

MNTMSim2016

**First International Conference
On**

Micro & Nano Technologies, Modelling and Simulation 2016

1 – 3 March 2016, Kuala Lumpur, Malaysia

Conference Program

And Abstracts of Presented Papers

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Micro & Nano Technologies, Modelling and Simulation 2016

1 – 3 March 2016, Kuala Lumpur, Malaysia

Conference Chair	Assoc. Prof. Dr Zuwairie Ibrahim, University of Malaysia in Pahang
Honorary Conference Co-Chairs	Assoc Prof Dr Ismail Saad, University of Malaysia in Sabah Prof Dr Qiang Shen, University of Aberystwyth, UK Dr Athanasios Pantelous, University of Liverpool, UK
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Local Arrangements Chair and Session Coordinators	Mr Zulkifli Yusuf, University of Malaysia in Pahang
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General Chairs	Professor Dr David Al-Dabass, Nottingham Trent University, UK Professor Dr Ajith Abraham, Machine Intelligence Research labs (MIR)

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MNTMSim2016, Program at a Glance

MNTMSim2016 Conference Program at a Glance

Conditions for Submission to IEEE-Xplore

1. Presenter must demonstrate deep and detailed knowledge of the paper content by utilizing the full 20 minutes presentation time.
2. The session chair must be satisfied the presenter has answered at least one question in full to the approval of both the session chair and the participants.
3. The value of conference attendance is to get maximum feedback from participants on the significance of the research being presented.
4. Speak clearly and slowly, do not Mumble or race through the sentences, moderate your voice to make sure attendees hear every word you say without shouting.

MNTMSim2016 Conference Program at a Glance

Session Code: Tue.pm1 means Tuesday afternoon before tea break. Other Time periods: am1, pm1, pm2	Paper Code: e.g. B1 see following page for a full list: Track letter: A, B, C . and paper number within track e.g. B1
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Tuesday 1 March 2016: Pacific Regency Hotel, Level 33.

Time	Day-1: Tuesday 1 March 2016 (Registration, Keynote Speaker + 9 papers)
10am	Registration & Refreshments
10.45 - 12	Tue.am1 (Chair: Al-Dabass) Opening Session and Keynote Speaker Prof Razali Ismail
12 - 1.15	Lunch
1.15 - 3.45, 5 papers	Tue.pm1 (Zuwairie): B1, E1, F1, J1, K1
3.45 - 4	Refreshments
4 - 6, 4 papers	Tue.pm2 (Ibrahim Shapiai): L1, S1, T1, T2
6pm	Closing of Conference and Photo Opportunity
7pm	Dinner
	Day-2 and day-3: Social Program free time to explore the heritage, culture and history of Kuala Lumpur and Malaysia

MNTMSim2016, Table of Content

Seq	EDAS Paper ID	Track	First author	Presenters: names
Track: 02-B Nano Technologies				
B1	<u>1570251569</u>	<i>Computational Study of Gas Molecules Adsorption on Defective Graphene Nanoribbon</i>	Zuriana Auzar	Johari
Track: 05-E Discrete Event and Real Time Systems				
E1	<u>1570250495</u>	<i>Real Time Identification of Electrical Devices through Power Consumption Pattern Detection</i>	Vibhatha Abeykoon	Kankanamdu urage
Track: 06-F Image, Speech and Signal Processing				
F1	<u>1570250645</u>	<i>Smart Infotainment System: A Human Machine Interface Based Approach</i>	Deepak Desai	Desai
Track: 09-J Engineering: Civil, Mechanical, Chemical, Industrial, Manufacturing and Control				
J1	<u>1570249567</u>	<i>Application of Kane's Method for Dynamic Modeling of Rotary Inverted Pendulum System</i>	Mukhtar Hamza	Hamza
Track: 10-K Energy, Power Generation and Distribution				
K1	<u>1570250420</u>	<i>Self-Sustaining Autonomous System for High Voltage Transmission Line Inspection and Fault Detection in Sri Lanka</i>	Pasika SashmalRanaweera	Malaviarachchi
Track: 11-L Transport, Logistics, Harbour, Shipping and Marine Simulation				
L1	<u>1570249139</u>	<i>A Multi-Objective Genetic Algorithm Based Optimum Schedule under Variety Capacity Restriction</i>	Fanrong Sun	Sun
Track: 16-S Performance Engineering of Computer & Communication Systems				
S1	<u>1570248195</u>	<i>4G LTE Network Design Around Budi Luhur University Campus And Its Neighborhood</i>	Setyaji Zunaierlan	Riyanto
Track: 17-T Circuits, Sensors and Devices				
T1	<u>1570250252</u>	<i>Equivalent Circuit Model Implementation of Dual Channel Vertical Strained Impact Ionization MOSFET (DC-VESIMOS) in Biosensor Applications</i>	Andee Hazwani SyazanaBachoho	Bachoho
T2	<u>1570250726</u>	<i>Low Power 1-bit Full Adder Circuit using modified Gate Diffusion Input (GDI)</i>	Deepali Koppad	Koppad

MNTMSim2016, 1 to 3 March 2016, Kuala Lumpur, Malaysia

Time	Session
Tuesday, March 1	
10:45 am-12:00 pm	Tue.AM1: <i>Keynote speaker</i>
01:15 pm-03:45 pm	Tue.PM1: <i>Papers from tracks B, E, F, J, K</i>
04:00 pm-06:00 pm	Tue.PM2: <i>Papers from Tracks L, S and T</i>

Tuesday, March 1, 10:45 - 12:00

Tue.AM1: Keynote speaker

Chair: David Al-Dabass (Nottingham Trent University, United Kingdom)

Scaling Challenges of Floating Gate Non-Volatile Memory and Si Nanowire (SiNW) based Gate-All-Around (GAA) Structure as the Future Flash Memory Device

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Abstract

The high demands from consumer electronics have resulted in the requirements of massive storage capabilities. This study presents the challenges and issues related to the floating gate memory device. Each component of the gate stack, which consist of the tunnel oxide layer, the inter-poly dielectric (IPD) and the poly-Si floating gate are looked at. In resolving the relating issues, the 3D NAND architectures which adopt the GAA configuration with floating gate structure are reviewed. In conjunction with the proposed device, the modelling and simulation work are studied. Simulations are carried out to evaluate the performance of various floating gate structures which can be extended to obtain compact models for SPICE-like circuit simulation.

Biography



Razali Ismail received the B.Sc. and M.Sc. degrees in Electrical and Electronic Engineering from the University of Nottingham, Nottingham, U.K. in 1980 and 1983 respectively and the Ph.D. degree from Cambridge University, Cambridge, U.K., in 1989.

In 1984 he joined the Faculty of Electrical Engineering, Universiti Teknologi Malaysia as a lecturer in Electrical and Electronic Engineering. He has held various faculty positions including as Head of Department and Chief Editor of the university journal. In 1985, he began his PhD work at the Department of Electronics and Computer Science, University of Southampton, Southampton, U.K. From 1987 to 1989, he continued his research work at the Department of Engineering, Cambridge University, Cambridge, U.K. where he completed his Ph.D. degree in microelectronics. His main research interest is in the field of microelectronics which includes the Modelling and Simulation of IC Fabrication Process and Modelling of Semiconductor Devices. His current research interest is in the emerging area of nanoelectronics devices focusing on the use of carbon based materials and novel device structures. He has published more than 170 papers in internationally refereed indexed journals and conference proceedings.

Tuesday, March 1, 13:15 - 15:45

Tue.PM1: Papers from tracks B, E, F, J, K

Chair: Zuwairie Ibrahim (Universiti Malaysia Pahang, Malaysia)

1:15 Computational Study of Gas Molecules Adsorption on Defective Graphene Nanoribbon

Zuriana Auzar, Zaharah Johari, Sakina Shamim Husain and Nurul Ezaila Alias (Universiti Teknologi Malaysia, Malaysia)

This paper reported on the structural and electronics properties of armchair graphene nanoribbon (AGNR) distorted with single vacancy (SV) defect when adsorbing various gas molecules including oxygen (O₂), nitrogen (N₂) and ammonia (NH₃). The main focus is to investigate using self-consistent Extended-Huckel the adsorption geometry of the gas molecules located C, N and F from the SV defect. Both molecular and atomic gas molecules configuration are considered in determining the adsorption energy. Through simulation, it is demonstrated the gas molecules adsorption energy greatly influenced by its position towards the SV defects. Molecular O₂, N₂ and NH₃ adsorption on at N position achieved highest adsorption energy compared to other position. Other gases have little effect on modifying the electronic structure. The calculated charge transfer shows that molecular NH₃ acts as a donor while atomic NH₃, O₂ and N₂ acts as acceptor. We show that the defective AGNR are sensitive to the adsorption of molecular NH₃ and the system exhibit N-type semiconductor.

1:45 Real Time Identification of Electrical Devices through Power Consumption Pattern Detection

Vibhatha Abeykoon, Nishadi Kankanamdurage and Anuruddha Senevirathna (University of Ruhuna, Sri Lanka); Pasika Sashmal S Ranaweera (University of Ruhuna & Faculty of Engineering, Sri Lanka); Rajitha Udawapola (University of Ruhuna, Sri Lanka)

This research discusses a way to identify electrical devices in real time using intelligent techniques through data analysis. The electrical device identification process is initiated by collecting information related to power consumption of electric appliances which are used in households. A prototype data acquisition system was implemented to extract parameters such as active power, reactive power, phase shift, root mean square voltage and current from the appliances connected to it. The analysis is done using neural networks, support vector machines, K-Means, Mean-Shift and Silhouette classifiers. The purpose of this study is to select the best classifier which produces the optimum results in detecting and identifying electrical appliances in real time from their electric parameters. The selected classifier is used to determine a power consumption pattern (signature) for different electric appliances.

2:15 Smart Infotainment System

Deepak Desai (B. V. Bhoomaraddi College of Engineering & Technology & Visvesvaraya Technological University, India); Amit Kustagi (B. V. Bhoomaraddi College of Engineering & Technology, India); Rajeshwari M. Banakar (BVBCET, India); Kedar Kurandkar (B. V. Bhoomaraddi College of Engineering & Technology, India)

Vehicle Automation has dominated with the advancements in IoT applications since 2009. It becomes a prime necessity to arrive at a unique, single window solution for four major problems that exist today. Namely Safety, Infotainment, Inter-connectivity, and Traffic Congestion. A common solution to all these can be obtained by interfacing a speech recognition module to existing smart voice assistants like Apple's Siri, Google Voice or Window's Cortana to process the input voice commands using a Raspberry Pi board to control GPS, Car Automation etc. The system involves Wireless Communication which depicts IoT and hence will enable inter-car-communication on the basis of M2M (Machine to Machine) Communication. This will turn out to be a big leap in avoiding accidents since the driver can be more focused only to driving aspect, without physical distraction to operate other sub-units of the vehicle namely, power windows, entertainment system and interior lightings. Thus posing for a network of interconnected cars, using the concept of Internet of Things (IoT).

Tuesday, March 1, 13:15 - 15:45, Continued

Tue.PM1: Papers from tracks B, E, F, J, K

Chair: Zuwairie Ibrahim (Universiti Malaysia Pahang, Malaysia)

2:45 *Application of Kane's Method for Dynamic Modeling of Rotary Inverted Pendulum System*

Mukhtar Hamza, Hwa Yap and Imtiaz Choudhury (University of Malaya, Malaysia); Abdulbasid Isa (Sokoto State Polytechnic, Nigeria)

Rotary inverted pendulum (RIP) is under-actuated mechanical system which is inherently nonlinear and unstable. RIP is known widely as experimental setup for testing different kind of control algorithms. Most of literature used Newton-Euler or Lagrange methods to find the dynamic equation of RIP. Thus, this paper, described a development of nonlinear dynamical equations of the RIP system using Kane's method. The simulink model of RIP was developed based on the derived equations. Simulation study was carried out and the results indicated that, the RIP system is inherently nonlinear and unstable. Comparisons between the Euler Lagrange and Kane's methods were carried out using Matlab simulink, which demonstrate the advantage of Kane's method. It is realized that the difficulties and limitations in the previous dynamic equation of RIP proposed in literature are eliminated. Kane's method can be regarded as an alternative method for finding the dynamic model of the systems. This method does not require the calculation of multipliers or redundant forces which some time add complexity to the model.

3:15 *Self-Sustaining Autonomous System for High Voltage Transmission Line Inspection and Fault Detection in Sri Lanka*

Pasika Sashmal S Ranaweera (University of Ruhuna & Faculty of Engineering, Sri Lanka); Thamashi Upeksha Malaviarachchi, Thadeesha Perera and Supun Perera (University of Ruhuna, Sri Lanka)

High Voltage Transmission line inspection and maintenance is an extremely dangerous employment due to the reason that such tasks are performed at high altitudes around high magnitude voltages. In countries like Sri Lanka, this employment has caused the demise of experienced technicians over the years. As a solution to this timely matter on power distribution sector, an autonomous approach is introduced to perform the inspection through remote operation. A Remotely Operated Vehicle (ROV) prototype was implemented to test the proposed approach in a single transmission line span. The intended functions of the proposed ROV are positioning, live video transmission and the sag template indication of the transmission line which are being explicated in this paper. The prototype was tested in a high voltage laboratory environment to verify the feasibility of operation. A magnetic energy harvesting circuit was designed and implemented to satisfy the power requirement of the proposed autonomous system.

Tuesday, March 1, 16:00 - 18:00

Tue.PM2: Papers from Tracks L, S and T

Chair: Ibrahim Shapiai (Malaysia-Japan International Institute of Technology (MJIT), Malaysia)

4:00 A Multi-Objective Genetic Algorithm Based Optimum Schedule under Variety Capacity Restriction

Fanrong Sun and Yuxin Yang (Nanjing University of Aeronautics and Astronautics, P.R. China); Ge Qian (China Eastern Airlines Jiangsu Co., Ltd, P.R. China); Songchen Han (Nanjing University of Aeronautics and Astronautics, P.R. China)

Flight schedule influences the safe operation and profits of airlines, and also be restricted by air traffic capacity. In consideration of the complexity is a strict constraint of capacity and the different aircraft quantity of each en-route is a key element of traffic complexity, a matching model for the traffic flow and variety capacity based on the complexity is presented. And a novel flight schedule optimization method under variety capacity restriction is established. By defined an adjust cost and adjust number function of the flight bank construction for evaluating the planning strategy in each slot time, a multi-objective genetic algorithm is proposed to search Pareto solutions for flight schedule optimization model. Experimental results verify the effectiveness of the method as opposed to historical model.

4:30 4G LTE Network Design Around Budi Luhur University Campus And Its Neighborhood

Setyaji Zunaierlan (Universitas Budi Luhur & PT. Indosat Ooredoo, Indonesia); Indra Riyanto (Faculty of Engineering Budi Luhur University, Indonesia)

The need for high speed data and voice is essential nowadays. Long Term Evolution (LTE) is one technology that supports user's need of high speed data and voice. LTE development is still centered in the big cities, it is possible for LTE to start developing in educational area such as middle schools to universities. Budi Luhur University is one potential place for LTE development. The high number of lectures and student activities make students spend most of their time at the campus by accessing social media through their mobile phones, causing the need for high speed data communication is increasing. LTE planning should be considered at Budi Luhur University to get fast access and reliable data communication for the students. Planning method and scenario used in this LTE planning is 900Mhz frequency coverage and capacity. This planning will be simulated using Atoll software. The result of this planning will shows the best area to locate the site according to the need in Budi Luhur University and its surrounding area.

Tuesday, March 1, 16:00 - 18:00, Continued

Tue.PM2: Papers from Tracks L, S and T

Chair: Ibrahim Shapiai (Malaysia-Japan International Institute of Technology (MJIIT), Malaysia)

5:00 Equivalent Circuit Model Implementation of Dual Channel Vertical Strained Impact Ionization MOSFET (DC-VESIMOS) in Biosensor Applications

Andee Hazwani Syazana Bacho, Ismail Saad, Bunseng Chan, Mohd Zuhir Hamzah and Nurmin Bolong (Universiti Malaysia Sabah, Malaysia)

A Dual Channel Vertical Strained Impact Ionization MOSFET (DC-VESIMOS) equivalent circuit model has been successfully designed and modelled in this paper. Miniaturization of biosensor using field effect transistor (FET) based sensors with superb performance and enhanced reliability plays a vital role in transducing component of a biosensor. The importance of subthreshold value (S) towards the sensitivity and selectivity of biosensor contributes to the significance of those parameter in designing and modelling equivalent circuitry model of DC-VESIMOS. A technique facilitating the optimization of impedance element value in the modelled DC-VESIMOS circuitry is explained in order to match the exact S value of the simulated device. DC-VESIMOS reported has a low S value of about 10.98 mV/dec which indicates fast switching behavior that leads to high sensitivity as a biosensor transducer element. A comparison of subthreshold slope between the TCAD simulated device and the PSpice circuitry modelled shows a 86.79% similarity which ensure that the DC-VESIMOS are able to work fine on circuit level implementation and in fact a virtual representation of the actual device characteristics.

5:30 Low Power 1-bit Full Adder Circuit using modified Gate Diffusion Input (GDI)

Deepali Koppad (PES University, India); Sujatha Hiremath (RV College of Engineering, Bangalore, India)

Low Power techniques are becoming important and useful as the number of transistors is increasing every day. It is crucial to reduce the power dissipation for long life, more reliable and high performance systems. Gate Diffusion Input (GDI) is one technique to achieve low power. GDI requires less number of transistors as compared to corresponding CMOS logic. The basic GDI cell consists of only two transistors, where all the three terminals Gate, Source and Drain of the transistors are treated as inputs. GDI technique also has the advantage of less delay and reduced area. But the disadvantage of GDI is the output does not have a full swing of logic 1 and logic 0. In this paper basic GDI cell is modified to get a full swing for logic 1 and 0. This modified GDI cell is used to implement the full adder. Comparison results of basic GDI, Modified GDI, CMOS circuits are shown. These results are obtained from CADENCE VIRTUOSO based on 45nm technology with the supply voltage of 1.2V.