

Chem Symposium

Wednesday the 18th of March 2018
Bob Champion Research and Education Building - 0.21

Chem

ThermoFisher
S C I E N T I F I C

13:00 – Symposium welcome by **Dr Robert D. Eagling** (Chem - Editor-in-Chief)

13:10 – **Prof. Steve P. Marsden**

University of Leeds

Taking Control: New Tools to Explore Medicinally-Relevant Chemical Space

The impact of the molecular properties of screening compounds on the success rate of derived drug candidates is increasingly well understood, yet the chemistry widely adopted in discovery laboratories and chemical suppliers often leads to a divergence from ideal properties. In this talk, some recent innovations in methods to produce high-quality screening compounds with well-controlled molecular properties will be discussed. This will include applications of novel chemistry (e.g. C-H activation, oxidative dearomatisation) in providing scaffolds to the European Lead Factory project, as well as platform approaches which allow for highly efficient generation of diverse 3D scaffolds from small numbers of building blocks. Applications in fragment-based screening will be described.

14:05 – **Dr Allan J. B. Watson**

University of St. Andrews

Mechanism as a tool for reaction discovery

Catalytic C-N bond forming reactions are hugely important for synthesis in academia and industry. Organoboron compounds are some of the most widely used reagents in these processes. This talk will discuss some published and unpublished work focused on the formation of C-N bond using organoboron compounds and Cu catalysis, with an emphasis on mechanistic understanding.

15:00 – Coffee break

15:30 – **Prof. M. Carmen Galan**

University of Bristol

Synthetic Glyco-Tools for Biological Research

O-Glycosylation is a ubiquitous post-translational modification that is highly dynamic and responsive to cellular stimuli through the action of the cycling enzymes. Expression of specific O-glycans is linked to changes in gene expression in, for example, inflammatory bowel disease, cystic fibrosis and several types of cancer.

Glycan coated-nanoparticles constitute a good bio-mimetic model of carbohydrate presentation at the cell surface and provide a powerful tool to screen for protein carbohydrate interactions and consequently for the identification of carbohydrate receptors or ligands associated with many inter- and intracellular recognition processes associated to disease. In order to develop and use these glyco-tools for biomedical applications, it is of the utmost importance to have access to structurally defined oligosaccharide-based probes. In recent years, our group has developed stereoselective catalytic methods for the synthesis of oligosaccharides. In parallel, the group has also prepared mono- and multivalent O-glycan probes for the screening of O-glycosylation-linked interactions in live cells. Herein, we will report our latest developments on the use of transition metal catalysis in oligosaccharide synthesis and their application to the synthesis of biologically relevant targets, such as mucin type O-glycans. Moreover, we will also discuss our more recent results on the use of mucin-type glycan-coated nanoparticles for live-imaging of cancer cells.

16:25 – Prof. Peter H. Seeberger

Max-Planck Institute for Colloids and Interfaces

Preventing and Fighting Infectious Diseases: Carbohydrate Vaccines and Drugs Made in Flow

Most pathogens including bacteria, fungi, viruses and protozoa carry unique glycans on their surface. Currently, several vaccines against bacteria are marketed very successfully. Since many pathogens cannot be cultured and the isolation of pure oligosaccharides is extremely difficult, synthetic oligosaccharide antigens provide now a viable alternative. The automated synthesis platform, has been commercialized. The quality control of synthetic oligosaccharides by ion mobility mass spectrometry (IM-MS) is fast and extremely sensitive. Currently, the laboratory is pursuing the development of several semi- and fully synthetic carbohydrate vaccines against severe bacterial infections, including multi-resistant hospital acquired infections. In addition to their function as antigens, synthetic oligosaccharides serve as tools to create monoclonal antibodies, and to establish glycan microarrays to map vaccine epitopes. Diagnostic and preventive approaches against a host of bacteria, fungi, and parasites are being pursued.

In recent years continuous flow systems have become increasingly interesting to practitioners of synthetic chemistry. Described is the use of continuous flow systems to produce drug substances and other chemicals via multi step reactions including continuous purification. The anti-malaria drug artemisinin and its derivatives as well as other life-saving drugs are used as examples.

17:25 – Symposium closing remarks

17:30 – Drinks reception