The 10th Emerging Information and Technology Conference
(EITC-2010)

Research, Innovation and Commercialization

Conference Proceedings

James H. Clark Center, Stanford University
Stanford, CA, U.S.A.

Saturday - Sunday, August 14th - 15th, 2010

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Welcome Message

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Conference Themes

"Research, Innovation and Commercialization"

- **Research** - to conduct pioneering research in key areas of emerging technologies and services,

- **Innovation** - to make fundamental discoveries, generate innovative solutions to practical problems,

- **Commercialization** - to develop new technologies for commercial application.

The EITC-2010 consists of following four workshops:

- **Workshop 1 (W1)**: New Energy, Environment, Sustainability

- **Workshop 2 (W2)**: Bioinformatics, Biotechnology, Medicine, Public Health

- **Workshop 3 (W3)**: Advanced Materials Science, Nanotechnology, MEMS

- **Workshop 4 (W4)**: C4I (Content, Computer, Communication, Consumer Electronics, and Integration), SoC (System-on-a-Chip)

Planning Committee

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Jerry K. H. Chen	陳寬享	Investment & Trade Office, TECRO in the U.S.
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Program Committee

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Ko-Yang Wang	王可言	IBM Global Business Services
Liang-Gee Chen	陳良基	National Taiwan University

Workshop Track/Session Chairs (*: workshop co-chair)

Workshop 1: New Energy, Environment and Sustainability

***Che-Wun Hong**	洪哲文	**National Tsing Hua University**
***Wei-Jen Lee**	李偉仁	**University of Texas at Arlington**
***Grace Lin**	林蔚君	**Columbia University**
Peter Mei	梅家駒	21-Century Silicon, Inc.
Kan-Lin Hsueh	薛康琳	National United University
Ko-Yang Wang	王可言	IBM Global Business Service

Workshop 2: Medicine, and Public Health, Biotechnology, Bioinformatics

***Li-San Wang**	王立三	**University of Pennsylvania**
***Yi-Hsiang (Sean) Hsu**	許益祥	**Harvard University**
Hong-Yo Kang	康宏佑	Chang Gung University
Wen-Yih Issac Tseng	曾文毅	National Taiwan University
Jung-Ying Tzeng	曾仲瑩	North Carolina State University

Workshop 3: New Materials Science, Nanotechnology, NEMS

***Chih-Hung (Alex) Chang**	張至弘	**Oregon State University**
***Darrin J. Young**	楊駿	**University of Utah**
Lei Kerr	柯蕾	Miami University
Hsuan-Liang (Kevin) Liu	劉宣良	National Taipei University of Technology
Kuo-Lun Allan Tung	童國倫	Chung-Yuan University
Kuan-Jiuh Lin	林寬鋸	National Chung-Hsing University
Ching-Fuh Lin	林清富	National Taiwan University
Hsien-Hung Wei	魏憲鴻	National Cheng-Kung University

Workshop 4: SoC (System-on-a-Chip), C4I (Content, Computer, Communications, Consumer Electronics, and Integration)

***Howard Chen**	陳浩	**IBM T. J. Watson Research Center**

***Liang-Gee Chen**	陳良基	**National Taiwan University**
Scott Chun-Yang Chen	陳俊仰	Facebook Inc.
Sao-Jie Chen	陳少傑	National Taiwan University
Kea-Tiong Samuel Tang	鄭桂忠	National Tsing Hua University
Yung-Hsiang Lu	陸永祥	Purdue University
Jiun-In Guo	郭峻因	National Chung-Cheng University
Wei Hwang	黃威	National Chiao-Tung University
Chen-Yi Lee	李鎮宜	National Chiao-Tung University

Conference Manager

Wilson Wei-Cheng Lee	李偉誠	Stanford University

Publication

Conference Program	Howard Chen	陳浩	IBM T. J. Watson Research Center
Conference Proceedings	Hsi-Pin Ma	馬席彬	National Tsing Hua University

Conference Treasurer

Chinese Institute of Engineers

Local Management (Student Volunteers)

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Yi Hsuan Lin	林宜宣	Stanford University
Po-Chun Wu	吳柏均	National Taiwan University
Tsung-Ting Hsieh	謝宗廷	National Taiwan University
Benjamin Mei	梅凱頌	Stanford University

General Inquiries & Pre-registration

Investment & Trade Office, TECRO in the U.S.
(駐美投資貿易服務處)
Tel: 212-752-2340
E-mail: eitc.usa@hotmail.com

On-Site Registration

Stanford Taiwanese Student Association 史丹佛大學台灣同學會

Web Development

Wei-Cheng Wong	翁唯城	University of Texas at Dallas
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Co-organizing Associations

Organizing Associations

Stanford Taiwanese Student Association
Stanford Alumni Association, Taiwan

Co-organizing Associations

Chinese Institute of Engineers - GNYC
Science & Technology Division, Taipei Economic & Cultural Representative Office in the U.S.
Investment & Trade Office, Taipei Economic & Cultural Representative Office in the U.S.
Cultural Division, Taipei Economic & Cultural Office in San Francisco

Conference Program

Day 1 (Saturday, August 14th, 2010)

8/14th (Sat) 8:00 am - 6:00 pm : Registration

8/14th (Sat) 8:30 am - 9:20 am : Opening Session
Room: Auditorium

Chair 

Professor Lin-Shan Lee (lslee@cc.ee.ntu.edu.tw)
Dean, College of Electrical Engineering and Computer Science, National Taiwan University
台灣大學電機資訊學院院長 李琳山 教授

Mr. Thomas J. C. Chen (tecosf@sbcglobal.net)
Director General, Taipei Economic and Cultural Office in San Francisco
駐舊金山台北經濟文化辦事處 陳經銓 處長

Professor Ching H. Wang (wangch@stanford.edu)
Director, Pediatric Neuromuscular Clinic, Lucile Packard Children's Hospital, Stanford University
史丹佛大學醫學院神經內科 汪慶賢 教授

Ms. Josephine M. Cheng (chengjm@us.ibm.com)
IBM Fellow and Vice President, IBM Almaden Research Center
國際商業機器公司副總裁 鄭妙勤 女士

Professor Lin-Shan Lee (lslee@cc.ee.ntu.edu.tw)
Dean, College of Electrical Engineering and Computer Science, National Taiwan University
台灣大學電機資訊學院院長 李琳山 教授

8/14th (Sat) 9:20 am - 10:40 am : Technical Session D1-W1-T1: Energy, Environment and Sustainability
Room: S363

Chair 

Professor Che-Wun Hong (cwhong@pme.nthu.edu.tw)
Department of Power Mechanical Engineering, National Tsing-Hua University
清華大學動力機械工程學系 洪哲文 教授

"Efficient data management for green data centers"
Dr. Hui-I Hsiao (hhsiao@almaden.ibm.com)
Program Director, Technology Innovation for Emerging Market, IBM Almaden Research Center
國際商業機器公司研究中心新興市場技術創新計畫主持人 蕭暉議 博士

"Integration of renewable energy "
Mr. Rick Geiger (rggeiger@cisco.com)
Solutions Director, Utilities and Smart Grid, Business Transformation Team, Cisco Systems
思科系統公司公用事業智能電網解決方案總監 蓋格 先生

"Enabling technologies for customer demand and budget management in the deregulated environment"
Professor Wei-Jen Lee (wlee@uta.edu)
Director, Energy Systems Research Center, the University of Texas at Arlington
德州大學阿靈頓分校能源系統研究中心主任 李偉仁 教授

8/14th (Sat) 9:20 am - 10:40 am : Technical Session D1-W2-T1: Computational Genomics and System Biology
Room: S362

Chair

Professor Li-San Wang (lswang@mail.med.upenn.edu)
Institute on Aging / Penn Center for Bioinformatics, University of Pennsylvania
賓州大學醫學院 王立三 教授

"Marker-set association analysis for gene and gene-environment effects via gene-trait similarity regression"
Professor Jung-Ying Tzeng (jytzeng@stat.ncsu.edu)
Department of Statistics and Bioinformatics Research Center, North Carolina State University
北卡洛來那州立大學統計系 曾仲瑩 教授

Professor Cheng-Yan Kao (cykao@csie.ntu.edu.tw)
Department of Computer Science and Information Engineering, National Taiwan University
台灣大學資訊工程學系 高成炎 教授

"Discovering gapped binding sites of transcription factors"
Professor Chien-Yu Chen (cychen@mars.csie.ntu.edu.tw)
Department of Bio-Industrial Mechatronics Engineering, National Taiwan University
台灣大學生物產業機電工程學系 陳倩瑜 教授

8/14th (Sat) 9:20 am - 10:40 am : Technical Session D1-W3-T1: Nanotechnology
Room: S361

Chair 

Professor Darrin J. Young (darrin.young@utah.edu)
Department of Electrical and Computer Engineering, University of Utah
猶他州立大學電機工程與計算機科學系 楊駿 教授

"Nanogenerator for electric clothing"
Professor Liwei Lin (lwlin@me.berkeley.edu)
Co-Director, Berkeley Sensor and Actuator Center, University of California, Berkeley
加州大學柏克萊分校機械工程系 林立偉 教授

"Nanowire electromechanical devices and systems – from fundamentals to emerging technologies"
Dr. Philip X. L. Feng (xfeng@caltech.edu)
Senior Staff Scientist, Kavli Nanoscience Institute, California Institute of Technology
加州理工學院奈米科學研究所 馮曉勵 博士

"Low power sensing electronics for high-resolution error-correcting biomechanical ground reaction sensor"
Professor Darrin J. Young (darrin.young@utah.edu)
Department of Electrical and Computer Engineering, University of Utah
猶他州立大學電機工程與計算機科學系 楊駿 教授

8/14th (Sat) 9:20 am - 10:40 am : Technical Session D1-W4-T1: System-on-Chip Design Automation
Room: S360

Chair 

Professor Sao-Jie Chen (csj@cc.ee.ntu.edu.tw)
Department of Electrical Engineering, National Taiwan University
台灣大學電機工程學系 陳少傑 教授

"System-on-chip: Will scaling challenges curtail growth?"
Dr. Howard Ko (howardko@synopsys.com)
Senior Vice President and General Manager, Silicon Engineering Group, Synopsys, Inc.
新思科技有限公司資深副總裁 柯復華 博士

"Digital system verification using massively parallel processor arrays"
Dr. Mikhail Bershteyn (**bmike@cadence.com**)
Chief Hardware Fellow, Cadence Design Systems
益華電腦科技公司 柏旭天 博士

"The challenge of system-level design"
Dr. Andreas Kuehlmann (**kuehl@cadence.com**)
Cadence Fellow, Director of Cadence Research Laboratories
益華電腦科技公司研究實驗室主任 柯曼 博士

8/14th (Sat) 10:40 am - 11:00 am : Break

8/14th (Sat) 11:00 am – 12:20 pm : Technical Session D1-W1-T2: Energy, Environment and Sustainability
Room: S363

Chair

Professor Wei-Jen Lee (**wlee@uta.edu**)
Director, Energy Systems Research Center, University of Texas, Arlington
德州大學阿靈頓分校能源系統研究中心主任 李偉仁 教授

"Electrochemical energy conversion and storage – fuel cells and redox battery"
Professor Kan-Lin Hsueh (KanLinHsueh@nuu.edu.tw)
Director of Energy Research Center, National United University
聯合大學能源研究中心 薛康琳 主任

"Direct conversion of green energy: From quantum to system"
Professor Che-Wun Hong (cwhong@pme.nthu.edu.tw)
Department of Power Mechanical Engineering, National Tsing-Hua University
清華大學動力機械工程學系 洪哲文 教授

"Smart grid – Demand-side perspectives"
Dr. Edwin Liu (eliu@quanta-technology.com)
Vice President of Strategy Initiatives and Executive Advisor, Quanta Technology
量子技術公司副總裁 劉文雄 博士

8/14th (Sat) 11:00 am – 12:20 pm : Technical Session D1-W2-T2: Medicine
Room: S362

Chair

Professor Wen-Yih Isaac Tseng (wytseng@ntu.edu.tw)
Center for Optoelectronic Biomedicine, National Taiwan University Hospital
台灣大學醫學院光電生物醫學中心 曾文毅 教授

"Epigenetic control of heart development and disease"
Professor Ching-Pin Chang (chingpin@stanford.edu)
Division of Cardiovascular Medicine, Department of Medicine, Stanford University
史丹佛大學醫學系 張景濱 教授

"Imaging technology for personalized medicine"
Professor Wen-Yih Isaac Tseng (wytseng@ntu.edu.tw)
Center for Optoelectronic Biomedicine, National Taiwan University Hospital
台灣大學醫學院光電生物醫學中心 曾文毅 教授

"Electrical stimulation of degenerate retina towards the development of prosthetic vision for the blind"
Leanne Lai-Hang Chan (lechan@chla.usc.edu)
Post-doctorate Associate, Neuroscience Program, Saban Research Institute, Childrens Hospital Los Angeles
洛杉磯兒童醫院 陳儷行 博士

8/14th (Sat) 11:00 am – 12:20 pm : Technical Session D1-W3-T2: Nanotechnology
Room: S361

Chair

Professor Chih-Hung (Alex) Chang (changch@che.orst.edu)
Associate Professor, Department of Chemical Engineering, Oregon State University
奧勒岡州立大學化學工程系 張至弘 教授

"Nanoporous membranes formed by interferometric lithography"
Dr. Joseph W. Tringe (tringe2@llnl.gov)
Staff Scientist, Lawrence Livermore National Laboratory
勞倫斯立佛摩國家實驗室 特林其 博士

"Opportunities and challenges in developing flexible organic electronics"
Professor Samuel Graham (sgraham@gatech.edu)
The George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology
喬治亞理工學院機械工程系 葛蘭姆 教授

8/14th (Sat) 11:00 am – 12:20 pm : Technical Session D1-W4-T2: Medical System-on-Chip
Room: S360

Chair 

Professor Kea-Tiong Samuel Tang (kttang@ee.nthu.edu.tw)
Department of Electrical Engineering, National Tsing Hua University,
清華大學電機工程學系 鄭桂忠 教授

"Low-power analog front-end circuits for healthcare system and telemetry devices"
Professor Shuenn-Yuh Lee (ieesyl@ccu.edu.tw)
Department of Electrical Enigneering, National Chung Cheng University
中正大學電機工程學系 李順裕 教授

"Towards an electronic nose system-on-chip"
Professor Kea-Tiong Samuel Tang (kttang@ee.nthu.edu.tw)
Department of Electrical Engineering, National Tsing Hua University,
清華大學電機工程系 鄭桂忠 教授

"Low-power analog front-end circuits for ECG acquisition systems"
Professor Tsung-Heng Tsai (ttsai@ee.ccu.edu.tw)
Department of Electrical Engineering, National Chung Cheng University
中正大學電機工程學系 蔡宗亨 教授

8/14 (Sat) 12:20 pm - 2:00 pm : Lunch

8/14th (Sat) 2:00 pm - 3:00 pm: Workshop 1 & 3 Keynote (Energy and Nanotechnology)
Room: S361

Chair 

Professor Che-Wun Hong (cwhong@pme.nthu.edu.tw)
Department of Power Mechanical Engineering, National Tsing-Hua University
清華大學動力機械工程學系 洪哲文 教授

"Energy conversion at nano-scale"
Professor Friedrich B. Prinz (fbp@cdr.stanford.edu)
Rodney H. Adams Professor and Robert Bosch Chair, School of Engineering, Stanford University
史丹佛大學機械工程系主任 普林思 教授

8/14th (Sat) 2:00 pm - 3:00 pm: Workshop 4 Keynote (System-on-Chip):
Room: S360

Chair 

Professor Liang-Gee Chen (lgchen@cc.ee.ntu.edu.tw)
Department of Electrical Engineering, National Taiwan University
台灣大學電機資訊學院副院長 陳良基 教授

"Chip design and implementation service in Taiwan"
Dr. Chin-Long Wey (clwey@cic.org.tw)
Vice president, National Chip Implementation Center , National Applied Research Laboratories
國家實驗研究院國家晶片系統設計中心主任 魏慶隆 博士

8/14th (Sat) 3:00 pm – 4:20 pm : Technical Session D1-W1-T3: New Energy, Environment and Sustainability:
Room: S363

Chair 

Professor Grace Lin (gracelin.ny@gmail.com)
Department of Industrial Engineering & Operations Research, Columbia University
哥倫比亞大學工業工程系 林蔚君 教授

"Business process management for sustainability"
Dr. Ko-Yang Wang (kyw@us.ibm.com)
IBM Distinguished Engineer and IBM GBS BPM Practice Leader, IBM Global Business Services
國際商業機器公司全球商業服務傑出工程師 王可言 博士

"High pressure soda pop - How can we use it greenly?**"**
Dr. Hsiao-Yuan Bruce Li (bli@GhGSaviorTech.com)
President and Chief Technology Officer, GhG SaviorTech Corporation
GhG SaviorTech 總裁 李曉遠 博士

"Trends of green vehicle development"
Professor Yi-Hsuan Hung (hungyh@ntnu.edu.tw)
Department of Industrial Education, National Taiwan Normal University
師範大學工業教育學系 洪翊軒 教授

8/14 (Sat) 3:00 pm – 4:20 pm : Technical Session D1-W2-T3: Bioinformatics
Room: S362

Chair 

Professor Jung-Ying Tzeng (jytzeng@stat.ncsu.edu)
Department of Statistics and Bioinformatics Research Center, North Carolina State University
北卡洛來那州立大學統計系 曾仲瑩 教授

"Correcting population stratification in genetic association studies using a phylogenetic approach"
Professor Li-San Wang (lswang@mail.med.upenn.edu)
Institute on Aging / Penn Center for Bioinformatics, University of Pennsylvania
賓州大學醫學院 王立三 教授

"The past, present and future of genome-wide association study (GWAS)"
Kei-Hang Katie Chan (katiekhchan@ucla.edu)
Department of Epidemiology, University of California, Los Angeles
加州大學洛杉磯分校流行病學系研究生 陳紀行

"Investigation of endo- and exo-type of hydrolase by protein structure simulation"
Chih-Yu Cheng (cycheng@mail.nkmu.edu.tw)
Department of Marine Biotechnology, National Kaohsiung Marine University
高雄海洋科技大學海洋生物技術系 鄭至玉 教授

8/14th (Sat) 3:00 pm – 4:20 pm : Technical Session D1-W3-T3: Nanotechnology
Room: S361

Chair 

Professor Hsuan-Liang (Kevin) Liu (f10894@ntut.edu.tw)
National Taipei University of Technology
台北科技大學生物科技研究所所長 劉宣良 教授

"Nanofabrication and Radiation Hard Testing of TiO_2 Memristor devices"
Dr. William M. Tong (will.tong@transelcorp.com)
Technology Advisor, Nanofabrication & Nonvolatile Memory, TransEL
TransEL技術顧問 唐文偉 博士

"Mesoporous materials for biomedical and energy applications"
Professor Chia-Wen (Kevin) Wu (kevinwu@ntu.edu.tw)
Department of Chemical Engineering, National Taiwan University
台灣大學化學工程系 吳嘉文 教授

"Towards cost-effective encapsulation architectures and barrier layers for organic electronic devices"
Dr. Jimmy Granstrom (jimmy.granstrom@me.gatech.edu)
Post-doctoral fellow, School of Mechanical Engineering, Georgia Institute of Technology
喬治亞理工學院研究員 葛蘭斯重 博士

8/14th (Sat) 3:00 pm – 4:20 pm : Technical Session D1-W4-T3: Wireless System
Room: S360

Chair 

Professor Yung-Hsiang Lu (**yunglu@purdue.edu**)
School of Electrical and Computer Engineering, Purdue University
普度大學電機與計算機工程學院 陸永祥 教授

"Mobile and cloud computing – Opportunities and challenges"
Professor Yung-Hsiang Lu (**yunglu@purdue.edu**)
School of Electrical and Computer Engineering, Purdue University
普度大學電機與計算機工程學院 陸永祥 教授

"Beyond 3G™, Unlimited capacity"
Dr. James Larsen (james.larsen@iwics.com)
CEO & Chairman, Intelligent Wireless Integrated Communications Systems (IWICS, Inc.)
IWICS 執行長 拉森 博士

"A multimedia routing algorithm in multipath environment"
Zye-Kong Cheng (zkc400@gmail.com)
System Solutions Consultant, GhG SaviorTech Corporation
GhG SaviorTech 顧問 鄭志剛 先生

8/14th (Sat) 4:20 pm – 4:40 pm : Break

8/14th (Sat) 4:40 pm – 6:00 pm : Technical Session D1-W1-T4: Energy, Environment and Sustainability:
Room: S363

Chair 

Professor Kan-Lin Hsueh (KanLinHsueh@nuu.edu.tw)
Director of Energy Research Center, National United University
聯合大學能源研究中心主任 薛康琳 教授

"American Power Act to world power practice: A giant paradigm shift toward a carbon economy"
Dr. Truman G. Blocker III (tblocker3@GhGSaviorTech.com)
Director, Research and Development, GhG SaviorTech Corporation
GhG SaviorTech 研發長 布拉克 博士

"From renewable energy to energy saving: Fluid and thermal aspect"
Professor Shih-Hsiung Chen (**shchen86@hotmail.com**)
Department of Aeronautics and Astronautics, National Cheng Kung University
成功大學航空太空工程學系 陳世雄 教授

"Development of an environmentally benign, multifunctional biomedical surface treatment system using an
atmospheric-pressure plasma jet"
Professor Jong-Shinn Wu (chongsin@faculty.nctu.edu.tw), National Chiao Tung University
交通大學機械工程學系 吳宗信 教授

8/14th (Sat) 4:40 pm – 6:00 pm : Technical Session D1-W3-T4: Nanotechnology
Room: S361

Chair

Professor Kuo-Lun Allan Tung (**kuolun@cycu.edu.tw**)
Director, Research and Development Center for Membrane Technology, Chung Yuan University
中原大學薄膜研發中心主任 童國倫 教授

"A novel computational approach to identify the binding modes of various dyes towards different
protofibrils associated with neurodegenerative disorders and virtual screening"
Professor Hsuan-Liang (Kevin) Liu (f10894@ntut.edu.tw), National Taipei University of Technology
台北科技大學生物科技研究所所長 劉宣良 教授

"Nanopore characterization techniques – Status quo and future development"
Professor Kuo-Lun Allan Tung (**kuolun@cycu.edu.tw**)
Director, Research and Development Center for Membrane Technology, Chung Yuan University
中原大學薄膜研發中心主任 童國倫 教授

"Engineering microsystems to guide cell behaviors"
Professor Chia-Chi Ho (**Chiachi.Ho@UC.edu**)
Department of Chemical and Materials Engineering, University of Cincinnati
辛辛那提大學化學與材料工程系 何嘉琪 教授

8/14th (Sat) 4:40 pm – 6:00 pm : Technical Session D1-W4-T4: Multimedia System-On-Chip
Room: S360

Chair 

Professor Jiun-In Guo (jiguo@cs.ccu.edu.tw)
Department of Computer Science and Information Engineering, National Chung Cheng University
中正大學資訊工程系 郭峻因 教授

"Low power video technology for multimedia SoC design"
Professor Jiun-In Guo (jiguo@cs.ccu.edu.tw)
Department of Computer Science and Information Engineering, National Chung Cheng University
中正大學資訊工程系 郭峻因 教授

"Debunking the 100x GPU vs. CPU myth: An evaluation of throughput computing on CPU and GPU"
Dr. Yen-Kuang Chen (yen-kuang.chen@intel.com)
Principal Research Scientist, Intel Corporation
英代爾公司研究科學家 陳彥光 博士

"Innovation and commercialization of microdisplay for 3D applications"
Dr. Bor-Yeu Tsaur (btsaur@kopin.com)
Executive Vice President and General Manager, Display Operations, Kopin Corporation
高平磊晶科技 執行副總裁 曹伯禹 博士

8/14th (Sat) 7:00 pm – 9:00 pm : Dinner Keynote Speech (by invitation)

"Economic Cooperation Framework Agreement (ECFA) and its impact on Taiwan economy & cross-strait economic relations"
Dr. James Hsin-Hua Wu (hhwu@moea.gov.tw)
Director, Commercial Division, Taipei Economic & Cultural Office in Los Angeles
駐洛杉磯台北經濟文化辦事處商務組組長 吳新華 博士

Day 2 (Sunday, August 15, 2010)

8/15 (Sun) 8:00 am - 6:00 pm : Registration

8/15th (Sun) 9:15 am - 10:35 am : Technical Session D2-W1-T1: New Energy, Environment and Sustainability:
Room: S363

Chair 

Peter Mei
21-Century Silicon, Inc.
21-Century Silicon 執行長 梅家駒

"Developing trends in sustainable businesses"
Dr. Dwight Collins (dwight.collins@presidioedu.org)
Professor, Sustainability Management, Presidio Graduate School
普思蒂歐管理學院 柯林斯 博士

"Sustainable Globally Integrated Enterprise"
Professor Grace Lin (gracelin.ny@gmail.com)
Department of Industrial Engineering & Operations Research, Columbia University
哥倫比亞大學工業工程系 林蔚君 教授

8/15th (Sun) 9:15 am - 10:35 am : Technical Session D2-W3-T1: Nanotechnology
Room: S361

Chair 

Professor Lei Kerr (kerrll@muohio.edu)
Department of Paper and Chemical and Engineering, Miami University
俄亥俄州邁阿密大學化學工程系 柯蕾 教授

"Nano-structures for solar cells"
Professor Ching-Fuh Lin (cflin@cc.ee.ntu.edu.tw)
Graduate Institute of Photonics and Optoelectronics, National Taiwan University
台灣大學電機工程學系 林清富 教授

"Cobalt oxide nanowire arrays: Synthesis and energy applications"
Professor Yiying Wu (wu@chemistry.ohio-state.edu)
Department of Chemistry, Ohio State University
俄亥俄州立大學化學系 吳屹影 教授

"Deposition processes of thin-film CIGS-based solar cells"
Professor Chia-hua Huang (chuang@mail.ndhu.edu.tw)
Department of Electrical Engineering, National Dong Hwa University
東華大學電機工程學系 黃家華 教授

8/15th (Sun) 9:15 am - 10:35 am : Technical Session D2-W4-T1: System-on-Chip
Room: S360

Chair 

Professor Wei Hwang (hwang@mail.nctu.edu.tw)
Department of Electronics Engineering, National Chiao-Tung University
交通大學電子工程系 黃威 教授

"Memory-centric on-chip data communication platform for energy-efficient heterogeneous systems"
Professor Wei Hwang (hwang@mail.nctu.edu.tw)
Department of Electronics Engineering, National Chiao-Tung University
交通大學電子工程系 黃威 教授

"Modularized board-level and system-in-package platforms for complex system integration and prototyping"
Dr. Chun-Ming Huang (cmhuang@cic.org.tw)
National Chip Implementation Center, National Applied Research Laboratories
國家實驗研究院晶片系統設計中心設計服務組長 黃俊銘 博士

"Constructing electronic system level models using Simulink"
Dr. Emerson Ming-Fu Hsiao (emerson@faraday-tech.com)
Director, Field Application and Marketing, Faraday Technology Corporation
智原科技 蕭明富 博士

8/15th (Sun) 10:35 am - 11:00 am : Break

8/15th (Sun) 11:00 am – 12:20 pm : Technical Session D2-W1-T2: New Energy, Environment and Sustainability (6)
Room: S363

Chair 

Professor Grace Lin (gracelin.ny@gmail.com)
Department of Industrial Engineering & Operations Research, Columbia University
哥倫比亞大學工業工程系 林蔚君 教授

"Eco-Valley, a holistic approach to Green Economy "
Albert Oung (aoung@earthbuddy.hk)
Founder & CEO, Earth Buddy Inc. and Eco-Valley Inc.
球誼環保集團創辦人 汪振富 先生

"Venture opportunities in energy, environment, and sustainability"
Dr. Matthew Denesuk (denesuk@us.ibm.com)
Scientist, IBM Research & Partner, IBM Venture Capital
國際商業機器公司風險資本部門科學家 丹思克 博士

"Smart grid"
Dr. Erfan Ibrahim (eibrahim@epri.com)
Smart Grid Communications & Cyber Security Lead, Electric Power Research Institute (EPRI)
電力研究所 亞伯拉漢 博士

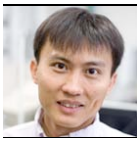
8/15th (Sun) 11:00 am – 12:20 pm : Technical Session D2-W3-T2: Nanotechnology
Room: S361

Chair 

Professor Kuan-Jiuh Lin (kjlin@dragon.nchu.edu.tw)
Department of Chemistry, National Chung-Hsing University
中興大學化學系 林寬鋸 教授

"CdS sensitized nanocrystalline solid state and liquid state solar cells"
Professor Lei Kerr (kerrll@muohio.edu)
Department of Paper and Chemical and Engineering, Miami University
俄亥俄州邁阿密大學化學工程系 柯蕾 教授

"Atomic force microscope direct write of Ge nanostructures on Si"
Stephanie Vasko (vasko@u.washington.edu)
Department of Materials Science and Engineering, University of Washington
華盛頓大學材料科學與工程系研究生 法斯柯



Professor Yi Cui (yicui@stanford.edu)
Department of Materials Science and Engineering, Stanford University
史丹佛大學材料科學與工程系 崔屹 教授

8/15th (Sun) 11:00 am – 12:20 pm : Technical Session D2-W4-T2: C4I/Medical System-on-Chip

Room: S360

Chair 

Professor Liang-Gee Chen (lgchen@cc.ee.ntu.edu.tw)
Department of Electrical Engineering, National Taiwan University
台灣大學電機資訊學院副院長 陳良基 教授

"Smart CMOS image sensors for biomedical applications"
Professor Jun Ohta (**ohta@ms.naist.jp**)
Graduate School of Materials Science, Nara Institute of Science and Technology, Japan
奈良先端科學技術大學院 太田淳 教授

"CMOS for biomedical applications"
Professor Luke Theogarajan (**ltheogar@ece.ucsb.edu**)
Department of Electrical and Computer Engineering, University of California at Santa Barbara
加州大學聖他芭芭拉分校電機與計算機工程學系 希歐格拉強 教授

"Design and implementation of an XML parsing engine"
Professor Sheng-De Wang (**sdwang@ntu.edu.tw**)
Department of Electrical Engineering, National Taiwan University
台灣大學電機工程學系 王勝德 教授

8/15th (Sun) 12:20 pm - 2:00 pm : Lunch

8/15th (Sun) 2:00 pm – 3:20 pm : Technical Session D2-W3-T3: Nanotechnology
Room: S361

Chair 

Professor Ching-Fuh Lin (cflin@cc.ee.ntu.edu.tw)
Graduate Institute of Photonics and Optoelectronics, National Taiwan University
台灣大學電機工程學系 林清富 教授

"Well-aligned multi-walled carbon nanotubes emitting natural white-light under microwave irradiation"
Professor Kuan-Jiuh Lin (kjlin@dragon.nchu.edu.tw)
Department of Chemistry, National Chung-Hsing University
中興大學化學系 林寬鋸 教授

"Electrodeposition of gold, silver on carbon nanotube thin films"
Dr. Si-Ty Lam (sity.lam@hp.com)
Principal Project Scientist, HP Laboratories, Hewlett-Packard Company
惠普實驗室 林士智 博士

"New paradigms for manipulation of DNA molecules at the nanoliter scale"
Professor Hsien-Hung Wei (**hhwei@mail.ncku.edu.tw**)
Department of Chemical Engineering, National Cheng-Kung University
成功大學化學工程系 魏憲鴻 教授

8/15th (Sun) 2:00 pm – 3:20 pm : Technical Session D2-W4-T3: Communication System-on-Chip
Room: S360

Chair 

Professor Chen-Yi Lee (cylee@mail.nctu.edu.tw)
Department of Electronics Engineering, National Chiao-Tung University
交通大學電子工程學系 李鎮宜 教授

"Recent progress in communications SoC's"
Professor Chen-Yi Lee (cylee@mail.nctu.edu.tw)
Department of Electronics Engineering, National Chiao-Tung University
交通大學電子工程學系 李鎮宜 教授

"Physical design challenge to cognitive radio/software defined radio"
Professor Kazuya Masu (masu.k.aa@m.titech.ac.jp)
Integrated Research Institute & Precision and Intelligence Laboratory, Tokyo Institute of Technology
東京工業大學統合研究院 益一哉 教授

"Recent progress in design methodologies for software defined radio"
Professor Yu-Hen Hu (**hu@engr.wisc.edu**)
Department Electrical and Computer Engineering, University of Wisconsin at Madison
威斯康辛大學電機與計算機工程系 胡玉衡 教授

8/15th (Sun) 3:20 pm – 3:40 pm : Break

8/15th (Sun) 3:40 pm – 5:00 pm : Technical Session D2-W3-T4: Nanotechnology
Room: S361

Chair 

Professor Hsien-Hung Wei (**hhwei@mail.ncku.edu.tw**)
Department of Chemical Engineering, National Cheng-Kung University
成功大學化學工程系 魏憲鴻 教授

"Synthesis and post-processing of nanomaterials using microreaction technology"
Professor Chih-Hung (Alex) Chang (changch@che.orst.edu)
Associate Professor, Department of Chemical Engineering, Oregon State University
奧勒岡州立大學化學工程系 張至弘 教授

"State-of-the-art in surface mechanical properties characterization methods"
Dr. Bo Zhou (Bo.Zhou@csm-instruments.com)
Technical Sales Engineer, CSM Instruments, Inc.
瑞士CSM儀器公司 周波 博士

8/15th (Sun) 4:40 pm – 6:00 pm : Technical Session D2-W4-T4: New Media and Entertainment Technology
Room: S360

Chair

Dr. Scott Chun-Yang Chen (cy.scott.chen@gmail.com)
Software engineer, Facebook, Inc.
Facebook 公司 陳俊仰 博士

"Data infrastructure at Facebook"
Dr. Scott Chun-Yang Chen (cy.scott.chen@gmail.com)
Software engineer, Facebook, Inc.
Facebook 公司軟體工程師 陳俊仰 博士

"Mine your business! – Value and utilization of implicit social networks"
Dr. Ching-Yung Lin (chingyun@us.ibm.com)
Project Lead, Event and Streaming Systems Department, IBM Thomas J. Watson Research Center
國際商業機器公司華生研究中心 林清詠 博士

"Technical challenges and solutions in web-based video conferencing systems"
Dr. Chuo-Ling Chang (chuoling@tokbox.com)
Senior Audio/Video Scientist, TokBox, Inc.
TokBox資深影音科學家 張倬領 博士

Acknowledgement

The EITC program committee would like to thank the following members of the Stanford Taiwanese Student Association for their leadership, organization, and support of this event.

Wilson Wei-Cheng Lee (wclee@stanford.edu)
Department of Materials Science and Engineering, Stanford University
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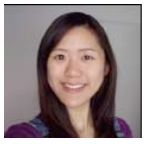
2009-2010 史丹佛台灣同學會會長 李偉誠

Yu-Hung Li (liyuhung@gmail.com)
Department of Material Science and Engineering, Stanford University
Vice president, 2009-2010 Stanford Taiwanese Student Association
2009-2010 史丹佛台灣同學會副會長 黎昱宏



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Department of Material Science and Engineering, Stanford University
Vice president, 2010-2011 Stanford Taiwanese Student Association
2010-2011 史丹佛台灣同學會副會長 謝秉翰

Abstracts and Biographies

Opening Speech

Conference Chair

Lin-Shan Lee, PhD (李琳山 院長**)**

Dean, College of Electrical Engineering and Computer Science, National Taiwan University
No. 1, Sec. 4, Roosevelt Rd., Taipei, 106, Taiwan, R.O.C.
Tel: +886-2-3366-3547
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BIOGRAPHY

Lin-shan Lee received a B.S. in Electrical Engineering from National Taiwan University in 1974, an M.S. and a Ph.D. in Electrical Engineering from Stanford University in 1975 and 1977, respectively. He has been a professor of Electrical Engineering and Computer Science of National Taiwan University (since 1982), was a department head of the university (1982-1987), now serves as the dean of College of Electrical Engineering and Computer Science of the university (since 2009), and served as the chair of the Commission on Research and Development of the university (2002-2005). He holds a joint appointment with the Institute of Information Science of Academia Sinica as a research fellow, and was the director of the institute from 1991 to 1997. His research interests include various topics in digital communications such as digital transmission theory and signal processing for communications, as well as spoken language processing including speech recognition and transcription, text-to-speech synthesis, spoken dialogue, and spoken document understanding and retrieval.

He served on various positions of IEEE Communications Society, including regional chair for Asia Pacific (1994-1995), member of the Board of Governors (1994-1997), Vice President for International Affairs (1996-1997) and the Awards Committee chair (1998-1999). He was the Technical Program Chair of IEEE Global Telecommunications Conference (Globecom) 2002 at Taipei. He developed quite several earliest versions of Chinese spoken language processing systems in the world, including text-to-speech systems (since 1984), a natural language analyzer (1986), dictation systems (since 1991), spoken document retrieval systems (since 1997), and spoken dialogue systems (since 1998). He served as a Board member of International Speech Communication Association (ISCA) (2001-2009). He also served as the Distinguished Lecturer of IEEE Signal Processing Society (2007-2008), an associate editor of IEEE Signal Processing

Magazine (2003-2006), a member of the Overview Paper Editorial Board of IEEE Signal Processing Society (since 2009), and the general chair of International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2009 at Taipei.

He was elected IEEE Fellow in 1992 with citation, "For Contributions to Computer Voice Input/Output Techniques for Mandarin Chinese and Engineering Education". He is the recipient of the National Chair Professorship of Taiwan, ROC in 2004 and 2007.

Opening Speech

Guest Speaker

Thomas J. C. Chen (陳經銓 處長)

Director General, Taipei Economic and Cultural Office in San Francisco
Email: tecosf@sbcglobal.net

BIOGRAPHY

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Opening Speech

Guest Speaker

Ching H. Wang, PhD (汪慶賢 教授)

Director, Pediatric Neuromuscular Clinic
Lucile Packard Children's Hospital, Stanford University

Email: wangch@stanford.edu

BIOGRAPHY

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Opening Speech

Ms. Josephine M. Cheng (鄭妙勤 女士)

IBM Fellow and Vice President
IBM Research - Almaden
Email: chengjm@us.ibm.com

BIOGRAPHY

Josephine M. Cheng is an IBM Fellow and Vice President of IBM Research - Almaden in San Jose, California. She oversees more than 400 scientists and engineers doing exploratory and applied research in various hardware, software and service areas, including: nanotechnology, materials science, storage systems, data management, web technologies, workplace practices and user interfaces.

Prior to her current role, Cheng was Vice President of IBM China Development Laboratories from 2004 to 2008. She led the China Software Development Laboratory (CSDL) located in three major cities: Beijing, Shanghai and Taipei, with a combined total of more than 3,000 employees.

Cheng has been at the forefront of relational database technology for over twenty-five years. She was also principally responsible for developing IBM's database technology for the web, allowing people to access huge amounts of data via the internet that was previously accessible only through proprietary systems. Her teams have produced such database technologies and products as: DB2 World-Wide Web and its follow-on, Net.Data, providing web access to corporate databases; XML Extender for DB2, permitting popular XML-formatted data to be integrated into DB2; and DB2 Everyplace, a tiny, totally self-managing database system that extends the power of DB2 to convenient pervasive computing devices such as handheld computers and cellular phones.

Cheng received the Asian American Engineer of the Year award in 2003. She was inducted into the United States National Academy of Engineering (NAE) in 2006 for sustained leadership and contributions to relational database technology and its pervasive applications to a wide range of digital operational systems. Also in 2006, she was named one of the Top 10 Software Leaders in China and received the prestigious Professional Achievement Award from UCLA in 2007. Currently, she is a guest professor at Tsinghua University and Shanghai University; member of the advisory board committee to the School of Software and Microelectronics, Peking University and chaired the advisory board committee of the Department of Computing of Hong Kong Polytechnic University from 2008-2010. Cheng is also on the Electrical

Engineering and Computer Science (EECS) advisory board of the University of California at Berkeley (UCB), as well as a member of San Jose State University's Engineering Industry Advisory Council. Cheng also serves on the advisory board of the UCB Center for Information Technology Research in the Interest of Society (CITRIS), board member of the Bay Area Science and Innovation Consortium (BASIC), University of Miami Department of Electrical and Computer Engineering (ECE) Industrial Advisory Board member, Silicon Valley CTO Forum Advisory Board member and member of the Anita Borg Institute For Women and Technology Board.

Josephine Cheng has been awarded 28 patents for her inventions.

Cheng was educated at the University of California, Los Angeles (B.S., 1975, Mathematics and Computer Science; M.S., 1977, Computer Science). She is a resident of San Jose, California.

Session D1-W1-T1: Energy, Environment and Sustainability

Session Organizer & Chair

Che-Wun Hong, Ph. D (洪哲文 教授)

Department of Power Mechanical Engineering, National Tsing Hua University
101, Sec. 2, Kwang Fu Road, Hsinchu 30013, Taiwan
Tel: +886-3-5742591, Fax: +886-3-5722840
Email: cwhong@pme.nthu.edu.tw

BIOGRAPHY

Prof. Che-Wun Hong was born in Kaohsiung city, Taiwan on March 15th, 1956. He received bachelor degree in Mechanical Engineering from National Cheng-Kung University in 1978. After graduation from the university, he served in the army as an armored vehicle officer (1978~1980), then worked as a mechanical engineer in the Ford Motor Company (1980~1981), and then transferred to the Industrial Technology Research Institute (ITRI) as an engine researcher (1981~1982). In the fall of 1982, after saving enough money, he went to United Kingdom to study higher degrees. He received his MSc degree from the UMIST (Manchester, UK) in 1983 and a PhD degree from the Imperial College (London, UK) in 1987, all majored in Mechanical Engineering.

In 8/1987, he returned to Taiwan and joined the Department of Power Mechanical Engineering of National Tsing Hua University as an associate professor. He was promoted to full professor in 1997. Being a faculty member for 23 years, his research area ranges from internal combustion engines, turbochargers to the automotive engineering; and then he switched to the green power engineering at the millennium. His current research focuses on the fuel cells, solar cells, lithium-ion batteries, ultra-capacitors and thermoelectric chips by means of the academic fundamentals, such as: quantum mechanics, molecular dynamics, Boltzmann modeling, computational fluid dynamics and control system dynamics. He has published more than 200 technical papers, including archived journals, proceedings of national and international conferences and technical reports; also he has registered for two patents in Taiwan and USA.

Session : ***D1-W1-T1: Energy, Environment and Sustainability***

Efficient Data Management for Green Data Centers

Hui-I Hsiao, PhD (蕭暉議 博士)

Program Director, IBM Almaden Research Center
650 Harry Road, San Jose, CA 95120, USA
Tel: +1-408-927-2838, Fax: +1-408-927-3215
Email: hhsiao@us.ibm.com

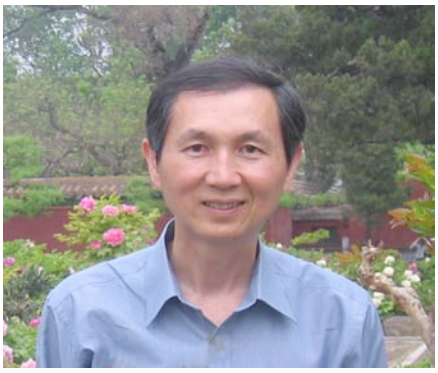
ABSTRACT

Efficient and effective information management is very crucial to the success of modern business operations. To gain competitive advantages, companies have devoted great deal of resources and energy in optimizing information management system performance in both system throughput and response time. With the increase of popularity in world-wide-web, the number of requests processed and the amount of data managed by information management systems have grown rapidly. To cope with the fast growing scalability requirement and the frequent changes of web workload, increasing number of large data centers have been built and deployed in the cloud (web).

One major concern of data center operators is the cost, especially the high electricity (power) cost, of operating their data centers. A study by James Hamilton in 2008 showed that power consumption and power related infrastructure cost constituting 41.6% of total cost of a data center through out the life time of a data center. Another study by an agency of US Department of Energy predicated that by 2012, the power costs for the data center equipment over its useful life will exceed the cost of the original capital investment. A more recent (October 2009) article in Ars Technica reported that Jon Haas, Director of Intel Eco-technology Program Office, is predicting that the electricity cost of a server over its lifetime will exceed the price of the server by 2010.

As power is projected to become the major cost in data center operation, both government and private sectors are now conducting studies on reducing power consumption in data centers. However, most of the current studies are focusing on building and deploying energy efficient infrastructure and computing equipment. In contrast, little has been done on optimizing software systems for energy efficiency. Data storage and computation are the major sources of power consumption in a data center. Energy efficient information management systems have the potential to put a big dent in the rising power cost of data center operation. With power becoming the dominating cost in data centers and the trend in moving toward green computing, optimizing information management systems for energy efficiency is now more important than ever. In this talk, I will discuss various opportunities for energy efficient data management and present an on-going research work, which takes advantages of the new memory and storage technologies to build an energy efficient information management system. Our experiments show that our new system can significantly improve system performance while requiring less energy/power to operate it.

BIOGRAPHY



Dr. Hui-I Hsiao was born in Yun-Lin County, Taiwan. He received a bachelor's degree from National Taiwan University, and the M.S. and Ph.D. degrees in computer science from University of Wisconsin at Madison, in 1984 and 1990, respectively.

He is a Program Director at IBM Almaden Research Center where he is responsible for technology innovation for emerging market. Prior to this, he was the Chief Scientist of Information Management and Deputy Director of IBM China Research Lab in Beijing from 2006 to 2008. Dr. Hsiao joined IBM T.J. Watson Research Center in 1990 and was appointed the manager of the Parallel Databases department in 1995. At IBM Watson Research, he led the design and development of DB2 Parallel Edition - a highly scalable parallel database system on open system platform. He moved to IBM Almaden Research Center in 1997 and managed the Content Management System department from 2000 to 2006. In that capacity, he led his group designed and developed an extensible architecture and a new data model for content management systems, which later became the foundation of the IBM Content Manager product. Prior to joining IBM, he worked as a software engineer at Nicolet Instrument Corporation at Madison Wisconsin, from 1984 to 1990, where he was named a Nicolet Associate Fellow.

Dr. Hsiao is a recipient of 2008 ACM Software System Award, which recognizes individual(s) for developing a software system that has had a lasting influence, reflected in contributions to concepts and in commercial acceptance. He received an Outstanding Innovation Award and an Outstanding Technical Achievement Award from IBM for contributions to IBM DB2 and Content Manager technologies. He was invited to IBM corporate technical recognition events (CTRE) in 2005 and 2010, which recognize top technical contributors in IBM. Dr. Hsiao is a member of IEEE, ACM, and ACM SIGMOD. He has published more than 30 refereed research papers and been awarded more than 25 patents. He was the program committee chair for 2006 AP SSME Symposium and served on program committees for many international conferences.

Session : ***D1-W1-T1: Energy, Environment and Sustainability***

Integration of Renewable Energy

Mr. Rick Geiger (蓋格 先生)

Director, Business Development for Enterprise Utility Solutions, Cisco Systems
Email: rggeiger@cisco.com

ABSTRACT:

Renewable Portfolio Standards set bold goals for the integration of renewable sources of electric power into the US Electricity supply chain. These can be integrated at the transmission level, the distribution level or the edge of the grid. The variability of the most prevalent technologies, wind and solar, presents significant challenges to the maintenance of voltage and phase stability. The power engineering to address stability issues requires near real time telemetry and control.

BIOGRAPHY

Rick Geiger has been with Cisco for 5 years, formerly as Director of Engineering in Cisco's Physical Security Business Unit. Prior to joining Cisco, Mr. Geiger was VP Engineering for GE Security in Physical Security, video surveillance and access control. Rick has in depth experience in the global utility market with more than 10 years as VP Engineering and Chief Technical Officer for Itron. Presently Solutions Director for Utilities and Smart Grid, on Cisco's Business Transformation Team, Rick and the Smart Grid Vertical Team serve the US and Canada Utility markets with Secure, Resilient and Scalable network solutions for smart grid, advanced metering, distribution automation and utility telemetry. Rick is an IEEE Senior Member and Member of the Power and Energy Society.

*Session : **D1-W1-T1: Energy, Environment and Sustainability***

Enabling Technologies for Customer Demand and Budget Management in the Deregulated Environment

Wei-Jen Lee, PhD (李偉仁 教授**)**

Director, Energy Systems Research Center, the University of Texas at Arlington
Email: wlee@uta.edu

ABSTRACT:

Present price structure that charges consumers with the traditional monthly flat rate based on the average load-profiling rate calculation of consumer classes (regardless the consumers' usage behaviors during the days) is not fair and should not be the customer service of the 21st century. Accordingly, the US Government perceives the necessity of the demand response from the end-use residential consumers as stated in the Energy Policy Act (EPAct) 2005 Sections 1252 (a) (14) (A), 1252 (d), 1252 (e), and 1252 (f).

U.S. Department of Energy (DOE) defines the demand response as *"Changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized"*. The primary benefit of electricity demand response, as described in FERC's Staff Report and the Department of Energy's Report to the US Congress, is the enhancement of effectiveness and efficiency in utilizing the system's overall resources both long-term and short-term. An effective demand response program can reduce or shift the electricity load consumptions away from the peak periods of near capacity limits and high marginal generating costs.

As we know, it can take several years of lead-time and significant investment to increase capacities to relieve the system constraints through physical infrastructure improvement. Demand response can be an immediate solution with a much shorter timeframe to execute. Resources to build new transmission networks or new power plants can be conserved or delayed, and the savings on the aggregate supply side may eventually pass to the end retail consumers. In addition, demand response can also lessen market power gaming that prevents generators from dishonestly withholding supply to raise prices.

This presentation discusses customer centered enabling technologies for effective demand response participation that conscious and price responsive consumers can effectively balance their comforts and savings by adjusting energy consumption pattern.

BIOGRAPHY

Wei-Jen Lee (S'85-M'85-SM'97-F'07) received the B.S. and M.S. degrees from National Taiwan University, Taipei, Taiwan, R.O.C., and the Ph.D. degree from the University of Texas, Arlington, in 1978, 1980, and 1985, respectively, all in Electrical Engineering.

In 1985, he joined the University of Texas, Arlington, where he is currently a professor of the Electrical Engineering Department and the director of the Energy Systems Research Center.

He has been involved in the revision of IEEE Std. 141, 339, 551, and 739. He is the Secretary of the IEEE/IAS, Industrial & Commercial Power Systems Department (ICPSD), the Committee Chairman of the Energy Systems Committee at ICPSD, and the associate editor of IEEE/IAS and International Journal of Power and Energy Systems. He is the project manager of IEEE/NFPA Collaboration on Arc Flash Phenomena Research Project.

Prof. Lee has been involved in research on renewable energy, power flow, transient and dynamic stability, voltage stability, short circuits, relay coordination, power quality analysis, demand response, on-line equipment protection, monitoring, and control system, and utility deregulation. He has served as the primary investigator (PI) or Co-PI of over seventy funded research projects He has published more than one hundred sixty journal papers and conference proceedings. He has provided on-site training courses for power engineers in Panama, China, Taiwan, Korea, Saudi Arabia, Thailand, and Singapore. He has refereed numerous technical papers for IEEE, IEE, and other professional organizations.

Prof. Lee is a Fellow of IEEE and registered Professional Engineer in the State of Texas.

Session : ***D1-W2-T1: Computational Genomics and System Biology***

Session Organizer & Chair

Li-San Wang, PhD (王立三 教授**)**

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BIOGRAPHY

Li-San Wang received his B.S. (1994) and M.S. (1996) in Electrical Engineering from the National Taiwan University. He received his M.S. (2000) and Ph.D. (2003) from the University of Texas at Austin, both in Computer Sciences, and was a postdoctoral fellow at the University of Pennsylvania between 2003 and 2006. Currently he is an Assistant Professor of Pathology and Laboratory Medicine and a fellow of the Institute on Aging, University of Pennsylvania. Dr. Wang's research interests include phylogenetics, comparative genomics, and microarray analysis. He has authored twenty six peer-reviewed book chapters and journals on computational biology and bioinformatics, and served on the program and organizing committees of several international workshops and conferences.

Session : ***D1-W2-T1: Computational Genomics and System Biology***

Market-set Association Analysis for Gene and Gene-environment Effects via Gene-trait Similarity Regression

Jung-Ying Tzeng, PhD (曾仲瑩 教授)

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ABSTRACT

Modern association studies of complex traits, such as GWAS or sequencing studies, demand statistical tools that are cable to detect small-effect variants, model complex interaction effects, and have convincing speed performance. In this work, we introduce one possible solution that uses similarity-based regression method to perform marker-set analysis. The method uses genetic similarity to aggregate information from multiple polymorphic sites (e.g., SNPs or a mixture of different polymorphisms), and regresses trait similarities for pairs of unrelated individuals on their genetic similarities to access the gene-trait association. The association is detected using a score test whose limiting distribution is derived. The proposed method can account for covariates, has the capacity to model both main and interaction effects, and is computationally efficient. We also show that the gene-trait similarity regression does not require phase sequence and that it explicitly models the non-additive effects among markers. These features make it an ideal tool for evaluating association between phenotype and marker sets defined by haplotypes, genes or pathway in whole-genome analysis.

BIOGRAPHY

Dr. Jung-Ying Tzeng received her bachelor degree in public health (major in epidemiology) and a master degree in biostatistics from the National Taiwan University, Taipei Taiwan, in 1994 and 1997 respectively. She earned her Ph.D. degree in statistics from Carnegie Mellon University, Pittsburgh PA., in 2003. Her Ph.D. research was under the supervision of Dr. Kathryn Roeder and her dissertation received the Umesh Gavasakar Thesis Award.

In 2003, she joined the Department of Statistics and the Bioinformatics Research Center at the North Carolina State University, Raleigh NC. Her research focuses on developing statistical methods that can facilitate genetic epidemiologic research on human complex diseases. Some of her current research projects include statistical modeling of multimarker/haplotype association for genome-wide and candidate-gene studies, gene-based and pathway-based analysis for pharmacogenetics, SNP genotyping error and quality control, and sequence data analysis. She has received funding from NSF and NIH and is currently the PI of NIH R01 grant "Genome-wide Haplotype Association Analysis in Mental Disorders" for developing statistical methods for multi-marker association modeling to study gene and gene-environment effects. She is an associate editor for Biometrics, and has served as an ad hoc reviewer for several NIH study sections.

Dr. Tzeng is currently a member of the American Statistical Association and the American Society of Human Genetics.

Session : ***D1-W2-T1: Computational Genomics and System Biology***

Application of Systems Biology on the Research of Mental Disorders

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ABSTRACT:

Schizophrenia, bipolar disorder and major depression are complex and devastating mental disorders, each with distinct yet overlapping epidemiologic characteristics such as psychosis. Several single nucleotide polymorphisms (SNPs) and mutations were found to be associated with one or more of the three diseases. Microarray and proteomics data of post-mortem brain samples also revealed genes which expressed abnormally in these diseases. Nevertheless, there were limited studies on the interrelationships among the genes and encoded proteins associated with schizophrenia, bipolar disorders and major depression. To understand the network biology of mental disorders, protein-protein interaction (PPI) subnetworks for schizophrenia, bipolar disorder and major depression subjects were constructed using the most highly expressed genes in post-mortem brain samples of patients. Overlapping 4- and 5-node cliques, with nodes ranked high in centrality analyse, were identified in these sub-networks and proposed as the "central functional modules" of BA10 and BA46 samples. A few "switchboard" nodes were found to form PPIs with nodes which were abnormally expressed in multiple diseases. PPIs which were unique to a disease or shared between two (or more) diseases were also observed. Genes which abnormally expressed in the brain samples of patients and associated with the central functional modules were proposed as disease markers. These marker genes were also proposed as targets for drug treatment.

BIOGRAPHY

Cheng-Yan Kao was born in Taipei, Taiwan, in 1948. He received his bachelor degree in mathematics from the National Taiwan University in 1971. After receiving his master degree in statistics from the University of Wisconsin, he went on to persuade his second master degree and PhD in computer science. He received his second master degree and PhD from the University of Wisconsin in 1978 and 1981, respectively.

Professor Kao worked as a software engineer and AI consultant in the Space Department of Ford, Unisys and GE in the USA during 1980 to 1990. He went back to his home town, Taipei, Taiwan in 1990. Since then, he holds the post of professor in the Graduate Institute of Computer Science and Information Technology, National Taiwan University. While serving in National Taiwan University, he was also the head of the Graduate Institute of Biomedical Electronics and Bioinformatics during 2001 to 2004, a professor in the above institute during 2006 to 2009, and a joint professor in the Graduate Institute of Molecular Biology and Biochemistry.

In addition, Professor Kao was the director of National Applied Research laboratories, Taiwan during 2006 to 2008, the vice president of the Institute of Information Industry during 2005 to 2008. He has also been the chairman of Asia Bioinformatics Society during 2000 to 2002 and 2006 to 2007, and the vice president during 2005 to 2006.

His research primarily focuses on bioinformatics and computational molecular biology. He had published more than 15 relevant papers on top journals of the field.

Session : D1-W2-T1: Computational Genomics and System Biology

Discovering Gapped Binding Sites of Transcription Factors

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ABSTRACT

A gapped transcription factor binding site (TFBS) contains one or more highly degenerate positions. Discovering gapped motifs is difficult, because allowing highly degenerate positions in a motif greatly enlarges the search space and complicates the discovery process. Here, we propose a new method for discovering TFBSs, especially gapped motifs. We use ChIP-chip data to judge the binding strength of a TF to a putative target promoter and use orthologous sequences from related species to judge the degree of evolutionary conservation of a predicted TFBS. Candidate motifs are constructed by growing compact motif blocks and by concatenating two candidate blocks, allowing 0~15 degenerate positions in between. The resultant patterns are statistically evaluated for their ability to distinguish between target and non-target genes. Then, a position-based ranking procedure is proposed to enhance the signals of true motifs by collecting position concurrences. Empirical tests on 32 known yeast TFBSs show that the new method is highly accurate in identifying gapped motifs, outperforming current methods, and it also works well on un-gapped motifs. Predictions on additional 54 TFs successfully discover 11 gapped and 38 un-gapped motifs supported by literature. Our method achieves high sensitivity and specificity for predicting experimentally verified TFBSs.

With the success of discovering TFBSs in yeast, we developed a web server, eTFBS, for mining TFBSs in human and other organisms. eTFBS asks for a set of potential target sequences and a set of negative sequences from the user, and reports the best ten motifs that are highly overrepresented in the positive set. For the human, mouse, fruit fly and yeast genomes, the input of eTFBS can be a set of gene names or RefSeq (SGD for yeast) identifiers and the server will collect the sequences of the promoter regions specified by the user directly from UCSC Genome Browser. Using three datasets to compare the performances of eTFBS and three current motif finding tools, we find that eTFBS outperforms the other three methods in most cases. It turns out that even with the search region restricted to [-500bp, TSS], eTFBS can achieve a reasonably good performance. Our study suggests that eTFBS is an efficient web server for mining TFBSs in a well-annotated eukaryotic genome.

BIOGRAPHY

Dr. Chien-Yu Chen is currently an associate professor of department of Bio-Industrial Mechatronics Engineering, National Taiwan University. She holds a B.S. degree of Electrical Engineering from National Taiwan University (1996), a M.S. degree of Electrical Engineering from Stanford University (1998), and a Ph.D degree of Computer Science and Information Engineering from National Taiwan University (2003). During the Ph.D program, she initiated the research of Bioinformatics, and has mainly focused on developing algorithms for studying molecular biology. She has been an Assistant Professor of Graduate School of Biotechnology and Bioinformatics in Yuan Ze University from Feb. 2004 to July 2005, where she began her academic career.

As a computational biologist, her research centers on two problems: sequence analysis and microarray data analysis. On sequence analysis, the research topics span several effective sequence-based methods for predicting protein functional sites associated with protein-DNA interactions, protein-ligand interactions, and protein-protein interactions. The basic idea behind those prediction methods is exploiting pattern mining technology in finding concurrent conserved regions among protein families. For another research topic, microarray data analysis, she utilizes the state of the art clustering and classification techniques on local microarray datasets for patient outcome prediction, time-course data analysis, and association discovery. The diseases studied so far include leukemia and breast cancer. Moreover, she applies pattern mining skills to identifying transcription factor binding sites directly from ChIP-chip data of yeast and combines public microarray data in current studies for constructing regulatory networks. Several published mining and prediction tools are available on the web, including MAGIIC-PRO, iPDA, and E1DS.

Dr. Chen has published 18 journal papers in the field of Bioinformatics and computational biology. Several published papers were honored as distinguished papers by National Taiwan University. Also she was honored as an excellent teacher by National Taiwan University in 2010. In recent years, Dr. Chen has dedicated herself to educating undergraduate students for interdisciplinary research.

Session : D1-W3-T1: Nanotechnology

Session Organizer & Chair

Darrin J. Young, PhD (楊駿 教授)

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BIOGRAPHY

Darrin J. Young received his B.S., M.S., and Ph.D. degrees from the Department of Electrical Engineering and Computer Sciences at University of California at Berkeley in 1991, 1993, and 1999, respectively. He pioneered the research work in MEMS-based, high-Q, tunable capacitors and on-chip 3-D coil inductors for low-phase noise RF voltage-controlled oscillator (VCO) design for wireless communication applications. His doctoral thesis work demonstrated the first RF-CMOS VCO employing on-chip high-Q passive devices achieving the stringent GSM phase noise requirements. Dr. Young joined the Department of Electrical Engineering and Computer Science at Case Western Reserve University in 1999 as an assistant professor. In 2009 he joined the Electrical and Computer Engineering Department at the University of Utah as an USTAR associate professor. His research interests include micro-electro-mechanical systems design, fabrication, and integrated analog circuits design for wireless sensing, biomedical implant, communication, and general industrial applications. He has published many technical papers in journals and conferences, and served as a technical program committee member and session chair for a number of international conferences. Dr. Young is an associate editor of the IEEE Journal of Solid-State Circuits and chair of the IEEE Electron Devices Society MEMS Committee.

Session : ***D1-W3-T1: Nanotechnology***

Nanogenerator for Electric Clothing

Liwei Lin, PhD (林立偉 教授)

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ABSTRACT:

A self-powering system that harvests its operating energy directly from the environment/body movement is an attractive proposition for sensing, personal electronics and security technologies. Mechanical energy scavenges by orderly electrospun piezoelectric nanofibers enable energy generation which could eventually leads to "electric clothing." This talk will introduce recent results on the demonstration of a single nanogenerator made of polyvinylidene fluoride (PVDF) via the in-situ stretching and poling electrospinning process. Results show that energy conversion efficiency of nanogenerator could be 10 times higher than large scale structures made of the same material. The capability of demonstrating electrospun nanofiber as possible power generator could have a profound impact in various application areas, including energy harvesting, strain sensing, and actuation sources.

BIOGRAPHY

Professor Liwei Lin received his Ph.D. degree from the University of California, Berkeley, in 1993 and is now Chancellor's Professor at the Mechanical Engineering Department and Co-Director at Berkeley Sensor and Actuator Center, an NSF/Industry/University research cooperative center. He served as the Vice-Chair for graduate study for the Mechanical Engineering department from 2006~2009. His research interests are in design, modeling and fabrication of micro/nano structures, sensors and actuators as well as mechanical issues in micro/nano systems including heat transfer, solid/fluid mechanics and dynamics. Dr. Lin is the recipient of the 1998 NSF CAREER Award for research in MEMS Packaging and the 1999 ASME Journal of Heat Transfer best paper award for his work on micro scale bubble formation. He led the effort in establishing the MEMS sub-division in ASME and served as the founding Chair of the executive committee for the MEMS division in ASME. He holds 13 U.S. patents in the area of MEMS and NEMS.

Session : ***D1-W3-T1: Nanotechnology***

Nanowire Electromechanical Devices and Systems - from Fundamentals to Emerging Technologies

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ABSTRACT:

Nanoscience today enables the creation of ultrasmall structures that lead to many fascinating topics at the research and technological frontiers. Nanoscale devices with mechanical degrees of freedom offer compelling characteristics that make them not only interesting tools for fundamental studies, but also intriguing candidates for technological applications. In particular, nanoelectromechanical systems (NEMS) vibrating in their *resonant* modes provide promising opportunities and advantages for developing novel sensors and transducers, in the previously inaccessible regimes. This presentation will describe some of my recent collaborative research efforts in *nanowire NEMS*, with an emphasis of how to innovate and advance today's state-of-the-art nanowire materials and structures into functional devices and integrated systems with high performance. I will first briefly overview the fundamentals of nanowire NEMS devices enabled by both the top-down and bottom-up nanofabrication techniques. I will then focus on the demonstrations of nanowire NEMS resonators and transducers in the very-high and ultra-high frequency (VHF/UHF) ranges, which have enabled single-biomolecule mass sensing in real time. I will show novel, high-performance Si nanowire NEMS based on a hybrid top-down/bottom-up technique. This new device technology has opened up the opportunities for monolithic and very-large-scale integration (VLSI); and has led to self-sensing nanowire NEMS sensors that are now being manufactured using industrial SOI technology. I shall also briefly highlight some latest milestones in SiC nanowires, nanowire NEMS logic and multifunctional devices. Finally, I will discuss the opportunities created by such explorations in future fundamental and technological research, and possibilities for emerging applications.

BIOGRAPHY

Philip Feng is a senior staff scientist at California Institute of Technology (Caltech), affiliated with the Kavli Nanoscience Institute, where he has also been serving as a co-principal investigator since 2008. He obtained his Ph.D. in electrical engineering from Caltech in 2007 for developing ultra-high-frequency nanoelectromechanical systems (NEMS) with low-noise technologies. He has since been a staff scientist and leading a small team of engineers and applied physicists at Caltech, to advance NEMS and other devices technologies for potential applications in sensing, signal processing, and computing. He has been privileged to deliver invited lectures at a number of peer-reviewed international conferences, as well as at research labs and institutes. He has been invited to serve on IEEE technical committees and also been serving as a frequent reviewer for more than fifteen high-impact multidisciplinary and IEEE journals

Session : D1-W3-T1: Nanotechnology

Low Power Sensing Electronics for High-Resolution Error-Correcting Biomechanical Ground Reaction Sensor Cluster

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ABSTRACT:

It is highly desirable to track a person's physical location in a GPS-denied environment, for example a fire fighter in a rescue mission or a traveler in a remote area. Commercially available inertial measurement units have been explored for such applications. However, these IMUs exhibit an excessive output drift over time, thus unsuitable for determining accurate position. It was recently demonstrated that a personal navigation system can be achieved by employing a high-resolution-gait-corrected IMU. The system combines a commercial IMU with a high-resolution, thin, flexible, error-correcting biomechanical ground reaction sensor cluster (GRSC). The IMU and GRSC will be placed within the heel and at the sole of a personnel boot and wirelessly connected to a handheld unit, which can process data in real-time. The high-resolution biomechanical GRSC can measure dynamic ground forces, shear strains, and sole deformation associated with a ground locomotion gait. These data can be used to detect periods of zero velocity accurately during the stance phase in a human bipedal locomotion to in turn provide correction to the IMU. This can drastically increase IMU effective positioning resolution and accuracy. This talk describes a low-power and low-interference sensing electronics to interface with the GRSC to accurately capture real-time dynamic response from a ground locomotion gait. The GRSC is composed of 13 x 13 sensing nodes. The integrated sensing electronics consist of a front-end multiplexer that can sequentially connect individual sensing nodes in a GRSC to a capacitance-to-voltage converter followed by an ADC, digital control unit, and driving circuitry to interrogate the GRSC. The sensing electronics are designed in a 0.15 μm CMOS process and occupy an area of approximately 3 mm^2 with an expected resolution of 10-bits and 14-bits for the z-axis pressure sensing and the x-y-axes shear strain sensing, respectively, while dissipating a DC power less than 2 mW from a 3V supply.

BIOGRAPHY

Darrin J. Young received his B.S., M.S., and Ph.D. degrees from the Department of Electrical Engineering and Computer Sciences at University of California at Berkeley in 1991, 1993, and 1999, respectively. He pioneered the research work in MEMS-based, high-Q, tunable capacitors and on-chip 3-D coil inductors for low-phase noise RF voltage-controlled oscillator (VCO) design for wireless communication applications. His doctoral thesis work demonstrated the first RF-CMOS VCO employing on-chip high-Q passive devices achieving the stringent GSM phase noise requirements. Dr. Young joined the Department of Electrical Engineering and Computer Science at Case Western Reserve University in 1999 as an assistant professor. In 2009 he joined the Electrical and Computer Engineering Department at the University of Utah as an USTAR associate professor. His research interests include micro-electro-mechanical systems design, fabrication, and integrated analog circuits design for wireless sensing, biomedical implant, communication, and general industrial applications. He has published many technical papers in journals and conferences, and served as a technical program committee member and session chair for a number of international conferences. Dr. Young is an associate editor of the IEEE Journal of Solid-State Circuits and chair of the IEEE Electron Devices Society MEMS Committee.

Session : D1-W4-T1: System-on-Chip Design Automation

Session Organizer & Chair

Sao-Jie Chen, PhD (陳少傑 教授)

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BIOGRAPHY

Sao-Jie Chen received the B.S. and M.S. degrees in electrical engineering from the National Taiwan University, Taipei, Taiwan, ROC, in 1977 and 1982 respectively, and the Ph.D. degree in electrical engineering from the Southern Methodist University, Dallas, USA, in 1988.

Since 1982, he has been a member of the faculty in the Department of Electrical Engineering, National Taiwan University, where he is currently a full professor. During the fall of 1999, he was a visiting professor in the Department of Computer Science and Engineering, University of California, San Diego, USA. During the fall of 2003, he held an academic visitor position in the Department of System Level Design, IBM Thomas J. Watson Research Center, Yorktown Heights, New York, USA. During the falls of 2004 to 2008, he was a visiting professor in the Department of Electrical and Computer Engineering, University of Wisconsin, Madison, USA. His current research interests include: VLSI physical design, SOC hardware/software co-design, and Wireless LAN and Bluetooth IC design.

Dr. Chen is a member of the Chinese Institute of Engineers, the Chinese Institute of Electrical Engineering, the Institute of Taiwanese IC Design, the Association for Computing Machinery, a senior member of the IEEE Circuits and Systems and the IEEE Computer Societies.

Session : ***D1-W4-T1: System-on-Chip Design Automation***

"System-on-Chip": Will Scaling Challenges Curtail Growth?

Howard Ko, PhD (柯復華 資深副總)

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ABSTRACT:

The rapid descent and "recovery" associated with the most recent downturn has shaken many of the industry leaders into rethinking their business and technical strategies. The result seems to be a growing bifurcation between those that will continue the pursuit of Moore's Law ("More Moore") and those focused on the heterogeneous integration of analog/RF, power, passives, sensors, actuators and biochips ("More than Moore"). This bifurcation extends to SOC where key functions such as storage and digital signal processing are dependent on Moore's Law scaling while functions such as power consumption, communication bandwidth as well as functions performed by sensors, actuators, biochips, optics, MEMS and embedded software do not.

Today, portable media, entertainment, medical, and automotive applications require the integration of CPUs and DSPs with other components such as analog, optical, digital and MEMs devices. Will the complexity and cost of scaling as well as integrating the necessary components of SOC s hinder the predicted SOC market growth (8-9% over the next 3 years)? Will the smaller footprint, higher performance, and better reliability overcome these issues? This paper will address the challenges facing the SOC ecosystem such as economics, technology development, IP, and verification in the context of today's and tomorrow's environment.

BIOGRAPHY

Dr. Howard Ko joined Synopsys in June 2002 and is currently Senior Vice President and General Manager of the Silicon Engineering Group. He manages products and solutions that address semiconductor

manufacturing technology needs. These solutions include TCAD, yield management, fracturing, and lithography. In his previous role as Vice President of Sales, Asia Pacific, Dr. Ko built a continuously increasing revenue stream, improved Synopsys' leadership position in the region, and increased collaboration with leading foundries. Before joining Synopsys, Dr. Ko served as Avant!'s executive operating officer since July 2001. Previously, he was general manager of Avant!'s mixed technology division and head of the system product line. Dr. Ko has also held senior management roles at Analogy, Inc. and Mentor Graphics. Dr. Ko received his Ph.D. in Electrical Engineering and Computer Science from UC Berkeley, and graduated with a B.S. degree in Electrical Engineering from the National Taiwan University.

Session : D1-W4-T1: System-on-Chip Design Automation

Digital System Verification Using Massively Parallel Processor Arrays

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ABSTRACT

Logic simulation does not belong to the class of problems that are embarrassingly easy to parallelize. Nevertheless, such parallelization is required in order to achieve simulation speed that does not grow proportionally to the system size. Field programmable gate arrays provide the required level of parallelism as long as system complexity does not exceed the capacity of few devices. Beyond this level of complexity, automatic system partitioning produces cut sizes that require deep time-division multiplexing of inter-device interconnect thus negating the speed advantage of parallelism. This paper describes massively parallel processor array architecture for digital system simulation. The array scales to the size required for mapping digital systems of extreme complexity. It is shown how static scheduling of message passing allows compiler to greedily schedule such systems for execution in constant amount of time. Practical considerations of system observability, controllability, external interfaces are discussed.

BIOGRAPHY

Mike Bershteyn was born in Kiev, Ukraine in 1952. Earned (the USSR equivalent of) PhD degree in computer science from Ukrainian Academy of Sciences Institute of Electrodynamics in Kiev, Ukraine, 1980.

He held various positions in software development for industrial automation, test and measurement. After immigrating to the USA in 1989, he worked at Mitsubishi Electric Research Laboratories as CAD development manager specializing in automatic test pattern generation and digital simulation. In 1995 he joined Quickturn Design Systems as director of software development for emulation. In 2001-2003 served as vice president of software engineering of Cognigine corporation. Since 2003 holds a position of fellow at Cadence Design Systems in San Jose, CA.

Dr. Bershteyn published a number of articles in the USSR technical journals, he is named as inventor in 9 US patents, presented papers at Design Automation Conference and International Test Conference, contributed to EDA for Integrated Circuits Handbook, CRC Press, 2006. In 1984 he earned the Ukrainian State Award for Outstanding Contributions to Science and Technology.

Session : ***D1-W4-T1: System-on-Chip Design Automation***

The Challenge of System-Level Design

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ABSTRACT:

The raise from gate-level to RTL design entry was driven by the need for higher design productivity. Specifically, RTL modeling allowed faster functional simulation and thus addressed the need for higher verification capacity to verify the growing system complexity. Furthermore, the availability of static timing analysis, formal equivalence checking between RTL and gate level, and automatic logic synthesis from RTL to gates supported a predictable automated implementation flow. The need for system-level modeling has similar motivations, mostly faster simulation for supporting early system validation and software development. However, there are significant differences. First, the level of abstraction needed for fast performance is significantly higher which results in a number of challenges for a consistent implementation flow. Second, there is no uniform level of model abstraction as large system models require a fine-tuned balance between modeling detail and performance for the different components. In this talk, we will provide an overview of the challenges in system level design and discuss a number of technologies that are currently available and under development.

BIOGRAPHY

Andreas Kuehlmann received the Dipl-Ing. degree and the Dr.-Ing. habil degree in Electrical Engineering from the University of Technology at Ilmenau, Germany, in 1986 and 1990, respectively. His research topics included algorithms for automatic layout verification and synthesis. After graduation, from 1990 to 1991, Andreas worked at the Fraunhofer Institute of Microelectronic Circuits and Systems, Duisburg, on a project to automatically synthesize embedded microcontrollers. In 1991 he joined the IBM T.J. Watson Research Center where he worked until June 2000 on various projects in high-level and logic synthesis and hardware verification. Among others, he was the principal author and project leader of Verity, IBM's standard equivalence checking tool. From January 1998 until May 1999 Andreas visited the Department of Electrical Engineering and Computer Science at U.C. Berkeley. In July 2000 he joined the Cadence Berkeley Laboratories where he continues to work on synthesis and verification problems. Since July

2002, he has also been an adjunct professor at the University of California at Berkeley. In 2003 Andreas was awarded IEEE Fellow. In August 2003 Andreas became the Director of Cadence Laboratories. Andreas currently serves as President of the IEEE Council on EDA (CEDA).

Session D1-W1-T2: Energy, Environment and Sustainability

Session Organizer & Chair

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BIOGRAPHY

Wei-Jen Lee (S'85-M'85-SM'97-F'07) received the B.S. and M.S. degrees from National Taiwan University, Taipei, Taiwan, R.O.C., and the Ph.D. degree from the University of Texas, Arlington, in 1978, 1980, and 1985, respectively, all in Electrical Engineering.

In 1985, he joined the University of Texas, Arlington, where he is currently a professor of the Electrical Engineering Department and the director of the Energy Systems Research Center.

He has been involved in the revision of IEEE Std. 141, 339, 551, and 739. He is the Secretary of the IEEE/IAS, Industrial & Commercial Power Systems Department (ICPSD), the Committee Chairman of the Energy Systems Committee at ICPSD, and the associate editor of IEEE/IAS and International Journal of Power and Energy Systems. He is the project manager of IEEE/NFPA Collaboration on Arc Flash Phenomena Research Project.

Prof. Lee has been involved in research on renewable energy, power flow, transient and dynamic stability, voltage stability, short circuits, relay coordination, power quality analysis, demand response, on-line equipment protection, monitoring, and control system, and utility deregulation. He has served as the primary investigator (PI) or Co-PI of over seventy funded research projects He has published more than one hundred sixty journal papers and conference proceedings. He has provided on-site training courses for power engineers in Panama, China, Taiwan, Korea, Saudi Arabia, Thailand, and Singapore. He has refereed numerous technical papers for IEEE, IEE, and other professional organizations.

Prof. Lee is a Fellow of IEEE and registered Professional Engineer in the State of Texas.

Session : D1-W1-T2: Energy, Environment and Sustainability

Electrochemical Energy Conversion and Storage - fuel Cells and Redox Battery

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ABSTRACT

To search alternative energies other than fossil fuel and due to global eco-awareness, renewable energies play an important role in development of sustainable energy and reduction of carbon dioxide emission. Hydrogen fuel cell is a clean energy technology. It uses hydrogen as the fuel and uses fuel cell as the energy conversion device to generated electricity and heat. Hydrogen can be generated from water in couple with photovoltaic and wind power. High efficiency, zero emission, and low noise makes hydrogen fuel cell becoming one of the most promising energy technology in near future. Beside the space and military applications, hydrogen fuel cell has been successfully demonstrated as the power sources (1) for transportation application, such as electrical vehicles, bus, and motor cycles, (2) for stationary application, such as distributed power station, combined heat and power unit, un-interrupted power supplier, auxiliary power unit, (3) for portable electronics application, such as notebook, etc. The power generation rate of photovoltaic and wind power is not steady. Energy storage is needed for load leveling and power management. Many energy storage technologies are under development. Vanadium redox flow battery is one of the best candidates as electrical energy storage in kWh~MWh range for wind turbine, photovoltaic micro-grid energy balance and power management. The cell stack and system of PEMFC are similar to those of VRB. This presentation will be briefly introduced these green energy technologies, fuel cell for energy conversion and redox flow battery for energy storage.

BIOGRAPHY

Kan-Lin Hsueh was born at KeeLung, Taiwan in 1956. He graduated from Chung-Yuan Christian University (Taiwan) in 1977. He received Ph.D. from Clarkson University (USA) in 1984. Graduated works were in the area of fuel cell and energy storage battery. After graduated, he joined the Chem. Eng. Dept., National Tsing Hua University (Taiwan) as associate professor. Research projects were mainly in the area of II-VI semi-conducting material for optical fiber. In 1989, he moved to US and joined AMP Inc.

as a member of technical staff. In AMP Inc., he carried out research in the area of high-speed selective plating. Between 1999 and 2001, he studied the electrochemical etching of silicon micro-channel plate in NanoSciences Corp. In 2001, he joined ITRI (industrial Technology Research Institute) Taiwan, conducting research on DMFC (direct methanol, fuel cell) for portable devices and PEMFC (proton exchange membrane fuel cell) for stationary applications. He also served as the manager of PEMFC lab. Since 2008, he joined the Dept. of Energy and Resources, National United University. He started research in the area of fuel cell for energy conversion and battery for energy storage.

Session : D1-W1-T2: Energy, Environment and Sustainability

Direct Conversion of Green Energy: from Quantum to System

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ABSTRACT:

Direct conversion techniques of green energy are presented. Multi-scale fundamentals, including quantum mechanics, molecular dynamics, lattice Boltzmann modeling, computational fluid dynamics and control system dynamics are integrated to develop various green power engines, such as: fuel cells, photoelectrochemical solar cells, lithium batteries, ultra-capacitors and thermoelectric generators for applications ranging from small potable power to large scale distributed power generation systems. Computer simulation was performed to evaluate the feasibility of the above green technologies to replace the traditional combustion engines. System-scale control strategies, macro- and micro-scale electrochemical performance design as well as nano-scale material optimizations are all covered in the research direction of my Green Energy & Molecular Engineering Lab aiming at the ultimate target of high efficiency green power conversion without any pollution.

BIOGRAPHY

Prof. Che-Wun Hong was born in Kaohsiung city, Taiwan on March 15th, 1956. He received bachelor degree in Mechanical Engineering from National Cheng-Kung University in 1978. After graduation from the university, he served in the army as an armored vehicle officer (1978~1980), then worked as a mechanical engineer in the Ford Motor Company (1980~1981), and then transferred to the Industrial Technology Research Institute (ITRI) as an engine researcher (1981~1982). In the fall of 1982, after saving enough money, he went to United Kingdom to study higher degrees. He received his MSc degree from the UMIST (Manchester, UK) in 1983 and a PhD degree from the Imperial College (London, UK) in 1987, all majored in Mechanical Engineering.

In 8/1987, he returned to Taiwan and joined the Department of Power Mechanical Engineering of National Tsing Hua University as an associate professor. He was promoted to full professor in 1997. Being a faculty member for 23 years, his research area ranges from internal combustion engines, turbochargers to the automotive engineering; and then he switched to the green power engineering at the millennium. His current research focuses on the fuel cells, solar cells, lithium-ion batteries, ultra-capacitors and thermoelectric chips by means of the academic fundamentals, such as: quantum mechanics, molecular dynamics, Boltzmann modeling, computational fluid dynamics and control system dynamics. He has published more than 200 technical papers, including archived journals, proceedings of national and international conferences and technical reports; also he has registered for two patents in Taiwan and USA.

Session : D1-W1-T2: Energy, Environment and Sustainability

Smart Grid – Demand-Side Perspectives

Edwin Liu, PhD (劉文雄 博士)

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ABSTRACT

President Barack Obama said: "We'll fund a better, smarter electricity grid and train workers to build it --- a grid that will help us ship wind and solar power from one end of this country to another.""Think about it. The grid that powers the tools of modern life --- computers, appliances, even BlackBerrys --- looks largely the same as it did half a century ago." This gave a major government commitment on the smart grid revolution. The smart grid's initial efforts, now backed with the largest single grid modernization investment in U.S. history among other investment grants, continues to develop without bounds. What began as a theoretical idea has increasingly become a reality; 54 workforce training initiatives have been selected to receive just shy of 100 million dollars to train new hires and to develop new strategies and training curriculum for the future. Close to $10 billion investments from both government and industry will introduce major activities in the next 3-5 years as the main momentum of the energy industry transformation.

With all these efforts, the main business drives can be categorized into three main areas: customer participation, emission awareness, and utility operation & planning. The final smart grid benefit recipient should be the consumers. The US Energy Secretary, Steve Chu, said: "To assuage consumers who are resistant to changing their habits, energy savings in the home has to be incredibly simple … Much like a point-and-shoot camera that lets consumers simply push a button to take a picture, but possess the ability to do much more embedded in the device … Real-time pricing will lead to demand response and, if done right – meaning consumers are given the right tools, like this "magic button" – energy costs will be driving down." So, in the near term, we should empower the consumers so that they can actively participate in the power grid operation and planning through demand response or other distributed energy resources; in the long term, we need to address how to build a smart grid that is consumer-centric, and capable of balance multiple-attributes (societal constraint verses individual consumer needs versus system operation constraints.)

In this presentation, we will address the demand-side smart grid activities --- from the energy industry transformation to the challenges and issues faced by smart grid development. The pathway of developing a consumer focused smart grid will also be discussed, including the integration of home automation, demand-side management, demand response, and electrification of transportation. Several practical considerations, such as privacy, technology adoption, benefits to consumers of smart grid efforts will be presented.

BIOGRAPHY

Dr. Edwin Liu, *Vice President of Strategy Initiatives and Smart Grid, Quanta Technology, LLC,* has more than 28 years of experience in consulting, research, and development on power system analytics and integration, both in industry and academia. Throughout his career, he has been with universities, software vendors, utility and consulting companies - focusing on applying state-of-the-art technologies to energy utility and industry. His expertise is on smart grid, information integration, power system optimization, electricity market modeling, energy and emission management, automation, technology innovation, and business strategy. In Quanta, Edwin is responsible for business initiatives in the smart grid and energy management areas, including analytical applications, automation, and integration. He is actively involved in the California smart grid projects. Dr. Liu is an experienced technical project manager and is equipped with interdisciplinary domain expertise.

Edwin received his BS degree in Electrical Engineering from National Taiwan University; MS and PhD in Electrical Engineering and Computer Sciences, both from University of California, Berkeley. Dr. Liu is an IEEE Fellow for his contributions to the development of state estimation and optimal power flows, and their integration in utility systems. He was the Chairman of the IEEE Computing and Analytical Methods Subcommittee. Dr. Liu was an advisor to the National Science Council, Taiwan. He serves as the industry advisor at the Energy Systems Research Center, University of Texas, and the visiting scholar at the Department of Electrical Engineering, Xi'An JiaoTong University. Before joined Quanta Technology, he has worked for Siemens, Pacific Gas and Electric Company, Bechtel, and was a member of the start-up management team of Nexant.

Session D1-W2-T2: Medicine

Session Organizer & Chair

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BIOGRAPHY

Education

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Ph.D., Department of Nuclear Engineering, 1998 February.
National Taiwan University **Taipei, Taiwan**
M.D., College of Medicine, 1987 December
National Tsinghua University **Hsinchu, Taiwan**
B.S., Department of Nuclear Engineering, 1980 June

Experience

National Taiwan University College of Medicine **Taipei, Taiwan**
2007 August - now
Professor, Center for Optoelectronic Biomedicine,
Adjunct appointment in the Institute of Biomedical Engineering,
Department of Radiology and National Health Research Institute
2003 August – 2007 August
Associate Professor, Center for Optoelectronic Biomedicine,
Adjunct appointment in the Institute of Biomedical Engineering,
Department of Radiology and National Health Research Institute
1999 August – 2003 July
Assistant Professor, Center for Optoelectronic Biomedicine
National Taiwan University Hospital **Taipei, Taiwan**
1999 August – now
Attending Doctor, Department of Medical Imaging
1992 - 1993

Attending Doctor, Department of Medical Imaging
1988 - 1992
Resident, Department of Medical Imaging
MGH-NMR Center, Harvard Medical School **Charlestown, MA**
1998 September – 1999 August
Instructor in Radiology, Massachusetts General Hospital
1998 February - 1999 August
Post-Doctoral Research Fellow
1994 - 1997
Research Assistant
Massachusetts Institute of Technology **Cambridge, MA**
1993 - 1996
Teaching Assistant

Selected Journal Papers

1. IC Liu, CH Chiu, CJ Chen, LW Kuo, YC Lo, WY I Tseng. Tractography based segmentation of corpus callosum in alcohol dependence: a diffusion spectrum imaging study. Psychiatric Research: Neuroimaging, 2010, in print.
2. FC Yeh, VJ Wedeen, and WY I Tseng. Generalized q-space imaging. IEEE Trans Med Imaging. 2010 Mar 18. [Epub ahead of print].
3. PF Tang, YH Ko, ZA Luo, FC Yeh, SH A Chen, and WY I Tseng. Tract-specific Quantitative Analysis of Corticospinal Tract Integrity in Subcortical Ischemic Stroke: A Reliability and Validity Study. AJNR Am J Neuroradiol. 2010 Jan 28. [Epub ahead of print].
4. YC E Hsu., CH Hsu, WY I Tseng. Correction for Susceptibility-induced Distortion in Echo Planar Imaging Using Field Maps and Model-Based Point Spread Function. IEEE Trans Med Imaging. 2009 Nov;28(11):1850-7.
5. MT Wu, MY M Su, YL Huang, KR Chiou, P Yang, HB Pan, TG Reese, VJ Wedeen, WY I Tseng. Sequential Changes of Myocardial Microstructure in Patients Post Myocardial Infarction by Diffusion-Tensor Cardiac MR Correlation with Left Ventricular Structure and Function. Circulation Cardiac Imgaging, 2009;2(1):32-40.
6. LW Kuo, CY Lee, JH Chen, VJ Wedeen, CC Chen, HH Liou, WY I Tseng. Mossy Fiber Sprouting in the Pilocarpine-induced Status Epilepticus Rat Hippocampus: A correlative study of diffusion spectrum imaging and histology. Neuroimage 2008;41:789-800.
7. LW Kuo, JH Chen, VJ Wedeen, and WY I Tseng. Optimization of Diffusion Spectrum Imaging and Q-ball Imaging on Clinical MRI System. Neuroimage 2008;41:7-18.
8. VJ Wedeen, RP Wang, JD Schmahmann, T Benner, WY I Tseng, G Dai, AJ D Crespigny, DN Pandya, P Hagmann, HD'Arceuil. Diffusion spectrum magnetic resonance imaging (DSI) tractography of crossing fibers. Neuroimage 2008;41:1267-77.
9. MT Wu, WY I Tseng, MY M Su, KR Chiou, CP Liu, VJ Wedeen, TG Reese, CF Yang. Diffusion tensor MRI mapping the fiber archiecture remodeling in human myocardium post infarction – correlation with viability and wall motion. Circulation 2006;114:1036-45.

Session : D1-W2-T2: Medicine

Epigenetic Control of Heart Development and Disease

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ABSTRACT

Epigenetic control of heart development and disease

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(2) Department of Genetics, Albert Einstein College of Medicine, New York, USA

Cardiac hypertrophy and failure are characterized by transcriptional reprogramming and fetal gene activation, which correlate with cardiac performance and clinical outcome. Adult cardiomyocytes in mice are post-mitotic and express mainly α-myosin heavy chain (α-MHC), whereas embryonic cardiomyocytes are highly proliferative and express primarily β-MHC. Adult hearts under stress develop hypertrophy, accompanied by a shift from α-MHC to fetal β-MHC, leading to contractile dysfunction and heart failure. Mechanisms bridging the developmental and pathological gene expression are not well understood. We show that Brg1, a core ATPase component of the BAF chromatin-remodeling complex, has a critical role in regulating cardiac growth, differentiation and gene expression. In embryos, *Brg1* promotes myocyte proliferation by maintaining *Bmp10* and suppressing a CDK inhibitor, $p57^{kip2}$. In parallel, Brg1 preserves fetal cardiac differentiation by interacting with histone deacetylases (HDACs) and poly (ADP ribose) polymerase (PARP) to repress α-*MHC* and activate β-*MHC*. In adults, *Brg1* expression is turned off in cardiomyocytes. It is reactivated by cardiac stresses and forms a complex with its embryonic partners, HDAC and PARP, to induce a pathological shift from α- to β-*MHC*. Preventing *Brg1* re-expression decreases hypertrophy, abolishes fibrosis and reverses the pathological *MHC* switch. *BRG1* is activated in certain patients with hypertrophic cardiomyopathy. Its level correlates with disease severity and *MHC* changes, suggesting a role of BRG1 gene in human hypertrophic heart disease. Our studies thus uncover a role of Brg1 in maintaining cardiomyocytes in an embryonic state, and an epigenetic mechanism by which three chromatin-modifying factors-Brg1, HDAC and PARP-cooperate to control developmental and pathological gene expressions. BRG1 may constitute a therapeutic target for cardiomyopathy and heart failure.

BIOGRAPHY

A. Academic history:

Colleges and universities attended, degrees received, dates.

9/1983-6/1990	MD	National Taiwan University (*summa cum laude*) Taipei, Taiwan
9/1992-6/1997	PhD	Stanford University - Cancer Biology Stanford, California

Scholarships and honors:

1983-1990	National Taiwan University, Dean's Lists & Dean's Awards
1989	Harvard Medical School, Exchange Student selection

Post-doctoral and residency training:

7/1/97-6/30/99 Internship and Residency, Internal Medicine

Massachusetts General Hospital, Harvard University, Boston, Massachusetts

7/1/99-6/30/01 Clinical Cardiology Fellowship

Stanford University School of Medicine, Stanford, California

7/1/01-6/30/04 HHMI Physician-Scientist Fellowship

Stanford University School of Medicine, Stanford, California

7/1/99-6/30/04 Fellowship, Clinical Investigator Pathway, Cardiovascular Medicine

Stanford University School of Medicine, Stanford, California

Board eligibility and boards passed, with date(s):

1990 Certified, Medical Practice by Department of Health, Taiwan

	Certificate No.: 019958
1991-1992	Certified, Educational Commission for Foreign Medical Graduates (ECFMG) Certificate No.: 0-468-016-1
1996-1998	U.S. Medical Licensing Exam (USMLE) Passed
2000	A.B.I.M. Certification, Internal Medicine Certificate No.: 197361
2004	A.B.I.M. Certification, Cardiovascular Disease Certificate No.: 197361

Licensure

7/1999 California Medical License #A69033

B. Employment history: List all academic and non-academic positions.

Academic positions:

7/1/04-12/31/04	Research Associate, Department of Pathology Stanford University School of Medicine
10/1/04-1/31/05	Acting Assistant Professor of Medicine, Cardiovascular Medicine Stanford University School of Medicine, Stanford, CA
2/1/05-pres	Assistant Professor of Medicine, Cardiovascular Medicine Stanford University School of Medicine, Stanford, CA

C. Public and professional service.

7/1990 – 8/1992 Medical Officer, Second Lieutenant, National Army, Taiwan

National

8/2006	Moderator, Undergraduate Research Roundtable Faculty, Undergraduate Research Training Program American Heart Association, CA
11/06-10/07	American Heart Association, Western Review Consortium Peer Review Committee 2B (Integrative Cardiology and Physiology; Rob MacLellan, Chair)
10/12/2007	American Heart Association, National Center Peer Review Committee BASIC 3 (Basic Science & Molecular Biology 3 Study Group; Richard Anderson, Chair)

D. Post-degree honors and awards

Honors and awards

1990	National Taiwan University Hospital, Best Intern Award

1990	National Taiwan University Medical School
2000	American College of Cardiology, Travel Award
2001 - 2004	Howard Hughes Medical Institute, Physician-Scientist Fellowship Award
3/8/2004	Keystone Symposia Award, International Keystone Symposia Scholarship for Molecular Biology of Heart Disease, Cardiac Development and Congenital Heart Disease, Keystone, CO
5/13-16/2004	Weinstein Award, International Weinstein Cardiovascular Development Conference, Leiden, Netherlands
2005	National Scientist Grant Award, American Heart Association
2006	Donald E. and Delia B. Baxter Foundation Faculty Scholar Award
2007	Children's Heart Foundation, Medical Research Grant Award
2007	March of Dimes Foundation, Research Award
2009	California Institute of Regenerative Medicine, New Faculty Award

E. Publications

Hang C, Yang J, Han P, Cheng HL, Ashley E, Zhou B, Chang CP. Chromatin regulation by Brg1 underlies heart muscle development and disease. *Nature* 2010; 466(7302): 62-67

Stankunas K, Hang C, Tsun ZY, Chen H, , Lee NV, Wu J, Shing C, Baylor JH, Shou W, Iruela-Arispe L, Chang CP. Endocardial Brg1 represses ADAMTS1 proteases to maintain the microenvronment for myocardial morphogenesis. *Dev. Cell* 2008 Feb;14(2):298-311.

Chang CP, Neilson JR, Bayle JH, Gestwicki JE, Kuo A, Graef IA, Crabtree GR. A field of myocardial-endocardial NFAT signaling underlies heart valve morphogenesis. *Cell* 2004 Sept; 118, 649-663.

Session D1-W2-T2: Medicine

Imaging Technology for Personalized Medicine

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ABSTRACT

The functional anatomy of the brain is its connectional anatomy, that is, its structure as a network. The human brain is a network of a few hundred sharply defined components—neural organs of gray matter and white matter fiber pathways. Conventional MRI cannot detect these intricate fiber pathways. Diffusion MRI, however, offers a unique opportunity of imaging and mapping human connectional anatomy for the first time, and further, to do so in living human subjects. In the past ten years, we developed diffusion spectrum imaging (DSI) which is an advanced diffusion imaging technique aiming to resolve complex crossing fibers in the brain. To make this advanced technique available to clinical studies, we determined the optimal acquisition parameters of DSI on clinical scanners. We also developed several techniques that are vital to application of DSI to clinical studies. The techniques included: 1) a new method to correct for susceptibility-induced distortion in echo planar imaging; 2) a non-Cartesian sampling technique of diffusion encoding directions to reduce the scan time; 3) a user-friendly software for reconstructing diffusion tractography; 4) algorithm for analyzing diffusion indices along a specific tract bundle; 5) a technique employing large deformation diffeomorphism to normalize DSI datasets unto a template; 6) a novel method that allows resolution of crossing fibers from generalized sampling in the diffusion-encoding space. These techniques have been integrated into a package allowing seamless workflow of acquisition, reconstruction and analysis of DSI data. This package has been implemented to study psychiatric or neurological diseases including alcoholism, obsessive compulsive disorder, autistic spectrum disorder, attention-deficit hyperactivity disorder, schizophrenia, stroke and epilepsy. Having verified the clinical potential of DSI, current works have been focused on a standardized and automatic processing of the whole brain tractography and presentation of normalized profiles of tract-specific integrity index over a group of brains. This platform could greatly facilitate the process of tractography analysis and establish normative tract profiles in a large population. The normative profiles could serve as a digital resource for neuroscience research and health care guidelines. Such data, called connectome, could also be used as endophenotypes of general population, from which the impact of functional polymorphism on systems level brain structure, as well as the association with the behavioral or cognitive phenotypes can be investigated.

BIOGRAPHY

Education

Massachusetts Institute of Technology **Cambridge, MA**
Ph.D., Department of Nuclear Engineering, 1998 February.
National Taiwan University **Taipei, Taiwan**
M.D., College of Medicine, 1987 December
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B.S., Department of Nuclear Engineering, 1980 June

Experience

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Professor, Center for Optoelectronic Biomedicine,
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2003 August – 2007 August
Associate Professor, Center for Optoelectronic Biomedicine,
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1999 August – 2003 July
Assistant Professor, Center for Optoelectronic Biomedicine
National Taiwan University Hospital **Taipei, Taiwan**
1999 August – now
Attending Doctor, Department of Medical Imaging
1992 - 1993
Attending Doctor, Department of Medical Imaging
1988 - 1992
Resident, Department of Medical Imaging
MGH-NMR Center, Harvard Medical School **Charlestown, MA**
1998 September – 1999 August
Instructor in Radiology, Massachusetts General Hospital
1998 February - 1999 August
Post-Doctoral Research Fellow
1994 - 1997
Research Assistant
Massachusetts Institute of Technology **Cambridge, MA**
1993 - 1996
Teaching Assistant

Selected Journal Papers

1. IC Liu, CH Chiu, CJ Chen, LW Kuo, YC Lo, WY I Tseng. Tractography based segmentation of corpus callosum in alcohol dependence: a diffusion spectrum imaging study. Psychiatric Research: Neuroimaging, 2010, in print.
2. FC Yeh, VJ Wedeen, and WY I Tseng. Generalized q-space imaging. IEEE Trans Med Imaging. 2010 Mar 18. [Epub ahead of print].
3. PF Tang, YH Ko, ZA Luo, FC Yeh, SH A Chen, and WY I Tseng. Tract-specific Quantitative Analysis of Corticospinal Tract Integrity in Subcortical Ischemic Stroke: A Reliability and Validity Study. AJNR Am J Neuroradiol. 2010 Jan 28. [Epub ahead of print].
4. YC E Hsu., CH Hsu, WY I Tseng. Correction for Susceptibility-induced Distortion in Echo Planar Imaging Using Field Maps and Model-Based Point Spread Function. IEEE Trans Med Imaging. 2009 Nov;28(11):1850-7.
5. MT Wu, MY M Su, YL Huang, KR Chiou, P Yang, HB Pan, TG Reese, VJ Wedeen, WY I Tseng. Sequential Changes of Myocardial Microstructure in Patients Post Myocardial Infarction by Diffusion-Tensor Cardiac MR Correlation with Left Ventricular Structure and Function. Circulation Cardiac Imgaging, 2009;2(1):32-40.
6. LW Kuo, CY Lee, JH Chen, VJ Wedeen, CC Chen, HH Liou, WY I Tseng. Mossy Fiber Sprouting in the Pilocarpine-induced Status Epilepticus Rat Hippocampus: A correlative study of diffusion spectrum imaging and histology. Neuroimage 2008;41:789-800.
7. LW Kuo, JH Chen, VJ Wedeen, and WY I Tseng. Optimization of Diffusion Spectrum Imaging and Q-ball Imaging on Clinical MRI System. Neuroimage 2008;41:7-18.
8. VJ Wedeen, RP Wang, JD Schmahmann, T Benner, WY I Tseng, G Dai, AJ D Crespigny, DN Pandya, P Hagmann, HD'Arceuil. Diffusion spectrum magnetic resonance imaging (DSI) tractography of crossing fibers. Neuroimage 2008;41:1267-77.
9. MT Wu, WY I Tseng, MY M Su, KR Chiou, CP Liu, VJ Wedeen, TG Reese, CF Yang. Diffusion tensor MRI mapping the fiber archiecture remodeling in human myocardium post infarction – correlation with viability and wall motion. Circulation 2006;114:1036-45.

Session D1-W2-T2: Medicine

Electrical Stimulation of Degenerate Retina towards the Development of Prosthetic Vision for the Blind

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ABSTRACT

Retinitis Pigmentosa (RP) is a blinding disease characterized by massive and progressive reduction in the population of photoreceptor cells, result in losing night vision, followed severely loss of peripheral vision an often total blindness. No effective treatment is yet available for RP. Electrical stimulation of the retina through a bioelectronic implant, replaces some of the lost function of the degenerated neurons, allowing test subjects with experimental implants to perform simple visual tasks. Thus, retinal implants have potential to provide an effective means of restoring vision to RP patients.

Retinal implant has been advanced from a low resolution (4x4) to a high resolution (60x60). It is noted that the safety and efficiency are the main concerns of a successful retinal implant. This project is to advance the understanding of electrical stimulation in degenerate retina using small electrode and thus enable the transition from low resolution to high resolution retinal prostheses. This project will hopefully lay the groundwork for the successful development of high resolution retinal prostheses to enable individuals suffered with RP to perform important visually-guided tasks, such as navigation, reading, and facial recognition.

BIOGRAPHY

Leanne Lai-Hang Chan received her B.Eng. in Electronic and Electrical Engineering from the University of Hong Kong in 2002. After one year of internship in industry with Motorola Semiconductor Hong Kong, she went to University of Southern California (USC) for graduate school, earning degrees in Electrical

Engineering (M.S. 2004) and Biomedical Engineering (M.S. 2006, Ph.D. 2009). She joined the Saban Research Institute at Childrens Hospital Los Angeles in 2009 as a postdoctoral fellow.

She works as a research assistant in the Biomimetic Microelectronics Systems Laboratory in the Engineering Research Center USC for five years. She has mentored students from Research Experiences for Undergraduates in the BMES education program for two summers. She also volunteered as a science teacher in Murchison Elementary School in the BMES outreach program. She published and co-authored two IEEE conference papers and co-authored one journal paper in Cell Tissue Research. Her research interests include retinal prostheses, functional electrical stimulation, *in vivo* electrophysiology, and cortical plasticity.

Dr. Chan is a member of Biomedical Engineering Society (BMES), Engineering in Medicine and Biology Society (IEEE EMBS), Association for Research in Vision and Ophthalmology (ARVO), and Society for Neuroscience (SfN). She has been a reviewer for Investigative Ophthalmology and Visual Science, and the IEEE Engineering in Medicine and Biology Conference. She received a leadership award in International Community at USC, and a travel grant from Women in Science and Engineering (WiSE) program.

Session D1-W3-T2: Nanotechnology

Session Organizer & Chair

Chih-hung (Alex) Chang, PhD (張至弘 教授**)**

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BIOGRAPHY

Chih-hung (Alex) Chang was born in Taipei, Taiwan 1969. He received a B.S. degree from the Department of Chemical Engineering, National Taiwan University in June 1991. He received his PhD degree in chemical engineering from University of Florida, Gainesville Florida in December 1999.

He did a research project to study deposition of thin film platinum on titanium substrates using electrochemical methods. He received a graduate fellowship from the Department of Chemical Engineering, University of Florida, and started the graduate program in August 1994. His dissertation research concerned the development of a manufacturing process for the growth of thin-film photovoltaic cells using rapid thermal processing under Prof. Timothy J. Anderson's guidance. He joined Oregon State University in January, 2000. He is currently a full professor in the School of Chemical, Biological, and Environmental Engineering. He was a visiting professor in the Materials Science and Engineering Department at National Taiwan University from April 2008 till September 2008 sponsored by the National Science Council of Taiwan.

Prof. Chang is a member of a number of professional societies including American Institute of Chemical Engineers, The Electrochemical Society, American Vacuum Society, American Chemical Society, and Material Research Society. He is a SHARP Labs of America scholar and a recipient of AVS Graduate Research award, National Science Foundation's CAREER award, and awardees of W.M. Keck Foundation. His group has studied solution based thin film deposition processes, ink jet printing, microreaction technology, and X-ray absorption fine structure. He has more than 55 refereed publications, 2 issued patents, and 10 pending patents in these areas.

Session D1-W3-T2: Nanotechnology

Nanoporous Membranes Formed by Interferometric Lithography

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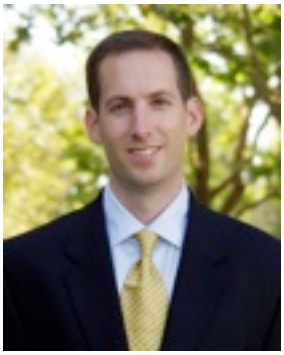
ABSTRACT

Membranes with nanometer-scale pores have demonstrated utility for molecular sensing, separation and water purification. Among the most common and useful molecular sieves available today are polycarbonate track-etched (PCTE) and anodic aluminum oxide (AAO) membranes. A new class of membranes based on carbon nanotubes is also very promising. For molecular sensing and separation applications, thinner membranes (100s of nm and below) have potential for enhanced molecular transport rates as well as reduced clogging due to the relatively short times that molecules spend in proximity to pore walls. Ultra-thin membranes in polycrystalline silicon have been demonstrated, for example, with excellent transport properties.

Here I present a general technology based on interferometric lithography for making uniform arrays of pores in membranes. Interferometric lithography employs two or more lasers overlapping in a photosensitive material to create a periodic pattern. The approach is promising for large-scale manufacturing of nanoporous membranes because it can function without a mask over large areas, and can be readily used to create deep sub-wavelength features. I will present molecular transport results obtained on membranes formed by interferometric lithography, as well as molecular dynamics simulations obtained with the ESPResSo (Extensible Simulation Package for Research on Soft matter) code, to demonstrate the functionality and utility of this class of nanoporous membranes.

BIOGRAPHY



Joe Tringe received a bachelor's degree in physics from Harvard University (Cambridge, Massachusetts) in 1994, and the Ph.D. degree in materials engineering from Stanford University (Stanford, California) in 2000.

He served in the U.S. Air Force at Kirtland Air Force Base, New Mexico, as Group Leader for the Air Force Research Laboratory's radiation-hard electronics development program, then joined Lawrence Livermore National Laboratory in Livermore, California, where he is presently a Staff Scientist. He is concurrently a Reserve Officer and Program Manager attached to the U.S. Air Force Asian Office of Aerospace Research and Development in Tokyo, Japan. His research interests include nanoporous membranes, materials for sensing and energy conversion, and energetic materials. He is a member of the American Physical Society, IEEE, and the Materials Research Society.

Session D1-W3-T2: Nanotechnology

Opportunities and Challenges in Developing Flexible Organic Electronics

Samuel Graham, PhD (葛蘭姆 教授)

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ABSTRACT

The development of organic electronics provides exciting opportunities to enable a wide range of flexible electronics. Both solution processed and small molecule materials have shown incredible performance in the areas of field effect transistors, electrochromics, displays, and solid state lighting, while photovoltaics have recently shown power conversion efficiencies over 8%. While much improvement in the active electronic materials has been made, many challenges remain when developing low cost devices on flexible substrates. Transparent polymer substrates have become the material of choice for flexible organic electronics, but have limited processing temperature range which impacts subsequent manufacturing steps which are used to create organic electronic devices. In addition, the need for barrier films and edge selants which prevent the ingress of moisture and oxygen are paramount to the long term stability of these devices. Finally, the mechanical response and reliability of laminar soft and hard materials must be understood in order to better design flexible devices which can withstand repeated flexural deformation.

In this talk, we will discuss some of the challenges and advancements in developing organic electronics for flexible applications. The talk will cover manufacturing techniques, the development of flexible electrodes, packaging, and mechanics of organic electronics. The talk will focus of applications including organic solar cells, LEDs, and electrochromics. Future challenges which must be addressed to push this technology forward will be discussed.

BIOGRAPHY

Samuel Graham is an Associate Professor of Mechanical Engineering at the Georgia Institute of Technology. He currently serves as the Organic Electronics Thrust Leader in the National Science Foundation's Science and Technology Center: Materials and Devices for Information Technology Research. Here, he leads a group of researchers developing packaging methods for organic electronics and the development of OFETs and OPVs. Other aspects of his work focus on the reliability and thermal management of electronics including wide band gap solid state lighting sources. Prior to joining Georgia Tech, he was a Senior Member of Technical Staff at Sandia National Laboratories and a visiting Researcher at Stanford University.

Session D1-W4-T2: Medical System-on-Chip

Session Organizer & Chair

Kea-Tiong Samuel Tang, PhD (鄭桂忠 教授**)**

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BIOGRAPHY

Kea-Tiong Tang received the B.S. degree in electrical engineering from National Taiwan University, Taipei, Taiwan in 1996, and received the M.S. and Ph.D. degrees in electrical engineering from California Institute of Technology, Pasadena, CA, USA, in 1998 and 2001, respectively.

During 2001–2006, he was a Senior Electrical Engineer with Second Sight Medical Products, Inc., Sylmar, CA, USA. He designed mixed signal ASIC for retina prosthetic device. In 2006, he joined the Electrical Engineering Faculty at National Tsing Hua University, Hsinchu, Taiwan, and is currently an Assistant Professor. His research interests include bio/chemical sensing system, analog and mixed signal IC design, neuromorphic SoC design, and biomedical SoC design.

Dr. Tang is a member of IEEE solid state circuit society (SSCS), circuits and systems society (CAS), and Engineering in medicine and biology society (EMBS). He is also TPC member of IEEE Life Science Systems and Applications (LiSSA).

Session D1-W4-T2: Medical System-on-Chip

Low-power Analog Front-end Circuits for HealthCare System and Telemetry Devices

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ABSTRACT

The **Low-Power Analog Front-End Circuits for HealthCare System and Telemetry Devices** will be presented in this lecture. Based on the well-development VLSI technology and RFIC/Mixed-signal IC techniques, the low-power RFIC circuits with CMOS process are introduced for HealthCare systems as well as a wireless power and data transmission microstimulator are also presented. Moreover, there are many analog front-end circuits including preamplifier, analog filter, and analog-to-digital converter for bio_signal acquisition systems, will be introduced. What are the circuit design and technology challenges in meeting biomedical system requirements? The low-power circuits have been implemented in TSMC 0.18-μm/0.35-μm CMOS process to reveal the design challenges.

BIOGRAPHY

Shuenn-Yuh Lee was born in Taichung, Taiwan, in 1966. He received the B.S. degree from the National Taiwan Ocean University, Chilung, Taiwan, in 1988, and the M.S. and Ph.D. degree from National Cheng Kung University, Tainan, Taiwan, in 1994 and 1999, respectively.

Since 2002 and 2006, he has been an Assistant Professor and Associate Professor, respectively, at the Institute of Electrical Engineering, National Chung Cheng University, Chia-Yi, Taiwan. His present research activities involve the design of analog and mixed-signal integrated circuits including filter, high-speed ADC/DAC, and sigma-delta ADC/DAC, biomedical circuits and systems, low-power and low-voltage analog circuits, and RF front-end integrated circuits for wireless communications.

Dr. Lee now is a member of Circuits and Systems (CAS) Society, Solid-State Circuits Society, Medicine and Biology Society (EMBS), and Communication Society of IEEE. Moreover, he is a member of IEICE and CIEE. Currently, he is also a chairman of Heterogeneous Integration Consortium (HIC) sponsored by Ministry of Education, Taiwan to serve the education on IC design of Taiwan.

Session D1-W4-T2: Medical System-on-Chip

Towards an Electronic Nose System-on-Chip

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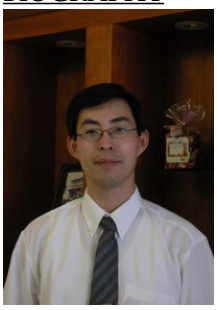
ABSTRACT

Electronic nose (E-Nose) systems are still bulky in size, limiting its feasibility for portable applications. An E-Nose signal processing chip has been designed and fabricated to replace personal computer, which is the bottleneck of size reduction of the system. Based on a multiple-walled carbon nanotube (MWNT) conducting polymer sensor array chip, the signal processing chip is composed of interface circuitry, analog-to-digital converter, memory, and microprocessor embedded with pattern recognition algorithm. Functionalities of the individual circuitry have been verified. The E-Nose signal processing chip has successfully classified three odors of carbon tetrachloride (CCl_4), chloroform ($CHCl_3$), and butanone (MEK). This signal processing chip is suitable for future integration of an electronic nose system-on-chip (SoC).

BIOGRAPHY



Kea-Tiong Tang received the B.S. degree in electrical engineering from National Taiwan University, Taipei, Taiwan in 1996, and received the M.S. and Ph.D. degrees in electrical engineering from California Institute of Technology, Pasadena, CA, USA, in 1998 and 2001, respectively.

During 2001—2006, he was a Senior Electrical Engineer with Second Sight Medical Products, Inc., Sylmar, CA, USA. He designed mixed signal ASIC for retina prosthetic device. In 2006, he joined the Electrical Engineering Faculty at National Tsing Hua University, Hsinchu, Taiwan, and is currently an Assistant Professor. His research interests include bio/chemical sensing system, analog and mixed signal IC design, neuromorphic SoC design, and biomedical SoC design.

Dr. Tang is a member of IEEE solid state circuit society (SSCS), circuits and systems society (CAS), and Engineering in medicine and biology society (EMBS). He is also TPC member of IEEE Life Science Systems and Applications (LiSSA).

Session D1-W4-T2: Medical System-on-Chip

Low-power Analog Front-end Circuits for ECG Acquisition Systems

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ABSTRACT

The integrated circuits are playing an important role in biomedical systems as the interface between physical signals and digital processors. In the field of the medical electronics, low-power dissipation and small-sized circuits are essential due to the relatively slow electrical activities of the human body. This talk will cover the design of low-power analog front-end circuits for ECG acquisition systems.

Circuit techniques to address $1/f$ noise in an instrumentation amplifier (IA) will be briefly reviewed. Besides, it is quite challenging to keep high common-mode rejection ratio (CMRR) while operating at low supply voltage. The design of a 1-V IA will be discussed. Furthermore, filters with very low cut-off frequencies (of the order of a few hertz) suitable to process ECG signals will be presented. Design issues associated to linearity, noise, and reduced transconductance for the transconductor block will be discussed. The operational transconductance amplifier-C (OTA-C) band-pass filter is designed and implemented in the weak inversion region to save power. Measurement results shows that the fourth order band-pass filter prototype consumes 100.5nW from a 1-V power supply, with a dynamic range greater than 42.5dB.

BIOGRAPHY

Tsung-Heng Tsai was born in Chia-Yi, Taiwan in 1972. He received the B.S. degree in control engineering from National Chiao Tung University, Hsin-Chu, Taiwan, in 1994, the M.S. degree in electrical engineering from the University of Southern California, Los Angeles, in 1998, and the Ph.D. degree in electrical and computer engineering from the University of California, Davis, in 2005.

From 1994 to 1996, he was a Second Lieutenant in electronic communications with the Army of Taiwan. From 1996 to 1997, he was a full-time Teaching Assistant with the Department of Electrical Engineering,

National Chiao Tung University. Since 2005, he has been with the faculty of the Department of Electrical Engineering, National Chung Cheng University, Chia-Yi, Taiwan, where he is currently an Assistant Professor. His main research interests are in mixed-signal integrated-circuit designs for data conversion, biomedical signal processing, and digital communication systems.

Prof. Tsai is a member of IEEE Solid-State Circuits Society. He is also a member of Taiwan IC Design Society.

Workshops 1 & 3 Keynote: Energy and Nanotechnology

Chair

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BIOGRAPHY

Prof. Che-Wun Hong was born in Kaohsiung city, Taiwan on March 15th, 1956. He received bachelor degree in Mechanical Engineering from National Cheng-Kung University in 1978. After graduation from the university, he served in the army as an armored vehicle officer (1978~1980), then worked as a mechanical engineer in the Ford Motor Company (1980~1981), and then transferred to the Industrial Technology Research Institute (ITRI) as an engine researcher (1981~1982). In the fall of 1982, after saving enough money, he went to United Kingdom to study higher degrees. He received his MSc degree from the UMIST (Manchester, UK) in 1983 and a PhD degree from the Imperial College (London, UK) in 1987, all majored in Mechanical Engineering.

In 8/1987, he returned to Taiwan and joined the Department of Power Mechanical Engineering of National Tsing Hua University as an associate professor. He was promoted to full professor in 1997. Being a faculty member for 23 years, his research area ranges from internal combustion engines, turbochargers to the automotive engineering; and then he switched to the green power engineering at the millennium. His current research focuses on the fuel cells, solar cells, lithium-ion batteries, ultra-capacitors and thermoelectric chips by means of the academic fundamentals, such as: quantum mechanics, molecular dynamics, Boltzmann modeling, computational fluid dynamics and control system dynamics. He has published more than 200 technical papers, including archived journals, proceedings of national and international conferences and technical reports; also he has registered for two patents in Taiwan and USA.

Workshops 1 & 3 Keynote: Energy and Nanotechnology

Energy Conversion at NanoScale

Friedrich B. Prinz, PhD (普林思 教授**)**

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ABSTRACT

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BIOGRAPHY

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Workshops 4 Keynote: System-on-Chip

Chair

Liang-Gee Chen, Ph. D (陳良基 副院長)

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BIOGRAPHY

Prof. Liang-Gee Chen received the B.S., M.S., and Ph.D. degrees in electrical engineering from National Cheng Kung University, Tainan, Taiwan, R.O.C. in 1979, 1981, and 1986, respectively. In 1988, he joined the Department of Electrical Engineering, National Taiwan University. During 1993–1994, he was a Visiting Consultant in the DSP Research Department, AT&T Bell Labs, Murray Hill, NJ. In 1997, he was a Visiting Scholar of the Department of Electrical Engineering, University of Washington, Seattle. During 2004-2006, he was the Vice President and General Director of the Electronics Research and Service Organization (ERSO) of the Industrial Technology Research Institute (ITRI). Since 2007, he has been serving as a Co-Director General of National SoC Program. He was the Deputy Dean of office of Research and Development in National Taiwan University during 2008-2009. Currently, he is the Deputy Dean of college of EECS and a Distinguished Professor of Department of Electrical Engineering at National Taiwan University. He is an IEEE Fellow from 2001 for his contributions to algorithm and architecture design on video coding systems.. In 2009, he was awarded TWAS Prizes and National Professorship. His research interests are DSP architecture design, video processor design, and video coding systems. He has over 430 publications, 20 patents and 15 US patents.

Dr. Chen has served as an Associate Editor of IEEE Transactions on Circuits and Systems for Video Technology and other international technical journals. He has also involved several IEEE technical committees, including the TPC Chair of 2009 IEEE ICASSP and the TPC chair of ISCAS 2012. He has received several outstanding research awards and outstanding industrial technology contribution awards from NSC. His group has won the DAC/ISSCC Student Design Contest for five times since 2004, and had the honor of Student Paper Contest at ICASSP 2006.

Workshops 4 Keynote: System-on-Chip

Chip Design and Implementation Service in Taiwan

Chin-Long Wey, PhD (魏慶隆 主任)

Vice president, National Chip Implementation Center , National Applied Research Laboratories
Email: clwey@cic.org.tw

ABSTRACT

National Chip Implementation Center (CIC) has been serving the academic and industrial societies in Taiwan for more than 15 years. Based on the trends and needs of the semiconductor industrial in Taiwan, the CIC placed her focus on advancing the IC design technology and training of IC designers before the year of 2000, and on advancing the SoC (system-on-chip) design technology between 2000 and 2008. After 2008, the CIC focused on the system integration and system applications, advancing application-oriented SoC design technology and training the interdisciplinary SoC designers. The CIC has prepared for academia researcher to take the challenges of future multi-sensor system development by providing the patented CMOS MEMS process and design platform, design-for-package in SiP (Silicon-in-Package) environment, and 3-D package (MORPACK) platform, for heterogeneous system integration. CIC will continue to devote advancing design technology for system integration and training more well-qualified system designers for both research and industrial societies to enhance system design productivity.

This talk will briefly describe the chip design and implementation services in Taiwan and present some service-oriented research results.

BIOGRAPHY

Chin-Long Wey received the Ph.D. degree in Electrical Engineering from Texas Tech University, Lubbock, Texas, in 1983. He is currently the Vice President and Director General of National Chip Implementation Center (CIC) at National Applied Research Laboratories (NARL), Hsinchu, Taiwan. He is also the TSMC Distinguished Chair Professor of Electrical Engineering at National Central University (NCU), Jhongli, Taiwan. He was the Dean of College of Electrical Engineering and Computer Science at NCU in 2003-2006, and a tenured full professor of Electrical and Computer Engineering Department at Michigan State University (MSU) (1983-2003). He was the co-founder and President of JMicron Technology Inc. He was the recipient of outstanding paper award from IEEE EIT Conferences (2007) and the Award for Outstanding Contributions in Science and Technology, NARL (2009). He is a Distinguished Research Fellow of NARL.

Session D1-W1-T3: Energy, Environment and Sustainability

Session Organizer & Chair

Grace Lin, PhD, *INFORMS Fellow* **(**林蔚君 教授**)**

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BIOGRAPHY

Dr. Grace Lin was born in Hualian, Taiwan. She received her B.S. and M.S. in Math from Tsing-Hua University, Taiwan, and an M.S. in Applied Math and a Ph.D. in IE from Purdue University.

She is the founder of World Resource Optimization, Inc. and the Green Value Net non-profit organization. She is also an Adjunct Full Professor at the Department of Industrial Engineering and Operations Research (IEOR) at Columbia University. Prior to this, she served as an IBM Distinguished Engineer, Global Sense-and-Respond Leader, CTO, and Director for Innovation and Emerging Solutions at IBM Global Business Services. From 1993 to 2003, she served as a Researcher, Manager, and Senior Manager for SCM & e-Business Optimization at the IBM T.J. Watson Research Center, and as their Relationship Manager for the IBM Integrated Supply Chain Organization. Dr. Lin and her IBM R&D team pioneered Extended Enterprise Supply Chain Management and helped save IBM more than $750M. Dr. Lin also initiated IBM's Sense-and-Respond Value Net efforts, founded the Value Chain Innovation Center, and created Sense-and-Respond consulting offerings bringing state-of-the-art business models and technology to IBM and its global customers including a number of Fortune 500 companies, and Defense and Government organizations. Dr. Lin's background and experience have positioned her at the intersection of technology, innovation, business consulting, and management; the fusion of business and IT; and the interaction of academia and industry.

Referred by Forrester as one of the six "Supply Chain Gurus" in 2002, Dr. Lin has published more than 60 technical papers, book chapters, and articles, and co-authored seven patents, with another five pending. Her awards include: The Franz Edelman Award, the IBM Outstanding Technical Achievement Award, the IBM Corporate Logistics Award, the IBM Research Division Award, as well as the IIE Doctoral Dissertation Award, and Purdue's Outstanding Industrial Engineer Award. Dr. Lin was named an IBM Distinguished Engineer, and a member of the IBM Academy of Technology. Twice elected INFORMS' VP Practice, she is an INFORMS Fellow, and Service Science Chair Elect, a member of INFORMS Fellow Se-

lection Committee, and an Edelman Award judge. Dr. Lin has served on the INFORMS Board, university and government panels, and on editorial boards of major journals. She has chaired a number of INFORMS and IEEE conferences, and is a frequent keynote speaker at international conferences and global company strategy sessions.

Session D1-W1-T3: Energy, Environment and Sustainability

Business Process Management for Sustainability

Ko-Yang Wang, PhD (王可言 博士)

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IBM Distinguished Engineer
Practice Area Leader, Business Process Management
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ABSTRACT

Business Process Management (BPM) is a discipline which leverages repeatable process expertise and business information to improve business performance, visibility, and agility, and to facilitate business innovation. Recent advances in BPM have provided new, systematic and semi-automated capabilities that enable actionable and adaptive business processes and rules, and support rapid process development and automation. In addition, BPM has provided much better support to model human-centric business process activities, allowing businesses to quickly handle exceptions to predefined business rules and unexpected events. BPM represents great opportunities for companies to improve their competitiveness in our increasingly competitive environment.

In this talk, Dr. Wang will discuss the recent advances in BPM including business rule management and actionable and human-centric business process management. He will present techniques that can quickly: Model and visualize process activities in easy-to- understand graphical models; identify and add performance monitoring check-points; enable run-time environments for executing processes and monitoring performances; and use the performance results to rapidly improve the processes. He will also discuss best practices in BPM, and how companies can use Modern Business Process Automation tools to support Rapid Process Development and Automation in order to respond to environmental and business changes much more quickly, and in ways that are more scalable. Finally, he will discuss issues in applying BPM in the areas of smart meters and smart utilities.

BIOGRAPHY

Dr. Ko-Yang Wang, born in Kao Hsuiang, Taiwan, received his B.S. and M.S. in Math from Tsing-Hua University, Taiwan, and an M.S. and Ph.D. in Computer Science from Purdue University. He has blended his many career interests by serving IBM through both technical and executive leadership roles. Currently, he is the *Business Process Management (BPM) Practice Area Leader* for IBM Global Business Services. As a *business executive*, Dr. Wang has led such efforts as launching IBM's BPM Practice, creating thought and market leadership, developing delivery capabilities and resources, and serving as the *delivery partner* for client projects.

In 2000, Dr. Wang became an IBM Distinguished Engineer. His roles as a *Technical Executive* included: CTO for IBM Global Services Business Transformation from 2000 to 2005, CTO for the Industrial Sector, AIS, from 2007 to 2009, and CTO for the BPM and Enterprise Integration Services Area since 2007. He has worked with clients from a wide range of industries, and led more than 20 IBM corporate-level task forces and strategic initiatives to help establish IBM's technical vitality and business innovation leadership in a number of areas including: Knowledge Management, Sense and Respond/BPM, Real Time Event Processing for Smarter Planets, Smarter Product Development Management, and SOA and SOA for SAP/Oracle. In founding the Enterprise of the Future effort in 2002, Dr. Wang led a team of more than 80 IBM Fellows, Distinguished Engineers and business leaders to develop a 2 - 5 year business vision and technology game changing strategies. He also helped IBM'S Greater China Group develop its C&SI Business Growth Strategy in 2005.

Earlier in his career, Dr. Wang was a Principal in the IBM Consulting Group, responsible for Knowledge and Information Management and Asset Reuse solutions from 1997 to 1999, after serving as a Research Staff Member in IBM's T.J. Watson Research Center from 1991 to 1996. He pioneered techniques for using AI to improve the performance of advanced compilers and programming, and led the run-time system for IBM's Parallel FORTRAN Compiler for SP2 - IBM's commercial distributed memory super computers. He was a Senior Research Faculty and Visiting Assistant Professor at the Computer Sciences Department, Purdue University from 1988 to 1991. He led research projects on intelligent compilers and high level programming environments for scientific computation.

Dr. Wang has co-authored 4 patents and published more than 40 book chapters, journal and conference papers, articles, and IBM white papers. He has received several major awards from IBM including Outstanding Technical Achievement Award and Consulting Group Division Award. He also led teams to win the 1998 and 1999 Giga / Excellence Awards on KM & Workflow Management. He has contributed to more than 10 IBM Academy studies, and became a member of the IBM Academy of Technology in 2009. Dr. Wang has mentored more than 30 technical and minority people, and helped 10 mentees to become IBM Distinguished Engineers.

Session D1-W1-T3: Energy, Environment and Sustainability

High Pressure Soda Pop - How Can We Use It Greenly?

H. Bruce Li, PhD, PE (李曉遠 總裁)

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ABSTRACT

GhG SaviorTech is building a demonstration plant on the shore of Lake Lavon northeast of the City of Garland, Texas. It converts existing carbon dioxide emission from flue gas into soda ash via partial Solvay process. In the step of making soda ash from the baking soda obtained from the Solvay process, half of the captured CO_2 normally was reemitted into the atmosphere. In this important step of "reflux", we pay particular attention first to pump out air, thus not letting N_2, O_2 mixing with CO_2 and H_2O. Pure, one to one molar ratio of CO_2 and H_2O are obtained.

This article discusses our innovative way to utilizing this high pressure soda pop.

At room temperature up to the boiling point of water, which is the range of temperature that reflective or refractive solar heating almost free of cost, the CO_2 and H_2O mixture follows an equation known as Krichevsky-Kasarnovsky equation. The pressure change can easily be manipulated to drive a hydraulic press for useful purpose such as pumping water from one region to another, or propel a slow moving ship carrying merchandise that does not require express delivery.

We have filed a Patent Application titled "Sub-Hertz solar powered Kalina Engine".

If you want to learn more in detail, please join the session.

BIOGRAPHY

Dr. Li was born in Hangzhou, China 1935. Moved to Taiwan at age 13, and spent 13 year there until 1961, then immigrated to the US until now. He holds a B. S. in Chemical Engineering from National Taiwan University, an M. S. and a Ph. D. in Chemical Physics from Oklahoma State University. He obtained his Chemical. Engineering Professional Engineer license in one sitting, with a high score of Fundamentals of Engineering Examination of **197** against a passing score of **93.**

He was employed by Texas Instruments for 16 years, then retired as a Federal Employee at age 63. He started **21-Century Silicon, Inc.** a solar grade silicon manufacturer, in 2005, and another company, **GhG SaviorTech Corporation**, for **CCP (Carbon Capture for Profit)**, in 2007. He serves as President & CTO for both Companies.

Session D1-W1-T3: Energy, Environment and Sustainability

Trends of Green Vehicle Development

Yi-Hsuan Hung, PhD (洪翊軒 教授)

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ABSTRACT

Global trends in developing green vehicles are presented. Various green power sources, such as: PEM fuel cells, lithium batteries and ultra-capacitors and traction motors/generators are utilized for advanced powertrains nowadays. Such devices have their unique strength but also with their weakness. To minimize drawbacks and to maximize output performance, hybrid architecture is needed. For global automotive enterprises, design philosophies and technology development are divergent. In this talk, the comparison in their development strategies of vehicle designs and key components will be conducted. Meanwhile, the current status of green vehicle development in Taiwan will be mentioned. Technologies, government subsidies and policies, prototyping products are introduced here. The prediction of world-wide trends and international cooperative opportunities for Taiwan automotive industry will be discussed at the final part of this talk.

BIOGRAPHY

Dr. Yi-Hsuan Hung was born in Taipei city, Taiwan on Nov. 12th, 1974. He received his BSc, MSc, and Ph.D. degrees from Power Mechanical Engineering from National Tsing-Hua University in 1997, 1999 and 2004, respectively. After graduation, he served in the army in 2005 and then transferred to the Industrial Technology Research Institute (ITRI) as a researcher (2005~2009). During the working period in ITRI, he was a project manager/department manager of the Electric Propulsion & Battery Management Dept., also the director of the Next Generation Energy & Power Lab., and leader of several government-funded projects.

In 8/2009, he joined the Department of Industrial Education of National Taiwan Normal University as an assistant professor. His current research focuses on fuel cells, lithium-ion batteries, ultra-capacitors and various types of advanced vehicles by means of academic fundamentals, such as: graphical modeling

approaches, control strategy applications, optimal designs, real-time modeling techniques. He has published more than 35 technical papers, including journals, proceedings of domestic/international conferences, and over 35 technical reports. Also he has registered for 8 patents in Taiwan and USA. He has completed over 30 public speeches to promote the concept of green energies and to share experiences on developing advanced vehicles.

Session : ***D1-W2-T3: Bioinformatics***

Session Organizer & Chair

Jung-Ying Tzeng, PhD (曾仲瑩 教授**)**

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BIOGRAPHY

Dr. Jung-Ying Tzeng received her bachelor degree in public health (major in epidemiology) and a master degree in biostatistics from the National Taiwan University, Taipei Taiwan, in 1994 and 1997 respectively. She earned her Ph.D. degree in statistics from Carnegie Mellon University, Pittsburgh PA., in 2003. Her Ph.D. research was under the supervision of Dr. Kathryn Roeder and her dissertation received the Umesh Gavasakar Thesis Award.

In 2003, she joined the Department of Statistics and the Bioinformatics Research Center at the North Carolina State University, Raleigh NC. Her research focuses on developing statistical methods that can facilitate genetic epidemiologic research on human complex diseases. Some of her current research projects include statistical modeling of multimarker/haplotype association for genome-wide and candidate-gene studies, gene-based and pathway-based analysis for pharmacogenetics, SNP genotyping error and quality control, and sequence data analysis. She has received funding from NSF and NIH and is currently the PI of NIH R01 grant "Genome-wide Haplotype Association Analysis in Mental Disorders" for developing statistical methods for multi-marker association modeling to study gene and gene-environment effects. She is an associate editor for Biometrics, and has served as an ad hoc reviewer for several NIH study sections.

Dr. Tzeng is currently a member of the American Statistical Association and the American Society of Human Genetics.

*Session : **D1-W2-T3: Bioinformatics***

Correcting Population Stratification in Genetic Association Studies Using a Phylogenetic Approach

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ABSTRACT

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BIOGRAPHY

Li-San Wang received his B.S. (1994) and M.S. (1996) in Electrical Engineering from the National Taiwan University. He received his M.S. (2000) and Ph.D. (2003) from the University of Texas at Austin, both in Computer Sciences, and was a postdoctoral fellow at the University of Pennsylvania between 2003 and 2006. Currently he is an Assistant Professor of Pathology and Laboratory Medicine and a fellow of the Institute on Aging, University of Pennsylvania. Dr. Wang's research interests include phylogenetics, comparative genomics, and microarray analysis. He has authored twenty six peer-reviewed book chapters and journals on computational biology and bioinformatics, and served on the program and organizing committees of several international workshops and conferences.

Session : D1-W2-T3: Bioinformatics

The Past, Present and Future of Genome-wide Association Study (GWAS)

Kei-Hang Katie Chan (陳紀行)

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ABSTRACT

Genetic determinants may play a significant role in common disease pathogenesis due to the fact that they strongly affect susceptibility and also influence disease-related quantitative traits. An understanding of the genetic factors may contribute to better prevention, diagnosis and treatment of disease. Previously, linkage analysis and the candidate gene approach have been utilized to identify the relevant disease genes, especially for monogenic 'Mendelian' diseases. In recent years, genome-wide association studies (GWAS), which does not require an initial hypothesis, have been adopted for identifying genetic variants associated with disease phenotypes. The method has discovered a large number of robust associations between specific chromosomal loci and complex human disease such as type 2 diabetes and rheumatoid arthritis. More powerful GWAS would greatly advance our comprehension of the genetic basis of common diseases and complex traits. Multidisciplinary studies which incorporate knowledge and intelligence from clinical medicine, epidemiology, genetics, molecular biology and bioinformatics will be necessary to continuously reveal the genomic contributors to complex diseases and this genetic information may have predictive value in clinical practice. This talk describes the procedure of conducting a GWAS on diabetes and discusses some current challenges of GWAS as well as follow-up strategies.

BIOGRAPHY

Ms. Kei-hang Katie Chan obtained her Bachelor of Engineering degree in Information Engineering from the University of Hong Kong in 2004. She then received her Master of Public Health in Epidemiology and Biostatistics from the University of Southern California in 2006, and now a PhD candidate in the Genomics and Nutrition program and the Center for Metabolic Disease Prevention at the University of California, Los Angeles (UCLA).

As a Graduate Student Researcher in the Center for Metabolic Disease Prevention at UCLA, she has been involved in genomic projects which investigated the association between genetic variants that are along inflammatory pathways and risk of Type 2 Diabetes among postmenopausal women. She is interested in investigating the complex network of multifaceted diseases which may deliver novel preventive approach, diagnoses, and treatment for diseases with major global burden.

Ms. Chan is a doctoral fellow of the Burroughs Wellcome Fund Inter-school Training Program in Metabolic Diseases and is also a recipient of the University Fellowship (Epidemiology) at UCLA. She recently published a paper which examined the association between genetic variants in fatty acid-binding protein-4 and clinical diabetes in postmenopausal women in the Journal of Obesity.

Session : ***D1-W2-T3: Bioinformatics***

Investigation of Endo- and Exo-type of Hydrolase by Protein Structure Simulation

Chih-Yu Cheng, PhD (鄭至玉 教授)

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ABSTRACT

In general, glycoside hydrolases (GH) can hydrolyze substrates by either endo-type or exo-type manner to produce specific-length or mixture of oligosaccharides. By comparing endo- and exo-splitting of glycosyl hydrolases, we found the relationship between protein structure and the truncation pattern. These glycosyl hydrolases under investigation include endo-/exo-glucanase of GH-6 and GH-9, endo-/exo-xylanase of GH-8, poly-galacturonase, and exo-polygalacturonosidase of GH-28. On each surface of these enzymes, there is a deep cleft which acts as the substrate binding site. For enzyme with both ends of the cleft opening, the enzyme is endo-splitting type; otherwise, the enzyme is exo-splitting type.

Under this hypothesis, chitosanase (EC 3.2.1.132), a glycoside hydrolases which catalyzes the hydrolysis of the β-1,4 glycosidic linkage of chitosan, was used as a case study. Most chitosanases are behaved like the endo-type enzyme; however, few chitosan-degrading enzymes possess the exo-type catalytic feature. The first artificial exo-chitosanase was designed and expressed in 2008 in our lab by inserting two surface loops. Now, we propose to investigate the splitting patten of endo- and exo- glycoside hyrolase by their protein structures alignment. Under this model, it also defines the correlations between substrate's subsite mode and the length of hydrolysate product. Since enzyme structure determines the hydrolysis characteristic, several artificial enzymes are designed by computer simulation. Protein structures designed to produce different lengths of products by calculating the space of clefts. These structures including trimer-making chitosanase, tetramer-making chitosanase and endo-chitinase were simulated. Several recombinant proteins were expressed in *E. coli* system and studied.

This is joint work with Yaw-Kuen Li of National Chiao Tung University.

BIOGRAPHY

Chih-Yu Cheng received her B.S. (1993) and M.S. (1995) from the Tatung University in Bioengineering and Chemical Engineering, respectively. She received her Ph.D. (2003) and was a postdoctoral fellow (2003-2007) in Applied Chemistry from National Chiao Tung University. Currently, Dr. Cheng is an

Assistant Professor of Marine Biotechnology of National Kaohsiung Marine University. Achievements include research in structural simulation and protein engineering to convert an endo-chitosanase to an exo-chitosanase. Research interests include protein engineering, immobilized enzyme and bioreactor.

Session : D1-W3-T3: Nanotechnology

Session Organizer & Chair

Hsuan-Liang (Kevin) Liu, PhD (劉宣良 所長)

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BIOGRAPHY

Prof. Hsuan-Liang (Kevin) Liu was born in Keelung, Taiwan on Nov. 13, 1969. He received his B.S. and Ph.D degree in the field of Chemical Engineering in 1991 and 1998 from National Taiwan University and Iowa State University, respectively. Prof. Liu's research fields are computational biology, bioinformatics, proteomics, and genetic & protein engineering.

He has been working in the Department of Chemical Engineering and Biotechnology of National Taipei University of Technology (NTUT) for eleven years. He was promoted as a distinguished professor in August 2008 due to his outstanding academic performance. He has received three and two times of the Outstanding Research Awards from the College of Engineering of NTUT and NTUT, respectively. He joined the member of the Taiwan Institute of Chemical Engineering and received the Young Research Fellow Award in 2004. To date, he has published around 100 SCI papers with high quality, including those in Proteomics, Bioinformatics, Current Protein & Peptide Science, Chemical Physics Letters, Biotechnology Progress, Chemical Engineering Journal, etc. His current research interests include molecular dynamics simulations, molecular docking, pharmacophore-based and structure-based virtual screening, and computer-aided drug design.

Prof. Liu is currently a member of the American Chemical Society, the Taiwan Institute of Chemical Engineering, and the Taiwanese Chemical Society. He is also the chair of the Graduate Institute of Biotechnology of NTUT. By continuous devoting his effort in the academic society, Prof. Liu has received high reputation in his country.

*Session : **D1-W3-T3: Nanotechnology***

Nanofabrication and Radiation Hard Testing of TiO_2 Memristor devices

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ABSTRACT

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BIOGRAPHY

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Session : D1-W3-T3: Nanotechnology

Mesoporous Materials for Biomedical and Energy Applications

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ABSTRACT

Mesoporous silica materials were independently discovered in early 1990 independently by both Prof. Kuroda's group (FSM series) in Japan and by Mobil company (MCM series) in USA. Since then, mesoporous materials have attracted great attention due to many advantages of these materials, *e.g.* high surface area (over 1000 m^2/g), ordered mesostructure (2D hexagonal, 3D cubic), uniform and tunable pore size (2 to 10 nm), abundant silanol groups on the surface, robust and biocompatible framework, various compositions (silica, titania) and morphologies (nanoparticles, films). These materials have also shown promise in catalysis, optics, separations, and bio-applications.

In this talk, I will introduce the research accomplishments on mesoporous materials that are synthesized through a combination of chemistry and engineering. The content will include three categories: synthesis, lithography-assisted micropatterning, and applications toward biomedical and energy.

(1) Synthesis: Mesoporous materials are generally synthesized through a sol-gel process of inorganic species (*e.g.* silicon alkoxides) in the presence of self-assembled amphiphilic surfactants. Therefore, a chemical route can be used to control the morphology, adjust the structure, and further functionalize the surface. I will introduce a phenomenon called "structural transformation" for the mesoporous thin-film materials by applying different aging or calcination conditions. I will also present a new mesostructure called "radial structure" for mesoporous silica nanoparticles made by co-condensation of tetraethyl orthosilicate and an organoalkoxysilane.

(2) Lithography-assisted micropatterning: A hierarchical structure is significant for biomimic study and device fabrication. I developed a new method to pattern mesoporous thin films by depositing a surfactant-templated silica or titania precursor solution onto lithography-designed substrates. Furthermore, this technique allows us to control the orientation of the mesopores at any desired location on the substrates.

(3) Applications: As a material scientist, the ultimate goal is to use the synthesized materials for a specific application. Here I will introduce the biomedical and energy applications by using the synthesized mesoporous materials. For example, perpendicular mesoporous platinum films can be replicated from mesoporous titania thin films and be used as an efficient electrode for fuel cells. In addition, we demonstrate that mesoporous silica nanoparticles (MSN) can be used in intracellular drug delivery with a controllable release rate. For energy application, we have designed multi-functionalized MSNs as efficient catalysts for lignocellulosic biomass conversion.

BIOGRAPHY

Kevin Chia-Wen Wu was born in Taiwan in Feb. 8, 1976. Dr. Wu got his Bachelor degree in 1998 and Master degree in 2000 at the Department of Agriculture Chemistry, National Taiwan University, Taiwan. After that, he studied his Ph.D. course at the Department of Materials Science and Engineering, The University of Tokyo, Japan, and got the Ph.D. degree in 2005. Dr. Wu's major was mesoporous materials, materials chemistry, and lithography.

After he finished his PhD, he joined Prof. Kuroda's group at the Department of Applied Chemistry, Waseda University, Japan as a post-doc from April 2005 to Aug. 2006. From Sep. 2006 to Jul. 2008, he did the second post-doc job with Prof. Victor Lin at the Department of Chemistry, Iowa State University and DOE Ames National Laboratory, U.S. Since Aug. 2008, he joined the Department of Chemical Engineering, National Taiwan University, Taiwan as an Assistant Professor. His current interests include the design and synthesis of multi-functional mesoporous nanoparticles and thin films for biomedical and energy applications by using sol-gel processes, surfactant-templating chemistry, and lithographical technology.

Prof. Wu is a member of the Chemical Society Located in Taipei, Taiwan Institute of Chemical Engineering, American Chemical Society, The Chemical Society in Japan, and The Ceramics Society in Japan. He was a Taiwan-Japan Interchange Association Scholarship Recipient from 2001 to 2005. He also got the Best Speech Award at the 19th Ceramic Research Conference of Kanto Branch, 2003.

*Session : **D1-W3-T3: Nanotechnology***

Towards Cost-effective Encapsulation Architectures and Barrier Layers for Organic Electronic Devices

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ABSTRACT

As flexible organic electronic devices become more realistic as a consumer device, the need for low-cost, high performance encapsulations has risen sharply. The organic active components of organic light-emitting diodes (OLEDs) and organic photovoltaic (OPV) devices readily deteriorate with minimal exposure to the atmosphere, resulting in the rapid degradation of device performance. The air sensitivity of organic electronic devices has delayed the broad commercialization of the printed "plastic" electronics technology. The vacuum deposition methods used to fabricate multi-layers which fulfill the encapsulation requirements for plastic electronic devices are complex and expensive. Fully printed "plastic" electronics requires the development of encapsulation architectures which comprise solution deposited barriers, e.g. UV-curable polymers, and/or low-cost free-standing barrier films based on polymers, e.g. poly ethylene terephthalate (PET).

The realization of cost-effective packaging solutions requires the development of both optimized barrier materials and innovative encapsulation architectures. The perfluorinated polymer Cytop™ has been identified as a candidate for one of the layers in a printable polymer/inorganic multilayer encapsulation [1]. Instability suppression, using a high viscosity co-solvent, has been used to improve the barrier performance for thin (< 200 nm) Cytop™ layers [2]. However, the permeability of these barrier layers is still several orders of magnitude higher than the encapsulation requirements for OLEDs and OPVs, thus, the use of Cytop™ in a packaging solution for OLEDs and OPVs requires additional barrier layers for satisfactory encapsulation performance. An architecture comprising nitrogen gas-phase spacers between free-standing barrier films has recently been demonstrated [3], with water vapor transmission rates as low as $2.1*10^{-4}$ g/(m^2, day) utilizing low-cost materials in a Russian Doll structure with epoxy seals separated by nitrogen spacers [4]. This water vapor transmission rate correlates to predicted lifetimes of at least 10 years for inverted OPV modules fabricated and tested by Konarka Technologies (Lowell, MA, USA).

In this talk, I will discuss challenges for barrier layers deposited by vacuum techniques [5], solution deposition [6] and encapsulation architectures comprising nitrogen spacers in order to fulfill the packaging requirements with regards to barrier-, optical- and mechanical properties for encapsulation of organic electronic devices [7].

References

1. J. Granstrom, J. S. Swensen, J. S. Moon, G. Rowell, J. Yuen, A. J. Heeger, Appl. Phys. Lett., 93, 193304 (2008)
2. J. Granstrom, A. Roy, J. S. Moon, G. Rowell, E. Jerkunica, A. J. Heeger, Thin Solid Films, 518, 3767 (2010)
3. J. Granstrom, M. Villet, T. Chatterjee, J. A. Gerbec, E. Jerkunica, A Roy, Appl. Phys. Lett., 95, 093306 (2009)
4. J. Granstrom, M. Gällstedt, M. Villet, J. Moon, T. Chatterjee, Thin Solid Films, In press
5. N. Kim, W. J. Potscavage, B. Domercq, B. Kippelen, S. Graham, Appl. Phys. Lett., 94, 163308 (2009)
6. J. A. Gerbec, J. Granstrom, H. Nulwala, M. Furukawa, C. J. Hawker, L. Campos, Mater. Res. Soc. Proc., 1195-B08-26 (2010)
7. J. Granstrom, M. Gallstedt, O. Arias, T. Chatterjee, S.-W. Cho, T. Blomfeldt, H. Kim, Y. Kim, M. Hedenqvist, S. Graham, Manuscript in preparation for Thin Solid Films

BIOGRAPHY

Jimmy Granstrom was born in Stockholm, Sweden on June 19 1979. He earned his M. Sc. in chemical engineering (major: polymer technology) at Kungliga Tekniska Högskolan (Royal Institute of Technology) in Stockholm, Sweden in December 2004, and his Ph. D in materials science at the University of California Santa Barbara (UCSB) in March 2010 under the supervision of Prof. Alan J. Heeger (Nobel Laureate in Chemistry in 2000).

He worked as a research contractor at Bell Laboratories (supervisors: Howard Katz and Elsa Reichmanis) in Murray Hill, New Jersey, between November 2003 to June 2005. At Bell Labs, Jimmy made significant contributions to the development of the first fiber transistor and the first oscillator circuit produced with mass printing technologies (in collaboration with BASF and Chemnitz Printing Institute in Germany). This work resulted in co-inventorship on two U.S patents ("Fibers with polymeric coatings and making of the same", U.S. Patent # 20050227059 and "Liquid phase fabrication of active devices including organic semiconductors", U.S. Patent # 20070077681). At UCSB, he co-developed an instability suppression approach for solution-deposited barrier layers and published the first paper on encapsulation architectures comprising nitrogen spacers (Appl. Phys. Lett., 95, 093306 (2009)). He is currently a post-doctoral fellow under the supervision of Prof. Samuel Graham at The George W. Woodruff School of Mechanical Engineering at Georgia Institute of Technology in Atlanta, GA. His interests include encapsulation technologies and solution deposition methods for the active layers of organic electronic devices.

Dr. Granstrom is a member of the Materials Research Society (MRS) and the American Physical Society (APS). His work has been published in J. Mater. Res. (2004, 19, 3540), Organic Electronics (2007, 8, 480), Chem. Mater (2007, 19, 4676), Appl. Phys. Lett. (2008, 93, 193304) and Thin Solid Films (518, 3767 (2010)). He was awarded with a fellowship from Crown Princess Victoria of Sweden during the Sweden-America Foundation Annual Meeting in Stockholm in April 2008. He received travel support from the International Center for Materials Research (ICMR) and the Mitsubishi Chemical Center for Advanced Materials (MC-CAM) to visit Mitsubishi Chemical Research Center (MCRC) in Yokohama, Japan in November 2009. He was also awarded with a travel fellowship from the Materials Research Laboratory (MRL) at UCSB to visit Umeå University (Sweden) in December 2009 and the Royal Institute of Technology in Stockholm, Sweden in January 2010. The attached picture was taken during a visit to Copenhagen, Denmark in May 2009, where he gave presentations at the Nordic Polymer Days conference.

Session : D1-W4-T3: Wireless System

Session Organizer & Chair

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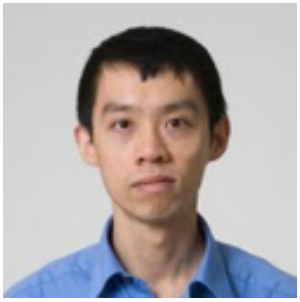
BIOGRAPHY



Yung-Hsiang Lu (陸永祥) received BSEE from National Taiwan University, Taipei, Taiwan, MSEE from Stanford University, California, USA, and Ph.D. from Stanford University, California, USA. He joined Purdue University in 2002 as an assistant professor and was promoted to an associate professor in 2008.

He was an intern researcher at SGI, IBM, and Compaq in 1996, 1998, and 2000 respectively. He has published 18 journal or magazine articles and more than 50 referred conference papers. Representative publications are

- Karthik Kumar and Yung-Hsiang Lu, "Cloud Computing for Mobile Users: Can Offloading Computation Save Energy?", IEEE Computer, 43(4), April 2010, pages 51-56.
- Nathaniel Pettis and Yung-Hsiang Lu, "A Homogeneous Architecture for Power Policy Integration in Operating Systems", IEEE Transactions on Computers, 58(7), July 2009, pages 945-955.
- Douglas Herbert, Vinaitheerthan Sundaram, Yung-Hsiang Lu, Saurabh Bagchi , and Zhiyuan Li, "Adaptive Correctness Monitoring for Wireless Sensor Networks Using Hierarchical Distributed Run-Time Invariant Checking", ACM Transactions on Autonomous and Adaptive Systems, 2(3), September 2007, Article No. 8, 23 pages.

His research focuses on energy conservation and resource management in computer systems, embedded systems, and mobile robots.

Dr. Lu received a Career Award from the National Science Foundation in 2004 and the Purdue Class 1922 Helping Student Learn Award in 2008. He is an associate editor of ACM Transactions on Embedded Computing Systems since 2008. Dr. Lu is a senior member of the IEEE and the ACM.

Session : D1-W4-T3: Wireless System

Mobile and Cloud Computing -- Opportunities and Challenges

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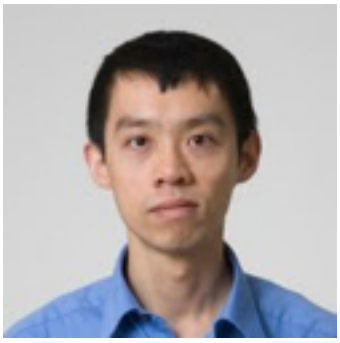
ABSTRACT

Mobile systems have become the primary computing platforms for many users, in applications ranging from web surfing, communication, to multimedia. Meanwhile, cloud computing provides the opportunity to fundamentally change the way in which information is accessed, stored, and delivered. Cloud computing enables users to obtain high performance, large storage, and scalable service, without significant initial investment in hardware or software. This seminar explores how this emerging trend of cloud computing will impact the users of mobile systems. I will first explain the conditions to use computation offloading for extending the battery lifetimes of mobile systems. The conditions consider the amounts of computation, the quantities of data transferred between mobile systems and the cloud, as well as the available bandwidths. I will describe a few issues that may prevent mobile cloud computing from becoming reality; these issues include privacy, reliability, and real-time data. Some potential solutions will be presented as the focuses of future research.

BIOGRAPHY



Yung-Hsiang Lu (陸永祥) received BSEE from National Taiwan University, Taipei, Taiwan, MSEE from Stanford University, California, USA, and Ph.D. from Stanford University, California, USA. He joined Purdue University in 2002 as an assistant professor and was promoted to an associate professor in 2008.

He was an intern researcher at SGI, IBM, and Compaq in 1996, 1998, and 2000 respectively. He has published 18 journal or magazine articles and more than 50 referred conference papers. Representative publications are

- Karthik Kumar and Yung-Hsiang Lu, "Cloud Computing for Mobile Users: Can Offloading Computation Save Energy?", IEEE Computer, 43(4), April 2010, pages 51-56.

- Nathaniel Pettis and Yung-Hsiang Lu, "A Homogeneous Architecture for Power Policy Integration in Operating Systems", IEEE Transactions on Computers, 58(7), July 2009, pages 945-955.
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His research focuses on energy conservation and resource management in computer systems, embedded systems, and mobile robots.

Dr. Lu received a Career Award from the National Science Foundation in 2004 and the Purdue Class 1922 Helping Student Learn Award in 2008. He is an associate editor of ACM Transactions on Embedded Computing Systems since 2008. Dr. Lu is a senior member of the IEEE and the ACM.

Session : D1-W4-T3: Wireless System

Beyond 3G™. Unlimited Capacity

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ABSTRACT

This paper introduces ODMA. ODMA is a subscriber relay network technology that addresses the primary "last-mile" problems in telecom deployments: Coverage, Cost, and Capacity. ODMA takes advantage of advances in complementary technology used to deploy wireless communication services such as advanced modems, host processors, and transmitters. ODMA has high synergy with technologies such as WiMAX, 802.11a/b/g, and MIMO.

An ODMA system requires far less infrastructure investment than conventional wireless communication methods. IWICS' ODMA technology enables each user to become a part of the communication network infrastructure. An ODMA system's deployment cost can be dramatically reduced by the use of unlicensed spectrum to effect transmission between network units. The low investment and operational cost basis of an ODMA network enables Service Providers to provide a highly competitive yet simple wireless services offering for home, business and mobility solutions.

Innovative ODMA technology will enable operators of mobile wireless data networks to provide mass-market access to the Internet at speeds previously available only over broadband connections such as DSL and cable. IWICS' ODMA system will enable true end-to-end Internet Provider connectivity and the lowest cost per megabyte of data delivered. IWICS' ODMA - *Beyond 3G™*.

Key areas addressed in this paper are:

- SoC (System-on-a-Chip), C4I (Content, Computer, Communications, Consumer Electronics, and Integration)
- *Intelligent Infrastructure, Smart Sensing, Emergency Preparedness, Sustainability*

BIOGRAPHY

James Larsen, CEO & Chairman

James Larsen founded IWICS in 2001 utilizing his 25 years of experience in leading teams in the research, development and implementation of intelligent adaptive wireless packet switched relay systems. These multi-hop full mesh networks were applied to a wide range of wireless networks ranging from satellite systems to vehicle telematics throughout the world. Systems researched, designed and developed by James have been successfully manufactured and deployed in a number of multimillion dollar packet switched projects worldwide. James played a key role in the specification, negotiation and deployment of these projects.

James has played the lead role in the development of the IWICS international patent portfolio and is actively involved with the filing of new and innovative patents throughout the world. Before establishing IWICS, James served as President & Chairman of Salbu Research and Development where he lead a team in the primary research and development of a cellular relay system concept to enhance the performance and capacity of future cellular/wireless systems and developed demonstrable hardware and software to implement the concept.

James worked extensively within the worldwide standards bodies to help define the international 3G standards. He has also done extensive work modeling current and future network traffic models, mobility models, propagation models, and evaluation of the models against performance requirements.

James earned a BSEE (Communications, RF and microwave systems, analog integrated circut design) at the University of Natal, South Africa from 1980 to 1984. He has completed substantial experimental and theoretical work toward a PhD in advanced adaptive "Burst mode" packet switch systems and antenna design. James has a total of 12 inventions in the field of adaptive packet switched systems, with 142 patents being granted or accepted, covering nearly 50 countries.

Session : D1-W4-T3: Wireless System

A Multimedia Routing Algorithm in Multipath Environment

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ABSTRACT

In the dynamic networking requirement, capillary routing, for a given network, is a multi-path solution between a pair of source and destination nodes. Unlike shortest path routing, for any network topology only one capillary routing solution exists.

A dozen of capillary routing layers, built on several hundreds of network samples obtained from a random walk wireless Mobile Ad-Hoc Network (MANET), are built on real-time. We show that flow diversity patterns built by capillary routing algorithm reduce substantially the amount of FEC codes required for protection of communication

BIOGRAPHY

ZK Cheng, System Architect iCHIPdesign International Inc. Over the 25 years of telecom experiences of system engineering skills. Feasibility Analysis, technical strategic planning, generation and maintenance of business and technical/software requirements, design, development & testing including disaster recovery plan. Product delivered to customer and put in services for multiple companies.

ZK Cheng has been a Ph.D Engineering Management program at Walden University. ZK also hold a master degree on computer science in University of North Texas.
Results-driven technical professional with strong record of outstanding achievements in establishing the business and technical requirements, technical planning, business case, network design & development with testing and operational support systems including Operations Administrations, Maintenance &

Procedures to ensure service quality assurance/management functions in order to meet company and customer needs. ZK Cheng hold five USPTO patents and many papers and architecture awards.

Session : D1-W1-T4: Energy, Environment and Sustainability

Session Organizer & Chair

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BIOGRAPHY

Kan-Lin Hsueh was born at KeeLung, Taiwan in 1956. He graduated from Chung-Yuan Christian University (Taiwan) in 1977. He received Ph.D. from Clarkson University (USA) in 1984. Graduated works were in the area of fuel cell and energy storage battery. After graduated, he joined the Chem. Eng. Dept., National Tsing Hua University (Taiwan) as associate professor. Research projects were mainly in the area of II-VI semi-conducting material for optical fiber. In 1989, he moved to US and joined AMP Inc. as a member of technical staff. In AMP Inc., he carried out research in the area of high-speed selective plating. Between 1999 and 2001, he studied the electrochemical etching of silicon micro-channel plate in NanoSciences Corp. In 2001, he joined ITRI (industrial Technology Research Institute) Taiwan, conducting research on DMFC (direct methanol, fuel cell) for portable devices and PEMFC (proton exchange membrane fuel cell) for stationary applications. He also served as the manager of PEMFC lab. Since 2008, he joined the Dept. of Energy and Resources, National United University. He started research in the area of fuel cell for energy conversion and battery for energy storage.

Session : D1-W1-T4: Energy, Environment and Sustainability

American Power Act to World Power Practice: A Giant Paradigm Shift toward a Carbon Economy

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ABSTRACT

The mission of GhG SaviorTech Corp. (GhG) is to convert The Inconvenient Truth into a *Convenient Business* was presented by GhG Founder Peter C. Mei at the 2009 EITC Conference, advocating creation of worldwide opportunities for many decades to come.

GhG SaviorTech has established the ICCI (International Carbon CleanTech Institute) together with the startup of the Garland Power&Light (GP&L) pilot demonstraton plant using a partial Solvay process without recycling ammonia. (In the meantime, Senators John Kerry and Joe Lieberman introduced the American Power Act to start the wheels rolling.)

The first year profit from the GhG/GP&L pilot demonstration plant will be invested into ICCI to develop a series of innovative products that will have worldwide impact, turning the focus from Carbon Capture for Storage (CCS) to Carbon Capture for Products (CCP). Details will be presented at the Conference.

BIOGRAPHY

Truman G. Blocker III, PhD -- R&D Director, GhG SaviorTech Corporation

Dr. Blocker received his bachelors degrees in Pure Mathematics and Physics at the University of Texas, Austin and his M.S. and Ph.D. in Physics, University of Pennsylvania, under Alan J. Heeger, the 2000 Nobel Laureate in Chemistry. His career includes 17 years at Texas Instruments (he is co-holder of patents for the FAA's Air Traffic Control Radar installed at major airports worldwide.) Blocker served in

various technical/management roles including Manager of the VLSI Technology Laboratory, demonstrating 0.1 micron feature size transistor structures in the early 1970s. In the 1980s and 1990s, he served as Director of Corporate Relations for the National Nanofabrication Facility at Cornell University and Director of Research Implementation at the Semicondutor Research Corporation.

*Session : **D1-W1-T4: Energy, Environment and Sustainability***

From Renewable Energy to Energy Saving: Fluid and Thermal Aspect

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ABSTRACT

Renewable energies often exist in fluid and thermal forms, meaning we can take elements such as wind, water, or heat, etc. and convert them into renewable energies. This presentation is to describe how the Group of Energy Conversion Laboratory in National Cheng Kung University is dedicated to the study and development of renewable energy and energy saving products using the fundamental theory of fluid dynamics and thermal dynamics, which evolved from the turbomachinery technology developed for gas and rocket engines. More than 30 patents are involved in related products so far. The presentation is to give a broad view of what has been done in the past and what is going to be done in the future, rather than giving details of a specific technology. Some selected research and development topics are presented, and will cover wind turbine, solar thermal energy application, hydro turbines, and truck drag reduction devices. For the wind turbine design, aerodynamically optimized shrouded design proved itself to be the highest efficiency in the same category in commercial product. Blade number effects on the performance are discussed. The solar thermal energy studies cover solar ventilation, solar heating, power generation, and air-conditioning. In the hydro power studies, the applications cover the ocean tidal power energy conversion and river low pressure hydro turbine designs. For the energy saving product, the truck drag reduction device with two nozzles installed at the rear corner is introduced. Computer simulation and wind tunnel testing showed that 15% fuel saving can be achieved, with proper choosing of the nozzle area ratio and the flow turning angle. These studies were supported by a private green energy company that jointly developed the products and lead the commercialization.

BIOGRAPHY

Shih-Hsiung Chen received his bachelor's degree in Aeronautical Engineering from National Cheng Kung University (Tainan, Taiwan) in 1978, an M.S. degree in Aeronautics and Astronautics from Stanford University (Palo Alto, California) in 1981, and a Ph.D. degree in Aeronautics and Astronautics from Purdue University (West Lafayette, Indiana) in 1987.

He served as a Senior Specialist in the rocket engine turbopump department of Rocketdyne Division, Rockwell International from 1987 to 1994 before joining National Cheng Kung University in Tainan, Taiwan as an Associate Professor. His research interests include rocket and gas turbine engine propulsion, fluid machinery aerodynamics, electronics cooling, renewable energy and energy efficiency studies. He established Jetpro Technology in 1992, SonicEdge Industries in 2000, and Smart Energy, Inc. in 2008, and has published about 50 technical papers and reports. He is also the inventor of about 100 patents, in which 65 are in electronics cooling and the rest in renewable energy designs. His research is strongly linked with innovative ideas and commercialization.

*Session : **D1-W1-T4: Energy, Environment and Sustainability***

Development of an Environmentally Benign, Multifunctional Biomedical Surface Treatment System Using an Atmospheric-Pressure Plasma Jet

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ABSTRACT

In this talk, the development of an environmentally benign, flexible, large-area, high-throughput and multi-functional biomedical surface treatment system (named MBSTS hereafter) is presented. The MBSTS is capable of carrying out: 1) dry sterilization/inactivation, 2) dry hydrophilicity improvement, and/or 3) dry biocompatible functionalization of amine for the surface of bare glass, PLA and UHMWPE by using the technology of nitrogen-based parallel-plate DBD-type atmospheric-pressure plasma jet (APPJ). As compared to the conventional methods, e.g., chitosan, for amine functionalization, the required treatment time before efficient cell culture decreases greatly from 5-10 hours down to less than 5-10 minutes, in addition to the very low cost, because nitrogen is used and there is no vacuum equipment needed, and the environmental benignity due to its totally dry treatment. Several examples of surface treatment and possible applications are presented in the meeting.

BIOGRAPHY

Prof. Jong-Shinn Wu was born in Tainan city, Taiwan on 2nd March 1964. He received bachelor degree in Mechanical Engineering from National Taiwan University in 1986. Later on, he received his MS degree in the same department in 1988. Then, he served in the army as a lecturer in the military high school (1988~1990). Right after the military service, he went to the University of Michigan (USA), working on optical diagnostics of turbulence phenomena pertinent to sprays, and received his PhD degree in Aerospace Engineering in 1994. He continued to work as a postdoctoral research fellow in the same department, conducting research on the measurements of optical properties of soot resulting from flames. In late of 1995, he returned to Taiwan and worked as an engineer at National Space Organization of Taiwan on the subject of thermal vacuum test for satellites. In 1998, he joined the Department of Mechanical Engineering at National Chiao Tung University as an assistant professor. He was promoted to a full professor in 2005. His current research interests include development of hybrid rocket system, simulation of rare-

fied gas dynamics (DSMC), low-temperature plasma physics and applications, development of advanced kinetic-based numerical schemes for gas flows and large-scale parallel scientific computing (MPI and GPU). He has published more than 50 referred international journal papers and 100 international and national conference papers. He is also the associate editor of the International Journal for Plasma Science and Engineering since 2008 and has served as the International Advisory Committee member for both the Asia CFD Conference and the International Conference on Parallel CFD since 2010.

Session : D1-W3-T4: Nanotechnology

Session Organizer & Chair

Kuo-Lun Allan Tung, PhD (童國倫 教授)

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BIOGRAPHY

Allan Tung was born in 1968 in Taipei, Taiwan. He received the B.S., M.S. and Ph.D. degrees in 1991, 1994 and 1998, respectively, from the National Taiwan University, all in chemical engineering. After post-doctoral research work for one year at National Taiwan University, he joined Chung Yuan University in 1999, where he is currently a Full Professor in the department of chemical engineering. He is one of the founding members of the CMT since 2000 and was elected to serve as deputy director and director in 2006 and 2009, respectively. The CMT is aimed at promoting the development of membrane technology, excelling academic exchange and enhancing cooperation with the industrial sector.

He is now the Director of the R&D Centre for Membrane Technology (CMT) at Chung Yuan University in Taipei, Taiwan with a specialty of research and development on membrane filtration applications for 19 years. With a solid training background of filtration theory since 1990, Allan Tung has been doing research in the area of membrane filtrations for more than 18 years with a strong research interest in the fundamental study of membrane fouling and applications on downstream processing for bioseparation and water/wastewater treatments using experimental and computational methods. Recent research topics include fundamental researches of membrane fouling and filtration mechanism of deformable particle, CFD analysis of fluid flow through textile filter media and porous membranes, molecular dynamic study of transport phenomena in membranes, computer simulation of multi-phase flow and membrane module design for water/wastewater treatments. Some of the developed patented technologies, say feed spacer design technology for spiral wound membrane module, have been transfer to industries.

Prof. Kuo-Lun Allan Tung is also active in the international affairs in membrane filtration discipline. He is now a council member of The Filtration Society in UK and also serving as the managing committee

member of the membrane technology and water reuse specialist groups in international water association (IWA), Taiwan representative Secretary of Asia Pacific Desalination Association (APDA), Taiwan deputy representative of Taiwan, International Delegates on Filtration (INDEFI), and executive committee member of International Recycling Society (IRS).

Session : D1-W3-T4: Nanotechnology

A Novel Computational Approach to Identify the Binding Modes of Various Dyes towards Different Protofibrils Associated with Neurodegenerative Disorders and Virtual Screening

Hsuan-Liang (Kevin) Liu, PhD (劉宣良 所長)

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ABSTRACT

Thioflavin T and Congo red have been commonly used to identify amyloid fibrils in tissues. Their derivatives, such as [^{11}C]PIB, [^{11}C]SB-13, [^{18}F]FDDNP, have been developed as positron emission tomography (PET) tracers to detect and visualize senile plaques (SPs) and neurofibrillary tangles (NFTs), the hallmark pathologies accompanying the neurodegeneration involved in Alzheimer's disease (AD). It is obvious that understanding the binding modes of various dyes towards protofibrils in a molecular level is essential for the design of better dyes for clinical purposes. However, the specificity and the stabilities of these binding modes and their roles in amyloid fibril detection remain elusive. The lack of high-resolution models further complicates the investigation of these binding modes. In this study, a novel computational approach combining molecular docking, molecular dynamics simulations, and binding free energy calculation using MM/PBSA (molecular mechanics Poisson-Boltzmann surface area) has been developed to investigate: (i) the binding modes of Congo red towards a protofibril formed by an amyloidogenic fragment (GNNQQNY) from the yeast prion protein Sup35 and (ii) the binding modes of Thioflavin T and its neutral analog BTA-1 towards $A\beta_{9\text{-}40}$ protofibrils. Our results, consistent with previous experimental data, provide molecular insights into the nature of the binding modes of these dyes towards amyloid protofibrils. Based on the identification of these binding modes, pharmacophore- and structure-based virtual screening were further performed to identify new binding ligands, which may serve as a target for developing new dyes in clinical applications.

BIOGRAPHY

Prof. Hsuan-Liang (Kevin) Liu was born in Keelung, Taiwan on Nov. 13, 1969. He received his B.S. and Ph.D degree in the field of Chemical Engineering in 1991 and 1998 from National Taiwan University and

Iowa State University, respectively. Prof. Liu's research fields are computational biology, bioinformatics, proteomics, and genetic & protein engineering.

He has been working in the Department of Chemical Engineering and Biotechnology of National Taipei University of Technology (NTUT) for eleven years. He was promoted as a distinguished professor in August 2008 due to his outstanding academic performance. He has received three and two times of the Outstanding Research Awards from the College of Engineering of NTUT and NTUT, respectively. He joined the member of the Taiwan Institute of Chemical Engineering and received the Young Research Fellow Award in 2004. To date, he has published around 100 SCI papers with high quality, including those in Proteomics, Bioinformatics, Current Protein & Peptide Science, Chemical Physics Letters, Biotechnology Progress, Chemical Engineering Journal, etc. His current research interests include molecular dynamics simulations, molecular docking, pharmacophore-based and structure-based virtual screening, and computer-aided drug design.

Prof. Liu is currently a member of the American Chemical Society, the Taiwan Institute of Chemical Engineering, and the Taiwanese Chemical Society. He is also the chair of the Graduate Institute of Biotechnology of NTUT. By continuous devoting his effort in the academic society, Prof. Liu has received high reputation in his country.

Session : D1-W3-T4: Nanotechnology

Nanopore Characterization Techniques-Status Quo and Future Development

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ABSTRACT

A survey of pore size, pore size distribution and morphology characterization techniques for filtration membranes will be presented. Most of the current available techniques can provide "bulk" pore properties in the filtration membranes only and could not provide "depth" profile of the pore properties and/or three-dimensional pore structure in the multilayer filtration membranes. The presentation will be divided into two parts: in the first part, a brief review of the current methods for characterizing filtration membrane pore properties with pore size ranging in several tenth nanometer regions will be given; in the second part, some innovative methods can give "depth profile" properties of pore and free volume in filtration membranes from micron-scale to angstrom will be introduced. Two of those innovative methods, nano-transmission x-ray microscope (NTXM) and position annihilation lifetime spectroscopic (PALS) techniques will be illustrated thoroughly with examples of microfiltration and nanofiltration membranes.

BIOGRAPHY

Allan Tung was born in 1968 in Taipei, Taiwan. He received the B.S., M.S. and Ph.D. degrees in 1991, 1994 and 1998, respectively, from the National Taiwan University, all in chemical engineering. After post-doctoral research work for one year at National Taiwan University, he joined Chung Yuan University in 1999, where he is currently a Full Professor in the department of chemical engineering. He is one of the founding members of the CMT since 2000 and was elected to serve as deputy director and director in 2006 and 2009, respectively. The CMT is aimed at promoting the development of membrane technology, excelling academic exchange and enhancing cooperation with the industrial sector.

He is now the Director of the R&D Centre for Membrane Technology (CMT) at Chung Yuan University in Taipei, Taiwan with a specialty of research and development on membrane filtration applications for 19 years. With a solid training background of filtration theory since 1990, Allan Tung has been doing research in the area of membrane filtrations for more than 18 years with a strong research interest in the fundamental study of membrane fouling and applications on downstream processing for bioseparation and water/wastewater treatments using experimental and computational methods. Recent research topics include fundamental researches of membrane fouling and filtration mechanism of deformable particle, CFD analysis of fluid flow through textile filter media and porous membranes, molecular dynamic study of transport phenomena in membranes, computer simulation of multi-phase flow and membrane module design for water/wastewater treatments. Some of the developed patented technologies, say feed spacer design technology for spiral wound membrane module, have been transfer to industries.

Prof. Kuo-Lun Allan Tung is also active in the international affairs in membrane filtration discipline. He is now a council member of The Filtration Society in UK and also serving as the managing committee member of the membrane technology and water reuse specialist groups in international water association (IWA), Taiwan representative Secretary of Asia Pacific Desalination Association (APDA), Taiwan deputy representative of Taiwan, International Delegates on Filtration (INDEFI), and executive committee member of International Recycling Society (IRS).

Session : D1-W3-T4: Nanotechnology

Engineering Microsystems to Guide Cell Behaviors

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ABSTRACT

Microfabrication techniques are widely used in the electronic industry to generate small features with size between 1-100 μm. This size range is on the same order of a single cell, thus, these microsystems are well suited for studying cell behaviors. Cells in the environment are in contact with the culture solution and extracellular matrix. They sense the signals in the environment and activate signal transudation pathways to alter their behavior. This talk will demonstrate some examples of using micropatterned surfaces and microfluidic systems to control local environment around the cell. Micropatterned surfaces were used to control the cell size and shape. Endothelial cells patterned within the 20 μm grooves formed capillary tube-like structure containing a central lumen. Capillary networks embedded in other tissue specific cell types can be formed on the biomaterials for creating vascularized tissue. Patterned biomaterials can be applied to guide neurons to extend axon and neurite for creating neuronal networks. We have also devised a completely novel microarray-based technique to amplify the natural directional persistence of migrating cells (MANDIP). Using MANDIP, we can amplify this directional persistence to coerce the migration of cells indefinitely along arbitrary paths in one preset direction without chemoattractants, gradients in substrate adhesiveness, or external fields. Potential applications of MANDIP include cell-sorting, drug screening, tissue engineering, wound healing, and mechanistic studies of cell migration, cell-cell interactions, and other cellular processes requiring temporal and spatial regulation. We have devised and are seeking to commercialize a simple *in vitro* migration assay that offers significant improvements in reliability and ease of implementation compared to traditional "wound healing" assays. Instead of mechanically wounding cells, which leads to interferences caused by dead cell debris that block cell movement and molecules released by wounded cells that alter artificially the rate of cell migration, confluent groups of cells, initially confined within patterns of cell-resistant polyelectrolyte, are released by electrostatic adsorption of a second, cell adhesive polyelectrolyte.

BIOGRAPHY

Chia-Chi Ho has a B.S. degree in Chemical Engineering from National Taiwan University (1996), and a Ph.D. degree in Chemical Engineering from University of Delaware (2001). She was a visiting scientist in Harvard University in 2001 working with Prof. George Whitesides and Donald Ingber.

She is currently an Associate Professor in the Chemical and Materials Engineering Department at the University of Cincinnati after being promoted from the Assistant Professor in 2008. Her research interests include membrane separations, membrane design and fabrication, biomaterials, and tissue engineering.

Prof. Ho has been named as Professor of the Quarter by the University of Cincinnati College of Engineering and the Engineering Tribunal, Rising Star by the YWCA, and awarded the 3M nontenured faculty award. Her research has been published in the following: Journal of Membrane Science, Separation Science and Technology, Journal of Colloid and Interface Science, Biotechnology and Bioengineering, Desalination, Journal of Biomedical Materials Research, Macromolecules, Advanced Materials, Langmuir, Biomaterials, Nature Materials, Journal of American Chemical Society, and FASEB Journal.

Session : ***D1-W4-T4: Multimedia System-on-Chip***

Session Organizer & Chair

Jiun-In Guo, PhD (郭峻因 教授**)**

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BIOGRAPHY

Jiun-In Guo was born in Kaohsiung, Taiwan, R.O.C. in 1966. He received the B.S. degree and Ph.D. degree in electronics engineering from National Chiao Tung University, Hsinchu, Taiwan, in 1989 and 1993, respectively.

He is currently the research distinguished professor and chair of the Department of Computer Science and Information Engineering, National Chung-Cheng University, Chiayi, Taiwan. He joined the System-on-Chip Research Center of National Chung-Cheng University since March 2003 to start involving in several Grand Research Projects on low-power, high-performance processor design and multimedia IP/SOC design. He was the director of SOC Research Center, National Chung-Cheng University from 2005 to 2008. He was an Associate Professor of the Department of Computer Science and Information Engineering, National Chung-Cheng University from 2001 to 2003 and an Associate Professor of the Department of Electronics Engineering, National Lien-Ho Institute of Technology from 1994 to 2001.

Prof. Guo was the recipient of the National Science Council (NSC) Research Award in 1996 and 2001. He was the recipient of the 2003 MXIC Young Professor Award for his contributions to the course of low-power Multimedia/DSP Silicon IP Design. He was also the recipient of the 2004 Chinese Institute of Electrical Engineering (CIEE) Outstanding Youth Electrical Engineer Award and the recipient of the 2008 Chinese Institute of Electrical Engineering (CIEE) Tai-Chung Section Outstanding Engineering Professor Award to recognize his excellent contributions to R&D and service of electrical engineering. He was also the recipient of the 2006 Outstanding Research Award of National Chung Cheng University. He has published over 140 technical papers on the research areas of low-power and low cost algorithm and architecture design for DSP/Multimedia signal processing applications. His research team has won over 30 IC related student design contest awards from 2003 to 2010. His research interests include image, multimedia, and digital signal processing, VLSI algorithm/architecture design, digital SIP design, and SOC design.

Session : ***D1-W4-T4: Multimedia System-on-Chip***

Low Power Video Technology for Multimedia SoC Design

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ABSTRACT

Low power video is a major design trend in multimedia SoC, especially for the portable hand-held applications. The demand of more advanced video coding technology and higher video coding resolutions have imposed great design challenges for real-time multimedia SoC design.

In this talk, we will describe the major design challenges and solutions to the low power video design technology for multimedia SoC. The low power video design from different levels of abstract will be surveyed and investigated to depict the major design issues for achieving the design goal of real-time processing. In addition, the power-aware video coding design, which is widely used to trade-off the power consumption and video coding quality for portable multimedia, will also be introduced. Future design trends in stereo/multi-view video coding will be discussed in the final of the talk.

BIOGRAPHY

Jiun-In Guo was born in Kaohsiung, Taiwan, R.O.C. in 1966. He received the B.S. degree and Ph.D. degree in electronics engineering from National Chiao Tung University, Hsinchu, Taiwan, in 1989 and 1993, respectively.

He is currently the research distinguished professor and chair of the Department of Computer Science and Information Engineering, National Chung-Cheng University, Chiayi, Taiwan. He joined the System-on-Chip Research Center of National Chung-Cheng University since March 2003 to start involving in several Grand Research Projects on low-power, high-performance processor design and multimedia IP/SOC design. He was the director of SOC Research Center, National Chung-Cheng University from 2005 to

2008. He was an Associate Professor of the Department of Computer Science and Information Engineering, National Chung-Cheng University from 2001 to 2003 and an Associate Professor of the Department of Electronics Engineering, National Lien-Ho Institute of Technology from 1994 to 2001.

Prof. Guo was the recipient of the National Science Council (NSC) Research Award in 1996 and 2001. He was the recipient of the 2003 MXIC Young Professor Award for his contributions to the course of low-power Multimedia/DSP Silicon IP Design. He was also the recipient of the 2004 Chinese Institute of Electrical Engineering (CIEE) Outstanding Youth Electrical Engineer Award and the recipient of the 2008 Chinese Institute of Electrical Engineering (CIEE) Tai-Chung Section Outstanding Engineering Professor Award to recognize his excellent contributions to R&D and service of electrical engineering. He was also the recipient of the 2006 Outstanding Research Award of National Chung Cheng University. He has published over 140 technical papers on the research areas of low-power and low cost algorithm and architecture design for DSP/Multimedia signal processing applications. His research team has won over 30 IC related student design contest awards from 2003 to 2010. His research interests include image, multimedia, and digital signal processing, VLSI algorithm/architecture design, digital SIP design, and SOC design.

*Session : **D1-W4-T4: Multimedia System-on-Chip***

Debunking the 100X GPU vs. CPU Myth: An Evaluation of Throughput Computing on CPU and GPU

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ABSTRACT

Recent advances in computing have led to an explosion in the amount of data being generated. Processing the ever-growing data in a timely manner has made throughput computing an important aspect for emerging applications. Our analysis of a set of important throughput computing kernels shows that there is an ample amount of parallelism in these kernels which makes them suitable for today's multi-core CPUs and GPUs. In the past few years, there have been many studies claiming GPUs deliver substantial speedups (between 10X and 1000X) over multi-core CPUs on these kernels. To understand where such large performance difference comes from, we perform a rigorous performance analysis and find that after applying optimizations appropriate for both CPUs and GPUs the performance gap between an Nvidia GTX280 processor and the Intel Core i7 960 processor narrows to only 2.5x on average. In this talk, we discuss optimization techniques for both CPU and GPU and architecture features contributed to performance differences between the two architectures.

BIOGRAPHY

Yen-Kuang Chen received the Ph.D. from Princeton University and is a Principal Research Scientist at Intel Corporation. His research interests include developing innovative multimedia applications, analyzing the performance bottleneck in current computers, and designing next generation microprocessor/platform with many cores. In particular, he is analyzing the emerging multimedia applications and providing inputs to the definition of the next-generation CPUs and GPUs with many cores. He has 20+ US patents, 25+ pending patent applications, and 85+ technical publications.

He is an associate editor of the Journal of Signal Processing Systems (including a special issue on "Multi-core Enabled Multimedia Applications & Architectures"), of IEEE Transactions on Circuit and System for Video Technology (including a special issue on "Algorithm/Architectures Co-Exploration of Visual Com-

puting"), of IEEE Transactions on Multimedia, and of IEEE Transactions on Circuit and System I. He is a guest editor of the special issue on "Signal Processing on Platforms with Multiple Cores: Part 1 -- Overview and Methodology" and the special issue on "Signal Processing on Platforms with Multiple Cores: Part 2 -- Design and Applications" for IEEE Signal Processing Magazine. He is a member of Multimedia Signal Processing TC, IEEE Signal Processing Society, Design and Implementation of Signal Processing Systems TC, IEEE Signal Processing Society, Multimedia Systems and Applications TC, IEEE Circuits and Systems Society, and Visual Signal Processing and Communications TC, IEEE Circuits and Systems Society. He has served as a program committee member of 35+ international conferences and workshops.

Currently, he is trying to bring the awareness of the trends and the challenges of many core eras to the development of multimedia applications. In ICME 2007 and 2008, he organized the special sessions on "Multi-Core Enabled Multimedia Applications and Standards" and "Multimedia Signal Processing on Graphics Processors with Hundreds of Cores." In ICME 2009, he organized the workshop on "Multimedia Signal Processing and Novel Parallel Computing." In ICASSP 2008, he gave a tutorial on "Multimedia Signal Processing on Processors with Many Cores." In ICASSP 2009 and ISCAS 2009, he gave a tutorial on "Multimedia Signal Processing on CPUs and GPUs with Many Cores." He is an IEEE Senior Member and an ACM Senior Member.

*Session : **D1-W4-T4: Multimedia System-on-Chip***

Innovation and Commercialization of Microdisplay for 3D Applications

Bor-Yeu Tsaur, PhD (曹伯禹 博士)

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ABSTRACT

The flat panel display industry has been growing at astonishing rate in the last decade, with global market now exceeding the total semiconductor industry. Display touches every aspect of our daily life either at work or for personal use. The advent of 3D has emerged recently as the next most important application for display, and there is a "Gold Rush" by the display industry trying to capture this potentially explosive market. Microdisplay has been a niche product in the past, but now could potentially play a very important role in the 3D era. This talk will discuss the innovation and commercialization of microdisplay for 3D applications.

The CyberDisplay, a proprietary high-performance microdisplay technology pioneered by Kopin, is the highest-pixel-density, full-color, transmissive AMLCD. The key behind this achievement is the use of IC-quality single-crystal Si TFT pixel transistors on glass for transmissive LCD displays. The use of single-crystal transistors allows the pixel size to be much smaller than those for LCD TVs and laptop computer screens. By use of innovated compact optics, however, the microdisplay with HD resolution can be magnified to yield a virtue image equivalent to a 50-60 inch TV. In a binocular system, where each eye can view microdisplay with slightly different content, natural 3D image can be obtained.

The 3D system based on binocular microdisplay has several inherent advantages over the conventional 3D TV technology using shutter glass. The potential advantages are flicker free viewing, better space-depth perception for 3D, better color fidelity and brightness, and lower system cost. In addition, portable 3D system for personal use is feasible in a mobile environment. Examples of portable 3D product prototype will be shown.

BIOGRAPHY

Bor-Yeu Tsaur received the B. S. Degree from the National Taiwan University in 1977 with top honor and the Ph. D. Degree in Electrical Engineering from the California Institute of Technology in 1980. His Ph. D. thesis on "Ion-Beam-Induced Modifications of Thin-Film Structures and Formation of Metastable Phases" was recognized as important pioneer research in the field of particle-solid interaction. He was invited to contribute an article on "Ion-Beam Mixing" in McGraw-Hill's Encyclopedia of Science and Technology.

Dr. Tsaur joined MIT Lincoln laboratory in 1980 and served as Director of the Electronic Material Group from 1985 to 1997. At Lincoln Laboratory, he was involved in advance research in many areas, including solar cell technology, silicon-on-insulator VLSI technology, radiation-hardened electronics, high-speed optical electronics, infrared imaging sensors, and flat panel displays. He joined Kopin in 1997 as Executive Vice President and General Manager of Display business unit. He led the development and commercialization of the award winning Kopin Cyberdisplay products. He also pioneered the newly announced breakthrough Digital iVision technology for the new generation of mobile video eyewear. Dr. Tsaur has published over 160 technical papers and has coauthored 30 patents.

Dinner Keynote Speech (by Invitation)

Economic Cooperation Framework Agreement (ECFA) and Its Impact on Taiwan Economy & Cross-Strait Economic Relations

James Hsin-Hua Wu, PhD (吳新華 博士)

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BIOGRAPHY

Work Experience:

Since Feb 2008	Director, Commercial Division, TECO in LA
March 2004-Feb 2008	Deputy Director General, Bureau of Foreign Trade, Ministry of Economic Affairs
June 2000-March 2004	Director, Economic Division, TECRO in Washington DC

Prior to 2000, served in Taiwan's overseas trade offices in Bangkok, Manila, Houston and Copenhagen, and home service with the bilateral trade relations Department of Bureau of Foreign Trade, Ministry of Economic Affairs, ROC

Education Attainment:

Ph. D Economics	University of Santo Tomas, Manila, Philippines (1982)
MBA	San Juan de Letran College of Management, Manila, Philippines
BA Economics	Tunghai University, Taichung, Taiwan, ROC

Session : ***D2-W1-T1: New Energy, Environment and Sustainability***

Session Organizer & Chair

Peter C Mei (梅家駒 執行長)– Founder/CEO

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BIOGRAPHY

Peter C. Mei – Chairman/CEO

Mr. Mei was born June 4th, 1955 in Saigon/VN. After finished his high school in Vietnam, he fled out of Saigon by ship and arrived Taiwan in 1972. He earned a BSEE from National Taiwan U. in 1977 and MSEE in Solid State Electronics from Rutgers University in 1983.

During his tenure at TI from '84 to '97, he worked in process control on 0.8-1.2um CMOS fab. 0.8-0.5um Radiation-hardened SOI SRAM development. 0.25, 0.18 and 0.13um CMOS device and isolation technology development for logic DSP. Later, he worked as a member of Technical Staff for TI Corporate R&D on Power Device & Analog/Mix-signal ICs.

Currently, Mr. Mei is Chairman/CEO of 21-Century Silicon, Inc. in Garland, Texas, a silicon material solution company to develop innovative, low-cost Si-material for renewable energy and solar-cell since May'06. President/CEO of iCHIPdesign International, Inc., An innovation materials & technology solutions, Fabless IC "Design+Technology", Before that, he was Exec.VP of Energy Saving Technology Co. and VP, Technical Marketing & Sales(Asia) of GlobiTech Inc. Responsible for develop company's Epitaxy foundry business, Discrete/Power Epi products promotion and value-added IPs. Promoting value-added epitaxy Si material solution, Strained-Si/SiGe, sSOI, GOI and low cost 300mm. As project manager of Infineon International Technology Transfer Management team to transfer 64M/256M DRAM to Taiwan ProMOS startup and harmonization to Infineon Dresden fab., and 0.18/0.13um Core Logic/eDRAM technology to Essonne, France.

Mr. Mei had 25 years of technology R&D, engineering, IC design, and semi & solar material marketing experience. He holds eight patents (6 on LCD HV CMOS devices, 2 on Silicon material) and has published 28 technical papers. He is a Senior Member of IEEE.

Peter and his wife Agnes reside in Plano, Texas since '84, raising two college kids and a ten year old daughter, who keep him from empty nest too soon before he can even thinking of retirement.

*Session : **D2-W1-T1: New Energy, Environment and Sustainability***

Developing Trends in Sustainable Business

Dwight Collins, PhD (柯林斯 博士)

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ABSTRACT

Over the last few years, the concept of sustainability has gained considerable popularity in the fields of product development and commercialization. More than ever before, firms are acknowledging the need to consider the sustainability imperative in developing products and business strategy. Sustainability parameters such as the greenhouse gas (GHG) footprint are becoming as central to design and development decisions and profit optimization frameworks as more conventionally considered factors like customer service and product quality.

In this talk, the speaker will provide an overview of a number of features of this rapidly evolving sustainable business landscape. Based on his experience as a founding faculty member of the Presidio Graduate School, he will describe a new kind of MBA that integrates sustainability throughout the MBA curriculum. He will provide an overview of the exciting new discipline of Industrial Ecology, which views an industrial system not in isolation from its surrounding systems, but in concert with them. Finally, he will describe a number of examples of how sustainability is a driving force in identifying networks of production that turn potential wastes into raw materials and in the reprocessing/ remanufacture of products at end of life.

BIOGRAPHY

Dwight Collins is a member of the founding faculty of the Presidio Graduate School. He teaches sustainable operations management and is the founder of the Presidio's Experiential Learning Program. He co-designed and co-teaches Fairleigh Dickinson University's Graduate Certificate Program in Managing Sustainability. As President of Colbridge & Company, he provides consulting services in supply chain

optimization, and sustainable business. He also provides strategic and financial consulting services to sustainable product and service startups.

Prior to joining the Presidio, Dwight directed Aspen Technology's Strategic Planning Practice, which provided strategic planning optimization consulting services to senior executives. Common goals included planning acquisitions, divestitures, post-merger capacity rationalization, production consolidation, and distribution network redesign. Clients included BP Chemicals, NOVA Chemicals, and Abbott Labs.

Prior to this, Dwight founded a Semiconductor Industry Practice at Chesapeake Decision Sciences through which he was instrumental in devising strategic enterprise planning and customer order promising systems for several semiconductor companies including IBM Microelectronics, LSI Logic and Cypress Semiconductor. In this time frame, Dwight also implemented supply chain optimization capabilities for Shaw Industries, the largest carpet producer in the US, and chemical company Rohm & Haas.

Dr. Collins directs the Collins Family Foundation (http://www.collinsff.org), which works to make our human presence on Earth sustainable. The Foundation organizes retreats and conferences, supports non-profits focused on sustainability, and publishes books (through its Collins Foundation Press division (www.collinsfoundationpress.com)) on themes related to sustainability.

Dr. Collins earned a BS degree in Engineering Physics, and MS and Ph.D. degrees in Operations Research, all from Cornell University. He is a member of INFORMS (**In**stitute **f**or **O**perations **R**esearch and **M**anagement **S**cience) and has served in leadership roles on a number of its program committees.

Session : ***D2-W1-T1: New Energy, Environment and Sustainability***

Sustainable Globally Integrated Enterprise

Grace Lin, PhD, *INFORMS Fellow* **(**林蔚君 教授**)**

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ABSTRACT

Supply Chain Management (SCM) has changed fundamentally in the last two decades, evolving from a back office operation to a main driver for business growth. Leveraging SCM for continual cost reductions, efficiency improvement, and vertical and horizontal integration has become integral to the fabric of today's successful businesses. Riding on their successes from integrated supply chains, many companies are continuing to evolve into globally-integrated enterprises (GIEs). GIEs have shifted their focus from efficiency-driven models to value-driven approaches that leverage and integrate global capabilities to deliver more value speedily, seamlessly, and flexibly to their stakeholders. GIEs stay highly competitive in today's global marketplace by continuously examining market conditions and customer needs, enhancing their own agility, flexibility and core competencies, and collaborating better with their value net partners.

In this talk, Dr. Lin will discuss emerging themes in supply chain evolution and a case study of a GIE's business transformation. She will then explore opportunities in green supply chains and intelligent transportation. Finally, she will discuss next steps for GIEs to become more economically and environmentally responsible.

BIOGRAPHY

Dr. Grace Lin was born in Hualian, Taiwan. She received her B.S. and M.S. in Math from Tsing-Hua University, Taiwan, and an M.S. in Applied Math and a Ph.D. in IE from Purdue University.

She is the founder of World Resource Optimization, Inc. and the Green Value Net non-profit organization. She is also an Adjunct Full Professor at the Department of Industrial Engineering and Operations Research (IEOR) at Columbia University. Prior to this, she served as an IBM Distinguished Engineer, Global Sense-and-Respond Leader, CTO, and Director for Innovation and Emerging Solutions at IBM

Global Business Services. From 1993 to 2003, she served as a Researcher, Manager, and Senior Manager for SCM & e-Business Optimization at the IBM T.J. Watson Research Center, and as their Relationship Manager for the IBM Integrated Supply Chain Organization. Dr. Lin and her IBM R&D team pioneered Extended Enterprise Supply Chain Management and helped save IBM more than $750M. Dr. Lin also initiated IBM's Sense-and-Respond Value Net efforts, founded the Value Chain Innovation Center, and created Sense-and-Respond consulting offerings bringing state-of-the-art business models and technology to IBM and its global customers including a number of Fortune 500 companies, and Defense and Government organizations. Dr. Lin's background and experience have positioned her at the intersection of technology, innovation, business consulting, and management; the fusion of business and IT; and the interaction of academia and industry.

Referred by Forrester as one of the six "Supply Chain Gurus" in 2002, Dr. Lin has published more than 60 technical papers, book chapters, and articles, and co-authored seven patents, with another five pending. Her awards include: The Franz Edelman Award, the IBM Outstanding Technical Achievement Award, the IBM Corporate Logistics Award, the IBM Research Division Award, as well as the IIE Doctoral Dissertation Award, and Purdue's Outstanding Industrial Engineer Award. Dr. Lin was named an IBM Distinguished Engineer, and a member of the IBM Academy of Technology. Twice elected INFORMS' VP Practice, she is an INFORMS Fellow, and Service Science Chair Elect, a member of INFORMS Fellow Selection Committee, and an Edelman Award judge. Dr. Lin has served on the INFORMS Board, university and government panels, and on editorial boards of major journals. She has chaired a number of INFORMS and IEEE conferences, and is a frequent keynote speaker at international conferences and global company strategy sessions.

Session : D2-W3-T1: Nanotechnology

Session Organizer & Chair
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BIOGRAPHY

Dr. Lei L. Kerr received her B.S. in Chemical Engineering from Wuhan Institute of Chemical Technology, Wuhan, China in 1997. She received her Ph.D. in Chemical Engineering from University of Florida with Professor Tim Anderson in May, 2004. She joined the faculty of Chemical and Paper Engineering at Miami University Miami University in August, 2004. She was the 2006 summer faculty Fellow at NASA Glenn Research Center in Cleveland, OH.

Session : ***D2-W3-T1: Nanotechnology***

Nano-Structures for Solar Cells

Ching-Fuh Lin, PhD (林清富 教授**)**

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ABSTRACT

The foreseeable fossil-energy depletion and the global warming caused by the carbon dioxide gives rise to the increasing need of alternative renewable energy, especially photovoltaic (PV). Although crystalline Si-PV devices are quickly spreading, the large consumption of Si materials hinders their vast applications. Therefore, it is very important to develop thin-film PV devices of low cost. In this talk, we will discuss the use of nano-structured semiconductors that enable the fabrication of thin-film solar cells with improved efficiency. Two types of such thin-film solar cells will be discussed, including the semiconductor-oxide sandwiched organic solar cells and semiconductor nanowire solar cells.

In the sandwiched-type organic solar cells, the semiconductor oxides that sandwich the organic active materials are investigated and discussed. We will discuss the conditions and the function of the semiconductor oxides as well as the processing conditions for good interpenetrating nano-morphology of the organic active layer. Special care will be brought up to the solution process for depositing those layers. The solution process promises very low-cost production of organic solar cells in the future.

For the solar cells using semiconductor nanowires, we are exploring the combination of the nanowires with the organic materials to form p-n junction as well as the techniques to transfer those nanowires to alien substrates to lower the material cost.

BIOGRAPHY

Dr. Ching-Fuh Lin obtained the B.S. degree from National Taiwan University in 1983, and the M.S. and Ph.D. degrees from Cornell University, Ithaca, NY, in 1989 and 1993, respectively, all in electrical

engineering. He is now a joint professor in the Graduate Institute of Photonics and Optoelectronics, Graduate Institute of Electronics Engineering, and Department of Electrical Engineering at National Taiwan University. His research interests include organic-inorganic composite thin-film solar cells and optoelectronic devices, Si nanowire solar cells, Si-based photonics, and physics in broadband semiconductor lasers and optical amplifiers.

He is currently a Fellow of IEEE, Fellow of SPIE, Member of Asia-Pacific Academy of Materials, and a member of OSA. He has published about 130 journal papers and more than 300 conference papers and hold over 30 patents. He is also the sole author of a book, Optical Components for Communications: Principles and Applications, published by Kluwer Academic Publishers (USA 2004). He had obtained 5 times of Class A Research Awards and the Distinguished Research Award from National Science Council of Taiwan, ROC, and the Outstanding Electrical Engineering Professor Award from the Chinese Institute of Electrical Engineering. He and his students had also been granted the 18th Acer Research Golden Award, 18th Acer Research Excellent Award, 14th Acer Research Excellent Award, Collins Thesis Awards for years 1998, 2001, 2002, 2004, 2007, and 2009.

Prof. Lin has served as the Chair of IEEE LEOS Chapter Taipei Section, the Board member of the 17th IEEE Taipei Section, the Evaluation Committee member of Higher Education Evaluating & Accreditation Council of Taiwan, the Council member of the 10th Optical Engineering Society of ROC, and the Convener in the area of Electronics and Information for the Conventional Industry Technology Development Project in the Bureau of Industry, Ministry of Economics, ROC. He has also served as Project Instructors of the National Programs in the nano-science and nano- technology and the renewable energy (solar energy).

Session : ***D2-W3-T1: Nanotechnology***

Cobalt Oxide Nanowire Arrays: Synthesis and Energy Applications

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ABSTRACT

Co_3O_4 is a versatile and multi-functional material with exciting applications in catalysis, electrocatalysis, Li-ion batteries and solar selective absorbers. I will talk about the growth mechanism of Co_3O_4 nanowire arrays, their electrocatalytic properties toward oxygen evolution reaction, and their use in Li-ion batteries. A facile and template-free method for the large-area growth of free-standing Co_3O_4 nanowire arrays in solution was developed. These nanowires are hollow in the center and highly mesoporous. Surprisingly, the whole structure is single-crystalline. We carefully studied the growth mechanism of the nanowire arrays, and discovered that they were from topotactic oxidation conversion of intermediate $Co(OH)_2$ nanowires through the Kirkendall effect. More interestingly, we identified that axial screw dislocation played a critical role in the growth of intermediate brucite $Co(OH)_2$ crystals. Self-perpetuating spiral basal steps from the screw dislocation provide active sites for continuous adsorption of incoming molecules, altering the growth habit of brucite crystals from normal nanoplates (suppression in *c*-axis) to nanowires (elongation along *c*-axis). Moreover, the direct use of Co_3O_4 nanowire arrays as the anode for high-power lithium ion batteries was demonstrated. Compared to commercial nanopowders and unsupportive Co_3O_4 nanowires, they showed significantly improved reversible capacity, better cycleability and superior capacity retention at charge/discharge rates as high as 50C. In addition, we investigated the electrocatalytic properties of these nanowire arrays for the oxygen evolution reaction (OER). It was shown that, with Ni-doping, Co_3O_4 nanowires exhibited enhanced electrocatalytic activities. This was resulted from larger surface areas, better electrical conductivity and more active sites in Ni-doped Co_3O_4 nanowires.

BIOGRAPHY

Yiying Wu received his B.S. in chemical physics from the University of Science and Technology of China in 1998, and his Ph.D. in chemistry from the University of California at Berkeley with Professor Peidong Yang in 2003. He then did his postdoctoral research with Professor Galen D. Stucky at the University of California, Santa Barbara, and joined the chemistry faculty at The Ohio State University in the summer of 2005. He won the Cottrell Scholar Award in 2008 and NSF-CAREER award in 2010.

Session : D2-W3-T1: Nanotechnology

Deposition Processes of Thin-Film CIGS-based Solar Cells

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ABSTRACT

The typical deposition processes of copper indium gallium diselenide ($CuIn_{1-x}Ga_xSe_2$ or CIGS) films are co-evaporation process and selenization process. So far, the best efficiency thin-film CIGS solar cell employs the co-evaporation method. The co-evaporation system consists of four effusion cells for evaporation of Cu, In, Ga, and Se elemental sources, and EIES (Electron Impact Emission Spectroscopy) for the monitoring and control of the flux rates of four elements during the deposition.

The selenization process for the preparation of CIGS films can be easily scaled up for the mass production of large-area substrates. The slenization process is conducted by using the less toxic Se vapor. The dependence of the selenization conditions such as the Se flow rate, processing temperature, and processing duration on the resulting CIGS films are explored.

BIOGRAPHY

Dr. Chia-Hua Huang received the B.S. degree in the Department of Electrical Engineering from the National Sun Yat-Sen University, Taiwan. Dr. Huang earned the M.S. and Ph.D. degree in the Department of Electrical and Computer Engineering from University of Florida in 1997 and 2002, respectively. Dr. Huang's major research was the thin-film CIGS-based solar cells for his graduate study.

He was a faculty member in the Department of Electrical Engineering of National Chi Nan University from 2002 to 2003. Since August of 2003, he has joined the Department of Electrical Engineering of National Dong Hwa University, Hualien, Taiwan. Since 1995, he has been focusing on the research of thin-film CIGS-based solar cells. His research interests include the thin-film CIGS-based solar cells, dye-sensitized solar cells, and organic solar cells. He has published the scientific papers in the fields of thin-film CIGS-based solar cells, dye-sensitized solar cells, and organic solar cells.

Session : ***D2-W4-T1: System-on-Chip***

Session Organizer & Chair

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BIOGRAPHY

Wei Hwang (Fellow IEEE) received the B. Sc. degree from National Cheng Kung University, Taiwan, the M. Sc. degree from National Chiao Tung University, Taiwan and the M. Sc and Ph.D. degrees in electrical engineering from the University of Manitoba, Winnipeg, MB, Canada, in 1970 and 1974, respectively.

From 1975 to 1978, he was an Assistant Professor with the department of Electrical Engineering, Concordia University, Montreal, QC, Canada. From 1979 to 1984, he was an Associate Professor with the department of Electrical Engineering, Columbia University, New York, NY, USA. From 1984 to 2002, he was a Research Staff Member with the IBM Thomas J. Watson Research Center, Yorktown Heights, NY, USA. In 2002, he joined National Chiao Tung University (NCTU), Hsinchu, Taiwan, as the Director of Microelectronics and Information Systems Research Center until 2008, where he currently holds a Chair Professor with the Department of Electronics Engineering. During 2003 to 2007, he served as Co-principal Investigator of National System-on-Chip (NSoC) Program, Taiwan. From 2005 to 2007, he also served as a Senior Vice President and Acting President of NCTU, respectively. He is the coauthor of the book "Electrical Transports in Solids-With Particular Reference to Organic Semiconductors", Pergamon Press, 1981, which has been translated into Russian and Chinese. He has authored or coauthored over 200 technical papers in renowned international journals and conferences, and holds over 150 international patents (including 65 U.S. patents).

Prof. Hwang was a recipient of several IBM Awards, including 16 IBM Invention Plateau Invention Achievement Awards, 4 IBM Research Division Technical Awards, and was named an IBM Master Inventor. He was also a recipient of the CIEE Outstanding Electrical Engineering Professor Award in 2004 and Outstanding Scholar Award from the Foundation for the advancement of Outstanding Scholarship for 2005 to 2010. He has served several times in the Technical Program Committee of the ISLPED, SOCC,

and A-SSCC. He has also served as the General Chair of 2007 IEEE SoC Conference (SOCC 2007) and 2007 IEEE International Workshop on Memory Technology, Design and Testing (MTDT 2007). Currently, he is serving as Founding Director of Center of Advanced Information Systems and Electronics Research (CAISER) of University System of Taiwan, the Director of ITRI and NCTU Joint Research Center, and a Supervisor of IEEE Taipei Section.

Session : ***D2-W4-T1: System-on-Chip***

Memory-Centric On-chip Data Communication Platform for Energy-Efficient Heterogeneous Systems

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ABSTRACT

With increasing demands on ubiquitous wireless high-data-rate multimedia services, it is critical to have efficient processing capability and a merging multi-task system to sustain the growth. Moreover, green computing design concepts become essential to handle concurrent multimedia services at minimum processing power. In this talk, we present a new low-power memory-centric on-chip data communication multicore platform to overcome the challenges in the multi-task system design that needs to support wireless video entertainment. This platform will provide energy-efficient data transfer, data storage and transmission control protocols. With circuit and architecture co-designs, the memory-centric communication multicore platform will provide dynamic scheduling mechanisms to optimize the memory allocation, low latency and high bandwidth of on-chip communication. Advantages and highlight of a case study, the integrated digital home server with heterogeneous network entertainment systems, will also be presented.

BIOGRAPHY

Wei Hwang (Fellow IEEE) received the B. Sc. degree from National Cheng Kung University, Taiwan, the M. Sc. degree from National Chiao Tung University, Taiwan and the M. Sc and Ph.D. degrees in electrical engineering from the University of Manitoba, Winnipeg, MB, Canada, in 1970 and 1974, respectively.

From 1975 to 1978, he was an Assistant Professor with the department of Electrical Engineering, Concordia University, Montreal, QC, Canada. From 1979 to 1984, he was an Associate Professor with the department of Electrical Engineering, Columbia University, New York, NY, USA. From 1984 to 2002, he

was a Research Staff Member with the IBM Thomas J. Watson Research Center, Yorktown Heights, NY, USA. In 2002, he joined National Chiao Tung University (NCTU), Hsinchu, Taiwan, as the Director of Microelectronics and Information Systems Research Center until 2008, where he currently holds a Chair Professor with the Department of Electronics Engineering. During 2003 to 2007, he served as Co-principal Investigator of National System-on-Chip (NSoC) Program, Taiwan. From 2005 to 2007, he also served as a Senior Vice President and Acting President of NCTU, respectively. He is the coauthor of the book "Electrical Transports in Solids-With Particular Reference to Organic Semiconductors", Pergamon Press, 1981, which has been translated into Russian and Chinese. He has authored or coauthored over 200 technical papers in renowned international journals and conferences, and holds over 150 international patents (including 65 U.S. patents).

Prof. Hwang was a recipient of several IBM Awards, including 16 IBM Invention Plateau Invention Achievement Awards, 4 IBM Research Division Technical Awards, and was named an IBM Master Inventor. He was also a recipient of the CIEE Outstanding Electrical Engineering Professor Award in 2004 and Outstanding Scholar Award from the Foundation for the advancement of Outstanding Scholarship for 2005 to 2010. He has served several times in the Technical Program Committee of the ISLPED, SOCC, and A-SSCC. He has also served as the General Chair of 2007 IEEE SoC Conference (SOCC 2007) and 2007 IEEE International Workshop on Memory Technology, Design and Testing (MTDT 2007). Currently, he is serving as Founding Director of Center of Advanced Information Systems and Electronics Research (CAISER) of University System of Taiwan, the Director of ITRI and NCTU Joint Research Center, and a Supervisor of IEEE Taipei Section.

Session : ***D2-W4-T1: System-on-Chip***

Modularized Board-Level and System-in-Package (SiP) Platforms for Complex System Integration and Prototyping

Chun-Ming Huang, PhD (黃俊銘 組長**)**

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ABSTRACT

In this talk, we will present two platforms for system integration and prototyping, namely, CONCORD-II and MorPack. CONCORD-II is a fully configurable board-level system prototyping platform, which provides high flexibility in connection interfaces, high flexibility and high architectural compatibility for design changes, and high modularity for specific applications. MorPack is a multi-substrate system-in-package platform, which provides the capability to implement a whole system into a single package. We will show how these two platforms can help system designers to explore and verify complex system architecture before detailed silicon implementation, furthermore, can prototype whole systems with very low cost.

BIOGRAPHY

Chun-Ming Huang received the B.S. degree in mathematical science from National Chengchi University, Taipei, Taiwan, R.O.C., in 1990, and the M.S. and Ph.D. degree, both in computer science, from the National Tsing-Hua University, Hsin-Chu, Taiwan, R.O.C., in 1992 and 2005, respectively. Since 1993, he has been with the National Chip Implementation Center (CIC), where he is currently a researcher and department manager in the Design Service Department (DSD). His research interests include VLSI design and testing, platform-based SOC design methodologies, and multimedia communication. Dr. Huang is a member of Phi Tau Phi Scholastic Honor Society.

Session : ***D2-W4-T1: System-on-Chip***

Constructing Electronic System Level Models Using Simulink

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ABSTRACT

Our work aims at introducing a methodology that adopts nowadays existing tool to develop models that can be reused repeatedly in the future. This methodology enables MATLAB Simulink to involve in the entire SoC design phase from high level abstract algorithm design all the way down to cycle-based comprehensive hardware implementation, to consider simultaneously both control plane and data plane design aspects. Models constructed in this way offer versatile solutions that suit a wide range of electronic system level (ESL) design requirements, they can be integrated in pure software virtual platform, VHDL/Verilog simulation environment, or hardware accelerated simulation solutions. An intellectual property (IP) design project is used as a case study, showing a significant improvement on design flow and IP quality.

BIOGRAPHY

Emerson M.F. Hsiao is the Director of Filed Application and Marketing at Faraday Technology Corporation. He received his B.S in Electrical Engineering from Chung Yuan University in 1990, M.S and Ph.D in Electrical Engineering from National Taiwan University in 1992, and 2003 respectively. His research interest includes VLSI physical design, logic synthesis and signal integrity.

Session : ***D2-W1-T2: Energy, Environment and Sustainability***

Session Organizer & Chair

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BIOGRAPHY

Dr. Grace Lin was born in Hualian, Taiwan. She received her B.S. and M.S. in Math from Tsing-Hua University, Taiwan, and an M.S. in Applied Math and a Ph.D. in IE from Purdue University.

She is the founder of World Resource Optimization, Inc. and the Green Value Net non-profit organization. She is also an Adjunct Full Professor at the Department of Industrial Engineering and Operations Research (IEOR) at Columbia University. Prior to this, she served as an IBM Distinguished Engineer, Global Sense-and-Respond Leader, CTO, and Director for Innovation and Emerging Solutions at IBM Global Business Services. From 1993 to 2003, she served as a Researcher, Manager, and Senior Manager for SCM & e-Business Optimization at the IBM T.J. Watson Research Center, and as their Relationship Manager for the IBM Integrated Supply Chain Organization. Dr. Lin and her IBM R&D team pioneered Extended Enterprise Supply Chain Management and helped save IBM more than $750M. Dr. Lin also initiated IBM's Sense-and-Respond Value Net efforts, founded the Value Chain Innovation Center, and created Sense-and-Respond consulting offerings bringing state-of-the-art business models and technology to IBM and its global customers including a number of Fortune 500 companies, and Defense and Government organizations. Dr. Lin's background and experience have positioned her at the intersection of technology, innovation, business consulting, and management; the fusion of business and IT; and the interaction of academia and industry.

Referred by Forrester as one of the six "Supply Chain Gurus" in 2002, Dr. Lin has published more than 60 technical papers, book chapters, and articles, and co-authored seven patents, with another five pending. Her awards include: The Franz Edelman Award, the IBM Outstanding Technical Achievement Award, the IBM Corporate Logistics Award, the IBM Research Division Award, as well as the IIE Doctoral Dissertation Award, and Purdue's Outstanding Industrial Engineer Award. Dr. Lin was named an IBM Distinguished Engineer, and a member of the IBM Academy of Technology. Twice elected INFORMS' VP Practice, she is an INFORMS Fellow, and Service Science Chair Elect, a member of INFORMS Fellow Se-

lection Committee, and an Edelman Award judge. Dr. Lin has served on the INFORMS Board, university and government panels, and on editorial boards of major journals. She has chaired a number of INFORMS and IEEE conferences, and is a frequent keynote speaker at international conferences and global company strategy sessions.

Session : ***D2-W1-T2: Energy, Environment and Sustainability***

Eco-Valley, a Holistic Approach to Green Economy

Albert Oung (汪振富 先生**)**

Founder & CEO, Earth Buddy Inc. and Eco-Valley Inc.
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ABSTRACT

Seeded since the 80s, Mr. Oung adopt an holistic approach in promoting the importance of the new 'Green Spirit' where all living beings in our mother earth must possess the most fundamental element of 'Love'. Under 'One World concept' and the well-being of World Citizen, we then come with passion and commitment to change our world into a much better way.

Eco-Valley is an open green platform for Change and Sharing. Through new business creation especially in poor and underdeveloped rural communities, innovative research and development, global partnership and environmental diplomacy, we cut down excessive emissions of carbon dioxide and other greenhouse gases to our earth's atmosphere. Our business models will also help to eradicate rural poverty from the roots causes and through concerted global effects, helps protect and improve long terms health of our global environment. Eco-Valley becomes a green hub to attract world attention for green or non-green scholars, institutions, business and governmental bodies to build a much more efficient and practically, a sustainable green economic model with micro and macro approaches.

Eco-Valley will also act as a coordinator to introduce all participating parties. Mr. Oung's companies are now conducting many world class certification programs and schemes to govern all their performance in the region. Mr. Oung fully believed that green education is so important for our children and we need to rethink our approach. This will be the focal point of his sharing. Sharing of his practical green knowledge and experiences in opening up this new green horizon.

BIOGRAPHY

Albert Oung. A 1983 graduate of the University of Toronto in Commerce and Economic is by all means a green warrior who seeded his green dream since the 80s. Since then, 'Mr. Green' created green brands such as 'Roots', 'Earthworm', 'Earth Buddy', 'Eco-Valley' and others.

'Earth Buddy' models the life cycle of a natural and sustainable eco-system as their business platform using agricultural wastes and crop residues as basis. Earth buddy now manufactures biodegradable food containers and industrial package products.

'Eco-Valley' signifies the importance of integrating all social and commercial elements under a green platform, building a new sustainable green community by conserving its natural beings and working in harmony within their green economy.

Session : ***D2-W1-T2: Energy, Environment and Sustainability***

Venture Opportunities in Energy, Environment, and Sustainability

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BIOGRAPHY

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Session : ***D2-W1-T2: Energy, Environment and Sustainability***

Smart Grid

Erfan Ibrahim, PhD (亞伯拉漢 博士**)**

Smart Grid Communications & Cyber Security Lead, Electric Power Research Institute (EPRI)
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BIOGRAPHY

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Session : D2-W3-T2: Nanotechnology

Session Organizer & Chair

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BIOGRAPHY

Education:

B.S. 1984 – 1988	Department of Chemistry, Tankang University
M.S. 1988 – 1990	Department of Chemistry, National Taiwan University
Ph. D. 1990 – 1993	Department of Chemistry, National Taiwan University

Professional Appointments:

2003 – 2009	Director of Center of Nanoscience and Nanotechnology, National Chung Hsing University
2005/2-	Professor, Department of Chemistry, National Chung Hsing University
2002/2 - 2005/1	Associate Professor, Department of Chemistry, National Chung Hsing University
1999/8 - 2002/1	Assistant Professor, Department of Chemistry, National Chung Hsing University
1993/10 - 1999/7	Post-Doctoral fellowship, Institute of Chemistry, Academia Sinica, Taipei

Honors and Awards:

Academia Sinica Outstanding Research Award 2000
National Science Council Research Award, 1999-2001
Junior Research Faculty Award of National Chung-Hsing University, 2004
Chinese Chemical Association Outstanding Research Award, 2004
National Science Council Wu Da-Yuo Award, 2004
Y. Z. Hsu Outstanding Scientific Paper Award for Nanoscience and Technology, 2005 (Far Easterm Foundation)

Research Interests:

1. Fabrication of plasmonics for bio-chips
2. Fabrication of transparent conductive films
3. Energy-saving materials for LED –lighting, DSSC, and Low-Emissivity Glasses

Selected Publications:

1. Nujiang Tang, Waston Kuo, Chienchung Jeng, Liyuan Wang, **Kuan-Jiuh Lin** and Youwei Du, "Coil-in-Coil Carbon Nanocoils: 11 Gram-Scale Synthesis, Single Nanocoil Electrical Properties, and Electrical Contact Improvement" *ACS Nano*, **2010**, ***4*** (2), 781–788. (Impact factor: 5.472)
2. Nujiang Tang, Jianfeng Wen, Yang Zhang, Fanxin Liu, **Kuan-Jiuh Lin** and Youwei Du, "Helical Carbon Nanotubes: Catalytic Particle Size-Dependent Growth and Magnetic Properties" *ACS Nano*, **2010**, ***4*** (1), 241–250. (Impact factor: 5.472)
3. Wen Yin Lynn Ko, Hitesh G. Bagaria, Subashini Asokan, **Kuan-Jiuh Lin**, and Michael S. Wong, "CdSe Tetrapod Synthesis Using Cetyltrimethylammonium Bromide and Heat Transfer Fluids" *Journal of Materials Chemistry* **(2010) DOI: 10.1039/b922145j** (Impact factor: 4.646)
4. Wei-Hung Chen, Wen-Yin Ko, Ying-Shiou Chen, Ching-Yuan Cheng, Chi-Ming Chan, and **Kuan-Jiuh Lin**, "Growth of Copper Phthalocyanine Rods on Au Plasmon Electrodes through Micelle Disruption Methods" *Langmuir* **(2010)** 26, 2191–2195. (Impact factor: 4.097)
5. Hsu Chuen-Yuan, Huang Jing-Wen, Gwo Shangjr, **Lin Kuan-Jiuh**, "The facile fabrication of tunable plasmonic gold nanostructure arrays using microwave plasma" *Nanotechnology*, **(2010)**, 21(3), 035302/1-035302/6. (Impact factor: 3.446)
6. Su, Jun-Wei, Gwo, Shangjr. **Lin, Kuan-Jiuh**, "Well-aligned multi-walled carbon nanotubes emitting natural white-light under microwave irradiation" *Chemical Communications* **(2009)**, 44, 6777-6779. (Impact factor :5.141)

Session : D2-W3-T2: Nanotechnology

CdS sensitized Nanocrystalline Solid State and Liquid State solar cells

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ABSTRACT

The obstacle to realize the large scale production of Dye Sensitized Solar Cells (DSSCs) is its long term stability and reliability problem. One of the main causes to the instability of DSSCs is the use of liquid electrolytes. In addition, exploring quantum dots or nano-sized particles of CdS as an alternative sensitizer for organic dye in dye sensitized solar cells have attracted great interest due to the high cost and the UV instability of the organic dye. Our study has found that the CdS sensitized TiO_2 cell degrades rapidly in the liquid electrolytes even under dark environment. Thus, in this work, a solid state solar cell structure of Glass/FTO/TiO_2/CdS:Cu/Pt/FTO/glass was made. An efficiency of 0.7% was obtained. CdS:Cu served as both the p-type conductor and sensitizer. No efficiency was obtained for cell structures of glass/FTO/TiO_2/CdS/FTO/glass. This indicates the effectiveness of hole conducting behavior of CdS:Cu. This is the first time this type of solid state solar cell is reported. In addition, a 2.46% (V_{oc}=0.69 V, J_{sc}= 6.54 mA/cm^2, F.F. = 0.55) CdS sensitized nanoparticle TiO_2 solar cell is achieved for activation area of 0.16 cm^2 under AM 1.5. This is the highest reported efficiency of using CdS alone as sensitizer (0.16 cm^2 Am 1.5). The control sample of N3 dye sensitized TiO_2 solar cell has efficiency of 7.8%.

BIOGRAPHY

Dr. Lei L. Kerr received her B.S. in Chemical Engineering from Wuhan Institute of Chemical Technology, Wuhan, China in 1997. She received her Ph.D. in Chemical Engineering from University of Florida with Professor Tim Anderson in May, 2004. She joined the faculty of Chemical and Paper Engineering at Miami University Miami University in August, 2004. She was the 2006 summer faculty Fellow at NASA Glenn Research Center in Cleveland, OH.

Session : ***D2-W3-T2: Nanotechnology***

Understanding Atomic Force Microscope High-Field Lithography

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ABSTRACT

Fabricating Ge on Si integrated structures with nanoscale accuracy is a challenging pursuit essential for novel advances in electronics and photonics. An ideal nanostructure growth process would afford precise control of nanostructure chemistry, size, shape, and placement to completely eliminate any post growth fabrication. This talk will present a novel approach to Ge on Si nanostructures that exploits the tip of an atomic force microscope (AFM) to localize nanostructure growth. In this approach, the biased AFM tip (*ca.* -12 V) locally reacts an organometallic liquid precursor (diphenylgermane) while it traces desired shapes on the sample. This produces high quality carbon-free Ge nanostructures with deterministic placement, size, and composition control. Potential applications include Ge channel transistors and photodetectors.

BIOGRAPHY

Stephanie Vasko is a chemistry graduate student at the University of Washington working for Prof. Marco Rolandi in the Department of Materials Science and Engineering. She received her BS (magna cum laude) in Chemistry from Carleton College in 2007 and her MS in chemistry from the University of Washington in 2009. She worked for Prof. Melissa Eblen-Zayas (Dept. of Physics) at Carleton College from 2005-2007 and was an NSF-REU participant at Penn State (Dept. of Physics, 2004) and SUNY Stony Brook's Center for Environmental Molecular Science (2005).

Her research focuses on the deposition and characterization of inorganic nanostructures from precursor liquids via high-field atomic force lithography. She is also working on elucidating the unique chemical reactions that take place at the tip-sample gap during deposition using this technique.

She received an National Science Foundation Integrative Graduate Education Research Traineeship (NSF-IGERT) from 2008-2010, the University of Washington Chemistry Department's West Fellowship from 2007-2008.

Session : ***D2-W3-T2: Nanotechnology***

Nanostructured Energy Applications

Yi Cui, PhD (崔屹 教授)

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ABSTRACT
Highly engineered nanomaterials afford the great opportunities for controlling electronic, photonic, mechanical and ionic processes, which are important for energy applications. Here I will present examples on high performance and/or low-cost nanostructured energy applications including transparent electrodes, photovoltaics, batteries, supercapacitors and large-scale energy storage devices.

BIOGRAPHY

Yi Cui went to University of Science and Technology of China, where he received a Bachelor's degree in Chemistry in 1998. He attended graduate school from 1998 to 2002 at Harvard University, where he worked under supervision of Professor Charles M. Lieber. His Ph.D thesis concerned semiconductor nanowires for nanotechnology including synthesis, nanoelectroncis and nanosensor applications. After that, he went on to work as a Miller Postdoctoral Fellow with Professor Paul Alivisatos at University of California, Berkeley. His postdoctoral work was mainly on electronics and assembly using colloidal nano-crystals. In 2005 he became an Assistant Professor in Department of Materials Science and Engineering at Stanford University. In 2010 he was promoted to an Associate Professor with tenure. His current research is focused on nanomaterials for energy storage, photovotalics, topological insulators, biology and environment.
He has received the Sloan Research Fellowship (2010), the Global Climate and Energy Project Distinguished Lecturer (2009), KAUST Investigator Award (2008), ONR Young Investigator Award (2008), MDV Innovators Award (2007), Terman Fellowship (2005), the Technology Review World Top Young Innovator Award (2004), Miller Research Fellowship (2003), Distinguished Graduate Student Award in Nanotechnology (Foresight Institute, 2002), Gold Medal of Graduate Student Award (Material Research Society, 2001).

Session : ***D2-W4-T2: Medical System-on-Chip***

Session Organizer & Chair

Liang-Gee Chen, Ph. D (陳良基 副院長)

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BIOGRAPHY

Prof. Liang-Gee Chen received the B.S., M.S., and Ph.D. degrees in electrical engineering from National Cheng Kung University, Tainan, Taiwan, R.O.C. in 1979, 1981, and 1986, respectively. In 1988, he joined the Department of Electrical Engineering, National Taiwan University. During 1993–1994, he was a Visiting Consultant in the DSP Research Department, AT&T Bell Labs, Murray Hill, NJ. In 1997, he was a Visiting Scholar of the Department of Electrical Engineering, University of Washington, Seattle. During 2004-2006, he was the Vice President and General Director of the Electronics Research and Service Organization (ERSO) of the Industrial Technology Research Institute (ITRI). Since 2007, he has been serving as a Co-Director General of National SoC Program. He was the Deputy Dean of office of Research and Development in National Taiwan University during 2008-2009. Currently, he is the Deputy Dean of college of EECS and a Distinguished Professor of Department of Electrical Engineering at National Taiwan University. He is an IEEE Fellow from 2001 for his contributions to algorithm and architecture design on video coding systems.. In 2009, he was awarded TWAS Prizes and National Professorship. His research interests are DSP architecture design, video processor design, and video coding systems. He has over 430 publications, 20 patents and 15 US patents.

Dr. Chen has served as an Associate Editor of IEEE Transactions on Circuits and Systems for Video Technology and other international technical journals. He has also involved several IEEE technical committees, including the TPC Chair of 2009 IEEE ICASSP and the TPC chair of ISCAS 2012. He has received several outstanding research awards and outstanding industrial technology contribution awards from NSC. His group has won the DAC/ISSCC Student Design Contest for five times since 2004, and had the honor of Student Paper Contest at ICASSP 2006.

Session : D2-W4-T2: Medical System-on-Chip

Smart CMOS Image Sensors for Biomedical Applications

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ABSTRACT

I present recent progress of implantable biomedical devices based on microelectronics technologies developed in our laboratory. First, I will demonstrate retinal prosthesis devices, which are implanted in the retinal and electrically stimulate retinal cells to partially restore vision for blind patient suffered from retinitis pigmentosa (RP) and age-related macular degeneration (AMD). To realize clear vision, over 1000 stimulus points are required. We are developing a retinal prosthesis device with large number of electrodes by introducing microelectronics technologies. We have successfully demonstrated that a microelectronics-based stimulator implanted in a rabbit eye can stimulate the retinal cells. Next, I will show an implantable device into a mouse brain to measure *in vivo* imaging of fluorescence inside a mouse hippocampus in real-time. The device is based on a CMOS image sensor with 176 x 144-pixel integrated with four Pt electrodes on the sensor surface for electrical stimulation and potential sensing of neural cells. The device also employs UV-LEDs to excite fluorescence, which can be detected with the image sensor. We have successfully demonstrated real-time *in vivo* protease imaging inside the mouse hippocampus by injecting kinic acid intraperitoneally to induce epilepsy intentionally, which causes serine protease emitted. In the next stage, we are planning to measure the evolution of brain activities in an untethered mouse..

BIOGRAPHY

Jun Ohta was born in Gifu, Japan in 1958. He received the B.E., M.E., and Dr. Eng. degrees in applied physics, all from the University of Tokyo, Japan, in 1981, 1983, and 1992, respectively.

In 1983, he joined Mitsubishi Electric Corporation, Hyogo, Japan, where he engaged in the research on optoelectronic integrated circuits, optical neural networks, and artificial retina chips. From 1992 to 1993,

he was a Visiting Researcher in Optoelectronics Computing Systems Center, University of Colorado at Boulder, where he engaged in the research on smart CMOS sensors. In 1998, he joined Graduate School of Materials Science, Nara Institute of Science and Technology (NAIST), Nara, Japan as Associate Professor. He was appointed as Professor in 2004. His current research interests are vision chips, CMOS image sensors, retinal prosthesis, biomedical-photonic LSIs, integrated photonic devices. He is an author of *Smart CMOS Image Sensors and Applications*, CRC Press, Boca Raton, FL, 2007, and co-authors of *Artificial Sight*, by M.S. Humayun *et al.* (Eds.), Springer, New York, NY 2007 and *Bio-Medical CMOS ICs* by Hoi-Jun Yoo and Chris van Hoof (Eds.), Springer, New York, NY 2010.

Professor Ohta received the Best Paper Award of the Institute of Electronics, Information, and Communication Engineers (IEICE) Japan in 1992, the Ichimura Award in 1996, the National Commendation for Invention in 2001, Niwa-Takayanagi Award of The Institute of Image Information and Television Engineers (ITE) Japan in 2007, and Izuo Hayashi Award of the Japan Society of Applied Physics (JSAP) in 2009. He is a Councilor of JSAP, an Editorial Committee of ITE and a Chairman of ITE Information Sensing Research Committee, a member of IEICE Japan, IEEE, and OSA. In 2008 to the present, he serves as a Far East Regional Committee and an International Technical Program Committee in Imagers, MEMS, Medical devices, and Displays of IEEE International Solid-State Circuits Conference (ISSCC).

Session : ***D2-W4-T2: Medical System-on-Chip***

CMOS for Biomedical Applications

Luke Theogarajan, PhD (希歐格拉強 教授**)**

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ABSTRACT

Recently there has been a renewed interest in the application of CMOS circuits to solve biomedically relevant problems. This talk will focus on two facets of this area 1) Neural Prostheses and 2) Biosensors. The first part of the talk will discuss our recent effort in the area of neural prostheses mainly the retinal prosthesis that we hope will restore partial sight to patients that have become blind due to diseases such as age related macular degeneration. The talk will highlight our results from our fully implantable, wirelessly powered neural stimulator designed in 0.5μm CMOS technology and also talk about the challenges that remain. We will also highlight our efforts in the area of neural recording from the brain. The second part of the talk will focus on biosensing using CMOS technology. Current biosensors often separate the sensing from the processing which leads to a suboptimal solution. In this talk we will highlight our recent efforts in the area of DNA sequencing using CMOS technology, which integrate the sensor and sensing electronics in the same platform leading to higher bandwidth while lowering noise. We will also highlight the novel solutions that arise from integrating the sensing electronics and the sensor in the same platform.

BIOGRAPHY

Luke Theogarajan was born in Chennai, India. He was awarded a Bachelor's degree (B.E) in electronics and telecommunications from the Manipal Inst. Of Tech, Manipal, India in 1994, a Master of Science in electrical engineering from Arizona State University, Tempe, AZ in 1996 and a Ph. D in electrical engineering and computer science in 2007 from the Massachusetts Institute of Technology, Cambridge, MA.

From 1996-2000 he was with Intel corp., Hillsboro, OR as a senior design engineer working on the Pentium 4 processor and from 200-1001 he was with Intel corporation, Hudson, MA as a senior hardware design engineer working on the IXP2200 network processor. In 2007 after obtaining his Ph. D he was a

post-doctoral fellow at the Massachusetts Institute of Technology, Cambridge, MA. Since 2008 he has been at the University of California, Santa Barbara where he is currently an assistant professor

Prof. Theogarajan was awarded the outstanding faculty award in both 2009 and 2010, the Catalyst fellowship for his graduate studies and the Intel division recognition award in 2001. Prof. Theogarajan holds 4 U.S. patents and has published both in the fields of electrical engineering and polymer chemistry.

Session : D2-W4-T2: Medical System-on-Chip

Design and Implementation of an XML Parsing Engine

Sheng-De Wang, PhD (王勝德 教授)

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National Taiwan University, Taiwan
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ABSTRACT

XML (Extensible Markup Language) is a cross-platform markup language. It has been used on lots of most common applications in our computer system because of the extension and user customization features. In order to parse XML documents efficiently, much research has been done to accelerate the processing of XML documents or messages. The hardware-accelerated approach is becoming important due to a higher performance is getting expected. Current hardware platforms for processing XML documents lack the capability of well-formed checking for XML documents because of complication. To improve existing design methods, lower the CPU load and process XML efficiently, we present a hardware accelerated XML parser with well-formed checker by using the abstract classification table. The approach provides a testing and verification platform for XML processing. Abstract classification table is an emerging indexing technique to represent the hierarchical structure of XML documents and can accelerate XML processing. In our platform, the hardware accelerator can parse XML documents at 206 Mbps and provide a Giga bit level throughput.

BIOGRAPHY

Sheng-De Wang was born in Taiwan in 1957. He received the B.S. degree from National Tsing Hua University, Hsinchu, Taiwan, in 1980, and the M. S. and the Ph. D. degrees in electrical engineering from National Taiwan University, Taipei, Taiwan, in 1982 and 1986, respectively.
Since 1986 he has been on the faculty of the department of electrical engineering at National Taiwan University, Taipei, Taiwan, where he is currently a professor. From 1995 to 2001, he also served as the director of computer operating group of computer and information network center, National Taiwan University. He was a visiting scholar in Department of Electrical Engineering, University of Washington,

Seattle during the academic year of 1998-1999. From 2001 to 2003, He has been served as the Department Chair of Department of Electrical Engineering, National Chi Nan University, Puli, Taiwan for the 2-year appointment. His research interests include embedded systems, reconfigurable computing, and intelligent systems. Dr. Wang is a member of the Association for Computing Machinery and IEEE computer societies. He is also a member of Phi Tau Phi Honor society.

*Session : **D2-W3-T3: Nanotechnology***

Session Organizer & Chair

Ching-Fuh Lin, PhD (林清富 教授**)**

Professor, Graduate Institute of Photonics and Optoelectronics and Department of Electrical Engineering,
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BIOGRAPHY

Dr. Ching-Fuh Lin obtained the B.S. degree from National Taiwan University in 1983, and the M.S. and Ph.D. degrees from Cornell University, Ithaca, NY, in 1989 and 1993, respectively, all in electrical engineering. He is now a joint professor in the Graduate Institute of Photonics and Optoelectronics, Graduate Institute of Electronics Engineering, and Department of Electrical Engineering at National Taiwan University. His research interests include organic-inorganic composite thin-film solar cells and optoelectronic devices, Si nanowire solar cells, Si-based photonics, and physics in broadband semiconductor lasers and optical amplifiers.

He is currently a Fellow of IEEE, Fellow of SPIE, Member of Asia-Pacific Academy of Materials, and a member of OSA. He has published about 130 journal papers and more than 300 conference papers and hold over 30 patents. He is also the sole author of a book, Optical Components for Communications: Principles and Applications, published by Kluwer Academic Publishers (USA 2004). He had obtained 5 times of Class A Research Awards and the Distinguished Research Award from National Science Council of Taiwan, ROC, and the Outstanding Electrical Engineering Professor Award from the Chinese Institute of Electrical Engineering. He and his students had also been granted the 18th Acer Research Golden Award, 18th Acer Research Excellent Award, 14th Acer Research Excellent Award, Collins Thesis Awards for years 1998, 2001, 2002, 2004, 2007, and 2009.

Prof. Lin has served as the Chair of IEEE LEOS Chapter Taipei Section, the Board member of the 17th IEEE Taipei Section, the Evaluation Committee member of Higher Education Evaluating & Accreditation Council of Taiwan, the Council member of the 10th Optical Engineering Society of ROC, and the Convener in the area of Electronics and Information for the Conventional Industry Technology Development

Project in the Bureau of Industry, Ministry of Economics, ROC. He has also served as Project Instructors of the National Programs in the nano-science and nano- technology and the renewable energy (solar energy).

Session : D2-W3-T3: Nanotechnology

Well-Aligned Multi-Walled Carbon Nanotubes Emitting Natural White-Light under Microwave Irradiation

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ABSTRACT

Carbon nanotube forest (namely, CNT-forest), freestanding vertically from the substrate, is an important core-structure for fuel cell electrocatalysts, engineering optical polarizers, and field-emitter arrays for flat-panel displays. Large quantities of CNT-forest sheets can now be produced by wet- and dry-state spinning techniques. Highly efficient synthesis of CNT-forest has been achieved through chemical vapor deposition growth. However, low-cost black coating with large-scale CNT-forest from water-soluble carbon nanotubes still presents a great challenge. The main challenge to the fabrication of CNT-forest is dispersing the carbon naotubes at high enough concentration suitable for efficient alignment and effective coagulation. In this report, we successfully prepared high concentrations of nanocomposites comprising multi-walled carbon nanotubes well-dispersive in water-soluble poly(vinyl alcohol) (PVA) matrix. Afterward, CNT-forest was achieving in the course of PVA-burning carbonaceous crust. This approach represents a novel methodology to make large quantities of highly aligned carbon nanotubes.
More importantly, the CNT-forest has the polychromatic emission spectra when ignited it inside a home-made microwave oven. The CIE 1931 (x, y) coordinate is (0.327, 0.349) that is very closed to the CIE coordinates for a pure white-light, (0.333, 0.333). The new lighting has three significant contributions in carbon technology. First, having individual narrow-bands RGB trichromatic emission wavelengths, a brilliant color gamut can be achieved through the dramatic fabrication. Second, unlike today's conventional lighting, the future CNT-forest bulbs contain no mercury and have no electrode to wear out, which is a key metric for energy saving consideration. Third, ruling out gas discharge sparked by microwave, the low thermal-radiation implementation play a key role towards the commercial viability of electrodeless of CNT-forest lighting systems. Due to the low-cost coating technology, we firmly believe that the CNT-forest illumination technology will come into blossom in the future.

BIOGRAPHY

Education:

B.S. 1984 – 1988 Department of Chemistry, Tankang University
M.S. 1988 – 1990 Department of Chemistry, National Taiwan University
Ph. D. 1990 – 1993 Department of Chemistry, National Taiwan University

Professional Appointments:

2003 – 2009 Director of Center of Nanoscience and Nanotechnology, National Chung Hsing University
2005/2- Professor, Department of Chemistry, National Chung Hsing University
2002/2 - 2005/1 Associate Professor, Department of Chemistry, National Chung Hsing University
1999/8 – 2002/1 Assistant Professor, Department of Chemistry, National Chung Hsing University
1993/10 - 1999/7 Post-Doctoral fellowship, Institute of Chemistry, Academia Sinica, Taipei

Honors and Awards:

Academia Sinica Outstanding Research Award 2000
National Science Council Research Award, 1999-2001
Junior Research Faculty Award of National Chung-Hsing University, 2004
Chinese Chemical Association Outstanding Research Award, 2004
National Science Council Wu Da-Yuo Award, 2004
Y. Z. Hsu Outstanding Scientific Paper Award for Nanoscience and Technology, 2005 (Far Easterm Foundation)

Research Interests:

1. Fabrication of plasmonics for bio-chips
2. Fabrication of transparent conductive films
3. Energy-saving materials for LED –lighting, DSSC, and Low-Emissivity Glasses

Selected Publications:

1. Nujiang Tang, Waston Kuo, Chienchung Jeng, Liyuan Wang, **Kuan-Jiuh Lin** and Youwei Du, "Coil-in-Coil Carbon Nanocoils: 11 Gram-Scale Synthesis, Single Nanocoil Electrical Properties, and Electrical Contact Improvement" *ACS Nano*, **2010**, ***4*** (2), 781–788. (Impact factor: 5.472)
2. Nujiang Tang, Jianfeng Wen, Yang Zhang, Fanxin Liu, **Kuan-Jiuh Lin** and Youwei Du, "Helical Carbon Nanotubes: Catalytic Particle Size-Dependent Growth and Magnetic Properties" *ACS Nano*, **2010**, ***4*** (1), 241–250. (Impact factor: 5.472)
3. Wen Yin Lynn Ko, Hitesh G. Bagaria, Subashini Asokan, **Kuan-Jiuh Lin**, and Michael S. Wong, "CdSe Tetrapod Synthesis Using Cetyltrimethylammonium Bromide and Heat Transfer Fluids" *Journal of Materials Chemistry* **(2010) DOI: 10.1039/b922145j** (Impact factor: 4.646)
4. Wei-Hung Chen, Wen-Yin Ko, Ying-Shiou Chen, Ching-Yuan Cheng, Chi-Ming Chan, and **Kuan-Jiuh Lin**, "Growth of Copper Phthalocyanine Rods on Au Plasmon Electrodes through Micelle Disruption Methods" *Langmuir* **(2010)** 26, 2191–2195. (Impact factor: 4.097)
5. Hsu Chuen-Yuan, Huang Jing-Wen, Gwo Shangjr, **Lin Kuan-Jiuh**, "The facile fabrication of tunable plasmonic gold nanostructure arrays using microwave plasma" *Nanotechnology*, **(2010)**, 21(3), 035302/1-035302/6. (Impact factor: 3.446)
6. Su, Jun-Wei, Gwo, Shangjr. **Lin, Kuan-Jiuh**, "Well-aligned multi-walled carbon nanotubes emitting natural white-light under microwave irradiation" *Chemical Communications* **(2009)**, 44, 6777-6779. (Impact factor :5.141)

Session : ***D2-W3-T3: Nanotechnology***

Electrodeposition of Gold, Silver on Carbon Nanotube Thin Films

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ABSTRACT

In a carbon nanotube (CNT) thin film, CNTs form complicated networks with numerous junctions where individual CNTs intersect or simply contact other CNTs. This results in a significant reduction of the electrical conductivity of the film as compared with the intrinsic conductivity of the CNT. Because of this, the current state of the art CNT films are unsuitable for many information display applications. We were able to overcome this issue by developing an electrodeposition process in which a precise amount of metal such as gold or silver was deposited onto CNT films. This process uniquely allows a small amount of metal to be preferentially and uniformly deposited on the CNTs and at CNT junctions. With additional heat treatment, the conductivity of the CNT film increases by more than four times while its optical transmittance remains unchanged.

BIOGRAPHY

Dr. Si-Ty Lam is a Principal Project Scientist in the Information Surfaces Lab of HP Laboratories, Hewlett-Packard Company. He received his PhD degree in Materials Science and Engineering from the University of California, Davis, in 1979. He was an Advisory Engineer at IBM (1979-1983), Wafer Fab Engineering Manager at Magnex Corporation (1984), prior to joining Hewlett-Packard Company (1984-present).
His research activities for the past three decades have been in the areas of thermal inkjet printing, information storage and information display devices, materials and manufacturing processes. His current research focuses on creating new technologies for updatable, low-cost printable display surfaces that combine the best features of existing displays and print. He has over 25 patents and 20 journal publications.
Dr. Lam is a member of the Materials Research Society, Society for Information Display, American Chemical Society, Electrochemical Society, Engineering Honors Society (Tau-Beta-Pi) and National Geography Society.

Session : D2-W3-T3: Nanotechnology

New Paradigms for Manipulation of DNA Molecules at the Nanoliter Scale

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ABSTRACT

Thanks to the recent advance in micro/nano technology, it now becomes possible to manipulate objects at the molecular level. Much attention has turned to DNA, since it not only is a biomolecule that carries genetic information but also possesses unique physical and chemical properties that can be used in various applications. In this talk, I will discuss strategies for on-chip manipulation of DNA, and in particular demonstrate our recent efforts on the use of applied force fields in realizing trapping, stretching, combing, and assembly of DNA molecules. Roles of confinement and surface surfactant will also be illuminated for a judicious control of the dynamics of a single DNA molecule.

BIOGRAPHY

Dr. Hsien-Hung Wei received his BS in Chemical Engineering from National Taiwan University in 1991. After military service, he attended the City University of New York for advanced study in the area of fluid mechanics and obtained his Ph.D. in Chemical Engineering in 2000. He then went to University of Michigan and conducted his postdoctoral research in the fields of biofluid mechanics and microfluidics. In 2003, he joined the faculty in the Department of Chemical Engineering at National Cheng Kung University (NCKU) in Taiwan. Currently, he is an Associate Professor.

His research interests are microfluidics and nanofluidics, emphasizing applying small-scale physics and engineering principles for functional synthesis, guiding colloidal/molecular assembly, and manipulating fluid flows. Along this line, his research group has been exploring a diversity of subjects, including development of integrated platforms for molecular sensing and detection, exploitation of AC electrokinetics for enhancing functionalities of micro/nanodevices, use of stretched DNA in developing molecular assays, design of micro/nano swimmers for controlling their self organizing behavior, and flow-mediated formation of ordered nano/microscale materials. Combining both theoretical and experimental studies, his

team not only identifies how systems are characterized by relevant length and time scales to quantify the effects at work, but also utilizes such fundamental knowledge for design, control, and optimization of processes.

Dr. Wei has published more than 30 articles, covering various topics in fluid mechanics, colloidal and surface science, applied physics, and microfluidics. He is the recipient of the Young Investigator Award (in memory of Dr. Wu, Da-You) from National Science Council of Taiwan in 2007. He was selected as a Rising Star by the School of Engineering at NCKU in 2007 and 2008. He also received the Best Paper Award from the Taiwan Institute of Chemical Engineers in 2008.

Session : ***D2-W4-T3: Communication System-on-Chip***

Session Organizer & Chair

Chen-Yi Lee, PhD (李鎮宜 教授)

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BIOGRAPHY

Chen-Yi Lee received the B.S. degree from National Chiao Tung University, Hsinchu Taiwan in 1982, and the M.S. and Ph.D. degrees from Katholieke University Leuven (KUL), Belgium in 1986 and 1990 respectively, all in electrical engineering.

From 1986 to 1990 he was with IMEC/VSDM, working in the area of architecture synthesis for DSP. In February 1991, he joined the faculty of the Electronics Engineering Department, National Chiao Tung University, Hsinchu Taiwan, where he is currently a Professor, VP of R&D Office, and Vice Chancellor of UST. His research interests mainly include VLSI algorithms and architectures for high-throughput DSP applications. He is also active in various aspects of short-range wireless communications, system-on-chip design technology, very low power designs, and multimedia signal processing. In these areas, he has published more than 200 journal/conference papers and received more than 25 ROC/USA patents.

He served as the Director (2000~2003) of Chip Implementation Center (CIC), an organization for IC design promotion in Taiwan. He was the former IEEE CAS Taipei Chapter Chair (2000~2001), the SIP task leader (2003~2005) of National SoC Research Program, and the microelectronics program coordinator (2003~2005) of Engineering Division under National Science Council of Taiwan. He is also a Member of IEEE.

*Session : **D2-W4-T3: Communication System-on-Chip***

Recent Progress in Communications SoC's

Chen-Yi Lee, PhD (李鎮宜 教授**)**

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ABSTRACT

As VLSI technologies scale down, more and more devices can be integrated in a single chip to cover analog front-end and digital baseband processing. Typical design examples in wireless communications can be found in recent ISSCC/JSSC publications which not only provide cost-effective solutions but also reduce overall power consumption under similar system performances. Such solutions have been accepted in WLAN, BT, and other short range wireless links. However for certain applications which request long-term data transmission, including a quartz crystal oscillator for reference frequency generation often results in too much overhead in power consumption for battery-limited devices. As a result, integrating silicon oscillators in current SoC's becomes a new research trend. In this talk, a new silicon oscillator based on standard CMOS processes will be first addressed. Key design issues related to PVT variations will be further investigated. Then the application of this silicon oscillator will be demonstrated by two real examples to prove the feasibility of "crystal-less" silicon oscillators for communications SoC in standard CMOS processes.

BIOGRAPHY

Chen-Yi Lee received the B.S. degree from National Chiao Tung University, Hsinchu Taiwan in 1982, and the M.S. and Ph.D. degrees from Katholieke University Leuven (KUL), Belgium in 1986 and 1990 respectively, all in electrical engineering.

From 1986 to 1990 he was with IMEC/VSDM, working in the area of architecture synthesis for DSP. In February 1991, he joined the faculty of the Electronics Engineering Department, National Chiao Tung University, Hsinchu Taiwan, where he is currently a Professor, VP of R&D Office, and Vice Chancellor of UST. His research interests mainly include VLSI algorithms and architectures for high-throughput DSP applications. He is also active in various aspects of short-range wireless communications, system-on-chip design technology, very low power designs, and multimedia signal processing. In these areas, he has published more than 200 journal/conference papers and received more than 25 ROC/USA patents.

He served as the Director (2000~2003) of Chip Implementation Center (CIC), an organization for IC design promotion in Taiwan. He was the former IEEE CAS Taipei Chapter Chair (2000~2001), the SIP task leader (2003~2005) of National SoC Research Program, and the microelectronics program coordinator (2003~2005) of Engineering Division under National Science Council of Taiwan. He is also a Member of IEEE.

Session : ***D2-W4-T3: Communication System-on-Chip***

Physical Design Challenge to Cognitive Radio/Software Defined Radio

Kazuya Masu and Noboru Ishihara (益一哉 教授**)**

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ABSTRACT

A variety of wireless communication such as mobile phone (2G, 3G, 3.xG, etc.), WiFi, WiMAX, Bluetooth, GPS, DTV, RFID, etc. has become available and given paramount impacts on our life. Multi-standard and multi-mode wireless communications are now mandatory required. Furthermore, cognitive radio/software radio concept is essentially required for improving the frequency efficiency. On the other hand, CMOS miniaturization has enables GHz RF circuits and RF SoC. In the CMOS circuit implementation, the chip area reduction which can bring the low cost is essential.
There are be two approaches of implementing RF CMOS SoC, (1)low-cost mature (0.3-0.13μm) CMOS with the use of novel passives such as extremely high-Q inductor and variable inductors, 3D integration, and/or SiP approach, (2)miniaturized (65, 45,32nm…) CMOS where large area passives such as inductor and capacitors are eliminate in use, and digital technique is introduced in RF signal processing and performance compensation and improvement.
We have developed RF CMOS circuit which has ***scalability***. The ***Scalability*** is the circuit area can be reduced if the advanced CMOS process is employed. The elimination of inductors is the first step for the ***scalability***. Several RF CMOS circuit blocks of LNA, VCO, PLL, MIX, etc. have been developed based on CMOS inverter, where the feature is no use of inductor. Circuit performance and scalability is discussed. Then, some time-to-analog approaches are also discussed.

BIOGRAPHY

Kazuya Masu received the B.E., M.E. and Ph.D. degrees in Electronics Engineering from Tokyo Institute of Technology, Tokyo, Japan, in 1977, 1979 and 1982, respectively.

He was with the Research Institute of Electrical Communication, Tohoku University, Sendai, Japan from 1982 to 2000 as Research Associate, Associate Professor, and Professor. His works in Tohoku University were (1)Al-CVD for CMOS multilevel interconnect and BEOL process technology, (2)scanning μ-RHEED microscope and particle counter of toxic gases, (3)proposal of temperature scaling scheme and 77K-operated 0.1 μm MOSFET, etc. In June 2000, he moved to Precision and Intelligence Laboratory, Tokyo Institute of Technology, Yokohama, Japan and he is currently a professor in Solutions Research Laboratory, Tokyo Institute of Technology. He was a visiting Professor in Georgia Institute of Technology in 2002 and 2005. His current interests are (1)signal integrity and GHz signal propagation in multilevel interconnect of Si CMOS ULSI, (2)reconfigurable and scalable RF CMOS technology, (3)performance evaluation and prediction based on interconnect wire length distribution, (4)design environment and wafer shuttle service for integration of diverse functionalities, etc. Recent work is briefly summarized in "Physical design challenges to nano-CMOS circuits" by K. Masu, N. Ishihara, N. Nakayama, T. Sato and S. Amakawa, IEICE Electronics Express (ELEX), 6(11) (2009), pp. 703-720.

Professor Masu is a member of IEEE, IEICE (Institute of Electronics, Information and Communication Engineers), JSPS (Japan Society of Applied Physics), IEEJ (Institute of Electrical Engineers of Japan), and JIEP (Japan Institute of Electronics Packaging). He received IEICE Electronics Society Award in 2005 and JSPS Fellow Award in 2009. He serves as President of Electronics Society of IEICE in 2009, and Program Committee Chairperson of SSDM2010 (2010 International Conference on Solid State Devices and Materials) He is a project leader of Development of Functionally Innovative Three-Dimensional Integrated Circuit (Dream Chip) Technology (NEDO) from 2008.

Session : ***D2-W4-T3: Communication System-on-Chip***

Recent Progress in Design Methodologies for Software Defined Radio

Yu-Hen Hu, PhD (胡玉衡 教授**)**

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ABSTRACT

Immense processing power of modern micro-processor technology enables efficient, flexible implementation of various wireless communication baseband processing algorithms on chip. This kind of *software defined radio* (*SDR*) promises integration of versatile communication functions into a universal communicator. Toward this goal, digital signal processing algorithms and algorithm level design methodologies offer great opportunities toward low power, low cost design. In this presentation, two recent efforts toward this goal will be reported.

The first effort concerns a novel signal processing approach to reduce peak to average power ratio (PAPR) of an orthogonal frequency division multiplexing transmitter. A sparse bit plane coding method is developed that achieve the goal of PAPR reduction without compromising the accuracy of transmitted OFDM symbols.

The second effort concerns a bit-parallel realization of a bit-serial linear feedback shift register in a scrambler on a word-based micro-architecture. A novel look-ahead transformation formulation which outperforms existing solutions by order of magnitudes speedup will be presented.
Collaborators of these works include Prof. S. J. Chen and S. J. Lin of National Taiwan University and C. H. Sung of UW-Madison

BIOGRAPHY

Yu Hen Hu received BSEE from National Taiwan University, Taiwan ROC in 1976, and MSEE and PhD degrees from University of Southern California, Los Angeles, CA, USA in 1982. He was in the faculty of the Electrical Engineering Department of Southern Methodist University, Dallas, Texas. Since 1987, he has been with the Department of Electrical and Computer Engineering, University of Wisconsin, Madison where he is currently a professor.

Dr. Hu's has broad research interests ranging from design and implementation of signal processing algorithms, computer aided design and physical design of VLSI, pattern classification and machine learning algorithms, and image and signal processing in general. He has published more than 300 technical papers, edited or co-authored three books and many book chapters in these areas.

Dr. Hu has served as an associate editor for the IEEE Transaction of Acoustic, Speech, and Signal Processing, IEEE signal processing letters, European Journal of Applied signal Processing, Journal of VLSI Signal Processing, and IEEE Multimedia magazine. He has served as the secretary and an executive committee member of the IEEE signal processing society, a board of governor of IEEE neural network council representing the signal processing society, the chair of signal processing society neural network for signal processing technical committee, and the chair of IEEE signal processing society multimedia signal processing technical committee. He was also a steering committee member of the international conference of Multimedia and Expo on behalf of IEEE Signal processing society.

Dr. Hu is a fellow of IEEE.

Session : D2-W3-T4: Nanotechnology

Session Organizer & Chair

Hsien-Hung Wei, PhD (魏憲鴻 教授**)**

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BIOGRAPHY

Dr. Hsien-Hung Wei received his BS in Chemical Engineering from National Taiwan University in 1991. After military service, he attended the City University of New York for advanced study in the area of fluid mechanics and obtained his Ph.D. in Chemical Engineering in 2000. He then went to University of Michigan and conducted his postdoctoral research in the fields of biofluid mechanics and microfluidics. In 2003, he joined the faculty in the Department of Chemical Engineering at National Cheng Kung University (NCKU) in Taiwan. Currently, he is an Associate Professor.

His research interests are microfluidics and nanofluidics, emphasizing applying small-scale physics and engineering principles for functional synthesis, guiding colloidal/molecular assembly, and manipulating fluid flows. Along this line, his research group has been exploring a diversity of subjects, including development of integrated platforms for molecular sensing and detection, exploitation of AC electrokinetics for enhancing functionalities of micro/nanodevices, use of stretched DNA in developing molecular assays, design of micro/nano swimmers for controlling their self organizing behavior, and flow-mediated formation of ordered nano/microscale materials. Combining both theoretical and experimental studies, his team not only identifies how systems are characterized by relevant length and time scales to quantify the effects at work, but also utilizes such fundamental knowledge for design, control, and optimization of processes.

Dr. Wei has published more than 30 articles, covering various topics in fluid mechanics, colloidal and surface science, applied physics, and microfluidics. He is the recipient of the Young Investigator Award (in memory of Dr. Wu, Da-You) from National Science Council of Taiwan in 2007. He was selected as a Rising Star by the School of Engineering at NCKU in 2007 and 2008. He also received the Best Paper Award from the Taiwan Institute of Chemical Engineers in 2008.

*Session : **D2-W3-T4: Nanotechnology***

State-of-the-art in Surface Mechanical Properties Characterization Methods

Bo Zhou, PhD (周波 博士**)**

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Email: Bo.Zhou@csm-instruments.com

ABSTRACT

CSM Instruments has for over 30 years been developing state-of-the-art instruments for surface mechanical properties characterization. Based on such experience we have evolved our analysis laboratory into a measurement centre able to fulfill the testing and hardware requirements of our customers regarding tribology, indentation and scratch studies. Our products include:

- Indentation Testers: Used to determine the hardness and elastic modulus of coatings and surfaces with extremely high precision at the macro-, micro-, and nano-scales to aid in material selection and development.
- Scratch Testers: Used to measure characteristics such as adhesion of a coating, delamination effects, or cracking in order to optimize coating techniques and determine failure points and modes of the film-substrate system.
- Tribometers: Used to measure the friction coefficient and wear rate between material pairs, as well as perform lifetime analyses.

BIOGRAPHY

Dr. Bo Zhou has a MSc (2005) and PhD (2008) in Materials Engineering from Auburn University. His PhD focused on substrate effects and contact mechanics of ultra-thin film nanoindentation and led to the development of a new model to decouple the elastic modulus of the film from that of the substrate. His current role is Technical Sales Engineer and he has published 12 papers on various nanoindentation subjects.

Session : ***D2-W3-T4: Nanotechnology***

Synthesis and Post-Processing of Nanomaterials using Microreaction Technology

Chih-hung (Alex) Chang, PhD (張至弘 教授**)**

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ABSTRACT

A critical barrier to the routine use of nanomaterials is the tedious, expensive means of their synthesis. Microreaction technology takes advantage of the large surface area-to-volume ratios within microchannel structures to accelerate heat and mass transport. This accelerated transport allows for rapid changes in reaction temperatures and concentrations leading to more uniform heating and mixing which can have dramatic impacts on macromolecular yields and nanoparticle size distributions. Benefits of microrecation technology include higher yield and reactant conversion, better energy efficiency and less by-product generation. Microreators can help minimize the environmental impact of nanoproduction by enabling solvent free mixing, integrated separation techniques and reagent recycling. The possibility of synthesizing nanomaterials in the required volumes at the point-of-use eliminates the need to store and transport potentially hazardous materials and provides the flexibility for tailoring complex functional nanomaterials. Continuous flow microreactors have been used by several research groups to synthesize and characterize nanomaterials. An overview of these efforts and issues related to scale up and other post synthesis processes such as separation and deposition are presented in this talk.

BIOGRAPHY

Chih-hung (Alex) Chang was born in Taipei, Taiwan 1969. He received a B.S. degree from the Department of Chemical Engineering, National Taiwan University in June 1991. He received his PhD degree in chemical engineering from University of Florida, Gainesville Florida in December 1999.

He did a research project to study deposition of thin film platinum on titanium substrates using electrochemical methods. He received a graduate fellowship from the Department of Chemical Engineering, University of Florida, and started the graduate program in August 1994. His dissertation research concerned the development of a manufacturing process for the growth of thin-film photovoltaic cells using rapid thermal processing under Prof. Timothy J. Anderson's guidance. He joined Oregon State University in January, 2000. He is currently a full professor in the School of Chemical, Biological, and Environmental Engineering. He was a visiting professor in the Materials Science and Engineering Department at National Taiwan University from April 2008 till September 2008 sponsored by the National Science Council of Taiwan.

Prof. Chang is a member of a number of professional societies including American Institute of Chemical Engineers, The Electrochemical Society, American Vacuum Society, American Chemical Society, and Material Research Society. He is a SHARP Labs of America scholar and a recipient of AVS Graduate Research award, National Science Foundation's CAREER award, and awardees of W. M. Keck Foundation. His group has studied solution based thin film deposition processes, ink jet printing, microreaction technology, and X-ray absorption fine structure. He has more than 55 refereed publications, 2 issued patents, and 10 pending patents in these areas.

Session : ***D2-W4-T4: New Multimedia and Entertainment Technology***

Session Organizer & Chair

Scott Chun-Yang Chen, PhD (陳俊仰 博士**)**

Software Engineer, Facebook
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Email: cy.scott.chen@gmail.com

BIOGRAPHY

Scott Chun-Yang Chen was born in Taipei, Taiwan on November 22, 1977. He received the B.S. degree in electrical engineering and M.S. degree in communication engineering both from National Taiwan University, Taiwan in 2000 and 2002 respectively. He received the Ph.D. degree in electrical engineering from California Institute of Technology in 2009 with specialty of digital signal processing and minor in applied computational mathematics. He is a winner of the student paper award in 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing.

Dr. Chen joined Facebook data infrastructure team after graduation to help the company store and process large quantity of fast-growing data. Currently he is working on improving task scheduling in the open-source Hadoop MapReduce project and various other issues including scalability, availability and latency.

Session : ***D2-W4-T4: New Multimedia and Entertainment Technology***

Data Infrastructure at Facebook

Scott Chun-Yang Chen, PhD (陳俊仰 博士)

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ABSTRACT

Facebook is the world's largest social network, with over 400 million users. People spend over 500 billion minutes per mouth on the site. More than 25 billion pieces of content shared each month. The scale of such a gigantic website raises a lot of interesting engineering problems. One of these interesting problems is how to store and process such huge amount of information. Facebook uses Hadoop, a distributed system to process massive quantity of data in parallel. Facebook also developed Hive, a data warehouse built on top of Hadoop. These infrastructures allow us to store and process data on thousands of computers at the same time. In this talk, we will have a general introduction to these infrastructures and discuss the challenges we have encountered.

BIOGRAPHY

Scott Chun-Yang Chen was born in Taipei, Taiwan on November 22, 1977. He received the B.S. degree in electrical engineering and M.S. degree in communication engineering both from National Taiwan University, Taiwan in 2000 and 2002 respectively. He received the Ph.D. degree in electrical engineering from California Institute of Technology in 2009 with specialty of digital signal processing and minor in applied computational mathematics. He is a winner of the student paper award in 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing.

Dr. Chen joined Facebook data infrastructure team after graduation to help the company store and process large quantity of fast-growing data. Currently he is working on improving task scheduling in the open-source Hadoop MapReduce project and various other issues including scalability, availability and latency.

*Session : **D2-W4-T4: New Multimedia and Entertainment Technology***

Mine Your Business! -- Value and Utilization of Implicit Social Networks

Ching-Yung Lin, PhD (林清詠 博士)

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IBM Thomas J. Watson Research Center
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ABSTRACT

Nine-Hundred-and-Forty-Eight Dollars. That's the annual dollar value of each person in your email address book at work. "Too many cooks spoil the broth" really is true -- with less success attributed to projects with too many managers emailing each other and subordinates. Teams with an even mix of genders also performed well financially.

We were looking to scientifically determine how valuable electronic social networks are. We developed a distributed privacy-preserving network mining system -- SmallBlue -- to collect data of thousands of people for 3-4 years to understand who they connect to, what types of knowledge they know, what kinds of information were distributed and used, etc. These "big data" also made possible of utilizing social networks for expertise search, social capital management, social path, social network analysis, personalized info recommendation & search. All were done automatically.

BIOGRAPHY

Ching-Yung Lin is the IBM Lead of the Social and Cognitive Network Science Research Center. He joined IBM Watson Research Center as a Research Staff Member in 2000, after graduating from the Electrical Engineering Department of Columbia University. He is also an Adjunct Associate Professor at Columbia University in 2005-6, and an Affiliate Assistant/Associate Professor at the University of Washington since 2003, co-advising Ph.D. students in data mining, network analysis, and healthcare informatics. He is teaching a new graduate course of "Network Science" in Columbia University in Fall 2010.

His research interest is mainly on multimodality signal processing and understanding, data and network mining, and security. His team includes researchers with background in EE, CS, sociology, physics, business management, information, etc. Dr. Lin is a keynote speaker of Web 2.0 Expo, New York, 2009. His research work on the "Value of Social Networks" was selected as the "Top Story of the Week" of BusinessWeek Magazine, April 2009. He is the inventor of the IBM Expertise Mining and Social Network

Analysis System -- SmallBlue. Dr. Lin is the Chair of IEEE CAS Society Multimedia Technical Committee, 2010-2011, the General Chair of IEEE Intl. Conf. on Multimedia and Expo, 2009, and the Steering Committee Chair of ACM Intl. Conf. on Health Informatics, 2010-2012. He was the Editor of the Interactive Magazines (EIM) of the IEEE Communications Society (2004-2006), and a Guest Editor of the Proceedings of IEEE -- Special Issue on Digital Rights Management, 2004, the EURASIP Journal on Applied Digital Signal Processing -- Special Issue on Visual Sensor Network, 2006, and the IEEE Trans. on Multimedia -- Special Issue on Communities and Media Computing, 2009. Dr. Lin is a recipient of 2003 IEEE Circuits and Systems Society Outstanding Young Author Award, 2004 IBM Research Division Award, and (co-)author of more than 130 referred research papers.

*Session : **D2-W4-T4: New Multimedia and Entertainment Technology***

Technical Challenge and Solutions in Web-based Video Conferencing System

Chuo-Lin Chang, PhD (張倬領 博士)

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ABSTRACT

TokBox is the most user-friendly multi-party video conferencing system on the web. Its service allows up to 20 people in a conference, which can be further broadcasted to an audience of up to 200 people. Other features include multimedia, document and presentation sharing, and conference moderation and scheduling. The service is entirely web-based with the client built in a typical web browser, requiring no additional download or installation. For such a web-based system, the limited computation resource accessible by the client imposes many technical challenges for delivering a satisfying communication experience. In this talk, these challenges will be discussed, together with several server-side solutions developed at TokBox that significantly improve the system usability and audio and video quality.

BIOGRAPHY

Chuo-Ling Chang received a B.S. degree in Electrical Engineering in 1998 from National Taiwan University, Taipei, Taiwan, and an M.S. and a Ph.D. degree in Electrical Engineering from the Information Systems Laboratory of Stanford University, CA, in 2002 and 2009 respectively. His research interests mainly include scalable coding and streaming of multimedia data. Since 2008, he has been working with several startup companies, developing novel communication systems for live video sharing and video conferencing. He is currently a Senior Audio/Video Scientist at TokBox Inc., San Francisco, CA.

Important Telephone Numbers (EITC-2010)

Campus Eateries:

The following on-campus dinning facilities maybe open on weekend:

- **Market Square Cafeteria**, **Stanford Medical Center** (Across from the Emergency Room). It is located about 0.7 mile or 11 minutes from the Clark center. Address: 300 Pasteur Drive. Tel: (650) 723-6968
- **Cool Café, Cantor Arts Center, Stanford Museum**. It is located about 0.6 mile or 9 minutes of walking from the Clark center. Address: 328 Lomita Drive. Tel: (650) 725-4758
- **Stanford Bookstore Café:** Address: Upper Level, 519 Lasuen Mall. Tel: (650) 329-1217

Cafes/Restaurants at Stanford Shopping Center:

The Stanford Shopping Center is located about one mile (or 15~18 minutes of walking) from the Clark center. Address: 680 Stanford Shopping Center, Palo Alto, CA 94304.

You'll find some excellent choices, such as:

- California Pizza Kitchen ASAP. Location: D-136. Tel: (650) 325-2753
- Max's Opera Café. Location: E-711. Tel: (650) 323-6364
- McDonald's. Location: Location: F-190. Tel: (650) 327-0560
- P.F. Chang's China Bistro. Location: W-900. Tel: (650) 330-1782
- Palo Alto Creamery Fountain & Grill. Location: G-2A. Tel: (650) 327-3141
- Starbucks Coffee. Location: D-79. Tel: (650) 330-0754
- Etc.

Taxi Services near Stanford University:

- **Stanford Taxi Cab**. Tel: (650) 669-0101
- **Taxi Cab**: Tel: (650) 363-7777
- **Call2Taxi**: Tel: (650) 284-6555

Emergency Contact:

(for emergency issues in Passport, Medical, Accidents, etc.)

- **Taipei Economic & Cultural Office in San Francisco** (TECO in San Francisco). Tel: (415) 265-1351 (a 24-hour telephone line)

Travel, Accommodation, and Registration

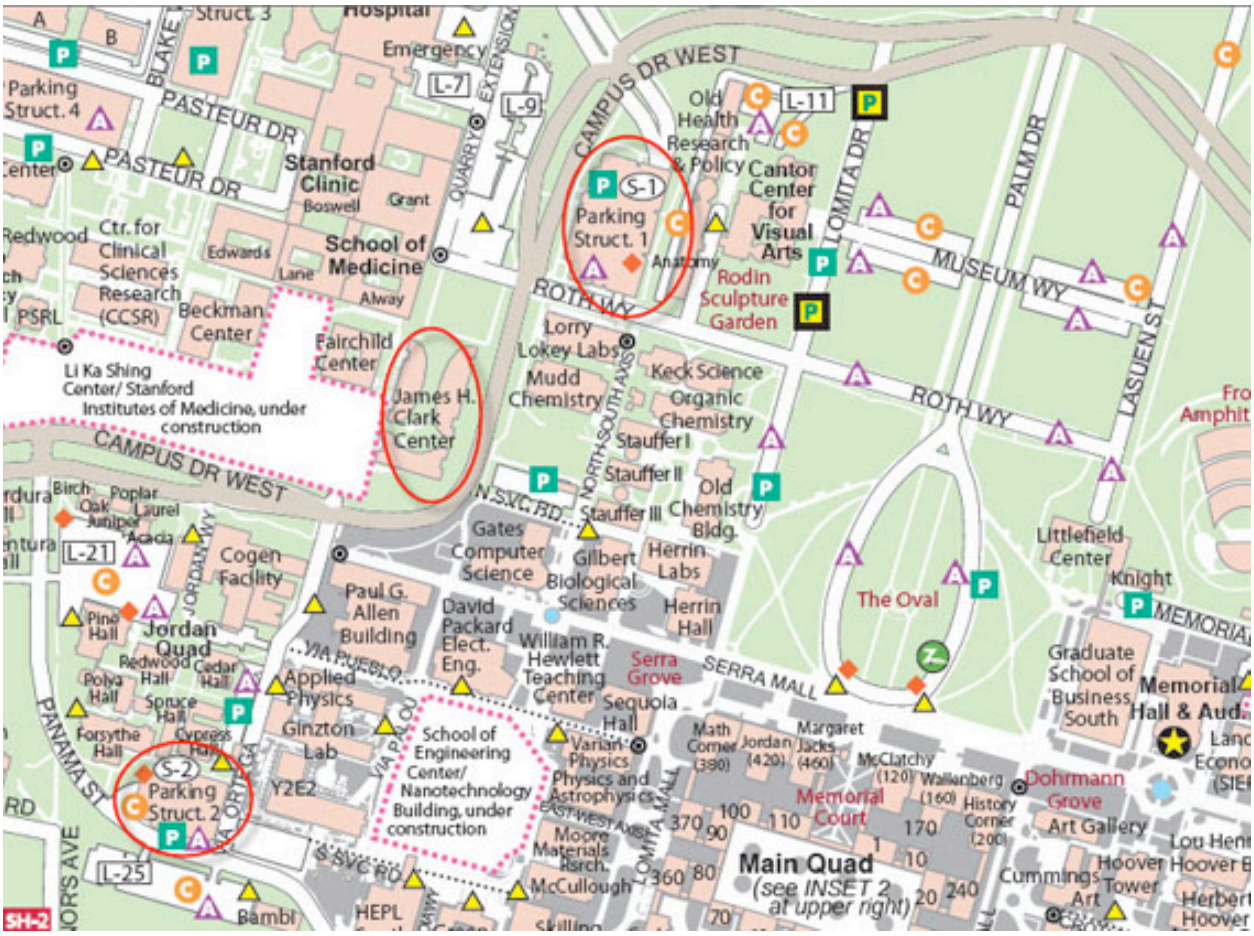
Where to meet

The EITC-2010 workshops will be held at rooms - (the Clark Center Auditorium, S360, S361, S362, and S363), James H. Clark Center, Stanford University (Address: 318 Campus Drive, Stanford, CA, 94305).

Free Stanford Shuttle Services:
The **Stanford Terrace Inn** is conveniently located close to Stanford University on **line A of the Marguerite shuttle route**, a free shuttle operated by Stanford University during the weekdays (Monday throgh Friday). Other hotels are also reachable via the Marguerite. To get to the James H. Clark Center with the "A" Marguerite Shuttle line, **get off at the Via Ortega stop** and walk to the James H. Clark Center.

Visitor Parking:
Coin-metered visitor parking (P) at $1.50/hour (quarters only accepted) is available on Level One of the Parking Garage and throughout the campus. **Parking is free after 4pm and on weekends.**

For more information, please see the Parking Information Website.



Taxi Services near Stanford University:

- **Standford Taxi Cab**: (Tel: 650-669-0101)
- **Taxi Cab**: (Tel: 650-363-7777)
- **Call2taxi**: (Tel: 650-284-6555)

Other Important links & telephone numbers:

- Click here to get the **directions** to the James H. Clark Center.
- Click here for a **map** showing the location of the James H. Clark Center.
- Click here for a list of **important telephone numbers** to have on you while visiting Stanford University.

How to register

The EITC-2010 at Stanford University is a free event, no charge. Registration for the event is now open. Please download and complete **the registration form (PDF) / registration form (MS Word)**, and send in.

For Pre-registration: Email: eitc_usa@yahoo.com

Maps

Stanford is easily accessible from throughout the San Francisco Bay area, including San Francisco, Berkeley, and San Jose. We encourage you to download the **Printable Visitor Map** (PDF) and bring it with you.

If you are using Yahoo's maps Web site to plan your route, the easiest way to locate Stanford is to enter zip code **94305**.

Recommended Conference Hotels

The following are the recommended conference hotels:

Hotel Name	Address	Phone	Price	Current Availability	Comment
Stanford Guest House	2575 Sand Hill Rd., Menlo Park, CA 94025	650-926-2800	$109	8/13/10 - 8/15/10	Ready for making reservations
Stanford Terrace Inn	531 Stanford Ave., Palo Alto, CA 94306	650-857-0333	$119 (CO2 Package) $125 (standard mail package)	8/13/10 - 8/15/10	Ready for making reservations

Note 1: The Stanford Guest House, on the grounds of the Stanford Linear Accelerator, is an economical favorite of Stanford visitors. The hotel is run by Stanford University. There are still some rooms available on Friday-Sunday, 8/13/10-8/15/10. Just mention to the front desk that you are attending a conference (EITC-2010) on Saturday-Sunday, 8/14/10-8/15/10 at the James H. Clark center when you make the reservation.

Note 2: Both the Stanford Guest House and the Stanford Terrace Inn are about 2 miles (or 35 min walking distance) to the James H. Clark center. Both hotels provide free shuttle van services to the Clark center **during the weekend**. **Please contact the front desk for the schedules of the shuttle van services when you check in the hotel.**

Note 3: Check out Stanford's lodging guide. The guide is based on proximity to campus and includes Web site links, rates, and contact information.

More on Where to Stay

Stanford's location adjacent Palo Alto and Menlo Park offers an abundance of lodging choices, ranging from B&Bs and motels to luxury hotels.

Local Lodging List:
Stanford's lodging guide is based on proximity to campus and includes Web site links, rates, and contact information.

Stanford Properties:

- Rosewood Sand Hill offers luxury accommodations at special rates for Stanford visitors, as well as a spa and fine dining restaurant.
- The Schwab Residential Center is an attractive residential complex located just a few blocks from Hoover Tower, housing GSB students and overnight guests. It is a unique and convenient place to stay while on campus for university business.
- The Stanford Guest House, on the grounds of the Stanford Linear Accelerator, is an economical favorite of Stanford visitors.

Destination Palo Alto:

Other helpful information (Lodging, Eating, Shopping, Recreation, etc.) is available at Destination Palo Alto.

Where to eat

A. Campus eateries:

The following **on-campus dining facilities** may be open on weekends:

- **Market Square Cafeteria** (**map**) (Stanford Medical Center, across from the Emergency Room) (The **Market Square Cafeteria** is located about 0.7 mile or 11 minutes of walking from **the Clark center**. Address:300 Pasteur Drive. Tel: (650) 723-6968)
- **Cool Café** (**map**) (**Cantor Arts Center, Stanford Museum**) (The **Cool Café** is located about 0.6 mile or 9 minutes of walking from **the Clark center**. Address: 328 Lomita Drive. Tel: (650) 725-4758)
- **Axe & Palm** (**map**) (**Old Union**) (Address: 520 Lasuen Mall. Tel: (650) 498-7160)
- **Stanford Bookstore Café** (**map**) (**Stanford Bookstore**) (Address: Upper Level, 519 Lasuen Mall. Tel: (650) 329-1217)
- **The Treehouse** (**map**) (**Tresidder Memorial Union**) (Address: 459 Lagunita Drive. Tel: (650) 723-4500)

B. Cafes/restaurants at Stanford Shopping Center (address: 680 Stanford Shopping Center, Palo Alto, CA 94304)**:**

The Stanford Shopping Center is located about a mile (or 15~18 minutes of walking) from the Clark center. You'll find some excellent choices, such as :

- **California Pizza Kitchen ASAP**
- **Max's Opera Cafe**
- **McDonald's**
- **P.F. Chang's China Bistro**
- **Palo Alto Creamery Fountain & Grill**
- **Starbucks Coffee**
- **Etc.**

Note: Click here to get the **directions** to the **Stanford Shopping Center** from the James H. Clark Center (about a mile).

Stanford Weather

- Current Stanford weather is available at the Stanford Weather Station.
- Detailed Stanford forecast is available at the Yahoo Weather.

Major Airports

Three major airports serve the San Francisco Bay Area, including **San Francisco International (SFO)**, **San Jose Mineta International (SJC)**, and **Oakland International (OAK)**. We suggest comparing fares to all three airports, as there can be significant differences, even for the same airline.

Choosing Airports:
Stanford is roughly equidistant from the San Francisco and San Jose airports. Although San Francisco is the largest of the three area airports and offers the most airlines and flights, some visitors find that San Jose's smaller size makes it a somewhat more convenient alternative, especially for domestic flights.

Learning More About the Airport Options:
Helpful information about each airport, including transportation options, is available at the SFGate.com Web site.

Airport Transportation

Your **transportation options** to and from the main campus of Stanford University include driving, alternative transportation, and airport shuttles, or taxis.

1. San Jose International Airport (SJC)

By car

To Stanford:

Exit airport and take Highway 87 to US 101 North. Take the Embarcadero Road exit west toward Stanford. At El Camino Real, Embarcadero becomes Galvez Street as it enters the campus. For visitor parking information, please refer to the Parking and Circulation Map. Please check parking signs carefully and note that parking is enforced Monday - Friday, 8 a.m. – 4 p.m.

From Stanford:

Take Galvez Street to Embarcadero Road, and follow signs to US 101 South. From US 101 South take the Highway 87 exit, then take the Skyport Drive exit to the Airport.

By public transportation

To Stanford:

Exit terminal, and cross to bus pick-up. Take the free VTA Bus 10 (Airport Flyer) to Santa Clara Caltrain Station. Take Caltrain north to the Palo Alto Transit Center, and then take the free Stanford Marguerite Shuttle to your campus destination (weekdays with limited weekend/holiday service).

From Stanford:

Take the free Stanford Marguerite Shuttle to the Palo Alto Transit Center. Board a southbound Caltrain to Santa Clara Caltrain Station. In Santa Clara, transfer to the free VTA Bus 10 (Airport Flyer) to reach the airport.

2. San Francisco International Airport (SFO)

By car

To Stanford:

Exit airport to US 101 South. Take the Embarcadero Road exit west toward Stanford. At El Camino Real, Embarcadero becomes Galvez Street as it enters the campus. For visitor parking information, please refer to the Parking and Circulation Map. Please check parking signs carefully and note that parking is enforced Monday - Friday, 8 a.m. – 4 p.m.

From Stanford:

Take Galvez Street to Embarcadero Road, and follow signs to US 101 North. From US 101 North take the San Francisco International Airport Exit.

By public transportation

To Stanford:

Take AirTrain to the International terminal, and board BART to San Bruno. At San Bruno, transfer to a Millbrae bound BART train. At Millbrae, exit the BART system, and board a southbound Caltrain to the Palo Alto Transit Center. Take the free Stanford Marguerite Shuttle to your campus destination (weekdays with limited weekend/holiday service).

From Stanford:

Take the free Stanford Marguerite Shuttle to the Palo Alto Transit Center. Board a northbound Caltrain to Millbrae Caltrain Station. In Millbrae, transfer to BART, and take BART to the San Bruno BART station. At San Bruno, transfer to a San Francisco International Airport bound BART train. The BART train will arrive at the International terminal, and you can take the AirTrain to reach your departure terminal.

3. Oakland International Airport (OAK)

By car

To Stanford:

Exit airport to I-880 South, and take exit to CA-84 W (Dumbarton Bridge). Turn left at University Ave., and continue straight as it turns into Palm Drive after downtown Palo Alto. For visitor parking information, please refer to the Parking and Circulation Map. Please check parking signs carefully and note that parking is enforced Monday - Friday, 8 a.m. – 4 p.m.

From Stanford:

Take Palm Drive, and continue straight as it turns into University Avenue just before downtown Palo Alto. Merge right onto CA-84E, and take the Dumbarton Bridge. Merge onto I-880 North, and exit at 98th Avenue towards the airport. Turn left at the stoplight. Continue straight to Airport Drive and the airport.

By public transportation

To Stanford:

Take AirBART to the Coliseum/Oakland Airport BART station. Take the BART Fremont line to Union City. At Union City, transfer to the Dumbarton Express bus, which will take you to the Palo Alto Transit Center. Take the free Stanford Marguerite Shuttle to your campus destination (weekdays with limited weekend/holiday service).

From Stanford:

Take the free Stanford Marguerite Shuttle to the Palo Alto Transit Center. Transfer to the Dumbarton Express bus, and take that bus to the Union City BART station. At Union City, transfer to a BART train to the Coliseum/Oakland Airport stop. Once there, transfer to the AirBART bus to reach the airport.

Public Transit

Whether you are staying in Palo Alto or traveling from elsewhere in the San Francisco Bay Area, you can reach Stanford by way of convenient public transportation.

The local transit hub for bus and train services at Stanford is **the Palo Alto Caltrain Station**, located near the main entrance to campus near the intersections of Palm Drive, University Avenue, and El Camino Real. The Stanford Marguerite Shuttle, the University's free shuttle bus, operates several routes. Most provide service from the Caltrain Station to multiple campus locations.

If you are traveling from San Francisco or San Jose, Caltrain is your most convenient option. A one-way trip from San Francisco takes approximately one hour and costs about $5.75; a one-way trip from San Jose takes approximately 40 minutes and costs about $4.00. **Caltrain also connects with stations and shuttles serving the San Francisco and San Jose International Airports.**

Please access Stanford's public transit for more detailed information.

Driving Directions

The following driving directions are to Stanford Visitor Center. The Visitor Information Center is in Memorial Hall, across from Hoover Tower on Serra Street.

From Highway 101 North & South:
Take the Embarcadero Road exit west toward Stanford. At El Camino Real, Embarcadero becomes Galvez Street as it enters the campus. Stay in the left lane and continue toward the center of campus, past the stadium on the left, and crossing Campus Drive. There is visitor parking on Memorial Way at Galvez Street. Additional metered parking is available nearby at Encina Hall and the Burnham Pavilion at Serra Street and Arguello Way.

From Highway 280 North & South:
Exit onto Sand Hill Road and follow the signs for Stanford University. Heading east, drive approximately 3 miles to the Stanford Shopping Center. Turn right onto Arboretum Road (Nordstrom is on your right). Stay on Arboretum until it ends, then turn right onto Galvez Street. Move to the left lane and continue past the stadium and across Campus Drive. There is visitor parking on Memorial Way at Galvez Street. Additional metered parking is available nearby at Encina Hall and the Burnham Pavilion at Serra Street and Arguello Way.

From El Camino Real:
Exit El Camino Real at University Avenue. Turn toward the hills (away from the center of Palo Alto). As you enter Stanford, University Avenue becomes Palm Drive. Go through one traffic light, and turn left onto Campus Drive at the first stop sign. Turn right at Galvez Street, the next stop sign. There is visitor parking on Memorial Way at Galvez Street. Additional metered parking is available nearby at the Burnham Pavilion at Serra Street and Arguello Way.

Parking Information

Stanford requires permits for its on-campus lots. Visitors may park in lots or spaces designated with a green "P" or an "E" sign. Parking in these spaces costs $1.50 per hour between 8:00am and 4:00pm., Monday through Friday. Weekend and holiday parking is normally free.

Please access Stanford's Parking for more detailed information.

Visitor parking will have either a meter at the parking space or a permit vending machine located in the parking lot. Coins are necessary for meters; pay machines generally accept currency, coins, and credit cards. There is a two-hour limit at meters unless displaying a permit issued from vending machine.

Contact Us

For general inquiries, please contact us at:

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