The 8th IEEE International Conference on
Nano/Molecular Medicine and Engineering

IEEE NANOMED 2014

Conference Program

Kaohsiung, Taiwan

9-12 Nov. 2014

Welcome Message

Welcome all of you to the 8th IEEE International Conference on Nano/Molecular Medicine and Engineering (IEEE NANOMED 2014) as held at EDA resort in Kaohsiung, Taiwan from November 9-12, 2014. IEEE NANOMED is an annual conference organized by the IEEE Nanotechnology Council, to attract together scientists, engineers, and even for medical doctors, etc.

This conference has managed to invite leading scientists to give 3 plenary talks, 4 keynote talks, and 16 invited presentations for the topic reviews and future perspectives of NANOMED fundamentals and applications. Another two special symposium are involved this time, Prof. Fei-Bin Hsiao's memorial Symposium and Cross-Strait Symposium. Two awards, best conference paper award an best student presentation award, will be raced from the selected abstracts by technical committee members. Some of full papers will be invited to be published in special issues, including Biomicrofluidics, IEEE-Transactions on NanoBioscience, Journal of Microsystem Technologies, and IEEE Nanotechnology magazine. We hope these awards and special issues of Journals can inspire more people to present their excellent research results in Nano/Molecular Medicine and Engineering fields.

Before we kick-off IEEE NANOMED 2014, we want to express our appreciativeness to every attendance who contributed your works. Without your brilliant ideas and elegant works, the conference cannot be attractive. We also want to thank our conference organizers, technical program committee members, our sponsors and the great local organizing committee members. We hope all of you can enjoy staying at EDA resort, one of sunshine city in Taiwan.
Please don't forget being ready for IEEE NANOMED 2015 at Hawaii, USA.

Your Conference General Chair,

Jeffrey Da-Jeng Yao

Professor and Director, ASME fellow
Institute of NanoEngineering and MicroSystems (iNEMS)
Department of Power Mechanical Engineering
Department of Engineering System and Science
National Tsing Hua University,
Hsinchu, Taiwan

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General Information

About E-DA World

Established by E-United Group, the world's fifth-largest steel producer, E-DA World is a new 90-hectare shopping and entertainment district in Kaohsiung, Taiwan. Other than E-DA World, the E-United Group also has a university, hotel chain, hospital, and golf club.

Occupying a large area in Dashu Town on Mt. Guanyin, E-DA World houses E-DA Outlet Mall, E-DA Theme Park as well as two upscale hotels: E-DA Skylark Hotel and Crowne Plaza. E-DA Theme Park is designed in an ancient Greek mythology style, which features three zones, including Greek Temple, Aegean Sea Village and Trojan Castle. The European designs and features are to offer all visitors an exotic European ambience in Taiwan.

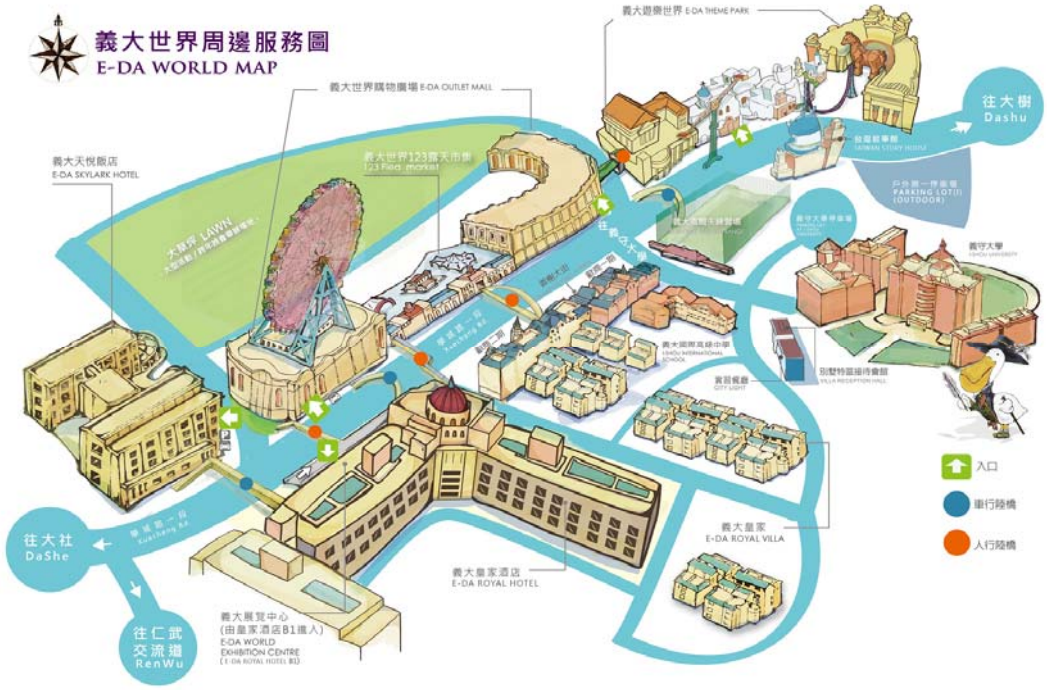
The E-DA Outlet Mall is one of the world's largest outlet malls. It houses about 300 international brands such as Calvin Klein, DKNY, Gucci, Polo by Ralph Lauren, TOD's, and Tommy Hilfiger, with an 85-metre Ferris wheel is housed on the top of the shopping mall. The Ferris wheel is composed of 40 gondolas, including a VIP car equipped with a bar, computer, TV, fridge and luxury leather seating. The sophisticated LED lighting will assure you a fabulous evening ride!

Another highlight of the E-DA World is surely the Fly Over Taiwan, which is the first panoramic flying simulator in Taiwan developed by Vekoma Rides Manufacturing. A total of 72 guests can take the ride at a time; each eight-seater platform offers 4D effects and a spherical screen plus isolating guests above or below. Two other coasters, including a customized indoor family coaster covering five floors of the shopping mall and an outdoor thrill coaster are ready to give you a memorable Taiwan travel experience!

The two upscale hotels: E-DA Skylark Hotel and Crowne Plaza within E-DA World offer elegantly decorated rooms for you to relax and unwind after a wonderful day at the E-DA World. Each beautiful room of E-DA Skylark is equipped with LCD TV, welcome fruit, separate shower and bath as well as internet access. The in-house restaurants are to serve you an ultimate dining experience with regional and international cuisines.

With all-in-one entertainments, E-DA World is where one may not want to miss when visiting Taiwan!

Reference from: http://sinotour.com/tourguide/kaohsiung/e-da-world.html



Conference Date and Venue

Date: November 09-12, 2014

Venue: E-DA Royal Hotel

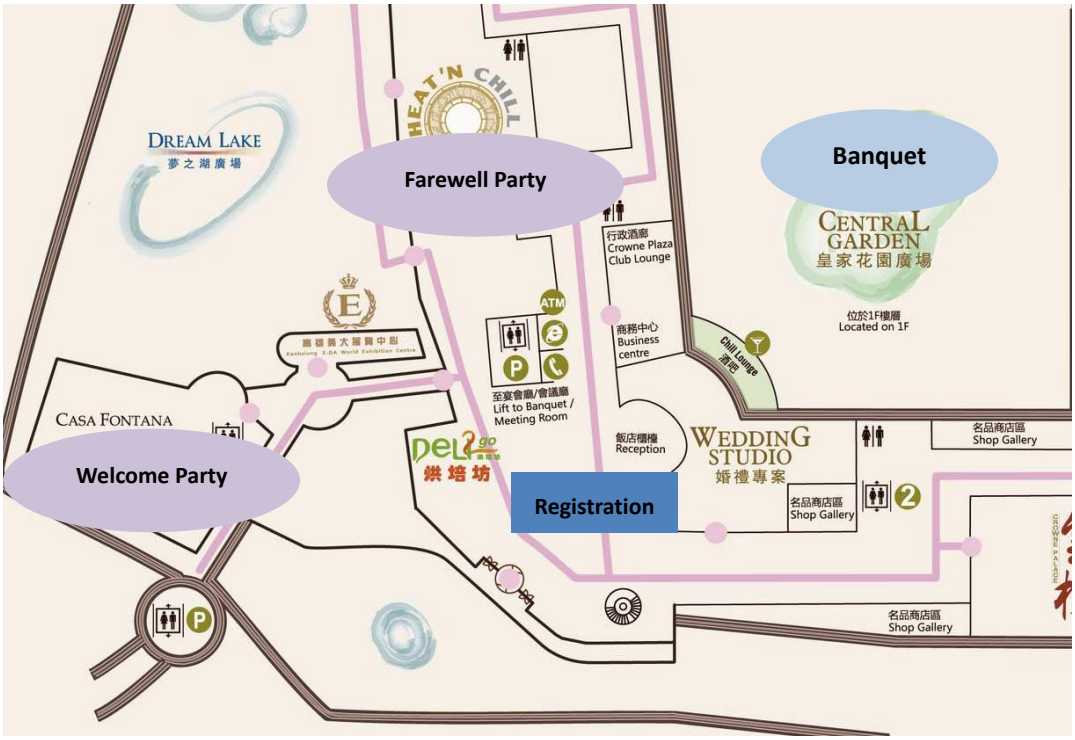
Registration Desk Open Time:

November 09 (Sunday) 15:30-19:00 at the left of lobby

November 10 (Monday) 08:30-17:00 at the left of lobby

November 11 (Tuesday) 08:30-17:00 at the 6th floor

November 12 (Wednesday) 08:30-11:30 at the 6th floor

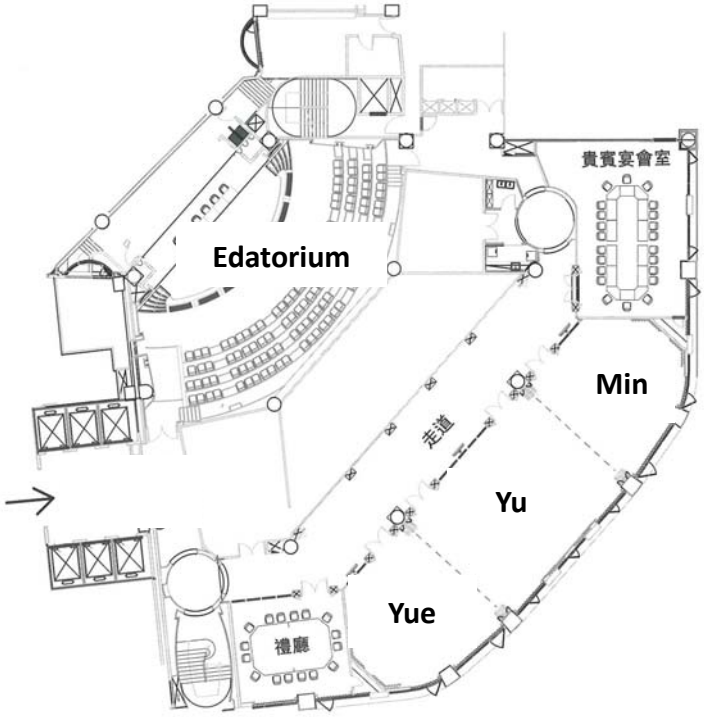


Conference Events

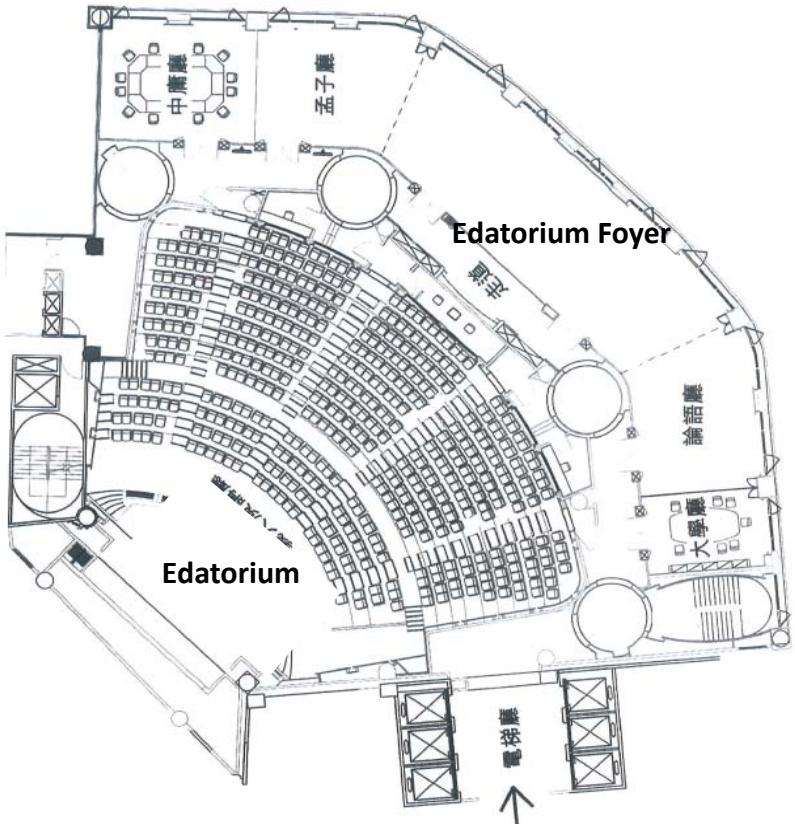
Welcome party	Sunday, 18:00-21:00 at Casa Fontana (LB Floor)
VIP Dinner (by invitation)	Monday, 18:00-21:00 at the 3rd Floor
Banquet	Tuesday, 18:00-21:00 at the Central Garden (1st Floor)
Farewell Party	Wednesday, 12:30-13:30 at the Heat'N Chill (LB Floor)

Venue Floor Plan (E-DA Royal Hotel)

The 6th Floor



The 7th Floor



Content

Plenary & Keynote Sessions

Venue: 6F Edatorium	
November 10 (Monday)	
09:10-10:10	**Plenary Talk I: Prof. Chih-Ming Ho** **University of California, Los Angeles, USA** Title: *Phenotypic Personalized Medicine* **Chair: Prof.** Jeff Wang
10:30-11:10	**Keynote Talk I: Prof. Yu-Hwa Lo** **University of California at San Diego (UCSD), USA** Title: *Point-of-care biomedical devices for 21th century healthcare* **Chair:** Prof. Jeff Wang
November 11 (Tuesday)	
08:30-09:30	**Plenary Talk II: Prof. Tao-shih Hsieh** **Institute of Cellular and Organismic Biology** **Academia Sinica, Taiwan** Title: *DNA Topoisomerases as DNA Nanomachines and Targets for Anticancer Drugs* **Chair:** Prof. Chao-Min Cheng
09:30-10:10	**Keynote Talk II: Prof. Chayong James Yang** **Xiamen University, China** Title: *Evolution of Functional Nucleic Acid Probes for Biomedicine* **Chair:** Prof. Yu-Lin Wang
November 12 (Wednesday)	
08:30-09:30	**Plenary Talk III: Prof. Hiroyuki Fujita** **The University of Tokyo, Japan** Title: *Bio-Conjugated MEMS for Progress in Medicine* **Chair:** Prof. Da-Jeng Yao
09:30-10:10	**Keynote Talk III: Prof. Hsing-Wen Sung** **National Tsing Hua University, Taiwan** Title: *Bubble-Generating Carrier Systems for Localized Controlled Release* **Chair:** Prof. Che-Hsin Lin
10:30-11:10	**Keynote Talk IV: Prof. Yan-Yi Huang** **Peking University, China** Title: *Nonlinear Optical Microscopy of Bioorthogonal Molecular Labels and Nanomaterials in Living Cells* **Chair:** Prof. Che-Hsin Lin

Plenary Session Invited Talk I

Phenotypic Personalized Medicine

Prof. Chih-Ming Ho

Department of Bioengineering, UCLA, Los Angeles, 90095

Department of Mechanical and Aerospace Engineering, UCLA, Los Angeles, 90095

Abstract

In human disease, many molecular assemblies and pathways in the cellular network behave and interact aberrantly compared with how they act in a healthy state. Intricate cellular functions emerge from mutual interactions of a collection of signaling complexes and difficult to address by studying individual cellular components in isolation. The cellular network changes dynamically as it is subjected to external stimulations. The resultant responses of the bio-system are often not transparent as the result of this innate complexity. The most effective way to handle a problem of the magnitude and complexity as a human disease is to attack it on many fronts, such as by using combinatorial drug therapies. A multidisciplinary paradigm shift concept Feedback System Control (FSC) technology [1, 2, 3] has been developed and can efficiently handle the agile adaptability of biological systems toward environmental stimuli. FSC can provide unprecedented control and insight into the dynamic nature of cellular behavior to enable directed cellular phenotypic and genotypic outcomes for transformative applications in personalized medicine.

References

1. Wong, P.K, Yu, F., Shahangian A., Cheng, G., Sun, R. and Ho, C.M., "Closed-Loop Control of Cellular Functions Using Combinatory Drugs Guided by a Stochastic Search Algorithm", Proceeding of National Academy of Science, Vol. 105, No.13 pp. 5105-5110, 2008
2. Ho, D. and Ho, C.M., "System Control-Mediated Drug Delivery Towards Complex Systems via Nanodiamond Carriers", International Journal of Smart and Nano Materials, v. 1. no.1 p,70-81, 2010
3. Wang, H., Silva, A., and Ho, C.M., "When Medicine Meets Engineering - Paradigm Shifts in Diagnostics and Therapeutics", Diagnostics, Vol. 3, pp. 126-154, 2013

CV

Dr. Chih-Ming Ho received his Ph.D. from The Johns Hopkins University and holds the Ben Rich-Lockheed Martin Professor in the UCLA School of Engineering. He served as the UCLA Associate Vice Chancellor for Research from 2001-2005. Dr. Ho specializes in microfluidics, bio system technologies and turbulence. He is ranked by ISI as one of the top 250 most cited researchers worldwide in the entire engineering category. In 1997, Dr. Ho was inducted as a member of the National Academy of Engineering. In the next year, he was elected as an Academician of Academia Sinica. Dr. Ho holds ten honorary professorships. He has delivered 22 named distinguished lectures and presented 150 plenary/keynote talks in international conferences. Dr. Ho was elected Fellow of the American Physical Society, American Institute for Medical and Biological Engineering as well as American Institute of Aeronautics and Astronautics.

Plenary Session Invited Talk II

DNA Topoisomerases as DNA Nanomachines and Targets for Anticancer Drugs.

Prof. Tao-shih Hsieh

Institute of Cellular and Organismic Biology, Academia Sinica, Taipei, Taiwan

Abstract

The well-known structure of DNA double helix provides an elegant mechanistic basis for storage and transmission of genetic information. However, the unwinding and rewinding of the duplex during the processes of DNA transactions can lead to topological entanglements that result in genome instability if left unresolved. Many other processes during DNA transactions including helical tracking and coiling of DNA to form higher order structures can also lead to topological complexities that are potentially deleterious to cells. DNA topoisomerases are nature's tools to resolve the problems of DNA entanglements by enabling topological transformations, thus regulating the structures of DNA/chromosomes and their associated cellular functions. The importance of these enzymes is also evidenced by the fact that they are ubiquitous in nature and their impairment due to genetic mutations results in deleterious effects including lethality in many organisms.

Topoisomerases tackle these seemingly complex problems by utilizing a simple yet elegant chemistry of reversible transesterification reactions. The active site tyrosine in these enzymes functions as a nucleophile to generate a transient break serving as DNA gate through which all topological transformations can occur. Our laboratory has generated fluorescence-labeled DNA substrate so that we can monitor the strand break and gate opening by topoisomerase using either single molecules measurements or under bulk conditions. These optical approaches to examine the steps in manipulating DNA structures by the enzyme have allowed us to design a facile high through-put screening platform for identifying potential anticancer drugs targeting DNA topoisomerases.

CV

Dr. Tao-shih Hsieh is Distinguished Research Fellow and Director, Institute of Cellular and Organismic Biology, Academia Sinica, Nankang, Taiwan. He is also Adjunct Professor of Chemistry, National Taiwan University, and Professor of Biochemistry Emeritus, Duke University, USA. Dr. Hsieh grew up and received his formative education in Tainan, Taiwan. He has devoted his effort to the research of fundamental questions in chromatin structure and functions. He has focused his efforts to investigating the mechanism of DNA topoisomerases and their functions in chromatin dynamics. His work characterized biochemically and biophysically eukaryotic type II DNA topoisomerases from human and Drosophila, providing a mechanistic basis for the induction of DNA breaks by many clinically useful anticancer drugs. He is Academician of the Academia Sinica, and Fellow in TWAS (The World Academy of Sciences), and among others, he received the American Cancer Society Junior Faculty Research Award, and served on many advisory boards including US NIH Molecular Biology and Molecular Genetics Study Sections.

Plenary Session Invited Talk III

Bio-Conjugated MEMS for Progress in Medicine

Prof. Hiroyuki Fujita

CIRMM, Institute of Industrial Science, The University of Tokyo,

4-6-1 Komaba, Meguro-ku, Tokyo, JAPAN

Abstract

The advance in micromachining technology has miniaturized the feature size of MEMS from micrometers to a few tens of nanometers and also widened the varieties of materials from metals and semiconductors to polymers and bio materials. This opens the way to handle and combine biological molecules and cells in MEMS. The simplest class of such bio-conjugated MEMS is micromachined tools for bio molecular/cellular detection and measurement. MEMS sensors for bio molecular detection, ultra-small chambers for single molecular/cellular measurement, and MEMS tweezers for bio molecular manipulation are all included in the class. The more advanced class is the heterogeneous integration of biological molecules and cells with MEMS. Microfluidic devices for three-dimensional cell culture and reconstructed bio-molecular-motor system on chip are in this class. In my talk, I will first introduce this concept and related research. Then I will give you some of our activities on bio-conjugated MEMS which are intended to contribute the progress in medicine. The first is silicon nano tweezers for capturing, handling and characterizing DNA. The damages in DNA molecules by radiation or chemicals can be in-situ monitored by the tweezers; this may help improving cancer radiotherapy and chemotherapy. The second is an on-chip-reconstructed bio-molecular-motor system, i.e. a microtubule-kinesin system, for the detection of microtubule-associate-proteins (MAPs). The measurement of MAP attachment capability to microtubules may lead to the early diagnosis of neurodegenerative disease such as Alzheimer's disease. Finally, I will show the self-organized formation of microvasculatures in engineered three-dimensional microstructures that allow transporting fluid in cultured tissue. Angiogenesis interaction between tumors and blood vessels can be modeled.

CV

Dr. Hiroyuki Fujita received the B.S., M.S. and Ph.D. degrees from Department of Electrical Engineering of The University of Tokyo, Tokyo, Japan in 1975, 1977 and 1980, respectively.

Dr. Fujita currently engaged in the investigation of micro and nano electromechanical systems fabricated by IC-compatible processes and applications to bio and nano technology. Major research projects include MEMS-in-TEM experiment for simultaneous visualization and material property measurement of nano objects, and biomolecular characterization by using MEMS tools.He has published more than 300 papers in academic journals. He received M. Hetenyi Award of Experimental Mechanics from the Society for Experimental Mechanics in 1986, Chevalier de l'Ordre des Palmes Academiques from Government of France in 2001, The Prize for Science and Technology in Research Category from Japanese Ministry of Education, Culture, Sports, Science and Technology, Outstanding Achievement Award from The Institute of Electrical Engineers of Japan in 2005, and The Yamazaki-Teiichi Prize from Foundation for Promotion of Material Science and Technology of Japan in 2013.

Keynote Session Invited Talk I

Point-of-care Biomedical Devices for 21th Century Healthcare

Prof. Yu-Hwa Lo

Department of Electrical and Computer Engineering,

University of California at San Diego (UCSD), USA

Abstract

With an aging population, the cost of health care has increased substantially over the years. Today nearly 3 trillion dollars are spent in the United States each year, and it is imperative that we keep the climbing health care expense under control while raising the quality and efficiency of the health care. Point of care is a promising path to meet such goals because it promises timely, personal, and cost effective diagnosis and treatments with improved patient outcomes. However, most of today's point-of-care devices have traded quality and performance for cost and speed. As a result, the clinical utility of today's point-of-care devices has been seriously limited. In this presentation, we will discuss the challenges and potential solutions for new generation biomedical devices for point-of-care applications. These devices will be built upon a lab-on-a-chip platform that integrates many technologies including microfluidics, photonics, nanotechnologies, and electronics. They will also leverage from the prevailing mobile devices for enhanced portability, connectivity, and usability. A few examples of such point-of-care devices for disease diagnosis and health monitoring will be discussed.

CV

Dr. Yu-Hwa Lo is professor at Department of Electrical and Computer Engineering, University of California at San Diego (UCSD), USA. Professor Yu-Hwa Lo received his Ph.D in Electrical Engineering from UC Berkeley in 1987. He worked at Bellcore as a technical staff member from 1988-1990, and became an assistant and then associate professor of Cornell University from 1991 to 1999. He became a professor of UCSD in 1999 and has been the director of the Nano3 Facility (Nanoscience, Nanoengineering, and Nanomedicine) since 2005. Currently his research interests are in microfluidics and optofluidics, lab-on-a-chip devices for biomedicine, bio-imaging, nanophotonics, and semiconductor single-photon detectors. He has published over 400 papers, 10 book chapters and been awarded 30 patents. His inventions have been licensed to and commercialized by semiconductor, optoelectronic, and biotech industries, yielding over $4B product revenues and leading to several startup companies. He has served a number of panels for US government and been a member of the scientific advisory board of several biotech companies. He has received NASA Innovation Award, the Commercialization of Advanced Technology Award, and a couple of best paper awards and teaching awards. He is a fellow of the Optical Society of America and the IEEE.

Keynote Session Invited Talk II

Evolution of Functional Nucleic Acid Probes for Biomedicine

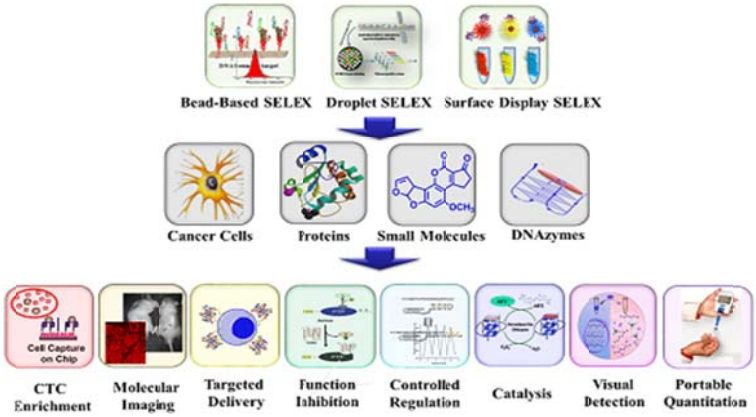
Prof. Chaoyong James Yang

Department of Chemical Biology, Xiamen University,

Xiamen, 361005, China

Abstract

Over the last two decades, numerous functional nucleic acid probes including aptamers, riboswitches, ribozymes, and DNazymes have been discovered. The emergence of these functional nucleic acid probes has greatly changed our view on the role of nucleic acids in life processes-they are not only the carriers of genetic information, they can also function as enzymes and receptors. More importantly, these functional nucleic acid probes have found their wide applications in biomedicine including biomolecule sensing, biomarker discovery, drug screening, target delivery, gene regulation and disease diagnosis. In this talk, I will present some recent progress from our group on functional nucleic acid probe selection, optimization, structure modification and their applications in bioanalysis and biomedicine.



CV

Dr. Chaoyong James Yang received his B.S. (1998) and M. S. (2001) from Xiamen University, China. He studied for this PhD in the Department of Chemistry at the University of Florida from 2001 to 2006. After completing his PhD dissertation, he conducted his postdoctoral research at the University of California, Berkeley. In 2008, he became a faculty member of Xiamen University and now is the Lu Jiaxi Professor of Chemistry in the Department of Chemical Biology at Xiamen University. He won a Chinese Government Award for Outstanding Students Abroad (2005) and is the recipient of American Chemical Society DAC Graduate Fellowship in 2005, CAPA Distinguished Faculty Award in 2012 and National Outstanding Young Investigator Award in 2013. His current research is particularly focused on molecular engineering, molecular recognition, high throughput evolution, single cell analysis and microfluidics.

Keynote Session Invited Talk III

Bubble-Generating Carrier Systems for Localized Controlled Release

Prof. Hsing-Wen Sung

Department of Chemical Engineering, National Tsing Hua University, Hsinchu, Taiwan

Abstract

In this work, two bubble-generating agents, ammonium bicarbonate (ABC) and sodium bicarbonate (SBC) that can generate CO_2 bubbles, are separately encapsulated in carrier systems for actively triggering drug release locally. Widely recognized for their ability to increase intratumoral accumulation, PEGylated liposomes are employed as stable vehicles for carrying doxorubicin (DOX; Doxil®). However, the slow and passive drug release from the Doxil® formulation significantly inhibits its antitumor efficacy. To resolve this problem, our group develops a thermoresponsive liposomal formulation. As the key component of this liposomal formulation, its encapsulated ABC creates the transmembrane gradient needed for a highly efficient DOX encapsulation. Moreover, at a high temperature of roughly 42°C, ABC decomposition generates CO_2 bubbles, subsequently creating permeable defects in the lipid bilayer and ultimately inducing a rapid DOX release to instantly increase the drug concentration locally. The feasibility of using this thermoresponsive bubble-generating liposomal system for tumor-specific chemotherapy under mild hyperthermia is investigated. The in vitro drug-release profiles are quantified from test liposomes under mild hyperthermia conditions. Their in vivo biodistribution, pharmacokinetics, drug accumulation, and antitumor activity against locally heated tumors are examined as well. We also develop hollow microspheres (HMs) that can deliver anticancer drug into tumor cells and quickly release the drug in an acidic organelle such as lysosome. The HMs are fabricated from PLGA using a double-emulsion method, with the aqueous core containing DOX and SBC. In acidic environments, SBC reacts with the acid to quickly generate CO_2 bubbles, triggering the shell of the HMs to disrupt, thereby quickly releasing DOX locally and causing the cells to die. These highly stimuli-responsive carrier systems contribute to efforts to establish effective tumor-selective chemotherapy.

CV

Dr. Hsing-Wen Sung is a Tsing Hua Chair Professor, Department of Chemical Engineering and the Director of Institute of Biomedical Engineering, National Tisng Hua University. He received his PhD degree from Department of Chemical Engineering and Biomedical Engineering Center, Georgia Institute of Technology in May 1988. His research interests are nanobiomaterials, nanomedicine, drug/gene delivery, and tissue engineering. Professor Sung has received numerous awards such as Fellow of American Institute for Medical and Biological Engineering, Fellow of International Union of Societies for Biomaterials Science and Engineering, Academician of Asia Pacific Academy of Materials, Ho Chin Tui Outstanding Research Award, National Science Council Outstanding Research Award, and Professor Tsai-The Lai Award. He has published 220 scientific papers and received 70 international patents.

Keynote Session Invited Talk IV

Nonlinear Optical Microscopy of Bioorthogonal Molecular Labels and Nanomaterials in Living Cells

Prof. Yanyi Huang

Materials Science and Engineering, College of Engineering, Peking University

and Biodynamic Optical Imaging Center (BIOPIC), Peking University

Beijing 100871, China

Abstract

Quantitative single-cell analysis enables the characterization of cellular systems with a level of detail that cannot be achieved with ensemble measurement. Nonlinear optical microscopy exploits light−matter inter- actions that are intrinsic to, and often specific to, the unique optical properties of chemical compounds and structures. I will explore quantitative cellular imaging applications with nonlinear microscopy techniques, majorly the coherent Raman scattering and transient absorption. These techniques have demonstrated powerful applications in tissue imaging and in vivo diagnostics in which many cells and cell types must be interrogated in unison.

One strategy to achieve high specificity while avoiding large fluorescent molecule labels is to label proteins or cellular components of interest with small tags which have distinct vibrational signatures. Deuterium, alkyne, and azide, for example, all display a Raman peak in the “silent region” of the spectrum, a spectral region in which cells typically do not have any significant Raman peaks. With the use of small chemical tags, coherent Raman scattering offers enhanced chemical specificity with minimal perturbation of the system, which is important in many current biological research endeavors.

We also applied the transient absorption microscopy to image nanodiamonds and gold nanorods in live cells. The transient absorption signals were monitored through lock-in amplification. This provides a new way of observing nanomaterials with no need of fluorescent modification, and with no interference from background autofluorescence.

CV

Dr. Yanyi Huang received his B.S. (Chemistry) and Sc.D. (Inorganic Chemistry) from Peking University in 1997 and 2002, respectively. He worked at Caltech with Amnon Yariv (Postdoc in Applied Physics) and then moved to Stanford with Stephen Quake (Postdoc in Bioengineering). He joined Peking University faculty in 2006. He is Professor in College of Engineering, and Principal Investigator and Associate Director of Biodynamic Optical Imaging Center (BIOPIC). His current research interests are single cell studies with microfluidics, label-free microscopy, and high throughput sequencing.

Invited Session I: Frontier Technology in NANOMED Field

Chair: Prof. Somin Lee

Venue: 6F Edatorium
November 10 (Monday) 11:10 - 12:30
(192) Semiconductor Electronic Label-Free Assay (SELFA) *Chi On Chui** *University of California at Los Angeles, USA*
(193) Ultrahigh Speed Optofluidics for Single Cell Manipulation and Analysis *Eric Pei-Yu Chiou ** *University of California at Los Angeles, USA*
(194) Nanomedical approaches to effective cancer stem cell treatment *X Wang, W Hou, LN Abdullah, E Osawa, JM Bishop, D Ho, EK Chow** *National University of Singapore, Singapore*
(197) Reversible aptamer-Au plasmon rulers for single-molecule detection of secreted matrix metalloproteinases *Somin Eunice Lee** *University of Michigan, USA*
(208) A nanoengineered systems approach for probing collective cell migration *Pak Kin Wong** *University of Arizona, USA*
(211) Molecular imaging: a primer for interventionalists and imagers *Michael D. Kuo** *University of California at Los Angeles, USA*

Best Conference Paper

Chair: Prof. Pei-Yu Chiou

Venue: 6F Yu Room
November 10 (Monday) 13:30-15:10
(102) Protein Preconcentration Using Nanofissures Generated by the Self-Assembly of Nanoparticles Assisted by Electric Breakdown at Junction Gaps *Chun-Ping Jen*, Kuan-Fu Chen, Tsung-Hsiang Chiang and Yu-Hung Chen* *National Chung Cheng University, Taiwan*
(133) Microsphere Based Bi-Phasic Osteochondral Scaffolds for Tissue Engineering *Shalumon K T, Chialin Sheu, Yi-Teng Fong and Jyh-Ping Chen** *Chang Gung University, Taiwan*
(159) A gold nanorod-locked nucleic acid approach for revealing single cell gene expression dynamics in tissue morphogenesis *Shue Wang, Reza Riahi, Donna Zhang and Pak Wong* *University of Arizona, USA*
(185) Integrated Microfluidic Reactor Array for Large-Scale Drug Screening *Chao-Jyun Huang, Kelly Hau, Hao-Chen Chang, Chia-Hsien Hsu,* *Ching-Hua Wang and Jing-Tang Yang* *Chang Gung University, Taiwan*
(195) Determination of Cell Mass and Density using Digital Electric Field *Yuliang Zhao, Lai Hok Sum Sam, Guanglie Zhang*, Gwo-Bin Lee and Wen J. Li* *City University of Hong Kong, Hong Kong*

Best Student Conference Paper

Chair: Prof. Pei-Yu Chiou

Venue: 6F Yu Room
November 10 (Monday) 15:30-17:00
(105) Multiple Enzyme-doped Thread-based Microfluidic System for Blood Urea nitrogen and Glucose Detection in Human Whole Blood *Yu-An Yang and Che-Hsin Lin* *National SYS University, Taiwan*
(119) A Hybrid Electrokinetic Bioprocessor for Single Cell Antimicrobial Susceptibility Testing *Yi Lu, Tingting Liu and Pak Kin Wong* *University of Arizona, USA*
(150) Food Quality Monitors: Rapid Detection of Biogenic Amine Odorants with Inkjet-Paper-Based Sensors Prepared by Reversal Nanoimprint Technique *Shih-Yu Tseng and Dehui Wan** *National Tsing Hua University, Taiwan*
(162) Enrichment of Neural Stem Cells from Dissociated Neurospheres using a Microfluidic Chip *Ching-Hui Lin, Yi-Hsing Hsiao, Don-Ching Lee, Ing-Ming Chiu, Chih-Chen Chen and Chia_Hsien Hsu* *National Chung Hsing University, Taiwan*
(184) Control the growth direction of neuroblastoma B35 using a micro/nano hybrid patterned chitosan scaffold *Ying-Ting Lin, Ching-Wen Li and Gou-Jen Wang* *National Chung Hsing University, Taiwan*

Microfluidic Systemsand Platforms

Chair: Prof. Shih-Kang Fan

Venue: 6F Ming Room
November 10 (Monday) 13:30-15:10
(148) To Enhance Sperm Motility Sorting Efficiency by Utilizing Microfluidic Chip *Po-Wei Huang and Da-Jeng Yao* *National Tsing Hua University, Taiwan*
(151) Electrical Properties Measurement of the EWOD Microfluidic Device Based on LPCVD Si3N4 Dielectric Layer *Hsien-Hua Shen and Da-Jeng Yao* *National Tsing Hua University, Taiwan*
(158) Flow-through Immunosensing Using Porous Monoliths and Gold Nanoparticles on a Polymer Chip *Shao-Hsuan Chuag, Jun-You Chen and Chien-Fu Chen* *National Chung Hsing University, Taiwan*
(169) Synthesis and Performance of Silver Nanofliud in Absorber/Reciver of Parabolic Trough collector *Dnyaneshwar Waghole* *Goveernment college of Engineering Aurangabad, India*
(189) A Portable Microfluidic Whole Cell Biosensor for Environmental Monitoring *Dominique Macias, Yi Lu, Zachary Dean and Pak Kin Wong* *University of Arizona, USA*
(190) Evaporation Behavior of Sessile Nanofluid Droplet Affected by Base Solution *Xin Zhong and Fei Duan* *Nanyang Technological University, Singapore*

Characterization and Measurement Systems

Chair: Prof. Kin Fong Lei

Venue: 6F Ming Room
November 10 (Monday) 15:30-17:00
(117) Centrifugal Filter Device for Rare Immue-binding Cell Detection *Yu-An Chen, Chih-Chung Chen and Da-Jeng Yao* *National Tsing Hua University, Taiwan*
(118) Development of High Sensitivity Cholesterol Sensor based on Ultra-low Sensitivity of H2O2 Sensor *Chia Ho Chu, Kuan Chung Fang, Chen Pin Hsu, Yen Wen Kang, Jung Ying Fang, Jia Feng Xiao, Yi Ting Chen and Yu Lin Wang* *National Tsing Hua University, Taiwan*
(142) Development of Low Fluorescence Thick Photoresist for High Aspect Ratio Microstructures in Bio Application *Hidetaka Tamai, Katsuya Maruo, Hidetoshi Kotera and Takaaki Suzuki* *Kagawa University, Japan*
(146) Capacitive Current Induced by Double-Strand DNA With Doxorubicin for Biosensor *Chen-Pin Hsu, Yu-Fen Huang and Yu-Lin Wang** *National Tsing Hua University, Taiwan*
(153) Real-time Monitoring of the Formation of Cancer Cell Colony in Microfluidic Device *Zong-Ming Wu and Kin Fong Lei* *Chang Gung University, Taiwan*
(173) Apparel Smart Diagnostic Module Design & Implement on Breast Cancer in UWB-MI Diagnosis System *Xin Zhong and Fei Duan* *Anna University, India*

Invited Session II: Low-cost Point-of-Care Diagnostics

Chair: Prof. Chao-Min Cheng

Venue: 6F Edatorium
November 11 (Tuesday) 10:30 - 12:00
(113) Two Nanomedical Innovations of Microliter-Scale Diagnostic Tools in Ophthalmology: Paper-Based ELISA *Min-Yen Hsu, Chihchen Chen and Chao-Min Cheng* *National Tsing Hua University, Taiwan*
(123) Paper-based Diagnostic Devices for Evaluating Mammalian Sperm Motility *Wen-Qian Li, Koji Matsuura, Kuan-Hung Chen, Yuka Asano, Keiji Naruse and Chao-Min Cheng* *Okayama University, Japan*
(125) Three-Dimensional Patterned Paper Immunoassays *Wen-Qian Li, Koji Matsuura, Kuan-Hung Chen, Yuka Asano, Keiji Naruse and Chao-Min Cheng* *Tufts University, USA*
(160) A Paper / Pdms Hybrid Microfluidic Biochip For Instrument-Free Infectious *Maowei Dou, Delfina Dominguez and XiuJun (James) Li* *Michigan State University, USA*
(210) Studying Cancer Cell Adhesion Using AFM based Nanorogot *Zhiyong Sun, Ruiguo Yang, Bixi Zeng, Ning Xi, Bo Song, Lina Hao, Liangliang Chen, and Marc D. Bassoni* *Michigan State University, USA*

Innovative Micro/Nano Technologies

Chair: Prof. Pak Wong

Venue: 6F Yu Room
November 11 (Tuesday) 13:30 - 15:10
(111) Synthesis of Silver Nanoparticles-Chitosan Composite Particles *Lung-Shuo Wang, Chih-Yu Wang, Chih-Hui Yang, Chen-Ling Hsieh, Chi-Yen Shen, Jia-Jung Wang and Keng-Shiang Huang* *I-Shou University, Taiwan*
(131) Differential profiles of β-actin and HSP70 gene expression during the post-irradiation wound healing process in response to gold nanorod-mediated laser thermal therapy *Yuan Xiao, Riahi Reza and Pak Wong* *University of Arizona, USA*
(164) Long-term Monitoring of the Uptake of Gold Nanorodes by Cancer Cells in a Microfluidic Device with Cell Trapping Mechanism *Hsueh-Peng Tseng, Lih-Rou Rau, Shiao-Wen Tasi, Kin Fong Lei and Jiunn-Woei Liaw* *Chang Gung University, Taiwan*
(196) Enhanced Nanoparticle Trapping by Giant Induced Dipoles *Hsin-Lung Chen, Yen-Ching Li and Hsien-Hung Wei* *National Cheng Kung University, Taiwan*
(198) Fabrication of Nanochannels with Controllable Aspect Ratios on PMMA Substrates Using Nanomechanical Probes *Cong Wu, Zhikun Zhan, Yi Li, Guanglie Zhang and Wen Jung Li* *City University of Hong Kong, Hong Kong*

Diagnostic and Detection

Chair: Prof. Sheng-Shian Li

Venue: 6F Yu Room
November 11 (Tuesday) 15:30 - 17:00
(115) Embryo formation from low sperm concentration by using dielectrophoretic force *Wei-Lun Kao, Hong-Yuan Huang, Po-Wei Huang and Da-Jeng Yao* *National Tsing Hua University, Taiwan*
(121) A Novel Resistive Sensor based on Polyaniline for Real Time Detection of Hydroxyl Radical *Indu Sarangadharan, Jung-Ying Fang, Kuan Chung Fang, Chen-Pin Hsu, Fan Ren and Yu-Lin Wang* *National Tsing Hua University, Taiwan*
(122) Design and Characterization of CMOS-MEMS Capacitive Micromachined Ultrasonic Transducers *Yi-Jen Liao, Tzu-Wen Kuo, Ming-Huang Li, Chao-Yu Chen and Sheng-Shian Li* *National Tsing Hua University, Taiwan*
(130) Pre-implantation Development of Mouse Embryos in Microwells *Yu-Hsiang Chung, Yi-Hsing Hsiao, Wei-Lun Kao, Chia-Hsien Hsu, Da-Jeng Yao and Chihchen Chen* *National Tsing Hua University, Taiwan*
(154) Single-Cell Fluorescent Detection of Notch Signaling In 3D Spheroid Cancer Invasion Models *Zachary Dean, Reza Riahi, Donna Zhang and Pak Wong* *University of Arizona, USA*
(177) Bidirectional quantum teleportation and secure direct communication via entanglement swapping *Shima Hassanpour And Monireh Houshmand* *Imam Reza International University, Iran*

Cross Strait Symposium (I)

Chair: Prof. Honglong Chang

Venue: 6F Ming Room
November 11 (Tuesday) 13:30 - 15:10
(108) Treatment of Radix Dipsaci Extract Prevents Long Bone Loss Induced by Modeled Microgravity in Hindlimb *Yinbo Niu, Yalei Pan, Chenrui Li, Xianglong Wu, Tingli Lu and Qibing Mei* *Northwestern Polytechnical University, China*
(110) Cytomechanical Investigation of Various Bone Cell Lines by Atomic Force Microscopy *Zhe Wang and Peng Shang* *Northwestern Polytechnical University, China*
(112) A Micro Flow Cytometer Prototype Using Side Scatter and Fluorescence *Wenpeng Xun, Honglong Chang, Jianguo Feng, Shuijin Hong and Weizheng Yuan* *Northwestern Polytechnical University, China*
(116) Single cell culturing by micromolding in capillaries technology coupled with cytophobic biomaterial *Fang Ye, Binghe Ma, Jie Gao, Li Xie, Chen Wei and Jin Jiang* *Northwestern Polytechnical University, China*
(144) Discussion on some technology of Electron Beam Nano-lithography *Baoqin Chen* *Chinese Academy of Sciences, China*

Cross Strait Symposium (II)

Chair: Prof. Honglong Chang

Venue: 6F Ming Room
November 11 (Tuesday) 15:30 - 17:00
(145) Investigation of Osteocyte Alignment and Flow Effect Based on Collagen-Hydroxyapatite Substrate using an integrated Microfluidic Device *Li Ren, Zhe Wang, Pengfei Yang, Lingwei Huang and Peng Shang* *Northwestern Polytechnical University, China*
(176) Electric Control Metamaterials for High-speed and High-depth Terahertz Modulation *Zhen Zhou, Lishuang Feng, Bohao Yin and Chenlong Li* *Beihang University, China*
(178) Three-Dimensional Process Simulation for DRIE-Etched Nanostructures with Controlled-Sidewall Profile *Guangyi Sun, Xin Zhao and Haixia Zhang* *Peking University, China*
(187) Investigation of osteocyte alignment and flow effect based on collagen-hydroxyapatite substrate using an integrated microfluidic device *Li Ren, Huiyun Xu, Jing Duan, Lingwei Huang and Peng Shang* *Northwestern Polytechnical University, China*

Invited Session III: Micro/Nano Exploration of Cell Electrical and Mechanical Properties

Chair: Prof. Wen J. Li

Venue: 6F Edatorium
November 12 (Wednesday) 11:10 - 12:30
(212) Micro/nano Characterization of Cells' Intrinsic Left-right Asymmetry *Ting-Hsuan Chen* *City University of Hong Kong, Hong Kong SAR*
(213) High-throughput Cell Differentiation and Quantification by Dynamic Dielectrophoretic Force Field *Guanglie Zhang* *City University of Hong Kong, Hong Kong*
(214) Enabling Mechanical Biomarkers using AFM based Nanorobot *Yuqiang Fang, Runhuai Yang, and King Wai Chiu Lai* *City University of Hong Kong, Hong Kong*
(215) Impedimetric Quantification of Cell Culture Process in Microfluidic Systems *Chao-Jyun Huang, Kelly Hau, Hao-Chen Chang, Chia-Hsien Hsu, Ching-Hua Wang and Kin Fong Lei* *Chang Gung University, Taiwan*
(216) Experimental Investigation of Thermocapillary Flows in Opto-Electrokinetics Microfluidic Chips *Fei Fei Wang, Lianqing Liu, Gwo-Bin Lee, and Wen J. Li* *City University of Hong Kong, Hong Kong*

Poster Session

Chair: Prof. Yenwen Lu

Venue: 6F Yue Room
November 12 (Wednesday) 11:10 - 12:30
(103) Optical Detection of Metastatic HeLa Cells by Scanned Laser Pico-Projection *Chih-Ling Huang, Wen-Tai Chiu, Yu-Lung Lo, Min-Hao Huang, Chin-Ho Chuang, Yu-Bin Chen*, Tung-Ting Ke, Shu-Jing Chang and Hua-Lin Wu* *Natiolnal Cheng Kung University*
(109) Preparation of Core-Shell Structure Microcapsules by Combining Droplets Electrostatic and Droplets Microfluidic Techniques *Keng-Shiang Huang* *I-Shou University, Taiwan*
(114) Layered Double Hydroxide Nanovehicles along with stratified Liposome coat as potential controlled drug release systems for Transdermal delivery of photosensitizer *Ranjith kumar Kankala, Yaswanth Kuthati, Zih-Ann Chen, Chia-Hung Lee* and Chen-Lun Liu* *National Dong Hwa Univdersity, Taiwan*
(129) Calligraphy-based Analytical Devices *Chen-Meng Kuan, Kuan-Hung Chen and Chao-Min Cheng** *National Tsing Hua University, Taiwan*
(132) Controlled Release of Doxorubicin from Folate-Conjugated Graphene Oxide in Thermo-Sensitive Hydrogel for Cancer Therapy *Yi Teng Fong, Shalumon K.T. and Jyh-Ping Chen** *Chang Gung University, Taiwan*
(134) Programmable and On-demand Drug Release using Electrical Stimulation *Yen-Tsai Yi, Ju-Yen Sun, Ying-Chih Liao and Yen-Wen Lu** *National Taiwan University, Taiwan*
(138) Lipid Bilayer Formation by Moving Magnetic Droplet with Magnetic Force *Ming-Hong Siao, Hong-Yu Lin, Cheng-Yeh Huang and Wensyang Hsu** *National Chiao Tung University, Taiwan*
(141) The Vacancy Defect in Graphene Nano-ribbons in the Presence of an External Perpendicular Magnetic Field

Somaye bahrami, Ali shhahoseini and mohamad kazem moravvej farshi
Islamic Azad University, Iran

(147) Using EWOD Device for in Vitro Fertilization of Mouse
Lung-Yuan Chung, Hsien-Hua Shen and Da-Jeng Yao
National Tsing Hua University, Taiwan

(152) An Origami based Paper Device for ELISA
Zong-Keng , Yu-Shin Chen and Chao-Min Cheng
National Tsing Hua University, Taiwan

(157) Oral Fluid Testing on Microfluidic Paper Based Analytical Devices for Driving Under the Influence of Ketamine
*Yu-Chun Yen, Yi-Ting Huang, Chung-Chun Wang and Chien-Fu Chen**
National Chung Hsing University, Taiwan

(165) Stability of Crosslinked Hyaluronic Acid Electrospun Nanofibrous Membrane for Prevention of Intra-Abdominal Adhesion
*Chia-Lin Sheu, Shalumon K T and Jyh-Ping Chen**
Chang Gung University, Taiwan

(167) Magnetic Bead Manipulations on a Digital Microfluidic Platform for Genomic DNA ExtractionMagnetic Bead Manipulations on a Digital Microfluidic Platform for Genomic DNA Extraction
Ping-Yi Hung, Pei-Shing Jiang, Erh-Fang Lee, Shih-Kang Fan and Yen-Wen Lu
National Taiwan University, Taiwan

(172) A Sub-ppm Ammonia Gas Sensor for Liver Disease Using Ultrathin InN-based Gas Sensor
Kun-Wei Kao, Kunal Kashyap, Chin-Jen Cheng, Shangjr Gwo and J. Andrew Yeh Vigor, Taiwan

(179) Development and Characterization of Sorafenib Loaded PLGA Nanoparticles for Systemic Treatment of Liver Fibrosis
Ts-Ting Lin and Yunching Chen
National Tsing Hua University, Taiwan

(180) Antibacterial Activity and Cytotoxicity of Multi-walled Carbon Nanotubes Decorated with Silver and Copper Nanoparticles
Youngmin Seo and Jonghoon Choi
Hanyang University, Korea

(181) Aptamer conjugated Mesenchymal Stem Cell Biosensor for C-reactive Protein Detection

Jangsun hwang and Jonghoon Choi

Hanyang University, Korea

(182) Novel Nanoprobe for Sensitive Detection of Francisella Tularensis

Ji-eun Kim, Sung Wook Park, Kwan Hyi Lee and Jonghoon Choi

Hanyang University, Korea

(183) Development of Alginate/Hyaluronic Acid Nanogels for The Sensitive Endoscopic Diagnosis of Cancerous Lesions

Yoon Jeong, Woojun Kim, Dayoung Yoon, Boa Song, Jonghoon Choi and Kangwon Lee

Hanyang University, Korea

(186) Development of a Miniaturized Multi-channel Real-time Isothermal DNA Amplification Platform

Ting-Hsuan Chen, Ruey-Shyan Hong, Ping-Jung Wu, Kuo-Hsing Wen, Su-Jan Lee, Chih-Hsiang Sung, Pei-Shin Jiang, Ting-Shou Chen and Jane SC Tsai

ITRI, Taiwan

(209) Fabrication of Optimal Silver Nanowires Film with Polyol Process

Cheng-Tang Pan, T.L. Yang, I.C. Wu, Y.C. Chen, K.H. Hung, Y.R. Lin, H.L. Huang, C. F. Liu and S.W. Mao

National Sun Yat-Sen University, Taiwan