Department Management Team

Prof Xu Guo Qin (Head)
Assoc Prof Lam Yulin (Deputy Head)
Assoc Prof Yao Shao Qin (Deputy Head)
Assoc Prof Chuah Gaik Khuan (Assistant Head)
Assoc Prof Vallyaveettil Suresh (Assistant Head)

Management Council

Prof Xu Guo Qin (Chair)
Prof Chan Sze On Hardy (Deputy Chair)
Assoc Prof Loh Kian Ping (Deputy Chair)
Prof Hor Tzi Sum Andy
Prof Lee Hian Kee
Prof Liu Xiang Yang
Prof Jagadese J Vittal
Assoc Prof Ang Siau Gek
Assoc Prof Chin Wee Shong
Asst Prof Liu Xiaogang
Ms June Chan
Ms Tang Chui Ngoh

Specialized Programmes

Prof Zhou Weibiao (Director, Food Science and Technology Programme)
Assoc Prof Chang Young-Tae (Leader, Medicinal Chemistry Programme)
Professors
Chan Sze On Hardy P5
Hor Tzi Sum Andy P6
Lee Hian Kee P7
Li Fong Yau Sam P8
Liu Xiang Yang P9
Jagadese J Vittal P10
Wong Ming Wah Richard P11
Xu Guo Qin P12
Zhou Weibiao P13

Associate Professors
Ang Siau Gek P14
Ryan PA Bettens P15
Chang Young-Tae P16
Cheng Hansong P17
Chin Wee Shong P18
Chuah Gaik Khuan P19
Fan Wai Yip P20
Huang Dejian P21
Stephan Jaenicke P22
Kang Hway Chuan P23
Khor Eugene P24
Lai Yee Hing P25
Lam Yulin P26
Loh Kian Ping P27
Lu Yixin P28
Tan Choon Hong P29
Valiyaveettill Suresh P30
Thomas Walczyk P31
Thorsten Wohland P32
Xu Qing-Hua P33
Yao Shao Qin P34
Yip Hon Kay John P35

Assistant Professors
Ang Wee Han P36
Chan Yin Thai P37
Chen Wei P38
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Zhang Chun........................................P52

Research Fellows

Chi Chunyan......................................P53

Teaching-Track Faculty Members

Adrian M Lee......................................P54
Leong Lai Peng....................................P55
Chan Sau Han Edith..............................P56
Ship Chee Ping....................................P57
Tan Sue Qing Emelyn............................P58
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Emmanuel Dinesh Pillai.........................P60
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Bellam Sreenivasulu.............................P60
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Chng Ting Ting....................................P61
Leonard Joachim Pereira.......................P61
Emeritus Professors
Ang How Ghee
Goh Suat Hong
Huang Hsing Hua

Adjunct Faculty Members
Professor Bosco Bloodworth (Health Sciences Authority)
Assoc Professor Chen Ping (Dalian Institute of Chemical Physics)
Professor Chua Sin Bin (Agri-Food & Veterinary Authority)
Assoc Professor Thomas Keller (Novartis Institute of Tropical Diseases)
Assoc Professor Lan Weiguang (Sinomem Technology Ltd)
Research Fellow Lee Wei Woon, Wayne (Singapore Polytechnic)
Professor Lien Wen Sze (Nestle R&D Centre Singapore)
Asst Professor Ong Kheng Chuan Peter (OBS Ingredients Pte Ltd/OBS Consulting Pte Ltd)
Professor Joseph Ignatius Rasiah (William Global Partners)
Asst Professor Michael Sullivan (Institute of High Performance Computing)
Assoc Professor Sun Tak On Eric (S*Bio)
Professor Tay Ming Kiong Michael (Health Sciences Authority)
Research Fellow Mahesh Uttamchandani (DSO National Laboratories)
Asst Professor Andrew Wan (Institute of Bioengineering and Nanotechnology)
Professor Jackie Ying (Institute of Bioengineering and Nanotechnology)
Professor Zhou Mei Sheng (Chartered Semiconductor Manufacturing)
Professor CHAN Sze On Hardy
Ph.D., Univ. of Manchester Inst. of Science & Technology, 1975; B.Sc., Southbank Polytechnic, 1972

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       65 6516 2673 (Chemistry Office)

RESEARCH INTERESTS
I am interested in:
• Functional polymers
• Organic electronics
• Nanomaterials

RECENT HIGHLIGHT
Our research presently focuses on the preparation of nanostructured conducting polymers and polymer-metal composites. We have recently observed polyaniline (PANi) morphology evolution in non-polar media. Various structures, including 1D open-ended microtubes, 2D novel solid microplates and 3D solid micro-spheres were controllably synthesized in the same reaction system. In diluted reaction solutions, solid microplates were mainly produced at the reactor wall/solution interfaces due to adsorption polymerization; while other structures were mainly obtained from solution by employing various reverse micelles as polymerization templates. The PANi spheres exhibit novel intrinsic hydrophobic properties due to its surface roughness. The microplates I-V measurements suggest that at low voltages the charge transport mechanism is consistent with Ohm’s law but at higher voltages the charge transport is consistent with space-charge-limited emission.

REPRESENTATIVE PUBLICATIONS
• RQ Ping, PJ Chia, JC Tang, HSO Chan, JH Burroughes, RH Friend, PKH Ho, Nature Materials, 9, 152 (2010)
• HSO Chan and SC Ng, Prog. in Polymer Sci., 23, 1167-1231 (1998)
Professor HOR Tzi Sum Andy
D.Sc., Univ. of London, 1999; Postdoc., Yale Univ., 1984; D.Phil., Univ. of Oxford, 1983; B.Sc.(Hons), Imperial College of Science and Technology, 1979

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MAJOR RECOGNITION
Executive Director, Institute of Materials Research & Engineering, A*STAR, 2010-present
Outstanding Scientist Award, Faculty of Science, NUS, 2007.
Fellow, NUS Teaching Academy, 2009-present
President, Singapore National Institute of Chemistry (SNIC), 2003-present
Member, Senior Advisory Committee of Graduate Education (SAGE), NGS, 2009-present
Associate Editor (Commissioning), Australian Journal of Chemistry (CSIRO), 2008-present
Member, International Advisory Board, Chemistry: An Asian Journal (VCH/Wiley), 2006-present
Member, International Advisory Board, Inorganica Chimica Acta (Elsevier), 2003-present
Member, International Advisory Board, International Symposium for Chinese Inorganic Chemists, 1999-present
Member, International Advisory Board, 3rd Asia Pacific Congress on Catalysis (APCAT3), Sapporo, Japan, July 18-23, 2010
Member, International Advisory Committee, 42nd IUPAC Congress, Glasgow, Scotland, 2-7 Aug 2009
Chair, 1st International Conference on Green & Sustainable Chemistry, Singapore, 3-5 Aug 2009
Chair, 1st International Conference on Molecular & Functional Catalysis, Singapore, 10-15 July 2010
Chair, 41st International Chemistry Conference on Coordination Chemistry, Singapore, 2014
Chair, 15th Asian Chemical Congress, Singapore, 2013
Chair, Advisory Committee on Hazardous Substances & Toxic Wastes, National Environment Agency, 2001-present
Visiting Professor, University of Strasbourg, France, 2009
Visiting Professor, Noyori Lab of Materials Science & Research Center for Materials Science, Nagoya University, Japan, 2008

RESEARCH INTERESTS
Our SMS (Supramolecular & Molecular Science) laboratory is interested in challenges at the interface of molecular and supramolecular sciences and their relationship and applications in other intersecting areas such as catalysis, molecular imaging, small molecule activation, inter-metallic cooperation and biomass. Specific foci are:
• Synthesis: Supramolecular & MOF Assemblies
• Catalysis: Molecule Economy, System & Structural System, Catalytic Intermediates & Mechanism

RECENT HIGHLIGHT
A “stand-alone” NHC carbene without a heterocyclic secondary donor has been crystallographically identified together with its terminal counterpart, with both coc

REPRESENTATIVE PUBLICATIONS
• S Q Bai, G Y H Quek, L L Koh and T S A Hor, Crystallographic analysis of different water–halide cluster blends in cationic [{SNS/Pd}] pincer complexes, Crystengcomm., 12, 226-233 (2010)
• X Y Han, L L Koh, Z P Liu, Z Q Weng and T S A Hor, Must an N-Heterocyclic Carbene Be a Terminal Ligand? Organometallics, 29, 2403-2405 (2010)
• S Y Li, C W Kee, K W Huang, T S A Hor and J Zhao, Cyclopentadienyl Molybdenum(II/VI) N-Heterocyclic Carbene Complexes: Synthesis, Structure, and Reactivity under Oxidative Conditions, Organometallics, 29, 1924-1933 (2010)
Faculty Highlights 2011

Department of Chemistry

Professor LEE Hian Kee
Ph.D., University of Canterbury, Christchurch, New Zealand, 1982; B.Sc.(Hons), University of Canterbury, 1978

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MAJOR RECOGNITION

• Editor, Journal of Chromatography A, 2010 - current
• Editor, Analytica Chimica Acta, 2005 - 2010
• Member, Editorial Board, Journal of Chromatography A, 2004 - 2010
• Editorial Advisor, Analytica Chimica Acta, 2003 - 2005
• Member, International Advisory Board, Analyst, 1997 - 2008
• Member, Advisory Board, Analytical Sciences, 2004 - current
• Member, Editorial Advisory Board, LC·GC Asia Pacific, 2006 - current
• Member, Editorial Advisory Board, LC·GC Europe, 2008 - current
• Scientific Advisory Board, Separation Science, 2008 - current
• Federation of Asian Chemical Societies Foundation Lectureship Award, 2009
• NUS Faculty of Science Outstanding Scientist Award, 2009
• NUS Outstanding Researcher Award, 2006
• National Project Coordinator, United Nations University (Japan) Programme on the Asia Coastal Hydrosphere
• Member, External Audit Panel, Singapore Water Reclamation and Marina Bay Projects

RESEARCH INTERESTS

Our research interests are focused on the development and applications of solvent-minimized, miniaturized sample preparation procedures techniques, in combination with microscale chromatographic techniques. A specific objective is to apply these methods to environmental analysis. We also have interest to develop these for onsite applications.

RECENT HIGHLIGHT


This work reports on a novel two-step microextraction technique, that combines dispersive liquid-liquid microextraction, and dispersive micro-solid-phase extraction that uses magnetic nanoparticles as sorbent

REPRESENTATIVE PUBLICATIONS

• L Zhao and HK Lee, Liquid-phase microextraction combined with hollow fiber as a sample preparation technique prior to gas chromatograph/mass spectrometry, Anal. Chem., 74, 2486-2492 (2002)
Faculty Highlights 2011

Department of Chemistry

Professor LI Fong Yau Sam

D.Sc., Imperial College, 1998; Ph.D., Imperial College, 1984; B.Sc., Imperial College, 1981

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/lifys.htm

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MAJOR RECOGNITION

• Outstanding Researcher Award, National University of Singapore/IMRE, 1999
• Dupont Accomplishment Award, DuPont Company, 1993

RESEARCH INTERESTS

Areas of research interest include water eco-efficiency, metabolomics, capillary electrophoresis, lab-on-chip devices, environmental analysis, biomedical analysis, bioimaging, sensor technologies, lab-on-chip devices, nanomaterials analysis, chromatographic techniques, scanning probe microscopy, supercritical fluid extraction and chromatography.

RECENT HIGHLIGHT


Mechanisms of interaction of single-strand DNA and hybridized DNA on gold nanoparticles in the presence of Hg^{2+} was studied. We compared the interactions of different DNA probes on gold nanoparticles (AuNPs) using both absorption and fluorescence detection. It was found that there were only small partial dsDNA dissociated from the surface of AuNPs after hybridization in the presence of Hg^{2+}. Moreover, we found that the aggregated AuNPs/DNA system tended to be dispersed again with increasing Hg^{2+} concentration up to 250M. Based on these results, the mechanism for interaction of AuNPs/DNA solution in the presence of Hg^{2+} was proposed. Selective detection of mercury at high concentrations of other metal ions was demonstrated.

REPRESENTATIVE PUBLICATIONS

3. Liu, F; Wan, SY; Jiang, ZJ; Li, SFY; Ong, ES; Osorio, JCC. 2009. Determination of pyrrolizidine alkaloids in comfrey by liquid chromatography-electrospray ionization mass spectrometry. TALANTA 80 (2): 916-923.
Professor Liu Xiang Yang
Senior Scientist, Unilever Research Port Sunlight Laboratory, 1999; Postdoc., Nijmegen University, 1996; Ph.D. (Cum Laude), Nijmegen University, 1993; M.Sc, Shandong Univ., 1985.

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/liuxy.html
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MAJOR RECOGNITION
• Outstanding Researcher Award, 2007, National University of Singapore, Singapore.
• Councilor of the International Organization for Crystal Growth
• Vice President of the Singapore-China Association for Advancement of Science and Technology

RESEARCH INTERESTS
• Soft and Bio Functional Materials
• Biophysics
• Biomimicking
• Micro/Nano Structure formation and engineering
• Crystallization/molecular assembly and hybrid materials

RECENT HIGHLIGHT
Adv. Fun. Mat. 20, 3196–3216 (2010) (Feature Article). Highlighted by the Frontispiece: “Supramolecular materials containing three-dimensional fiber networks are designed and constructed in the micro-/nanometer scale to deliver different benefits for applications in many fields, such as drug delivery, tissue engineering, nanocrystallite synthesis, etc. On page 3196, X. Y. Liu and co-workers present novel approaches to engineering the micro-/nanostructure of fiber networks, based upon the structural characterization and the understanding of the network formation dynamics.”

REPRESENTATIVE PUBLICATIONS
Professor Jagadese J VITTAL
Postdoc., Univ. of Western Ontario, 1987; Ph.D., Indian Inst. of Science, 1982; M.Sc., Madurai Univ., 1977; B.Sc., Univ. of Madras, 1975

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/jjvittal.htm
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MAJOR RECOGNITION
• WCU Chair Professor, Gyeongsang National University, Jinju, S. Korea, 2009-2013
• Outstanding Scientist Award, Faculty of Science, NUS, 2007
• Associate Editor, Journal of Synthesis and Reactivity in Inorganic, Metal-Organic and Nano-Metal Compounds, 2006-present

RESEARCH INTERESTS
Current interests include solid-state photoreactivity and structural transformations in coordination polymers, luminescent coordination polymeric gels and fibers, water aggregates in crystals, metal-organic frameworks as gas storage materials, chemistry of metal chalcogencarboxylates, nanomaterials from coordination polymers, green routes to organic and materials synthesis, metal chalcogenide and oxide thin films and nanomaterials. Currently we are interested in renewable energy including lithium ion batteries.

RECENT HIGHLIGHT

Left: Highly luminescent hierarchical 3D meso- assemblies of ZnTeO₃ and ZnₓTeₙO₈ with interesting morphologies formed by changing the pH of the reaction solution. Right: Ultra thin nanoplates of thickness 30-40 nm with uniform coating of carbon favor the fast insertion and excretion of Li⁺ ions, and results in the high rate performances and excellent capacity retention up to 50 cycles.

REPRESENTATIVE PUBLICATIONS
**Faculty Highlights 2011**

**Department of Chemistry**

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**Professor WONG M W Richard**


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**MAJOR RECOGNITION**

- Chairman, 4th Asian Pacific Conference on Theoretical and Computational Chemistry, 2009
- International Board Member, Asian Pacific Association on Theoretical and Computational Chemistry, present
- Outstanding Researcher Award, National University of Singapore, 2002
- Australian Research Fellow, Australian Research Council, 1992-1997

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**RESEARCH INTERESTS**

Specific foci are:

- Computational quantum chemistry, organocatalysis, hydrogen storage materials, molecular sensors,
- Weaker intermolecular interactions, sulfur chemistry, reactive intermediates, computer-aided drug design

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**RECENT HIGHLIGHT**


A new type of β-amino chiral catalyst has been designed computationally mimicking the catalytic triad of chymotrypsin. DFT calculations predict that this designed organocatalyst catalyzes Michael additions of aldehydes to nitroalkenes with excellent enantioselectivities and remarkably high anti diastereoselectivities. The unusual stacked geometry of the enamine intermediate, hydrogen bonding network and the adoption of an exo transition state are the keys to understand the stereoselectivity.

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**REPRESENTATIVE PUBLICATIONS**

Professor XU Guo Qin
Postdoc., Univ. of Toronto, 1991; Postdoc., Brookhaven National Lab, 1989; Ph.D., Princeton Univ., 1987; B.Sc., Fudan Univ., 1982

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/xugq.htm
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MAJOR RECOGNITION
• National Youth Award for Excellence in Science and Technology, Singapore National Youth Council, 1997

RESEARCH INTERESTS
My specific foci are:
• Surface chemistry
• Self-assembled nanostructures and molecular conductivity

RECENT HIGHLIGHT

Self-assembled molecular corrals have been formed on the Si(111)-(7×7) surface by binding pyrrole molecules chemically on the silicon centre adatom through the breakage of the N–H bond. The dissociative adsorption of pyrrole on Si(111)-(7×7) leads to pyrroyl and H atom binding with an adatom and an adjacent rest atom, respectively. The molecular corral has dramatically modified the electronic property of the silicon surface, which leads to the formation of pyridine dative bonding to Si(111)-(7×7) surface at room temperature. The self-assembled molecular corral may provide a template for controlling the molecular binding configurations and quantum confinement effect of nanoclusters.

REPRESENTATIVE PUBLICATIONS
• Y. P. Zhang, S. Wang, E. S. Tok, and G. Q. Xu. "Tuning molecular binding configurations of pyridine on Si(111)-(7×7) via surface modification". J. Phys. Chem. C (in Press)
Professor ZHOU Weibiao
Postdoc., Univ. of Waterloo, 1991; Ph.D., Univ. of Queensland, 1991; M.Eng., Chinese Academy of Sciences, 1985; B.Sc., Beijing Univ. of Chemical Technology, 1982
http://www.fst.nus.edu.sg/OurPeople/ZhouW.htm
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MAJOR RECOGNITION
• Editor, International Journal of Food Properties, Taylor & Francis, 2007-present
• Asia Editor, Food Manufacturing Efficiency, IFIS, UK, 2007-present (International Editorial Board Member 2006-present)
• Member, Editorial Boards of International Journal of Food Engineering, USA, 2004-present; Food and Bioprocess Technology, Springer, 2007-present; Food Engineering Reviews, Springer, 2008-present
• Fellow, Australian Institute of Food Science and Technology (AIFST), 2007
• Board Member, Agri-Food and Veterinary Authority of Singapore (AVA), 2008-present
• Member-at-large, Executive Committee, International Society of Food Engineering (ISFE), 2006-present

RESEARCH INTERESTS
My interests are in food processing and food engineering; particularly baking processes, dairy processes, drying processes, functional foods, food process modelling and optimisation, advanced process control, and the effect of food processing on functional components such as antioxidants, isoflavones and probiotics. Specific foci are:
• Modeling, optimisation, and advanced control of food processes
• Innovative processing technologies for next-generation functional foods

RECENT HIGHLIGHT

The relative stability of catechins in the biscuit system can be sequenced as (-)-CG > (-)-GCG > (-)-ECG > (-)EGCG. Retention rates of green tea catechins were improved by reducing the pH of the dough.

Microstructure of GTE biscuit (left) and EGCG profile during biscuit baking (right)

REPRESENTATIVE PUBLICATIONS
**Assoc Professor ANG Siau Gek**

Ph.D., Cambridge Univ., 1987; M.Sc., National Univ. of Singapore, 1984; B.Sc., National Univ. of Singapore, 1981

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/angsg.htm

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**MAJOR RECOGNITION**

- Chevalier in the Order of the Palmes Academiques, French Ministry of Youth, Education and Research, 2004

**RESEARCH INTERESTS**

We study structures of organometallic compounds using a variety of spectroscopic and other physical techniques including X-ray diffraction and surface analytical methods. Our current main interest is in the fabrication and study of organometallic nanostructures.

**RECENT HIGHLIGHT**


We are studying the fabrication of amine derivatives of metal phthalocyanines (MTAPc) as organometallic nanowires via electropolymerization using porous alumina filters as templates. The characterization of these nanowires is carried out using field-emission scanning electron microscopy (FE-SEM), and the interaction of these polymeric nanowires with oxidising gases is being investigated for possible applications as chemical sensors.

**REPRESENTATIVE PUBLICATIONS**

- B-W Sun, M-S Zhang, G-Y Yang, SG Ang and HG Ang, Decacarbonyl-1,3C,2,3C,3x3C-(μ-pentafluorophenylhydrazine-1xN:2xN')-triangulo-triosmium: a hydrazine-edge-bridged triangular trismium cluster, **Acta Cryst. Crystallograph.**, E61, m2419-m2420 (2005)
- HG Huang, CL Xiang, YS Ning, JY Huang, SG Ang and GQ Xu, Dry synthesis of triple cumulative double bonds (C=C=C=N) on Si(111)-7x7 surfaces, **J. Phys. Chem. B**, 109(41), 19296-19300 (2005)
- SG Ang and B-W Sun, Crystal structure and characterization of organic-inorganic hybridized molecules with molecular zipper structures and two-dimensional grid networks, **Cryst Growth & Design**, 5, 383-386 (2005)
Assoc Professor Ryan P A BETTENS

Postdoc., Australian National Univ., 1999; Postdoc., Ohio State Univ., 1996; Postdoc., ETH, 1994; Ph.D., Monash Univ., 1992; B.Sc., Univ. of Queensland, 1986

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RESEARCH INTERESTS

My research area is in the understanding and accurate description, via computational chemistry, of inter- and intra-molecular interactions. Ultimately the understanding and description will be applied to the dynamics of large systems like proteins and nucleic acids. Specific foci are:

- Accurately describe and predict enzyme-substrate interactions
- Accurately describe water and its interactions with large molecules
- Performance of first-principle molecular dynamics of an enzyme and substrate

RECENT HIGHLIGHT


In the highlighted article we show, amongst other things, that our energy based fragmentation method accurately reproduces the electrostatic potential for a selection of peptides, both charged and uncharged, and other molecules of biological interest at the solvent accessible surface and beyond when compared with the full ab initio or DFT electrostatic potential. We demonstrate that our fragmentation approach can be readily applied to very large systems and provide the fragmentation electrostatic potential for the neuraminidase tetramer (ca. 24000 atom system) at the MP2/6-311(+)G(2d,p) level (Front Cover, below).

Left: The error in the electrostatic potential mapped onto the solvent accessible surface for BCX± (upper panels), and tuftsin (lower panels). The left two panels represent the error due to fragmentation approximation, whereas the right two represents the error using NPA distributed charges.

For reference, the interaction energy of a 0.5e charge with 0.1 V potential is about 5 kJ mol⁻¹.

REPRESENTATIVE PUBLICATIONS

Assoc Professor CHANG Young-Tae


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MAJOR RECOGNITION
• Career Award, National Science Foundation, USA, 2005
• Editorial Board Member, Current Chemical Biology, 2006-present
• Editor for special issue of Chemical Genetics/Genomics, Current Topics in Medicinal Chemistry, 2003
• Editorial board member: Molecular Biosystems (2009-present)
• Head of Bioimaging probe development lab at Singapore Bioimaging Consortium (2007-present)

RESEARCH INTERESTS
Development of Bioimaging probes & sensors for in vitro, in vivo and clinical applications by Diversity Oriented Fluorescence Library Approach (DOFLA) and chemical genetics. Specific foci are:
• Stem cell specific optical probe & regulator development
• Protein target identification by tagged small molecule library
• Molecular evolution & artificial tongue

RECENT HIGHLIGHT

The first pluripotent stem cell probe CDy1 (compound of designation yellow 1) was developed by Diversity Oriented Fluorescence Library Approach (DOFLA). This work was highlighted at “Fluorescence method detects stem cells, C&EN News, 2010 (September 20).

REPRESENTATIVE PUBLICATIONS
RESEARCH INTERESTS

We use the state-of-the-art computational chemistry methods and experimentation to understand mechanistic aspects of physical and chemical processes and thus to enable design and discovery of novel materials for a variety of applications. Specific areas of our current research interests include:

1. high capacity hydrogen storage materials for on-board automotive applications and for hydrogen delivery at near ambient conditions;
2. semiconductor thin film growth via chemical vapor deposition and atomic layer deposition;
3. thin film deposition of transparent conducting oxide nanoparticles on temperature sensitive flexible substrates;
4. heterogeneous catalysis of small molecules on transition metal surfaces;
5. reactive force field development for metallic nanoparticles.

REPRESENTATIVE PUBLICATIONS


RECENT HIGHLIGHT


We have discovered three fundamental conditions for a glue layer (G) to be effective in promoting adhesion of a thin film material (M) to the substrate (S) and to suppress agglomeration of the film at the interface. These conditions are most critical for selecting the appropriate glue layer for optimizing the interfacial interactions of the metal layer with the substrate.

1. \( E_{MG} > E_{MS} \)
2. \( E_{GS} > E_{MG} \)
3. \( E_{GS} > E_{MS} \)

The performance of a Cu monolayer on TaN(111) surface and on TaN(111) supported Ru and Al glue layers is illustrated using *ab initio* molecular dynamics simulations.
Assoc Professor CHIN Wee Shong

Commeworth Fellowship., Univ. of Bristol, 1994; Ph.D., National Univ. of Singapore, 1993; B.Sc.(Hons), National Univ. of Singapore, 1987

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MAJOR RECOGNITION

University Quality Service Award , NUS, 2005
Faculty Teaching Excellence Award, Faculty of Science, NUS, 2007 & 2008

RESEARCH INTERESTS

Our research focuses on the field of nanostructures and their assemblies. The targets include finding good methodologies to synthesize size-, shape- and phase-controllable nanocrystals, as well as doped and core-shell nanomaterials; understanding their properties and developing methods to assemble them into novel nanostructures for applications. Current projects include:

• Synthesis and studies of core/shell doped sulfide and oxides nanoparticles
• Synthesis and assembly of multilayered metal/semiconductor/polymer nanowires and nanocomposites

RECENT HIGHLIGHT


We report the size-dependent optical nonlinearities of PbS nanoparticles in both film and solution. Different sizes of PbS nanoparticles were synthesized by chemical methods; and the sizes were controlled by varying surfactant and reaction temperature. PbS-Polystyrene thin films adhered on glass slide were successfully prepared by a simple imprinting thermal cross linking method. We found that smaller nanoparticles show higher nonlinear absorption and refraction of photo-excited free carriers and larger optical Kerr nonlinearity. Our studies also revealed that nonlinear scattering be strongly dependent on size and play a dominant role in the case of bigger nanoparticles in solution at higher excitation

REPRESENTATIVE PUBLICATIONS

Assoc Professor CHUAH Gaik Khuan

Postdoc., Fritz-Haber-Institüt, 1987; Ph.D., Texas A&M Univ., 1987; B.Sc., Univ. of Singapore, 1984

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RESEARCH INTERESTS

Our main research area is on heterogeneous catalysis:
• Applications of zeolites in fine chemicals synthesis
• Green chemistry and catalysis
• Synthesis and applications of materials with tunable textural properties
• Sorbents for uremic toxins

RECENT HIGHLIGHT

Materials with tunable pore sizes are investigated as catalysts. In one application, supported niobium oxide catalysts were prepared by grafting niobium ethoxide onto MCM-41 and hydrous zirconia. These materials contain Brønsted acid sites whereas bulk niobium oxide has predominantly Lewis acid sites. Hence, they are able to act as solid acids. In one application, the catalysts are tested for the esterification of glycerol with lauric acid. The desired product is glycerol monolaurate which is an important ingredient in the food, pharmaceutical and cosmetic industries. Good activity and a high monolaurate selectivity was achieved when the active niobium oxide phase was coated within the pore channels of an MCM-41 support with a mean pore diameter of 2.2 nm. Phosphated Nb2O5/MCM-41 showed an even higher activity without any penalty in selectivity, enabling monolaurate yields of 89-90%. A key feature of these pore confined-catalysts is the sustained high selectivity to monolaurate even at high conversions. In contrast, niobium oxide supported on wide pored hydrous zirconia showed lower selectivity. The catalysts are active in solventless esterification of a number of alcohols and acids and can be easily recycled for subsequent batch reactions, making them attractive as green catalysts for sustainable processes.

CH₃(CH₂)₁₀COOH

HOCH₂-CH(OH)-CH₂OH

REPRESENTATIVE PUBLICATIONS

Assoc Professor FAN Wai Yip
Postdoc., Univ. of California at Berkeley, 2000; Ph.D., Univ. of Cambridge, 1998; M.Sc., Univ. of Toronto, 1996; B.Sc., Univ. of London, 1994

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/fanwy.htm
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RESEARCH INTERESTS
Emphasis of the research is on the organometallic reactions and homogeneous catalysis using transition metal carbonyl complexes and the preparation and functionalization of nanomaterials. Specific areas are:
• Manganese and ruthenium-based homogeneous catalysis and mechanism studies
• Rhenium and ruthenium-based nanomaterials for photochemical applications

RECENT HIGHLIGHT
Reference: Organometallics, 2010, 29, 4459-4463

UV photolysis of CpMn(CO)3 with thiols effected the following catalytic transformation: 2 RSH \rightarrow R2S2 + H2. This reaction is a greener way towards making disulfides, as it produces H2 as the only side-product. The manganese system exhibits high chemo-selectivity as the transformation proceeds efficiently even in the presence of numerous functional groups. A manganese dicarbonyl complex, CpMn(CO)2RSH and cyclopentadiene have also been detected using FTIR and NMR spectroscopic techniques respectively.

REPRESENTATIVE PUBLICATIONS
• K Y D Tan, J W Kee and WY Fan, CpMn(CO)3-Catalyzed Photoconversion of Thiols into Disulfides and Dihydrogen, Organometallics, 2010, 29, 4459-4463.
• B Swennenhuis, R Poland, W Y Fan, D J Darenbourg and A Bengali, Ligand Substitution from the (η5-DMP)Mn(CO)2(Solv) [DMP = 2,5-dimethylpyrrole, Solv = solvent] Complexes: To Ring Slip or Not to Ring Slip?, Inorg. Chem. 2010, 49, 7597–7604
Assoc Professor HUANG Dejian

Postdoc., MIT, 2001; Ph.D., Indiana Univ. Bloomington, 1999; M.Sc., Chinese Acad. of Sciences, 1990; B.Sc., Fujian Teachers Univ., 1987

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/huangdj.htm
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RESEARCH INTERESTS

My group focuses on transition metal complexes with proanthocyanidins and their derivatives, functionalized fluorescent quantum dots for sensing of reactive oxygen species, and evidence-based functional foods development. Specific foci are:

- Synthesis and catalytic activity of metal complexes with polydentate ligands derived from proanthocyanidins obtained from agricultural wastes
- Design and fabrication of functional semiconductor quantum dots for sensing reactive oxygen species

RECENT HIGHLIGHT


Summary: The photoluminescence of non-fluorescent molecularly engineered quantum dots with iron(III) dithiocarbamates was selectively switched on by nitric oxide. Such functional QDs consisted of CdSe-ZnS nanocrystal as fluorophores and surface bound tris-(N-(dithiocarboxy)sarcosine)iron(III) as reactive centers for nitric oxide. The fluorescence of the QDs was quenched by energy transfer between the excited QDs cores and the surface bound ion(III) dithiocarbamates due to their optical energy overlapping. Nitric oxide restored the fluorescence of the QDs through reduction of the surface bound ion(III) complexes to iron(I)-NO adducts and thus shutting down the energy transfer pathway. The fluorescence of the iron (III) complex engineered QDs was selectively and quantitatively restored by nitric oxide but not by other reactive oxygen species. Such property of the functional QDs could be used for sensing nitric oxide based on fluorescence “turn on” mechanism.

REPRESENTATIVE PUBLICATIONS

RESEARCH INTERESTS
The research in my group centers around two topics: development of new catalytic reactions and process integration. Nature provides enzymes which are unsurpassed as catalysts for very specific reactions. We try to enhance the substrate spectrum of enzymes, and work on methods to use these enzymes in a continuous flow reactor (enzyme membrane reactor) for stereoselective transformations. We are also interested in selective reductions and oxidations using co-ordination (Cu, Ag, Au) metal nanoparticles, as well as in C-C bond formation by Ag-catalyzed decarboxylation. Specific foci are:

- Heterogeneous catalysis (zeolites and metal nanoparticles)
- Enzyme catalysis and whole cell fermentation as route to chiral synthons

RECENT HIGHLIGHT

The direct formation of hydrogen peroxide from H₂ and O₂ was carried out in a capillary microreactor under ambient conditions using polymer micelle incarcerated (PMI) palladium nanoparticles in an amphiphilic polystyrene-based polymer. Excess of oxygen in the feed stream is necessary to suppress the catalytic reduction of hydrogen peroxide to water. A two-fold oxygen excess was identified as close to the economic optimum. The immobilization of palladium from a soluble precursor by the PMI method resulted in uniform palladium nanoparticles of 2.5 to 3.6 nm diameter, which were outstandingly resistant to leaching. The stability of the catalyst was demonstrated during the continuous production of hydrogen peroxide for eleven days. Using a 2 mm ID microreactor coated with PMI-Pd, a maximum concentration of 1.4 wt% of H₂O₂ corresponding to a turnover frequency of 0.54 mol H₂O₂/h·gPd was obtained.

REPRESENTATIVE PUBLICATIONS

- J.F. Ng, S. Jaenicke*, K. Eisele, J. Dorn, T. Weil*, cBSA-147 for the Preparation of Bacterial Biofilms in a Microchannel Reactor, Biointerphases (in print)
Assoc Professor KANG Hway Chuan
Ph.D., Caltech, 1989; B.Sc., Yale Univ., 1983

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/kanghc.htm

Email: chmkhc@nus.edu.sg

RESEARCH INTERESTS
Surface chemistry and physics and computational chemistry are my main interests. My specific foci include:
- Silicon-germanium surfaces/interfaces
- Electronic structure and reactivity of nanoclusters of pure and mixed transition metals
- Sputtering dynamics

RECENT HIGHLIGHT
My research focuses upon the use of simulations grounded in statistical and quantum mechanics to provide molecular scale "pictures" of physical and chemical processes in molecules, clusters, surfaces and bulk materials. We are interested in modelling the kinetics of catalytic reactions, the structure and properties of solid and cluster surfaces, reaction energetics, the interactions and reactions of molecules adsorbed on surfaces, and the energetics of defects on surfaces and in the bulk.

REPRESENTATIVE PUBLICATIONS
- R.Q.M. Ng, E.S. Tok, and H.C. Kang, “Molecular mechanisms for disilane chemisorption on Si(100)-(2×1)”, J. Chem. Phys. 130, 114702 (2009).
- Q Li, ES Tok and HC Kang, “Energetics of adsorbed hydrogen and surface germanium on stepped SixGe1-x(100)-(2×1) surfaces”, Phys. Rev. B 77, 205306 (2008) (United States)
Assoc Professor KHOR Eugene  
Ph.D., Virginia Tech, 1983; B.Sc., Lakehead Univ., 1979

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/khore.htm
Email: chmkhore@nus.edu.sg

MAJOR RECOGNITION
- Associate Editor, Biomaterials, 2005
- International Advisory Committee, 11th International Chitin Chitosan Conference and 8th Asia Pacific Chitin Chitosan Symposium 2009
- Founder of Biomedical Research And Support Services Private Limited, an NUS spin-off company serving the Biomedical sector in Singapore and the region since 1999. www.brass-asiapacific.com

RESEARCH INTERESTS
General research interest is in the area of Biomaterials and their applications to medical devices. Present interest is in the design and use of biomaterials for medical devices.

RECENT HIGHLIGHT
Set up of Anatomic Replacement Materials Private Limited to produce a medical device for the spine. On-going research in developing medical devices for ophthalmology applications.

REPRESENTATIVE PUBLICATIONS
- Y. Zou and E Khor, Preparation of sulfated-chitins under homogeneous conditions, Carbohyd. Polym., 77, 516-525, 2009
- Y Zou and E Khor, Preparation of C-6 substituted chitin derivatives under homogeneous conditions, Biomacromolecules, 6, 80-87 (2005)
- E Khor and LY Lim, Implantable applications of chitin and chitosan, Biomaterials, 24, 2339-2349 (2003) (Invited review)
Assoc Professor LAI Yee Hing

Assoc Professor LAI Yee Hing

Postdoc., Univ. of California at Berkeley and Lawrence Berkeley Laboratory, 1982; Ph.D., Univ. of Victoria, 1980; B.Sc., Nanyang Univ., 1978

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/laiyh.htm

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RESEARCH INTERESTS

My primary interest lies on organic chemistry.

RECENT HIGHLIGHT

Our research interests are centred mainly on the studies of conjugated aromatic systems going from theoretically interesting molecules to organic materials for specific applications.

REPRESENTATIVE PUBLICATIONS

Assoc Professor LAM Yulin

Research Fellow, Inst. of Molecular and Cell Biology, 1994-1996; Research Fellow, The Scripps Research Inst., 1992-1994; Ph.D., National Univ. of Singapore, 1992; B.Sc.(Hons), National Univ. of Singapore, 1987

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RESEARCH INTERESTS

Our research interests are (i) combinatorial synthesis and biological evaluation of small molecules as potential therapeutic agents, and (ii) development of polymer-supported reagents and catalysts. Specific foci are:

• Design, Synthesis and Biological Evaluations of Novel Organic Compounds and Natural Product Derivatives as Potential Anticonvulsants, DHFR Inhibitors, NOS Inhibitors, Anti-cancer and Antiviral Agents
• Development of Polymer-supported Oxidants, Reductants and Catalysts

RECENT HIGHLIGHT


A class of polyenylpyrroles and their analogs were designed from a hit compound identified in a thermophilic fungus. The compounds synthesized were evaluated for their cell cytotoxicity against human non-small cell lung carcinoma cell lines A549. Two compounds were found to exhibit high cytotoxicity against A549 cells with IC50 being 0.6 and 0.01 μM respectively. The underlying mechanisms for the anti-cancer activity were demonstrated as caspases activation dependent apoptosis induction through loss of mitochondrial membrane potential, release of cytochrome c, increase in Bax level, and decrease in Bcl-2 level. The two compounds were non-toxic to normal human lung Beas-2b cells (IC50 > 80 mM) indicating that they are highly selective in their cytotoxicity activities. Furthermore, one compound showed in vivo anti-cancer activity in human lung cancer cells-bearing mice.

OCH3

Cl

OCH3

Cl

Auxarconjugatin B, IC50 = 0.6 μM

1g, IC50 = 0.01 μM

A

B

Vehicle

Compound 1g

Figure: (A) Inhibition of human lung cancer xenografts growth in vivo by 1g; (B) human lung tumor tissues with in vivo 1g treatment displayed an increase in activated caspase 3 protein expression

REPRESENTATIVE PUBLICATIONS

Assoc Professor LOH Kian Ping

Postdoc., National Inst. for Material Science, Tsukuba, Japan, 1998; Ph.D., Oxford Univ., 1996; B.Sc., National Univ. of Singapore, 1994

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/lohkp.htm

Email: chmlohkp@nus.edu.sg

MAJOR RECOGNITION

- Dean's chair professor
- Faculty Young Scientist Award, NUS, 2009, Outstanding Chemist Award, 2009
- University Young Scientist Award, NUS, 2008
- NRF-CRP award, NRF, 2007

RESEARCH INTERESTS

General interests include advanced functional carbon materials, nanomaterials for drug delivery and bioimaging, surface science. Specific foci are:
- Diamond and Graphene

RECENT HIGHLIGHT

"Graphene Oxide-Organic Dye Ionic Complex with DNA Sensing and Optical Limiting Properties" by Kian Loh, Janardhan Balapanuru, Jia-Xiang Yang, Si Xiao, Qiaoliang Bao, Ji Wei, Angewandte Chemie, 49 (2010), 6549


REPRESENTATIVE PUBLICATIONS

Assoc Professor LU Yixin


http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/lyx.htm

Email: chmlyx@nus.edu.sg

RESEARCH INTERESTS
Main areas of study are asymmetric organocatalysis/medicinal chemistry. Specific foci include:
• Organocatalytic asymmetric reactions
• Development of analgesics and anti-cancer agents

RECENT HIGHLIGHT

Enantioselective conjugate addition of 3-aryl oxindoles to vinyl sulfone 2 was achieved by employing 7 as a catalyst. To effect an asymmetric conjugate addition of 3-alkyl oxindoles to 2, a novel class of trifunctional catalysts containing natural amino acid residues were designed and prepared for the first time. Applying the synthetic method developed as a key step, enantioselective synthesis of 3,3-alkyl/aryl-substituted oxindoles and indolines with an all-carbon quaternary stereogenic center were realized.

REPRESENTATIVE PUBLICATIONS
Assoc Professor TAN Choon Hong
Postdoc., Harvard Univ., 2002; Ph.D., Univ. of Cambridge, 1999; B.Sc. (Hons), National Univ. of Singapore, 1996

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/tanch.htm
Email: chmtanch@nus.edu.sg

MAJOR RECOGNITION
• UK-Singapore Partners In Science Collaboration Development Awards, British High Commission, 2008

RESEARCH INTERESTS
We are interested in Synthetic Organic Chemistry and Medicinal and Biological Chemistry.

RECENT HIGHLIGHT

Chiral bicyclic guanidine 1 is found to catalyze the tandem conjugate addition – enantioselective protonation. It is useful for the reactions between phthalimidoacrylates with thiols and itaconimides with secondary phosphine oxides. Optically pure analogues of cysteine and cystine can be obtained using this methodology. Highly enantioselective deuteration reaction can also be achieved. A small but significant level of kinetic isotope effect was also observed.

REPRESENTATIVE PUBLICATIONS
Assoc Professor VALIYAVEETTIL Suresh  
BSc, MSc, MTech, PhD  
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/suresh.htm  
Email: chmsv@nus.edu.sg

MAJOR RECOGNITION
• Visiting Professor, Tokyo Institute of Technology, Japan, 2008.  
• Visiting Professor, Indian Institute of Technology Madras, 2006-current  
• Visiting Professor, University of Houston, 2007

RESEARCH INTERESTS
Organic/ Polymer synthesis, Nanomaterials and Biomaterials
Current research interest of my group involves the synthesis and characterization of nanostructured materials (polymers, hybrid materials and bionanomaterials). Another area of interest involves establishing the toxicity of nanomaterials in both in vitro (cell models) and in vivo (in fish models) to identify the impact of nanomaterials in environment. Nanohybrid materials are prepared from organic and inorganic components for specific applications such as sensors, photovoltaics and molecular electronic applications.

RECENT HIGHLIGHTS

REPRESENTATIVE PUBLICATIONS
Assoc Professor Thomas WALCYZK

Postdoc., Swiss Federal Inst. of Technology (ETH Zurich), 1996; Ph.D. (Dr. rer. nat.), Univ. of Regensburg, 1994; Dipl. Chem., Univ. of Regensburg, 1991

Dept.: http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/walczyk.html
Email: walczyk@nus.edu.sg

joint appointment with Yong Loo Lin School of Medicine, Department of Biochemistry

RESEARCH INTERESTS

My research is directed towards a better understanding of mineral and trace element metabolism in humans and their role in health and disease with a special focus on iron and calcium. Specific foci are:

• Development and application of stable isotope techniques for element tracing in human intervention studies
• Analysis and modeling of tracer kinetics in human experiments
• Exploration of natural isotope signatures in the human body for essential elements
• Inorganic trace analysis and elemental speciation analysis by isotope dilution mass spectrometry

RECENT HIGHLIGHT


Ferritin is the major iron storage protein in living organisms from bacteria to men. Increasing ferritin content of plant foods either by genetic engineering or conventional breeding (biofortification) is globally pursued as a sustainable strategy to combat iron deficiency and iron deficiency anemia, the most common nutrient deficiency disorders worldwide. However, techniques are lacking to assess the amount of ferritin bound iron in seeds for the design and evaluation of breeding strategies.

Based on isotope dilution mass spectrometry we have developed a fully traceable method for accurate assessment of ferritin bound iron in seed samples. This technique utilizes $^{57}$Fe labeled ferritin which we produced by cloning and overexpressing the Phaseolus vulgaris ferritin gene pfe in Escherichia coli in the presence of $^{57}$Fe. Plant ferritin and added spike ferritin were extracted and separated by anion exchange chromatography followed by isotopic analysis by thermal ionization mass spectrometry. Repeatabilities that can be achieved are on the order of <5% RSD for quintuplicate analyses at an absolute detection limit of 60 ng of ferritin-bound iron for plant seeds. Studies in six different legumes revealed ferritin-iron contents ranging from 15% of total iron in red kidney beans up to 69% in lentils.

REPRESENTATIVE PUBLICATIONS

• M Hoppler, C Zeder and T Walczyk, Quantification of Ferritin-Bound Iron in Plant Samples by Isotope Tagging and Species-Specific Isotope Dilution Mass Spectrometry, Anal. Chem. 81, 7368-7372 (2009)
Assoc Professor Thorsten WOHLAND
Postdoc., Stanford Univ.; Ph.D., Swiss Federal Inst. of Technology at Lausanne; Dipl. Phys., Univ. of Heidelberg
Dept. Website: http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/tw.htm
Group Website: http://staff.science.nus.edu.sg/~chmwt/
Email: chmtw@nus.edu.sg

RESEARCH INTERESTS
My group works on the development of new fluorescence spectroscopy techniques for the measurement of biomolecular interactions in cells, tissues, and organisms. Specific foci are:
• Techniques: Single wavelength excitation fluorescence cross-correlation spectroscopy (SW-FCCS) and EMCCD based fluorescence correlation spectroscopy
• Biological systems: Transmembrane protein receptors and peptides and their interaction with membranes, measurement of biomolecular actions and interactions in living cells and organisms

RECENT HIGHLIGHT

The life sciences require new highly sensitive imaging tools, which allow the quantitative measurement of molecular parameters within a physiological three-dimensional (3D) environment. Therefore, we combined single plane illumination microscopy (SPIM) with camera based fluorescence correlation spectroscopy (FCS). SPIM-FCS provides contiguous particle number and diffusion coefficient images with a high spatial resolution in homo- and heterogeneous 3D specimens and live zebrafish embryos. Our SPIM-FCS recorded up to 4096 spectra within 56 seconds at a laser power of 60 mW without damaging the embryo. This new FCS modality provides more measurements per time and more less photo-toxic measurements per sample than confocal based methods. In essence, SPIM-FCS offers new opportunities to observe biomolecular interactions quantitatively and functions in a highly multiplexed manner within a physiologically relevant 3D environment.

Fig.: In the figure are shown a range of correlation functions measured over a whole plane within a zebrafish. For that purpose we injected 200 nM polystyrene beads into the bloodstream of the zebrafish and monitored the blood flow profile in a caudal vein. In the last graph one can see how the whole bloodflow profile can be mapped within a single less than 1 minute measurement. This system can be extended to the observation of molecules, their concentration, diffusion, transport and binding.

REPRESENTATIVE PUBLICATIONS
MAJOR RECOGNITION

- Young Scientist Award, Faculty of Science, NUS 2008

RESEARCH INTERESTS

We are mainly interested in development of various light based applications, such as sensing, imaging, photosensitization and optoelectronics using nano-materials and organic/polymer materials, as well as investigation of the underlying fundamental mechanisms and photophysical processes using various novel optical spectroscopy and imaging techniques to understand their working principles, which provide insights for device design of better performance. Specific foci are:

- Materials physics and biophysics
- Optical spectroscopy and imaging

RECENT HIGHLIGHT


The cationic conjugated polymers were found to induce the aggregate formation and plasmonic coupling of the Ag and Au nanoparticles, which resulted in significant enhancement in the two-photon emissions of metal nanoparticles. These studies could be further extended to the applications of two-photon imaging and sensing.

REPRESENTATIVE PUBLICATIONS

Assoc Professor YAO Shao Qin

Postdoc. 1998-2001, Scripps Research Institute & Univ. of California Berkeley; Ph.D., Purdue Univ., 1998; B.Sc., Ohio State Univ., 1993

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/yaosq.htm

Email: chmyaosq@nus.edu.sg

MAJOR RECOGNITION

- Dean’s Chair Professor, National University of Singapore (2009-2012)
- ASAIHL-Scopus Young Scientist Award (2008), international
- Outstanding Scientist Award, Faculty of Science, National University of Singapore, Singapore, 2007
- Mr & Mrs Sun Chan Memorial Award, International, 2006
- Young Research Award, National University of Singapore, 2005
- Young Investigator Award, A*STAR Singapore, 2002

RESEARCH INTERESTS

“Catalomics” - We are interested in developing powerful strategies in Chemical Biology and Chemical Proteomics that enable organism-wide, high-throughput studies of enzymes. Specific foci are:

- Chemical Biology
- Medicinal Chemistry

RECENT HIGHLIGHT


*En route to new 14-3-3 binder:* A fragment-based combinatorial small molecule microarray (SMM) generates affinity-based fingerprints of the 14-3-3c protein. One small molecule that disrupts the 14-3-3/protein interaction has been identified (see picture). The compound is cell-permeable and possesses both *in vitro* and *in-cell* activities.

PREMIUM PUBLICATIONS

RESEARCH INTERESTS
We are interested in supramolecular chemistry, especially molecular recognition and constitutional dynamic chemistry of metallacycles and metallopolymers. Another research area is design and synthesis of inorganic luminescent materials which have potential applications in bioimaging, catalysis and sensing.

RECENT HIGHLIGHT

Templated assembly of nanoscopic macrocycles was demonstrated in the self-assembly of nanoscopic pseudorotaxane \((1)\underset{2}{\rightleftharpoons}2\) which is composed of the gold rectangle \([\text{Au}4(\mu-\text{PAnP})2(\mu-\text{bipy})2](\text{OTf})4\) (1) and the linear template \(4,4''\text{-bis}(9''\text{-anthryl})\text{biphenyl}\) (2).

![Templated assembly of nanoscopic macrocycles](image)

REPRESENTATIVE PUBLICATIONS
• Y. Wang, R. Lin, J. H. K. Yip*, Templated Assembly of a Pseudorotaxane of Gold Rectangle, *Dalton Trans.*, 2806, 2008 (Selected as Hot paper and cover page)
Asst Professor ANG Wee Han

Postdoc., Massachusetts Inst. of Technology, 2009; Ph.D., Ecole Polytechnique Fédérale de Lausanne, 2007; B.Sc. (Hons), Imperial College of Science, Technology and Medicine, 1995

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/angwh.html

Email: chmawh@nus.edu.sg

MAJOR RECOGNITION

EPFL Doctorate Prize, Ecole Polytechnique Fédérale de Lausanne, 2008

RESEARCH INTERESTS

We are interested in the development of therapeutic metallopharmaceuticals and techniques to investigate the interactions of transition metal-based drugs with their biological targets

RECENT HIGHLIGHT


A small-molecule organometallic glutathione transferase inhibitor was developed by tethering ethacrynic acid to a ruthenium-arene complex, yielding excellent inhibitors with multiple modes of activity. Its interaction with the target GSTP1-1 enzyme was investigated using kinetic and structural studies.

PREMIUM PUBLICATIONS

Asst Professor CHAN Yin Thai
Postdoc., Stanford Univ., in progress; Ph.D., Massachusetts Inst. of Technology, 2006; B.Sc., Univ. of California at Berkeley, 2001
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/chanyt.html
Email: chmchany@nus.edu.sg

MAJOR RECOGNITION
Howard Hughes Medical Institute Postdoctoral Fellow, Stanford University, 2006-2008

RESEARCH INTERESTS
Our research interests generally lie in the development of novel hierarchically complex semiconductor nanomaterials for optoelectronic, photocatalytic and biological imaging applications. Specific foci are:
• Biological and chemical sensing using nanoparticle-based multilayer microfluidics
• Synthesis and characterization of hybrid metal-semiconductor nanostructures
• Developing the surface chemistry of semiconductor nanoparticles for bio-imaging

REPRESENTATIVE PUBLICATIONS
Asst Professor CHEN Wei
Postdoc National University of Singapore, 2004-2008, Ph.D., National University of Singapore., 2004; B.Sc., Nanjing Univ., 2001

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/chenwei.html

Email: chmcw@nus.edu.sg

MAJOR RECOGNITION
- NUS Young Investigator Award, Singapore, 2010
- Hitachi Research Fellowship, Japan, 2010
- IPS Omicron nanotechnology Award, Singapore, 2009
- Lee Kuan Yew Postdoctoral Research Fellowship, NUS, 2006

RESEARCH INTERESTS
My research focuses on the investigation of the interface problems associated with molecular electronics, organic electronics and graphene-related devices., with specific focus on:
- Self-assembled molecular nanostructures
- Molecule-substrate interfaces

RECENT HIGHLIGHT

Self-assembly of molecules on pre-patterned surface nanotemplates represents a promising way for the fabrication of highly periodical functional nanostructure arrays over macroscopic areas. We use p-sexiphenyl nanostripes on Ag(111) as a surface nanotemplate to fabricate the long-range ordered C60 linear chain arrays.

REPRESENTATIVE PUBLICATIONS
- W Chen, DC Qi, H Huang, XY Gao, ATS Wee, “Organic-Organic Heterojunction Interfaces: Effect of Molecular Orientation” (invited review article) *Advanced Functional Materials* (Accepted)
Asst Professor CHUA Lay Lay
Ph.D., Univ. of Cambridge, 2007; Research Fellow, ONDL, Physics, NUS (2004-2008); Research Associate, Cavendish Laboratory, Univ. of Cambridge (2002-2003); Member of Technical Staff, Bell Laboratories (2001-2002); Engineer, then Principal Engineer, Chartered Semiconductor Manufacturing (1995-2001); B.Sc. Computational Chemistry, NUS (1995)

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/chualaylay.html
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RESEARCH INTERESTS
I am interest in the device physics and spectroscopy of solution-processable graphene and conjugated polymers for organic semiconducting applications (field-effect transistors, solar cells, light-emitting diode)

RECENT HIGHLIGHT

Short-circuit external quantum efficiency spectra of interpenetrating heterostructure ITO/ PEDT:PSSH/ PFB/ F8BT/ Ca/ Al PVs with different PFB thicknesses, compared to a bulk-distributed heterostructure diode. The lateral length scale of the columnar nanostructured is 200nm.

REPRESENTATIVE PUBLICATIONS

Asst Professor HUYNH Han Vinh

Dr. rer. nat., Univ. Münster (WWU), Germany, 2002; Dipl. Chem., Univ. Münster (WWU), Germany, 1999

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MAJOR RECOGNITION

• Feodor Lynen Research Fellowship, Alexander von Humboldt Foundation, 2003-2004
• Asian Core Program Lectureship Award for Hong Kong 2010

RESEARCH INTERESTS

Our research involves organic ligand design for applications in organometallic and classical coordination Chemistry. Specific foci are:

• Transition metal complexes of N-heterocyclic carbenes (NHCs) and their applications
• Development of unprecedented and non-classical carbenes

RECENT HIGHLIGHT

Reference: Organometalics, 28, 5395-5404 (2009)

The electronic parameters of various ligands including backbone and substituent effects have been determined by $^{13}$C NMR spectroscopy on mixed Pr$_2$-bimy/co-ligand Pd(II) complexes as probes. This method allows an easy, safe and more accurate evaluation of donor strengths compared to well-known carbonyl-based systems, and unprecedentedly, puts Werner-type and organometallic ligands on an unified scale.

REPRESENTATIVE PUBLICATIONS

• Y. Han, H. V. Huynh, Pd(II) Pyrazolin-4-yldienes: Substituent-Effects on the Formation and Catalytic Activity of Pyrazole-based Remote NHC Complexes, Organometallics, 28, 2778-2786 (2009)
Asst Professor Martin J LEAR
Asst. Prof., Tohoku Univ., 2000; Postdoc., Parke-Davis & CNRS, 1997; Ph.D., Univ. of Glasgow, 1995; B.Sc. (Hons), Univ. of Glasgow, 1991

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/lear.htm
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RESEARCH INTERESTS
Total & analogue synthesis of natural products & glycolipids of high biological relevance & structural complexity.
• Total synthesis of antimalarial (e.g. bielschowskysin) and antibiotic (e.g. platensimycin) leads
• Development of transannulation and desymmetrisation strategies to natural product carbon frameworks
• Discovery of biological targets of natural products and biologics through chemical biology approaches

RECENT HIGHLIGHTS

REPRESENTATIVE PUBLICATIONS
• A bismuth(III)-catalyzed Friedel-Crafts Cyclization and Stereocontrolled Organocatalytic approach to (−)-Platensimycin, SEC Eey, MJ Lear, Org. Lett. 2010, 12 (23), 5510-5513.
• Total synthesis confirms laetirobin as a formal Diels-Alder adduct, S Oliver, B Reux, JJ La Clair, MJ Lear, Chem. Asian J. 2010, 5, 342-351 (featured with cover-page).
Asst Prof LIU Shao Quan

Postdoctoral Fellow, New Zealand Dairy Research Institute, 1994-1997; Ph.D, Massey University, New Zealand, 1994; M.S., Massey University, New Zealand 1990; B.S., South China Agricultural University, Guangzhou, China, 1985

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/liusq.html
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RESEARCH INTERESTS
General interests are food science and technology. Specific foci are:
• Flavour generation via biocatalysis and fermentation
• Food and beverage fermentation

RECENT HIGHLIGHT

This study reports on the enhancement of flavour compound formation in papaya wine fermented with a mixed-yeast culture of Saccharomyces cerevisiae and Williopsis saturnus by leveraging off the high ethanol-producing capability of the former yeast and the high ester-synthesizing activity of the latter yeast.

Saccharomyces cerevisiae yeast + Williopsis saturnus yeast → enhanced papaya wine flavour

Higher alcohols + Acetyl-CoA → Acetate esters

REPRESENTATIVE PUBLICATIONS
Asst Professor LIU Xiaogang
Postdoc, Massachusetts Inst of Tech, 2006; Ph.D., Northwestern Univ, 2004; M.Sc., East Carolina Univ, 1999; B.Sc., Beijing Tech and Business Univ, 1996

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/liuxg.htm
Email: chmlx@nus.edu.sg

RESEARCH INTERESTS
My general interests are supramolecular chemistry, materials science, and nanotechnology:
• Developing nanoparticle-based ultrasensitive sensor systems for metal ions and biological molecules
• Designing novel nanomaterials with high catalytic activity and recyclability
• Synthesizing low-dimensional nanomaterials
• Developing lanthanide-doped fluorescent nanoparticle probes

RECENT HIGHLIGHT
Lanthanide ions exhibit unique luminescent properties, including the ability to convert near infrared long-wavelength excitation radiation into shorter visible wavelengths through a process known as photon upconversion. In recent years lanthanide-doped upconversion nanocrystals have been developed as a new class of luminescent optical labels that have become promising alternatives to organic fluorophores and quantum dots for applications in biological assays and medical imaging.

REPRESENTATIVE PUBLICATIONS
Asst Professor Christian A. NIJHUIS
Postdoc., Harvard University, 2007; Ph.D., University of Twente, 2002; M. Sc., University of Groningen, 1996

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/nijhuis.html
Email: chmnca@nus.edu.sg

MAJOR RECOGNITION
NRF research fellowship award (2010)
Veni award, the Netherlands Organization for Scientific Research NWO (2010)
Rubicon award, the Netherlands Organization for Scientific Research NWO (2007)

RESEARCH INTERESTS
My general research interests include molecular electronics, supramolecular chemistry & self-assembly to
- design, characterize, and self-assemble organic-inorganic hybrid nano-structures
- develop test-beds to study the mechanisms of charge transport across nano-structures
- to explore new physics

RECENT HIGHLIGHT
This paper describes a new class of molecular diodes based on self-assembled monolayers (SAMs) that have ferrocenes only in the top. These molecular diodes block the current in one direction of bias, but allows the current to pass through the molecules in the other.

The mechanism of charge transport across this so-called molecular diode is based on mechanisms of charge transport that change with the polarity of bias: from tunneling (at one bias), to hopping combined with tunneling (at the opposite bias)

REPRESENTATIVE PUBLICATIONS
Asst Professor David G POPOVICH

Postdoc., NSERC, 2005; Postdoc., Univ. of British Columbia, 2004; Ph.D., Univ. of British Columbia, 2004; M.Sc., Univ. of Toronto, 1996; B.Sc., Univ. of Toronto, 1991

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RESEARCH INTERESTS

1. Cellular models to study natural medicinal plant compounds and extracts influence on cultured adipocytes, hepatocytes and colonocytes.
2. Components that are cytotoxic and induce apoptosis or necrosis and influence cytokine production.
3. Synergy between bioactive plant compounds
4. Phytochemistry

RECENT HIGHLIGHT

Zhang W.; Popovich D.G. Chemical and Biological Characterization of Oleanane Triterpenoids from Soy. Molecules 2009 14: 2959-75

REPRESENTATIVE PUBLICATIONS


Confocal mages of hepatocytes indicating apoptosis after oleanane triterpenoid treatment derived from soy
Asst Professor WANG Jian

Postdoc., The Scripps Research Institute, USA
Ph.D., The University of New Mexico, USA

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MAJOR RECOGNITION

- Chinese Government Award for Outstanding Self-Financed Oversea Students.
- Sigma Xi Excellent Graduate Research Award, USA.
- Dean’s Dissertation Fellowship, The University of New Mexico, USA.
- Ph.D. with Distinction, The University of New Mexico, USA.

RESEARCH INTERESTS

Development of novel synthetic methodology for the synthesis of natural products, pharmaceuticals and other very interesting biologically active molecules, particularly focusing on asymmetric synthesis, is the major theme of my lab.

- C-H Activation Via Fe, Cu and Pd
- Asymmetric Organocatalysis
- Total Synthesis
- Medicinal Chemistry
- Chemical Biology

REPRESENTATIVE PUBLICATIONS

Asst Professor WU Jishan

Postdoc., Univ. of California at Los Angeles, 2005-2007; Ph.D., Max-Planck Inst. for Polymer Research, 2004; M. Sc., Chinese Acad. of Sciences, 2000; B.Sc., Wuhan Univ., 1997

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MAJOR RECOGNITION
• NUS Young Investigator Award, NUS, 2007
• Singapore National Young Scientist Award, 2010

RESEARCH INTERESTS
We study Functional π-systems for electronics & supramolecular chemistry and responsive materials. Specific foci are:
• Graphene-related materials and devices
• Template-directed synthesis of supramolecular architectures and their materials applications

RECENT HIGHLIGHT

A 2D semiconductor! A cruciform 6,6’-dipentacenyl (TIPS-DP) molecule was prepared and it can self-assemble into an ordered structure with two π-stacking axes (a and b) as disclosed by crystallographic analysis. Therefore, it can be regarded a novel 2D semiconductor allowing 2D isotropic charge transport along the two π-stacking axes. The thin film materials showed FET mobility up to 0.11 cm²/Vs which is the highest among all cross-shaped semiconductors.

REPRESENTATIVE PUBLICATIONS
Asst Professor XUE Feng

Postdoc., The Wistar Inst., 2005; Ph.D., The Chinese Univ. of Hong Kong, 2000; B.Sc., Tsinghua Univ., 1993

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RESEARCH INTERESTS
We aim to further our understanding of chemical and biological systems through molecular structures, leading to engineered molecular assemblies and structure-based drug design. Specific foci are:

• Crystal engineering and supramolecular self-assemblies
• Protein crystallography and structural bioinformatics

RECENT HIGHLIGHT
Cyclin-Dependent Kinase 5 (CDK5) is targeted in neurodegenerative diseases, regulates downstream proteins by phosphorylation specific residues. To understand CDK5 activation mechanism, which significantly differs from typical CDK activation, we built a 3D model of inactive CDK5 (apo-CDK5) based on the crystal structure of apo-CDK2 (PDB: 1PW2) using homology modeling. Inactive kinases have been recognized to be another possible avenue to achieve selectivity among kinase targets. Imatinib, a selective tyrosine kinase inhibitor, was docked into the binding site of apo-CDK5 to evaluate the possibility of novel inhibitors. Interestingly, the results showed that the inhibitor is capable of reaching the back floor of apo-CDK5 binding site, as well as reveals additional hydrophobic pocket created by T-loop.

REPRESENTATIVE PUBLICATIONS

• R Thaimattam, F Xue, JA Sarma, TC Mak and GR Desiraju, Inclusion compounds of tetrakis(4-nitrophenyl)methane: C-h...O networks, pseudopolymorphism, and structural transformations, J. Am. Chem. Soc., 123, 4432-45 (2001)
Asst Professor YEUNG Ying Yeung

Postdoc., Harvard Univ., 2005-2008; Ph.D., The Chinese Univ. of Hong Kong, 2005; B.Sc.(1st Hons), The Chinese Univ. of Hong Kong, 2001

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MAJOR RECOGNITION
• Asian Core Program Lectureship Award, 2010
• Young Scholars Dissertation Award, The Chinese Univ. of Hong Kong, 2005

RESEARCH INTERESTS
Our research group has broad interests in synthetic organic chemistry. The main focuses are centered on novel methodologies development and complex molecules synthesis. Research directions include:
• Asymmetric halogenation reactions
• Multi-component synthesis
• Novel functional molecules synthesis for biological studies

RECENT HIGHLIGHT
Electrophilic bromination is a very useful reaction. Recently, we developed an efficient one-pot four-component electrophilic aminooalkoxylation in the synthesis of substituted morpholine. In addition, a novel bromolactonization catalyzed by an amino-thiocarbamate catalyst was developed.

REPRESENTATIVE PUBLICATIONS
Asst Professor YUK Hyun Gyun

Research Associate, USDA/ARS/ERRC, USA, 2007-2009; Postdoc., University of Florida, USA, 2004-2007; Ph.D., Mississippi State University, USA, 2000-2003; B.S. and M.S., Kyungnam University, Korea, 1993-1999

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RESEARCH INTERESTS
I am interested in bacterial stress response to elucidate the foodborne pathogen’s ability to survive in unfavorable environment, in post-harvesting control and preservation technologies to minimize microbial risk in foods, and in the development and the improvement of rapid methods to detect foodborne pathogens in foods. The overall goal of research projects is to improve microbial safety of foods.

RECENT HIGHLIGHT
It has been known that carbon dioxide of supercritical state can kill microorganisms in liquid foods. Newly developed a continuous supercritical carbon dioxide (SCCO2) system using a gas-liquid contactor is cost-effective because of using low pressure and temperature. This study evaluated the bactericidal effect of this system against *Escherichia coli* K12 in apple cider. Results show that increased CO2 concentrations and temperatures significantly enhanced the bactericidal effect, resulting in a maximum reduction of 7.31 log CFU/mL at 8% CO2 and 42 °C. SEM observations showed morphological changes in the cell envelope after SCCO2 processing. At a processing condition of 8% and 38 °C, the reduction of *E. coli* was 6.03 log and the sublethal injury of the survivors was 84%. The regrowth or survival of *E. coli* in SCCO2 processed apple cider was not observed during storage for 28 days at 4, 8, and 20 °C. Thus this study showed the potential of SCCO2 processing with a gas–liquid porous metal contactor for the nonthermal pasteurization of apple cider.

REPRESENTATIVE PUBLICATIONS
Asst Professor ZENG Huaqiang
Postdoc., The Scripps Research Institute, 2002-2006; Ph.D., The State University of New York at Buffalo, 2002; B.Sc., University of Science & Technology of China (USTC), 1996
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RESEARCH INTERESTS
The central theme in our research group is focused on the applications of broadly defined, bioinspired Supramolecular Chemistry to address many challenging issues at the interface of chemistry and biology. Specific foci are:
• Synthetic ion channels
• High-throughput screening systems for discovering highly efficient, stereoselective catalysts of varying kinds for catalyzing wide-ranging chemical transformations
• Alzheimer's Disease
• Targeting telomers for anticancer therapy
• Catalytic drugs that can catalytically cleave any chosen disease-causing proteins

RECENT HIGHLIGHT

To capture Nature’s astonishing ability in creating sophisticated folding biopolymers with nanosized cavities, we have developed a general strategy for designing folded structures with modifiable outer surfaces and easily tunable interior cavities, which may find important applications in catalysis, separation & molecular recognition, etc.

REPRESENTATIVE PUBLICATIONS
• B Qin, C L Ren, H Q Zeng,* et al, Persistently Folded Circular Aromatic Amide Pentamers Containing Modularly Tunable Cation-Binding Cavities with High Ion Selectivity, J. Am. Chem. Soc. 2010, 132, 9564
Asst Professor ZHANG Chun

Postdoc., Georgia Institute of Technology, 2005-2008; Ph.D., University of Florida, 2004; M.S., Fudan University, 2000; B.S., Fudan University, 1996

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MAJOR RECOGNITION
• CNMS Research Scholar Award, Oak Ridge National Lab (US), 2005

RESEARCH INTERESTS
Our research interests are theoretical modeling and simulation of materials at nanoscale Specific foci are:
• Molecular electronics
• Nanocatalysis

RECENT HIGHLIGHT

Spin-density-functional calculations of tip-suspended gold chains, with molecular oxygen, or dissociated oxygen atoms, incorporated in them, reveal structural transitions for varying lengths.

REPRESENTATIVE PUBLICATIONS
• C Zhang, B Yoon and U Landman, Predicted Oxidation of CO Catalyzed by Au Nanoclusters on a Thin Defect-free MgO, J. Am. Chem. Soc., 129, 2228 (2007)
Dr CHI Chunyan
Research Fellow


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RESEARCH INTERESTS
We study the structural design, synthesis and physical properties of the new organic materials with their applications on organic electronic/optoelectronic devices, chemosensors and biosensors, with specific focus as follows:
• Design and synthesis of high-performance n-type organic semiconductors for electronic devices

RECENT HIGHLIGHT

A heptacene derivative substituted with four electron-deficient trifluoromethylphenyl and two trisopropylsilylvinyl (TIPSE) groups was prepared by a new synthetic strategy. Photo-oxidative resistance studies showed that this newly developed heptacene compound persisted 47 h in solution under ambient light and air conditions, and it represents the most stable heptacene derivative reported to date.

REPRESENTATIVE PUBLICATIONS

Si
CF₃
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CF₃
Si
CF₃
Dr Adrian M LEE
Senior Lecturer
Singapore Millenn. Found. Fellow, National Univ. of Singapore, 2002-2004; Postdoc., Univ. of Cambridge, 2002; Ph.D., Univ. of Cambridge, 1997; M.A., Univ. of Cambridge, 1996; B.A., Univ. of Cambridge, 1992
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MAJOR RECOGNITION
• NASA Achievement Award, NASA, 1996

RESEARCH INTERESTS
We study the development and application of fragment-based quantum chemical methods to accurately describe the properties and interactions of very large molecules. Specific foci are:
• Calculating the interaction energy between a neuraminidase substrate and several inhibitors, including tamiflu and relenza
• Optimisation of molecules within the energy-based fragmentation approximation and the application of such techniques to nmr structure elucidation

RECENT HIGHLIGHT

This study reports the fragmentation of an entire enzyme and substrate and shows that the majority of the small fragment molecule interactions can be accurately evaluated without the need to compute the ab initio interaction energy. The perturbation approach presented in this work indicates the possibility to perform accurate first principles molecular dynamics in systems as large as proteins.

REPRESENTATIVE PUBLICATIONS
• HK Roscoe, AE Jones and AM Lee, Midwinter start to Antarctic ozone depletion: Evidence from observations and models, Science, 278, 93–96 (1997)
Dr LEONG Lai Peng

Senior Lecturer

Ph.D., Univ. of Leeds, 2000; M.Sc., Univ. of Leeds, 1996; B.Sc., Universiti Kebangsaan Malaysia, 1995

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**RESEARCH INTERESTS**

Main interest is in Kinetics of chemical reactions in application to foods either during processing or involving the development of methods for the analysis of foods. Specific foci are:

- Analysis of antioxidants in foods especially in relation to synergistic effect of antioxidants in micro and nanoeulsion.
- Kinetics of Maillard reaction and antioxidant reactions in foods and in model system.

Other research area includes the migration of toxic contaminants in foods and the authenticity of indigenous foods.

**RECENT HIGHLIGHT**


The kinetic of phenols and DPPH was studied focusing on the number and position of the groups in different solvents and at various temperatures. It shows the presence of internal hydrogen bonding and interactions with solvents plays a significant role in the H donation ability of the phenols studied.

**REPRESENTATIVE PUBLICATIONS**

Dr CHAN Sau Han Edith

Lecturer

Ph.D, The University of Hong Kong, 2007; M.Phil., The Chinese University of Hong Kong, 2001; B.Sc.(Hons), The Chinese University of Hong Kong, 1999

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MAJOR RECOGNITION

• Hon. Treasurer and Scientific Co-Chair, International Conference on Green & Sustainable Chemistry (ICGSC), 2009.

RESEARCH INTERESTS

General interests include chemical biology and chemical education.

REPRESENTATIVE PUBLICATIONS


Dr SHIP Chee Peng

Lecturer

Postdoc., Ghent Univ., 2003; Ph.D, Univ. of Southampton, 2002; B.Sc,(Hons), Univ. of Malaya, 1997

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MAJOR RECOGNITION

• Ph.D. ORS Award and Research Studentship, University of Southampton, 2002
• Mentor for the Singapore team at the International Chemistry Olympiad, Cambridge 2009

REPRESENTATIVE PUBLICATIONS

Dr TAN Sue Qing Emelyn

Lecturer

Ph.D., Univ. of Canterbury, 2006; B.Sc. (Hons), Univ. of Canterbury, 2002

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TEACHING AND RESEARCH INTERESTS

• Teach general, physical and material chemistry modules.
• Teaching interests also include coordinating outreach programs such as the Singapore Chemical Science Fairs (SCSF) and National Chemistry Weeks (NCW).
• Research interests include chemical education, nanomaterials, chemically modified surfaces and electrochemistry.

REPRESENTATIVE PUBLICATIONS

• Tan, E. S. Q.; Wiviani, R.; Toh C. S., Heterogeneous and homogeneous aptamer-based electrochemical sensors for thrombin, Electroanalysis, 21(6), 749-754 (2009)
Dr ZHAO Jin
Lecturer
Ph.D., Technological Univ. of Munich, 2005; M.Sc., Chinese Acad. of Science, 1995; B.Sc., Liaoning Univ., 1992

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RESEARCH INTERESTS
Organometallic chemistry and catalysis are our main areas of study. Specific foci are:
• Organometallic chemistry of metals with high oxidation state and their application in oxidation catalysis and environmental catalysis
• Transition metal complexes and their application in catalytic oligomerization of ethylene

RECENT HIGHLIGHT
Reference: Organometallics, 2010, 29, 1924-1933

A series of N-heterocyclic carbene (NHC) complexes CpMo(CO)2(NHC)X (1-5) and [CpMo(CO)2(IMes)][BF4] (6) have been synthesized and fully characterized. The stability of metal-NHC ligand bonds in these compounds under oxidative condition has been investigated. The thermally stable Mo(VI) dioxo NHC complex, [CpMoO2(IMes)][BF4] has been isolated by the oxidation of the ionic complex 6 by TBHP (tert-butyldimethylether). Complex 6 can be applied as very active and selective olefin epoxidation catalyst. While under oxidative condition (in the presence of TBHP), compounds 1-5 decompose into imidazolium bromide and imidazolium polyoxomolybdate.

REPRESENTATIVE PUBLICATIONS
• A. M. Al-Ajlouni, D. Veljanovski, A. Capape, J. Zhao, E. Herdtweck, M. J. Calhorda, F. E. Kuehn, Kinetic Studies on the Oxidation of η5-Cyclopentadienyl Methyl Tricarbonyl Molybdenum(II) and the Use of Its Oxidation Products as Olefin Epoxidation Catalysts, Organometallics, 2009, 28, 639-645
Dr Emmanuel Dinesh PILLAI
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M.Sc., National Univ. of Singapore, 2004; M.Sc., Bangalore Univ., 1996; B.Sc., Bangalore Univ., 1994
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Dr Untung Edy RUSBANDI
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PhD from University of Neuchatel (2007, Switzerland), DEA of Process & Environment Engineering from ENSIACET Toulouse (2003, France), Bachelor of Engineering from ITS Surabaya (2002, Indonesia)
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M.Phil., Bharadhidasan University,India, 2005., M.Ed., University of Madras,1998
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Dr Leonard Joachim PEREIRA
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B Sc Nanyang University, 1980 (Chemistry, Physics); B Sc (Hons) NUS, 1981 (Chemistry); Ph D NUS, Nov 2004 (Chem); Dip Ed, IE 1983 (Chemistry, Physics)
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