MULTI-DIMENSIONAL CHROMATOGRAPHY

29TH OCTOBER 2019

ChromSoc
The Chromatographic Society - Founded 1956

Jealott's Hill International Research Centre

syngenta

Jealott's Hill International Research Centre
Bracknell, Berkshire
RG42 6EY, United Kingdom

A one-day symposium that explores the latest techniques in multi-dimensional chromatography.

Leading specialists from industry and academia will explain how they apply the latest 2-D techniques to achieve very difficult separations in the liquid, supercritical fluid, and gas phases.

Instrumentation and consumables will be displayed in a comprehensive supporting exhibition from relevant manufacturers.

INVITED LECTURE PRESENTATIONS

"Development of two-dimensional high-performance liquid-chromatography for the separation and characterisation of therapeutic oligonucleotides and associated manufacturing impurities" - Christina J Vanhinsbergh (Uni Sheffield)

“The Investigation of 2D Separation Techniques for the Analysis of Agrochemical Formulations and Co-formulants” - Pablo Navarro (Syngenta, Jealott’s Hill, UK)

“2D-LC coupled with radio-detection: applications for chiral agrochemical analysis” - Dr Mark Garrod (Syngenta, Jealott’s Hill, UK)

“Lecture Title to be announced” - Jeorg Weber (Syngenta, Münchwilen, Switzerland)

“Multi-dimensional liquid chromatography: from small molecules to large particles and from method development to data analysis” - Bob Pirok (Van ‘t Hoff Institute for Molecular Sciences University of Amsterdam)

Lecturers and Exhibitors will be updated and timings and abstracts added to the programme as they are received.

REGISTRATION

The Chromatographic Society
SAS Event & Association Management
The Old George Brewery
Rollestone Street
Salisbury SP1 1DX UK
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Stephne Graham: steph@sasevents.co.uk

Event Registration: registration@sasevents.co.uk

Delegate Admission Prices

Member of the Chromatographic Society or one of its affiliated societies

(BMSS, ELRIG or RSC) - £150 + VAT = £180

Non-member rate - £180 + VAT = £216

Bona fide student/Retired rate £75 + VAT = £90

CHROMSOC Industrial and student bursaries are available, for more information and to apply, visit our website.
http://www.chromsoc.com/academic-support.aspx

Please find below the link to register online for the meeting.

If you are attending the conference as a paying delegate, an exhibitor,

or as a complimentary delegate (Chromatographic Society Committee, organiser or invited speaker)

please CLICK HERE to register.

Please note that Syngenta employee scientists are admitted free of charge to lectures and exhibition.

The Chromatographic Society thanks Dr David Portwood and Syngenta management for inviting us to run this symposium at their site at Jealott's Hill.

Refreshments will be provided throughout the day for paying delegates, exhibitors and speakers.

SPONSORSHIP AND EXHIBITION COSTS

GOLD LEVEL SPONSORSHIP - £1750 + VAT = £2100

This includes a table top exhibition stand plus 20 mins lecture time integrated into the programme and 3 free delegate admission places.

SILVER LEVEL SPONSORSHIP - £1250 + VAT = £1500

This includes a table top exhibition stand plus 10 mins lecture time integrated into the programme and 2 free delegate admission places.

BRONZE LEVEL SPONSORSHIP - £750 plus VAT = £900

This includes a table top exhibition stand and 1 free delegate admission place.

SPEAKERS & EXHIBITORS:

To discuss your sponsorship level and/or your lecture content please contact

Dr. Chris Bevan on chris.anne.bevan@gmail.com

To book your exhibition stand and sponsorship please click on the registration link HERE.

Multidimensional Liquid Chromatography: a growing addition to separation science technology.

By Christina Jayne Vanhinsbergh, PhD researcher in 2D-LC, University of Sheffield.

Many industries rely heavily on liquid chromatographic separations for the analysis of molecular products, active pharmaceutical ingredients, reaction components and toxic substances. Improvements in stationary phase chemistry, along with reduction in particle size has helped to increase selectivity and peak capacity dramatically over the past decade. A drawback for many separations, however, is that molecular species analysed today are structurally and physicochemically closely related. This, along with biased separation mechanisms, can lead to co-elution or reduced resolution of analytes.

Multidimensional chromatography couples orthogonal modes of separations to overcome challenging analyses. Orthogonal separations can pre-treat samples, simplify complex chromatography, as well as resolve co-eluting species. The technique is developing into both comprehensive and selective approaches, suited to the analytical drivers of separation.

Multidimensional liquid chromatography also has the potential for reducing reliance on technologies requiring highly skilled analysts, such as mass spectrometry - as separation of critical species reduces the requirement for targeted mass detection over a peak. In workflows where mass spectrometry is utilised, increases in peak capacity and resolution can improve quantitative analysis.

Multidimensional liquid chromatography presents challenges to the analyst, which require a detailed understanding of the mobile and stationary phase chemistries, potential analyte interactions and what factors can detrimentally effect separation (such as miscibility of mobile phases, dilution and sensitivity). The challenges described, indicate that optimisation of the technique must be approached with due diligence to achieve the benefits of peak capacities ranging into the thousands. Multidimensional liquid chromatography could be applied for food, cosmetic, pharmaceutical, chemical and environmental analysis. A search for available literature documents evidence of its growing use in aforementioned industries, as is the growing number of chromatographic conferences dedicating presentation space to

researchers in the field.

Multi-dimensional liquid chromatography: from small molecules to large particles and from method development to data analysis

By Dr. Bob Pirok (Van 't Hoff Institute for Molecular Sciences University of Amsterdam)

In the MANIAC project, completely different and (seemingly) incompatible separation mechanisms are compared into a single highly efficient and extensively optimized instrument. Hence the name "Making Analytically Incompatible Approaches Compatible". In MANIAC, various chemical, physical and microbial processes are integrated with (multi-dimensional) separation systems. Amongst the investigated applications is the characterization of complex polymeric nanoparticles encountered in coating formulations and drug-delivery systems. These complex samples feature a multitude of sample dimensions, such as the particle-size distribution, the surface composition and charge, and the molecular weight and chemical composition of the constituting molecules including its active-ingredient if applicable. A successful technique for the separation of complex mixtures is comprehensive two-dimensional liquid chromatography (LC×LC).

Comprehensive two-dimensional liquid chromatography is indispensable for the separation of complex mixtures. In principle, the development of an LC×LC method requires establishing two separation dimensions with vastly different ("orthogonal") selectivities. However, with the advent of state-of-the-art instrumentation for LC×LC, the number of options to realize and optimize LC×LC separations is increasing dramatically. Advanced modulation interfaces have significantly reduced the threats of solvent incompatibility and limited detector sensitivity in the comprehensive mode (LC×LC). However, these developments are accompanied by an increase in the complexity of the system and, thus, the time required for method development.

We recently demonstrated a proof-of-principle MANIAC system, which combined a separation of particles in aqueous hydrodynamic chromatography with a fast separation of the constituting polymers by organic size-exclusion chromatography. The developed method featured a novel implementation of intermediate sample transformation and now has been expanded to allow even

hydrophilic and charged particles to be modulated. In addition, we focus on the use of capillary and chip-based microreactors to improve the applicability and flexibility of the overall potential of LC×LC separations towards drug-delivery particles.

In this presentation, these and other developed methods for large and small molecules will be shown.

Moreover, great attention will be given to the feasibility of 2D-LC as a technique in the industrial routine lab. The development and application of method-development and data-analysis tools to facilitate easy and flexible use of 2D-LC will be demonstrated.