Department Management Team

Prof Loh Kian Ping (Head)
Assoc Prof Lam Yulin (Deputy Head)
Assoc Prof Chuah Gaik Khuan (Deputy Head)
Assoc Prof Lu Yixin (Deputy Head)
Assoc Prof Liu Xiaogang (Assistant Head)
Assoc Prof Fan Wai Yip (Assistant Head)

Management Council

Prof Loh Kian Ping (Chair)
Prof Chan Sze On, Hardy (Deputy Chair)
Prof Hor Tzi Sum, Andy
Prof Lee Hian Kee
Prof Jagadese J Vittal
Prof Xu Guo Qin
Assoc Prof Chuah Gaik Khuan
Assoc Prof Ang Siau Gek
Assoc Prof Chin Wee Shong
Dr Liu Qiping
Ms June Chan

Specialized Programmes

Prof Zhou Weibiao (Director, Food Science and Technology Programme)
Prof Chang Young-Tae (Leader, Medicinal Chemistry Programme)
Professors
Chan Sze On, Hardy P5
Chang Young-Tae P6
Tamio Hayashi P7
Hor Tzi Sum, Andy P8
Lee Hian Kee P9
Li Fong Yau, Sam P10
Liu Xiang-Yang P11
Loh Kian Ping P12
Jagadese J Vittal P13
Wong Ming Wah, Richard P14
Xu Guo Qin P15
Yao Shao Qin P16
Zhou Weibiao P17

Associate Professors
Ang Siau Gek P18
Ryan PA Bettens P19
Cheng Hansong P20
Chin Wee Shong P21
Chuah Gaik Khuan P22
Fan Wai Yip P23
Gao Zhiqiang P24
Huang Dejian P25
Huynh Han Vinh P26
Stephan Jaenicke P27
Kang Hway Chuan P28
Lai Yee Hing P29
Lam Yulin P30
Lu Yixin P31
Liu Xiaogang P32
Valiyaveettil Suresh P33
Thomas Walczyzk P34
Thorsten Wohland P35
Wu Jishan P36
Xu Qing-Hua P37
Yip Hon Kay, John P38
Assistant Professors

Ang Wee Han P39
Chan Yin Thai P40
Chen Wei P41
Chi Chunyan P42
Chng Shu Sin P43
Chua Lay Lay P44
Goki Eda P45
Liu Shao Quan P46
Christian A Nijhuis P47
Teo Peili P48
Wang Jian P49
Yeo Boon Siang, Jason P50
Yeung Ying Yeung P51
Yuk Hyun-Gyun P52
Zeng Huaqiang P53
Zhang Chun P54
Zhao Yu P55

Teaching-Track Faculty Members

Chan Sau Han, Edith P56
Chui Sin Yin, Stephen P57
Adrian Michael Lee P58
Leong Lai Peng P59
Linda Sellou P60
Tan Sue Qing, Emelyn P61
Simon Watts P62
Zhang Sheng P63
Zhao Jin P64
Chng Ting Ting P65
Hoang Truong Giang P65
Nayak Sanjit P65
Thyagarajan Saradha P65
Xu Hairuo P65

Teaching Assistant

Fung Fun Man P66
Ong Yue Ying P66
Pereira Leonard Joachim P66
Tan Wee Boon P66
Emeritus Professors
Ang How Ghee
Goh Suat Hong
Huang Hsing Hua
Kiang Ai Kim

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 Lan Weiguang (Sinomem Technology Ltd)
Assoc Professor Li Xu (Institute of Materials Research and Engineering)
Asst Professor Ong Kheng Chuan, Peter (OBS Ingredients Pte Ltd/OBS Consulting Pte Ltd)
Asst Professor Michael Sullivan (Institute of High Performance Computing)
Asst Professor Tan Yen Nee (Institute of Materials Research and Engineering)
Professor Tay Ming Kiong, Michael (Health Sciences Authority)
Asst Prof Mahesh Uttamchandani (DSO National Laboratories)
Asst Professor Wang Fuke (Institute of Materials Research and Engineering)
Asst Professor Xu Jianwei (Institute of Materials Research and Engineering)
Professor Jackie Ying (Institute of Bioengineering and Nanotechnology)
Professor CHAN Sze On Hardy
Ph.D., Univ. of Manchester Inst. of Science & Technology, 1975; B.Sc., Southbank Polytechnic, 1972

http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/chanhardy.htm
Email: chmcsoh@nus.edu.sg

RESEARCH INTERESTS

My research interests are:
• Functional polymers
• Organic electronics
• Nanomaterials

RECENT HIGHLIGHT

Our recent research focuses on the preparation of nanostructured conducting polymers and polymer-metal composites. We have studied the morphology evolution of polyaniline microstructures and its effect on the I-V electrical properties of individual and stacked microplates. We observed Ohmic behavior at low voltages and a power law behavior at high voltages due to a different conduction mechanism.

In-situ IV measurement of PANI plates

REPRESENTATIVE PUBLICATIONS

• T Wan, JH Shi, CH Sow, HSO Chan, J. Nanosci. & Nanotech., 12, 91-98 (2012)
• HSO Chan and SC Ng, Prog. in Polymer Sci., 23, 1167-1231 (1998)
Professor CHANG Young-Tae


http://ytchang.science.nus.edu.sg/

Email: chmcyt@nus.edu.sg

MAJOR RECOGNITION

• Career Award, National Science Foundation, USA, 2005
• Editor for special issue of Chemical Genetics/Genomics, Current Topics in Medicinal Chemistry, 2003
• 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


A fluorescent compound CDr3 (compound of designation red 3) that specifically labels live neural stem cells by binding to an intracellular protein FABP7 was developed by Diversity Oriented Fluorescence Library Approach (DOFLA).

REPRESENTATIVE PUBLICATIONS

Professor HAYASHI Tamio

Postdoc., Colorado State University, USA, 1976-1977
Ph.D., Kyoto University, Japan, 1975
B. Eng., Kyoto University, Japan, 1970

Email: chmtamh@nus.edu.sg, tamioh@imre.a-star.edu.sg

MAJOR RECOGNITION

- The Chemical Society of Japan Award in 2003, Author C. Cope Scholar Award in 2008, and The Medal with Purple Ribbon in 2010

RESEARCH INTERESTS

- Synthetic Organic Chemistry: Selective organic synthesis catalyzed by transition metal complexes
- Organometallic Chemistry: Mechanistic understanding of catalytic Synthetic Organic Chemistry
- Catalysis: Development of a new type of catalytic asymmetric reactions and design of new chiral ligands

RECENT HIGHLIGHT


Catalytic asymmetric synthesis of (triaryl)methylamines with high enantioselectivity was realized by rhodium-catalyzed asymmetric arylation of cyclic ketimines substituted with two aryl groups at the imine carbon. Thus, the addition of arylboroxines to cyclic N-sulfonyl ketimines 1 and N-acyl ketimine precursors 2 in the presence of a rhodium catalyst coordinated with a chiral diene ligand ((R)-diene* or (S,S)-Fc-tfb) gave high yields of the corresponding arylation products with up to 99% ee. The chiral benzosultams obtained were transformed into the chiral (triaryl)methylamines by breaking the cyclic structure.

REPRESENTATIVE PUBLICATIONS

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  
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/hor.htm  
Email: andyhor@nus.edu.sg

MAJOR RECOGNITION
Executive Director, Institute of Materials Research & Engineering, A*STAR, 2010-present  
Advisor, Early Career Researchers, A*Star  
President-Elect, Federation of Asian Chemical Societies  
Fellow, NUS Teaching Academy, 2009-present  
Outstanding Scientist Award, Faculty of Science, NUS, 2007  
President, Singapore National Institute of Chemistry (SNIC), 2009-present  
Associate Editor (Commissioning), Australian Journal of Chemistry (CSIRO), 2009-present  
Member, International Advisory Board, Chemistry: An Asian Journal (VCH/Wiley), 2009-present  
Member, International Advisory Board, Inorganica Chimica Acta (Elsevier), 2009-present  
Member, International Advisory Board, International Symposium for Chinese Inorganic Chemists, 2008-present  
Member, International Advisory Board, 16th International Symposium on Relations between Homogeneous & Heterogeneous Catalysis, 4-9 Aug 2013  
Chair, A*Star Scientific Conference, 18-19 Oct 2012  
Chair, 41st International Chemical Conference on Coordination Chemistry, Singapore, 21-25 July 2014  
Chair, 15th Asian Chemical Congress, Singapore, 19-23 Aug 2013  
Chair, Organising Committee, Young Scientist Award, SNAS & A*Star  
Chair, Advisory Committee on Hazardous Substances & Toxic Wastes, National Environment Agency, 2001-present  
Chair, ISO/TC229, Nanotechnology National Working Group, SCIC & SPRING  
Member, Advisory Committee, TUM CREATE, Singapore  
Jury President, L’Oréal Singapore for Women in Science National Fellowship 2012

RESEARCH INTERESTS
Our SMS (Supramolecular & Molecular Science) laboratory is interested in challenges at the interface of molecular, supramolecular & materials sciences and practical applications in catalysis & synthesis, materials, energy & environment:  
- Synthesis: Supramolecular & MOF Assemblies; Porous & network materials  
- Catalysis: Molecule economy & green catalysis; Hybrid ligands and structures; Bimetallic catalysis  
- Materials: Catalytic materials; Coordination polymers; Advanced energy storage

RECENT HIGHLIGHT
Reference: Organometallics, 30, 2137–2143 (2011)  
Derivatives of the natural product cinchonine are used as novel cyclometalating ligands to support soluble phosphorescent Ir(III) complexes with high quantum efficiencies.

PREMIUM PUBLICATIONS
Professor LEE Hian Kee

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

NUS Provost’s Chair Professor (2011-2014)

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

Email: chmleehk@nus.edu.sg

MAJOR RECOGNITION

• Editor, *Journal of Chromatography A*, 2010 - current
• Editor, *Analytica Chimica Acta*, 2005 - 2011
• Member, Editorial Board, *Journal of Chromatography A*, 2004 - 2010
• Member, International Advisory Board, *Analyst*, 1997 - 2008
• Member, Advisory Board, *Analytical Sciences*, 2004 - current
• Member, International Editorial Advisory Board, *Journal of the Chinese Chemical Society*, 2011 - current
• Member, Editorial Boards, *LC·GC Asia Pacific*, 2006 - current; *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
• Fellow, Academy of Sciences Malaysia

RESEARCH INTERESTS

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

RECENT HIGHLIGHT


Cloud point extraction with inductively coupled plasma mass spectrometry was applied to the analysis of zinc oxide nanoparticles (ZnO NPs, mean diameter ~40 nm) in water and wastewater samples.

REPRESENTATIVE PUBLICATIONS

• Z Huang and HK Lee, Materials-based approaches to minimizing solvent usage in analytical sample preparation, *Trends Anal. Chem.*, 39, 228-244 (Review)
Professor LI Fong Yau Sam  
D.Sc., Ph. D, B. Sc. Imperial College, London, UK  
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/lifys.htm  
Email: chmlifys@nus.edu.sg

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


A combined metabolomic and metallomic approach was developed in this study using the hypercholesterolaemic rat model, which involved the use of proton nuclear magnetic resonance for the analysis of rat urine to achieve metabolic fingerprinting and inductively coupled plasma mass spectrometry for the analysis of rat blood serum to achieve metallomic fingerprinting. The results obtained indicated that major metabolic processes like Krebs cycle, cholesterol metabolism and osmoregulation in hypercholesterolaemic rats are perturbed upon berberine injection. In addition, the changes of some elements, such as V, Mn, Na and K, revealed in the metallomic study may contribute to the search of new biomarkers for hypercholesterolaemic disease.

REPRESENTATIVE PUBLICATIONS

Professor Liu Xiang Yang

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

Email: phyliuxy@nus.edu.sg

MAJOR RECOGNITION

- Outstanding Researcher Award, 2007, National University of Singapore, Singapore.
- Councilor of the International Organization for Crystal Growth
- The 5th president of the Asian Crystal Growth and Crystal Technologies.
- Vice President of the Singapore-China Association for Advancement of Science and Technology

RESEARCH INTERESTS

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

RECENT HIGHLIGHT

The kinetics of the entire nucleation process has never been verified experimentally. We applied an EM field controlled colloidal assembly system (up left) to examine the process. The kinetics of nucleation has been obtained quantitatively for the first time since it was indentified a few centuries ago. (Up right: the change of size distribution of embryos with time. (a)-(d): the embryos fluctuation at the same time interval. Nature 429, 739 (2004); Adv. Fun. Mat. (Feature article) 22, 1354 (2012).

REPRESENTATIVE PUBLICATIONS

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/lohp.htm
Email: chmlohp@nus.edu.sg

MAJOR RECOGNITION
• University Outstanding Researcher Award 2012
• Dean’s Chair professor 2010
• 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
"A hydrothermal Anvil made of Graphene nanobubbles on diamond
Candy Su, Kian Ping Loh et. al.*
Nature Communications (2013), 10.1038/ncomms2579

PREMIUM PUBLICATIONS
1. Transforming Fullerene Molecules into Graphene Quantum dots
Jiong Lu, Pei Shan Emmeline Yeo, Chee Kwan Gan, Ping Yu and Loh, KP*
Nature Nanotechnology, 6, 247–252, (2011)

Graphene as broadband polarizer
Nature Photonics, 5, 411–415 (2011)

Graphene oxide as a chemically tunable platform for optical applications
Loh KP*, Bao QL, Eda G, Manish Chowalla
Nature Chemistry, 2, 12, 1015-1024 (2010)

Transforming Graphene Moire Blisters into Geometric Nanobubbles,
Jiong Lu, Antonio C. Neto, Kian Ping Loh*
Nature Communications, 8;3:823.(2012)

Nature Communications, 8;3:823.(2012)
Probing the Catalytic Activity of Graphene Oxide and its origin,
Chen Liang Su and Kian Ping Loh* et. al., Nature Communications, 3, 1298 (2012)

A hydrothermal Anvil made of Graphene nanobubbles on diamond
Candy Su, Kian Ping Loh et. al.*
Nature Communications (2013), 10.1038/ncomms2579.

The chemistry of ultra-thin transition metal dichalcogenide nanosheets
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

Email: chmjjv@nus.edu.sg

MAJOR RECOGNITION

• Outstanding Researcher Award, NUS, 2011
• World Class University Chair Professor, Gyeongsang National University, S. Korea (2009-2013)
• A topic editor, Crystal Growth & Design, from 2012
• One of the founding Board of Editors, Crystal Growth & Design Network by American Chemical Society
• Associate Editor, Journal of Synthesis and Reactivity in Inorganic, Metal-Organic and Nano-Metal Compounds, 2006-present
• Erudite Scholar-in-Residence, Kerala State Higher Education Council, India, 2011

RESEARCH INTERESTS

Current interests include solid-state photochemistry and structural transformations, processable functional coordination polymers such as gels and fibers, metal-organic frameworks as gas & energy storage materials, chemistry of metal chalcogenocarboxylates, metal chalcogenide and oxide thin films and nanomaterials. Currently we are interested in renewable energy including lithium ion batteries

RECENT HIGHLIGHT


(2nd right) The first textbook in Crystal Engineering by G. R. Desiraju, J. J. Vittal and A. Ramanan was published by World Scientific Publishers, in June, 2011

PREMIUM PUBLICATIONS

Professor WONG Ming Wah Richard


http://staff.science.nus.edu.sg/~chmwmw/index.htm
Email: chmwmw@nus.edu.sg

MAJOR RECOGNITION

• President, Singapore Catalysis Society, 2011 - current
• Advisory Board member, Asian Journal of Organic Chemistry, 2011 - current
• 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

RESEARCH INTERESTS

• Computational quantum chemistry, organocatalysis, hydrogen storage materials, molecular sensors
• Weak intermolecular interactions, molecular recognition, reactive intermediates, computer-aided drug design

RECENT HIGHLIGHT

A new type of chiral β-amino acid catalyst has been computationally designed, mimicking the enzyme catalysis of serine proteases. Our catalyst approach is based on the bioinspired catalytic acid/base dyad, namely, a carboxyl and imidazole pair. DFT calculations predict that this designed organocatalyst catalyzes Michael additions of aldehydes to nitroalkenes with excellent enantioselectivities and remarkably high anti diastereoselectivities.

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

Email: chmxugq@nus.edu.sg

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

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


When I look into your cells: A two-photon dye (Flu7) was developed (see scheme), which strongly fluoresces only upon selective binding to the plasma membrane of mammalian cells. Upon addition of a UV- and phosphatase-controlled quencher switching and can be used to image membrane-associated receptor-like protein tyrosine phosphatase (RPTP) activity.

REPRESENTATIVE PUBLICATIONS

**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  
Email: chmzwb@nus.edu.sg

**MAJOR RECOGNITION**
- Fellow, Australian Institute of Food Science and Technology (AIFST), elected since 2007
- Board Member, Agri-Food and Veterinary Authority of Singapore (AVA), 2008-present
- Chairman, AVA Research and Development Committee, 2010-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**
Reference: *Food and Bioprocess Technology*, in press.

Fortification of green tea extract (GTE) enhanced the development properties of steamed bread dough through preventing the dough from collapsing during prolonged proofing. GTE did not affect the gassing power of yeast.

**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

Email: chmangsg@nus.edu.sg

MAJOR RECOGNITION

• Chevalier in the Order of the Palmes Academiques, French Ministry of Youth, Education and Research, 2004
• Public Administration Medal (Bronze), National Day Awards, Singapore, 2010.

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

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

http://www.chemistry.nus.edu.sg/people/academic_staff/bettens.htm

Email: chmbrsa@nus.edu.sg

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 present a new energy-based fragmentation method that is based on our previous work and combines the best elements of other energy-based fragmentation methods. Our new approach, termed "combined fragmentation method", is foremost simple to implement, robust, accurate, and produces small fragments, which are independent of conformation and size of the target molecule. Essentially small collections of bonded atoms in the target molecule are assigned to groups. Fragment molecules are formed by taking all bonded pairs of these groups. These fragments are then interacted with one another, and the interaction energy is simply added to the initial fragmentation energy. The method has been tested on numerous molecules of biological interest both in vacuum and in a continuum solvent.

Left: (A) Density matrix for α-helix (Ala)$_{20}$ obtained from HF/6-311G(d); (B) the difference between (A) and the resulting density matrix obtained from our fragmentation method; and (C) the difference density matrix for the capping hydrogens.

REPRESENTATIVE PUBLICATIONS

RESEARCH INTERESTS

We use the state-of-the-art computational chemistry methods and experimentations to understand mechanistic aspects of physical and chemical processes and thus to enable design and discovery of novel materials for a variety of applications with particular focus on energy materials and devices. 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. ink-based deposition technology for fabrication of transparent conducting oxide thin films for applications in optoelectronic devices, such as displays and solar cells;
3. highly conductive polymeric electrolytes and membranes for lithium-ion battery and fuel cell applications;
4. development of efficient heterogeneous catalysts for hydrogenation and dehydrogenation;
5. reactive force field development for metallic nanoparticles.

REPRESENTATIVE PUBLICATIONS

Assoc Professor CHIN Wee Shong  
Commeworthy Fellowship, Univ. of Bristol, 1994; Ph.D., National Univ. of Singapore, 1993; B.Sc.(Hons), National Univ. of Singapore, 1987  
http://www.chemistry.nus.edu.sg/people/academic_staff/chinws.htm  
Email: chmcws@nus.edu.sg

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 fabrication and applications of nanostructures and their hybrids. We explore methodologies to synthesize size-, morphology- and phase-controllable nanomaterials, and to fabricate them into heterostructured or hybrid materials for specific applications. Current projects include synthesis of doped and layered oxide/hydroxide nanocomposites for energy, sensor and photocatalytic applications.

RECENT HIGHLIGHT  

We reported a simple fabrication of CoOOH nanosheets via surface alkaline treatment of cobalt foil at room temperature without the need of templates and catalysts. These oriented CoOOH arrays can be used directly as electrodes, offering enhanced electrode-electrolyte contact area, minimum diffusion resistance and direct active material–current collector connection for fast electron transport. The electrode was tested as an electrochemical sensor towards non-enzymatic detection of hydrogen peroxide H2O2 and hydrazine N2H4 in alkaline solution using amperometric detection at low potential (0 V and 0.1 V).

PREMIUM PUBLICATIONS  
Assoc Professor CHUAH Gaik Khuan

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

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

Email: chmcgk@nus.edu.sg

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
• Photocatalysts in water remediation

RECENT HIGHLIGHT

A critical step in the synthesis of the rare sugars, L-lyxose and L-ribose, from the corresponding D-sugars is the oxidation to the lactone. Instead of conventional oxidizing agents like bromine or pyridinium dichromate, it was found that a heterogeneous catalyst, Pd-Bi/C, could be used for the direct oxidation with molecular oxygen. The composition of the catalyst was optimized and the best results were obtained with 5:1 Pd: Bi. The overall yields of the five-step procedure to L-ribose and L-lyxose were 47 % and 50 %, respectively. The synthetic procedure is advantageous from the viewpoint of overall yield, reduced number of steps, and mild reaction conditions. Furthermore, the heterogeneous oxidation catalyst can be easily separated from the reaction mixture and reused with no loss of activity.

REPRESENTATIVE PUBLICATIONS

RESEARCH INTERESTS

Emphasis of the research is on photochemistry and spectroscopy of small molecule bond activation using transition metal carbonyl complexes and nanomaterials. We are currently working on manganese, rhenium and ruthenium-based hydrogen generation via dehydrogenative coupling and CO2 reduction to CO. A new area on utilizing metal carbonyls as anti-cancer agents and CORMS (CO-releasing molecules) is being explored.

RECENT HIGHLIGHT

Reference: Organometallics, 2010, 29, 4459-4463

UV photolysis of CpMn(CO)3 with thiols effected the following catalytic transformation: 2 RSH → 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.
Assoc Professor GAO Zhiqiang

B.Sc. Ph.D., Wuhan University; Feinberg Postdoctoral Fellow, Weizmann Institute of Science; Lee Kuan Yew Postdoctoral Fellow, National University of Singapore.

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RESEARCH INTERESTS

Research Interests
Electrochemistry, Nanomaterials, Nanobiotechnology, Renewable Energy and Medical Devices.

RECENT HIGHLIGHT


Based on the detection of the product of a ligation chain reaction (LCR) and the use of gold nanoparticles (AuNPs) as signal generators, a simple and highly sensitive colorimetric DNA assay is developed. During LCR, the AuNPs are ligated together, resulting in a distinct color change in real time after a sufficient number of thermal cycles. DNA quantification could easily be realized colorimetrically or by visual inspection. The cumulative nature of the protocol produces a subfemtomolar sensitivity and a selectivity factor of 10³.

REPRESENTATIVE PUBLICATIONS

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

The current focuses are:

• Transition metal complex-based fluorescent probes for ultrasensitive detection of small molecules of biological importance, such as H₂S, NO, NO₂, and ¹⁸O₂.
• High throughput assay-guided isolation and characterizations of natural products with alpha-amylase inhibitory activity and anti-aging activity (using yeast as a model), induced phytoalexins from plant seeds
• Chemistry of dietary organosulfur compounds with regard to their activity as a natural H₂S donors in biology.

RECENT HIGHLIGHT


A high throughput screening assay was developed based on the yeast chronological aging model and applied in evaluating several factors that mediate lifespan, including inoculum size, cellular state in nutrient-rich medium, and calorie level. Using our assay, we confirmed the previously reported genetic mimics of calorie restriction, including deletion of TOR1, SCH9 or RAS2. In contrast, deletion of SIR2 had longevity effect but seemed to produce only small beneficial effect on the response to calorie restriction. Overall, this new high throughput screening assay may facilitate identification of calorie restriction mimetics with a rapid and simple protocol, uncomplicated data analysis, and high sensitivity. In addition, the assay also provides quantifiable data including lag-time, growth rate, doubling time, and survival percentage.

REPRESENTATIVE PUBLICATIONS

Assoc Professor HUYNH Han Vinh

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

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

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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 ligand design for applications in organometallic and classical coordination Chemistry. Specific foci are:

• Development of unprecedented and non-classical carbenes and related strong donor ligands
• Applications of N-heterocyclic carbenes (NHCs) complexes in catalysis and bioorganometallic chemistry
• Physical organic chemistry

RECENT HIGHLIGHT


A series of Au(I) and Au(III) mono- and bis(carbene) complexes bearing the benzimidazole-derived (‘Pr2-bimy) and/or the pyrazole-derived (Fpyr) NHC ligands have been synthesized and fully characterized. The cytotoxic activities of all complexes have been studied *in vitro* with the NCI-H1666 non-small cell lung cancer cell line revealing that cationic bis(carbene) complexes show better cytotoxicity in comparison to cisplatin. In particular, heterobis(carbene) complexes have superior activity, with IC₅₀ values of around 0.2 μM.

REPRESENTATIVE PUBLICATIONS

RESEARCH INTERESTS

The Jaenicke Research Group conducts studies in heterogeneous catalysis with the aim to understand the origins of catalytic activity, and to use that fundamental understanding for the design of improved catalysts. Reactions are followed by steady state measurements in flow reactors, and by determining the concentration profiles in batch reactions. The data allow for quantitative chemical kinetic evaluation of catalytic performance. Other methods employed include spectroscopic measurements to identify species on the catalyst surfaces. X-Ray photoelectron spectroscopy, solid state NMR, UV-vis reflectance and infrared spectroscopy reveal further details of the chemical state of the surface and the bonding of adsorbed species. The acid catalysis by zeolites, hydrodeoxygenation of biomass derived molecules, and the photochemical degradation of recalcitrant organic pollutants over semiconductor surfaces are catalytic systems of current interest. Particularly the conversion of sugars and other biomaterial into platform molecules for the chemical economy of the future, which will be based on renewable raw materials (bio-refinery concept) is central to our research program.

RECENT HIGHLIGHT

Novel Zeolite beta/Silicalite-1 core/shell microcomposites have been prepared. These materials have been tested as racemization catalyst in the dynamic kinetic resolution (DKR) of secondary alcohols by highly stereoselective lipase-catalyzed transesterification.

The inert but porous Silicalite-1 shell covers the external acidic sites of the Beta zeolite core, and suppresses dehydration and non-enantioselective transesterification of the alcohol. The small alcohol molecules can penetrate the Silicalite-1 shell to access the acidic sites at the core where they racemize, but the bigger (R)-ester formed by enzyme-catalyzed reaction is excluded. As a result, the high ee of the (R)-ester product is conserved, and the dehydration reaction is suppressed. Because of the shape selective nature of this composite racemization catalyst, small and readily available acyl donors can be used in the enzyme-catalyzed transesterification to obtain the esters with high enantiopurity. The DKR of 1-phenylethanol with isopropenyl acetate using an optimized core/shell catalyst gave 92 % selectivity for ester formation, and the desired (R)-1-phenylethyl acetate was obtained with 94 % ee.

REPRESENTATIVE PUBLICATIONS

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
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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, E.S. Tok and H.C Kang, “Energetics of adsorbed hydrogen and surface germanium on stepped SiGe1-x(100)-(2×1) surfaces”, *Phys. Rev. B* 77, 205306 (2008) (United States)
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

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

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RESEARCH INTERESTS

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

- Combinatorial Synthesis and biological evaluations of novel organic compounds and natural product derivatives as potential anti-cancer, anti-inflammatory and neurological agents
- Development of recyclable, fluorous reagents and catalysts

REPRESENTATIVE PUBLICATIONS

- B Yan, E X Yau, S Samanta, C W Ong, K J Yong, L K Ng, B Bhattacharya, K. H. Lim, R Soong, K G Yeoh, Y Lam, M Salto-Tellez. “A Clinical and Therapeutic Relevance for PIM1 Kinase in Gastric Cancer” Gastric Canc., 15, 188-197 (2012)

Recent Highlight


West Nile virus (WNV) is a mosquito-borne pathogen which causes a large number of human infection each year. Currently no vaccines and antiviral therapies are available for human use. In this study, a WNV NS2B-NS3 protease inhibitor with a 9,10-dihydro-3H,4aH-1,3,9,10a-tetraaza-phenanthren-4-one scaffold was identified by screening a small library of non-peptidic compounds. Optimization of this initial “hit” by solution-phase synthesis of a focussed library of compounds with this scaffold for screening led to the identification of a novel, uncompetitive inhibitor (1a40, IC$_{50}$ = 5.41±0.45 μM) of the WNV NS2B-NS3 protease. Molecular docking indicates that the S-enantiomer of 1a40 interferes with the productive interactions of the NS2B cofactor with the NS3 protease domain and is a preferred isomer for the inhibition of the WNV NS3 protease.
Assoc Professor LU Yixin


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Email: chmlyx@nus.edu.sg

MAJOR RECOGNITION

- Outstanding Chemist Award, Department of Chemistry, NUS, 2011
- Young Chemist Award, Department of Chemistry, NUS, 2010
- Asian Core Program Lectureship Award from Japan, 2009
- Asian Core Program Lectureship Award from Korea, 2009
- Young Scientist Award, Faculty of Science, NUS, 2009

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


Phthalides were used for the first time in the allylic alkylation reactions with MBH carbonates for the creation of chiral 3,3-disubstituted phthalides. Highly enantioselective regiodivergent synthesis of $\gamma$-selective or $\beta$-selective allylic alkylation products was achieved by employing bifunctional chiral phosphines or multifunctional tertiary amine–thioureas as the catalyst, respectively.

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

MAJOR RECOGNITION

• NUS Young Investigator Award, 2006
• BASF-SNIC Award in Materials Chemistry 2011
• Chemical Society Reviews Emerging Investigator Lectureship Award 2012

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

REPRESENTATIVE PUBLICATIONS


Photovoltaic (PV) technologies for solar energy conversion represent promising routes to green and renewable energy generation. The main difficulty in improving the efficiency of PV energy conversion lies in the spectral mismatch between the energy distribution of photons in the incident solar spectrum and the bandgap of a semiconductor material. In recent years, luminescent materials, which are capable of converting a broad spectrum of light into photons of a particular wavelength, have been synthesized and used to minimize the losses in the solar-cell-based energy conversion process.
Valiyaveettil Suresh

Ph.D. - Univ of Victoria, BC, Canada. BSc/MSc. Calicut University, Kerala, India,
MTech. - Indian Institute of Technology, New Delhi, India
Post doc. - Max-Planck Institute for Polymer Research, Cornell University.
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/suresh.htm
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RESEARCH INTERESTS
My research interests are:
• Functional polymers
• Nanomaterials
• Nanosafety/Nanotoxicity
• Biomaterials
• Materials for environmental applications

RECENT HIGHLIGHT
My group is interested in developing novel functional polymers photovoltaic and environmental applicators. The efforts are focused on design, synthesis, characterization and exploration of applications for these organic materials. In case of nanomaterials, a range of nanoparticles (e.g. metallic, carbon and polymeric) and their hybrid with polymers are prepared. Recently, we have established the mechanism of interaction and toxicity of nanomaterials in living cells. Another area of interest involves the development of materials for environmental applications. Both (nano)biofibers and biomembranes are prepared and tested their efficiency for water purification.

REPRESENTATIVE PUBLICATIONS
• Asharani, P. V., Yi, L. W., Gong, Z. Y., Valiyaveettil, S. Comparison of the toxicity of silver, gold and platinum nanoparticles in developing zebrafish embryos, Nanotoxicology, 2011, 5, 43-54.
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

Reference: K. Hotz and T. Walczyk, JBIC (in press)

Following our discovery of natural variations in iron isotope composition of blood we attempted to identify factors that determine the unique iron isotopic signature that we carry in our blood. Earlier experiments let us hypothesize that the efficiency of iron absorption in the gut as well as an inhomogeneous distribution of iron isotopes in the body are primary determinants. In agreement with this hypothesis we found in a recent human trial that accumulation of heavier iron isotopes in liver iron stores and/or its release for red blood cell formation affects blood iron isotopic composition. Most recently we could show directly that the efficiency of dietary iron absorption in the gut correlates with iron isotopic signatures in blood and that South-East Asians and Caucasians differ in blood iron isotopic composition. This finding is remarkable. Isotopic signatures in blood are highly stable and as such they point to long-term differences in iron absorption between individuals and ethnicities which are currently unknown to exist. Conventional tracer techniques for measuring iron absorption failed to pick up such differences as iron absorption efficiency varies strongly within and between days in the individual.

REPRESENTATIVE PUBLICATIONS

- K Hotz and T Walczyk, Natural iron isotopic composition of blood is an indicator of dietary iron absorption efficiency in humans, JBIC (in press)
- K. Hotz and T. Walczyk, Isotopic signatures of iron in body tissues as a potential biomarker for iron metabolism, JAAS 26, 1347-1353 (2011)
- TD Bullen and T Walczyk, Environmental and biomedical applications of natural metal stable isotope variations, Elements 5, 381-385 (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 imaging fluorescence correlation spectroscopy (ITIR-FCS, SPIM-FCS)
• 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.

Single SPIM-FCS: 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 cadrinal 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

Associate 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

http://www.chemistry.nus.edu.sg/people/academic_staff/wujs.htm
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MAJOR RECOGNITION

• NUS Young Investigator Award, NUS, 2007
• Singapore National Young Scientist Award, 2010
• NUS Young Researcher Award, 2012
• BASF-SNIC Award on Materials Chemistry, 2012

RESEARCH INTERESTS

• Novel aromatic systems and materials & Supramolecular Chemistry

RECENT HIGHLIGHT


**Z-shaped polycyclic hydrocarbons with open-shell ground state**: A series of Z-shaped zethrene molecules were prepared and it was found that the heptazethrene and octazethrene have an open-shell singlet biradical ground state.

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**REMIUM PUBLICATIONS**

• Z Sun, K W, Huang, J Wu, Soluble and stable heptazethrene bis(dicarboximide) with a singlet open-shell ground state, J. Am. Chem. Soc., 133, 11896-11899 (2011)
Associate Professor XU Qing-Hua

http://staff.science.nus.edu.sg/~chmxqh
Email: chmxqh@nus.edu.sg

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, Nanophotonics, Biophotonics and optoelectronics
• Optical spectroscopy and imaging

REPRESENTATIVE PUBLICATIONS

Assoc Professor YIP Hon Kay John
Ph.D., Univ. of Hong Kong, 1993; B.Sc., Univ. of Hong Kong, 1989
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/yipjohn.htm
Email: chmyiphk@nus.edu.sg

RESEARCH INTERESTS
We design and synthesize inorganic and organometallic molecules for photocatalytic CO₂ reduction, H₂ formation and multichromophoric supramolecular assemblies for light harvesting and energy transfer.

RECENT HIGHLIGHT


Platinum-Conjugated Homo- and Heterobichromophoric Complexes of Tetracene and Pentacene

REPRESENTATIVE PUBLICATIONS
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
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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

Platinum(IV) anticancer prodrugs were stably entrapped within carbon nanotubes via hydrophobic-hydrophobic interactions and selectively released from their protective shell upon chemical reduction and subsequent reversal in hydrophobicity. This simple method of controlled release by chemical reduction and hydrophobicity reversal, exploiting the Pt(IV) scaffold as a prodrug, paves the way for their use in the targeted delivery of platinum drugs into cancer cells.

PREMIUM PUBLICATIONS
• CF Chin, Q Tian, MI Setyawati, W Fang, ESQ Tan, DT Leong, WH Ang*, Tuning the activity of platinum(IV) anticancer complexes through asymmetric acylation, J. Med. Chem. 55, 7571-7582 (2012).
• DYQ Wong, JY Lau, WH Ang*, Harnessing chemoselective imine ligation for tethering bioactive molecules to platinum(IV) prodrugs, Dalton Trans. 41, 6104-6111 (2012).
Asst Professor CHAN Yin Thai
Postdoc., Stanford Univ., 2006-2008; Ph.D., Massachusetts Inst. of Technology, 2006; B.Sc., Univ. of California at Berkeley, 2001

http://www.chemistry.nus.edu.sg/people/academic_staff/chanyt.htm
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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

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MAJOR RECOGNITION
• Singapore Young Scientist Award, Singapore, 2012
• 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
The broad objective of my research is to have molecular-scale understanding of the interface properties for molecular, organic and graphene electronics, to provide design rules for effective interface engineering approaches to improve device performance and materials efficiency, with particular emphasis on the interface-controlled organic solar cells, graphene based nanodevices, and nanocatalyst for energy and environmental issues.

RECENT HIGHLIGHT


REPRESENTATIVE PUBLICATIONS
• W Chen, H Li, H Huang, YX Fu, HL Zhang, J Ma, ATS Wee, 2D Pentacene:PTCDA supramolecular chiral networks on Ag(111), J. Am. Chem. Soc., 130, 12285-12289 (2008).
Asst Professor CHI Chunyan


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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


6,13-Dibromopentacene [2,3:9,10]-bis(dicarboximide) (1a) was synthesized for the first time by using in situ generated benzo[1,2-c:4,5-c]difuran as a key intermediate. Compound 1a can be further functionalized by Pd-catalyzed coupling reactions to give a series of soluble and stable pentacene diimides such as 1b-1e. These molecules exhibit good photostability in comparison to other reported pentacene derivatives and 1c shows the half lifetime about one month when its solution was exposed to the ambient light and air conditions. 1b has low-lying LUMO energy level at -4.19 eV, so it shows obvious n-type FET behavior with electron mobility of 0.08 cm²/Vs when the devices are made by solution processing techniques.

REPRESENTATIVE PUBLICATIONS

RESEARCH INTERESTS
My group focuses on understanding how biological membranes are assembled in cells using bacterial outer membranes as models. Specifically, we are interested to elucidate the mechanisms of inter-membrane lipid trafficking in Gram-negative bacteria and mycobacteria and to identify protein targets in these bacteria for antibiotics discovery.

RECENT HIGHLIGHT
The folding and assembly pathway of the two-protein complex, LptD/E, that inserts lipopolysaccharide (LPS) into the Gram-negative bacterial outer membrane has been described. Seven in vivo states on the oxidative folding pathway of LptD have been observed. Proper assembly involved a non-functional intermediate containing non-native disulfides. Disulfide bond-dependent protein folding of LptD requires the proper assembly of a two-protein complex in order to promote disulfide bond rearrangement. This, in turn, is necessary for the assembly of the full bacterial LPS exporter that spans the Gram-negative cell envelope.

REPRESENTATIVE PUBLICATIONS
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/people/academic_staff/chualaylay.htm
Group website: http://www.physics.nus.edu.sg/~ondl/
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RECENT INTERESTS
Several device chemistry aspects that is central to Organic Electronics, including: (i) structure-morphology–property relations (ii) materials development and (iii) energy-level engineering. (iv) functionalisation and development of new applications for solution-processable graphenes and CVD graphene.

RECENT HIGHLIGHT

Dispersed single graphene sheets show optical limiting behaviour with limiting threshold lower than the benchmark carbon black suspension and carbon nanotubes through a new nonlinear optical limiting mechanism due to the interaction of the sheets with the environment, and not micro-plasma damage. This leads to the first ever practical non-linear optical-limiting solid-state films that can be incorporated into protective devices.

REPRESENTATIVE PUBLICATIONS
Professor EDA Goki

Postdoc, Imperial College London
Ph.D., Rutgers University
M.Sc., Worcester Polytechnic Institute
B.A., International Christian University

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RESEARCH INTERESTS

- Graphene and other 2-dimensional solids
- Optical and vibrational spectroscopy
- Charge transport
- Electronic and optoelectronic devices
- Intercalation chemistry and colloidal processing

RECENT HIGHLIGHT

Our studies have recently found that layered tungsten dichalcogenides such as WS$_2$ and WSe$_2$ undergo indirect-to-direct band gap transition when thinned to a monolayer. The transition results in strongly enhanced photoluminescence from monolayer WS$_2$ and WSe$_2$.

REPRESENTATIVE PUBLICATIONS

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 biogeneration via biocatalysis and fermentation
• Probiotics viability and application
• Food and beverage fermentation

RECENT HIGHLIGHT
Survival of L. rhamnosus HN001 in fermented milk during storage at 30°C in the presence of supernatant and washed yeast cells of S. cerevisiae EC1118. ●, S. cerevisiae EC1118 culture; ▲, S. cerevisiae EC1118 washed cells; ■, S. cerevisiae EC1118 supernatant; O, control (no added yeast).

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

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MAJOR RECOGNITION

NRF CRP (2012)
NRF research fellowship award (2010)
Veni award, the Netherlands Organization for Scientific Research NWO (2010)

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


Molecular electronic devices are complex physical-organic systems that consist of at least two electrodes, the organic component, and two (different) organic/inorganic interfaces. Singling out the contribution of each of these components to the device performance is not straightforward. Here we experimentally show that subtle changes in the intermolecular van der Waals interactions in the active component of a molecular diode (monolayer of S(CH2)nFc; Fc = ferrocene) dramatically impact the performance of the device: junctions made from an odd number of alkyl units have a lower packing energy by approximately 0.4-0.6 kcal mol⁻¹ and rectify currents 10 times more efficiently, give 10% higher yield of working devices and can be made 2-3 times more reproducibly than junctions made from an even number of alkyl units. In the future, to ensure optimal performances, the rational design of SAM-based junctions and in general studies involving charge transport across (bio)molecules, should take into account van der Waals interactions.

PREMIUM PUBLICATIONS

Asst Professor Teo Peili

Postdoc., California Inst. of Technology, 2009-2012; Ph.D., National University of Singapore, 2008; B.Sc. (Hons), National University of Singapore, 2004

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

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MAJOR RECOGNITION

A*STAR Graduate Scholarship (Postdoctoral fellowship), 2009
A*STAR Graduate Scholarship (PhD), 2004

RESEARCH INTERESTS

We are interested in the development of catalysts for heterofunctionalization of terminal olefins to form linear or chiral alcohols, amines, ethers and halides. We are also interested in transfer hydrogenation catalysts, especially asymmetric transfer hydrogenation catalysts, for the production of chiral alcohols and amines. Linear alcohols and amines are important reagents to the organic chemistry laboratory, bulk/fine chemical, pharmaceutical and material industry. Currently, there is no reproducible single-step process to convert an olefin to a linear alcohol or amine. Both processes have been listed as one of the “Top ten challenges of catalysis” since 1993. We are keen in finding solutions to these challenges in our group.

REPRESENTATIVE PUBLICATIONS

• P. Teo, T. S. A. Hor, Spacer directed metallo-supramolecular assemblies of pyridinecarboxylates, Coordination Chemistry Reviews, 2011, 255, 273
• P. Teo, L. L. Koh, T. S. A. Hor, Oligo- and polymeric Pd(II) and Pt(II) using pyridylcarboxylate spacers for topology control, Inorganic Chemistry, 2008, 47, 6464.
• P. Teo, L. L. Koh, T. S. A. Hor, General formation of trigonal prismatic [Ag6X3(dppf)]+ (X = Cl, Br, I) through an unusual ligand migration from NiX2(dppf) to AgOTf, Chemical Communications, 2007, 4221.
Assistant Professor WANG Jian  
Post-Doctorate, The Scripps Research Institute, USA  
Ph.D. The University of New Mexico, USA  

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Tel: (65) 6516-1760

RESEARCH INTERESTS
I am interested in:
• Asymmetric Synthesis  
• Pd-catalyzed reactions

RECENT HIGHLIGHT
The development of novel methods for the preparation of functionalized heterocyclic complexes has been of long-standing interest to organic chemists. As a result of their broad applications in organic synthesis they are widely distributed in a vast array of bioactive molecules. Although currently most of them prescribed as the racemate, activity and metabolism are markedly dissimilar for the two enantiomers, one of the enantiomer being more active than another enantiomer. Furthermore, two enantiomers are metabolized by different pathways, which are validated by the different half-lives in living organisms. Therefore, efficient asymmetric syntheses of functionalized complex molecules are of great interest. Below, Figure depicts an example illustrating the process of indane catalyst in different protocols.

REPRESENTATIVE PUBLICATIONS
Assistant Professor Yeo Boon Siang

Postdoc., Lawrence Berkeley National Laboratory, 2012; Ph.D., ETH Zurich, 2008; M.Sc., National University of Singapore, 2004; B.Sc.(Hons), National University of Singapore, 2001.

Website: http://www.chemistry.nus.edu.sg/people/academic_staff/yeobsj.htm
Email: chmyeos@nus.edu.sg

RESEARCH INTERESTS

A major scientific challenge for the 21st century is to develop a sustainable and environmentally friendly energy economy. To contribute to this goal, we aim to understand and develop efficient and robust materials to catalyze several energy conversion reactions. Systems of interest include reduction of carbon dioxide to methane, fuel cell reactions, and water splitting. We will develop and apply state-of-the-art analytical tools to understand the mechanistic and structural aspects of these processes with high spatial and temporal resolutions. This knowledge will then be exploited to design and synthesize systems with improved functionality.

REPRESENTATIVE PUBLICATIONS

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

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

Email: chmyy@nus.edu.sg

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
• Multicomponent 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 aminoalkoxylation in the synthesis of substituted morpholine. In addition, a novel bromolactonization catalyzed by an amino-thiocarbamate catalyst was developed.

REPRESENTATIVE PUBLICATIONS

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
Recent study determined survival of Salmonella Typhimurium adapted with food antimicrobials such as sodium
lactate (NaL) and sodium acetate (NaA) in simulated gastric fluid and during heat treatment. The results showed
that the foodborne pathogens adapted to these antimicrobials had enhanced heat resistance and NaA-adapted
cells adapted showed enhanced acid resistance in simulated gastric fluid. Thus, this study indicates that
adaptation of S. Typhimurium to 5% NaL or 3% NaA could enhance their ability to survive thermal processes or
in the human stomach, possibly increasing the risk of Salmonella outbreaks. (Yuan et al., 2012. Food Microbiol.
30:448-452)

REPRESENTATIVE PUBLICATIONS
• Nguyen, H. D. N. and Yuk, H. G*. 2013. Changes in resistance of Salmonella Typhimurium biofilms formed
under various conditions to industrial sanitizers. Food Control, 29:236-240.
• Huang, Y., Ghate, V., Phua, L., and Yuk, H. G*. Prevalence of Salmonella spp. and Vibrio spp. in seafood
Ensuring Microbiological Safety of Meat: Current and Future Trends. Comprehensive Reviews in Food
adaptation on Salmonella Typhimurium acid and heat resistance. Food Microbiology, 30:448-452.
• Seow, J., Ágoston, R., Phua, L., and Yuk, H. G*. 2012. Microbiological quality of fresh vegetables and fruits
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

Website: http://www.chemistry.nus.edu.sg/people/academic_staff/zenghq.htm
Email: chmzh@nus.edu.sg

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. Focused areas include:

• Synthetic ion channels
• Alzheimer's Disease
• Targeting telomeres for anticancer therapy
• Heavy metal-sequestering agents

RECENT HIGHLIGHT

To capture Nature’s astonishing ability in creating sophisticated folding biopolymers with nanosized cavities and by using directional intramolecular hydrogen-bonds, we have developed a general strategy for designing folded helices and macrocycles with modifiable outer surfaces and easily tunable interior cavities, promising important applications in catalysis, separation, molecular recognition, ion transportation, etc.

PREMIUM PUBLICATIONS

• Ren, C. L.; Maurizot, V.; Zeng, H. Q.,* et al J. Am. Chem. Soc. 2011, 133, 13930
• Qin, B.; Ong, W. Q.; Zeng, H. Q.,* et al Chem. Commun. 2011, 47, 5419
• Qin, B.; Ren, C. L.; Zeng, H. Q.,* 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
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/zc.html
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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)
RESEARCH INTERESTS

➢ To develop simple (asymmetric) catalytic systems to address key problems in chemistry
  ✓ Bulk molecule activation (CO₂, NH₃, etc.)
  ✓ Chiral Fe-based complexes in asymmetric catalysis
  ✓ Novel approaches for catalyst discovery
➢ To synthesize molecules with a complex structure and/or useful functions
➢ To deliver chemical tools for applied areas such as pharmaceuticals and material science

RECENT HIGHLIGHT

➢ reported the first highly enantioselective catalytic kinetic resolution of oxindole-derived tertiary alcohols, which are important targets and intermediates in medicinal chemistry

![Chemical reaction diagram]

S = 70
(relative rate of two enantiomers)

52%, 87% ee
45%, 98% ee

REPRESENTATIVE PUBLICATIONS

Dr CHAN Sau Han Edith

Lecturer

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

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

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MAJOR RECOGNITION

• Hon. Treasurer and Scientific Co-Chair, International Conference on Green & Sustainable Chemistry (ICGSC), 2009.
• Organizing committee member, International Conference on Coordination Chemistry (ICCC-41), 2014.

RESEARCH INTERESTS

General interests include chemical biology and chemical education.

PREMIUM PUBLICATIONS


Dr CHUI Sin Yin, Stephen
Lecturer
Ph.D., Hong Kong University of Science and Technology, 1999. University of Hong Kong, 2001-2011.
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/XXXXX.htm
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RESEARCH INTERESTS

1) Advanced X-ray Structural Methods
2) Porous Solids
3) Functional Molecules

1) Structural Determination using Powder Diffraction
Homoleptic metal organothiolates or organoacetylides were long realized to have polymeric structures. Owing to the problem of low solubility in organic solvents and difficulty in obtaining single crystals, I firstly used laboratory powder X-ray diffraction data to elucidate their unknown 1-D and 2-D structures that correlate with the charge-transporting or luminescent behavior. Their unique polymeric networks of these metal-organic precursors directed facile formations of respective metal sulfide nanoparticles.

2) Qualitative and Quantitative Analysis using Powder Diffraction
Besides, X-ray diffraction is a simple and non-destructive analytical tool for crystalline solid materials. i.e. Monitoring solid-solid transformations, determination of crystallite sizes, identification of unknown phases & quantification of phases in a mixture.

3) Metal-Organic Open Framework
Porous solids is one of emerging areas in materials science and coordination chemistry. Judicious choices of metal ions and poly-dentate organic ligands will generate a number of novel & robust porous solids called “metal-organic frameworks” or MOFs. E.g., copper(II) benzene-1,3,5-tricarboxylates (or HKUST-1) showed practical applications in gaseous separation (H2, CO2, CH4), and catalysis. Future direction is to explore the pore micro-environment, that stereochemically catalyzes useful reactions.

4) Structure-Property Relation of Functional Molecules
New molecular materials exhibiting interesting solid-state properties such as charge-transport, magnetism, ferroelectricity, vapoluminescence, as well as liquid crystallinity could be structurally investigated by X-ray diffraction method coupled with Rietveld structural analysis and refinement under normal or in-situ variable-temperature condition. In this aspect, any sort of formal or informal interdisciplinary collaboration or discussion in a local or worldwide level is highly welcomed.

REPRESENTATIVE PUBLICATIONS
(Please refer to my publication list in departmental webpage)
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

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

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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.(Hon), Universiti Kebangsaan Malaysia, 1995

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

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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 nanoemulsion.
• Kinetics of Maillard reaction and antioxidant reactions in foods and in model system.
• Shelf life study of foods.

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 Linda Sellou
Lecturer


http://www.chemistry.nus.edu.sg/people/Teaching_staff/Sellou.html
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TEACHING AND RESEARCH INTERESTS
Colloidal chemistry,
Structure in Colloidal Silica and its influence on Abrading surfaces
Dr TAN Sue Qing Emelyn
Lecturer
Ph.D., Univ. of Canterbury, 2006; B.Sc. (Hons), Univ. of Canterbury, 2002
http://www.chemistry.nus.edu.sg/people/Teaching_staff/tansq.htm
Email: chmtsqe@nus.edu.sg

MAJOR RECOGNITION

• Excellent Young Teacher Award AY2010/2011

TEACHING AND RESEARCH INTERESTS

• Teach analytical, general, physical and material chemistry modules.
• Teaching interests also include coordinating outreach and in-reach programs such as the National Chemistry Weeks (NCW) and with role as Advisor to Chemical Sciences Society (CSS).
• Research interests include chemical education, nanomaterials, chemically modified surfaces and electrochemistry.

PREMIUM PUBLICATIONS

• CHIN, C F, Quan Tian, M I SETYAWATI, Wanru Fang, E S Q TAN, DT LEONG and W H ANG*, "Tuning the Activity of Platinum(IV) Anticancer Complexes through Asymmetric Acylation". JOURNAL OF MEDICINAL CHEMISTRY, 55, no. 17 (2012): 7571-7582. (United States).
• TAN*, E S Q, W RIDHA and C S Toh, "Heterogeneous and homogeneous aptamer-based electrochemical sensors for thrombin". ELECTROANALYSIS, 21, no. 6 (2009): 749 - 754. (United States).
MAJOR RECOGNITION
• Chair of the (UK) Committee of Heads of Environmental Sciences, 2006-2007
• Member of Council of the Institute of Environmental Sciences, 2005-2007

RESEARCH INTERESTS
Atmospheric biogeochemistry of Sulfur, and its effects on health and climate. Development of passive samplers for hydrogen sulfide, carbonyl sulfide and a range of atmospheric pollutants. Particular foci are:
• outdoor urban air quality and health
• Indoor urban air quality, cultural artefacts and health
• Passive samplers (particularly for reduced sulfur) to assess air quality
• emissions of reduced sulfur from engine exhaust systems
• reduced sulfur and climate change

RECENT HIGHLIGHT
Reference: Atmos. Env. 42 (18) pp4079-4088 [2008]
The new class of multi analyte high speed passive samplers.

REPRESENTATIVE PUBLICATIONS
Dr ZHANG Sheng
Lecturer
Deputy Director of Laboratory

Ph.D., National University of Singapore, 2008; B.Sc., Peking University, 2003

http://www.chemistry.nus.edu.sg/people/Teaching_staff/zhangs.htm

Email: chmzs@nus.edu.sg

RECENT HIGHLIGHT
Excellent Young Teacher Award
Mentor of Singapore Team for International Chemistry Olympiad
Mentor of Singapore Chemistry Olympiad
Judge of Singapore Science & Engineering Fair (SSEF)

Teaching
CM1121 Organic Chemistry I
CM1401 Chemistry for Life Sciences
CM1191 Experiments in Chemistry I
CM2121 Organic Chemistry II
CM2191 Experiments in Chemistry II
CM3291 Advanced Experiments in Organic & Inorganic Chemistry
CM5121 Graduate Organic Chemistry

Research Interest
Chiral Separation by High Performance Liquid Chromatography (HPLC)
Dr ZHAO Jin
Lecturer
Ph.D., Technological Univ. of Munich, 2005; M.Sc., Chinese Acad. of Science, 1995; B.Sc., Liaoning Univ., 1992
http://www.chemistry.nus.edu.sg/ourpeople/academic_staff/zhaoj.htm
Email: chmzhaoj@nus.edu.sg

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

RECENT HIGHLIGHT
A high-valent molybdenum NHC dioxo complex [CpMoO₂(IBz)]₂[Mo₆O₁₉] (IBz = 1,3-dibenzylimidazol-2-ylidene) has been isolated in its hexamolybdate form and crystallographically elucidated to show a Mo–C(NHC) bond of 2.173(4)Å (NHC = N-heterocyclic carbene).

REPRESENTATIVE PUBLICATIONS
• F. Xue, J. Zhao*, T. S. A. Hor*, Fe(II) Complexes with Functionalized Amine-Pyrazolyl Tripodal Ligands in the Cross-Coupling of Aryl Grignard with Alkyl Halides, Dalton Trans. 2011, 40, 8935-8940.
Ms CHNG Ting Ting
Instructor
B.Sc., 2006, National University of Singapore
M.Sc., 2012, National University of Singapore
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Dr Hoang Truong Giang
Instructor
B.Sc., 2004, National University of Singapore
Ph.D., 2012, University of Minnesota, Twin Cities, USA
Email: chmhoan@nus.edu.sg

Dr Nayak Sanjit
Instructor
Ph.D.: University of Karlsruhe, Germany (2008),
Postdoc: Leiden University, the Netherlands (2008-2009); Marburg University, Germany
(2009-2011); University of Liverpool, UK (Marie Curie Fellowship, 2011-2013)
Email: s.nayak@nus.edu.sg

Ms THYAGARAJAN Saradha
Instructor
M.Phil., Bharathidasan University, India, 2005., M.Ed., University of Madras, 1998
M.Sc., University of Madras., 1992;
Email: chmthyag@nus.edu.sg

Dr XU Hairuo
Instructor
B. Sc., Peking University, 2003
Ph.D., National University of Singapore, 2009
Email: chmxhr@nus.edu.sg
Mr Fung Fun Man
Teaching Assistant
B.Sc. (Hons), 2010, National University of Singapore
M.Sc., 2012, National University of Singapore & Technische Universität München
Email: chmffm@nus.edu.sg

Ms Ong Yue Ying
Teaching Assistant
B.Sc. (Hons), 2005, National University of Singapore
Ph.D., National University of Singapore, in progress
Email: chmoyy@nus.edu.sg

Dr Leonard Joachim PEREIRA
Teaching Assistant
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)
Email: chmplj@nus.edu.sg

Mr Tan Wee Boon
Teaching Assistant
B. Sc. (Hons), 2005, National University of Singapore
Ph.D., National University of Singapore, in progress
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