ANALYTICAL MATTERS

ISSUE 7 – SPRING EDITION 2018

UPCOMING EVENTS

A selection of analytical events coming up in the next few months

Spring SciX
17th-20th April 2018, Glasgow
more information

RSC-NPL Symposium: Nanoparticle concentration – critical needs and state-of-the-art measurement
24th April 2018, London
more information

Emerging Analytical Professionals
11-13th May 2018, Knutsford
more information

Analytical Research Forum
20th June 2018, London
more information

AVAILABLE RESOURCES

Analytical Methods Committee Technical Briefs
Technical information on a wide range of analytical techniques, found here

RSC online CPD
Log your continuing professional development

Welcome to the seventh issue of Analytical Matters, the e-newsletter of the Analytical Division of the Royal Society of Chemistry. Our newsletter showcases the wide range of analytical science activities being run across the Royal Society of Chemistry Analytical Division by the various analytical member groups as well as linking with parts of the UK analytical community beyond our membership. Please send your feedback and any content for the next issue by May 31st by emailing the Editor here.

With my very best wishes,

Duncan Graham FRSC

President, RSC Analytical Division

EVENTS

One for the diary: Emerging Analytical Professionals 2018

Designed for early career analytical scientists, this May (11th-13th) will see the twenty-first annual Emerging Analytical Professionals Conference (EAP). The event provides the opportunity for analytical scientist from both industry and academia to present their research. This year's keynote speakers are Dr Matt Baker (Strathclyde) and Dr Bhavik Patel (Brighton), with a special evening lecture from Dr Matthew Partridge @Errantscience (Southampton) on 'Why is the world worth analyzing? A cartoon guide." Don't miss out – book your place at: www.analyticalsciencenetwork.co.uk .

A full event program, including continuing development workshops is available online on the analytical science network website.

For enquiries please email: info@analyticalsciencenetwork.co.uk

Poster deadline = 31st March 2018.

ERRANTSCIENCE LIVE TALK:

WHY IS THE WORLD AROUND US WORTH ANALYSING? - A CARTOON GUIDE

EMERGING ANALYTICAL PROFESSIONALS 2018

11 MAY- 13 MAY

BOOK HERE: HTTP://BIT.DO/EAP2018

Analytical Science Network
Supporting early career analysts

Analytical Research Forum 2018

FEATURED EVENT

The Analytical Research Forum (ARF) provides a high impact scientific meeting for the UK analytical community with both high profile speakers and opportunities for younger researchers to present their work.

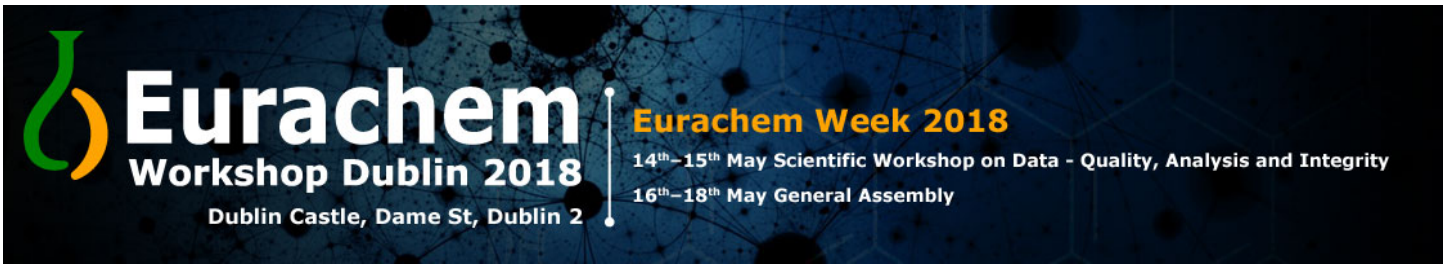
Our one day format includes keynotes and invited talks plus additional oral papers selected by the Scientific Committee from the submitted abstracts.

The flash poster session enables yet more participants to share their work in this exciting interdisciplinary meeting for the analytical science community. In addition to opportunities during lunch and refreshment breaks to view the posters and exhibition, additional networking will be possible during an evening event which end with a wine reception.

ARF 2018 is not to be missed and the Scientific Committee look forward to welcoming you to Burlington House, Piccadilly, London on 20 June. Register here.

Analytical chemistry is vitally important to the food industry, the UK's biggest manufacturing sector, and separation science contributes to its role in ensuring food is safe, authentic, nutritious and enjoyable. The RSC's Separation Science Group (SSG) and the Food Group are thus pleased to announce the second bi-annual, one-day meeting on '**Advances in the Chemical Analysis of Food**'. The meeting will be held at **Burlington House in London, on the 27th of April (2018)**. Confirmed speakers include Prof Andy Taylor (Flavometrix/University of Nottingham), Dr Dara Fitzpatrick (University College Cork), Prof John Dean (Northumbria University), Dr James Donarski (Fera UK) and the SSG's own Prof John Langley (University of Southampton).

Special registration rates are available for RSC members and students, and a limited number of travel bursaries will be granted for undergraduate and postgraduate students. Registration details can be found here. Registration closes on the 26th of April, and places are limited, so hurry!



Data – Quality, Analysis and Integrity Workshop:

Eurachem is a network of organisations in Europe having the objective of establishing a system for the international traceability of chemical measurements and the promotion of good quality practices.

This workshop will be directly relevant to everyone involved in state, semi-state, pharmaceutical, analytical, medical, environmental and academic sectors. Register and find more information here.

AWARDS AND RECOGNITION

Charles N. Reilley Award at Pittcon

Professor Patrick Unwin

Congratulations to Professor Patrick Unwin from the University of Warwick who received the 2018 Charles N. Reilley Award at Pittcon in Orlando in February. The Award recognises his outstanding research contributions in electroanalytical chemistry. Pat was the 35th winner of the Award and the first person from the UK to receive it. The Award is given in memory of the renowned US analytical chemist Charles N. Reilley and celebrates scientists whose work advances fundamental understanding in electroanalytical science over empiricism.

Pat's research group have made spectacular advances in instrumental electrochemistry in the past few years, developing innovative electrochemical imaging probes to visualise interfacial dynamic processes of wide applicability, from electrocatalysts to living cells.

Analytical Chemistry's Virtual Issue Highlighting Selected Women Analytical Chemists

Aligning with the international day for women and girls in science, the journal Analytical Chemistry created a virtual issue, aiming to highlight excellence among women analytical chemists and mentor the next generation of scientists to enhance diversity. Find the issue here. The journal highlighted some of the work by female analytical scientists around the world including:

- Mary Wirth's use of slip flow in sub-micrometer particles to provide higher efficiency HPLC separations (10.1021/ac504683d).
- Ying Ge's development of a serial size exclusion chromatography strategy to enable high-resolution size-based fractionation of intact proteins from complex mixtures (10.1021/acs.analchem.7b00380).
- Julie Macpherson's development of diamond electrodes with sp^2 regions for improved pH sensor performance (10.1021/acs.analchem.5b03732)
- Maryanne Collinson's potentiometric measurements made in subnanoliter droplets (10.1021/acs.analchem.5b04668).
- Bhavya Sharma's use of spatially offset Raman detection of model neurochemicals through the skull (10.1021/acs.analchem.7b00985).
- Karen Fauld's description of special considerations needed when using multiple extrinsic surface-enhanced Raman scattering labels in assays (10.1021/acs.analchem.5b02776).
- Erin Carlson describing natural product structure elucidation using collision induced dissociation fragmentation mechanisms (10.1021/acs.analchem.5b01543).

ANALYTICAL DIVISION CALL – GET INVOLVED!

Raising the profile of analytical science through national public outreach

It is of great importance to tackle the challenge of raising the profile of analytical science to the general public, within schools, higher education and in universities.

The impact and importance of analytical science is immense and is exposed to the public more than they ever realise as the examples are not always linked back to the innovative science the analytical community deliver.

Be it drugs in sport, the *i*-knife, the smell of Parkinson's disease, planetary landers and no doubt the forensic investigation recent events in Salisbury, analytical science is high profile, regularly in the news, engaging and inspirational.

Therefore, AD Council has a clear desire to enhance the profile and also enable members of the UK and global analytical community to get involved and be the advocates of analytical science.

AD Council is in the process of developing a package of materials that can be used in outreach activities to demonstrate the impact, innovation and importance of analytical science.

The material will be coordinated by RSC AD Council and will be made available to the broader analytical science community to encourage and support individual outreach activities.

Therefore, as AD Council can provide the materials what do we need from you?

We would like you all to get out there to your local schools, public outreach events such as sci-bars, Pint of Science events and science fairs and deliver this engaging, inspiring and fun material.

Let's inspire the next generation of analytical scientists and inform the public on what we do!

If you would like further information or even better, want to get involved, please contact Tony Bristow.

REGISTER FOR APACT '18

APACT 18 is an open forum for the presentation and discussion of recent scientific and engineering advances relevant to process analytics and control technologies. Plenary and keynote speakers (https://apact.co.uk/speakers) will report recent advances in the development and application of novel process analytics, predictive modelling and control technologies, and will review the benefits achieved. Following the success of previous conferences, APACT 18 will feature plenary and parallel sessions on topics crucial to the achievement of manufacturing excellence.

To register for APACT 18, please click here:
http://onlineshop.strath.ac.uk/conferences-and-events/science-faculty/pure-and-applied-chemistry/apact-18

Further details about our **pre-conference courses, exhibition and sponsorship opportunities** can be found at: www.apact.co.uk

EVENTS

The Analytical Division's Schools' Analyst Competition 2018 begins!

An example of outreach activities run by the Analytical Division, the annual Schools' Analyst Competition, is underway for 2018. The competition involves first year sixth form students studying AS level Chemistry or equivalent (i.e. Year 12), investigating different areas of the analytical sciences.

The Analytical Division's Regions heats, are held in early spring each year, to select a team or teams, to go through to the National Final (held in June). Each team comprises three students (with an accompanying teacher). The Final of the Competition sees around 20 teams competing for a glass engraved trophy. First, Second and Third placed teams in the National Final receive prizes of £3000, £2000 and £1000, respectively.

Teams are required to undertake various practical analytical determinations based on problems relevant to industrial or social needs. These are judged for skill, understanding and accuracy and are intended to promote teamwork and safety in the laboratory. Each competition aims to provide some tasks, which are relatively familiar to the students such as titrations and others, which are likely to be unfamiliar, such as chromatographic separations or atomic and molecular spectroscopy. In this way, it is hoped that the competitors will learn new skills, as well as demonstrate their existing knowledge, skills and aptitude for analytical science.

Current locations of the regional heats in 2018 are:

- **East Anglia Region:** Hertfordshire & University of East Anglia.
- **Midlands Region:** Nottingham University, University of Warwick & Wolverhampton University.
- **Northern Ireland Region:** Stranmillis University College.
- **North West Region:** Bangor University, Liverpool John Moores, University of Lancaster & Manchester University.
- **North East Region:** University of Bradford, Huddersfield University, Hull University, Northumbria University, University of Sheffield, Sunderland & Teesside University.
- **Scottish Region:** Heriot Watt University & Robert Gordon University.
- **South East Region:** Kingston University, University of Greenwich & Queen Mary University of London.
- **Western Region:** Bristol, Plymouth & Swansea.
- **Republic of Ireland:** University College Cork, Dublin City University & National University of Ireland Galway.

For further details contact: Professor John R Dean (email: John.Dean@northumbria.ac.uk)

Robert Gordon's University Heat review – written by Dr Eva Krupp

The North Heat of the School's Analyst Competition 2018 was held at Robert Gordon's University in Aberdeen, with nine Schools coming for the competition, from as far as Inverness to Dundee. Thanks to Graeme Kay and his team, the competition ran very smoothly and was very well organized. Heather Milton from the RSC talked with the teachers on the day and informed them of news in the RSC and support for schools.

The pupils were working very hard, and finally we had two schools on the first place. A tie-breaker was used, and finally ISA, the International School of Aberdeen made the first place, earning their place in the national final, while Aboyne Academy were awarded second place and Robert Gordon's School came in third place.

Launch of SWIG early career scientific poster competition 2018:

£1,200 first prize
£500 second prize
£200 third prize

SWIG invites students and employees in the field of water sensor research to design a poster summarising their work. This is an opportunity for researchers within the water and environmental sectors to showcase their scientific talents and innovative thinking.

The SWIG Early Career Researcher Prize is intended to raise awareness of technological development and novel applications related to water measurements and thereby promote innovation in sensor research and commercial application. The competition is open to all 'early career researchers' to include undergraduate and postgraduate students either in full time education or within the first 4 years of employment within their area of expertise.

For full details of the competition, including terms and conditions, please see the attached flyer or the SWIG website. To submit an abstract and a poster, please use the web portal.
Deadline for submissions: Friday 7 September 2018

REVIEWS

RSC online twitter poster competition 2018

The Royal Society of Chemistry Twitter Poster Conference is an online event held entirely over Twitter to bring members of the scientific research community together to share their research, network and engage in scientific debate. For the past three years, the Royal Society of Chemistry has hosted a

Twitter poster conference, inviting participants to submit posters on Twitter based on their research in the chemical sciences. These poster conferences, the first of their kind, allowed people all over the world and at all stages of their careers to present their work and network with other chemists without having to travel.

This year, people from all across the globe participated in the Twitter poster conference, achieving 1,912 contributors, 6,715 Tweets, an audience of 2,019,127 and 10,267,097 total impressions! This means that the conference was an even greater success than Last year, where there were 1,650 contributors and 6,473 tweets.

Of all the different topic areas, #RSCAnalytical was the most tweeted hashtag, with Maria Sánchez-Purrà taking the #RSCAnalytical first prize for her work on "SERS-based lateral flow immunoassay for multiplexed detection of zika and dengue biomarkers".

REVIEWS

HTC-15

The 15th International Symposium on Hyphenated Techniques in Chromatography and Separation Technology (HTC-15) was held between January 24th and 26th 2018 in Cardiff, UK. The meeting was organised by the Royal Society of Chemistry Separation Science Group (SSG), together with the Royal Flemish Chemical Society (KVCV), and took place in Cardiff City Hall in Cardiff Central, an area of impressive buildings, landscaped gardens and tree-lined avenues. Close to 300 attendees from 21 countries, nearly evenly split in terms of gender, and including representatives from both academia and industry (the latter comprising approximately 40% of the delegates), participated in the three-day conference.

The main conference was preceded by several day-long short courses on January 23rd, on supercritical fluid chromatography, biopharmaceutical analysis and on the statistical analysis of chromatographic data; these courses were led by experts in each field, who guided the 35 course participants from fundamental concepts to advanced problem-solving in a workshop setting. The conference itself opened with the presentation of the 2017 Knox Medal to Prof Peter Myers, who gave a spirited and thought-provoking Knox Medal Lecture on alternatives to silica-based separations.

Prof Peter Myers accepting the 2017 Knox Medal from Prof John Langley

The conference programme consisted of a total of 101 presentations, including 5 plenary lectures, 16 keynote lectures, 8 tutorial lectures, and 29 presentations by early-career researchers; at any given time, attendees could choose between talks and tutorials in three parallel, themed sessions. In addition to Prof Myers, the plenary speakers included Prof Peter Schoenmakers, Prof Tuulia Hyötyläinen, Prof Rob Beynon, and Dr Eric Little, and their talks showcased the innovative science and big ideas driving separations research today.

The themed sessions spanned a wide range of topics, from fundamental principles of separation science and comprehensive chromatography to recent advances in biopharmaceutical analysis and the impact of big data on the analytical sciences. The latter theme dominated the series of sessions introduced by Dr Little's talk on 'Transforming Big Data into Big Analysis', which were particularly well-received. 65 poster presentations, vendor seminars and a busy technical exhibition area kept attendees engrossed between sessions, with vendors such as Agilent, Waters and Shimadzu presenting their latest developments in instrumentation, software and applications related to the hyphenation of separation, detection and sample preparation techniques.

The conference also marked the inaugural presentation of the LCGC Europe/HTC Innovation Award, which was launched to celebrate “innovative achievements in hyphenated techniques that benefit society” and was presented to Prof Carolin Huhn from Eberhard Karls Universität Tübingen, for her work on modular approaches to instrument design for complex chemical analyses.

Prof Caroline Huhn, accepting the inaugural LCGC Europe/HTC Innovation Award

Social and networking events closed each day of the conference, and the gala conference dinner was held in the magnificent setting of the National Museum of Cardiff, where conference goers were regaled by a stellar performance from the Blaenavon Male Voice Choir.

Blaenavon Male Voice Choir

Fittingly, HTC-15 closed with the announcement that Prof James Jorgenson will be the 2018 recipient of the Knox Medal, and that a special symposium in his honour will be held at the Royal Society of Chemistry’s Burlington House on June 29th, 2018. All in all, HTC-15 was a resounding success, and we look forward with anticipation to HTC-16 in 2020.

REVIEWS

ACTF Forum on CAMS-UK Monday 19th February, Burlington House

After an open call to Heads of Chemistry and other academic contacts of the ACTF, 30 representatives of the analytical community met at Burlington House on Monday 19th February to hear details of the new CAMS-UK initiative and how ACTF might support it.

Prof Duncan Graham (ACTF Chair) opened the meeting with a welcome and brief introduction. All attendees were encouraged to provide their thoughts and feedback during the course of the day so that trustees are able to consider the views of the academic community when deciding how they might contribute to CAMS-UK. Initial presentations from Dr Ruth Hearn (ACTF Administrator) and Prof John Dean (ACTF Honorary Treasurer) provided background information on the Trust Fund. An overview of the restrictions of the trust deed and the trustee's responsibilities and requirements to meet charity commission regulations were presented together with details of the types of projects that are currently funded. Prof. Dean gave further information about how the trust fund has been invested over recent years and the typical amount of funds contributed to the various projects.

Prof Melissa Hanna-Brown (ACTF Past Chair) then gave a presentation on how the CAMS-UK initiative had developed. She told of discussions that had been held with industry representatives on how they might contribute to and participate in CAMS-UK for the benefit of all analytical measurement scientists across industry and academia. There will be two parts to CAMS-UK – the Martin-Synge Research Institute, a virtual institute focused on research & innovation and BEAM (Building Effective Analytical Measurement) which will focus on training and networking within the analytical community. Membership of CAMS-UK would be through one of three tiers of membership each requiring a different level of commitment. There has already been a very positive response and some firm commitment from industry and research councils.

After lunch and the opportunity to discuss the morning's presentations, Prof Dean gave some details on the commitments that ACTF trustees have already made to help with the development of the CAMS initiative and outlined other ways in which it is considering providing increased funds to leverage its impact on the analytical measurement community. Trustees will need to consider whether they should increase spend at the risk of reducing the overall fund value, in order to make the most of the opportunity that CAMS-UK could provide; or whether funding for other types of activities should be limited to reduce the impact on the total trust value.

The remainder of the afternoon provided an opportunity for open discussion, questions and debate about CAMS-UK and the ACTF. Key topics of conversation were:

- The proposal for Chairs of Analytical Measurements in universities which are expected to be new positions funded by the university as part of their Tier 1 membership. It was commented that there are several universities that would not consider this.
- There was strong support for more junior positions such as lecturers and fellows in analytical science. However, it was noted that there should be checks on the quality of these recruits and that these should be primarily focused on analytical science.

- Studentships were considered very cost-effective and highly valued by staff and students.
- It was acknowledged that the pool of talent for analytical scientists in the UK and Republic of Ireland was limited and therefore emphasis on developing that talent and creating the expertise was critical.
- There was a discussion on the Centre for Process Analytics and Process Technology (CPACT), a UK centre established by the Foresight Initiative and administered through the University of Strathclyde. There are some similarities with the CAMS-UK and CPACT has been very successful. It was thought that this success was partly due to a mix of long-term support from industry as well as the ability to respond to some of the short-term problem-solving requirements of industry.
- General feedback from attendees was that summer studentships, PhD students and Fellowships supported by the ACTF were very positive and should continue and expand where possible.
- There was also a strong level of support for exchange programs (industry to university and vice versa)
- It was noted that trustees would need to ensure that support was continued to be provided to the Republic of Ireland as well as the UK.

The meeting concluded with a discussion about how best to maintain conversations & feedback about CAMS-UK. It was agreed that the CAMS website should be used for this purpose as well as specific email distribution to those who have expressed an interest. It was also suggested that there might be presentations and/or posters at relevant conferences in order to further disseminate information and developments. The Chair thanked all attendees for their lively participation in the discussions and for very positive and useful feedback.

ANNOUNCEMENTS

ACTF supports CAMS-UK to the tune of £3.56M

The Analytical Chemistry Trust Fund (ACTF) exists to promote, assist and extend the science and study of Analytical Chemistry. It has achieved this over many years in part through supporting research and investigation into all aspects of analytical chemistry development and by establishing and maintaining fellowships and studentships. These activities are closely aligned with the aims of CAMS-UK. Over several months, the CAMS-UK project has been discussed within the RSC AD, ACTF and general analytical community. We are delighted to announce that on 15 March 2018 the Trustees agreed to support CAMS-UK with funding of £3.56M. The funding will be used to fund a number of new lecturers, post doctoral researchers, fellowships, summer studentships and PhD studentships in analytical measurement science. The expectation is that this will be distributed via CAMS-UK operated calls, open to the UK and Ireland.

Prof. Duncan Graham (ACTF Chair) commented “This is an exciting time for analytical measurement science in the UK. The EPSRC delivery plan for Analytical Science aims for this research community to have developed a clearer identity and be recognised as a research area in its own right by 2020. This decision by the ACTF Trustees will provide a significant stimulus for the industry led CAMS-UK initiative and is one step towards achieving this EPSRC goal. Alan Handley (for CAMS-UK) “I am extremely grateful to the Trustees of the ACTF for their support. This is a significant milestone in the development of CAMS-UK and we can now move forward with renewed energy to formally launch CAMS-UK later this year.”

CAMS-UK is an industrially-led, strategically connected membership-based community dedicated to supply world class analytical measurement science (AMS) training, research and innovation. CAMS-UK has two key focus areas i) a pipeline of key Analytical Measurement Science (AMS) talent and ii) an innovative core for UK Analytical Measurement Science, initially with a strong focus on point of use measurement technologies.

RSC TRAVEL GRANTS

RSC Travel Grants for PhD Students and Early Career Scientists are designed to support conference travel for PhD student and early career members (including industrialists and technicians). They are highly competitive. Members can apply for up to £800 to travel to anywhere in the world for conferences that may benefit their professional development. In October 2016, the RSC extended the scheme to include early career researchers between 5 and 10 years post-PhD as well as allowing technicians to also apply. Here we summarise travel grants in the last few months that have directly benefited the analytical community:

Position	Affiliation	Conference	Funding granted
PhD student	Aston University	Practical Applications of NMR in Industry Conference	£790.00
Postdoctoral researcher	Imperial College London	Pittcon 2018	£679.76
Postdoctoral researcher	University of Ibadan	RSC 5th Analytical Biosciences Early Career Researcher Meeting 2018	£800.00
Postdoctoral researcher	Imperial College London	Pittcon 2018	£642.00

And of the reports received, some selected highlights, showing the benefit of the RSC travel grants:

"Attending SciX provided me with a fantastic professional opportunity to attend presentations from world-class researches in my field. As well as valuing the opportunity to showcase my work through an oral presentation, there was many opportunities to network with other PhD students and professionals from both academia and industry. I was given advice on further techniques I could apply to my research to increase the impact of it."

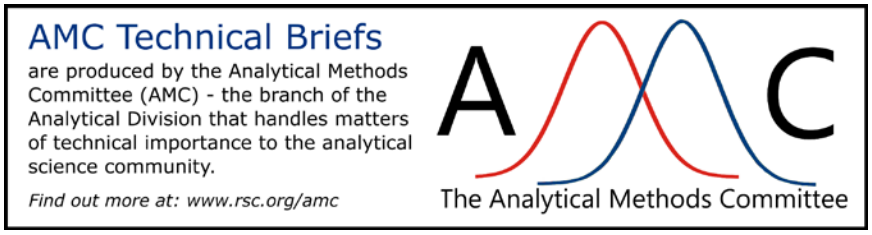
"I was able to meet various delegates who work in my field which has given me new career prospects to consider. I am leaning towards a more industrial career than academic, so this allowed me to make good connections within the companies I would be looking to apply to once my PhD research has ended. I was also able to speak and listen to people who are carrying out similar research to myself, with various techniques which has broadened my own knowledge, and provided me with considerations for future work in my own research."

ANNOUNCEMENTS

Analytical Methods Committee Update

New Analytical Methods Committee (AMC) Technical Brief, No. 84, Beam Sampling: Taking Samples at the micro-scale released.

This technical brief outlines that when using a beam to make a measurement *in situ*, irrespective of scale, the process implicitly includes the taking of a sample. Therefore, the uncertainty of the measurement result needs to include the uncertainty generated by the sampling process, which is usually dominated by the heterogeneity of the analyte at that scale. Reliable estimates of the uncertainty of beam measurements are essential to judge their fitness-for-purpose (FFP) and hence to enable their rigorous interpretation. This approach can be applied to a wide range of techniques for the analytical assessments of materials, from handheld portable X-ray Fluorescence (pXRF) at the millimeter scale, to Secondary Ion Mass Spectrometry (SIMS) at the micron scale.



Analytical Chemistry Trust Fund Update

ACTF, an independent charity (Reg. No. 268893) was established in 1974. It is closely associated with the Analytical Division of the Royal Society of Chemistry. Its primary task is to support analytical science in the UK and abroad. It uses the returns from its capital investments to spend a significant sum supporting PhD programs, summer studentships, research fellowships and support for analytical conferences as well as educational initiatives. For further details please see the Analytical Chemistry Trust Fund webpage.