringent. For example, it requires wider coverage and higher communication bandwidth, smaller data transmission delays and lower data packet loss rate. Therefore, a routing algorithm based on improved ant colony optimization is proposed to enhance the QoS performance of latency and reliability. A pheromone emission rule is set to make the ant get efficient guiding information and approach the destination node quickly thus reduce the time delay and packet-loss rate efficiently. Simulation results demonstrated that the proposed algorithm can efficiently improve the QoS performance of communication network for AMI in smart grid.</p>
<p>CET023 17:00-17:15</p>	<p>Numerical study of Bulk Acoustic Wave Resonators operating at 2GHz</p> <p><b>Noel Zi Xiang Ong</b>, Nan Wang, Yao Zhu, Srinivas Merugu, and Alex Yuandong Gu</p>

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A\*STAR (Agency for Science, Technology and Research) / National University of  
Singapore, Singapore

Abstract. With the advent of 5G network technology, Aluminium Nitride (AlN) has increased in popularity as the material of choice for high performance Bulk Acoustic Wave (BAW) resonators used in narrowband filter design. This is due to the material's physical properties that allow for the fabrication of high-frequency and high-Q value resonators. An accurate simulation model of the physical performance of the resonator can help increase design efficiency and reduce the cost of developing new and novel resonator designs to push towards the implementation of 5G network technology. This paper explores the effect of the thickness of the AlN piezoelectric layer on the admittance of the BAW resonator by comparing simulations done on COMSOL Multiphysics Software, as well as the effect of different parameters of the software on the degree of accuracy of the simulation results. COMSOL Multiphysics is a simulation software that allows its users to accurately simulate the physical performance of models under realistic conditions. The simulation parameters that were studied on COMSOL were to vary the Meshing Density, Fixed Constraints and Mechanical Damping. This was done so as to define a set of parameters to be used on future simulations of the resonators, that balance the computation run time and accuracy of the simulation results. It was observed that increasing the meshing density of the model gave more accurate results but took longer to compute. As such, it is important that the mesh density is chosen to maximize computational efficiency for any given model. Including fixed constraints and mechanical damping to the simulation allowed the physical modelling of the resonator to be more accurate to the actual performance of the resonator. It was further observed that by varying the thickness of the piezoelectric layer of the AlN resonator model, the resonant frequency at which the admittance of the resonator reached its peak decreased with increasing thickness. This decrement in the resonant frequency is observed to be linearly related by gradient of -1.3467 to the

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	<p>increment in the thickness of the piezoelectric layer. In conclusion, the application of the simulation parameters studied in this paper on COMSOL Multiphysics allows for the physical performance of AlN BAW resonator designs to be accurately computed with greater efficiency as the balance between accuracy and computation time is emphasized in the selection of these simulation parameters. Through these simulations, the paper also presented a linear relation between increasing piezo-electric layer thickness and reducing resonant frequency.</p>
CET024 17:15-17:30	<p>Experimental Demonstration on the Optimized Anchor Design of GHz AlN Based Lamb Wave Resonators</p> <p><b>Nan Wang</b>, Yao Zhu, Srinivas Merugu and Yuandong Gu</p> <p>A*STAR (Agency for Science, Technology and Research), Singapore</p> <p>Abstract. Over recent years, enormous effort has been devoted to the development of radio frequency microelectromechanical system (RFMEMS) devices, out of which filters, duplexers and multiplexers are a few established and successful applications. The successful development of RFMEMS devices is due to the growing demand of highly integrated components in wireless transceivers to full the increasingly congested frequency bands in mobile platforms. The current market is dominated by film bulk acoustic resonator (FBAR) technology, in which the resonant frequency of the resonator is determined by the thickness of the piezoelectric film. As such, in order to build integrated filters which require resonators with different resonant frequencies to be fabricated on the same chip, additional mass loading step or trimming step is necessary. Furthermore, it is also extremely challenging for the current FBAR technology to achieve integrated duplexing functions, which requires filters with multiple frequency bands to be fabricated on the same chip. On the contrary, Lamb wave based resonators have great potential to overcome the challenges faced by FBAR, thanks to their lithographically tuned resonant frequency. However, their performance needs to be enhanced and optimized to meet the standard of FBAR before achieving integrated</p>

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	<p>duplexing functions. This work reports experimental results on the design optimization of aluminum nitride (AlN) based Lamb wave resonators operating in GHz frequency range. In particular, the design optimization process is from the perspective of the design of the supporting anchors. The resonators are fabricated on the in-house CMOS-compatible platform, and testing results show that 1) resonators with different anchor widths show comparable performance in terms of resonant frequency and spurious modes. However, the resonator with narrower anchors experiences high insertion loss (IL) than the resonator with wider anchors; 2) for the resonators with wide anchors, the resonator with distributed anchors exhibits better spurious mode performance than the resonator with the whole anchor. In summary, with the optimized anchor design, the Lamb wave resonator is one step closer to achieve integrated duplexing functions. Future work includes the optimization on other design perspective, in order to fully develop the potential of Lamb wave resonator in next-generation mobile communication applications.</p>
<p>CET035 17:30-17:45</p>	<p>Performance investigation of metallic diffraction grating based surface plasmon resonance refractive index sensor</p> <p><b>Sarbjit Singh, Dr. R.S. Kaler, Dr. Siddharth Sharma</b></p> <p>Thapar Institute of Engineering and Technology (Deemed University), India</p> <p>Abstract - We investigate the performance of metallic diffraction grating(MDG) based surface plasmon resonance fiber optic sensor for bio-sensing applications. In this sensor diffraction order negative, one is used to excite plasmon waves. Sensing performance is evaluated using numerical simulations based on rigorous coupled wave analysis (RCWA) method. The reflectance amplitude, width of the SPR curve and shift in the resonant wavelength with refractive index change are considered for estimating the bio-sensing performance. Our results show that aluminum grating based SPR sensor proves to be best for sensing applications and maximum sensitivity in angular interrogation is found to be 248°/RIU which is best for excellent sensor.</p>

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<p>CET040 17:45-18:00</p>	<p>Pre-Habilitation and Wellness through Gait Analysis using Body Worn Sensors</p> <p><b>Neha Sathe</b>, Anil Hiwale and Rasmi Phalnikar</p> <p>Department of Information Technology, MIT College of Engineering, Ex-Serviceman colony, Kothrud, Pune, India</p> <p>Abstract. Gait analysis that is used to measure human activity level, is an important aspect for the health professionals. It helps in understanding the limitations caused in the locomotion due to some orthopedic conditions or some neurological disorders. Health analysis though of key importance is yet, limited to the routine pathological monitoring and dietitian consultation. A possible Extension of it could be pre-habilitation (Pre-hab) process for wellness. Pre-hab process helps to prepare your body for high level of activities, reduces the possible risk of injury and ensures quick recovery. The work proposed in the paper emphasize on aspect of Recognition of Gait Pattern for pre-hab through the body worn sensors comprising of accelerometer, gyroscope &amp; electromyography. Continuous remote monitoring is done using sensor connectivity to internet of things (IoT). The analysis of normal or abnormal gait is done using the Data Analytics Module.</p>
<p>CET044 18:00-18:15</p>	<p>Extending Nutritional Risk Screening in Critically Ill Patients using IoT devices</p> <p><b>Vaishali P. Suryawanshi</b>, Rashmi S. Phalnikar, Subhal Dixit and Sweetey Agarwal</p> <p>Research Scholar, MIT-WPU Computer Science and Engineering, Pune, India</p> <p>Abstract. The NUTRIC score (Nutrition Risk in the Critically Ill) is a method designed to calculate the risk of critically ill patients developing adverse conditions that is likely be improved by optimal nutritional therapy. The objective of this study is to validate the NUTRIC score for aggressive nutrition therapy and identify critically ill patients that are most likely to benefit from macronutrients with an aim to improving mortality rate. A logistic model is proposed to identify the relationship between the observed parameters of NUTRIC score like age, APACHE II score, SOFA score and number of co-morbidities using statistical methods and further authenticate it. The relationship between these</p>

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	<p>parameters is often aggravated in the ICU due to the hypermetabolic nature of critical illness. This care can be extended by use of IoT devices which may be wearable for monitoring patients health. It will help not only to keep track patient's health, but to improve how the physicians deliver care as well. New technology innovations can be leveraged in nutritional health care context to monitor patients remotely.</p>
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**Dinner Time: 18:15 -19:30**

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## Session III

### Part I-Communication and signal processing

14:00-15:45

Breakout Room 9

Level 3

Chaired by- Prof. Lela Mirtskhulava,  
Iv. Javakhishvili Tbilisi State University, Georgia

#### Presentations

BN004 BN013 BN014 CET3003 CET043 BN026 T006

**Note: Please arrive at the designated conference room 30 minutes earlier, in case some authors are not able to make the presentation on time.**

<p>BN004 14:00-14:15</p>	<p>A Novel CQI Prediction Scheme for LTE-A System</p> <p>Xiang Zeng; <b>Yuping Zhao</b>; Wanyue Qu</p> <p>Peking University, Beijing, P.R.China</p> <p>Abstract--The 3rd Generation Partnership Project (3GPP) introduces carrier aggregation (CA) technology in LTE-Advanced (LTE-A) systems which admits aggregating different component carriers. As a result, it increases the feedback delay of the channel quality indicator (CQI) from user equipments (UE) to eNodeB. This unavoidable CQI delay lowers the system performance, especially in practical LTE-A system which has long delay. Herewe introduced a novel CQI prediction scheme named historical-parallel-weighted extrapolation (HPWE) with low complexity to compensate the CQI change. Simulation results show that the proposed scheme improves system performance significantly in terms of throughput and fairness compared to the other existing solutions when users move in relatively high speed in LTE-A system.</p>
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<p>BN013 14:15-14:30</p>	<p>Research on Multi-domain Mixed Analysis Technology of Communication Signals</p> <p style="text-align: center;"><b>Hao Zeng</b>, Lianping Guo, Jian Gao</p> <p style="text-align: center;">University of Electronic Science and Technology of China, China</p> <p>Abstract--Aiming at the test requirements for broadband signals, transient signals and HDR (High Dynamic Range) signals under complex electromagnetic environment, the multi-domain mixed analysis technologies of transient signals, including time domain, frequency domain, modulation domain, communication protocol domain, statistical domain, etc. are studied in this paper. Firstly, the urgent demand on multi-domain real-time measurement of broadband and large dynamic transient signals are analyzed and the overall hardware architecture of multi-domain mixed analysis of signals, together with the working procedures of various modules are proposed; then, frequency conversion of broadband RF (radio frequency) signals, high-speed high-precision sampling, multi-domain time-dependent conjoint analysis and other key technologies are demonstrated in detail; finally, relevant technologies are verified through stimulating and testing, the results of which show that this scheme is feasible, providing necessary guarantee for follow-up development of engineering prototype.</p>
<p>BN014 14:30-14:45</p>	<p>A Rapid De-mapping Method for 64-APSK</p> <p style="text-align: center;"><b>Junwei BAO</b>, Dazhuan XU, Xiaofei ZHANG</p> <p style="text-align: center;">Nanjing University of Aeronautics and Astronautics, College of Electronic and Information Engineering, College of Science, China</p> <p>Abstract--64-Amplitude Phase Shift Keying (64-APSK) is one of the key technologies, which is widely used in deep space communications and digital video broadcasting via satellite-second generation (DVB-S2) due to the enhanced effectiveness and high spectrum efficiency. Traditional hard de-mapping methods possess good performance, whereas complicated decision regions and troublesome decision procedure are involved. In this paper, a rapid de-mapping method for 64-APSK with low complexity is presented, in which and the constellation of 64-APSK is divided into 6 symbol mappings</p>

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	<p>according to the principal bit. Mean-while, only the symbol mappings in the first quadrant are employed and subsequently, the irregular decision regions in each of them are replaced by regular sectors and the sectors with similar value are combined into bigger decision regions of 0-points and 1-points. When the received signal is mapped to the symbol mappings in the first quadrant, each bit of the received signal is located correspondingly in the decision region. The proposed method can greatly reduce computational complexity since it only needs limited judgments. The simulation results verify that the time consumption is decreased almost without any penalty on Bit Error Rate (BER).</p>
<p>CET3003 14:45-15:00</p>	<p style="text-align: center;">Smart Water Lora IoT System</p> <p style="text-align: center;">Jian-xiong Wang, <b>Yang Liu</b>, Zhi-bin Lei, Kang-heng Wu, Xiao-yu Zhao &amp; Chao Feng Hong Kong Applied Science and Technology Research Institute Company Limited (ASTRI), Hong Kong</p> <p>Abstract. ASTRI Smart Water Long Range (Lora) Internet of Things (IoT) System allows operators to monitor water systems in real-time. Applied through both wired and wireless detectors across the systems, it facilitates data analysis, supports user enquiry, and allows timely access to water quality information. In addition, the ultrasound water meter detects water leakage and improves the efficiency of water usage. The water leakage alert system, along with the leakage detection hardware, uses machine learning to solve water leakage problem and improves the service providers' operational efficiency. Currently, ASTRI Smart Water IoT System is successfully deployed in several China Provinces. In 2017, our work received two awards: Asia Pacific ICT Alliance Merit Award and Hong Kong ICT Bronze Award.</p>
<p>CET043 15:00-15:15</p>	<p style="text-align: center;">Implementation of Home Network System based on CoAP/6LoWPAN with DTLS in Mobile Internet Environment</p> <p style="text-align: center;"><b>Bo-Kyung Lee</b>, Gyeong-Jae Park, Yeong-Hoon Lee Korea Polytechnic University, South Korea</p>

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Abstract. Recently, as the Internet of Thing(IoT) technology has become a big issue, many researches have been carried out to link the Internet of things with the home network system. Various home network systems are being implemented to connect many devices used in the home with the Internet and to control and operate the devices using a smart phone. Since the existing Internet protocol is not suitable for use in limited environments such as low power, low capacity and low performance, IETF proposes CoAP/6LoWPAN technology and adopts it as a standard. However, security problems of IoT are emerging and IETF recommends using DTLS protocol as a security protocol suitable for CoAP/6LoWPAN environment. DTLS is a lightweight security protocol that operates on UDP. In this paper, a secure home network system is implemented to control and operate various IoT devices in a home using CoAP/6LoWPAN with DTLS in mobile environment. The implemented secure home network system consists of secure CoAP client, 6LoWPAN G/W, secure CoAP server, and Sensor, and the functions of each system are as follows;The secure CoAP client operates in the Android environment and receives various information from sensors such as temperature, humidity, air pressure, and brightness through the CoAP server. It operates to control devices in the home using information received from the CoAP server. Authentication is performed between the secure CoAP client and the secure CoAP server through the pre-shared key method.

6LoWPAN G/W operates on Raspberry pie and connects CoAP client with wifi and supports BLE communication between 6LoWPAN G/W and CoAP server. It also dynamically assigns IPv6 addresses to CoAP servers.

The secure CoAP Server supports BLE communication with 6LoWPAN G/W, and receives various information from sensors node implemented in Arduino by Zigbee communication. The secure CoAP server also uses the pre-shared key method for authentication.

Through the system implemented in this paper, it will be possible to use more secure home network systems in Mobile Internet environment. However, DTLS consumes a lot

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	<p>of energy due to data transmission during the handshake process even though it uses UDP instead of TCP. Future research will be to analyze the performance of DTLS and propose an improved DTLS protocol that can reduce energy consumption using the system implemented in this study.</p> <p>Acknowledgment : This research work was supported by National Research Foundation of Korea. (NRF-2017R1A2B1005577)</p>
T006 15:15-15:30	<p>Using Smart Contract for Privacy Preserving in Internet of Things (IoT) Environments</p> <p style="text-align: center;"><b>Zahra Dehrouyeh</b>, Reza Azmi</p> <p style="text-align: center;">Alzahra University, Tehran, Iran</p> <p>Abstract— The utilization of IoT technology increases uninterrupted .The sensors in IoT environments collect great amounts of data and give them to the service providers .This generous content of user’s individual data for IoT applications introduces new security challenges. Indeed privacy preserving is a very significant issue for IoT applications .In this paper , we propose a protocol for privacy preserving in IoT environments using blockchain technology and smart contract concept .Blockchain provides a condition that non-trusting members can correlate with each other without a trusted intermediary .Smart contract is a computer code that executes the conditions of a contract itself .Smart contract helps us to exchange our valuable things in a transparent way without any need to a middleman .The key issue in this work is a secure transmission of the shared key between a sender and a receiver using smart contract and blockchain technology in IoT environments .The secure exchange of shared key can result privacy preserving .We have implemented a prototype of the proposed protocol using pyethereum ,and evaluate its security via AVISPA tool.</p>
 <b>Coffee Break &lt;15:30---16:00&gt;</b>	

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## Session III

### Part II-Communication and signal processing

16:15-18:00

Breakout Room 9

Level 3

Chaired by- Prof. Lela Mirtskhulava,  
Iv. Javakhishvili Tbilisi State University, Georgia

Presentations:

BN009 CET034 CET007 CET009 CET010 T2002

**Note: Please arrive at the designated conference room 30 minutes earlier, in case some authors are not able to make the presentation on time.**

<p>BN009 16:15-16:30</p>	<p>Detection and Classification of Noise Using Bark Domain Features</p> <p>Samrudhi Mohdiwale, <b>Tirath Prasad Sahu</b>, Rahul Kumar Chaurasia, Naresh Kumar Nagwani and Shrish Verma</p> <p>NIT Raipur, India</p> <p>Abstract--To detect the presence of noise in the speech signal, an amplitude and frequency comparison approach is presented in the paper. This paper also provides a procedure to classify noise into their corresponding type if, any noise detected in the signal. A feature called cumulative short time fourier transform has introduced to train and classify noise. As the various type of noises can be present in the signal, classification problem is formulated as multiclass classification problem and classify using multiclass support vector machine. Results obtained by proposed method provides better accuracy than classical methods.</p>
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<p>CET034 16:30-16:45</p>	<p>Classification of Heart Sounds Using Softmax Regression and Convolutional Neural Network</p> <p>Jia Xin Low &amp; <b>Keng Wah Choo</b></p> <p>Nanyang Polytechnic/School of Engineering, Singapore</p> <p>Abstract. This research explores a new approach in using deep learning neural network for heart sound classification. The Michigan heart sound and murmur database (MHSDB) provided by the University of Michigan Health System was used in this research. The heart sounds are segmented per heartbeat and each segment is converted to form an intensity map and classified using two methods: a simple Softmax Regression (SMR) network and a convolutional neural network (CNN). This approach removes the need to provide features for supervised machine learning methods. Instead, the features are determined automatically through training of the neural network models. The result proves that the CNN is able to provide much better classification accuracy than the Softmax Regression network. In addition, classification of periodic heart sounds provides better resolution in detecting abnormal heart sounds in early stage of heart disease. Due to its simplicity in implementation, this approach can be used for real-time classification of heart sounds in wearable devices and smartphones in settings beyond hospitals.</p>
<p>CET007 16:45-17:00</p>	<p>Design and modelling of high dynamic range analog front-end in neural recording devices</p> <p><b>Yi Chen</b> and Yuan Gao</p> <p>Institute of Microelectronics, Agency of Science, Technology and Research, Singapore</p> <p>Abstract---Neural recording device which acquires spike and local field potential (LFP) from brain cortex typically require a high dynamic range of 60 dB due to small magnitude spike signal and large LFP. Presence of DC offset of electrodes, power line interference and stimulation artifact would further aggravates the situation by saturating high gain amplifier in the recording channel. Various techniques such as signal folding, artifact</p>

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	<p>cancelling and sigma-delta modulation can be adopted to either provide a high dynamic range or reduce signal dynamic range in the analog front-end. In this work, a review is given for these technique. Analysis and modelling of these techniques is also provided as a high-level verification for the high dynamic range analog front-end design.</p>
<p>CET009 17:00-17:15</p>	<p style="text-align: center;">A 1.8V/3.3V Power Management for Fully Implantable Biomedical Application</p> <p style="text-align: center;"><b>Darmayuda I Made</b>, Lei Yao, Yuan Gao</p> <p style="text-align: center;">Institute of Microelectronics, Singapore</p> <p>Abstract---Electrical stimulation has been widely used in biomedical application such as pacemaker, cochlear and retinal implants. It also has been proven that electrical stimulation is also effective for muscular and neural functions. A fully implantable electrical stimulation system would be an ideal rehabilitation solution for people with full or partial mobility issue. Battery which requires regular replacement is not ideal for fully implantable system. In this situation wireless power transmission and control is preferred. The wireless power transmission generates unregulated 5V and 2.5V. Proper operation of the stimulation front and digital control block are ensured by power management block which generates fix 3.3V and 1.8V supply voltage. The circuit is design using CMOS 0.18<math>\mu</math>m technology with 24V option. Both power supply have less than 1mV/V line regulation, while 4mV/mA and 10mV/mA of line regulation are achieved by 1.8V and 3.3V supply respectively.</p>
<p>CET010 17:15-17:30</p>	<p style="text-align: center;">A voltage doubler used in PMOS rectifier for wireless power transferring</p> <p style="text-align: center;"><b>Jianming Zhao</b>, Yuan Gao</p> <p style="text-align: center;">Institute of Microelectronics, A*STAR (Agency for Science, Technology and Research), Singapore</p> <p>Abstract. A fully on-chip voltage doubler used to drive a fully PMOS AC-DC rectifeir for implantable biomedical devices is intorduced. In this rectifier, only PMOS is used to conduct wireless AC power in order to prevent possible latch-up occurrence due to parasitic diode conduction in rectifier power-up or AC power signal</p>

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	<p>amplitude/frequency fluctuation. A 40 pF MIM capacitor is utilized as the flying capacitor and a 100pF NMOS gate capacitor acts as the load capacitor. The switch clock is provided by the AC power signal, 13.56MHz. In simulation, the voltage doubler achieves 87% power efficiency when supplying 100 <math>\mu</math>A current load with input voltage and output voltage are 2V and 3.8V, respectively. The whole AC-DC rectifier has been fabricated with 0.18 <math>\mu</math>m CMOS technology.</p>
T2002 17:30-17:45	<p>An Optimal Allocation of Tracking Tasks in a SW/HW Fog/Cloud Based Distributed Video Surveillance System</p> <p>Ugo Sbai, <b>Samy Meftali</b>, Djamel Aouali</p> <p>University of Lille, FRANCE</p> <p>Abstract—In this paper we propose a novel and systematic approach for dynamic allocation of tasks in a video surveillance system using smart cameras and based on Cloud/Fog architecture. Tracking tasks arrive in the system in a random way and must be assigned to the available devices (cameras, Fog nodes and the Cloud). Our approach guarantees the best solution optimizing power consumption and communication cost over the system. The proposed methods uses an integer programming model and its effectiveness is shown on an application example.</p>
 <b>Dinner Time: 18:15 -19:30</b>	



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## Session IV

### Part I-Computer Science and Software Engineering

Breakout Room 10-Level 3

14:00-15:45

Chaired by- Prof. Dr Rashid Hussain,  
Hamdard University, Pakistan

Presentations:

CET014 CET019 T016 BN005 T005 T009 T015

**Note: Please arrive at the designated conference room 30 minutes earlier, in case some authors are not able to make the presentation on time.**

CET014 14:00-14:15	<p>An Assessment of Bior Wavelet Decomposition's for Image Compression</p> <p><b>Rashid Hussain</b></p> <p>Hamdard University, Pakistan,</p> <p>Abstract. Compressing image using standard wavelet transform may not yield optimal results due to the limitations on wavelet bases. For astronomical images, computational constraints for signal processing and transmission require having an appropriate technique with least computational cost. The result of this study includes image compression analysis; it has been observed that that bior1.3 has efficient reconstruction capability for Adaptively Scanned Wavelet Difference Reduction technique. Another aspect of this study shows that the level5 of bior Wavelet requires less number of bytes per pixel for compression rate. This study focuses on the the appropriate selection of technique and level of bior Wavelets that can support light weight compression techniques for distant transceiver with high computational and power constraints.</p>
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<p>CET019 14:15-14:30</p>	<p style="text-align: center;">Corner Detection via Walking Particles</p> <p style="text-align: center;"><b>Pasindu Kuruppuarachchi &amp; Stanislav S. Makhanov</b></p> <p style="text-align: center;">Thammasat University, Thailand</p> <p>Abstract. A novel method of corner detection based on walking particles (WP) or bubbles rising through the edge map of the image from the bottom to the top is proposed in this paper. The WP follows the edges and are able to avoid the edge if it blocks their way to the top. The WP records their status at each step. The main idea of the new method is that at the corner the bubble has less possible options to move, compared with the flat edge. The method has been tested on a set of synthetic and real images against the most popular Harris (H) and Shi-Tomasi (ST) corner detection method. The numerical experiments show that the method outperforms H and ST method in 70% of distorted and normal images experiments and all the test cases with noise added images and real image of the evaluation.</p>
<p>T016 14:30-14:45</p>	<p style="text-align: center;">Object Detection without Color Feature Case Study: Autonomous Robot</p> <p style="text-align: center;"><b>Deshinta Arrova Dewi, Elankovan Sundararajan, Anton Satria Prabuwno, Lau Meng Cheng</b></p> <p style="text-align: center;">The National University of Malaysia, Malaysia</p> <p>Abstract-Object detection is a major area of concern and such method has been extensively used in numerous applications whereas the success of using color information has been continuously reported with less attention given to several issues, such as the lengthy process to calibrate color, color fading, and others. Nonetheless, the need of such application that does not necessarily rely on color information has seen a hike due to the mentioned issues. In fact, some of the desirable solutions are those that take less computation time, as well as those that provide higher accuracy and scalability for a large number of objects in a scene. One application that requires such solution is in a game playing by autonomous robot. This paper suggests a novel patch carried by</p>

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	<p>autonomous robots with relevant detection algorithm using contour detection and geometric moment without using the color feature.</p>
<p>BN005 14:45-15:00</p>	<p style="text-align: center;">Software Artefact Traceability Analyser: A Case-Study on POS System</p> <p style="text-align: center;"><b>I. D. Rubasinghe</b>, D. A. Meedeniya, G. I. U. S.</p> <p style="text-align: center;">Perera University of Moratuwa, Sri Lanka</p> <p>Abstract--Software traceability is a key notion in the software development. The paper explores the previously developed research-based Software Artefact Traceability Analyser tool called 'SAT-Analyser'. The workflow and capabilities of SAT-Analyser tool are described and evaluated using a case study of a Point of Sale system. Phases such as software artefact identification, data pre-processing, data extraction and traceability establishment methodologies used in the tool SAT-Analyser are presented with graph-based traceability outcome. The case-study based evaluation shows positive accuracy results for the SAT-Analyser tool. Moreover, the proposed traceability management framework for the entire software development life cycle is presented.</p>
<p>T005 15:00-15:15</p>	<p style="text-align: center;">EE Course Planning Software System</p> <p style="text-align: center;"><b>Mohammad Shakeel Laghari</b></p> <p style="text-align: center;">Department of Electrical Engineering, UAE University, United Arab Emirates.</p> <p>Abstract: Student course planning at the Department of Electrical Engineering (EE), UAE University, is important to ensure that a student fulfills the degree requirements of the university in an organized way, without encountering any redundant delays. Although the UAE University has a well-established Banner Registration System, however, course planning performed by the faculty and staff at department and college level sometimes is short of required expertise and qualification. Students have faced problems due to lack of a proper advising system as well as an inadequacy of seeking proper advice. An EE Course Planning Software System (EE-CPSS) package is devised in this respect. The software is developed by using the Python computer programming language. This system helps students in selecting from four to seven most suitable courses to register</p>

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	<p>in the next semester. The outcome of the course selection is stored in a file for future reference.</p>
<p>T009 15:15-15:30</p>	<p style="text-align: center;">Gaussian Copula Marginal Regression Modeling for Technology Analysis</p> <p style="text-align: center;"><b>Sunghae Jun</b></p> <p style="text-align: center;">Department of Statistics, Cheongju University, Chungbuk, Korea</p> <p>Abstract—Understanding the linkages between technologies and trend of individual technology are very important tasks for research and development (R&amp;D) planning of companies. Recently, researches have been actively conducted on this subject, and various approaches to technology analysis are being studied in the field of technology management. Most of the methods of technology analysis were based on patent documents related to target technology, because patents contain many information on developed technologies. So the keywords extracted from patent documents are valuable data for technology analysis. The data consist of a matrix of patent (row) and keyword (column), and each element of the matrix is frequency of occurred keyword. In this paper, we propose a technology analysis using Gaussian copula marginal regression (GCMR) model, and use the R data language for patent analysis by the GCMR. In addition, we carry out a case study to show how this study could be applied to real problem. This research contributes to diverse R&amp;D planning of companies and nations.</p>
<p>T015 15:30-15:45</p>	<p style="text-align: center;">Auto-Construction for Distributed Storage System reusing Used Personal Computers</p> <p style="text-align: center;"><b>Toshiya Kawato</b>, Shin-ichi Motomura, Masayuki Higashino, Takao Kawamura</p> <p style="text-align: center;">Tottori University, Japan</p> <p>Abstract: Storage for storing data is indispensable. If a storage capacity becomes insufficient, we can increase its capacity by adding new disks. It is, however, difficult to purchase a new disk when a budget is limited. On the other hand, there are many unused idle resources such as used personal computers despite those use value. In order to solve those problems, used personal computers can be reused as storage. Accordingly, it is necessary to discuss a storage system that considers characteristics of</p>

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	<p>used personal computers. In addition, in order to reduce works required for an installation and operation, it is necessary to automate processing necessary for construction. In this paper, we organize the characteristics of used personal computers, and consider a storage system based on the characteristics. We have then implemented a system that automatically establishes an environment as a node of the distributed storage system on each used personal computer.</p>
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**Coffee Break <15:45---16:15>**

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## Session IV

### Part II-Computer Science and Software Engineering

Breakout Room 10-Level 3

16:15-18:00

Chaired by—Prof. Dr Rashid Hussain,  
Hamdard University, Pakistan

Presentations:

T019 T2001 CET003 CET005 CET013 CET015 CET039

**Note: Please arrive at the designated conference room 30 minutes earlier, in case some authors are not able to make the presentation on time.**

T019 16:15-16:30	<p>Approximate Performance Evaluation Method of Computer Systems with Hybrid Input Source</p> <p>Hikari Yoshii, Hozomi Miyamoto, Mayuko Hirose, Itaru Koike, <b>Toshiyuki Kinoshita</b></p> <p>Tokyo University of Technology, Hachioji Tokyo Japan.</p> <p>Abstract: Queuing network techniques are effective for evaluating the performance of computer systems. We considered a queuing network with two input sources, one is a finite input source and the other is an open input source. We call this as hybrid input source. For a finite input source, the finite number of terminals exists and a job is dedicated to its own terminal. After a think-time at the terminal, the job moves to the server, and goes back to its own terminal after the CPU and /O processing from the server. On the other hand, in the open input source, the job arrives at the server randomly from the outside, and goes to outside after the CPU and I/O processing from the server. However, the queuing network model with memory resource has no product form solution and cannot be calculated the exact solutions. We proposed an</p>
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	<p>approximate queuing network technique to calculate the performance measures of computer systems with hybrid input source in which multiple types of jobs exist. This technique involves dividing the queuing network into two levels; one is "inner level" in which a job executes CPU and I/O processing, and the other is "outer level" that includes terminals and communication lines. By dividing the network into two levels, we can prevent the number of states of the network from increasing and approximately calculate the performance measures of the network. We evaluated the proposed approximation technique by using numerical experiments and a Monte Carlo simulation, and clarified the characteristics of the system response time and the accuracy of the approximation.</p>
T2001 16:30-16:45	<p>An Intelligent Mobile System to Predict Blood Sugar Level for Gestational Diabetes Patients using Machine Learning</p> <p><b>Shiyu Sara Huang</b>, Chou in Luk, Liping Zhou, Yu Sun</p> <p>Shanghai High School International Division, Shanghai, China 200231</p> <p>California State Polytechnic University, Pomona, CA 91768</p> <p>Amazon.com, Irvine, CA 92618</p> <p>Abstract: Gestational diabetes patients have to closely monitor their blood sugar levels four times a day using the traditional finger pricks, which often causes extra pains and inconvenience during the pregnancy. The monitoring approach without using finger pricks has not been widely used due to the low accuracy and high cost. In this project, we address this problem by using mobile computing and machine learning. A mobile app has been developed to collect the patient's diet and the tested blood sugar level. Once a sufficient amount of data has been collected, the system is able to train the machine learning model and predict the patient's blood sugar level based on the diet. Experiments show that our prediction without finger prick monitoring can reach to 91% accuracy when the patient is under a regular and routine diet with adequate daily exercises.</p>

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<p>CET003 16:45-17:00</p>	<p>EEG Based Emotion Recognition System for Special Children</p> <p>Krishna Bairavi, <b>Sundhara Kumar KB</b></p> <p>SSN College of Engineering, Kalavakkam, Chennai</p> <p>Abstract. EEG, one of the finest modality to study neural basis of cognition is majorly used in the area of emotion recognition. There is a major problem faced by specially abled children in comprehending and conveying emotion. Music has been used as a promising medium to evoke and study emotion over the past decade. The subjects produce alpha waves majorly while listening to music in a general relaxed state and produce large amount of beta and gamma waves while introspecting the music. The waveforms vary depending upon every individuals perception to that particular stimuli. Through our work a continuous emotional recognition system by giving music as a stimuli that could aid in continuous patient monitoring is proposed. Random forest algorithm is used to classify the emotions and later is integrated to the patient monitoring system.</p>
<p>CET005 17:00-17:15</p>	<p>Error Correction Scheme for Regenerating Code based Distributed Storage Systems</p> <p>Lakshmi V.S., <b>Deepthi P.P.</b></p> <p>Department of Electronics and Communication Engineering, National Institute of Technology, Calicut, India</p> <p>Abstract. Distributed storage systems (DSS) provide a cost effective and scalable solution to the increased demand for large scale data storage. Regenerating codes (RC) which offer an optimal tradeoff between storage efficiency and repair bandwidth efficiency are emerging as the future coding technique for distributed storage. But the proper functioning of a RC based DSS heavily depends upon the reliability of data being transferred between storage nodes. In this paper, the problem of exact node regeneration and data reconstruction in the presence of channel errors in a distributed storage system is considered. An efficient scheme is proposed to detect and correct</p>




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	<p>channel errors with minimum communication overhead and decoding complexity, thus making it highly suitable for wired and wireless distributed storage applications.</p>
<p>CET013 17:15-17:30</p>	<p style="text-align: center;">Binarized Genetic Algorithm with Neural Network for Stock Market Prediction</p> <p style="text-align: center;"><b>Dr. Kudipudi Srinivas</b>, Dr. Vaddi. Srinivasa Rao &amp; M. Sreemalli</p> <p style="text-align: center;">Dept. of CSE, V.R.Siddhartha Engineering College, Vijayawada, India</p> <p>Abstract: Stock market prediction is a challenging task to predict the upcoming stock values. It is very difficult to predict because of unstable nature of stock. This stock market prices are continuously changing day by day. Many Business Analysts spends more money on this stock market. Some of the persons may lose the money on this stock market because, they don't have clear idea about the stock market. Estimate and analyse the stock market accurately then only get more profit. Artificial neural network is a very popular technique for forecast the stock market price, but using this technique to forecast the stock market price upto some extent. So there is a need to improve the accuracy of the system. In this paper, propose a novel system called Binarized Genetic Algorithm with Artificial Neural Network (BGANN) technique to predict and forecast future behavior of individual stocks or the upcoming stock. Binarized Genetic Algorithm is used for optimizing Neural Network weights while training. Comparative analysis shows that BGANN method performance is better compared to the Support Vector Machine (SVM), Neural Network (NN), and Auto Regressive Integrated Moving Average (ARIMA) models.</p>
<p>CET015 17:30-17:45</p>	<p style="text-align: center;">3D Process Simulation for Advanced Immersion Lithography</p> <p style="text-align: center;"><b>Shijie Wang</b>, Ying Lin, Keng Heng Lai, Serene Tan and Qun Ying Lin</p> <p style="text-align: center;">A*STAR (Agency for Science, Technology and Research), Singapore</p> <p>Abstract—ArF immersion lithography has been widely adopted for advanced integrated circuits manufacturing since the 45nm technology node, and now is still one of the mainstream patterning techniques for semiconductor mass production. In this paper, we reported comprehensive evaluation results of a full track tri-layer coating immersion</p>

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	<p>process for 28nm/20nm technology node applications, which included tri-layer process setup and film stack thickness optimization, illumination selection for establishment of printing 45nm line/space (L/S) and 65nm contact hole (CH) patterns. By combination of simulation and experimental verifications, a manufacturable immersion process has been successfully set up and optimized to meet customers' requirements.</p>
<p>CET039 17:45-18:00</p>	<p style="text-align: center;">Corner Detection via Walking Particles <b>Pasindu Kuruppuarachchi &amp; Stanislav S. Makhanov</b> Thammasat University, Thailand</p> <p>Abstract. A novel method of corner detection based on walking particles (WP) or bubbles rising through the edge map of the image from the bottom to the top is proposed in this paper. The WP follows the edges and are able to avoid the edge if it blocks their way to the top. The WP records their status at each step. The main idea of the new method is that at the corner the bubble has less possible options to move, compared with the flat edge. The method has been tested on a set of synthetic and real images against the most popular Harris (H) and Shi-Tomasi (ST) corner detection method. The numerical experiments show that the method outperforms H and ST method in 70% of distorted and normal images experiments and all the test cases with noise added images and real image of the evaluation.</p>
 <p><b>Dinner Time: 18:15 -19:30</b></p>	

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<b>Poster Session</b>	
CET3002	<p style="text-align: center;"><b>The Survey of WLAN-Based Indoor Fingerprinting Localization</b></p> <p style="text-align: center;">Xiaomin Yu, Huiqiang Wang and Meijuan Jia</p> <p style="text-align: center;">Harbin Engineering University, China</p> <p>Abstract. With the development of the technology of the Internet and the decline of all kinds of hardware manufacturing costs, the demand for indoor location is increasing. The existing positioning methods are mainly divided into two categories: one is using Bluetooth, Zigbee Ultra-WideBand (UWB), WLAN, RFID, wireless signals and so on to realize indoor positioning, another is using inertial sensor for positioning. WLAN-based indoor fingerprinting positioning method gets the attention of the researchers because it can make use of existing infrastructure to save the cost of hardware. In this paper, we introduce and analyze the present situation of the research on WLAN-based fingerprinting location, points out the existing research shortcomings and future research prospects and provides a more detailed comparison for the researchers.</p>
BN020	<p style="text-align: center;"><b>A Novel Amplitude Spectrum Formation Algorithm for FRFT-TDCS</b></p> <p style="text-align: center;">Zheng Bo, Qiu Zheng, Zhang Hengyang, Cheng Cheng</p> <p style="text-align: center;">Information and Navigation Institute, Air Force Engineering University, Xi'an, China</p> <p>ABSTRACT-For the problems of the traditional Transform Domain Communication System (TDCS) dealing with Multi-component Linear Frequency Modulation (MLFM) interference signals, we propose a novel amplitude spectrum formation algorithm for FRFT-TDCS (Transform Domain Communication System based on Fractional Fourier Transform) in this paper. The algorithm can achieve the maximum available bandwidth through an optimal transform order selection scheme. We firstly analyze the spectrum distribution characteristics of LFM interference signals with different transform orders in the FRFT domain, and quantify their energy bandspread and center position. Then the spectrum magnitude vector would be generated through the preset threshold, and the optimal transform order which can maximize the number of available spectrum</p>

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	<p>subcarrier is chosen. We then derive the relationship between the system BER and autocorrelation function of the basis function through the CSK demodulation model. It proves that the system BER can be reduced by increasing the number of available spectrum subcarrier. Simulation results show that when dealing with MLFM interference signals, the proposed algorithm can find the optimal transform order, decrease the peak and mean value of the basis function, improve the system LPI and LPD performance, and reduce the system BER effectively.</p>
T017	<p>Design and Implementation of A Cross-database Query Tool on Multi-source Databases</p> <p style="text-align: center;">Liang Liang, Zhu Guangxin, Li Yuqian, Hu Junjun</p> <p>Abstract: With the rapid development of the company's business, and the demand for inter-business type data correlation inquiry, an easy and efficient cross-database query tool is urgently needed. Currently, the cross-database query method has the following problems: firstly, it can not meet the needs of multiple data sources; second, there are complicated operations and waste of resources; third, full real-time data can not be guaranteed. In order to solve these problems, this paper designs a cross-database query tool with multiple data sources, which is realized by adapters, distributed parallel collaborative query and heterogeneous data association. The tool can insert a variety of data sources through plug-in, shield different data source differences, use the unified SQL accessing to query relationship, and use the memory to ensure query efficiency and real-time. It does not store data itself, only as data processing Channel to reduce the waste of storage resources.</p>
BN007	<p style="text-align: center;">A Threat-Driven Approach to Modeling a Campus Network Security</p> <p style="text-align: center;">Marlon A. Naagas, Thelma D. Palaoag</p> <p style="text-align: center;">Central Luzon State University, Science City of Munoz, NE, Philippines</p> <p>Abstract--The Higher Education Institutions (HEI) readiness to cyber security threats has gotten less consideration than certain organizations and financial companies and the need to address these kinds of adversities are necessary in colleges and universities.</p>

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	<p>These institutions face challenges which are unique to the way they operate, meaning they have to seek out appropriate solutions to keep their assets safe and secure. Threat-Driven Approach is a systematic approach that is driven by a clear understanding of the security need. Using this systematic approach, the strength of a protection is easily gauged through simple identification of the weakest link of the network. Various Threat Driven approach have been proposed, but most of the study focuses on the security of software development and business infrastructure. Based on the existing literature, there is no HEI that are practicing the systematic approach in securing their assets. The primary purpose of this paper is to enable HEI to apply this approach and will provide detailed guidance that will enable HEI to place threats at the forefront of planning, design, testing, deployment and operational activities. The threat driven approach is a set of integrated methodology, practices and tools into one framework/model. The STRIDE and DREAD are also used in this study to identify and calculate the potential threats of the Network Security. As a result, our approach can make network design secured from anticipated security threats and, thus, reduce significant design-level vulnerabilities.</p>
BN008	<p style="text-align: center;">Shock Wave Based Ray Tracing Method for Travel Time Estimation</p> <p style="text-align: center;">Gen Li, Lu Sun</p> <p style="text-align: center;">Southeast University, China</p> <p>Abstract--Travel time has been recognized as one of the most important performance measures of transportation system. This paper presents a ray tracing method for travel time estimation by following shock wave generation and propagation within a link. The proposed method is a physics driven approach and meanwhile vehicle trajectories are also estimated. As a mechanism-based method, it provides a physical interpretation on how vehicle traverses a stretch of roadway. The ray tracing method is compared to other conventional methods by using both field experiment and microscopic simulation, suggesting that the former exhibits more accurate and robust estimation results. It was</p>

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	<p>found that as the proposed method can make the best of traffic data (speed, density, flow rate) to trace the real vehicle speed trajectories, it yields much better performance than other methods during transition flow and congestion, which is vital for a travel time estimation method.</p>
BN026	<p style="text-align: center;">An Offline Equivalence Scheduling Technique for Time-Triggered Ethernet</p> <p style="text-align: center;">Shiqian Zhang, Zonghui Li, Ningchen Wang, Hai Wan, Xibin Zhao</p> <p style="text-align: center;">Tsinghua University, Beijing, China</p> <p>Abstract—Time-triggered networks, like TTEthernet, require tight communication latency and minimal jitter requirements. One efficient way to meet these requirements is pre-compute the transmission points of the frames on the network and stores the complete schedule within the local memory. This method avoids contentions of frames. However, as the size of network grows, the size of offline table increases and the memory requirements increase while memory is a scare resource. Due to the memory limitation, a table based scheduling approach might not be applicable.</p> <p>In this paper, we present an offline equivalence scheduling technique for Time-triggered Ethernet. Offline equivalence is an online policy that is equivalent to a given offline table to combine the advantages of both online and offline scheduling. Here online scheduling is used, and only deviations from offline table are required to be stored. We consider each end in dataflow as a real-time embedded system (end-station) and solve the scheduling problem based on offline equivalence technique. In the evaluation, we consider an ILP-based solver CPLEX as our baseline to test our new scheduler under three different typical topologies. The results show that offline equivalence scheduling technique achieves high schedulability ratio, and only having to store on average a few bytes of the offline schedule in small-medium network.</p>



# Memo