

Mass Spectrometry Focus



Mass Spectrometry for a Changing World

As the Universities of Cardiff and Swansea have long held a renowned position in the world of Mass Spectroscopy via their output of well known academics and post graduate students, it seemed appropriate that the nomadic 31st BMSS 3 day meeting should find its way to the Cardiff City Hall (September 5-8th). Dr John Langley, the outgoing Chairman of the BMSS, noted in his letter to delegates that the fact that this constituted a quantum shift away from the usual academic campus environments which had previously hosted the BMSS meeting, this movement was driven by feedback from delegates and exhibitors, the organisers requirements for venue capabilities and 'the crippling costs imposed by Universities'. To further reinforce the changes this year, delegates were encouraged to book their own accommodation, a reflection on the University offered options from the past.

Perhaps the most intriguing contributors were the bookmakers (and punters) who were associated with the Racing Pigs event, the less said about which, the better.

Author Details:

Bernie Monaghan,
Contributing Editor for Separation
Science and Spectroscopy,
International Labmate Ltd
Email: bernie@intlabbmate.com



Figure 1. The venue – Cardiff City Hall

Most importantly of all, feedback from delegates had indicated that a change in the structure of the meeting would be welcomed leading to a revamped format that reflected the structure of the current world of Mass Spectrometry. For many delegates the social programme is the keystone of the meeting and this was kept as intact as possible with various off-site venues hosting the delegates and exhibitors as they continued to network. Unfortunately the usual generous sponsorship of the exhibitors as seen at York two years ago was not forthcoming, maybe a sign of the economic climate, but the organisers did manage to find sponsors to keep the events alive.

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Figure 2. Pig Racing Underway

Activity	Sponsor
Sunday Evening Social Event	Brains Brewery
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Exhibitor Wine Reception	BMSS + The Racing Pigs
Barber/Bardoli Prizes (best young person's poster and oral presentation)	
Barber Prize	Pfizer Ltd
Bardoli Prize	Syngenta

Figure 3. Meeting Sponsors

135 Posters, over 300 delegates, 71 oral presentations and 11 vendor workshops – that's the statistics out of the way.

STRUCTURE AND CONTENT OF THE MEETING – NOT AN –OMICS IN THE TITLES

Changes, based on delegate feedback were taken on-board by the organisers for this meeting and followed some old structure but also incorporated some new and innovative timings. Each of the 3 days would start with an invited presentation (Marcolli Lecture and Keynote Lectures) by eminent speakers who would give thoughts on a variety of

topics. This would be followed by a series of 20 minute oral presentations by 11 of the 'Next Generation' of Mass Spectroscopists who were all candidates for the Barber prize for the best oral presentation. The criteria for the award, and that of its sister award, the Bardoli (posters), is that all candidates must be BMSS members and aged under 27 on the 1st September 2010 and engaged on full or part time PhD in MS. Lunch was served in the poster area, exhibits were perused and then three parallel sessions commenced. We had for the first day one session on MS in Food/Environmental area, one on MS in Clinical Applications and one featuring 10 minute presentations by 12 of the exhibitors. The Tuesday session mirrored the Monday but with sessions on Biological Analysis for MS and one for Separation Science in MS complimented again by vendor presentations. Wednesday was devoted to non-commercial presentations with a Keynote lecture followed by 3 parallel sessions on MS in Surface/Nano Analysis, Instrument Developments and one on MS in Biological Analysis. The meeting concluded with the Chairs Invited Lecture.

This was a radically different way of structuring a meeting particularly for the vendors and will either be a blueprint for future meetings or consigned to the recycle bin. Hopefully it will be a hybrid leaning towards the former.

ORAL PRESENTATIONS

The Marcolli Lecture, which kicked off the meeting, was this year delivered by Professor Carol Robinson from the University of Oxford who spoke on 'Mass Spectrometry and its role in Structural Biology'. She spoke about recent developments in MS, which have added further dimension to the study of protein complexes that of their collision cross-section. Using ion-mobility MS her group has been able to add spatial restraints to the models to existing models thus validating models with measurements of collision cross section. Also she has very recently developed the means to preserve intact membrane complexes in the gas phase. This allows the group to establish lipid and nucleotide binding and to define the stoichiometry and post translational modifications within the intact transmembrane regions of a number of complexes.

The Keynote lecture for the MS in Environmental and Food Analysis session was given by David Cook (University of Nottingham) who spoke on 'Applications of on-line and rapid mass spectrometry techniques to study flavour development during malting and brewing processes.' This was followed by six lectures from delegates on that topic. Similarly and concurrently a Keynote lecture for the Clinical Analysis session was given by Brian Keevil (University Hospital South Manchester), entitled 'LC-MS/MS Analysis of Testosterone in Clinical Laboratories', again followed by delegate presentations.

The Plenary lecture, which opened the proceedings on the second day, was given by Professor Alison Ashcroft of the University of Leeds who spoke on 'Using Ion Mobility Spectrometry - MS to Unravel Biomolecular Assembly'. Professor Ashcroft explained how mapping of viral capsid pathways is key to anti-viral therapeutic development. Non-covalently bound protein-nucleotide intermediates have been characterised in real time during the assembly of the MS2 bacteriophage capsid from its coat protein. The stoichiometry of these species was determined by mass measurements and by using different nucleotides for the assembly process. Modelling, in conjunction with cross-section measurements, has provided new structural insights into virus assembly intermediates and competing pathways. The Keynote lectures for the afternoon session were given by Brian Smith who spoke on the topic of 'Use of MS in Clinical Drugs of Abuse Testing' and Martin Larsen (University of Southern Denmark) presented on 'Modification specific proteomics: the identification and quantization of phosphorylated proteins and sialylated glycoprotein'. Both sessions then had six delegates presentations to give more in-depth coverage of Separation Science and Biological Analysis.

Vendor	Talk
AB Sciex	AB Sciex Triple TOF 5600 System: High Performance for Qualitative and Quantitative LC/MS/MS
Advion Biosciences	Liquid Extraction Surface Analysis (LESA) for direct sampling of tissue, TLC Plates and Dried Blood Spots
ARC Sciences	Combining electrochemistry with MS-Oxidation, Oxidation, Oxidation
CovalX	Protein Interaction Analysis by High Mass MALDI MS
Fortis Technologies	Does UHPLC make us more productive?
Jaytee Bioscience	Introducing the Evolution MS/MS System
KR Analytical	Extending the capability of the DART ion source.
Medic Wave	Using MBS Software in label free Quantitative Proteomics: analytical validation and biomarker discovery using LC/MS DATA
Perkin Elmer	Advantages of a new field free APCI ion source in LCMS applications.
Quotient Bioresearch	Answers through innovation: MS within Quotient Bioresearch
Sigma -Aldrich	Optimisation of LCMS conditions for High Efficiency Peptide Separations
Thermo Fisher Scientific	Complete workflow solutions to harness the power of MS

Figure 4. Vendor presentations, Monday 6th September

Vendor	Talk
ACD	ACD/Labs Expert software for the Expanding World of Mass Spectrometry
Agilent	Sub-attomole detection limits using enhanced ion-funnel technology on a triple quadrupole mass spectrometer
Bruker	MS imaging from discovery to reality –what's important
Dionex	Simplifying workflows for peptide separations with Nano LC/MS
Ionoptika	A new time of flight SIMS instrument for 3D imaging and analysis
Jeol	Recent advances in JEOL MS products – Spiral ToF
LECO	New additions to LECO ChromaToF software: Variable modulation times and the statistical compare package
MS Vision	Teaching Q-ToF new tricks – Introducing an ultra high mass upgrade for Q-ToF instruments
Presearch	LDTD-MS/MS for in vitro and in vivo assays; an overview
SS Scientific	Bespoke MS Solutions at your fingertips
Waters	Stepping up to the challenge

Figure 5. Vendor presentations, Tuesday 7th September

The final day opened with a Plenary lecture given by Professor John Vickerman (University of Manchester) on the subject of 'Progress in Matrix-free Mass Spectra 2D and 3D Imaging Of Bio-Systems With Good Spatial Resolution'. This was followed by 3 Plenary lectures given by Brigit Hagenhoff (Tascon GmbH) on 'ToF-SIMS: A Fine Tuned Comb For Surfaces', 'Static And Dynamic Electric Field Homogeneity Limitations To The Performance of FTICR Mass Spectrometer' by Peter O'Connor (University Of Warwick) and 'Shape Selective Studies of Complex Systems Utilising Travelling Wave Ion Mobility Mass Spectrometry' from Jim Scrivens also University of Warwick. Delegates' oral presentations then followed in each of the three parallel sessions.

As is common at the BMSS meeting, the final presentation is that decided by the Chair of the BMSS at that time. This time John Langley had invited Dr Bob Boyd from the NRC in Canada to address the delegates on 'Mass Spectrometrists are Analytical Scientists' in which he discussed some advances in scientific understanding made by mass spectrometrists in the fields of physics, molecular biology, environmental sciences and metrology. These serious achievements were the result of combining the theory of mass spectrometry (knowing why it works even if it doesn't) with its practice (i.e. when it works but we don't know why) to create a discipline that is a merger of the two (it often doesn't work and we have no idea why not).

THE EXHIBITION

With over 50 exhibiting organisations ranging from the well known players in the instrument business through to manufacturers, CRO organisations, suppliers of ancillary and specialist products, software offerings, 3rd party Servicing companies, HPLC Column manufacturers, Specialist journals, Training and Recruitment agencies, there was certainly something there for everyone. An interesting departure was the timing of the vendor presentations to the delegates which ran alongside the 'official' presentations during the afternoon sessions on the 6th and 7th.

More information on the companies and their products can be found at <http://www.massspectrum.co.uk/cardiff-2010/pdfs/BMSS-2010-Exhibitors.pdf>

WINNERS OF THE BARBER AND BARDOLI PRIZES

The Barber Prize (best oral) went to joint winners - Martin De Cecco (Edinburgh University) and Dale Shepherd Leeds University). The Bardoli Prize (best poster) went to Salina Abdul Rahman (Edinburgh University).

BMSS 2011

The 32nd BMSS meeting will also be held in Cardiff from September 11-14th, with the promise of horse racing next year instead of the pigs.

The New Gas Analyser



Hidden Analytical introduce the new QGA compact benchtop mass spectrometer configured for continuous real-time multi-species analysis of both gases and vapours in the pressure range from 2 bar to 100mbar absolute. Applications include thermal analysis, fermentation processes, catalysis and general gas reaction studies. With mass range to 300amu and detection levels to 100ppb the system features the QGA operating program for quantitative analysis of up to 16 gases and vapours, together with an internal 10-peak spectral library and automated spectral overlap correction. Data is readily integrated in real time with external monitors including temperature, pressure and weight and with external gas monitors for applications such as CO monitoring in the presence of N₂. The innovative APSI mode reduces molecular fragmentation by soft ionisation to refine analysis of complex organic molecules and enables selective ionisation of many gas species by selection of specific ionisation energies - helium and deuterium at mass 4 for example.

The flexible 2M long sample interface operates to 200°C and is configured to balance sample consumption to the process requirements with sample consumption rates controllable from 1 to 16mL/min. Options include high- pressure adaptors for sample pressures to 30 bar, gas stream selectors for selection from up to 80 gas streams and hot-zone extensions for direct sampling from processes to 1000°C.

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Kinesis R&S Ltd, 9 Glen Court, Ashbourne Road, Colworth Business Park, 32 North, Cambridge CB2 3RQ, UK. Tel: 01480 47 99 47 Fax: 01480 21 21 40 Email: sales@kinesis-rss.co.uk www.kinesis-rss.co.uk



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