

focus on Mass Spectrometry & Spectroscopy

Fast Atom Bombardment (FAB) Technology Celebrates 30th Anniversary in Cardiff

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Following the 2010 3-Day BMSS meeting in Cardiff, the same venue was chosen again to host the 2011 event. As a non-university venue there were misgivings about initially making such a move for the societies major event but overall, based on the largely positive feed back from delegates that attended in 2010, the move was judged a success and hence 250 delegates (50 less than in 2010 – a sign of the times rather than the meeting content surely?) made the journey to South Wales to update themselves with 'what's hot and what's not' in the field of Mass Spectrometry.



Figure 1. The venue – Cardiff City Hall.

This year's theme was entitled 'From Atoms to Biomolecules, celebrating the technological innovations of mass spectrometry on the 30th Anniversary of Fast Atom Bombardment (FAB)'. For the uninitiated, Dr Susan Crossland (Chair of the BMSS) explained that pre-1981 mass spectrometry was the domain of analysing relatively volatile compounds. Other techniques such as Electron impact and Chemical Ionisation were the norm. FAB opened the door to the analysis of peptide, polar and ionic compound analysis although it was not an easy technique to master. Evolution of the technique as more scientists worked on the technology eventually led to MALDI, electrospray and the likes leading to techniques that allow the wide range of compounds that can be routinely analysed by MS today.

Structure and content of the meeting

Following comments made after last years meeting some enhancements were made to the structure of the sessions with a combination of Plenary, Keynote, orals (68) and manufacturers presentations (80) giving a varied series of topics for the delegates. Coupled to that were the posters (118) and exhibition interactions to be fitted in and it was a heavy 3 days to say the least. The meeting secretariat had certainly done their job to ensure quality speakers who were able to inform, excite and stimulate in equal proportions.



Figure 2. Delegates assemble in the Council Chamber prior to one of the parallel sessions.

The plenary and invited lectures were given as the first talk each day with the Maccoll Lecture being given on Monday morning by Professor Richard Evershed, the most recent Aston Medal winner, (University of Bristol) on the topic of 'Linking isotopes and molecules to the diets of our ancestors'. Tuesdays was given by Professor David Muddiman (North Carolina State) who spoke on 'Rational Biomarker Discovery and Validation using a Systems Approach'. Wednesday saw Andrew Tyler (Agiros Pharmaceuticals), speak on the topic of 'Mass Spectroscopy at



Figure 3. Dr Tyler rolls back the years.

UMIST IN 1981: When we was F.A.B.' – an eminently suitable choice since he had co-authored the original UMIST paper on FAB. Closing the proceedings with the chairs invited lecture was Professor Ron Herren (FOM Institute AMOLF) speaking on 'Imaging pathways: Looking at molecular Signals with multimodal imaging mass spectroscopy.'

Oral Presentations

The debate regarding parallel oral sessions and how to allow scientific sponsors to have the attention of the delegates has been raging on for some years with various permutations run at different meetings. This year the BMSS ran a variety of sessions covering different application areas

and established and emerging techniques. On the first day a series of orals were given under the heading of 'Next Generation', and this was followed by parallel sessions on MS in Environmental/Food analysis, Separation Science for MS and a series of Manufacturers presentations.

Day 2 followed the same schematic with parallel sessions on MS for Biological Analysis, Instrument Development and more Manufacturers talks. Day 3 ran MS in Surface/Nano analysis throughout the day alongside MS in Biological Analysis and Clinical related sessions.

The Exhibition

The exhibition was again a sell out with several new products being show cased either in Europe for the first time or onto the global market. Space does not allow a complete listing of all companies or products but some of the more intriguing ones that caught the authors eyes are mentioned below:

An interesting addition to the range of Instruments on show was the Microsaic 3500 MiD, claimed to be the first chip based molecular ion detector for HPLC. The instrument is designed to have much smaller footprint than conventional LC-MS modules and is based around the fact that all components for ion generation, mass analysis and ion transmission are micro engineered. These chip components are produced in batches on wafers using MEMS micro-fabrication techniques and may be rapidly swapped by users in a matter of minutes. Application areas are claimed as on-line reaction monitoring. Peptide and protein screening, chiral analysis and in flash and SFC analysis. (www.microsaic.com)

Perkin Elmer (www.perkinelmer.com) featured their new Clarus SQ-8 GC/MS which is claimed to 'set a new benchmark for sensitivity and stability with a unique Clarifi detector that delivers both enhanced performance and superior longevity.' The Instrument was designed to offer users flexibility in choosing the desired

sensitivity and dynamic range to suit their particular analysis. The sensitivity available also gives excellent throughput and productivity by minimising calibration requirements and reducing the need for preparation and concentration.

With its 'world leading sensitivity' the instrument can be returned to as-new performance levels with a simple, user executable, cleaning. As shown the chromatographic consistency for 1 picogram of OFN before and after running of 2,500 high matrix environmental samples is excellent.

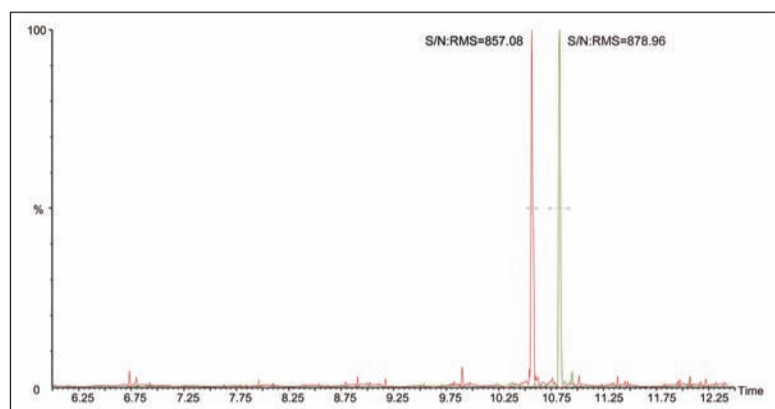


Figure 4. Cleaning works wonders.

Leco instruments featured (www.leco.com) instruments utilising the company's new High Resolution Time-of-Flight Mass Spectrometers (HRT). Available in both LC and GC configurations, these HRT systems utilise Leco's exclusive Folded Flight Path™ (FFP™) technology to provide full-range mass spectra at speeds of up to 200 spectra per second, and resolutions of up to 100,000 with mass accuracies of less than 1 ppm. The Citius LC-HRT represents a substantive innovation in High Performance Mass Spectrometers for the LCMS market. The system utilises Leco's FFP technology to provide full-range mass spectra at speeds of over 200 spectra per second, and resolutions of up to 100,000 with high-performance mass accuracy. The system provides the versatility of ESI, APCI, and DESI (desorption electrospray) ionisation sources as options to complement its high-performance MS capabilities and unchallenged dynamic range. The Pegasus GC-HRT represents the next generation of High Performance Mass Spectrometers for the GCMS market. The system also utilises Leco's Folded Flight Path FFP technology to provide full-range mass spectra at speeds of up to 200 spectra per second, and resolutions of up to 50,000 with high-performance mass accuracy.

As ever, the major suppliers of mass spectrometers were present and promoting some of their latest Instruments. Agilent (www.agilent.com/chem) showed their 7200 Q-TOF GC/MS, the company's first GC time-of-flight instrument. Designed to deliver improved chromatographic and spectral resolution from increasingly complex samples it is aimed at the environmental, sports doping and natural products research markets.

AB Sciex (www.absciex.com) heavily promoted their QTRAP 5500 system. The manufacturers claim that 'the synergy resulting from the companies (and world's) most sensitive triple quadrupole is united with the worlds most sensitive linear ion trap technology then the result is more than the sum of the parts'. The hybrid architecture offers better sensitivity and speed to allow solution-based workflows that solve problems 'beyond other manufacturers systems'. Pretty heavy claims and I suppose the end user community will be the judges ultimately of that,

The speed at which analyses are performed these days also puts pressure onto the Data Handling suites that are available. ACD/Labs (www.acdlabs.com/ixcr) are one of the companies who are specialists in producing software for deconvolution and compound recognition procedures. Their IXCR suite which was featured on the stand was designed to reduce time spent on manual interpretation, searching and validation of GC/MS spectra to conduct rapid, non-targeted analysis of water, wastewater and other environmental samples. The software is vendor neutral and supports a variety of GC/MS file formats from most major Instrument manufacturers. Also on show was the ACD/Labs Metabolite ID Suite which, as the name implies, has a specific application in mind.

The exhibition not only features instruments but also products and services that are ancillary and complimentary to the various hybrid mass spectrometry variants that are common place now including training. Specialist suppliers of HPLC Columns Hichrom (www.hichrom.com) announced that they were now offering the Cogent HPLC columns from MicroSolv Technology Corporation which are designed to be more stable and selective than regular Columns due to the unique silica hydride based particle used for the packing material. Jaytee Biosciences (www.jaytee.com) announced the range of Brezza gas generators manufactured by Claind (Italy) was now available through them. The complete range of generators for LC/MS, GC, TOC, ICP and ELSD amongst other techniques is available. An interesting product available from iBiosys, (www.ibiosys.co.uk) dealers for Spark Holland products in the UK, is the SPE-LC-MS/MS Symbiosis system which is aimed at the peptide analysis market. Simple protein precipitation including internal standard addition is all that is required thus reducing tedious and error prone extra handling steps such as liquid-liquid extraction, SPE eluate collection, evaporation, reconstitution and dilution etc. are thus avoided.

As well as the training courses run by the instrument manufacturers and BMSS short courses Crawford Scientific have now announced that all University students and staff can have access to their ChromAcademy training software (www.chromacademy.com) for a period of five years as their commitment to ensuring that a continuing flow of UK Students, versed in the basics of Mass spec theory, keep the MS flag flying high.

Winners of the Barber and Bordoli prizes

One of the major *raison d'être* of the BMSS is to ensure that students and young scientists are encouraged to share their work and attend as many meetings as possible. Student Bursaries are available and in the case of the 3-Day BMSS Annual Meeting awards, named after famous mass spectroscopy practitioners, are made, sponsored by commercial companies, for the best poster and best oral presentation. This year's winners were;

Barber Prize – sponsored by Signet (best Oral presentation) – Ross Chewer – University of Manchester

Borolo Prize – sponsored by Waters (best poster) – Laura Cole Sheffield Hallam University and Robert Smith University of Loughborough.

Aston Medal



Figure 5. Professor Robinson proudly displays the Aston Medal.

Credited with being the founding father of the British mass spectrometry industry, Francis William Aston (Nobel prize winner in Chemistry 1922) lent his name to a medal first awarded by the BMSS in 1987. The Aston Medal is the Society's prestigious scientific award, "to honour individuals deserving special recognition by reason of their outstanding contributions to knowledge in the biological, chemical, engineering, mathematical, and medical or physical sciences relating directly to mass spectrometry".

Many famous names have been recipients of the medal since then and this year's winner is a welcome addition to the distinguished list. Carol Robinson (Royal Society Research Professor and Dr Lee's Professor of Chemistry at the University of Oxford) received the

Society's Aston Medal for her globally recognised career in mass spectrometry". The award presentation was made at the Annual Conference Dinner held at the Millenium Stadium in Cardiff, home of Welsh football and rugby.

Next Year

Traditionally the BMSS 3-Day meeting is held for two consecutive years and in the third year when the IMSC held their meetings, the BMSS would not hold their major 3-Day event. However now that the IMSC has decided to run their meetings, primarily across Europe every two years, the financial implications of that decision led the BMSS to evaluate other possibilities that would smooth out their income from events. To this end, it was decided that in years when IMSC was being held that BMSS would run its Annual Meeting event around the Easter period which, although not on the scale of the 3-Day meeting, would be a notable presence in the diary of UK mass spectrometrists. The first event of this nature will be held from the 16-18th April 2012 at the Astra Zeneca site at Alderley Park, Cheshire. A copy of the flyer is shown in Figure 6.



Figure 6. Next years major BMSS event.

... and Finally

A straw poll indicated that 'ion mobility' was the hottest topic in the networking sessions and Pig# 4 continued to dominate events during the Pig racing sessions and continued its excellent form from last year.