The Nanjing Program
The latest insight into the Nanjing Program

Nobel Prize in Chemistry
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Secondly, I’d like to say a thank you to everyone who had a part in putting this issue together. Mainly to the news team who wrote all the articles, which I hope you’ll enjoy, but also to the staff members, alumni and students who gave us the information that we needed. I hope even more people get involved in the next issue, because without you, Resonance wouldn’t exist. It’s never too late to get involved; we are looking for writers, photographers, illustrators and designers. It doesn’t matter if you don’t have any experience; Resonance is a great place to start! If you have any comments or suggestions about Resonance feel free to contact us.

We’d love to hear your thoughts and ideas! Resonance is also starting up a blog! Fancy doing a bit of web design? You don’t have to be an expert, just willing to try. If you’re interested get in touch at chem-news@sheffield.ac.uk.

Let’s see what 2015 has in store for us!

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- Double Congratulations to two members of the Armes Group
- A Warm Welcome to Dr Spain
- Outreach in the Faculty of Science
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Let's see what 2015 has in store for us!
Publication success for Staniland group

Research from the Staniland group has now been published in the high-impact journal Proceedings of the National Academy of Sciences. The group’s research is focused on mimicking the biological methods used by certain bacteria in the synthesis of magnetic nanoparticles, with tight control over particle shape and size. The role of the ‘magnetosome membrane specific’ (Mms) proteins in this regard are of particular interest.

In this paper, they showed that the magnetic nanoparticles formation protein MmsF can control the formation of precise magnetic nanoparticles in vitro. The published work was important as it was the first example involving these particular proteins to be achieved in vitro. Furthermore, it identified the unexpected formation of water-soluble ‘proteinosomes’ from self-assembly of the MmsF protein. Finally, it led to the discovery that two proteins very similar to MmsF were ineffective at producing precise materials—this surprising discovery offers key clues into what is important about the MmsF protein for controlling magnetite nanoparticle formation.

Looking forward, the group is now looking towards producing interesting protein motifs on molecular scaffolds. It is hoped that this might eventually lead to a toolbox from which the synthesis of various nanoparticles of different shape and size can be accomplished.

Outreach in the Faculty of Science

Many of you will have seen the room right in the middle of the D-floor physical teaching laboratory and some of you might not know what it is.

The Faculty of Science has an outreach programme which comes in the form of widening participation, public engagement, knowledge transfer and demonstration of research impact; the schools lab is one way of achieving this.

Staffed three times a week, the schools lab holds sessions for children at a primary level all the way up to sixth formers. For example, sessions held for year 10 students involve making aspirin; which helps to develop both the students’ practical skills and their knowledge of the pharmaceutical industry. The sessions are largely run by volunteers from the Chemistry Department, including four Science and Engineering Champions, who receive training on teaching and are paid for their involvement.

The next training session for Science and Engineering Champion training will be happening in February. This is great for teaching experience and would look good on a CV or in an interview.

As well as these one-off sessions, there are several University and Faculty-led events such as Discover STEMM (DSTEM) days. These days involve more than just laboratory sessions; the students attend workshops and mini-lectures across all disciplines to introduce them to STEMM at a university level.

The Women in Science and Engineering night, which is on the 18th March, encourages year 9 to 11 girls to be more involved within STEMM.

All of these activities tell students (and their teachers) about the work that is done at university level; what its purpose is and why it is interesting. It is said “you know you fully understand your subject if you can explain it to a five year old!” The sessions hopefully allow more people to become engaged in science and inspire the next generation of scientists!

If you are interested in helping in the schools lab or want more information please contact Sara Bacon.

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Newsletters of the past

When Resonance was initially set up in September 2013 it was thought that it was the Chemistry Department’s first student run newsletter. However, after being informed of this mistake, it was discovered that Resonance has two predecessors.

The first, Byproduct, dates from 1955 to around 1970 and was run by volunteers from the Chemistry Society. The issues contained a wide variety of articles; student laments, terrible jokes, a ‘who’s who’ of the Department, opinion pieces and current research. Some of the thicker volumes of the newsletter consisted of a total of 72 pages! The majority of the pages were advertisements from companies including Procter & Gamble, Shell, local Sheffield businesses and even Barclays Bank. The money obtained from these adverts allowed the newsletter to be printed, but unfortunately in 1970 this funding became insufficient and the newsletter adopted a less professional format than before and soon came to an end.

Residues, was produced in the early 1990s and was the most satirical of our three examples. Again, it was written by the Department’s ChemSoc and was photocopied and distributed by Denise from the accounts office!

Although highly amusing, it’s doubtful that any of their articles would make it past the Head of Department today!
At the beginning of this academic year 20 students from Nanjing Tech University (NJUT) have joined the level three year group, forming the first cohort of Chinese students to come to Sheffield as part of the Department’s collaborative degree program with NJUT. Now, one semester later, Friederike Dannheim investigates how the program came to be and what the new students think about Sheffield.

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It all started in 2010 when Professor Mike Ward, Head of Department, was approached by a group of senior staff from Nanjing Tech in search of overseas partners for a joint degree program. It wasn’t by chance that their search brought them to Sheffield; through Professor Beining Chen, a Nanjing native in her own right, the Department already had a connection to NJUT. Intrigued by the idea Professor Ward and Professor Winter set out to meet with professors of senior staff from Nanjing Tech are taught in Mandarin teaching. About half of all courses of the joint degree program at Nanjing Tech are taught in Mandarin by NJUT staff and the other half in English by academics from the University of Sheffield. “All the effort involved in doing the teaching in China is what makes it possible”, Ward says.

And a lot of effort has been made indeed: The list of academics that have delivered teaching in Nanjing includes, but is not limited to, Prof Ward, Prof Winter, Prof Brammer, Dr Haynes, Dr Thomas, Dr Twyman, Prof Williams, Dr Williams, Prof Fowler and Prof Ryan. Dr Julie Hyde spends two months a year in Nanjing, doing laboratory teaching to all three year groups. Last year she was assisted by two of the Department’s PhD students. “It’s a very exciting experiment”, Professor Ward tells us, “And I’m not the only one to think so. The PhD students who went really enjoyed their trip and both of them immediately volunteered to go again.”

The reason why only 20 out of 29 ended up coming to Sheffield is primarily because of the high standard of assessment. The students have to achieve 50% in their exams, as opposed to the 40% required of Sheffield students, and prove themselves sufficiently capable of the English language to continue their degree in the UK. Apart from that, going abroad is quite a scary thing, as Prof Ward agrees: “There isn’t really any way to prepare someone for being in a foreign country.” Nonetheless, the program at NJUT is due to grow in the next few years. Prof Mike Ward, who travelled to China earlier this academic year to teach the new first year students, recounts that the newest cohort has 58 students. Asked about his predictions for the number of students joining us in two years he said: “Since the group of 58 is precisely twice the size of 29, we might have 40 students coming into our year three.”

In the future the University of Sheffield will also host Chinese students from other departments: After the Department of Chemistry, the Department of Maths and Physics have also entered collaborations with NJUT. Maths will welcome its first cohort next year; Physics has just completed the formalities and will be expecting its first students in 2018.

So, what do the new students from Nanjing think? Yichi, Zhang, Tian George Zhou and Ning Angus Feng have been kind enough to share their thoughts on the program and first impressions of Sheffield. “The course here was harder than expected at first”, George recounts, “I think this is mainly because we had fewer laboratory sessions in China and the Chinese teachers set other priorities for the assessment.” “But at least the English hasn’t troubled us much”, Zhang adds.

When asked about the differences between British and Chinese student life George notes a lot of differences. Being the only one of the three to live with British students at the moment he has much to tell about his experiences and things that are new to him, like the way everyone has their own room: “In the UK everyone has a lot more privacy”, he tells us, “back home everyone lives in halls with 5-6 students per room. But that had its good sides as well, everyone was really close.” The other two live with some of their Chinese classmates. “We like to get together and cook with the entire flat”, Zhang says.

“We like to get together and cook with the entire flat; British food is alright, but food from home is just the best!”

Photographs by Prof Mike Ward

Insight
The Nanjing Program

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Friederike Dannheim
Photographs by Prof Mike Ward
Nobel Prize in Chemistry

Nobel Prize Awarded for Development of Super-Resolved Fluorescence Microscopy

On the 8th October 2014, Eric Betzig, William E. Moerner and Stefan Hell were jointly awarded the Nobel Prize in Chemistry for the development of super-resolved fluorescence microscopy. The innovative and independent exploration by the three individuals, has led to the creation of technology that has already benefited researchers studying the behaviour of how HIV corrupts the body. The Nobel Prize panel has said that super-resolved microscopy brings ‘optical microscopy into the nanodimension’.

In 1873, Ernest Abbe proposed a limit to microscopy, which was roughly half the wavelength of light; 0.2 µm, this essentially meant that nothing smaller than a mitochondria organelle, with a diameter of 1 µm, could be sufficiently resolved. This has since remained the case, until the advancement of super-resolved fluorescence microscopy, where it has been found that this diffraction limit can be overcome. Although Abbe’s limit has been surpassed, it is still pertinent within microscopy. Instead of disproving Abbe’s limit Betzig, Moerner and Hell’s use of fluorescent molecules remained the case, until the advancement of super-resolved fluorescence microscopy, where it has been found that this diffraction limit can be overcome.

One of the principles, developed by Stefan Hell, was stimulated emission depletion (STED). This involved exciting fluorescent molecules within a sample, and quenching all fluorescence emission except from a nanometre-sized volume at the centre of the sample. Quenching refers to the reduction of the fluorescence intensity of emission, in this case, by the use of a light pulse. This is repeated, with emission from different areas being scanned, to create a detailed image of the sample. The first sample measured using this technique, in 2000, was an E. coli bacterium, which has a width of 0.5 µm, half that of a mitochondrion. In 1997, Moerner’s research led to the ability to optically control the fluorescence of single molecules, using the green fluorescent protein (GFP) found in fluorescent jellyfish. He found that the fluorescence of a variant of this protein could be manipulated using different wavelengths of light. When excited with light with a wavelength of 488 nm, the protein would emit fluorescence, before fading and deactivating. However, this protein could be reactivated using light with a wavelength of 405 nm. By exploiting this property, Moerner was able to detect the presence of individual proteins that were sparsely scattered in gel.

This research led to the second principle that circumvents Abbe’s diffraction limit, established by Betzig, called single-molecule microscopy. This principle works by superimposing images of the sample, where different molecules are fluorescent-active, these molecules obey Abbe’s diffraction limit, in that they are no closer than 0.2 µm in each image. Superimposition gives a highly detailed (super-resolved) image, with the position of each molecule easily seen. This technology has been used for visualisation of how HIV can shape-shift to enter the T cells of a human immune system. This has major ramifications of the development of vaccines that can block the infection of HIV. The virus can avoid detection by antibodies, through adopting a conformation that is unrecognisable to the body. This was seen by the use of fluorophores that were inserted into various regions of the virus, this closely correlates to the research accomplished by Moerner and later developed by Betzig.

Cate O’Brien
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The Ig Nobel Prizes, also awarded yearly, aim to honour humorous research. The prizes are intended to celebrate the unusual and imaginative, as well as spur people’s interest in science, medicine, and technology. Some of the latest Chemistry prizes include research for,

• Discovering that the biochemical process by which onions make people cry is even more complicated than scientists previously realised (2013)
• Solving why people’s hair turned green in certain houses in the town of Aderslöv, Sweden (2012)
• Determining the ideal density of airborne wasabi to wake people in case of emergency, and then applying this knowledge to invent the wasabi alarm (2011)
• Creating diamonds from tequila (2009)
• Developing ways to extract vanillin from cow dung (2007)
• How the temperature affects the ultrasonic velocity in cheddar cheese (2006)
• Whether people will be able to swim faster in syrup or water (2005)
The Element of Surprise

How accidental discoveries have shaped the history of science

Picture the scene; instead of a perfect sample of the product you have been hard at work for, you get something completely different. For most of us, this would just be a source of annoyance—however, in the history of science, such accidents have led to some incredible discoveries.

Some of the most fundamental discoveries in science happened by accident. Almost everyone has heard of Alexander Fleming and his discovery of penicillin from mould found growing on a cell culture. However, a lesser-known example was the discovery of radioactivity by the French physicist Antoine Henri Becquerel. Becquerel was examining what happened when sunlight passed through a sample of uranium, placed on a cross lying on top of a photographic plate. One cloudy day, he placed the setup in a drawer; a while later, he checked it again. The addition of colours and flavour to blobs of jelly, left over from an experiment, lead to the creation of Jelly Tots.

Of course, not every unsuccessful reaction will lead to something revolutionary. Neither are the outdated (and unsafe) practices performed in the past worth repeating in the hope of discovering something unexpected. But if a reaction makes you say “that’s strange...” then you may have an unexpected discovery of your own.

Sir William Perkin was a young British chemist working towards a synthesis of quinine. Whilst working in his home laboratory he obtained a vibrant purple colour. This led to the synthesis of mauveine, which offered a more lasting and affordable alternative to the natural purple dyes being used at the time. Suddenly, purple clothes were not restricted to the wealthy, and Perkin’s accidental discovery became extremely fashionable and profitable, paving the way to the creation of many more synthetic dyes.

Picture the scene; instead of a perfect sample of the product you have been hard at work for, you get something completely different.

Such accidental discoveries have been extremely successful.

Zoe Smallwood

Spectrometry in Space

How extra-terrestrial analytics are shaping our understanding of the solar system

In the last issue of Resonance, Cate O’Brien discussed how recent measurements of isotopic ratios in lunar rock are influencing the debate surrounding the moon’s origin. Similar isotopic abundance studies by the European Space Agency on comet 67P/Churyumov–Gerasimenko – the comet at which the Rosetta probe arrived last August – are now radically changing current theories of the source of the Earth’s water.

The ratio of hydrogen to its heavier isotope deuterium provides a molecular fingerprint which has been used to determine the age and origin of various water samples. The amount of deuterium detected in the water vapour of comet 67P is around three times higher than the average on Earth, suggesting that, despite their high ice content, comets are unlikely to be the main source of terrestrial water.

This evidence supports the theory that water instead came from asteroids, whose deuterium levels are more consistent with those on earth. Like comets, asteroids are small objects orbiting the sun which could collide with the Earth. Most asteroid collisions are known to have taken place around 3.8 billion years ago – giving scientists a rough idea of how long water has been here.

The finding coincides with the publication of results from NASA which indicate a large reservoir of ice or water below the surface of Mars. Their results show that the ratio of deuterium to hydrogen in this reservoir is closer to that of the Earth than to the levels previously recorded in the Martian atmosphere, suggesting that the water on Earth and Mars share a similar origin.

More detailed studies of the composition of the comet are planned as Rosetta continues its orbit. A series of ‘flyby’ maneuvers, in which the craft will move to within six kilometres of the comet, are scheduled for early this year. It is hoped that these experiments will identify some of the complex organic species present during our solar system’s formation, which may even provide clues to the origin of life.

Harry Grover

Expansion Microscopy

Researchers at M.I.T. have recently described the development of a new laboratory technique, expansion microscopy (ExM).

The method physically inflates cultured cells or tissue using polymers that swell in water, the same polymers found in disposable nappies, allowing the tissue to be viewed using standard optical microscopes.

Optical microscopy is understood to be limited to half the wavelength of light, around 200 nm, described by Abbe’s diffraction limit. For many years scientists have tried to overcome this limit and last year, three scientists were awarded the Nobel Prize for their work on super-resolution fluorescence microscopy.

Boyd’s group at M.I.T., infused the monomers sodium acrylate and acrylamide and the crosslinker N,N’-methylenebisacrylamide into chemically fixed brain tissue and cultured cells. Free radical polymerisation was initiated using ammonium persulphate and the accelerator tetramethylthelylenediamine. Dialysis in water then gave a 4.5-fold expansion uniformly across all dimensions. They also designed, and incorporated, a fluorescent label consisting of a fluorophore, an oligonucleotide which is capable of binding to a specific protein sequence, and a methacryloyl group that is capable of participating in the polymerisation.

The group were able to image the microtubules in the cultured cells using a standard confocal microscope. When compared to the images obtained from super-resolution structured illumination microscopy, generally the images were just as clear and detailed, while in some cases the images were in fact sharper. When observing mouse brain tissue utilising this technique, the group were able to identify structures at around 70 nm resolution, previously beyond the limit of the equipment they were using.

There is some scepticism around this method due to the way in which the samples must be processed but generally the group have garnered a lot of interest in this technique.

Ashle Butler
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In the last issue of Resonance, Cate O’Brien discussed how recent measurements of isotopic ratios in lunar rocks are influencing the debate surrounding the moon’s origin. Similar isotopic abundance studies by the European Space Agency on comet 67P/Curyumov–Gerasimenko – the comet at which the Rosetta probe arrived last August – are now radically changing current theories of the source of the Earth’s water.

The ratio of hydrogen to its heavier isotope deuterium provides a molecular fingerprint which has been used to determine the age and origin of various water samples. The amount of deuterium detected in the water vapour of comet 67P is around three times higher than the average on Earth, suggesting that, despite their high ice content, comets are unlikely to be the main source of terrestrial water.

This evidence supports the theory that water instead came from asteroids, whose deuterium levels are more consistent with those on earth. Like comets, asteroids are small objects orbiting the sun which could collide with the Earth. Most asteroid collisions are known to have taken place around 3.8 billion years ago – giving scientists a rough idea of how long water has been here.

The finding coincides with the publication of results from NASA’s Cassini mission which indicate a large reservoir of ice or water below the surface of Mars. Their results show that the ratio of deuterium to hydrogen in this reservoir is closer to that of the Earth than to the levels previously recorded in the Martian atmosphere, suggesting that the water on Earth and Mars share a similar origin.

More detailed studies of the composition of the comet are planned as Rosetta continues its orbit. A series of ‘flyby’ maneuvers, in which the craft will move to within six kilometeres of the comet, are scheduled for early this year. It is hoped that these experiments will identify some of the complex organic species present during our solar system’s formation, which may even provide clues to the origin of life.

Harry Grover

Expansion Microscopy

Researchers at M.I.T. have recently described the development of a new laboratory technique, expansion microscopy (ExM).

The method physically inflates cultured cells or tissue using polymers that swell in water, the same polymers found in disposable nappies, allowing the tissue to be viewed using standard optical microscopes. Optical microscopy is understood to be limited to half the wavelength of light, around 200 nm, described by Abbé’s diffraction limit. For many years scientists have tried to overcome this limit and last year, three scientists were awarded the Nobel Prize for their work on super-resolution fluorescence microscopy.

Boyden’s group, at M.I.T., infused the monomers sodium acrylate and acrylamide and the crosslinker N,N’-methylenebisacrylamide into chemically fixed brain tissue and cultured cells. Free radical polymerisation was initiated using ammonium persulfate and the accelerator tetramethylethylenediamine. Dialysis in water then gave a 4.5-fold expansion uniformly across all dimensions. They also designed, and incorporated, a fluorescent label consisting of a fluorophore, an oligonucleotide which is capable of binding to a specific protein sequence, and a methacryloyl group that is capable of participating in the polymerisation.

The group were able to image the microtubules in the cultured cells using a standard confocal microscope. When compared to the images obtained from super-resolution structured illumination microscopy, generally the images were just as clear and detailed, while in some cases the images were in fact sharper. When observing mouse brain tissue utilising this technique, the group were able to identify structures at around 70nm resolution, previously beyond the limit of the equipment they were using. Boyden and his co-workers are already discussing performing larger expansions to provide a higher resolution. There is some scepticism around this method due to the way in which the samples must be processed but generally the group have garnered a lot of interest in this technique.

Ashle Butler
A short history of the periodic table of elements

Döbereiner and Newlands’s concept of triads, which unwittingly showed that the properties of the elements in order of atomic weight appeared to repeat within collections of 3 elements. The true genius of Mendeleev’s work was proven by his use of his table to predict the properties of as-yet-undiscovered elements at the time. He named them based on those surrounding the gaps; eka-aluminium, eka-boron and eka-silicon were later discovered and named as gallium, scandium and germanium. The properties of the elements predicted by Mendeleev matched the actual properties very closely, cementing his table as the standard.

Zoe Smallwood

Elemental Factfile: Mercury

Mercury is one of only two elements that are liquid at room temperature, the other being bromine; its liquid state explains the alternative name of quicksilver. Mercury’s namesake is the Roman god, whose speed was renowned. Although it appears unrelated, the chemical symbol for mercury (Hg) also describes its properties; the symbol stems from the Greek “hydrargyros”, meaning ‘water-silver’.

Although it is normally associated with its use in thermometers, mercury is also used for measuring pressures (described by the unit ‘millimetres of mercury’, mmHg). Many people also associate mercury with dental fillings, however in reality an alloy of silver and mercury is used, with the formula Ag₃Hg₄. Mercuric nitrate was traditionally used in hat making, however the high toxicity of this compound caused many health problems for the workers exposed to it. This is where the term ‘mad as a hatter’ originates.

Zoe Smallwood

A conversation with Prof. Mike Ward

Since the start of 2015 Prof. Mike Ward has been the new Head of Department. Friederike Dannheim starts a conversation to find out more.

How did you get into chemistry?
I went to university to study natural sciences at Cambridge. I liked the natural sciences degree, because in the first year you don’t have to specialise. I went with the plan to do physics later, but the physics there was extremely hard! The chemistry on the other hand was a lot easier than expected. So at the end of the year it was an easy decision and I decided to specialise in chemistry. I then stayed in Cambridge to do a PhD in inorganic chemistry. During that time I decided that I liked research and wanted to become an academic.

So, how did you end up in Sheffield?
After finishing my PhD in 1989, I did a postdoctoral research fellowship. For that I went to a university in Strasbourg to work with the distinguished chemist Jean-Pierre Sauvage. After a year there I started applying for jobs, and I got a lectureship at the University of Bristol. I spent 13 very happy years in Bristol, and then I moved here in 2003 as a professor in inorganic chemistry. Dur- ing that time I decided that I liked research and wanted to become an academic.

Yes. I was Head of the Department from 2007 to 2011 and then Professor Jackson took a turn. And now I will be doing it again from January of 2015.

Why have you chosen to return to the post?
Again, there are two reasons. For one, because the rules about student recruitment are changing, which puts us under a bit of pressure, and I and a lot of other people thought that it is not a good time for someone inexperienced to fill the post. The other reason is that most of the other senior people in the department who would qualify for the position basically need to be left alone because they are bringing in quite large research grants and are doing spectacularly well at research. When you have people that good, you don’t give them a big administrative job to do.

Last but not least, do you have any curious hobbies?
I’m a keen photographer, a bit of a camera geek. It goes really well with my travelling. I travel a lot through work: I’ve been to China three times this year for example. I always take my camera gear with me and I try to find a day or two to walk around and explore whatever city I’m in and take photographs of what I see. Other than that I run around after my children, like all middle aged people do.

Friederike Dannheim
Triads and trends

A short history of the periodic table of elements

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Elemental Factfile: Mercury

Adorning the walls of countless classrooms and lecture theatres worldwide, the distinctive shape of the periodic table is a familiar sight to many. Dmitri Mendeleev, a Russian chemist, is credited with arranging the elements into the rows and periods we are all familiar with. However, the periodic table had many versions before the one we see everyday.

Although some of the elements had already been discovered, initially they were not grouped by any properties or trends. In the early 1800’s, Johann Döbereiner developed the concept of triads, which explained trends in properties within collections of 3 elements. Later, a breakthrough came from a chemist by the name of John Newlands, who placed the elements in order of atomic weight, and noticed that certain properties appeared to repeat. He described this as the Law of Octaves; although it is normally associated with its use in thermometers, mercury is also used for measuring pressures (described by the unit ‘millimetres of mercury’, mmHg). Many people also associate mercury with dental fillings; however in reality an alloy of silver and mercury is used, with the formula Ag₃Hg₄. Mercureic nitrate was traditionally used in hat making, however the high toxicity of this compound caused many health problems for the workers exposed to it. This is where the term ‘mad as a hatter’ originates.

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Interview

Zoe Smallwood

Friederike Dannheim

Mike Ward

Date 2015

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What’s more, if you’re a first or second year undergraduate, getting involved counts towards your Higher Education Achievement Report (HEAR).
Anyone can join, regardless of experience. If you’re interested, contact us on Facebook or drop us an email: chem-news@sheffield.ac.uk

Resonance Recommends:
Here we present you with a selection of our favourite sources of science communication to peruse at your leisure.

Matt: Why Don’t Penguins’ Feet Freeze? And 114 Other Questions
This great little book is one of a collection in which questions posed in the New Scientist magazine about everyday phenomena are answered by their readers. I think it’s great for dipping in and out of, and is a really interesting read. Many of the questions have more than one possible explanation provided, leaving you to decide which you like the look of more.

Harry: What If?
Randall Munroe, creator of stick figure comic xkcd, fearlessly tackles some of the most bizarre, pointless, and frequently macabre questions facing modern science. Ever wondered how long you could expect to live if your DNA suddenly disappeared? It turns out, a surprising number of xkcd fans have – and Munroe is looking for answers.

Michaela: BBC Inside Science
This BBC Radio 4 programme airs on Thursdays at 16:30. Adam Rutherford and guests enlighten the wonders and controversies of science affecting the world we live in. Each episode covers a variety of topics that can range from the origin of water on Earth to the designer of May Britt Moser’s dress for this year’s Nobel Prize Award ceremony in Stockholm, Matthew Hubble.

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Things you can do in less than 10 minutes

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Events Listings

Science Week 13th-22nd March
Discovery Night
Friday 13th March, 4:00-8:00pm, Firth Court and Western Bank
Chemistry in Space- Dr Anthony Meijer
Tuesday 17th March, 6:00pm LT1
Polysaccharides, Polyphenols and Pilsner:
The Chemistry of Beer- Charlie Bamforth, President of the Institute of Brewing and Distilling
Thursday 19th March, 5:30pm LT1
8th Annual RSC Pub Quiz
Thursday 26th March, 7:30pm, Bloo88
ChemSoc Annual Ball
Saturday 25th April, Bloo88 then onto Royal Victoria Holiday Inn
After Easter – ChemSoc AGM further details tbc

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