

ANALYTICAL MATTERS

ISSUE 15 – SPRING EDITION 2020

DIVISION EVENT UPDATES

Analytical Research Forum 2020

16th June 2020, London -
CANCELLED

Measuring Cancer Earlier: Connecting Analytical Scientists and Cancer Researchers

12th June 2020 – POSTPONED
(new date to follow)

ONLINE EVENTS OF INTEREST

#EnvChem2020: Chemistry of the Whole Environment research – more info [here](#)

16th June 2020

Assuring the quality of radio-labelled products from clinical trials to commercialisation – more info [here](#). 2nd July 2020

CPD 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 fifteenth issue of Analytical Matters, the e-newsletter of the Analytical Division of the Royal Society of Chemistry (RSC). Analytical Matters aims to showcase the wide range of analytical science activities being run across the Royal Society of Chemistry Analytical Division as well as linking with parts of the UK analytical community beyond our membership.

With the ongoing COVID-19 crisis, the power and importance of analytical science has been highlighted, perhaps, more than ever before. The need for high-throughput, rapid and reliable testing, as well as developing new measurement techniques for verification and characterisation is paramount. I thank all of you involved in this work. For those of you not working directly on COVID-19, the advances we make in analytical science now, will undoubtedly help us with the, as yet unknown, challenges of the future.

In this issue, we highlight the support available from the RSC during this time. If current events are having a negative financial impact on you, your partner or dependants – especially if they have led to changes in your regular income – please speak to the Chemists' Community Fund. Further, we aim to highlight Continued Professional Development (CPD) opportunities that are available for you to work on from home (if you find you have the capacity to do so) such as the RSC Chartered Chemist award and the RSC mentoring program.

Voting is now open for candidates to join the Analytical Division Council. Please take the opportunity to vote!

Please send your feedback and any content for the next issue by July 31st by emailing the Editor [here](#).

With my very best wishes – stay safe!

Duncan Graham FRSC

President, RSC Analytical Division



<http://rsc.li/analytical-matters>

#RSC_AD

ANALYTICAL DIVISION COUNCIL UPDATE

In July, Professor Duncan Graham comes to the end of his term as the Analytical Division President. On behalf of the Analytical Division and the analytical science community, the Council would like to thank Duncan for his excellent leadership during his 3-year appointment. His drive and passion for analytical science has been evident throughout.

Reflections from the Analytical Division President, Professor Duncan Graham

My time as President has passed really quickly with many activities and opportunities keeping me and the Analytical Division busy over the last 3 years. Unfortunately, we find ourselves in unprecedented times due to the COVID-19 virus and now more than ever analytical chemistry has a significant role to play. Testing of the infection in people, whether current or previous, as well as developing new measurement techniques and approaches for rapid point of use analysis is of paramount importance. Verifying that the techniques achieve what they are meant to achieve, are robust and reliable and can work within the limits of their performance again depend on robust analytical science being applied to the methodologies. Going beyond the testing there is a huge role for analytical measurement science in determining how well vaccines are being characterised and what targets they are actually interacting with at a molecular level and finally. New therapeutic agents require a significant degree of analytical chemistry in understanding the clinical response and any side effects and also the characterisation of the medicinal formulations.

Now more than ever it is important to bring together the academic and industrial communities which is something that the Analytical Division has done particularly well and now with the advent of the Community for Analytical Measurement Science (CAMS) there is a significant degree of momentum in terms of bringing together parties that can work effectively in collaboration to change the landscape of the analytical sector within the UK and beyond. The Analytical Division has many opportunities coming up, however, it was disappointing that we had to cancel our Analytical Research Forum and postpone our forthcoming workshop with CRUK. These are two excellent events, the ARF being one which is an annual event and an opportunity for support of our early career researchers and the workshop with CRUK was a new joint opportunity to bring together the analytical community with the cancer clinical community and create new collaborative opportunities where measurement science can have an impact on the cancer research field. Many, many more activities exist than those two and are too numerous to mention!

I really want to thank and praise all of our council members from the past during my tenure and also those who are presently council members for their tireless and selfless contributions to the community. In particular, Zoë Ayres, for putting together this Analytical Matters newsletter which is keeping the community in touch with events that are happening! I also really would like to pay tribute to Leanne Marle who has provided fantastic support to the Analytical Division Council and is a huge asset to the council going forward. She has shown herself to be someone who cares about the Division very much and is very innovative in support of the council during and between meetings. Finally I would like to wish my successor, Diane Turner, all the best for her presidency and I will continue to support her and the analytical community as best I can. I hope to see you all in person at some point when we emerge from lockdown but in the meantime take care and stay safe!!

Elections are now open

We are holding elections for elected members of the Analytical Division Council (two vacancies). The candidates are:

- Melanie Bailey MRSC
- Philip Dunn MRSC
- Karen Faulds FRSC FRSE
- Ruchi Gupta MRSC
- Dominic Hare CChem FRSC
- Konstantin Luzyanin MRSC
- Bhavik Patel FRSC
- William Robson MRSC
- Ian Wilson EurChem CChem FRSC

All members of the Analytical Division will be contacted by electoral services provider, Mi-Voice, with information on how to vote on-line.

The elections will close at 17:00 (UK time) on Thursday 18 June 2020.

ANALYTICAL DIVISION ACTIVITIES

COVID-19 update

It has become clear that, as a result of COVID-19, our community will face restrictions on holding physical events and travel for a considerable time and that many of the Divisions' usual activities (including scientific meetings, symposia and travel grants) will not be able to go ahead in their usual form.

The current status of our activities is given below and Analytical Division Council are currently exploring alternatives to support our community through this difficult time.

Analytical Research Forum	The meeting due to be held on 16th June 2020, Burlington House, London has been cancelled. The annual meeting for early career researchers will run again in June 2021 and abstract submissions will reopen at the end of 2020.
Measuring Cancer Earlier	The joint Analytical Division and Cancer Research UK workshop and networking event due to be held on 12 June 2020, Burlington House, London has been postponed . An announcement will be made as new dates are available.
Schools' Analyst Competition	The 2020 Schools' Analyst Competition has been cancelled and below is details of the virtual competition. All being well the competition will return in 2021.
Awards	Division Award winners will be announced on Wednesday 24 June .
Travel Grants for PhD Students and Early Career Scientists and	We are reviewing our Travel Grants in light of COVID-19 and are unable to accept applications currently. We will provide further information as soon as we can.
Scientific Meeting Grants	We are reviewing our Scientific Meetings Grant in light of COVID-19 and are unable to accept applications currently. We will provide further information as soon as we can.

The (NOW VIRTUAL) Schools' Analyst Competition 2020

Every year we run a competition for year 12 students to find the best team of young analytical scientists in the UK. Last year more than 1000 year 12 students, from all parts of the UK and Ireland took part in regional heats, and 20 teams made it to the final. This year due to COVID 19, we were not able to hold the competition.

Now – instead – we are holding a virtual version of the competition.

The Competition is to Design a New Logo for the Analytical Chemistry Trust Fund (ACTF), for year 12 students:

- The logo should represent analytical science in a simple way.
- You are all asked to upload your image to Instagram and tag it #SchoolsAnalyst2020.
- A prize of £300 will be awarded to the winning entry, which will form part of our web presence and our written material.
- We will also offer a prize of £100 each for the three best TikTok videos that show you doing analytical or measurement science at home. Again, label it #SchoolsAnalyst2020

For more detailed information on the competition, and terms and conditions, please [contact us](#).

To enter the competition, high resolution images and videos should be mailed to ruth@rhearn.net by 5.00 pm on the 18th June 2020. Prizes will be announced in July 2020



**ANALYTICAL
CHEMISTRY**
TRUST FUND



RSC SUPPORT

COVID-19 – find support

You can find detailed support for individuals, researchers, educators and businesses from the Royal Society of Chemistry and other organisations, including the UK Government on their [webpage](#).

Chemists' Community Fund

If current events are having a negative financial impact on you, your partner or dependants – especially if they have led to changes in your regular income – please speak to the Chemists' Community Fund, the benevolent fund for RSC members.

While we recognise that the support we can offer will be limited, we may be able to offer financial support to you and your family as a Royal Society of Chemistry member.

The Fund offers a completely confidential service. Please get in touch by phoning +44 (0)1223 432227, or by ccfund@rsc.org

Please see the [Chemists' Community Fund](#) website for more details and feel free to share this with others in your networks.

Grants for Carers and Assistance Grants

In response to the COVID-19 pandemic, the RSC have extended the purpose of our Grants for Carers and Assistance Grants schemes. Further information is available [here](#).

Chemistry against COVID-19

The RSC have started sharing #ChemVSCovid hero stories to celebrate the vital contributions the chemical science community is playing in the global response to COVID-19.

You can help us celebrate the chemists across the world who are making a difference by sharing your stories with us - either by e-mail (communications@rsc.org), or using the hashtag #ChemVSCovid on social media.

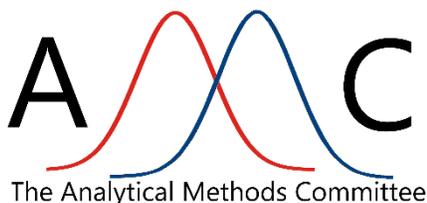
RSC EVENTS

Building a better chemistry culture webinar series

In response to the COVID-19 pandemic and with an aim to support the chemical sciences community beyond the current situation, Chemistry World and the Inclusion and Diversity Team at the Royal Society of Chemistry are offering a series of monthly webinars titled [Building a better chemistry culture](#).

The series will focus on the science behind some of the issues being experienced during this time and provide support such as sharing coping strategies and reducing stigma around mental health and wellbeing. The themes that will be explored include kindness, working from home, isolation and loneliness, impact on professional and personal relationships, coping with loss, managing uncertainty and lack of control.

If you missed the first webinar on Kindness – Building a better chemistry culture you can find the series on-demand [here](#).



Looking to gain chartered status? The Analytical Methods Committee (AMC) provide Technical Briefs, ideal for supporting continuing professional development.

The Analytical Methods Committee (AMC) is the Committee of the Analytical Division (AD) that handles matters of technical importance to the Analytical Science Community. Made up of expert Sub-Committees and designated representatives, the broad aim of the AMC is to participate in national and international efforts to establish a comprehensive framework for appropriate quality in chemical measurement, often working alongside numerous accreditation services and governing bodies, such as DEFRA and UKAS.

To do this, we assist in the development and establishment of suitable performance criteria for methods and instruments; advise on the use and development of appropriate statistical methods and are deeply involved in identification and promulgation of best analytical practice, including aspects relating to sampling, instrumentation and materials.

The AMC produces Reports and regular Technical Briefs (TBs) on a wide range of analytical topics, published in the RSC journal *Analytical Methods*. We are also proud to support the overall AD aim of supporting Continuing Professional Development (CPD) with our TBs which can be used towards CPD certification.

Find more information and our Technical briefs at www.rsc.org/AMC
or follow us @RSC_AMC



Read the latest Analytical Methods Committee Technical Briefs:

An introduction to hand-held infra-red and Raman instrumentation AMCTB No 94

Hand-held infrared and Raman instrumentation is now available for a wide range of applications in fields such as manufacturing, environmental protection or security, enabling staff without chemical analysis training to provide rapid answers to specific questions. This Technical Brief aims to inform both analysts and less technically aware users of the applications, capabilities and limitations associated with the use of this equipment.

<https://doi.org/10.1039/D0AY90025G>

Experimental design and optimisation (5): an introduction to optimisation AMCTB No 95

Once a suitable experimental design has been used to find the most important factors affecting the outcome of an experiment, and maybe to find any significant interactions between them, we can use an optimisation method to find the best levels (values) for those factors. This Technical Brief outlines the basic principles of optimisation and introduces some of the most commonly used approaches.

<https://doi.org/10.1039/D0AY90037K>

What's novel in the new Eurachem guide on uncertainty from sampling? AMCTB No 96

A second edition of the Eurachem guide, measurement uncertainty arising from sampling (UfS),¹ has recently been published (Fig. 1), in collaboration with CITAC, Eurolab, Nordtest and the Royal Society of Chemistry's Analytical Methods Committee. This Technical Brief aims to explain how this new second edition differs significantly from the first edition that was published in 2007. The stated objective of this new edition is to incorporate several recent research developments, and to explain how they can be integrated into the estimation of measurement uncertainty in different situations.

<https://doi.org/10.1039/D0AY90051F>

For more free technical briefs on topics of interest to the analytical chemistry community, visit the link [here](#).

The Royal Society of Chemistry encourages all members to undertake suitable professional development. One of the ways in which RSC support this is through their approval of training courses, where they approve training courses offered by 3rd party training providers.

A training course has to go through a rigorous peer-review process in order to meet certain criteria and become approved. Each training course is assessed by members that are expert in their field. Our members can be assured that these approved courses have met our high standards. We currently approve over 160 courses across a wide variety of subject areas. These include courses that look to develop technical skills in analytical chemistry, pharmaceutical chemistry, coatings, water treatment, quality assurance as well as many other areas. There is also a range of courses that look to develop professional skills such as leadership skills, project management skills and effective communication.

All RSC approved courses can be found at www.rsc.org/cpd/training, where you can easily browse and search for courses that are of interest.

Chartered Status

Why not work towards [chartered status](#)? The award of chartered status recognises the well-developed skills, knowledge and professionalism of those working within the chemical sciences. They are part of a broader recognition and development framework that includes the professional registers: Registered Science Technician (RSciTech) and Registered Scientist (RSci).

Gaining Chartered Chemist (CChem), Chartered Scientist (CSci), Chartered Environmentalist (CEnv) or Chartered Manager (CMgr) status demonstrates that you have:

- built on your academic achievements and developed professional skills in a work environment
- gained in-depth knowledge and critical awareness of your chosen area of the sciences
- developed strong scientific skills and are committed to improving them
- made a critical contribution to the success of your organisation, business or institution
- shown personal and professional integrity
- committed to developing your career, as well as advancing excellence in the sciences.

COMMUNITY NEWS

UKRI offer support to final year PhD Students

UK Research and Innovation (UKRI) funded doctoral students in their final year will receive an extension to their research with additional grants, known as a costed extension, of up to six months providing them with peace of mind that they will be able to complete their studies, due to COVID-19. Find out more [here](#).

Pan Africa Chemistry Network Update

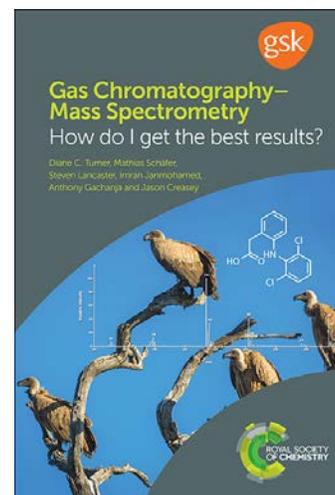
The [Pan Africa Chemistry Network](#) was set up by the Royal Society of Chemistry to advance the chemical sciences across Africa by building a self-sustaining science base. Skills development has always been a key focus of the PACN, mainly through our work with Professor Anthony Gachanja and Dr Steve Lancaster. More recently we have been working in partnership with GSK, Anthias Consulting, and our hubs in Ethiopia, Ghana, Kenya and Nigeria to extend this work and bring analytical science training to a wide community across Africa, in order to enhance the capabilities of African scientists in modern analytical techniques.



Since 2016, we have trained over 350 scientists from 26 African nations. With activity postponed in 2020, by the end of 2021 we will have exceeded our target of 400 scientists trained in the key analytical techniques of GC-MS or LC-MS, published a course text book, as well as training Local Trainers to train others, leaving a self-sustaining programme and a lasting legacy.

As of this month I am pleased to announce that like our GC-MS course the LC-MS course has been externally reviewed and now forms part of the growing list of chemical sciences training courses that have been approved by the Royal Society of Chemistry for professional development. We are also continuing to evaluate the success of the courses. An evaluation of the programme to date has highlighted the range of ways in which the course has benefitted scientists, including:

- Improving knowledge, confidence and ability to use GC-MS equipment
- Improving current research
- Sharing skills with colleagues
- Teaching analytical skills



Additionally, 100% of responses stated they would recommend the course to others highlighting the success of the current training programme. Demand is significantly out stripping the number of places we are currently able to offer and due to the success of the current programme, we are now making plans for Phase 2 (2021-2027).

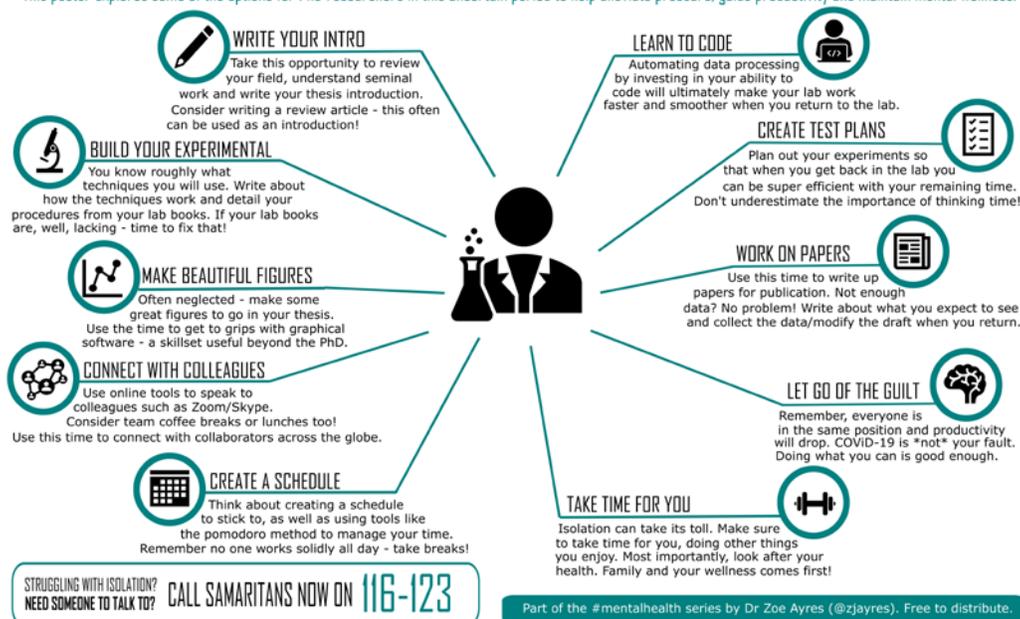
To find out more or if you would like to support phase 2, please contact Francesca Porcu at africa@rsc.org

Analytical Scientist without a lab?

Many of the analytical community are lab-based scientists and cannot go to the lab right now during the pandemic. Please see the useful infographic by Dr Zoë Ayres below (reproduced with permission), designed to help alleviate pressure, guide productivity and maintain mental wellness. Find an enlarged version [here](#)

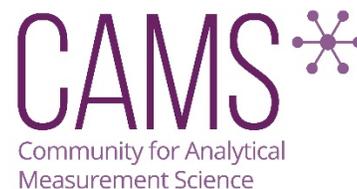
SCIENTIST WITHOUT A LAB? A PhD RESEARCHER GUIDE TO COVID-19

In these unprecedented times, many of us are finding ourselves without the ability to perform lab work and are having to self-isolate. This poster explores some of the options for PhD researchers in this uncertain period to help alleviate pressure, guide productivity and maintain mental wellness.



Community for Analytical Measurement Science (CAMS) Update

The Community for Analytical Measurement Science (CAMS), an industry-led network of world class analytical measurement science training, research and innovation, has been busy over the last few months. On the housekeeping front, CAMS incorporated has been set-up as a private not-for-profit company limited by guarantee, with the Community's aims, objective and governance having been formalised and adopted by its members.



CAMS Industry Advisory Board continues to work with academic institutions to identify collaboration opportunities and respond to current challenges aligned within the 4 CAMS themes:

1. Point of use sensors and photonics
2. Novel instrumentation or techniques
3. Data analytics
4. Complex mixtures, separations and detection

Work also continues in supporting our academic members and CAMS awardees in their research efforts during these unusual times, with many activities now taking place virtually. Thursday 07 May sees the first in a series of Webinars highlighting how CAMS members are responding to and supporting the response to COVID-19. If you'd like to take part in future events please don't hesitate to contact the CAMS Secretariat.

Planning for the CAMS Conference 2020 – our inaugural annual event scheduled for 16-17 Sep – is now dual pronged with preparations for both a face-to-face and virtual event now well underway.

In 2019, BEAM – the training and skills arm of CAMS – advertised a total of 52 events (1 a week) throughout the year, and the CAMS Secretariat is working hard to ensure the online training calendar remains up-to-date with details of useful eLearning and virtual events for 2020.

Please visit the CAMS website for the latest information about all CAMS events and activities:



Website: <https://cams-uk.co.uk>

Email: secretariat@cams-uk.co.uk

Twitter: [@CAMS_UK](https://twitter.com/CAMS_UK)

LinkedIn: www.linkedin.com/company/cams-uk

CAMS
Community for Analytical
Measurement Science

CONFERENCE
2020
16-17 Sep

**Imperial College
London**

Molecular Sciences Research Hub -
Imperial College London, W12 0BZ

Registration
0208 943 7407
www.cams-uk.co.uk
#CAMS-UK2020

MEETING REPORTS

Theobald Lecture 2020 - Between Science and Art: investigating, understanding and protecting our cultural heritage



The Theobald Lecture took place on the 17th of February 2020, at the Hochhauser auditorium at the Victoria and Albert Museum (V&A) in London. This meeting was a successful collaboration between the V&A Research Institute, the RSC Analytical Methods Committee (AMC), and the Analytical Methods Trust. The main highlight of this event titled 'Between Science and Art: investigating, understanding, and protecting our cultural heritage' was the awarding of the 2019 LS Theobald Lectureship to Dr. Lucia Burgio, Senior Scientist at the V&A.



Professor Jim Miller, introducing the event at the Hochhauser auditorium at the V&A(left) and Professor Jim Miller presenting Dr. Lucia Burgio with certificate for the 2019 Theobald Lectureship

The meeting had a number of talks by experts in the field of heritage science, along with a talk from Dr. Lucia Burgio titled 'What exactly does a museum scientist do?', where she discussed a range of scientific investigations that take place at the V&A and revealed some of the most recent scientific discoveries about their collections, such as the Barniz de Pasto cabinet and the Leman silk album. Presentations by a number of other heritage scientists discussed environmental monitoring, the use of scientific methods in identifying artists' materials and dating porcelain, and some of the challenges involved in preserving modern materials such as plastics.

Report by Dr Aya Abdalla, Analytical Methods Committee Publicity Officer

Vintage Theme at Northern Ireland's Schools' Analyst Competition

The chemical analysis of wine was the focus of this year's 'Schools' Analyst Competition' held recently (just before the lock-down) at Stranmillis University College Belfast. This year the competition was generously sponsored by local entrepreneur Dr Terry Cross OBE, owner of Château de La Ligne in Bordeaux, and featured the analysis of the white wine Marquis de la Ligne Bordeaux Blanc. The analysis of white wine serves as an excellent example of how analytical chemistry plays a vital role in the food and drinks industry and helps to relate chemistry theory and practical work to real-life contexts and applications. Teams of three sixth-form pupils representing 13 schools from across Northern Ireland competed to produce the most accurate determination of the wine's acid content, sulphur dioxide levels and concentration of iron.

The three-fold analysis of the wine also illustrates how the method of analysis is determined by the concentration of the species being analysed. The relatively high levels of tartaric acid in grapes allow for direct titration with a solution of alkali. The lower concentration of the preservative sulphur dioxide employs a back titration where the concentration is determined from the difference between the sample and a blank titration. The final analysis of the trace levels of iron require the much more sensitive technique of colorimetry.

The amount of acid present in wine varies and depends on the region the wine comes from, the climate the grapes were exposed to, and the conditions during fermentation. As the acid content influences the taste of the wine it is closely monitored and can be altered by addition of the base potassium hydrogen carbonate. Sulphur dioxide or sulphites are added to wine as a preservative to inhibit the growth of microorganisms and therefore ensure the wine is safer to drink. Sulphite is also an antioxidant and prevents the deterioration of flavour and discolouration by inhibiting both enzymic and non-enzymic browning. Since sulphites are normal products of the human body's metabolism, we are able to cope with them provided the levels are not too high. Therefore, the amount of sulphite added to wine must be carefully regulated as, in very high concentrations, it can produce gastric irritation and destroy the essential nutrient thiamine (Vitamin B1). Wine also contains low levels of iron which is taken up from the soil by the vine as the grapes grow and mature.

In the first analysis the pupils assume that tartaric acid is the only acid present and determine the amount present in white wine by a visual titration against a standard solution of sodium hydroxide. The determination of sulphur dioxide content is based on its reduction of iodine to iodide. In the analysis excess iodine is added to an acidic sample of the wine and the amount of unreacted iodine is determined by titration with sodium thiosulphate. A comparison with a blank titration allows the amount of sulphur dioxide to be determined. The lower level of iron requires the more sensitive method of colorimetry using a solution of 1,10 phenanthroline as the complexing agent. The absorbance of the complexed wine sample is compared to a calibration plot obtained from a series of standard solutions of iron(II).

The winning team from Lumen Christi College Derry was presented with their certificates and book tokens to the value of £200 by Dr Terry Cross OBE. The pupils from Rainey Endowed School (£100) came a close second, followed by Belfast High School (£80) and Rathmore Grammar School (£60). Dr Terry Cross OBE praised the pupils' practical skills and was particularly impressed at how they were able to put their knowledge of chemistry theory into practice. Addressing the pupils and their teachers he said: "As a business man and employer I am delighted to see high quality team work and problem-solving skills used in real-life scenarios. Our future economy relies on having the type of talented and dedicated young people I have observed here today."

All participants were found to meet the required level of accuracy and precision in their analyses and so were each presented with a book token and a certificate to mark their attainment. Finally, on considering the pupils' finding that a standard glass of Marquis de la Ligne Bordeaux Blanc would only contribute 4% to the recommended daily intake of iron, sticking with fortified breakfast cereals, lentils and spinach remains a more effective and healthier option!



Photo: (from left) Dr Michael Harriott (Chair of The NI Analytical Division of RSC), the winning team of Patrick Gormley, Sean Morrison and Lewis McGarrigle, and the event sponsor Dr Terry Cross OBE, owner of Château de La Ligne in Bordeaux.

To view previous issues of Analytical Matters please use the link: <http://rsc.li/analytical-matters>

RSC Members can join the Analytical Division and receive Analytical Matters.
To join email: membership@rsc.org