

## Welcome Message from President of STUST



President  
Dr. Lu, Deng-Maw

October 04, 2018

First of all, on behalf of Southern Taiwan University of Science and Technology (STUST), I would like to express our warmest welcome for your participation in the “**2018 International Symposium on Novel and Sustainable Technology (2018 ISNST)**”, and thank those who contribute to the success of this conference by sharing your professional competence and valued experience.

This is the sixteen year we hold this international conference. With our consistence, this conference has been made known to the academic public, and encouragingly about 250 people attend the conference. We have received 262 abstracts from 9 different countries, including 2 keynote speeches, 22 invited speeches, 53 oral presentations, and 187 poster presentations. I would like to express my deep appreciation to outstanding professors to give remarkable speeches. On this day, through the brainstorming, interactions, and discussions among the scholars and experts, we believe this conference will be successful and provide you more ideas in your future research work.

Finally, I again deeply appreciate all the participants for your support and contribution to this conference. I would also like to express my sincere wishes for the success of the conference, and for your findings of new opportunities in the ever-growing realm of mechanical technology, intelligent & electronic technology, electrical & photonic technology, and chemical- & bio-technology. Many thanks again for your coming.

**2018-ISONST Symposium Program**  
(E-13 Nien-Tzu International Conference Hall)

**October 4 (Thursday)**

October 4 (Thursday)				
08:00-09:00	<b>Registration</b> (E-13 Lobby)			
09:00-09:30	<b>Opening Ceremony</b> (Room: E1301) <b>Opening remark: Prof. Deng-Maw, Lu, Chairman of Congress</b> <i>The President of Southern Taiwan University of Science and Technology, Taiwan.</i>			
09:30-10:30	<b>Keynote Lecture 1</b> (Room: E1301) <b>Prof. Nguyen Hay</b> <i>President of Nong Lam University-Ho Chi Minh City, Vietnam.</i> <i>Title: Researching on application of Ultrasound, Radio Frequency, Infrared radiation which are combined with heat pump dryer in drying high value agricultural products in Viet Nam</i> <b>Chair: Prof. Aaron See</b>			
10:30-11:00	<b>Coffee Break</b>			<b>Poster Presentation 1 (Session A &amp; D)</b> (E-13 Lobby)
11:00-12:00	<b>Keynote Lecture 2</b> (Room: E1301) <b>Prof. Chen-Chi Ma</b> <i>Chair Professor Department of Chemical Engineering, National Tsing Hua University, Taiwan.</i> <i>Title: Advanced Polymer Composite for Aerospace Industry</i> <b>Chair: Ching-Fong Mao</b>			
12:00-13:00	<b>Lunch Break</b> (Room: E1302 · E1304)			
13:00-14:30	<b>Poster Presentation 2 (Session B &amp; C)</b> (E-13 Lobby)			
	<b>Session A</b> Room: E1305	<b>Session B</b> Room: E504	<b>Session C</b> Room: E509	<b>Session D</b> Room: E1301
14:30-16:00	<b>Invited</b> <b>Prof. Toshihiro Moriga</b> Professor of Faculty of Science and Technology, Tokushima Universitas, Japan. <i>Title: Eco-Friendly Preparation of Oxynitride Pigments and Phosphors from Nonstoichiometric Mixture of Starting Materials</i> <b>Chair: Prof. Nai-Shang Liou</b>	<b>Invited</b> <b>Prof. Soo Yong Lim</b> Assitant Professor of Department of Electrical and Electronic Engineering, University of Nottingham Malaysia Campus, Malaysia. <i>Title: Ray Tracing for 5G Systems</i> <b>Chair: Prof. Wen-Shan Chen</b>	<b>Invited</b> <b>Prof. Jeen-Shing Wang</b> Distinguished Professor of Department of Electrical Engineering, National Cheng Kung University, Taiwan. <i>Title: Integration of Wearable and AI Technology in Medical Applications</i> <b>Chair: Prof. Chun-Tang Chao</b>	<b>Invited</b> <b>Prof. Oliver Brüggemann</b> Head of Institute of Polymer Chemistry, Johannes Kepler University Linz, Austria. <i>Title: Functional polymers for medical and industrial applications</i> <b>Chair: Prof. Bing-Hung Chen</b>
	<b>Invited</b> <b>Prof. Nguyen Thanh Phuong</b> Professor of Institute of engineering, Ho Chi Minh City University of Technology, Vietnam. <i>Title: A Study On Single Phase 9 Levels Inverter</i> <b>Invited</b> <b>Prof. Ngoc-Bich Le</b> Professor of School of Engineering, Eastern International University, Vietnam. <i>Title: T-Shirt Auto-Dimensioning Utilizing Image Processing</i> <b>Chair: Prof. Nai-Shang Liou</b>	<b>Prof. Wen-Shan Chen and Prof. Bang-Yun Lin</b> Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan. <i>Title: Microtrip-Line-Fed Printed Slot Antennas with Hign Gain</i> <b>Prof. Sheng-Xiu Lin, Prof. Jun-Ming Xu, Prof. Liang-Bi Chen, and Prof. Chao-Tang Yu</b> Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan. <i>Title: DC-Based Power Line Communication Used in A Driving Safety Aided System</i> <b>Prof. Yi-Cheng Lin, Prof. Fu-Lin Lin and Prof. Chao-Tang Yu</b> Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan. <i>Title: Multipath Modeling of In-Vehicle Power Line Communication Channels</i> <b>Chair: Prof. Soo Yong Lim</b>	<b>Invited</b> <b>Prof. Tatsana Thomthong</b> Head of Electrical Engineering Department of Rajamangala University of Technology Lanna, Thailand. <i>Title: The Plastic Film Sheet Width Measurement Machine</i> <b>Chair: Prof. Lian-Jou Tsai</b>	<b>Invited</b> <b>Prof. Bing-Hung Chen</b> Professor of Department of Chemical Engineering, National Cheng Kung University, Taiwan. <i>Title: Study on Heterogeneously Catalyzed Oligomerization of Glycerol over Alumina Supported Ca/Sr Mixed Oxides</i> <b>Chair: Prof. Chih-Hsin Hung</b>
	<b>Oral</b> <b>Presenter: Po-Chun Chen</b> Southern Taiwan University of Science and Technology, Taiwan <i>Title: Low-dimensional material molybdenum sulfide coating on the surface of nano-porous aluminum alloy for high anti-wearing</i> <b>Presenter: Ryunosuke Minato</b> Tokushima University, Japan <i>Title: Verification of structure change from pylochloro to fluorite in <math>Ce_{1-x}La_xO_{2-\delta}</math> (<math>0 \leq x \leq 0.5</math>)</i> <b>Presenter: Zi-Quen Chen</b> Southern Taiwan University of Science and Technology, Taiwan <i>Title: Improved method on modelling vehicle contact force</i> <b>Chair: Prof. Shou-Tao Peng</b>	<b>Prof. Tsong-Shing Lee, Prof. Shao-En Huang, and Prof. Te-Chun Hung</b> Department of Electrical Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan <i>Title: Investigation of Electric-Field Coupling Wireless Power Transfer System with Modular Expansion Capability for LED Lighting Application</i> <b>Welsey Daniel C. Advincula 1, Chun-Ping Hsieh2, Dr. Nilo T. Bugtai1, Engr. Renann G. Baldovino1, Dr. Aaron Raymond See2, and Dr. Yi-Chun Du2</b> 1. Manufacturing Engineering and Management Department, De La Salle University Manila, Philippines. 2. Department of Electrical Engineering, Southern Taiwan University of Science and Technology Tainan, Taiwan. <i>Title: TV White Space for Enabling Telemedicine Solutions to Rural Hospitals and Health Centers in a Developing Country</i> <b>Long-Sheng Li, and Ya-Zhu Hsu</b> Department of Computer Science and Information Engineering, National Chiayi University, Taiwan. <i>Title: A SDN Based Handover Management Scheme for Taiwan High Speed Rails</i> <b>Chair: Prof. Soo Yong Lim</b>	<b>Oral</b> <b>Presenter: Chia-Feng Liu</b> National Cheng Kung University, Taiwan *Ashaka Technology Inc. <i>Title: Improvement of Attention in Learning Using Extremely Low Frequency Electromagnetic Field</i> <b>Presenter: Chia-Feng Liu</b> National Cheng Kung University, Taiwan *Ashaka Technology Inc. <i>Title: Pet Emotion Soothing Using Extremely Low Frequency Electromagnetic Field</i> <b>Presenter: Kryzz Amiel Magpantay</b> De La Salle University, Manila, Philippines Southern Taiwan University of Science and Technology, Taiwan <i>Title: Pilot study on the classification method using SSD model of CNN for identifying kidneys and bladders in ultrasound images</i> <b>Chair: Prof. Te-Chun Hung</b>	<b>Invited</b> <b>Prof. Chih-Hsin Hung</b> Professor of Institute of Biotechnology and Chemical Engineering, I-Shou University, Taiwan. <i>Title: Using bacteriophage and lysin to control Extended-Spectrum Drug-resistant Acinetobacter baumannii Infection</i> <b>Chair: Prof. Oliver Brüggemann</b>

16:00-16:30	Coffee Break	Coffee Break	Coffee Break	Coffee Break
16:30-18:00	<p><b>Oral</b>  <b>Presenter: Yu-Kai Wang</b>  Southern Taiwan University of Science and Technology, Taiwan  Title: Study the hydrolysis reaction of preceramic polysilazane precursor on aluminum nitride surface film  <b>Presenter: M. Matsumura</b>  Kumamoto University, Japan  Title: Experimental Study of Heat Transfer Coefficient Enhancement Effect by Graphene Oxide Nanofluid  <b>Presenter: Z.W. Lin</b>  Southern Taiwan University of Science and Technology, Taiwan  Title: Formation of Ta<sub>2</sub>O<sub>5</sub> doped coating on the surface of titanium within HF containing electrolyte by micro arc oxidation  <b>Chair: Prof. Shou-Tao Peng</b></p>	<p><b>Invited</b>  <b>Prof. Jung-Hsien Chiang</b>  Distinguished Professor of Department of Computer Science and Information Engineering, National Cheng Kung University, Taiwan.  Title: <i>Interdisciplinary innovation Application of Artificial Intelligence</i>  <b>Chair: Prof. Shu-Chen Cheng</b></p>	<p><b>Oral</b>  <b>Presenter: Chih-Yu Tsai</b>  Southern Taiwan University of Science and Technology, Taiwan  Title: <i>Development of a Microprocessor based Wireless Blood Pressure Monitoring System</i>  <b>Presenter: Exekiel Anthony M. Vergara</b>  Lyceum of the Philippines University Batangas  Title: <i>MCU Based Protection Suit for Human Fall Detection with GPS Locator</i>  <b>Presenter: Muslikhin Muslikhin</b>  Southern Taiwan University of Science and Technology, Taiwan  Title: <i>PWM Switching Strategies Study on Brushless DC Motor Drives</i>  <b>Chair: Prof. Te-Chun Hung</b></p>	<p><b>Oral</b>  <b>Presenter: Ying-Chen Yi</b>  Title: <i>Establishment of Constitutive and Inducible Recombinant Expression System by Shewanella oneidensis MR-1</i>  <b>Presenter: Wai Leng Carmen Loh</b>  Title: <i>Production of microbial carotenoids by Gordonia terrae TWRH01: cultivation and medium optimization</i>  <b>Presenter: Han-Yun Wu</b>  Title: <i>In vitro co-biosynthesis of 3-hydroxypropionic acid and 1,3-propanediol from glycerol through cell surface biocatalysis</i>  <b>Chair: Prof. Hui Suan Ng</b></p>
	<p><b>Oral</b>  <b>Presenter: Taiki Ishimoto</b>  Kumamoto University, Japan  Title: Study on electric boiler by a direct sending of electricity and its visualization  <b>Presenter: Keishi Nakamura</b>  Kumamoto University, Japan  Title: Study on Evaluation of Stability for Emulsion Fuel Using Biodiesel Fuel Created in Various Conditions  <b>Presenter: Lobo P. Isamara</b>  Southern Taiwan University of Science and Technology, Taiwan  Title: Initial Analysis of the Flight Performance of a Quadcopter Powered by a Hydrogen Proton Exchange Membrane Fuel Cell  <b>Chair: Prof. Cho-Yu Lee</b></p>	<p><b>Oral</b>  <b>Presenter: Yong-Ming Huang</b>  Title: <i>Exploring the application of a digital game in programming education</i>  <b>Presenter: Leonard Angelo N. Sabellina III</b>  Title: <i>Concept and Design of an Automated Elevation Mapping System using a Laser Rangefinder and its Applications</i>  <b>Presenter: Chia-Ju Kuo</b>  Title: <i>Wherever You Go, Wherever You Sit</i>  <b>Presenter: Ian Carlo M. Gandol,</b>  Title: <i>Aerial Human Detection using Image Processing for Search and Rescue Operations</i>  <b>Presenter: E. Sumonphan</b>  Title: <i>Scoreboard Controlled through Android Application</i>  <b>Chair: Prof. Horng-Horng Lin</b></p>	<p><b>Oral</b>  <b>Presenter: Tzu-Yu Chen</b>  Title: <i>Optoelectronic investigations of p-type ZnO and n-type MoS<sub>2</sub> heterojunction diode</i>  <b>Presenter: Ya-Liang Lin</b>  Title: <i>Optical Properties of Organometal Halide Perovskite Films</i>  <b>Presenter: Yi-Hui Chen</b>  Title: <i>Temperature-dependent Photoluminescence of Organometal Halide Perovskite</i>  <b>Presenter: Hsiang Kao</b>  Title: <i>A new type of composite electrolyte for all-solid-state lithium battery</i>  <b>Chair: Prof. Jeng-Feng Lin</b></p>	<p><b>Oral</b>  <b>Presenter: Shih-I Tan</b>  National Cheng Kung University, Taiwan  Title: <i>Development of Genetic Circuit Platform (GCP) as a High Sensitivity Biosensor in E. coli</i>  <b>Presenter: Jing-Hua Huang</b>  Yuan Ze University, Taiwan  Title: <i>Fabrication of Polyhydroxybutyrate-cellulose Based Matrix for Protein Recovery</i>  <b>Presenter: Ren Fang Yang</b>  National Yunlin University of Science and Technology, Taiwan  Title: <i>Encapsulation of oil within polysaccharides extracted from the seeds of Ficus pumila var. awkeotsang using a milli-fluidic device</i>  <b>Chair: Prof. Hui Suan Ng</b></p>
	<p><b>Oral</b>  <b>Presenter: Yuki Kotooka</b>  Kumamoto University, Japan  Title: Study on heat transfer promotion mechanism of nanofluid by using Al<sub>2</sub>O<sub>3</sub> nanofluid  <b>Presenter: Kohei Hamahata</b>  Kumamoto University, Japan  Title: Enhancement of Pool Boiling Heat Transfer by Diamond Particles Coated on Heating Surface  <b>Presenter: Manchala G. Krishna</b>  Southern Taiwan University of Science and Technology, Taiwan  Title: Simulation of Driving Strategy for Electric Car Running in Suzuka Circuit  <b>Chair: Prof. Cho-Yu Lee</b></p>			<p><b>Oral</b>  <b>Presenter: Man-Chun Chuang</b>  Title: <i>Potential of using Chitosan/Poly-gamma-glutamic acid Nanoparticles as Nanocarriers to Improve Antigen Immunogenicity</i>  <b>Presenter: Rei-Ming Guo</b>  Title: <i>Towards the Fabrication and Development of A Modified Sensor for Detection of Creatinine Concentration</i>  <b>Chair: Prof. Hui Suan Ng</b></p>
18:30	<b>Banquet</b> (LIXIN Grand Hotel)			

## October 5 (Friday)

	Session A Room: E1305	Session B Room: E504	Session C Room: E509	Session D Room: E1301
<b>09:00-10:00</b>	<p style="text-align: center;"><b>Invited</b> <b>Prof. Shuichi Torii</b> Professor of Department of Mechanical System Engineering, Kumamoto University, Japan. <i>Title: Effect of injection velocity ratio on thermal-fluid jet diffusion produced by annular channel</i></p> <p style="text-align: center;"><b>Invited</b> <b>Prof. Tomohiro Yamaguchi</b> Associate professor, Department of Applied Physics, Kogakuin University, Japan. <i>Title: Growth of Cu<sub>3</sub>N Films by mist Chemical Vapor Deposition</i></p> <p style="text-align: center;"><b>Invited</b> <b>Prof. Hiroki Nagai</b> Assistant Professor, School of Advanced Engineering, Kogakuin University, Japan. <i>Title: Super-hydrophilicity of an amorphous thin film fabricated by UV-irradiation to a molecular precursor film involving a Ti(IV) complex</i> <b>Chair: Prof. Yu-Ching Lee</b></p>	<p style="text-align: center;"><b>Invited</b> <b>Prof. Chunhua Su</b> Associate Professor of Information Security Laboratory, University of Aizu, Japan. <i>Title: Authentication Schemes for Next Generation of Computing Environments</i> <b>Chair: Prof. Shu-Chen Cheng</b></p>	<p style="text-align: center;"><b>Invited</b> <b>Prof. Tatsuo Mori</b> Professor of Department of Electrical Engineering, Aichi Institute of Technology, Japan. <i>Title: Fabrication of Organic Perovskite Solar Cells in AIT Laboratory</i> <b>Chair: Prof. Ching-Ming Hsu</b></p>	<p style="text-align: center;"><b>Invited</b> <b>Prof. Yern Chee Ching</b> Associate Professor of Department of Chemical Engineering, University of Malaya, Malaysia. <i>Title: Nanocellulose reinforced Biopolymer Based hydrogel for Drug Loading and Delivery</i> <b>Chair: Prof. Hui-Suan Ng</b></p>
	<p style="text-align: center;"><b>Invited</b> <b>Prof. Man Ho AU</b> Assistant Professor of Department of Computing, The Hong Kong Polytechnic University, Hong Kong. <i>Title: Cryptographic Techniques for Transaction Privacy in Blockchain-Based Applications</i> <b>Chair: Prof. Shu-Chen Cheng</b></p>	<p style="text-align: center;"><b>Invited</b> <b>Prof. Shoou-Jinn Chang</b> Chair Professor of Department of Electrical Engineering, National Cheng-Kung University, Taiwan. <i>Title: Growth and characterization of ZnSe-based 0D multi-quantum disk structure</i> <b>Chair: Prof. Ching-Ming Hsu</b></p>	<p style="text-align: center;"><b>Invited</b> <b>Prof. Hui-Suan Ng</b> Assistant Professor of Faculty of Applied Sciences, UCSI University, Malaysia. <i>Title: Functional polymers for medical and industrial applications</i> <b>Chair: Prof. Yern Chee Ching</b></p>	
<b>10:00-10:20</b>	<b>Coffee Break</b>	<b>Coffee Break</b>	<b>Coffee Break</b>	<b>Coffee Break</b>
<b>10:20-11:20</b>	<p style="text-align: center;"><b>Oral</b> <b>Presenter: Swapnil Shinde</b> Southern Taiwan University of Science and Technology, Taiwan <i>Title: Fabrication and characterization of flexible hybrid transparent electrodes based on metal and metal oxide stacked layers</i></p> <p style="text-align: center;"><b>Presenter: Zhi-Kai Wu</b> Southern Taiwan University of Science and Technology, Taiwan <i>Title: Using Back-propagation Neural Networks to Diagnose a Gasoline Engine Symptoms</i></p> <p style="text-align: center;"><b>Presenter: Bing-Hao Chen</b> Southern Taiwan University of Science and Technology, Taiwan <i>Title: Performance and effectiveness of rail pad stiffness on vibration isolation</i> <b>Chair: Prof. Sheng-He Wang</b></p>	<p style="text-align: center;"><b>Invited</b> <b>Prof. V. Parthasarathy</b> Professor of Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr Sagunthala R&amp;D Institute of Science &amp; Technology, India. <i>Title: Wearable Device Solution to Monitor Patient's Physical and Emotional Character by Fusing ECG and Respiratory Signals</i> <b>Chair: Prof. Bo-Ming Lee</b></p>	<b>Academic Exchange</b>	<p style="text-align: center;"><b>Oral</b> <b>Presenter: Thuy- Vi Vo</b> <i>Title: Preparation and characterization of Alkyl polyglucosides/Tea Tree Oil/Water microemulsion</i></p> <p style="text-align: center;"><b>Presenter: Ru-Xue Guo</b> <i>Title: Preparation of Copper-Organic Framework Packed Column for Adsorption and Electrocatalysis of Carbon Dioxide</i> <b>Chair: Prof. Chang-Ning Huang</b></p>
	<p style="text-align: center;"><b>Invited</b> <b>Prof. Ri-ichi Murakami</b> Professor of National Taiwan University of Science and Technology, Taiwan. <i>Title: Effect of Moisture on Mechanical Properties and Electric Magnetic Wave Shielding of Carbon Fiber Reinforced Bioplastic Composites</i></p> <p style="text-align: center;"><b>Invited</b> <b>Prof. Kei-ichiro Murai</b> Professor of Faculty of Science and Technology, Tokushima University, Japan. <i>Title: The Effect of Sintering Aid on Negative Thermal Expansion of Ti-doped Zr<sub>2</sub>WP<sub>2</sub>O<sub>12</sub></i> <b>Chair: Prof. Sheng-He Wang</b></p>	<p style="text-align: center;"><b>Prof. B.V.D Prasad</b> Research scholar of Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr Sagunthala R&amp;D Institute of Science &amp; Technology, India. <i>Title: Emotion and Heart Abnormality Detection Using ECG Signal - A Survey</i> <b>Chair: Prof. Bo-Ming Lee</b></p>	<p style="text-align: center;"><b>Invited</b> <b>Prof. Ivan Hanafi</b> Professor of Department of Electrical Engineering Education, Universitas Negeri Jakarta, Indonesia. <b>Chair: Prof. Chi-Jo Wang</b></p>	<p style="text-align: center;"><b>Oral</b> <b>Presenter: Yen-Ju Chen</b> <i>Title: Study on Optimization of Surfactant Enhanced Extraction of Tea Tree Oil using Response Surface Methodology</i></p> <p style="text-align: center;"><b>Presenter: Aleksandr Spivakov</b> <i>Title: Influence of the reaction temperature on the phase-purity of carbon-coated wustite nanoparticles.</i> <b>Chair: Prof. Chang-Ning Huang</b></p>
<b>11:20-12:00</b>	<p><b>Closing Ceremony</b> (Room: E1301)</p> <p><b>Closing remark: Prof. Min-Tsai Lai</b></p> <p><i>The Vice President for Academic Affairs of Southern Taiwan University of Science and Technology, Taiwan</i></p>			
<b>12:00-13:00</b>	<p style="text-align: center;"><b>Lunch Break</b> (Room: E1302 · E1304)</p>			
<b>13:30-17:00</b>	<p style="text-align: center;"><b>Excursion</b> (Chimei Museum)</p>			



# Keynote Speaker



**Prof. Dr. Nguyen Hay**

President of Nong Lam University Ho Chi Minh city

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*Professor Nguyen Hay is the President of the Nong Lam University Ho Chi Minh City from 2012 to present. He is also the Vice Chairman of the Vietnamese Society of Agricultural Engineering which belongs to the Vietnam Federation of Mechanics Engineering Associations. He is one of the leading experts in agricultural engineering of Vietnam. His research focuses on the areas of processing and post-harvest technologies/machineries of high quality agricultural products. He has published many textbooks, monographs and more than 100 papers in local and international journals in his field. In addition, he has attended many training courses in agricultural engineering in foreign countries.*

# Keynote Speaker

**Researching on application of Ultrasound, Radio Frequency, Infrared radiation which are combined with heat pump dryer in drying high value agricultural products in Viet Nam**

*Prof. Dr. Nguyen Hay*

*Nong Lam University Ho Chi Minh City, Viet Nam*

Vietnam holds great potential for high value agricultural products. However, the post-harvest losses were still high, thus reducing losses after harvesting was one of key target. Drying is one of the methods that contribute to reduce post-harvest losses.

Drying processes need high energy input. Thus, to balance energy demands, the development of energy systems with high efficiencies for drying are important. Therefore, our studies focused on using Ultrasound, Radio frequency or Infrared radiation in novel drying technology for high value agricultural products aim to reduce energy consumption, increase drying kinetics and quality of products.

Our researches show that Ultrasound, Radio frequency and Infrared radiation provides faster and deeper heat generation within products matrices, so heat and mass transfer rates are very high. During drying process, the energy in the form of electromagnetic wave or mechanical wave (Ultrasound drying) are absorbed directly by the sample without any loss to the environment leading to considerable energy savings. In addition, radiation technologies could reduce drying time and provide better-quality finished products.

We published a number of theoretical and experimental studies using heat pump drying combined Ultrasound, Radio frequency and Infrared radiation. The drying systems have successfully manufactured and applied in real production.

# Keynote Speaker

## CURRICULUM VITAE



**CHEN-CHI M. MA, Tsing Hua Chair PROFESSOR**

**National Tsing Hua University**

### **I. Education**

- B.S. National Cheng Kung University, Taiwan, R.O.C, 1969
- M.S. North Carolina State University, Raleigh, N.C. USA, 1975
- Ph.D. North Carolina State University, Raleigh, N.C. USA, 1978

### **II. Current Position**

- Tsing Hua Chair Professor, Dept. of Chemical Engineering  
National Tsing Hwa University, Hsin-Chu. Taiwan. R.O.C

### **III. Experience**

- Senior Research Engineer, Monsanto Company, Akron. OH. U.S.A  
(1977~1979)
- Senior Research Associate. Lord Corp. Erie. PA. U.S.A (1979~  
1980)
- Advanced Materials Research Engineer. Phillips Petroleum Co.  
Barntlesville, OK. U.S.A (1980~1984)
- Visiting Professor, National Science Council and National Tsing  
Hua Univ. (1984~1986)
- Professor, National Tsing Hua University, Hsin-Chu, Taiwan, R.O.C  
(1986~present)
- Advisor, Div of Science and Technology, Ministry of Economic  
Affairs (1990~1998)

# Keynote Speaker

## Advanced Polymer Composite for Aerospace Industry

**Chen-Chi M. Ma**

**President, THE POLYMER SOCIETY, Taipei (PST)  
Former Chairman, THE SOCIETY OF RP/C, R.O.C.,  
Tsing Hua Distinguished Chair Professor  
National Chair Professor (Ministry of Education, R.O.C.)**

**Laboratory of Nanocomposites**  
Department of chemical Engineering,  
National Tsing Hua University,  
Hsin-Chu 30013, Taiwan, R.O.C.

### OUTLINE

1. Polymer Composites for Aerospace Applications:
  - A. Aircraft (Civil and Military), .....
  - B. Aerospace: Space Craft, Shuttle, Satellite, .....
2. Materials
  - A. Polymer Matrices (Thermoset vs. Thermoplastic)
  - B. Reinforcements  
S (S-2) Glass, Carbon (Graphite) Fiber, Aramid, Ceramic, CNT, Graphene,.....
  - C. Fillers and Additives,.....
3. Sustainable Materials
4. Summary



## Session A: Advanced Manufacturing Science and Technology

1-1 Smart Manufacturing

1-2 3D Printing/Additive Manufacturing

1-3 Sensors

1-4 Advanced Vehicle

1-5 Robot

October 4 (Thursday) / Venue : E1305				
Time	ID	Speaker	Title	Page
14:30 – 14:50	A-I-01	Prof. Toshihiro MORIGA	Eco-Friendly Preparation of Oxynitride Pigments and Phosphors from Nonstoichiometric Mixture of Starting Materials Department of Applied Chemistry, Tokushima University, Japan	A-01
14:50 – 15:10	A-I-02	Prof. Thanh Phuong NGUYEN	A Study On Single Phase 9 Levels Inverter Institute of engineering, Ho Chi Minh City University of Technology, Vietnam	A-02
15:10 – 15:30	A-I-03	Prof. Ngoc-Bich LE	T-Shirt Auto-Dimensioning Utilizing Image Processing School of Engineering, Eastern International University, Vietnam	A-03
15:30 – 16:00	A-O-01	<u>Po-Chun CHEN</u> , Sheng-Chang WANG, Lung-Hao HU	Low-dimensional material molybdenum sulfide coating on the surface of nano-porous aluminum alloy for high anti-wearing Southern Taiwan University of Science and Technology, Taiwan	A-09
	A-O-02	<u>R. MINATO</u> , K. HATAI, Y. OTANI, X. LIU, K. MURAI, T. MORIGA, M. MORI	Verification of structure change from pyrochlore to fluorite in $Ce_{1-x}La_xO_{2-\delta}$ ( $0 \leq x \leq 0.5$ ) Tokushima University, Japan	A-10

	A-O-03	Cheng-Hao HUANG, <u>Zi-Quen CHEN</u> , Bing-Hao CHEN	Improved method on modelling vehicle contact force Southern Taiwan University of Science and Technology, Taiwan	A-11
16:00 – 16:30	<u>Coffee Break</u>			
16:30 – 17:00	A-O-04	<u>Yu-Kai WANG</u> , Sheng-Chang WANG, Lung-Hao HU	Study the hydrolysis reaction of preceramic polysilazane precursor on aluminum nitride surface film Southern Taiwan University of Science and Technology, Taiwan	A-12
	A-O-05	C.S. CHIEN, S.M. SYU, <u>Z.W. LIN</u> , T.Y. KUO	Formation of Ta <sub>2</sub> O <sub>5</sub> doped coating on the surface of titanium within HF containing electrolyte by micro arc oxidation Southern Taiwan University of Science and Technology, Taiwan	A-13
	A-O-06	<u>M. MATSUMURA</u> , S. TORII	Experimental Study of Heat Transfer Coefficient Enhancement Effect by Graphene Oxide Nanofluid Kumamoto University, Japan	A-14
17:00 – 17:30	A-O-07	<u>Taiki ISHIMOTO</u> , Shuichi TORII	Study on electric boiler by a direct sending of electricity and its visualization Kumamoto University, Japan	A-15
	A-O-08	<u>Keishi NAKAMURA</u> , Shuichi TORII	Experimental study of heat transfer coefficient enhancement effect by graphene oxide nanofluid Kumamoto University, Japan	A-16
	A-O-09	<u>Lobo P. ISAMARA</u> , Wei-Chin CHANG	Initial analysis of the flight performance of a quadcopter powered by a hydrogen proton exchange membrane fuel cell Southern Taiwan University of Science and Technology, Taiwan	A-17
17:30 – 18:00	A-O-10	<u>Yuki KOTOOKA</u> , Shuichi TORII	Study on heat transfer promotion mechanism of nanofluid by using Al <sub>2</sub> O <sub>3</sub> nanofluid Kumamoto University, Japan	A-18

	A-O-11	<u>Kohei</u> <u>HAMAHATA</u> , Shuichi TORII, Shigeru TANAKA	Enhancement of pool boiling heat transfer by diamond particles coated on heating surface Kumamoto University, Japan	A-19
	A-O-12	<u>Manchala</u> <u>Gopala</u> <u>KRISHNA</u> , Wei-Chin CHANG	Simulation of driving strategy for electric car running in Suzuka circuit Southern Taiwan University of Science and Technology, Taiwan	A-20

### October 5 (Friday) / Venue : E1305

Time	ID	Speaker	Title	Page
09:00 – 09:20	A-I-04	Prof. Shuichi TORII	Effect of injection velocity ratio on thermal-fluid jet diffusion produced by annular channel Kumamoto University, Japan	A-04
09:20 – 09:40	A-I-05	Prof. Tomohiro YAMAGUCHI	Growth of Cu <sub>3</sub> N Films by mist Chemical Vapor Deposition Kogakuin university, Japan	A-05
09:40 – 10:00	A-I-06	Prof. Hiroki NAGAI	Super-hydrophilicity of an amorphous thin film fabricated by UV-irradiation to a molecular precursor film involving a Ti(IV) complex Kogakuin university, Japan	A-06
10:00 – 10:20	<u>Coffee Break</u>			
10:20 – 10:40	A-I-07	Prof. Ri-ichi MURAKAMI	Effect of Moisture on Mechanical Properties and Electric Magnetic Wave Shielding of Carbon Fiber Reinforced Bioplastic Composites National Taiwan University of Science and Technology, Taiwan	A-07

10:40 – 11:00	A-I-08	Prof. Kei-ichiro MURAI	The Effect of Sintering Aid on Negative Thermal Expansion of Ti-doped $Zr_2W_2O_{12}$ Department of Applied Chemistry, Tokushima University, Japan	A-08
11:00 – 11:30	A-O-13	Yi-Zhen WANG, <u>Swapnil SHINDE</u> , Keh-moh LIN	Fabrication and characterization of flexible hybrid transparent electrodes based on metal and metal oxide stacked layers Southern Taiwan University of Science and Technology, Taiwan	A-21
	A-O-14	<u>Zhi-Kai WU</u> , Pei-Chung CHEN, Xin Chien TEH	Using back-propagation neural networks to diagnose a gasoline engine symptoms Southern Taiwan University of Science and Technology, Taiwan	A-22
	A-O-15	Cheng-Hao HUANG, <u>Bing-Hao CHEN</u> , Zi-Quen CHEN	Performance and effectiveness of rail pad stiffness on vibration isolation Southern Taiwan University of Science and Technology, Taiwan	A-23

## Poster Session

<b>October 4 (Thursday 10:30-12:00) / Venue: E13 Lobby</b>			
<b>ID</b>	<b>Authors</b>	<b>Title and Affiliation</b>	<b>Page</b>
A-P-01	Nai-Chia Chi, Yan-Hsiung Wang, Chih-Kuang Wang and Kuo-Lung Tung	Zirconia ceramic crown by 3D printer with novel composite materials, Kaohsiung Municipal Hsin Chuang Senior High School	A-24
A-P-02	Tsai Jia Ming†, Liu Chia Ying	Research on the Best Forming Parameters of Plastic Glasses Frames, Southern Taiwan University of Science and Technology	A-25
A-P-03	Keh-Moh Lin and Chang-Yuan Jiang	PEDOT:PSS/WO <sub>3</sub> Composite Thin Films Studied for NO <sub>2</sub> Gas Sensor Applications, Southern Taiwan University of Science and Technology	A-26
A-P-04	Shou-Tao Peng, Sheng-Sing Chen	An Application of Neural-Network-Based Visual Servoing Control to the Precision Seam Welding Using Band Image Processing, Southern Taiwan University of Science and Technology	A-27
A-P-05	Hashiguchi Shoma	Study on application of graphene oxide nanofluid to actual machine, Kumamoto University	A-28
A-P-06	Kuen-Hsien Wu and Chieh-An Cheng	Implementation of Microcavity Structures with Porous-Silicon for Chemical-Sensing Applications, Southern Taiwan University of Science and Technology	A-29
A-P-07	Atsushi Tsurumaru, Go Kitamura, Noriyuki Tsuzaki, Mizue Munekata, Hiroyuki Yoshikawa, Kenji Ono and Takashi Watanabe	Air Flow Characteristics and Mist Distribution in a Hemispheric Head Cyclone Separator, Kumamoto University	A-30
A-P-08	Eri Ichikawa,	Numerical Simulation of Orifice Flow Affected	A-31

	Takamasa Kinoshita, Mizue Munekata and Hiroyuki Yoshikawa	by Outlet Pipe Length and Opening Area Ratio, Graduate School of Science and Technology, Kumamoto University	
A-P-09	Isaku Fujita, Takaomi Utatsu, Mizue Munekata and Hiroyuki Yoshikawa	Behavior of a Drop of Liquid on a Rotating Disk under Orbital Motion during Accelerating at a Starting Time, Kumamoto University	A-32
A-P-10	Hsinn Jyh Tzeng, Hsin-Hung Chen	The study of Optimization Process of Bio- Detection Electrode by using Mold Flow Analysis, Southern Taiwan University of Science and Technology	A-33
A-P-11	Shunsuke Ohmagari, Shigeru Tanaka and Kazuyuki Hokamoto	New synthesis technology by explosion of explosives underwater, Department of Mechanical System Engineering, Kumamoto University	A-34
A-P-12	M. Takashima <sup>1</sup> , D. Inao, S. Tanaka, K. Hokamoto	Comparative experiment of shock wave response of water and gelatin, Department of Mechanical System Engineering, Kumamoto University	A-35
A-P-13	Jose Antonio G. Chocol, Leonard Angelo N. Sabellina, Renann G. Baldovino <sup>1</sup> , Nilo T. Bugtai, Yi Chun Du, and Aaron Raymond	3D Printed Robotic Arm for Prenatal Tele- Sonography, De La Salle University - Manila	A-36
A-P-14	K.Matoba <sup>1</sup> , R.Shimasaki, M.Munekata <sup>1</sup> and H.Yoshikawa <sup>1</sup>	Aerodynamic Characteristics of a Micro Quad- Rotor Hovering near a Side-Wall Attached to a Ground, Kumamoto University	A-37
A-P-15	Yi-Wei Shen, Ming- Jin Liu, Sheng-He Wang	Performance Simulation of Thin Piezoelectric Sensor with Loading Force Measurement, Southern Taiwan University of Science and Technology	A-38
A-P-16	Xu Yu-Min, Tai Tzu- Yao and Feng Shi- Huang	The prediction of material removal rate on EDMed surface with graphite electrode by using back propagation method Southern Taiwan University of Science and	A-39



		Technology	
A-P-17	Wei-Chuan Wang, Ching-Yi Hsu, Yih-Shyh Chiou and Shih-Lun Chen	Optimized FPGA-Based Implementation of Particle Filter for Location Tracking, Department of Electronic Engineering, Chun Yuan Christen University	A-40
A-P-18	Ru Li Lin and Ying-Xuan Lin	Theoretical analysis of Two Dimensional Antiplane Problem for a Piezoelectric Material, Southern Taiwan University of Science and Technology	A-41
A-P-19	Yu-Jen Hsiao	ZnO:Al films for the micro-electro-mechanical systems (MEMS) CO gas sensor, Department of Mechanical Engineering, Southern Taiwan University of Science and Technology	A-42
A-P-20	Chih-Liang Chu, Hung-Chi Chen	Development of a Desktop CMM with Positioning Error Compensation System, Southern Taiwan University of Science and Technology	A-43
A-P-21	Kohei Fujimoto	The study of Micro Pump with Piezoelectric, Kumamoto University	A-44
A-P-22	Yu-Jen Hsiao	In <sub>2</sub> S <sub>3</sub> films on p-Si substrate for photoelectric conversion, Southern Taiwan University of Science and Technology	A-45

# Curriculum Vitae

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## **Specialized Field**

Inorganic Materials Chemistry such as

1. Wide-bandgap Engineering in Oxides and Oxynitrides
2. Research and Development of Oxynitride Phosphors and Electrodes
3. Structural Chemistry in Perovskite-type Oxides for Solid Oxide Fuel Cells

## **Education (Academic Background)**

1988 BSc in Chemistry, Osaka University  
1990 MSc in Inorganic and Physical Chemistry, Osaka University  
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1991-1998 Assistant Professor, Faculty of Engineering, The University of Tokushima  
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2009 - Professor, Faculty of Engineering, Tokushima University  
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2017 - Vice Director (in charge of international education), Tokushima University  
2018- Chairperson, Department of Chemical Science and Technology, Tokushima  
University

## Eco-Friendly Preparation of Oxynitride Pigments and Phosphors from Nonstoichiometric Mixture of Starting Materials

**Toshihiro Moriga**<sup>†\*</sup>, and Kei-ichiro Murai

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### ABSTRACT

Oxynitrides have received much attention due to their fascinating chemical and physical properties offering a variety of applications in different fields such as non-toxic inorganic pigments, visible-light-driven photocatalysts, phosphors for white-LEDs and so on. Red-coloured Sr<sub>2</sub>TaO<sub>3</sub>N with the K<sub>2</sub>NiF<sub>4</sub>-type structure could be obtained after several times of 15h heating of oxide mixtures in ammonia flow, reported by Marchand et. al.<sup>1</sup> In this study, Sr<sub>2</sub>TaO<sub>3</sub>N was easily synthesized by thermal ammonolysis of Sr<sub>6</sub>Ta<sub>2</sub>O<sub>10.188</sub> precursor oxide at 1000°C for only 48 hours. We report the possible mechanism and the new synthesis approach to obtain Sr<sub>2</sub>TaO<sub>3</sub>N in such a shorter period of nitridation. The color of the resulting powders showed brighter reddish-orange than the perovskite-type SrTaO<sub>2</sub>N. Crystal structure determination of the Sr<sub>2</sub>TaO<sub>3</sub>N oxynitride has been conducted by Rietveld refinement using powder X-ray diffraction data. It was found that the Ta(O,N)<sub>6</sub> octahedra in Sr<sub>2</sub>TaO<sub>3</sub>N is more straightened in anion-Ta-anion bonding and possesses more room in volume, compared with those in SrTaO<sub>2</sub>N.<sup>2</sup> These facts agrees well with the idea that Sr<sub>2</sub>TaO<sub>3</sub>N is more covalent and less ionic than SrTaO<sub>2</sub>N, so that Sr<sub>2</sub>TaO<sub>3</sub>N shows redder color than SrTaO<sub>2</sub>N.

Ba<sub>3</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub>:Eu<sup>2+</sup> exhibited an intense green photoluminescence under near-UV to blue light excitation. We have shown that Ba<sub>3</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub> was stable in a wide range of Si/Ba from 2 to 6, which means Ba<sub>3</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub> would be allowed to have a considerable barium deficiency.<sup>3</sup> It was found that the nonstoichiometric mixture at Si/Ba=3 formed the Ba<sub>3</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub>-type phase easier than the stoichiometric one at Si/Ba=2 after it was fired at 1200°C for 5h under a diluted hydrogen flow (5% H<sub>2</sub>-95% N<sub>2</sub>). The excess Si source led to a formation of SiO<sub>2</sub> glass, which can act as a flux in case of formation of Ba<sub>3</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub> under such SiO<sub>2</sub>-rich mixtures.<sup>4</sup> For Ba<sub>3</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub>-type oxynitrides with Si/Ba=3, considerable redshift in emission wavelength was observed when substituted by Sr<sup>2+</sup> and Eu<sup>2+</sup>.<sup>5</sup> It was found that reduction of lattice parameters by the substitution redshifted the emission linearly. (Ba<sub>0.95-x</sub>Sr<sub>x</sub>Eu<sub>0.05</sub>)<sub>2</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub> phosphors showed the redshift in emission wavelengths from 520nm at x=0 up to almost 550nm at x=0.50, with increasing Sr content. (Ba<sub>0.80-x</sub>Sr<sub>0.20</sub>Eu<sub>x</sub>)<sub>2</sub>Si<sub>6</sub>O<sub>12</sub>N<sub>2</sub> phosphors exhibited the maximum emission intensity at x=0.15 and kept the higher emission intensity than a commercial YAG:Ce phosphor, activated by 460nm blue light, even at temperatures as high as 200°C.

Keywords: nonstoichiometry, oxynitrides, red pigments, green phosphor

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# CURRICULUM VITAE

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## B. AEDUCATIONAL BACKGROUND

<b>PHD</b>	
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Year of Graduation	2008
<b>MASTER</b>	
Degree	Master of Engineering in Automatic Control
Institution	Polytechnique University of Ho Chi Minh City Vietnam
Year of Graduation	2003
<b>BACHELOR</b>	
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Year of Graduation	1998

## C. TEACHING EXPERIENCE

INSTITUTION	SUBJECTS TEACH	YEAR FROM	YEAR TO	LEVEL OF STUDENT
HUTECH	- Automatic control engineering. - Power Electronic	1999	now	Undergraduate

## A Study On Single Phase 9 Levels Inverter

**Ngo Cao Cuong<sup>†</sup> and Nguyễn Thanh Phương\***

\*HUTECH institute of engineering, Vietnam, <sup>†</sup>University of Economic and Financial (UEF)

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### ABSTRACT

This paper presents a study on single phase 9 levels inverter, H-bridge is combined with a boosting and switched diode capacitor circuit to create 9 levels output voltage. A sine pulse width modulation is studied to switch IGBT. The simulation results are shown the effectiveness of the inverter.

Keywords: Pulse width modulation, Single phase inverter

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## SCIENTIFIC RESUME

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Eastern International University, Jan 2018 - Present

Research interest: Industrial automation, robotics, MEMs, Microfluidics, Optics manufacturing

Course: Manufacturing, Mechatronics system, Engineering economics, Microcontroller, PLC system,...

- **Training and Consulting Specialist**

II-VI Photop Vietnam, Jan 2018 - Present

Conduct training and consulting for engineering team in term of optics manufacturing knowledge, TPM, process control,...

- **Transfer Manager**

II-VI Photop Vietnam, Sep 2016 - Dec 2017

Photop is a recognized leader in the manufacture and supply of crystals, fiber optics, precision optics, and optical assemblies for applications including optical communication, industrial lasers, life science, instrumentation, and semiconductor production.

Functions:

- Leads and supervises all process engineers transfer team.
- Update the 5 year plan of transfer into Photop VN
- Prepare human resource according to the plan
- Build detail transfer plan for 12 month ahead
- Organize training plan for coming transfer projects
- Propose and conduct training for transfer engineers
- Manage the transfer project successfully including propose Equipment-Tooling-Consumable (ETC), layout design, machines installation, qualification.
- Manage ramp up plan after transfer to achieve yield, quality, productivity
- Develop appropriate documents including Quotation, BOM, Routing, WPS, Drawing, SPC, Cpk, Work process sheet (WPS), Work Instruction (WI),... to hand over the transfer projects to production team.
- Training plan for the team to capture current and future growth of the business developed and implemented.

This job also includes technician training, daily trouble shooting, process improvement, new product qualification, and on the job training. Responsible for meeting customer specification, relevant KPIs, reacting to findings of internal audit and initiating corrective action to ensure strict conformance to the procedures designed to ISO 9001 : 2008

- **Head of Mechatronics Department**

Eastern International University, Oct 2014 - Aug 2016

- **Deputy Head of Mechatronics Department**

Vietnam National University, Ho Chi Minh City University of Technolog, Oct 2010 - Sep 2014

Research focus: Robotics, industrial automation.

- **Ph.D Candidate**

Lab on a chip Laboratory, Southern Taiwan University, Taiwan, Sep 2007 - Jun 2010



# T-Shirt Auto-Dimensioning Utilizing Image Processing

Ngoc-Bich Le<sup>1</sup>, Chi-Thanh Nguyen<sup>2</sup>

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2. Faculty of Automation Technology Thuduc College of Technology, Ho Chi Minh City, Vietnam

Presenter: Ngoc-Bich Le

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## ABSTRACT

This paper studies the solution for automatically measuring the T-shirt dimensions to support operators in garment industry as well as to improve the productivity and accuracy of the inspecting process in the assembly line. To address this goal, the paper focuses on utilizing image processing to determine the T-shirts dimensions. The processing algorithm was given along with the proposed recognition regions method was expected to produce faster processing speed and to reduce errors. The obtained results were as expected in terms of accuracy and error as well as processing speed. Specifically, five different dimensions were successfully detected and measured; with the replication of 30, the maximum standard deviation of the measurement system is 2.01 mm and the maximum discrepancy between the proposed method and conventional manual measurement is 2.1% (for collar), this variation is relatively small compared with the allowed tolerances.

Keywords: **T-shirt auto-dimensioning, image processing, metrology automation.**

## I. INTRODUCTION

In the high quality T-shirts manufacturing field of famous brands such as Nike, Adidas... the requirements for product quality, especially product dimensions, are very strict. In practical production, a product is produced with many different standard sizes to fix different customers. This raises the issue that every product needs a certain accuracy of the correlation between the dimensions. Especially, there are some required tolerance on significant dimensions of a T-shirt such as chest width, bottom width, shoulder width, neck width, sleeve length, sleeve width, shirt length... These dimensions are related closely to ensure a standard product size. However, the current dimension inspection is mostly performed by hands. This leads to consequences such as low productivity, large error, high cost... Consequently, the demand of automated inspection with fast processing speed, high accuracy... was requested by industrial to improve productivity, increase product quality and reduce work space.

## II. MECHANICAL DESIGN

The proposed structure was designed to meet the desired operational productivity of 15-20 shirts / minute. When one shirt is in the process, including handling and processing time, the workers at remaining three stations have time to perform their handling operation. Specifically, waiting time for a station is estimated to be  $(5 \sim 6) \times 3 = 15 \sim 18$  seconds, this interval is quite enough for a worker to ensure his task.

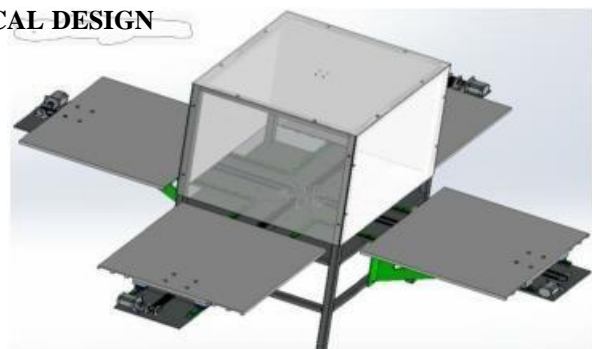


Fig 1. Proposed mechanical structure

## III. EXPERIMENTAL SETUP

The experimental setup presented in Figure 2 is comprised of one motor driven by power driver to actuate the sliding vacuum table; one processor unit to control the sliding table and to communicate with computer via Max 232 unit; control buttons to handle the table; limit switches to limit sliding table operating path; one computer to process data and one camera to capture image.

---

## Biography

**Name:** Shuichi TORII

**Sex:** Male

**Data of Birth:** January 27, 1960

**Highest Degree:** Ph.D. Mechanical Engineering,  
Kyushu University, JAPAN

**Professional Specialty:** Heat Transfer, Fluid Dynamics

Numerical Simulation

Production and Development of Renewable Energy

Combustion



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### Professional Experiences:

04/2003~present	Professor Department of Mechanical Engineering	Kumamoto University, Japan
06/1993~3/2003	Associate Professor Department of Mechanical Engineering	Kagoshima University, Japan
09/1990~09/1991	Visiting Scholar Department of Mechanical Engineering	University of Michigan, USA
04/1985~08/1990	Assistant Professor Department of Mechanical Engineering	Kyushu University, Japan

### Personal Introduction:

Shuichi TORII received the B.D. degree from Kagoshima University in 1983 and M.D. and Ph.D. degree from Kyushu University in 1985 and 1989, respectively, all in Mechanical Engineering. He then worked as the visiting scholar at University of Michigan, where he studied the solidification and oxidization in reactor using the experimental method and numerical simulation. In 1993, he became the associate professor at Kagoshima University, where he studied the thermal fluid flow transport phenomena for rotating machinery and combustion and the development of turbulence model. Since 2003, he currently is a Professor of Department of Mechanical Engineering at Kumamoto University. He focuses on production and development of clean Energy and renewable Energy, thermal fluid flow transport phenomena using nanofluids and advanced cooling device development with the use of nanofluids.

# EFFECT OF INJECTION VELOCITY RATIO ON THERMAL-FLUID JET DIFFUSION PRODUCED BY ANNULAR CHANNEL

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Presenter: **Shuichi TORII**

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## ABSTRACT

Numerical study is performed to investigate thermal-fluid diffusion phenomenon in vertical free jet using the coaxial flow formed with the annular nozzle. Emphasis is placed on the effect of injection velocity ratio of hot air to cold air on velocity and thermal fields. The proposed physical model to be studied and the coordinate system are the coaxial flow formed with the concentric annular duct, in which the cold air jet is vertically injected from the inner nozzle and the hot air is also ejected from the outer nozzle. It is found that (i) the flow pattern and isotherms in a jet are affected by the injection velocity ratio, and (ii) as velocity ratio is increased, the streamwise velocity gradient along the vertical direction is intensified, resulting amplification in the thermal diffusion. This result is applied to the laminar diffusion flame formed with the annular nozzle, resulting in stable combustion and an increase in the flame temperature in comparison with the laminar flame case in a circular pipe.

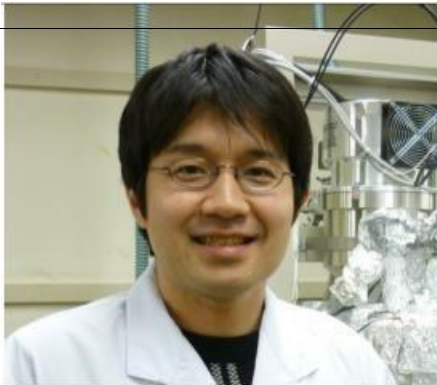
**KEYWORDS:** Computational Fluid Dynamics, Jet and spray, Numerical simulation, Thermal diffusion, Coaxial flow, Combustion

## 1. INTRODUCTION

Numerous studies were performed on jet diffusion flames formed by injecting a fuel in stagnant air and showed clearly that fresh ambient air is brought into the jet flow due to air entrainment subsequently triggered by the formation of ejected jet flames. Consequently, heat and mass transport phenomena in jet diffusion flames appear across the strained interface between the fresh air and mixture of hot products and reactants [1, 2]. Development of higher effective combustors such as the jet and rocket engine intensifies an increase in the heat quantity produced in the combustor, resulting in an amplification of the thermal stress to be added. In order to maintain the steady-state combustion condition in the combustor of the jet engine, it is important to suppress the blow-out of the flame in the high-speed air flow, to make the flame keep at the certain position in the combustor and to induce the air-fuel mixing. As a method for inducing the mixing, coaxial flow is employed. Here, the coaxial flow is established by using a concentric annular configuration comprising an inner nozzle and an outer cylinder encompassing its nozzle.

The coaxial jets have been found in the applications widely, i.e., air jet looms of a textile machine, ejectors, jet pumps, burners and jet propulsion systems. There have been a lot of studies on the coaxial jets discharging into the still air and their unique phenomenon. The works on the vertical structures of the coaxial jets were reported by many researchers [3-7]. Kiwata et al. [8] indicated the existence of a recirculating region along the axis of the coaxial

# CV

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<b>Research interest</b>	Crystal growth of semiconductors - MBE (molecular beam epitaxy) of nitride: GaN, InN and their alloys - Mist CVD (mist chemical vapor deposition) of oxide: Ga <sub>2</sub> O <sub>3</sub> , In <sub>2</sub> O <sub>3</sub> , their alloys and so on		
<b>Photo</b>			

## Growth of Cu<sub>3</sub>N Films by mist Chemical Vapor Deposition

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### ABSTRACT

Cu<sub>3</sub>N has been reported to be an indirect bandgap energy of approximately 1.3 eV, and its absorption coefficient reaches up to 10<sup>5</sup> cm<sup>-1</sup> in an energy range higher than 2.2 eV.<sup>[1]</sup> In addition, bipolar doping is possible with maintaining reasonable carrier densities. The Cu<sub>3</sub>N is thus one of candidates as a novel solar cell material.

Mist chemical vapor deposition (mist CVD) is a unique growth technique. After ingredient is dissolved in water, the solution is atomized using an ultrasonic transducer. These mist particles are transformed to a reactor using carrier gas. This unique growth method has so far entirely applied to grow oxide semiconductors.<sup>[2]</sup> In this study, we will give a report on the growth of Cu<sub>3</sub>N films as the first report on growth of nitride semiconductor using the mist CVD method.

Copper(II) acetylacetonate, Cu(C<sub>5</sub>H<sub>7</sub>O<sub>2</sub>)<sub>2</sub>, was used as an ingredient. This ingredient is dissolved in ammonium hydroxide, NH<sub>4</sub>OH, solvent. (0001) Al<sub>2</sub>O<sub>3</sub> was used as a substrate. Growth temperatures were varied between 250°C and 500°C.

Figure 1 shows XRD 2θ-θ patterns of the samples. In the samples grown at 250°C and 300°C, the diffraction peaks of Al<sub>2</sub>O<sub>3</sub>(0006) and Cu<sub>3</sub>N(002) were observed. This indicates that the films have an orientation relationship of [001]Cu<sub>3</sub>N//[0001]Al<sub>2</sub>O<sub>3</sub>. In the samples grown at 350°C and 400°C, an additional diffraction peak of Cu<sub>3</sub>N(111) was observed. In the sample grown at 500°C, the diffraction peaks of Cu<sub>3</sub>N(002) and Cu<sub>3</sub>N(111) almost disappeared and a clear diffraction peak of Cu(100) were observed instead. Thermal dissociation of Cu<sub>3</sub>N induces an appearance of Cu diffraction peak at the highest growth temperature of 500°C. No clear diffraction peaks of CuO and Cu<sub>2</sub>O were observed in all samples.

As shown in Fig. 2, absorption coefficient α was determined by measuring transmittance and reflectance spectra for the sample grown at 300°C. The Cu<sub>3</sub>N film exhibits α values in the order of 10<sup>5</sup> cm<sup>-1</sup> in the energy range higher than 1.9 eV. The values are higher than those in the previous report.<sup>[1]</sup> (αhν)<sup>0.5</sup> is plotted as a function of photon energy in Fig. 3. The bandgap energy of 1.3 eV, which is determined by the Tauc's plot, is in good agreement with the previously reported value.<sup>[1]</sup> Present results ensure potential to grow nitrides using the mist CVD method.

Keywords: mist CVD, Cu<sub>3</sub>N, XRD, absorption coefficient, bandgap energy

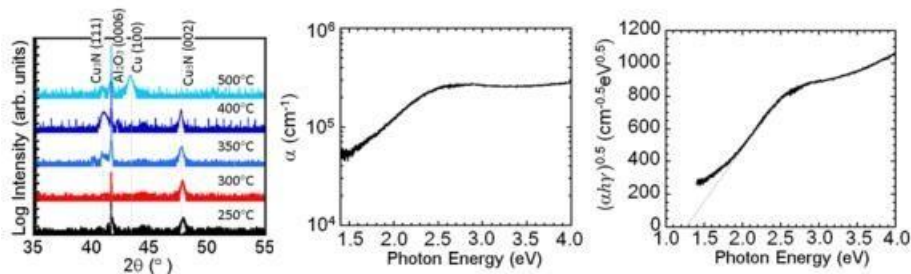


Fig. 1. XRD 2θ-θ patters of Cu<sub>3</sub>N films grown on (0001) Al<sub>2</sub>O<sub>3</sub> at 250-500°C. (left)

Fig. 2. Spectrum for absorption coefficient of Cu<sub>3</sub>N film grown at 300°C. (middle)

Fig. 3. (αhν)<sup>0.5</sup> versus hν plot for Cu<sub>3</sub>N film grown at 300°C. (right)

### REFERENCES

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## Super-hydrophilicity of an amorphous thin film fabricated by UV-irradiation to a molecular precursor film involving a Ti(IV) complex

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### ABSTRACT

Titanium dioxide (Titania) is a well-known *n*-type semiconductor and has been widely investigated for various applications, such as photocatalyst, photovoltaic cell, self-cleaner, and UV-light protector. Fabrication of titania thin film has been reported by using several methods including PVD, CVD, plating, sol-gel method, and the molecular precursor method [1]. Recently, our group could fabricate a *p*-type Cu<sub>2</sub>O thin film by using UV-irradiation to a precursor film involving Cu(II) complexes [2]. We report here the fabrication of super-hydrophilic thin film *via* UV-irradiation to a precursor film involving a Ti(IV) complex.

The titania precursor solution involving Ti(IV) complex with a ligand of oxalate (Ti<sup>4+</sup> concentration = 0.4 mmol/g) was prepared according to the reported procedure [1]. The precursor solution of 100 μL was dropped onto a quartz substrate (20 × 20 × 1.6 mm<sup>3</sup>). Then, the precursor film was prepared by spin-coating with double steps method (1st: 500 rpm for 5 s; 2nd: 2000 rpm for 30 s), and preheated in a drying oven at 70°C for 10 min. The precursor film was then UV-irradiated for 4 h, with a germicidal lamp having light intensity of 4 mW cm<sup>-2</sup> at 254 nm, under the condition of 30–40°C and humidity of 50–60%. The transparent thin film with 190 nm thickness is denoted as **F**. The contact angle between a water droplet and the thin film was measured. Crystal structure and optical properties of the resultant film were analyzed by using XRD and UV-Vis-NIR spectrometer, respectively. XRD measurement showed that **F** is amorphous. Transmittance spectra indicated that transparency of **F** is over ca. 80% in the visible region. Table 1 shows the results of contact angle experiment using **F** before and after UV-irradiation for 10 min. The contact angle between the water droplet and **F** decreased from 21(1) to 2(1)° by UV-irradiation for 10 min. The super-hydrophilic surface can be thus obtained by UV-irradiation for 10 min. Therefore, it is acceptable that the UV-irradiation lead the precursor film involving the Ti(IV) complex to the transparent and amorphous thin film having UV-sensitivity at ambient temperature.

**Table 1** Contact angle experiments of **F** before and after UV-irradiation for 10 min

	before	after
<b>F</b>		

Keywords: Molecular precursor method, UV-irradiation, Super-hydrophilicity, Thin film

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## Effect of Moisture on Mechanical Properties and Electric Magnetic Wave Shielding of Carbon Fiber Reinforced Bioplastic Composites

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### ABSTRACT

In long term application, the performance of composite should be concerned such as mechanical, physical and chemical properties. The characteristic performance of the composite can be tested under practical condition of several environments that could degrade their performance, *e.g.*, moisture, temperature, and radiation [1,2]. The objectivity of this research is to study the effect of the water absorption of carbon fiber (CF)/ bio plastic materials (BPM) composite on mechanical properties and electrical magnetic wave shielding of carbon fiber reinforced bioplastic composite. There are two composite was produced from these preparation: *Composite A*: 2 layer of Carbon fiber and 3 layer of Bio plastic 10 %, *Composite B* : 2 layer of Carbon fiber and 3 layer of Bio plastic 45 %. The composites were immersed for 1, 3, 5, 10, 15, 20, 25, 30, 35 and 40 days, respectively. Tensile tests of composites were performed by universal testing machine (MTS 810, MTS Systems Corporation, USA) with a load cell of 100kN at room temperature according to the ASTM D3039 standard.

Fig. 1 shows the effect of immersion time on the UTS for composite A and B of [0°] orientation. The UTS of composite A and B are almost constant for the immersion from 10 to 25 days, and significantly decreased in the immersion of 40 days. The UTS before the immersion for composite A was 254 MPa, and composite B was 303 MPa. When the immersion time was 40 days, the UTS for composite A and B was 162.3 and 185.6, respectively. Because the immersion of the composite in water affects the interfacial adhesion between the fiber and the matrix resin, the mechanical properties decrease. When the fiber and matrix interface was accessible to moisture in the environment, the development of shear stress at the interface might resulted in the fibers swelling. This fact leads to the ultimate debonding of the fibers, the delamination and the loss of structural integrity [3]. The decrease in the mechanical properties results also from the increase of voids. The presence of voids at the polymer–fiber interface may increase the ability of water molecules to penetrate into the composites [4, 5]. The elongation break of composite A and B increased with increasing the immersion time. Absorbed water molecules fill into cavities and crack within the composite. Therefore, the strain increases with increasing the immersion time.

The standard used to measure the Shielding Effectiveness is ASTM D4935. The SE was evaluated by frequency range from 500 MHz to 2 GHz. The EMI shielding results are shown on Figure 2 and Table 1. It is clear that the EMI SE of the bioplastic is 0.05 to 1.12 dB under frequency range of 500 MHz to 2000 MHz. The bioplastic cannot absorb the electromagnetic interference. The EMI SE of the composite can be influenced by their electrical conductivity [6]. If the materials would be highly electrical conductivity, the materials tend to absorb the energy of electromagnetic wave. Therefore, the carbon fiber reinforced bioplastic composite has high the EMI SE. When the EMI SE of the carbon fiber between 1 layer and 2 layers compares, the EMI SE of the carbon fiber with 2 layers is greater than that of the carbon fiber with 1 layer. Ayesha Kausar et al. observed that the EMI increases with increasing the content of the carbon fiber. The increase in the EMI SE result from the content of the carbon fiber

# Curriculum Vitae

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## **Specialized Field**

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- 2 Characterization and Development of Thermoelectric Oxide Materials

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2009-2011 Lecturer, Center of International Cooperation in Engineering Education  
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# The Effect of Sintering Aid on Negative Thermal Expansion of Ti-doped $Zr_2WP_2O_{12}$

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## ABSTRACT

### Introduction

Recently, significant advances in science and technology require capable materials in severe conditions. Although thermal expansion is generally in the order of micrometer, thermal damages has a significant influence on material strength and deformation behavior. This effect also affects microscopic products such as semiconductors which are core components of electronic products. In order to control of thermal expansion, negative thermal expansion (NTE) materials have been combined with positive thermal materials.

$Zr_2WP_2O_{12}$  which was reported as one of NTE materials by Evans et al<sup>[1]</sup>. has a wide temperature range and does not show phase transition. In last our study, it was figured out that thermal expansion coefficient (TEC) of  $Zr_2WP_2O_{12}$  can be controlled with doping Ti or Mo. However, the material that we synthesized is difficult to adopt experiment due to low relative density. In this study, Ti-doped  $Zr_{2-x}Ti_xWP_2O_{12}$  with MgO as a sintering aid was synthesized and the effect of addition of MgO on TEC of the material was investigated.

### Experiment

$ZrO_2$ ,  $WO_3$  and  $NH_4H_2PO_4$  were weighed to obtain the intended stoichiometric ratio as a powder raw material and mixed for 45 min using mortar and pestle. The mixed sample was calcined in an electric furnace under conditions of 900°C for 4 h (heating rate: 200°C/h). After calcination, the sample was gathered from the crucible. Then, MgO was added to the obtained sample, and mixed for 15 min using mortar and pestle. Thereafter, the mixed sample was fabricated (20 kN, 2 min) into a pellet form (diameter: 13 mm), the pellet sintered in an electric furnace at 1150°C. After sintering, the pellet sample was made into a powder.

For crystal structural analysis, X-ray diffraction (XRD) measurement was carried out. Scanning electron spectroscopic (SEM) micrographs were obtained for morphology. TECs were estimated by in situ high-temperature X-ray diffraction (HT-XRD).

### Results and Discussion

Fig.1 illustrates SEM images of  $Zr_{1.80}Ti_{0.20}WP_2O_{12}$ . In the case of MgO-free sample (Fig.1(a)), non-uniform size particles were observed. Particle size increased with increasing MgO content. Relative densities were 54.9, 86.0 and 94.3 in the sample of MgO-free, with 0.5wt% MgO and with 0.7wt% MgO, respectively. From these results, it was confirmed that MgO plays a role in and is capable as a sintering aid.

Fig. 2 portrays XRD patterns of  $Zr_{1.80}Ti_{0.20}WP_2O_{12}$ . All peaks in each figure could be exactly indexed to  $Zr_2WP_2O_{12}$ . No other miscellaneous peaks such as MgO,  $ZrO_2$ ,  $WO_3$  and so on were observed. This figure indicates that pure and monophasic has been obtained and MgO used sintering aid was doped in the crystal structure of  $Zr_{1.80}Ti_{0.20}WP_2O_{12}$ .

## Session B: Intelligent System & Electronics

**2-1 Vehicular Electronics**

**2-2 Consumer Electronics**

**2-3 Green Electronics**

**2-4 Networks and Communications**

**2-5 Smart Cities**

**2-6 Intelligent Systems and Applications**

<b>October 4 (Thursday) / Venue : E504</b>				
<b>Time</b>	<b>ID</b>	<b>Speaker</b>	<b>Title and Affiliation</b>	<b>Page</b>
14:30 – 15:00	B1-I-01	Prof. Soo Yong Lim	Ray Tracing for 5G Systems Department of Electrical and Electronic Engineering, University of Nottingham Malaysia Campus, Malaysia.	B1-01
15:00 – 15:30	B1-O-01	Wen-Shan Chen and Bang-Yun Lin	MICROTRIP-LINE-FED PRINTED SLOT ANTENNAS WITH HIGH GAIN Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan	B1-03
	B1-O-02	Sheng-Xiu Lin, Jun-Ming Xu, Liang-Bi Chen, and Chao-Tang Yu	DC-Based Power Line Communication Used in A Driving Safety Aided System Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan	B1-04
	B1-O-03	Yi-Cheng Lin, Fu-Lin Lin and Chao-Tang Yu	Multipath Modeling of In-Vehicle Power Line Communication Channels Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan	B1-05
15:30 – 16:00	B1-O-04	Tsong-Shing Lee, Shao-En Huang, and Te-Chun Hung	Title: Investigation of Electric-Field Coupling Wireless Power Transfer System with Modular Expansion Capability for LED Lighting Application Department of Electrical Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan	B1-06

	B1-O-05	Welsey Daniel C. Advincula <sup>1</sup> , Chun-Ping Hsieh <sup>2</sup> , Dr. Nilo T. Bugtai <sup>1</sup> , Engr. Renann G. Baldovino <sup>1</sup> , Dr. Aaron Raymond See <sup>2</sup> , and Dr. Yi-Chun Du <sup>2</sup>	Title: TV White Space for Enabling Telemedicine Solutions to Rural Hospitals and Health Centers in a Developing Country <sup>1</sup> Manufacturing Engineering and Management Department, De La Salle University Manila, Philippines <sup>2</sup> Department of Electrical Engineering, Southern Taiwan University of Science and Technology Tainan, Taiwan	B1-07
	B1-O-06	Long-Sheng Li, and Ya-Zhu Hsu	Title: A SDN Based Handover Management Scheme for Taiwan High Speed Rail Department of Computer Science and Information Engineering, National Chiayi University, Chiayi, Taiwan	B1-08
16:00 – 16:30	<u>Coffee Break</u>			
16:30 – 17:00	B2-I-01	Jung-Hsien Chiang	Interdisciplinary innovation Application of Artificial Intelligence	B2-01
17:00 – 17:50	B2-O-01	Yu-Lin Jeng, Yu-Hsiu Lin, Yong-Ming Huang	Exploring the application of a digital game in programming education Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-04
	B2-O-02	Leonard Angelo N. Sabellina III, Jose Antonio G. Choco, Pei Ling Cheng, Renann Baldovino and Dr. Aaron Raymond See	Concept and Design of an Automated Elevation Mapping System using a Laser Rangefinder and its Applications De La Salle University Taft, Manila, Philippines Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-05
	B2-O-03	Chia-Ju Kuo, Wen-De Chen, Yu-Hao Lin, Dr. Hang Hong Kuo and	Wherever You Go, Wherever You Sit Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-06

		Dr. Aaron Raymond See		
	B2-O-04	Ian Carlo M. Gandol, Gervin John T. Argente, Mick Reiy R. Meera and Engr. Evelyn L. De Castro	Aerial Human Detection using Image Processing for Search and Rescue Operations Lyceum of the Philippines University Batangas, Batangas City	B2-07
	B2-O-05	T. Chonbunrueang, W. Hengphiphat, W. Thipunand and E. Sumonphan	Scoreboard Controlled through Android Application Rajamangala University of Technology LANNA TAK, 63000, Thailand	B2-08

### October 5 (Friday) / Venue : E504

Time	ID	Speaker	Title and Affiliation	Page
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09:30 – 10:00	B2-I-03	Man Ho AU	Cryptographic Techniques for Transaction Privacy in Blockchain-Based Applications Hong Kong Polytechnic University, Hong Kong.	B2-03
10:00 – 10:20	<u>Coffee Break</u>			
10:20 – 10:50	B1-I-02	Prof. V. Parthasarathy	Wearable Device Solution to Monitor Patient's Physical and Emotional Character by Fusing ECG and Respiratory Signals Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science & Technology, India.	B1-02



10:50 – 11:20	B1-O-06	Prof. B.V.D Prasad	Title: Emotion and Heart Abnormality Detection Using ECG Signal - A Survey Department of Electronics and Communication Engineering, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science & Technology, India.	B1-09
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## Poster Session

<b>October 4 (Thursday 13:00-14:30) / Venue: E13 Lobby</b>			
<b>ID</b>	<b>Authors</b>	<b>Title and Affiliation</b>	<b>Page</b>
B1-P-01	Ming-Hung Chen <sup>1</sup> , Kun-Feng, Chen <sup>2</sup> , and Jung-Yang, Wang <sup>2</sup>	Development of Gallium-Nitride (GaN) Power Transistor Based Full-Bridge Phase-Shift Converter with Zero-Voltage Switching <sup>1</sup> Department of Electrical Engineering, Ming Chi University of Technology, New Taipei City, Taiwan <sup>2</sup> Missile and Rocket Systems Research Division, National Chung-Shang Institute of Science and Technology, Taoyuan City, Taiwan	B1-10
B1-P-02	Ming-Hung Chen <sup>1</sup> , Kun-Feng, Chen <sup>2</sup> , and Yi-Lun, Chen <sup>2</sup>	Development of Single-Phase, Three-Level dc-to-ac Power Converter Using Unipolar Switching Method <sup>1</sup> Department of Electrical Engineering, Ming Chi University of Technology, New Taipei City, Taiwan <sup>2</sup> Missile and Rocket Systems Research Division, National Chung-Shang Institute of Science and Technology, Taoyuan City, Taiwan	B1-11
B1-P-03	Jia-Yi Tan <sup>1</sup> , Zheng-Jun Yeh <sup>1</sup> , Szu-Yin Lin <sup>2</sup> and Shih-Lun Chen <sup>1</sup>	An Image Scaling Processing Algorithm Based on Classification and Filter Methodologies <sup>1</sup> Department of Electronic Engineering, Chung Yuan Christian University, Taoyuan City, Taiwan <sup>2</sup> Department of Information Management, Chung Yuan Christian University, Taoyuan City, Taiwan	B1-12
B1-P-04	Wen-Shan Chen and Ming Xuan Gao	MINIATURIZED USB ANTENNA FOR NB-IOT/LTE2300/2500 5G C-BAND APPLICATIONS Department of Electronic Engineering, Southern Taiwan University of Science and Technology	B1-13

		Tainan, Taiwan	
B1-P-05	Wen-Shan Chen, Zhe-Wei Zhan, Zhan-Yan Jiang, and Yi-Lun Tsai	USB dongle antenna design for WLAN/5G C-band operation Department of Electronic Engineering, Southern Taiwan University of Science and Technology Tainan, Taiwan	B1-14
B1-P-06	Tz-Heng Hsu and Wei-Ze Hong	DESIGN OF A CDN DISTRIBUTING ARCHITECTURE FOR DELIVERING MV-HEVC CODED VIDEOS Department of Computer Science and Information Engineering, Southern Taiwan University of Science and Technology	B1-15
B1-P-07	Jin-Hao Sam Cheong <sup>1</sup> , Jun-Hao Wang <sup>1</sup> , Ke-Ming Lu <sup>1</sup> , Ying-Jie Chen <sup>1</sup> , Mei-Li Chen <sup>2</sup> , and Chien-Min Cheng <sup>1</sup>	Study of ITO/GdOx-SiO <sub>2</sub> /TiN/Si Resistance Random Access Memory Thin Films <sup>1</sup> Department of Electronic Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan <sup>2</sup> Department of Electro-Optical Engineering, Southern Taiwan University of Science and Technology, Tainan, Taiwan	B1-16
B1-P-08	Tz-Heng Hsu, Kuan-Han Wu, Yan-Yun Fang, Jian-Ting Lai, and Wei-Ze Hong	AN INTELLIGENT MOBILE SEEKING SYSTEM FOR FINDING THE LOST MISSING PERSONS USING FACE RECOGNITION TECHNOLOGIES Department of Computer Science and Information Engineering, Southern Taiwan University of Science and Technology	B1-17
B1-P-09	Wei-Wen Hu and Bo-Kai Jhang	Demonstration of Visible Light Real-Time Audio Transmission System Using Commercial LED Lamp Department of Electronic Engineering, Southern Taiwan University of Science and Technology Tainan, Taiwan	B1-18
B2-P-01	Chien-Chung Wu, and Ming-Feng Chiu	Implementation of the Smart Bird-Repelling System through Deep learning Southern Taiwan University of Science and	B2-09

		Technology, Tainan, Taiwan	
B2-P-02	Chien-Chung Wu, and Ho-Change Tsai	Implementation of the Detection System of Surrounding Vehicles for Pedestrians Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-10
B2-P-03	Yong-Ming Huang and Yu-Hsiu Lin	Development of a Smart Home System as an Intelligent Electricity Energy Audit to Energy Saving in Smart Cities Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-11
B2-P-04	Ji-Jer Huang, and Yi-Ru Lin	Development of the behavioral monitoring system by using imaging technology for dementia patients Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-12
B2-P-05	Hsiang-En Hung, Zhi-Wei Ma, and Gwo-Jiun Horng	Design and Implementation of NFC and Mobile Device Applications for Intelligence Medical Care System Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-13
B2-P-06	Tz-Heng Hsu and Wei-Ze Hong	Design of a CDN Distributing Architecture for Delivering MV-HEVC CODED Videos Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-14
B2-P-07	Tz-Heng Hsu, Kuan-Han Wu, Yan-Yun Fang, Jian-Ting Lai, and Wei-Ze Hong	An Intelligent Mobile Seeking System for Finding the Lost Missing Persons Using Face Recognition Technologies Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-15
B2-P-08	Chien-Chung Wu, and Yu-Xuan Lin	The Case study of Recognition Police Patrol Car through Deep learning Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-16
B2-P-09	Chien-Chung Wu, and Yu-Long Kao	Implementation of the Autonomous Face Recognition Mobile Robot Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-17
B2-P-10	Shu-Chen Cheng,	To Build a Content-based Video Search	B2-18

	Tzu-En Hsu, and Chun-An Lu	Platform Using Association Rule Southern Taiwan University of Science and Technology, Tainan, Taiwan	
B2-P-11	Chen-Han Hsu, Sih- Yun Chen, and Di- wen Chen, and Shih- Lun Chen1	Automatic Grayscale Image Colorization with CNN and Block Algorithm Chung Yuan Christian University, Taoyuan City, Taiwan	B2-19
B2-P-12	Hsu-Ping Yang, Ching-Shiang Lee, Jing-Wein Wang	Target Detection in Complicated Environment with Color Distribution Applied to Tracking Moving Object National Kaohsiung University of Science and Technology, Kaohsiung, Taiwan	B2-20
B2-P-13	Hsin-Hung Cheng, Kwan Ouyang	Establish of standard for marine engine room in the unmanned autonomous Vessel Ministry of Transportation and Communication, Taipei, Taiwan Taipei University of Marine Technology Taipei, Taiwan	B2-21
B2-P-14	Rong-San Lin and Bing-Chia Lee	Imperceptibility Evaluation of Information Hiding in G.729 Bitstream Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-22
B2-P-15	Shan-Yang Wang, and Chia-Nian Shyi	A modified Simulated Annealing Algorithm to Implement a Steel Cutting System Far-East University, Taiwan Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-23
B2-P-16	Zong-Xian Yin† and Hong-Ming Xu	Application of wearable devices and interactive virtual character in home rehabilitation Southern Taiwan University of Science and Technology, Tainan, Taiwan	B2-24

# Ir. Dr. Soo Yong Lim (Grace)

## Personal:

Nationality: Malaysian  
Gender: Female

## Correspondence Address:

17-36-5 Mont' Kiara Palma, Jalan Kiara, 50480 Kuala Lumpur, Malaysia.  
e-m ail: [Grace.Lim@nottingham.edu.my](mailto:Grace.Lim@nottingham.edu.my)  
H/p: 6019-3582498 Office: 03-87253419

## Education

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### Postgraduate Certificate in Higher Education

*University of Nottingham, United Kingdom*

Fellow of the Higher Education Academy (HEA, UK)

(Recognition reference number: PR102931; Date of recognition: 24 March 2016)

Year 2014 – Year 2015 (**20 Feb 2016**)

### PhD, Electrical Engineering, Electrophysics

*University of Hawaii at Manoa, Honolulu, HI, USA*

Cumulative GPA: 3.71/4.00

PhD Dissertation: *Radio Wave Propagation Measurement and Modeling in Wireless Communication Environments*

Spring 2007 – Fall 2010 (**18 Dec 2010**)

### BEng(Hons), Electronics majoring in Telecommunications

*Multimedia University (MMU), Malaysia*

Cumulative GPA: 3.42/4.00 (Second Upper Class Honor)

Final Year Project: *Fiber Grating – Spectral Analysis (Grade A)*

Year 2000 – Year 2003 (**06 Nov 2003**)

## Current and Previous Employment

---

**Assistant Professor**, January 2014 – present

*Department of Electrical and Electronic Engineering, University of Nottingham Malaysia Campus*

*Associate Member at the George Green Institute for Electromagnetic Research, University of Nottingham, United Kingdom*

**Adjunct Assistant Professor**, January 2013 – present

*College of Engineering, University of Hawaii at Manoa, USA*

**Senior Lecturer**, July 2012 – December 2013

**Lecturer**, January 2011 – June 2012

*Department of Computer Science and Networked System, Sunway University, Malaysia*

**Graduate Assistant**, January 2007 – December 2010

*Hawaii Center for Advanced Communications (HCAC), Honolulu, USA*

**Research Officer**, January 2004 – 2006

*Centre for Applied Electromagnetic (CAEM), Multimedia University, Malaysia*

Research Topic: Development of Synthetic Aperture Radar Microwave Systems

**Electronics Engineer (Visual Product Sector)**, September 2003 – December 2003

*Sony Technology Malaysia , Bangi, Malaysia*

**Intern**, September 2002 – December 2002

*TS Automation, Melaka, Malaysia*

## Academics Achievements – Awards and Accolades

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- Recipient of the 2018 IEEE AP-S Donald G. Dudley Jr. Undergraduate Teaching Award, with the following citation – “For modernizing the teaching of electromagnetics and for innovating its relevant curriculum design”.  
July 2018.  
[This award honors an individual who has made outstanding and original contributions to undergraduate education at the early stage of his/her career as an educator in the general field of electromagnetics, including theory, analytical solutions, numerical methods, antennas, propagation, phenomena visualization, and measurements. One recipient (if qualified) is selected **worldwide** each year by the IEEE Antennas and Propagation Society.]
  - Research Award Certificate (Bronze), Faculty of Engineering, University of Nottingham Malaysia Campus. December 2017.
-

## Ray Tracing for 5G Systems

**Soo Yong Lim**†

Department of Electrical and Electronic Engineering, University of Nottingham Malaysia Campus  
Semenyih, Malaysia

†Presenter: **Soo Yong Lim**

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### **ABSTRACT**

Ray tracing is long known and recognized as one powerful method to do propagation prediction. Although the environment to be used for ray tracing is oftentimes difficult to construct, but its propagation output is amazingly accurate. Recently, as the scientific community hop on to the bandwagon of millimeter waves, ray tracing has been utilized afresh even for 5G systems, and beyond. The reasons leading to the popular trends of ray tracing for 5G systems are threefold. First, ray tracing is comparatively less confined by the carrier frequency and bandwidth, unlike other methods such as the measurement-based stochastic channel modeling, hence it can be applied more versatily in a greater diverse environments. Second, by utilizing the high spatial resolution of the results ray tracing is capable of generating, ray tracing-assisted beamforming algorithms can be developed for MIMO applications. Third, ray tracing is an effective method to overcome the limits of stochastic models and channel measurements especially in the moving communication scenarios of 5G whereby the transmitter, receiver, and even the encompassing scattering objects all can move. In the event where the birth and death of the multipath components need to be determined, ray tracing can come in very timely on this. In a nutshell, ray tracing is a powerful method that provides a simple and accurate way for determining the ray trajectory between a transmitter and a receiver. This talk on ray tracing is important and timely because the principles of operating ray tracing in the lower frequency bands can be applied to the higher frequency bands as well for millimeter waves and THz bands. Beyond that, successful utilization of the same technique can also benefit a great variety of propagation environments, including complex and emerging ones in indoor and outdoor environments.

Keywords: ray tracing, propagation, millimeter waves

### **RAY TRACING IMAGE METHOD**

Ray tracing is long known and recognized as one powerful method to do propagation prediction. Ray-tracing image method provides a simple and accurate way for determining the ray trajectory between a transmitter and a receiver [1]. To illustrate the basic idea of how the image method works, Fig. 1 shows a simple reflection surface.

For the scenario shown in Fig. 1, LOS is the path between the Tx and the Rx. To calculate the reflection from the surface, the image of Tx with respect to the surface is identified and is denoted as Tx'. Note that the distance from Tx to the surface and the distance from Tx' to the same surface are equal ( $d_1 = d_2$ ). Next, by connecting Tx' and Rx, the intersection point on the surface (P) is the reflection point where reflection occurs. For multiple reflections, multiple images with respect to the relevant surfaces will be determined in a similar way and the corresponding ray paths can be obtained.

**Dr. V.PARTHASARATHY ME, MBA, Ph.D.,**

**Professor,**

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#### Professional Traits

- Dynamic and competent with comprehensive blend of 15 years of hands-on professional and academic experience.
- Innovative and dedicated teacher, committed to teaching-learning, research and administration.

#### Academic Profile

Category	Name Of The Degree	Specialization	Year Of Passing	Name of the College	Name of the University	% of marks/ Grades obtained	Class obtained
UG	B.E	EEE	1995	Govt. College of Tech,	Bharathiyar university	72.29%	I
PG	M.E	CSE	2004	College of Engg. Guindy,	Anna University	6.9CGPA	I
Ph.D		Networking	2010	Anna University	Anna University	Commended	

#### Professional Experience

Name of the College	Designation	Joining Date	Relieving Date	Experience		
				Years	Months	Days
Vel Tech Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science & Technology	Professor & Director	26.09.2016	Till date			
Vel Tech Multi Tech Dr. Rangarajan Dr. Sakunthala Engineering College	Professor & Dean(R&D)	18.10.2012	25.09.2016	03	11	07
Chettinad College of Engineering and Technology	Professor & Principal	01.07.2009	01.09.2012	03	02	00
Chettinad College of Engineering and Technology	Associate Professor & HoD	11.07.2007	30.06.2009	01	11	19
KLN College of Information Technology	Assistant Professor & HoD	10.03.2005	10.07.2007	02	04	00



# WEARABLE DEVICE SOLUTION TO MONITOR PATIENT'S PHYSICAL AND EMOTIONAL CHARACTER BY FUSING ECG AND RESPIRATORY SIGNALS

**V. Parthasarathy**<sup>1</sup>, Professor, Vel Tech Rangarajan Dr. Sagunthala R & D Institute of Science and Technology, Avadi, Chennai 600062, Tamil Nadu, India.

**B.V.P. Prasad**<sup>2</sup>, Research scholar, Department of Electronics and Communication Engineering, Vel Tech Multi Tech Dr. Rangarajan Dr. Sagunthala Engineering College, Avadi, Chennai 600062, Tamil Nadu, India.

*E-mail: [sarathy.vp@gmail.com](mailto:sarathy.vp@gmail.com); [bvpprasadrm@gmail.com](mailto:bvpprasadrm@gmail.com)*

## ABSTRACT

A novel method to extract the physical and emotional state of a person is introduced in this paper. Previous techniques use ECG or EEG signal to determine physical or emotional conditions, this type of focus on single data may lead to false triggering. To reduce this risk fusion of two signals such as ECG, Photo Plethysmograph (PPG) and skin resistance is proposed. These signals can be extracted from the body of the patients with the help of belt like structure placed around the chest of the patient. The axial movement of two electrodes placed at the cross section of belt is used to measure PPG signal of a patient. Due to various factors such as baseline wandering and power line interference high-frequency noise will be accumulated on the signals. They are removed with the help of linear moving average FIR filters. This type of filters found efficient in removing high-frequency noise from more complex signals. The peak values of the signals are obtained with the help of proposed local peak detection technique. This technique uses a combination of both adaptive thresholding technique and min max approximation method to extract the peak values. The physical and mental state of the patient is identified with the help of relational weight based decision-making algorithm. In this phase, the abnormality of the person will be identified. This proposed algorithm will be a combination of both genetic and gravity based search algorithms. This type of decision-making algorithm will be more effective in complex situation such as fusion of respiratory and ECG signals combined with skin resistance values. With the help of this proposed scheme, the physical and mental state of a patient can be classified accurately.

Keywords: linear time invariant, FIR (Finite Impulsive Response), Skin resistance, axial movement, baseline wandering.

## I. INTRODUCTION

Bio-signals from human body carry many information that can be used in multiple applications. The applications include human recognition, health monitoring, emotion monitoring, pet health monitoring, physical activity monitoring etc. Incorporating this applications in real time world will lead to a revolution in IoT industry. Wearable technology devices were gaining attention nowadays due to advancement in IT sector. Sensors were produced by manufacturers to effectively extract the biomedical information from the body [1]. This information was then analysed to find the type of disease, this type of analysis is incorporated with wireless devices to monitor the type of disease at real time. This will eliminate the laboratory setup needed to diagnose the disease. There are many disadvantages with existing algorithms like delay, latency, data theft, power consumption, noise due to limited number of sensors etc. Due to limited number of sensors in wearable devices, noise in the signal

1. Name in Chinese 蔣榮先
2. Name in English (英文拼音) Jung-Hsien Chiang
3. School & Department, Designation (所屬機構及職稱) NCKU CSIE, Distinguished Professor
4. Email jchiang@mail.ncku.edu.tw
5. Speaker Biography

Dr. Jung-Hsien Chiang received his M.S. and Ph.D. degrees in computer engineering from the University of Missouri, Columbia, in 1991 and 1995, respectively. He worked as a researcher at the Computer and Communication Laboratory, Industrial Technology Research Institute, the largest information technology research institute in Taiwan. He joined the faculty of the National Cheng Kung University Computer Science and Information Engineering in February 1999 and is currently a professor of the department.

He performed his first research in computational intelligence in 1995 when he developed on algorithms for multimedia information server in cyber community. He led teams involved in the development of adaptive real-time multimedia transmission mechanism in intelligent gateway for D-Link Inc. in Taiwan. He developed and implemented fuzzy set based algorithms for user profiling and data mining. Dr. Chiang and his students created the technological foundation for the interpretations of fuzzy clustering by two novel algorithms based on support vectors, “adaptive cell growing” and “fuzzy cover”, which use competitive multisphere cells and fuzzy proximate functions for the iterative learning process respectively. The algorithms facilitate the exploration of grouping and separation uncertainty in producing meaningful interpretations of structure in the data. This research has been cited more than 400 times in Google Scholar.

In the early 2000s Chiang and his colleagues began exploring the idea of fuzzy algorithms in bioinformatics. Dr. Chiang’s prior research in bioinformatics has focused on intelligent text mining. He has contributed new techniques for developing biomedical text mining models, including data analytics, pattern extraction and literature classification. This leads to implementation of software prototypes to assist biomedical researchers in rapidly extracting useful knowledge from huge number of biomedical documents and to improve understanding of gene function annotation in the Human Genome Project. In 2003 the team was able to provide the available open source and the results have been published in Bioinformatics (Oxford University Press). This was the first study on the developing an ontology-based textmining system to efficiently extract knowledge from biomedical literature about the functions of gene products, and the web service has been utilized by more than 20 research teams and accessed more than 5,000 times since 2003.

His current research interests include fuzzy modeling in bioinformatics, text mining, pattern clustering, and modeling of systems biology problems. The research team he leads has cooperated with the Institute for Systems Biology (ISB) in Seattle, one of the top biomedical research organizations in the world. By combining its specialty in bioinformatics and computational biology, they assist the researchers in ISB to find either possible innovatively cancer related mechanisms or obtain a great quantity of experimental data for further analysis.

## Interdisciplinary innovation Application of Artificial Intelligence

Jung-Hsien Chiang

Department of Computer Science and Information Engineering, National Cheng Kung University, Tainan,  
Taiwan

### ABSTRACT

Taiwan's population moved to aged society makes long term care as one of the most family concerned social issues recently. The development of state-of-the-art technologies in artificial intelligence from home appliance industry and 3C manufacturers promotes their products to healthcare market in order to help home care and even long term care tasks.

## (2) CV (Curriculum Vitae)

Name in full SU Chunhua FAMILY First Middle		Gender F / OM	
Date of Birth 02 / 04 / 1981 Day Month Year Age 35		Nationality China	
Mailingaddress Office: Graduate School of Engineering, Osaka University, 2-1 Yamadaoka, Suita, Osaka, Japan 565-0871, Phone: 06-6879-7714 Fax:: 06-6879-7714 Home: 302 Sunrise Kasuga, 4-11-85 Kitakasuga, Ibaraki city, Osaka, Japan 567-0048 Phone: 080-3045-3833 Fax: Email : su@comm.eng.osaka-u.ac.jp			
Academic Background (degree obtained, name of school) / From high school to latest education			
Qinzhou No.2 High School, China		From 09/1996 To 06/1999	
Bachelor, Beijing Electronic Science and Technology Institute, China		From 09/1999 To 07/2003	
Research student, Kyushu University, Japan		From 10/2003 To 03/2004	
Master, Kyushu University, Japan		From 04/2004 To 03/2006	
Doctor of Engineering, Kyushu University, Japan		From 04/2006 To 10/2009	
		From Month/Year To Month/Year	
Previous employment	From~ To [Mth/Yr~Mth/Yr]	Institution / Position	
	04/2008 ~ 02/2010	Kyushu University/ JSPS fellow DC2	
	12/2009 ~ 03/2011	Singapore Management University / postdoctoral fellow	
	04/2011 ~ 05/2013	Institute for Infocomm Research, Singapore / Scientist I	
	05/2013 ~ 03/2016	JapanAdvanced Institute of Science and Technology /Assistant Professor	
	04/2016 ~ present	Osaka University /Assistant Professor	
Hobby	swimming, hiking, movie	Condition of health (circle one)	<input checked="" type="radio"/> Excellent <input type="radio"/> Good <input type="radio"/> Fair <input type="radio"/> Poor
Marital status	<input checked="" type="radio"/> Married <input type="radio"/> Unmarried		
Language ability	Grade your language ability (circle one for each language) English: <input checked="" type="radio"/> Fluent <input type="radio"/> Advanced <input type="radio"/> Intermediate <input type="radio"/> Beginner <input type="radio"/> None Japanese: <input checked="" type="radio"/> Fluent <input type="radio"/> Advanced <input type="radio"/> Intermediate <input type="radio"/> Beginner <input type="radio"/> None Specify other languages:		
Notes			



## Authentication Schemes for Next Generation of Computing Environments

Chunhua Su

Information Security Laboratory, University of Aizu, Japan.

### ABSTRACT

Authentication plays a central role in information security to protect users or devices from unauthorized access. Nowadays, Mobile devices like smartphones and IoT devices have become a personal assistant for common users to store their personal data and work as a social connection with peers. For this reason, those devices have become an attractive target by cyber-criminals for financial purposes. There is an increasing need to develop an appropriate user authentication schemes to protect such important information system from being unauthorized access. In this talks, we presents our current research results on new authentication schemes, The first one is a click-points map-based Graphical Password scheme that allows users to choose one place on a world map at first and then click a point or an object on an image relating to the previously selected location. Also I present our schemes envision a future IoT scenario in which end-users are with smart wearable objects related to human brainwave retrieval and Plantar Biometrics.

**Education**

2009 PhD, Computer Science and Software Engineering, University of Wollongong

2005 MPhil, Information Engineering, The Chinese University of Hong Kong

2003 BEng, Information Engineering, The Chinese University of Hong Kong

**Employment**

2014- Assistant Professor, Department of Computing, Hong Kong Polytechnic University

2014 Lecturer, University of Wollongong

2011-13 Associate Lecturer, University of Wollongong

2008-11 Postdoctoral Researcher, University of Wollongong

**Projects**

2018 Accountable Privacy-Preserving Authentications: New Constructions from Post-Quantum Cryptography, GRF-ECS

2018 Joint Lab on Blockchain & Cryptocurrency, CollinStar Capital & Monash University

2017 Blockchain-Based Food and Drug Counterfeit Detection and Regulatory System, ITC ITF-UICP

2017 Key Cryptographic Techniques in Publish/Subscribe Services with Provable Security, NSFC-ECS

2017 Blacklistable Attribute-Based Credentials with Hidden Policies, PolyU-Central Research Grant

2016 Fair Exchange of Digital Items, PolyU-DGRF

2015 Accountable Anonymity - Towards Achieving Security and Privacy without Trusted Entities, PolyU-Central Research Grant

2015 Indistinguishability Obfuscation: Why, How and What Next, PolyU-DGRF

**Thesis Examinations and Supervisions**

- External examiner of 4 PhD candidates, 2 from the Hong Kong University, 1 from Deakin University, 1 from University of South Australia
- Completed 1 master-by-research student as a supervisor and 3 PhD students as a co-supervisor
- Currently supervising 3 PhD students and co-supervising 1 PhD student

**Professional Activities/Appointment**

- Expert Member (China), ISO/IEC JTC 1/SC 27 Working Group 2
- Committee Member, Hong Kong Blockchain Society
- Program chair of GPC'2017, ProvSec'15, NSS'14, LSNS'14, LSNS'12;
- General chair of NSS'2018, CS'2016
- PC members of more than 40 international conferences/workshops, including ACNS'17, ACISP'17, ASIACCS'16, Globecom-CISS'16, IEEE TrustCom'16, etc.
- Associate Editor of JISA, Elsevier; Editorial board member of IJHPCN, Inderscience
- Guest co-editors of special issue for FGCS, CCPE, PUC, CSI

# Cryptographic Techniques for Transaction Privacy in Blockchain-Based Applications

Man Ho AU

Department of Computing, Hong Kong Polytechnic University, Hong Kong.

## ABSTRACT

Conceptualized 10 years ago as a core component of Bitcoin, blockchain has gained a vast amount of interest. Informally speaking, a blockchain is a distributed, shared, and immutable ledger that maintains a growing list of ordered records. It became extremely popular among the industries in the last few years. Many companies are exploring applications of blockchain beyond cryptocurrencies.

In this talk, the speaker will introduce blockchain and highlight some of the latest development in this area. In particular, we will discuss how cryptography helps in the protection of transaction privacy in blockchain-based applications, and why it is crucial. Topics covered include cryptographic primitives such as ring signatures and zero-knowledge proofs. Finally, we will review challenges related to the adoption of blockchain technologies.

## Session C: Electrical & Photonic Technology

3-1 Green Energy

3-2 Intelligent Control

3-3 Biomedical Electronics

3-4 Photonics : Material, Device, Technology and Application

3-5 Optical Engineering

October 4 (Thursday) / Venue : E509				
Time	ID	Speaker	Title and Affiliation	Page
14:30 – 15:00	C1-I-01	Jeen-Shing Wang	Integration of Wearable and AI Technology in Medical Applications	N.A.
15:00 – 15:30	C1-I-02	<u>Tatsana Thomthong<sup>†</sup></u> , Saharat Samakthai*, and Thawatchai Wongsang	The Plastic Film Sheet Width Measurement Machine	C1-01
15:30 – 16:00	C1-O-01	Chia-Feng Liu, Jing-Yau Tang, Ling-Han Kung* and Ling-Sheng Jang	Improvement of Attention in Learning Using Extremely Low Frequency Electromagnetic Field National Cheng Kung University *Ashaka Technology Inc.	C1-03
	C1-O-02	Chia-Feng Liu, Jing-Yau Tang, Ling-Han Kung* and Ling-Sheng Jang	Pet Emotion Soothing Using Extremely Low Frequency Electromagnetic Field National Cheng Kung University *Ashaka Technology Inc.	C1-04
	C1-O-03	Jolo Gerard Miel Tolentino, Kryzz Amiel Magpantay, Aaron Raymond See*, Yi-Chun	Pilot study on the classification method using SSD model of CNN for identifying kidneys and bladders in ultrasound images De La Salle University *Southern Taiwan University of Science and Technology	C1-05



		Du*, Renann Baldovino and Nilo Bugtai		
16:00 – 16:30	<u>Coffee Break</u>			
16:30 – 17:00	C1-O-04	Chih-Yu Tsai, Pei-Ling Cheng, Hang Hong Kuo and Aaron Raymond See	Development of a Microprocessor based Wireless Blood Pressure Monitoring System Southern Taiwan University of Science and Technology	C1-06
	C1-O-05	Exekiel Anthony Vergara, Joy Melein Arellano, Brandon Carlo Lorenzo, Ryann Rafael Razon and Evelyn De Castro	MCU Based Protection Suit for Human Fall Detection with GPS Locator Lyceum of the Philippines University Batangas	C1-07
	C1-O-06	Ming-Shyan Wang*, Muslikhin Muslikhin†, and Ting-Hui Lin	PWM Switching Strategies Study on Brushless DC Motor Drives Southern Taiwan University of Science and Technology	C1-08
17:00 – 17:40	C2-O-01	<u>Tzu-Yu Chen</u> , Hung-Pin Hsu, Der-Yuh Lin, Guan-Ting Lu, Tsung-Shine Ko and Hone-Zern Chen.	Optoelectronic investigations of p-type ZnO and n-type MoS <sub>2</sub> heterojunction diode Ming Chi University of Technology	C2-03
	C2-O-02	<u>Ya-Liang Lin</u> , Yi-Hui Chen, Zong-Liang Tseng, Hung- Pin Hsu and Ya- Fen Wu.	Optical Properties of Organometal Halide Perovskite Films Ming Chi University of Technology	C2-04
	C2-O-03	<u>Yi-Hui Chen</u> ,	Temperature-dependent Photoluminescence of	C2-05

		Ya-Liang Lin, Zong-Liang Tseng, Hung- Pin Hsu and Ya- Fen Wu.	Organometal Halide Perovskite Ming Chi University of Technology	
	C2-O-04	<u>Hsiang Kao</u> , Chien-Hsiang Chang	A new type of composite electrolyte for all- solid-state lithium battery National ChengKung University	C2-06

<b>October 5 (Friday) / Venue: E509</b>				
<b>Time</b>	<b>ID</b>	<b>Speaker</b>	<b>Title and Affiliation</b>	<b>Page</b>
09:00 – 09:30	C2-I-01	Prof.Tatsuo Mori	Fabrication of Organic Perovskite Solar Cells in AIT Laboratory Aichi Institute of Technology	C2-01
09:30 – 10:00	C2-I-02	Prof.Shoou-Jinn Chang	Growth and characterization of ZnSe-based 0D multi-quantum disk structure Department of Electrical Engineering, National Cheng-Kung University	C2-02
10:00 – 10:20	<u>Coffee Break</u>			
10:20 – 11:00	Academic Exchange			
11:00 – 11:20	C1-I-03	Ivan Hanafi	N.A.	C1-02

## Poster Session

<b>October 4 (Thursday 13:00-14:30) / Venue: E13 Lobby</b>			
<b>ID</b>	<b>Authors</b>	<b>Title and Affiliation</b>	<b>Page</b>
C1-P-01	Mei-Li Chen, Sheng-Chang Wang, Fuh-Cheng Jong, Zong-Sian Lai and Yi-Cheng Chang	Synthesis and characterization of copper zinc tin sulfide $Cu_2ZnSnS_4$ Southern Taiwan University of Science and Technology	C1-09
C1-P-02	Mei-Li Chen, Chien-Min Cheng, Fuh-Cheng Jong, Ba-Cong Cai, Guan-Ting Shi and Chi-Ying Tsai	Characteristics of the Resistive Switching Properties in $SmOx:SiOx$ Memory Devices Southern Taiwan University of Science and Technology	C1-10
C1-P-03	Te-Chun Hung, Guan-Ru Jiang, Chun-Yu Chen, Kai-Yuan Liu and Tsong-Shing Lee	Feedback Control Mechanism Design of Single-stage Converter with Wide Input Voltage Range Capability for Renewable Energy Source Southern Taiwan University of Science and Technology	C1-11
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C1-P-05	Yong-Dong Chang and Hsiu-Chin Ku	Practical Design Considerations of Larger Cooling Ton Solar Power Air Conditioner National Penghu University of Science and Technology *National University of Tainan	C1-13
C1-P-06	Yong-Dong Chang and Hsiu-Chin Ku*	Operated Reliability Analyses for Stand-Alone Solar Power Air Conditioner National Penghu University of Science and Technology *National University of Tainan	C1-14
C1-P-07	Yong-Dong Chang and Hsiu-Chin Ku	Design and Implementation Controller for Stand-Alone Solar Power System National Penghu University of Science and Technology	C1-15

		*National University of Tainan	
C1-P-08	Tsong-Shing Lee, Chun-Chia Chang, Chu-Hsien Tai and Te- chun Hung	Misalignment Charging Analysis of Inductively Coupled Power Transfer System for Rail- Guided Vehicle Application Southern Taiwan University of Science and Technology	C1-16
C1-P-09	Runa Iwasaki	Study on improvement of biomass characteristics by heat treatment Kumamoto University	C1-17
C1-P-10	Jung-Shun Chen	The development green energy solar air conditioning system National Kaohsiung Normal University	C1-18
C1-P-11	Wen-Tuan Wu, Chia- Ming Hsu, Chung-Fu Huang and Ching- Ming Hsu	Layer Characterization and Photovoltaic Properties of Nitrogen Containing Multi- Walled Carbon Nanotube on Si Southern Taiwan University of Science and Technology	C1-19
C1-P-12	Te-Chun Hung, Kai- Yuan Liu, Guan-Ru Jiang, Chun-Yu Chen, Tsong-Shing Lee, Ruei-Ping Yang and Yu-Hao Chen	Design of Integrated Converter with Energy Buffer Capability for Storage Device of Renewable Power System Application Southern Taiwan University of Science and Technology	C1-20
C1-P-13	Te-Chun Hung, Yu- Lin Chang, Yi-Fan Chen, Shao-En Huang and Tsong-Shing Lee	Design of Single Stage Converter with Input Flexible Expansion Capability for Hand-Held Tools Application Southern Taiwan University of Science and Technology	C1-21
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C1-P-15	Te-Chun Hung, Chun- Yu Chen, Tsong-Shing Lee and Shao-En Huang	Analysis of LLC Converter for Electric Vehicle Charging System with Constant-Current and Constant-Voltage Control Southern Taiwan University of Science and Technology	C1-23
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		Southern Taiwan University of Science and Technology	
C1-P-17	Yong-Dong Chang and Hsiu-Chin Ku	Research and Implementation of Drawing Maximum Energy from Stand-Alone Solar Array National Penghu University of Science and Technology *National University of Tainan	C1-25
C1-P-18	Yong-Dong Chang and Hsiu-Chin Ku*	DC and AC Hybrid Switchable Techniques Applied for Stand-Alone Solar Power System Controller National Penghu University of Science and Technology *National University of Tainan	C1-26
C1-P-19	Fu-Kun Chen and Chong-Hao Huang	Degradation in the feedforward ANC system due to Vibrated Reference Sensor Southern Taiwan University of Science and Technology	C1-27
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C2-P-04	Jian-Hua Wang , Yaw-Dong Wu	The study of characteristics of a triangle cavity coupled plasmonic waveguide structure with an nano-ring resonator, National Kaohsiung University of Sciences and Technology	C2-10
C2-P-05	Lai Yi-Ting, Yeh Tzu-Hung and Liu Shun-Wei.	OLEDs with aluminum oxide encapsulation by atomic layer deposition, Ming Chi University of Technology	C2-11
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C2-P-10	Ching-Ming Hsu, Yan-Yee Huang, Wen-Tuan Wu and Bi-Hong Chung.	Effect of Thermal Annealing on Mechanical Flexibility of ITO/PET, Southern Taiwan University of Science and Technology	C2-16
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C2-P-12	I-Sheng Hsu and Shun-Wei Liu.	A new organic electronic components: Organic Photovoltaic capacitors, Ming Chi University of Technology	C2-18
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Dist. Prof. Jeen-Shing Wang



## CURRICULUM VITAE

### Personal Information

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### Research interests

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Intelligent Control

Computational Intelligence

Embedded System and Its Applications

Inertial Sensing and Its Applications

Optimization Theory

Data Mining

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### Experience

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2015/08~For now

Distinguished Professor, Department of Electrical Engineering, National Cheng Kung University

2011/08~2015/08

Professor, Department of Electrical Engineering, National Cheng Kung University

2007/08-2011/07

Associate Professor, Department of Electrical Engineering, National Cheng Kung University

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### Education

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2001 Ph.D., Purdue University, U.S.A.

1997 M.S.E.E., University of Missouri-Columbia, U.S.A.

1996 B.S.E.E., University of Missouri-Columbia, U.S.A.

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### Publications- Journal

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1. Yen-Chin Chen, Cheng-Yu Lin, Carol Strong, Chung-Yi Li, Jeen-Shing Wang, Wen-Chien Ko, and Nai-Ying Ko, "Sleep disturbances at the time of a new diagnosis: a comparative study of human immunodeficiency virus patients, cancer patients, and general population controls," *Sleep Medicine*, vol. 36, pp. 38-43, 2017.
  2. Jia-Jen Chen, Li-Fan Liu, Jeen-Shing Wang, and Ting-Ting Chang, "A Pilot Study Exploring the Relationship between Short-Term HRV and Self-Rated Health Status among Elderly People," accepted by *Archives of Community Medicine and Public Health*, March 2017.
  3. Yu-Liang Hsu, Jeen-Shing Wang, and Che-Wei Chang, "A Wearable Inertial Pedestrian Navigation System with Quaternion-Based Extended Kalman Filter for Pedestrian Localization," accepted by *IEEE Sensors Journal*, Feb. 19, 2017.
  4. Yu-Liang Hsu, Cheng-Ling Chu, Yi-Ju Tsai, and Jeen-Shing Wang, "An inertial pen with dynamic time warping recognizer for handwriting and gesture recognition," *IEEE*
-

# TATSANA THOMTHONG

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## RESEARCH INTERESTS

My researches focus on power electronics converter and control system design applied for smart agriculture farm.

## EDUCATION

1997-2001 Master of Engineering in Electrical Engineering Chiang Mai University, Chiang Mai, Thailand

1992-1994 Bachelor of Engineering in Electrical Engineering Rajamangala University of Technology Thanyaburi, Thailand

## PUBLICATION AND PRESENTATION

2016 T. Tatsana, R. Nucha, M. Laktapon and P. Waratha, "*Parabolic Solar Tracking Concentrator Development for Drinking Water Production*," The 5<sup>th</sup> Phayao Research Conference, Phaya Ngam Muang Convention Hall, Phayao University, Thailand, 28-29 January 2016. P: 60-70. (in Thai version).

2015 C. Rachata, K. Nattapong, W. Thaweesak, and T. Tatsana, "*Electrical Yarn Spinning Machine Version II*," The 7<sup>th</sup> Conference of Electrical Engineering Network of Rajamangala University of Technology (*EENET'2015*), A-One The Royal Cruise Hotel, Pattaya Thailand, 27-29 May 2015. P: 588-591. (in Thai version).

2014 I. Manoch, R. Pichet, and T. Tatsana, "*Design and Implementation of Single-Phase Automatic Voltage Regulator*," The 6<sup>th</sup> Conference of Electrical Engineering Network of Rajamangala University of Technology (*EENET'2014*), Maritime Park and Spa Resort, Krabi Thailand, 26-28 March 2014. P: 449-452. (in Thai version).

## The Plastic Film Sheet Width Measurement Machine

**Tatsana Thomthong†, Saharat Samakthai\*, and Thawatchai Wongsang**

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### ABSTRACT

This article presents the design and implementation of a plastic film width measuring machine. This prototype machine include to the plastic film extruder at Popular pack Co., Ltd. The combine machine aimed to reduce conventional plastic waste in production line. The prototype machine comprised with an Arduino Mega 2560 microcontroller, keypad, two stepping motors, two ultrasonic sensors, a liquid crystal display, warning pilot lamp and buzzer. Arduino microcontroller get plastic film sheet reference width by keypad and calculated pulse number that used to control stepping motor movement and take ultrasonic sensors detect left and right edges of plastic film sheet. When ultrasonic sensors detect edge of plastic film sheet the microcontroller calculated plastic film sheet width and display plastic film sheet by liquid crystal display.-If plastic film sheet width over the reference range, the microcontroller take pilot lamp and buzzer warning.-This prototype machine take 100 times test by 300, 400, 500, and 600 centimeters plastic widths respectively. The testing results were found *firstly*, the maximum width errors are 1.0, 0.6, 1.2, and 0.4 millimeter. *Secondly*, the warning lamp and sound have 100 % decision making. *Finally*, the conventional plastic waste reduced by 56 % approximately.

Keywords : Microcontroller, Ultrasonic Sensor, Plastic film sheet

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### Research interests

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The research focus lies on the Technical Vocational Education and Training (TVET).

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### Short CV

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Besides giving lectures in the subject of Electronics Education and Computer Programming at Universitas Negeri Jakarta (former IKIP Jakarta), he also involved in providing consultancy services to The Ministry of National Education – Indonesia, assisted the Terro-Technologist International Consultant to review preventive maintenance and school-based management programs used in Junior and Senior Secondary Education.

He has been conducted as (1) Training Coordinator for Technical Training Center, Siemens Indonesia Company, (2) Chairman of the committee for doctoral scholarship and short-term training abroad on BERMUTU program, Directorate General of Higher Education, Ministry Education and Culture (MoEC), (3) Coordinator of the South East Asian Vocational and Technical Education Research and Networking (SEAVERN) Project for Indonesia, (4) Head of Center for Educational Policy Studies, Universitas Negeri Jakarta, (5) Chairperson of Master Programme for Technical and Vocational Education, Universitas Negeri Jakarta, and (6) Chairman of the Committee for Lecturer Certification Program, Directorate General of Science and Technology Resources and Higher Education – Ministry of Research, Technology, and Higher Education (MoRTHE).

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25 March 1987, Department of Electrical and Electronic Engineering, Graduate School of Engineering, Nagoya University (Master course)  
25 March 1990, Department of Electrical and Electronic Engineering, Graduate School of Engineering, Nagoya University (doctoral course)

#### **Research Career:**

1st April 1990: Assistant Professor, Department of Electrical Engineering, Nagoya University  
March-December 2000: Universite Paul Sabatier, France as Researcher Abroad of the Ministry of Education, Science, Sports and Culture.  
1st April 2001: Associate Professor, Department of Electrical Engineering, Nagoya University  
1st April 2004: Associate Professor, Department of Electrical Engineering and Computer science, Nagoya University  
1st April 2012: Department of Electrical Engineering, Faculty of Engineering, Aichi Institute of Technology

## Fabrication of Organic Perovskite Solar Cells in AIT Laboratory

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### ABSTRACT

Organic perovskite solar cell In our laboratory, we use an air-flow process and a solvent anneal during the fabrication process of organic perovskite solar cells to improve the device performance. The use of air-flow process suppresses the occurrence of pin-holes and the fineness of perovskite grain size. These leads to stable device performance. To obtain the perovskite grain with high quality, the solvent engineering (anti-solvent) method is famous and effective. However, it is difficult to incorporate this process with the air-flow process. We obtain the perovskite layer with high quality by means of the combination of the air-flow and the solvent anneal processes or the additive and the solvent anneal process.

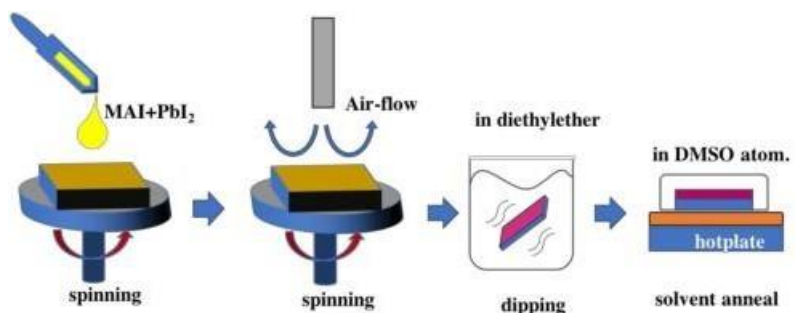
Keywords: Organic Perovskite Solar Cells, Air-Flow Process, Solvent Anneal, Additive

### 1. INTRODUCTION

We reported the fabrication and device properties on organic perovskite solar cells[1-5]. Especially we showed the introduction of air-flow process during the spin-coating for high-performance devices[1,2]. In addition, since we are interested in a solvent anneal process[6], we fabricated the devices by combining the solvent anneal with the air-flow etc. In this report, we introduce the combination fabrication processes of the air-flow and the solvent anneal processes or the additive and the solvent anneal (SA) process[7].

### 2. EXPERIMENTAL

We used a planar cell as FTO/ dense TiO<sub>2</sub> layer/ CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>/ spiro-OMeTAD/ gold and an inverted cell as ITO/ PEDOT:PSS/ CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>/PCBM/Al, which were completely fabricated under air ambient conditions except the deposition of gold vacuum-deposition. We fabricated the perovskite layer by a 1-step method. The air-flow process was carried out during spin-coating of precursor perovskite solution. The as-grown thin films were annealed in DMSO atmosphere on a hotplate after dipping in diethylether. On the other hand, we used 1,8-diiodooctan (DIO), which is the famous additive of organic thin-film solar cells, as an additive. We fabricated the perovskite layer using MAI+PbI<sub>2</sub>+DIO as the active layer of inverted device. Fig.1 The procedure of air-flow process on 1-step.



### 3. RESULTS AND DISCUSSION

When the air-flow are carried out during spin-coating, the perovskite grain sizes become



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1989

Ph.D., UCLA, U. S. A.

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M.S., SUNY, Stony Brook, U. S. A

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B.S., National Cheng Kung University, R. O. C.

### Experiences

2016.2-now

Chair Professor, Dept. of Electrical Engineering, National Cheng-Kung University (NCKU)

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Distinguished Professor, Dept. of Electrical Engineering, National Cheng-Kung University (NCKU)

2008.8-2011.7

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2008.8-2011.7

Deputy Director, Dept. of Electrical Engineering, NCKU

2004.7-2004.9

Visiting Scholar, Dept. Electrical Engineering and Bioscience, WASEDA University, Tokyo, Japan

2002.8-2002.9

Visiting Scholar, College of Applied Physics, University of Stuttgart, Germany

2002-

Honorary Professor, Changchun Institute of Optics and Fine Mechanics, China

2001.8-2001.9

Visiting Scholar, Institute for Microstructural Sciences, National Research Council, Canada

1999.7-2000.2

Visiting Scholar, Research Center for Advanced Science and Technology, University of Tokyo, Japan

1999.1-1999.3

Visiting Scholar, Department of Electrical and Electronics Engineering, University of Wales, Swansea, U.K.

1998-

Professor, Institute of Microelectronics, NCKU

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Professor, Dept. of Electrical Engineering, NCKU

1997-

Chief of Semiconductor research center, NCKU

2001

Visiting scholar of Micro-structure graduate school, National Research Council of Canada

1992-1998

Associate Professor, Dept. of Electrical Engineering, NCKU



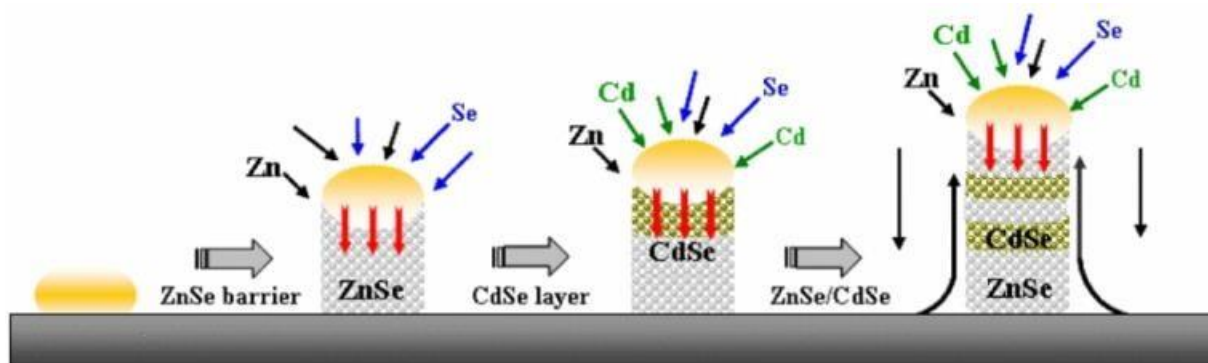
## Growth and characterization of ZnSe-based 0D multi-quantum disk structure

**Shou-Jinn Chang\***

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### ABSTRACT

The author report the growth of high-density ZnSe/CdSe multiquantum disks on oxidized Si substrate. It was found the as-grown nanotips were tapered with the mixture of cubic zinc blende and hexagonal wurtzite structures. Also, photoluminescence intensities observed from these ZnSe/CdSe multiquantum disks were much larger than that observed from the homogeneous ZnSe. Activation energies for the ZnSe/CdSe multiquantum disks with well widths  $L_w$  of 8, 12, and 16 nm were 22, 62, and 56 meV, respectively.



Keywords: ZnSe; multi-quantum disk structure

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- [1] C. Soci, A. Zhang, B. Xiang, S. A. Dayeh, D. P. R. Aplin, J. Park, X. Y. Bao, Y. H. Lo, D. Wang, "ZnO nanowire UV photodetectors with high internal gain", *Nano. Lett.*, vol. 7, pp. 1003-1009, Apr. 2007.
- [2] S. J. Chang, J. L. Hou, T. J. Hsueh, K. T. Lam, S. G. Li, C. H. Liu and S. P. Chang, "Triple-junction GaInP/GaAs/Ge solar cells with an AZO transparent electrode and ZnO nanowires", *IEEE J. Photovoltaics*, Vol. 3, No. 3, pp. 991-996, July 2013.

## Session D: Biotechnology & Chemical and Materials Engineering

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4-2 Chemical Materials

4-3 Bioprocess and Bioengineering

4-4 Biological Functional Assessment

4-5 Biotechnology of Health Care

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15:00 – 15:30	D1-I-02	Bing-Hung Chen	Study on Heterogeneously Catalyzed Oligomerization of Glycerol over Alumina Supported Ca/Sr Mixed Oxides National Cheng Kung University	D1-02
15:30 – 16:00	D2-I-01	Chih-Hsin Hung	Using bacteriophage and lysin to control Extended-Spectrum Drug-resistant Acinetobacter baumannii Infection I-Shou University	D2-01
16:00 – 16:30	<u>Coffee Break</u>			
16:30 – 17:00	D2-O-01	Ying-Chen Yi and I-Son Ng	Establishment of Constitutive and Inducible Recombinant Expression System by Shewanella oneidensis MR-1 NCKU	D2-03
	D2-O-02	Shih-I Tan and I-Son Ng	Development of Genetic Circuit Platform (GCP) as a High Sensitivity Biosensor in E. coli NCKU	D2-04
	D2-O-03	Han Yun Wu	In vitro co-biosynthesis of 3-hydroxypropionic acid and 1,3-propanediol from glycerol through cell surface biocatalysis National Yunlin University of Science and Technology	D2-05

17:00 – 17:30	D2-O-04	Ren Fang Yang	Encapsulation of oil within polysaccharides extracted from the seeds of Ficus pumila var. awkeotsang using a milli-fluidic device National Yunlin University of Science and Technology	D2-06
	D2-O-05	Wai Leng Carmen Loh, John Chi-Wei Lan and Hui Suan Ng.	Production of microbial carotenoids by <i>Gordonia terrae</i> TWRH01: cultivation and medium optimization UCSI University	D2-07
	D2-O-06	Jing-Hua Huang and John Chi-Wei Lan.	Fabrication of Polyhydroxybutyrate-cellulose Based Matrix for Protein Recovery YuanZe University	D2-08
17:30 – 17:50	D2-O-07	Man-Chun Chuang, Szu- Yu Chen and Mei-Chin Chen	Potential of using Chitosan/poly-gamma-glutamic acid nanoparticles as nanocarriers to improve antigen immunogenicity NCKU	D2-09
	D2-O-08	Yi Hu, Rei Ming Guo and Mei Jywan Syu	Towards the Fabrication and Development of A Modified Sensor for Detection of Creatinine Concentration NCKU	D2-10

<b>October 5 (Friday) / Venue : E1301</b>				
Time	ID	Speaker	Title and Affiliation	Page
09:00 – 09:30	D1-I-03	Yern Chee Ching	Nanocellulose reinforced Biopolymer Based hydrogel for Drug Loading and Delivery University of Malaya	D1-03
09:30 – 10:00	D2-I-02	Hui-Suan Ng	Extractive Disruption Of <i>Gordonia terrae</i> For Recovery Of Carotenoids With Alcohol/Salt Aqueous Biphasic System UCSI University	D2-02
10:00 – 10:20	<u>Coffee Break</u>			
10:20 – 11:20	D1-O-01	Thuy-Vi Vo, Pei-Tzu Yang and Bing-	Preparation and characterization of Alkyl polyglucosides/Tea Tree Oil/Water microemulsion	D1-04

		Hung Chen		
	D1-O-02	Ru-Xue Guo, Yan-Lin Wang and Mei- Jywan Syu	Preparation of Copper-Organic Framework Packed Column for Adsorption and Electrocatalysis of Carbon Dioxide	D1-05
	D1-O-03	Chen Yi- Ching, Chen Meng-Chen and Chang Chien-Hsiang	A study on Interfacial behavior of cationic vesicle-forming materials	D1-06
	D1-O-04	Yen-Ju Chen and Bing- Hung Chen	Study on Optimization of Surfactant Enhanced Extraction of Tea Tree Oil using Response Surface Methodology	D1-07
	D1-O-05	Aleksandr Spivakov, Yu- Chuan Chang, Chin-Lin Pan, Yaw-Teng Tseng and Chun-Rong Lin	Influence of the reaction temperature on the phase-purity of carbon-coated wustite nanoparticles	D1-08

## Poster Session

<b>October 4 (Thursday 10:30-12:00) / Venue: E13 Lobby</b>			
ID	Authors	Title and Affiliation	Page
D1-P-01	Chean-Cheng Su, Wei-Hsin Hsu, Shiu-Chih Wang, David Tarnng and Chih-Pin Hung	Activated Carbon Prepared from Resole-Type Crosslinked Phenolic by Chemical Activation	D1-09
D1-P-02	Chean-Cheng Su, Wei-Hsin Hsu, Shiu-Chih Wang, David Tarnng and Chih-Pin Hung	Activated Carbon Prepared from Phenolic Resin Laminates by Physical Activation	D1-10
D1-P-03	Tsai I-Chien and Mao Ching-Feng	Carbon Dioxide Capturing with Ionic liquids/Granule-Shaped Supports	D1-11
D1-P-04	Chaung Ya-Man and Mao Ching-Feng	Carbon Dioxide Absorption Kinetics of Supported Ionic Liquids	D1-12
D1-P-05	Guan-You Lin, Xuan-Yong Zhang and Hsiu-Wen Chien	A catalytic activity of green synthesis of silver nanopartivles by spent plastic water bottles/coffee ground composite	D1-13
D1-P-06	Ting-Ya Luo, Yan-Rong Chen and Wen-Chang Wu	Preparation and Characterization of SDC/sulfate Composite Electrolyte for Solid Oxide Fuel Cells	D1-14
D1-P-07	Shun-Fua Su, Rong-Kuan Zhuang and Bao-Yu Chen	Modified chlorophyll as catalyst for polymerization of limonene	D1-15
D1-P-08	Jhong-Ye Lee, Jun-Cheng Wu, Cheng-Chien Wang and Chang-Ning Huang	The catalytic process and transformation mechanism of $\beta$ -SiC nanowhiskers from rice straws by carbothermal reduction.	D1-16
D1-P-09	Jeng-Ywan Shih, Herry Suryadi Djayaprabha and Xin-Ling Cai	Thermal behavior of calcined dolomite slag-based composite	D1-17
D1-P-10	Hau Lin, Pei-Tzu Chiu and Yun-Hsiang	The Operating Conditions for Detection of Hydrogen Peroxide for the Minielectrode	D1-18

	Lai	Blended with Nickel Hexacyanoferrate and Silver Powder	
D1-P-11	Hau Lin, Kun-Yi Kao and Yun-Hsiang Lai	Analysis of the Effect of pH Value on Detecting Hydrogen Peroxide for the Unmodified Carbon Paste Electrode	D1-19
D1-P-12	Hau Lin, Ming-Tse Fang and Yun-Hsiang Lai	Analysis of the F Value of SPSS on Detecting Hydrogen Peroxide for the Electrode Blended with Chromium Hexacyanoferrate	D1-20
D1-P-13	Hau Lin, Wu-Chang Tsai and Yun-Hsiang Lai	The Factorial Effect of Reaction Parameters for Detecting Hydrogen Peroxide for the Modified Electrode Blended with Nano Silver Powder	D1-21
D1-P-14	Hau Lin, Chia-Ming Chang and Yun-Hsiang Lai	Analysis of the F Value of SPSS on Detecting Hydrogen Peroxide for the Unmodified Electrode	D1-22
D1-P-15	Hau Lin, Yu-An Chen and Yun-Hsiang Lai	The Main Effects and Interaction Effects of Parameters on Detecting Hydrogen Peroxide for the Electrode Blended with Cobalt Hexacyanoferrate and Silver Powder	D1-23
D1-P-16	Hau Lin and Yun-Hsiang Lai	A Study of the Effect of Ratio on Detecting Hydrogen Peroxide for the Electrode Modified by Copper Hexacyanoferrate and Nano Silver Powder	D1-24
D1-P-17	Hau Lin, Yu-Wei Lu and Yun-Hsiang Lai	The Effect of pH Value on Detection of Sensitivity of Hydrogen Peroxide for the Electrode Modified by Ruthenium Hexacyanoferrate	D1-25
D1-P-18	Zheng-Yi Shi, Yi-An Chang and Hong-Ru Lin	Microgel reinforced PVA hydrogel composite with self-healing properties	D1-26
D1-P-19	Chuh-Yean Chen, Ming-Li Wu, Chen-Li Chiang and Wan-Ru Lai	Applications of Multicore MnFe <sub>2</sub> O <sub>4</sub> /SiO <sub>2</sub> /Ag Nanoparticles in Surface Enhanced Raman Spectroscopy	D1-27
D1-P-20	Ching-Huei Wang	Investigation of alumina-supported chromium metal catalysts for the combustion of methane at low temperatures	D1-28
D1-P-21	Yu-Jie Chen, Chuh-Yean Chen, Chen-Li	Preparation and Characterization of Polyacrylamide Nanoparticles	D1-29

	Chiang, Ming-Li Wu and Hung Wu		
D1-P-22	Chen-Li Chiang, Chuh-Yean Chen, Ming-Li Wu and Hung Wu	Raising Positive Zeta Potential of Iron Oxide Nanoparticles via Adsorbing Amino Acids	D1-30
D1-P-23	Bo-Cheng Wu, Chen-Li Chiang, Chuh-Yean Chen, Ming-Li Wu and Hung Wu	Preparation and Characterization of $\gamma$ -Fe <sub>2</sub> O <sub>3</sub> Nanoparticles	D1-31
D1-P-24	Ming-Li Wu, Chuh-Yean Chen, Chen-Li Chiang and Wan-Ru Lai	Control of Nucleation and Growth of Gold Nanoparticles in Reverse Micelles System	D1-32
D1-P-25	Cheng-Chien Wang, Yin-Lung Liou, Yu-Ting Chen and Chi-Shu Wei	Preparation of Conductive Nylon Fiber via Atmosphere Plasma Treatment and Followed by Silver Sputtering Process	D1-33
D1-P-26	Wang Nan Kai and Chen Cheng Ho	Preparation of water-soluble polymer grafted polyaniline	D1-34
D1-P-27	Yung-Fu Wu, Chun-Hsuan Chung, Yu-Ting Wu and Bo Yu Su	Electrolyte Flow Controlled by Magnetic Field in a Microfluidic Channel	D1-35
D1-P-28	Chin-Lung Chiang, Yung-Lan Yeh, Wei-Jen Chen, Chien-Wei Hsu and Ming-Yuan Shen	A Study on Characterization of Graphene Nanoplatelets /Epoxy Nanocomposites via Rapid Dispersion Method	D1-36
D1-P-29	Chen-Li Chiang, Ming-Li Wu, Yong-Sin Cheng and Chuh-Yean Chen	Photodegradation of organic dye by silver chloride nanoparticles supported on a chelating polymer	D1-37
D1-P-30	Ming-Li Wu, Chen-Li Chiang and Chuh-Yean Chen	Synthesis and antimicrobial effect of silver nanoparticles loaded on a chelating polymer	D1-38
D1-P-31	Chen-Li Chiang, Ming-Li Wu, Wei-Ru	Preparation of CuS nanoparticles/polymer composite for dye degradation under visible	D1-39

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D1-P-36	Chean-Cheng Su, Cheng-Hsien Yu, 偉心徐, 幸蓉 吳 and 秀慈林	Phase behaviour in Poly(hydroxy ether of bisphenol-A)/Poly(1,4-butylene terephthalate) Blends	D1-44
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D1-P-44	Ying-Zhen Chen, Aleksandr Spivakov, Yu-Lian Yang, Bing-Yi Chen, Sornchat Phiw-On, Yaw-Teng Tseng and Chun-Rong Lin	Surface Modification of Magnetic Nanoparticles with Fluorescent Dye Molecular: Preparation, Characterization, and Applications	D1-52
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# Curriculum Vitae

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## Functional polymers for medical and industrial applications

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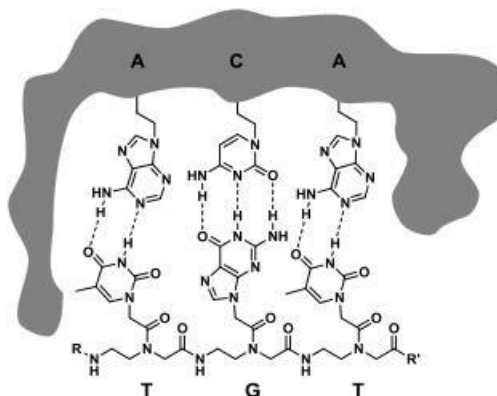
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### ABSTRACT

This paper presents novel functional polymers designed and prepared by us for medical, pharmaceutical or industrial purposes. One focus lies on molecularly imprinted polymers (MIPs) with the aim of, e.g., storing binary codes in the imprints of these MIPs. To follow nature's prominent method to store information in nucleic acids we use peptide nucleic acid (PNA) templates in this approach. In terms of depiction of binary codes in the templates, two types of template building units are necessary to represent "1" and "0". For this purpose, we first have to synthesize PNA building units bearing two different nucleobases (thymine = 1 and guanine = 0)<sup>1</sup>. With these units, templates with defined sequences can be generated via liquid phase synthesis<sup>2</sup>. Through the addition of functionalized, polymerizable monomers with attached template-complementary nucleobases (adenine and cytosine) and their self-assembly, an imprint can be formed through polymerisation. Using for instance a trimeric template (TGT), the resulting MIP contains its complementary sequence (ACA) as stored information (Figure 1).



**Figure 1.** Concept of storing binary codes in MIP cavities. The TGT sequence (representing the binary code 101) of a peptide nucleic acid template is stored as its complementary sequence (ACA) in a molecularly imprinted polymer by applying nucleobase-functionalized monomers.

In another approach, we prepared MIPs based on poly(organo)phosphazenes and investigated their potential use as a modular construction kit for biocompatible, degradable MIPs.

Poly(organo)phosphazenes are a group of inorganic-organic hybrid polymers with a backbone of alternating phosphorus and nitrogen atoms which offer unique and highly tuneable characteristics due to the vast range of applicable organic substituents, enabling precise controlled degradability and degradation to benign small molecules.<sup>3</sup> This, as well as the use of various functional groups for imprinting, makes these polymers serve as first-class candidates as basis for biocompatible and degradable MIPs.

MIPs in general are to a great extent based on poly(meth)acrylates and derivatives, and furthermore, are synthesized in form of micro- or nanoparticles. However, they mostly lack of



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Short Biography: (not more than 200 words)

Dr. Bing-Hung Chen received his BSc degree in Chemical Engineering from National Taiwan University in 1990 and PhD in Chemical Engineering from Rice University in 1998. His PhD work, under the guidance of Prof. Clarence A. Miller, focused on *solubilization of triolein by surfactant solutions and dissolution behavior of surfactants*. Shortly after one and half years as a post-doctoral research fellow working in critical phenomena in colloid-polymer system, Dr. Chen joined the Department of Chemical and Biomolecular Engineering at National University of Singapore (NUS) as an Assistant Professor. In 2002, Dr. Chen moved to National Cheng Kung University (NCKU) in Taiwan and is now a Professor of Chemical Engineering at NCKU. Conjointly, Dr. Chen also serves on several academic duties, such as the Advisory Board of the Journal of the Taiwan Institute of Chemical Engineers as well as the chairman in the Sub-Committee (TC 11/SC07) of Taiwan National Standards in Chemical Industry. Dr. Chen's research interests include interfacial phenomena and colloids chemistry, as well as catalysis and their applications in biofuels.

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## Study on Heterogeneously Catalyzed Oligomerization of Glycerol over Alumina Supported Ca/Sr Mixed Oxides

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### ABSTRACT

The solvent-less etherification of glycerol to oligomers using alumina supported Ca and Sr catalysts was studied. These catalysts were obtained with impregnation of strontium and calcium onto  $\gamma$ -alumina ( $\gamma$ -Al<sub>2</sub>O<sub>3</sub>) in Sr(NO<sub>3</sub>)<sub>2</sub> and Ca(NO<sub>3</sub>)<sub>2</sub> solutions. The evidence for synergistic effects between active Ca and Sr species was demonstrated by the etherification reactions over a series of Ca-Sr-Al catalysts with varied Ca-to-Sr molar ratios. Effect of calcination temperatures of these supported catalysts, from 600 °C to 900 °C, on the resultant reusability and conversion efficiency of glycerol to oligomers and the selectivity of linear and branched oligomer to cyclic ones were investigated. The catalyst properties were characterized by various instruments including BET, TPD, XRD and SEM, and the ICP-OES analysis was performed to confirm the leaching of the metal species in the liquid phase of the reaction mixture. With Ca and Sr supported on  $\gamma$ -alumina catalyst, the catalyzed etherification reactions were carried out at 260 °C with 3.5 wt% Ca/Sr/ $\gamma$ -alumina calcined at 900 °C in nitrogen atmosphere. Under the optimal reaction conditions, near 76% glycerol could be converted to glycerol oligomers after 4h from the onset of the etherification reaction. Moreover, a selectivity near 87% of di- and tri-glycerol in linear and branched forms over the cyclic form could be achieved.

Keywords: Etherification, Glycerol Oligomer, Heterogeneous Catalyst.

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## CURRICULUM VITAE



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### **BIBLIOMETRIC DATA**

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Polymer Composites

Functional Materials, Advanced Materials (Photonics Materials, Bio-Compatible Materials, Biomedical Materials, (Application of Materials in Energy, Environment and Medicine))

Nano-Materials (Nanocomposite Materials, , Nanocomposite Coating)

Material Processing Technology (Blown Film Extrusion, Polymer Casting Process, Injection Molding, Printing Technology)

I-Indexed)

## Nanocellulose reinforced Biopolymer Based hydrogel for Drug Loading and Delivery

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### ABSTRACT

A unique biodegradable, superporous, swellable and pH sensitive nanocellulose reinforced chitosan hydrogel with dynamic mechanical properties was prepared for enhancing bioavailability of curcumin [1]. Rod-shaped cellulose nanocrystals (CNCs) that were approximately 200–300 nm in length and 40–50 nm in width were prepared from microcrystalline cellulose via sulfuric acid hydrolysis. CNC ratios of 0%, 0.5%, 1%, 1.5%, 2%, and 2.5% were selected to study the effects of CNCs on the mechanical properties and swelling behavior of the chitosan hydrogel. The crosslinking reaction between chitosan and glutaraldehyde was confirmed by the presence of a  $-C=N$  stretching group at  $1548\text{ cm}^{-1}$  in the Fourier transform infrared spectrum of chitosan hydrogel. The crosslinking degree of the chitosan hydrogel was 83.6%. The X-ray diffraction patterns confirmed that adding CNCs induced a combination of amorphous and crystalline regions in the hydrogel matrix. Mechanical tests showed that the maximum compression of the chitosan hydrogel increased from  $25.9 \pm 1\text{ kPa}$  to  $50.8 \pm 3\text{ kPa}$  with increasing CNC content from 0%–2.5%. Field emission scanning electron microscope images revealed that the pore size significantly increased with the formation of widely interconnected porous structure in gas foamed hydrogels. The in vitro degradation rate of hydrogel decreased with the increase of CNC concentration of the hydrogel. Differential scanning calorimetry (DSC) results showed that the thermal stability of the hydrogel increased with the addition of nanocellulose due to the strong interfacial linkage between nanostructured cellulose and chitosan. All the hydrogels showed maximum swelling ratios greater than 300% in distilled water. CNC-chitosan hydrogels exhibited excellent pH sensitivity and producing the maximum swelling ratio under acidic condition (pH 4.01). As a result of its pH-responsiveness, the CNC/chitosan hydrogel has been evaluated as drug delivery vehicle to the stomach. Curcumin, a less water-soluble drug was used in this study, due to the fact that the fast swellable, superporous hydrogel could release a water-insoluble drug to a great extent. FTIR spectrum indicated that there is no interaction between drug and ingredients present in the hydrogels. The drug release data showed good fitting to Ritger-Peppas model. 0.5% CNC-chitosan hydrogel showed the highest increase of drug encapsulation efficiency and drug release after gas foaming at  $40\text{ }^{\circ}\text{C}$ , which was from 41% to 68% and from  $0.74\text{ mg/L}$  to  $1.61\text{ mg/L}$ , respectively. At the later part of this study, curcumin was extracted using turmeric and incorporated into 0.5% CNC-chitosan hydrogel with a nonionic surfactant (Tween 20), using in situ loading method. The drug release of hydrogel increased from  $0.21\% \pm 0.02\%$  to  $54.85\% \pm 0.77\%$ , with the increase of Tween 20 concentration from 0% to 30% (w/v), after 7.5 h. Moreover, the results revealed that the drug maintained its chemical activity after in vitro release. According to the results of this study, CNC reinforced chitosan hydrogel can be suggested to improve the bioavailability of curcumin for the absorption from stomach and upper intestinal tract.

## Curriculum Vitae

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## Using bacteriophage and lysin to control Extended-Spectrum Drug-resistant *Acinetobacter baumannii* Infection

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### ABSTRACT

From the *Klebsiella pneumoniae* contain NDM-1 (New Delhi Metallo- $\beta$ -lactamase 1) has been reported, superbug infection always resulted in big scare on the world. The superbugs are resistant to all antibiotics besides the colistin and tigecycline. Now, the *mcr-1* (plasmid mediate colistin resistant gene) and NDM-1 genes coexisted bacterium has been isolated from clinical specimen. No antibiotics can be used to fight these super-superbugs. So the old therapeutic agents-bacteriophage is rekindled and recognized as the potential weapon to combat these superbugs. From many literature reports in Poland and former Soviet Union, phage therapy and phage endolysin performed well therapeutic efficiency on multidrug-bacterium infection and no side effects is found. In 2017, one dean of University of California San Diego was rescued by phage treatment. It reveal that the phage therapy would be the potential to fill the loophole of antibiotic remedy.

*A. baumannii* is gram-negative, coccobacilli, nonmotile, glucose non-fermentative, aerobic and opportunistic pathogen, which usually resulted in outbreak of nosocomial infections, particularly in intensive care and burn units. The Extended Spectrum Drug-Resistant *A. baumannii* (XDRAB) strains used in this study were isolated from four Taiwan Medical Center. Eight lytic bacteriophages were isolated from the sewage of hospital and the best broad host spectrum phage  $\phi$ km18p was chosen for further analysis. XDRAB was lysed quickly from  $10^8$  CFU ml<sup>-1</sup> to  $10^3$  CFU ml<sup>-1</sup> in 30 min after  $\phi$ km18p inoculating. LD<sub>100</sub> XDRAB infected BALB/c mice were all survived (100%) after intra-peritoneal injection of different MOI (10, 1, 0.1) of  $\phi$ km18p ( $P \leq 0.0001$ ). Lysin of  $\phi$ km18p was extracted from culture medium by ammonia sulfate precipitation and identified by zymogram assay. The activate protein was extracted from the SDS-PAGE and was analyzed by MALDI-TOF/MS to determine the partial amino sequences. The amino sequences data was blast with  $\phi$ km18p whole genome sequences to confirm the lysin gene. Lysin gene was cloned in pET21b and over-expressed. The recombinant lysin protein with 5 ng would show clear zone on the zymography gel. Many literatures also showed that the antibiotics combine with bacteriophages or lysin proteins would perform additional efficiency on bacterium inhibition. Phage therapy still be doubted on clinical try, but it has been used about one hundred years and no side effects were reported. Before new antibiotics investigated, the phage therapy would be considered as the supplementary method.

**Key words:** phage therapy, *Acinetobacter baumannii*, lysin

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August – December 2011	(Undergraduate courses) <ol style="list-style-type: none"> <li>1. Food Engineering and Operation</li> </ol>	<ul style="list-style-type: none"> <li>- Laboratory demonstrator</li> <li>- Marking students' laboratory reports</li> </ul>

### Academic Qualifications

Year	Qualification	University	Dissertation
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July 2006 – May 2009	<b>B. Sc. (Hons) Biochemistry</b>	Universiti Putra Malaysia (UPM)	Effects of methanolic leaves extract of <i>Carica Papaya</i> on anti-inflammatory, antinociceptive and antioxidant activities
Dec 2009 – Apr 2013	<b>Ph.D. in Bioprocess Engineering</b>	Universiti Putra Malaysia (UPM)	Application of aqueous two-phase system on recovery of <i>Bacillus cereus</i> cyclodextrin glycosyltransferase (CGTase) and cyclodextrins (CDs)

## Extractive Disruption Of *Gordonia terrae* For Recovery Of Carotenoids With Alcohol/Salt Aqueous Biphasic System

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### ABSTRACT

Microbial carotenoids are gaining huge attention over the past decade with the increasing market demands of natural pigments. Natural plant sources of carotenoids are not sustainable because they are very susceptible to environmental changes. The downstream purification processes of the pigments often coupled with high cost and multi-steps unit operation. Therefore, aqueous biphasic system (ABS) comprised of alcohol and salt were introduced in this study for carotenoids extraction and recovery from *Gordonia terrae* fermentation. Different types of alcohols (ethanol, prop-1-ol, prop-2-ol) and salts (sulphate, citrate and phosphate) were used to develop the ABS. The effects of concentration of alcohols and salts, pH, amount of crude load, addition of additives, concentration of additives and the sonication time were evaluated for the optimum recovery yield of the carotenoids. Results showed that carotenoids partitioned to the alcohol-rich phase with a relatively high recovery at 86% using prop-1-ol and trisodium citrate system. The optimum recovery of carotenoids was obtained with 20% (w/w) 1-propanol and 20% (w/w) trisodium citrate salt of pH 9. A total of 10% (w/w) of bacterial cells was loaded into the optimum system with the addition of 4% (w/w) of NaCl and 60 mins of sonication. Extractive disruption of *Gordonia terrae* for recovery of intracellular carotenoids with an alcohol/salt ABS has been successfully demonstrated. The high water content and cost-effective one-step ABS allows the integration of extraction and separation of carotenoids from *Gordonia terrae* fermentation. Therefore, the overall production cost can be reduced with the simplification of the carotenoids recovery processes.

Keywords: carotenoid; aqueous biphasic system; extractive disruption