For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Professor Thomas Wirth
School of Chemistry
Cardiff University

Title: Iodine Reagents in Synthesis and Flow Chemistry

Date: June 14, 2019 (Friday)

Time: 2:30 p.m.

Venue: Room 104, Y.C. Liang Hall

<< Abstract >>

The development of catalytic reactions based on stoichiometric reactions using iodine-based reagents will be discussed. Novel chiral reagents and catalysts allow the easy synthesis of versatile scaffolds as synthetic building blocks as well as applications towards total synthesis.

Flow chemistry as enabling technology for synthesis will be introduced. The advantages of increased mixing of biphasic reaction mixtures in flow offers great potential compared to conventional flask techniques, especially when combined with microwave irradiation, sonication or phase transfer catalysis. Metal-catalyzed sequences can also be performed advantageously in biphasic systems. Chemistry with hazardous compounds and the development of a microreactor for electrochemistry will be discussed.

Thomas Wirth is professor of organic chemistry at Cardiff University. After studying chemistry in Bonn/Germany and at the Technical University of Berlin/Germany, he obtained his PhD in 1992 with Professor S. Blechert. After a postdoctoral stay with Professor K. Fuji at Kyoto University a JSPS fellow, he started his independent research at the University of Basel/Switzerland. In the group of Professor B. Giese he obtained his habilitation on stereoselective oxidation reactions supported by various scholarships before taking up his current position at Cardiff University in 2000. He was invited as a visiting professor to a number of places including the University of Toronto/Canada (1999), Chuo University in Tokyo, Osaka University, Osaka Prefecture University and with a JSPS fellowship to Kyoto University (2012). He was awarded the Werner-Prize from the New Swiss Chemical Society (2000), the Furusato award from JSPS London (2013) and recently the Wolfson Research Merit Award from the Royal Society and the Bader Award from the Royal Society of Chemistry (2016). In 2016 he was elected as a fellow of The Learned Society of Wales. His main interests of research concern stereoselective electrophilic reactions, oxidative transformations with hypervalent iodine reagents including mechanistic investigations and organic synthesis performed in microreactors.

ALL ARE WELCOME

Contact Person:
Prof. Y.Y. Yeung

For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Professor Rebecca R. Pompano
Department of Chemistry and Biomedical Engineering
University of Virginia

Title: Bioanalytical chemistry in living tissue

Date: June 19, 2019 (Wednesday)

Time: 10:30 a.m.

Venue: Room 106, Y.C. Liang Hall

< Abstract >

The overarching goal of the Pompano laboratory is to develop bioanalytical methods to see where and when cells communicate with each other during an immune response. To achieve this goal, we combine microfluidics with live tissue samples and novel assays of tissue chemistry. In this talk, I will describe the development of two microfluidic devices: one to deliver drugs locally to live tissue, and one to connect two tissues together to model tumor-induced immunosuppression. I will also describe our progress in detecting the activity of cells and proteins in the living tissue microenvironment, which is a fascinating application of analytical chemistry. By combining these tools with live fluorescence microscopy, we will be able watch cells and tissues as they interact during immunity and inflammation, bringing quantitative molecular stimulation and analysis to problems of chronic inflammatory diseases.

Biography:

Prof. Rebecca Pompano is an Assistant Professor in the Departments of Chemistry and Biomedical Engineering at the University of Virginia. She completed a BS in Chemistry at the University of Richmond (2005) and a PhD (2011) at the University of Chicago. Her graduate work focused on developing microfluidic devices to manipulate complex biological systems. In her postdoc, she led a collaboration at the interface of biomaterials engineering and immunology to develop non-inflammatory vaccines from chemically-defined nanoparticles. Since 2014, she has been a faculty member at UVA, where her research interests center on developing microfluidic and chemical assays to unravel the complexity of the immune response. She has received an Individual Biomedical Research Award from The Hartwell Foundation, a Careers in Immunology Fellowship from the American Association of Immunologists, and the national Starter Grant Award from the Society of Analytical Chemists of Pittsburgh. Recently, her lab was awarded an NIH R01 to develop hybrids of microfluidics and lymph node tissue to study inflammation. She is also active in advocating for continued funding for education and biomedical research on Capitol Hill.

ALL ARE WELCOME

Contact Person:
Prof. Bo Zheng

For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Professor Xiaoling Wei
State Key Laboratory of Transducer Technology
Shanghai Institute of Microsystem and Information Technology
Chinese Academy of Sciences

Title: Decoding Brain Signals Based on Ultra-Flexible Bioelectronics

Date: June 20, 2019 (Thursday)

Time: 4:30 p.m.

Venue: Room G03, Y.C. Liang Hall

< Abstract >

The ability to reliably record and track an ensemble of neighboring neurons over months and longer are of great importance to both basic and clinical neuroscience. Implanted neural electrodes provide one of the most important neuro-techniques that are able to direct record individual neuron electrical signals in the living brain. However, their recording stability and efficacy is often compromised by the instability of the tissue-electrodes interface. Ultra-flexible, cellular-dimensioned neural electrodes have recently demonstrated seamless integration with brain tissue and reliable recording of individual neurons for several months. In order to have complete mapping of neural activity, the ability to individually address densely packed neurons are required, which presents a great challenge. With novel substrate-less design and advanced fabrication, we have achieved unprecedented small dimensions probes which open up new opportunities for high-density neural recording by overcoming current physical limits in implanted neural electrodes. The as-demonstrated neural electrodes are expected to fundamentally advance both basic and applied neuroscience, as well as lead to substantial improvement in brain-computer interface that could be applied to neuroprosthetics.

Prof. Wei received his B.Eng. degree in 2008 from the Department of Polymer Science and Engineering, the University of Science and Technology of China and PhD degree in 2013 from the Department of Chemistry, the Chinese University of Hong Kong. After one more year as a postdoctoral associate in the Hong Kong Polytechnic University, Prof. Wei carried out his postdoctoral research (2014/11-2018/08) in Department of Biomedical Engineering, the University of Texas at Austin (USA). Since September 2018, Prof. Wei moved to Shanghai Institute of Microsystem and Information Technology, the Chinese Academy of Sciences and has been awarded "CAS Hundred-Talent". Prof. Wei has authored and co-authored over 20 peer reviewed scientific articles, including *Science Advances, Advanced Science, Nano Letters, ACS Nano Small* etc. He has done a lot of work related to nano-bio interface, especially research in neural interface.

ALL ARE WELCOME

Contact Person:
Prof. To Ngai

For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Professor Lei Zhu
Department of Macromolecular and Chemical Science and Engineering
Case Western Reserve University

Title: Polymer Brush-Grafted Silica Nanoparticles

Date: June 21, 2019 (Friday)

Time: 10:30 a.m.

Venue: Room 106, Y.C. Liang Hall

< Abstract >

In this presentation, we will introduce our recent study on self-assembled morphology of mixed homopolymer brushes grafted on silica nanoparticles. This is a collaborative effort among computer simulation, polymer synthesis, and morphology characterization. From computer simulation, a variety of intriguing self-assembled morphologies are predicted. Using sequential surface initiated and controlled free radical polymerization, mixed poly(*tert*-butyl acrylate) (P*t*BA) and polystyrene (PS) homopolymer brushes are successfully grafted from silica nanoparticles. Due to strong phase segregation between P*t*BA and PS, microphase separated morphologies are observed and are dependent upon grafting density, brush molecular weight and disparity, and silica particle size. In particular, three-dimensional (3D) transmission electron microscopy (TEM) is used to characterize the self-assembled morphology. With proper modification to our silica nanoparticles, we anticipate that polymer hairy nanoparticles will find great potential in practical applications.

Professor Zhu received his B.S. degree in Materials Chemistry in 1993 and M.S. degree in Polymer Chemistry and Physics in 1996 from Fudan University. He received his Ph.D. degree in Polymer Science from University of Akron in 2000. After two-year post-doctoral experience at the Maurice Morton Institute, University of Akron, he joint Institute of Materials Science and Department of Chemical, Materials and Biomolecular Engineering at University of Connecticut, as an assistant professor. In 2007, he was promoted to associate professor with tenure. In 2009, he moved to Department of Macromolecular Science and Engineering at Case Western Reserve University as an Associate Professor. In 2013, he was promoted to full Professor. His research interests include high k dielectric and ferroelectric polymers for advanced electrical applications, polymer nanocomposites, and polymer multilayer films. He is recipient of NSF Career Award, 3M Non-tenured Faculty Award, DuPont Young Professor Award, and Rogers Teaching Excellence Award. He is author and co-author of 174 refereed journal publications and 5 book chapters. He delivered over 175 invited talks and 45 contributed presentations, and his total citation is over 8200 times with an *h*-index of 51 (Google Scholar).

ALL ARE WELCOME

Contact Person:
Prof. To Ngai

For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

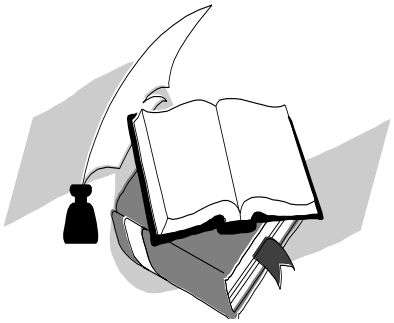
Speaker: Professor Zhaohui Wang
Department of Chemistry
Tsinghua University

Title: Nano-Carbon Imides: Precise Synthesis and Applications

Date: June 21, 2019 (Friday)

Time: 2:30 p.m.

Venue: Room 104
Y.C. Liang Hall



ALL ARE WELCOME

Contact Person:
Prof. Qian Miao

For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Professor Chris Le
Director, Analytical and Environmental Toxicology Division
University of Alberta, Canada

Title: Bioanalytical development enabling studies of arsenic health effects

Date: June 26, 2019 (Wednesday)

Time: 10:30 a.m.

Venue: Room 104
Y.C. Liang Hall

ALL ARE WELCOME

Contact Person:
Prof. Jimmy Yu

For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

Speaker: Professor Xianjin Xiao
Institute of Reproductive Health, Tongji Medical College
Huazhong University of Science and Technology

Title: Thermodynamics and kinetics guided DNA probe design for uniformly sensitive and specific DNA hybridization without optimization

<< Abstract >>

Sensitive and specific DNA hybridization is essential and fundamental for nucleic acid chemistry. Competitive composition of probe and blocker has been the most adopted probe design for its relatively high sensitivity and specificity. However, there exists an intrinsic inverse correlation between sensitivity and specificity of the competitive probe system, which led to labour-intensive optimization of the sequence design and reaction conditions to achieve a balanced performance. Herein, we have constructed a complete theoretical model for competitive DNA hybridization. Through the model, we, for the first time, disclosed that it was the thermodynamic inverse and the kinetic traps that led to the inverse correlation between sensitivity and specificity. Guided by the thermodynamics and kinetics, we invented a novel probe design approach based on holliday junction branch migration.

Both the theoretical calculations and experimental results demonstrated that the novel probe system broke up the intrinsic inverse correlation between sensitivity and specificity. Using the method, we discriminated the wild-type DNAs and mutant-type DNAs of 16 hot-pot mutation loci in human genome under uniform conditions, without any optimization at all.

The discrimination factors were all above 140. As a demonstration of the clinical practicability, we developed probe systems that detected mutations in human genomic DNA extracted from ovarian cancer patients with a detection limit of 0.1%. Scientifically, our work greatly deepened our understanding on the thermodynamics and kinetics of DNA hybridization, which would benefit various research fields such as DNA nanotechnology. And we anticipate that the proposed approach would be widely adopted in DNA probe based assays.

Date: June 27, 2019 (Thursday)

Time: 2:30 p.m.

Venue: Room G06
Y.C. Liang Hall

ALL ARE WELCOME

Contact Person:
Prof. Bo Zheng

For favour of posting

The Chinese University of Hong Kong
Department of Chemistry
Research Seminar Series

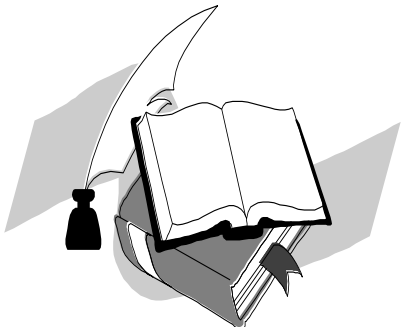
Speaker: Professor Zhixiang Yu
College of Chemistry
Peking University

Title: Proton Transfer Mechanisms and Developing Ring Formation Reactions

Date: June 28, 2019 (Friday)

Time: 2:30 p.m.

Venue: Room 104
Y.C. Liang Hall



ALL ARE WELCOME

Contact Person:
Prof. Y.Y. Yeung