

The race to equality

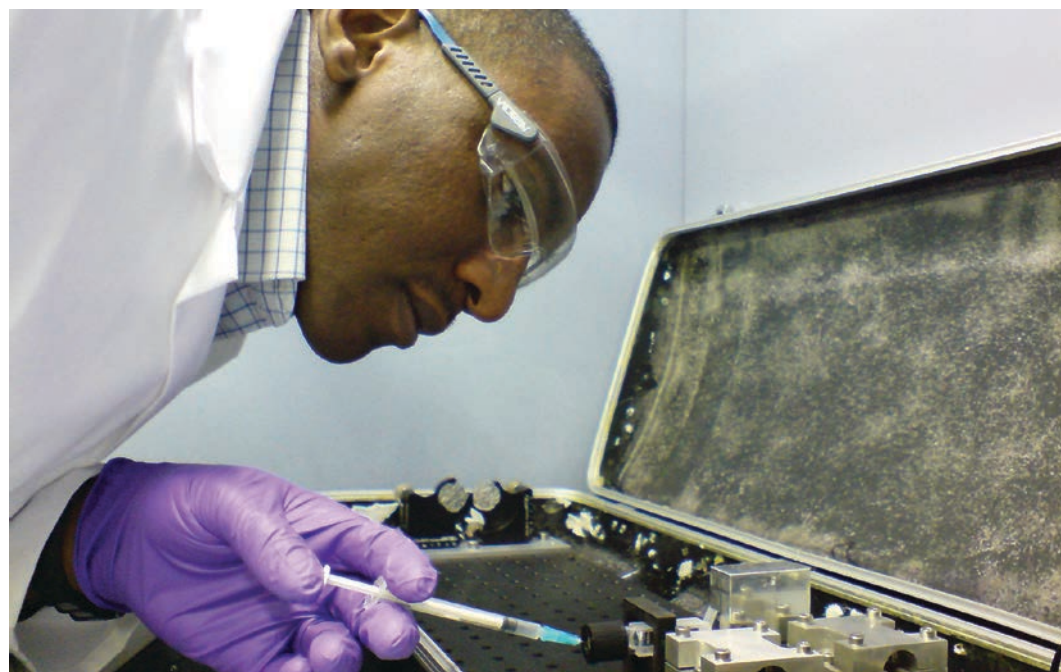
Nina Notman looks at the group and individual efforts to promote racial equality and increase the representation of black and minority ethnic students and staff in academia

In the past decade, UK universities have taken great strides in advancing gender equality in the Stemm (science, technology, engineering, medicine and mathematics) subjects. The Athena Swan charter, started in 2005, has been a key part of this change, supporting and recognising the efforts of universities to address the loss of women across the career pipeline. Coordinated by the Equality Challenge Unit (ECU) – a charity funded by UK higher education organisations – 134 UK institutions currently hold over 500 Athena Swan awards between them.

In January 2016, the ECU will launch the Race Equality Charter Mark. Its remit: to improve the representation, progression and success of black and minority ethnic (BME) academic staff and students. ‘Race is incredibly emotive and difficult to talk [about] and universities were struggling as to where to start,’ says Claire Herbert, an ECU senior policy advisor. ‘We took the decision that it would be useful to set up a framework for them to work through, to bring the success Athena [Swan] has had in gender equality to race equality.’

Attainment gaps

There is little doubt about the extent of the current disparity in race equality in the UK. In 2014, a report commissioned by the Royal Society crunched the Higher Education Statistics Agency’s 2011–2012 numbers, finding that within chemistry departments 19.1% of EU-domiciled undergraduates (students that normally reside in EU countries) and 28.1% of masters students were from BME groups. These proportions plummet at each stage of the career pipeline, falling to 11.8% of EU-domiciled postgraduate students, 8.4% of researchers, 7.2% of lecturers, with finally just 2.9%



Mark Richards is working to encourage British students of Caribbean ethnicity to apply to top universities

of chemistry professors from BME groups. The latest available Office for National Statistics data estimate that around 12% of the English and Welsh population are from BME groups.

None of these proportions are directly comparable. For

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example, current BME chemistry professors will have been students at a time when a smaller proportion of their peers were from BME backgrounds. The trend is also less clear when factoring in how the proportions vary between each BME group

and sexes within these groups. Nevertheless, the data suggest the possibility of a leaky pipeline.

The considerable gap between the proportion of UK-domiciled BME students receiving first or 2:1 degree classifications is also cause for concern. According to the ECU, in 2012–2013 around 57.1% of UK-domiciled BME students received a top degree compared with 73.2% of white British students – an attainment gap of 16.1%.

The US statistics tell a similar story. Around 63% of US residents are white, according to the latest US census. However, a 2013–2014 survey of the top 50 US chemistry departments, conducted by the US-government funded initiative Oxide (Open Chemistry Collaborative in Diversity Equity) in collaboration with *Chemical & Engineering News*, found that 82% of their academic staff were white.

Investigations into this 19% disparity have revealed a complex story. For example, those of Asian

or Pacific islander ethnicity (considered together in the survey) are over-represented, holding 13% of the faculty positions while only representing 5% of the overall US population. This means the remaining approximately 5% of faculty positions are held by so-called underrepresented minorities (URM) that compose around 32% of the overall population, including African American, Hispanic, Native American and multiracial academics.

Like in the UK, this survey found significant drops in the representation of minorities as the faculty rise through the ranks and earlier surveys uncovered a significant drop in URM proportions at later career stages.

Rigoberto Hernandez, Oxide’s director and professor of chemistry and biochemistry at Georgia Institute of Technology, Atlanta, explains that as well as data collecting and evaluating the status quo, Oxide takes a top-down approach to improving

equality within US university chemistry departments. ‘We work with the chairs of the chemistry departments to try to change policies and procedures in a way that lowers barriers for everyone,’ says Hernandez. ‘The difference is that the barrier is greater for a member of an underrepresented group than for everyone else.’

Sign of quality

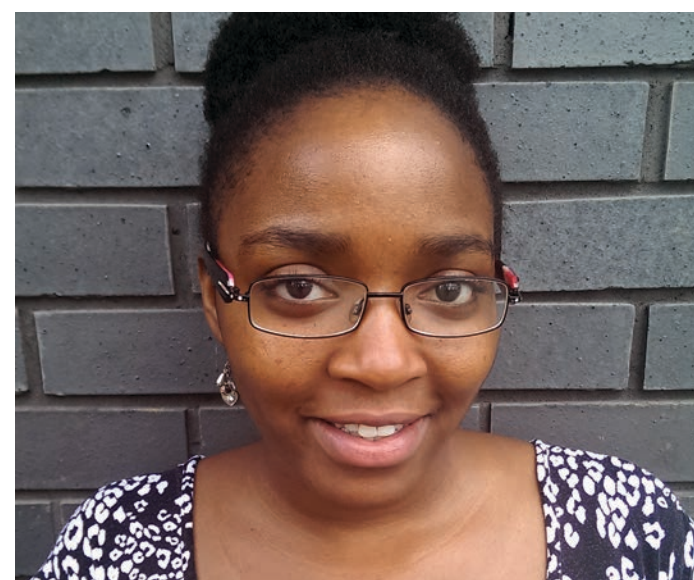
The ECU’s Race Equality Charter Mark also takes a top-down approach, and is currently only available at the institutional level. The ECU completed a pilot of the application process in August 2015, with eight of the 21 participating universities receiving a bronze award. ‘For Athena [Swan], first time bronze applicants’ success rate is around 50%,’ explains Herbert. ‘We therefore thought the race [equality charter mark] chance of success rate was reasonable.’

The success rates are indicative of the rigorous standards for these charter marks. The application process for the Race Equality Charter Mark is ‘really quite

The number of black people really falls off... it can be very lonely

intense,’ explains Debbie Epstein, diversity and inclusion manager at King’s College London, which earned a bronze award in the pilot study. ‘There’s extensive data gathering and analysis and a survey that looks at issues particular to race for both staff and students.’ With the help of focus groups and networks, an action plan for the next three years must also be compiled.

After this time, universities must demonstrate they have worked toward that plan – and put another in place – to renew their mark (they can also ‘upgrade’ marks stepwise to silver and then gold). ‘For us this [award] is just a starting point,’ says Patrick Johnson, head of equality and diversity at the



Marion Brooks-Bartlett teaches a Saturday school to support BME students

University of Manchester, which holds a bronze Race Equality Charter Mark. This continual development process is ‘what we like about this [award] compared to other awards,’ he explains.

Yet even outside awards, changes are emerging at a grassroots level. As with many situations in life, aspiring BME students and young researchers will often look to role models and mentors for inspiration and practical advice to overcome any barriers to success they may perceive.

Diversity DJ

One such person is Mark Richards, senior teaching fellow and head of outreach at the Imperial College London’s physics department. Richards’ parents moved to the UK from Jamaica in the 1960s. He was born in Nottingham in 1970 and grew up in the vibrant Caribbean community there.

When Richards left home to go to university, he wanted to maintain strong links with that community. ‘I always felt that it was important to keep my connection with that, because that’s part of what made me what I am,’ he says. ‘For me, being a DJ was a good way of doing that.’ Richards started his musical career – under the pseudonym DJ Kemist – during his undergraduate chemistry degree at the

through those difficult teenage stages so that they could become potential students here.’

Richards says a two-pronged approach is needed: aspirations and preparation. He has been involved in initiatives that both bust the myth that ‘Imperial doesn’t take students from our school’ as well as those that help students obtain top grades at A-levels. ‘Some schools are better at, say, converting an A to an A* than other schools,’ he explains.

Head of the class

Another scientist with Jamaican roots who is passionate about ensuring equality is Marion Brooks-Bartlett, who has just been awarded a chemistry PhD jointly from University College London (UCL), UK and Uppsala University, Sweden.

‘I want to be involved straight away when I hear that a project to promote diversity is going on,’ she says. At UCL, Brooks-Bartlett sits on the self assessment team for the chemistry department’s Athena Swan award (they currently have bronze status), and is a founding member of the Royal Society of Chemistry’s inclusion and diversity committee. This committee has a wide remit, including advising on how best to ensure RSC-run activities are inclusive and preparing best practice reports for both universities and industry.

Brooks-Bartlett also teaches at a Saturday school run by the Croydon Supplementary Education Project that focuses on supporting the Croydon BME school-aged community. ‘I’m teaching GCSE science and part of my role is to also talk about black history with the students.’ Like Richards, her motivation is to encourage engagement: ‘There is a huge drop off with achievement for ethnic minority groups as you go from Key stage 2 [age 7–11] to Key stage 3 [age 11–14]. It’s melting down from a really young age.’

UCL was one of the universities to be awarded the bronze Race Equality Charter Mark in the pilot. And Brooks-Bartlett is excited about seeing the university’s three year action plan coming to fruition. ‘The number

of black people really falls off [for PhD students compared with undergraduates] and it can be very lonely,' she says.

Faith in fairness

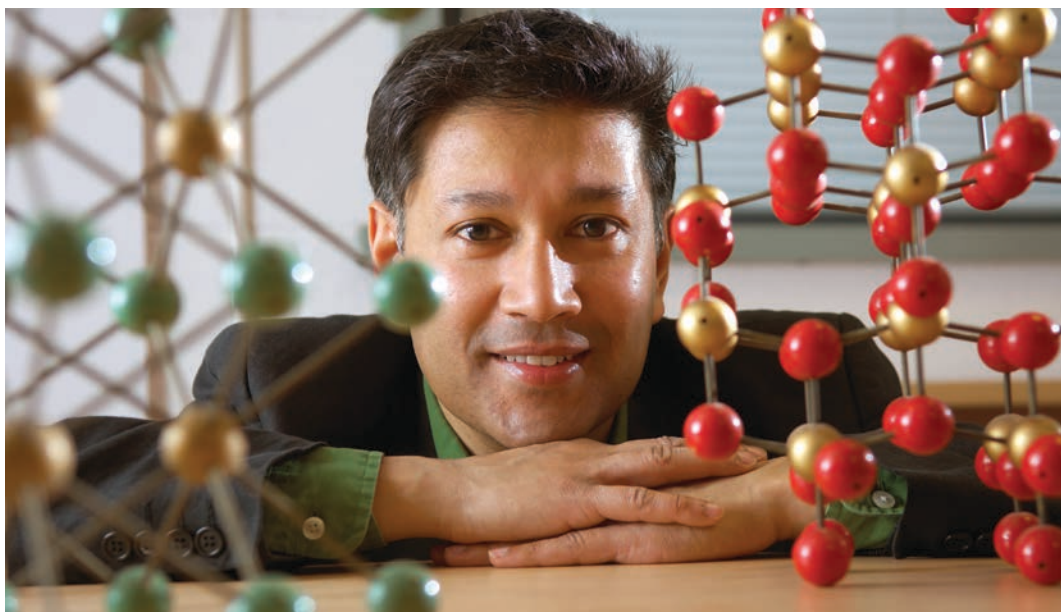
Earlier this year, the Royal Society launched a diversity committee to promote diversity across the breadth of the society's activities. Saiful Islam, professor of materials chemistry at the University of Bath, is a member. Islam was born in Pakistan to Bangladeshi parents and moved to London in 1964 aged one year. 'Then war broke between the two Pakistans – west and east – and we stayed in the UK,' Islam explains.

Life in the UK for a young British Asian at that time wasn't always easy. 'As a teenager in the late 1970s, there was verbal racist abuse and violent abuse as well; I'd get beaten up by skinheads,' Islam says. By contrast, Islam's personal experience of academic life has been welcoming and inclusive.

Prior to the formation of the Royal Society's diversity committee, Islam served on its predecessor: the equality and diversity advisory network. 'The diversity committee formed this year has proper standing committee status of the Royal Society,' he says. This is an indication of how much importance the Royal Society is now giving to ensuring equality across its activities and to increasing participation from underrepresented groups. 'The Royal Society feel that diversity is essential in delivering excellence in Stemm and that studying and working in science should be open to all,' Islam explains. 'I got involved is because I've always believed in greater fairness and equality in society in general.'

As an atheist and humanist, Islam has an awareness of other prejudices. 'I sometimes wonder about the kind of reaction my name gets, especially now with aspects of religious extremism.'

Islam also participates in outreach activities and is a regular speaker for The Training Partnership, which provides study days aimed at inspiring and motivating GCSE and A-level students. 'I give lectures to 900+ A-level students using 3D specs.



Saiful Islam sits on the Royal Society's diversity committee to promote science participation in underrepresented groups

It's great to see really mixed audiences coming from different backgrounds,' he says. 'In my talk I mention that I went to a comprehensive school in Haringey, north London; I give a positive message that that science is for everyone, but you do need support. One factor in my success was having some good mentors along the way.'

Taking the initiative

Malika Jeffries-El, associate professor of chemistry at Iowa State University, US, is a member



Malika Jeffries-El helped establish the ACS Women Chemists of Color program

of the Oxide advisory board and has participated in a number of American Chemical Society (ACS) diversity initiatives. As a female African American, Jeffries-El says she is very aware of her minority status in the scientific community.

'When I first got started in science, I really just wanted to do science. But I started to realise that I couldn't ignore the role that gender and race both collectively played in my experience,' she explains. 'I have had a good

support network of people who have helped me advance. But I have also encountered people who have been detrimental to my success. If I didn't have this other half to counterbalance it, I don't think I would be where I am.

'I realise that there's another population coming behind me who may not have connections and opportunities, and if they come across these negative people early in, they're going to just leave.'

Jeffries-El helped set up the ACS Women Chemists of Color program and is now one of its advisory board members. 'There were ACS programmes that served women and there was a committee on minority affairs,' she says. 'But it was identified that [women who are also from a minority ethnic group] have a different set of issues and needs that may not be being specifically met by either group. And we therefore started doing activities around that.'

The initiative raises awareness, gathers data and runs networking events and symposia. Jeffries-El is also heavily involved in promoting diversity at Iowa, and plans to continue in that vein when she moves Boston University in January.

Nina Notman is a science writer based in Salisbury, UK

Perfectly in tune

May Turner tells Phillip Broadwith how she balances topping the music charts with developing the latest generation of engine oils

Not many professional chemists can also claim to have hit the top spot on a UK music album chart. May Turner, a technology manager at BP, is one of the few.

'I'm very passionate about music, and I've always played a lot of instruments,' she says, 'but singing is my main passion.' Having sung throughout her time at university, she was keen to continue after leaving. 'I now sing with a very good chamber choir in Oxford.'

'We were fortunate enough to record an album of Christmas music by a contemporary composer, which ended up going to number one on the specialist classical chart either side of Christmas 2013,' Turner explains. 'We even got a slot singing live on BBC Radio 3.' The choir is non-professional, she adds, and is coincidentally full of scientists and other people with analytical minds, like doctors, surgeons, accountants, mathematicians, with very few trained musicians. 'It's a lovely thing to do, completely different from my day job.'

Slick design

When not singing, Turner is involved in managing BP's lubricants products across Europe and Africa. That involves working across various teams, from product development to bring together new formulations, though marketing and supply chain, to speaking directly to customers to understand their requirements.

After completing her PhD in heterogeneous catalysis and surface science with Richard Lambert at the University of Cambridge, Turner knew she wanted to work in industry rather than academia. 'That was the plan all along,' she says. 'I wanted to get involved with applying technology to improve things in everyday life.'



IMAGE COURTESY OF MAY TURNER

I wanted to get involved with applying technology to improve things in everyday life

designed for engines of all sizes, from tiny motorcycles to trucks. 'It's important to understand the differences in formulation, and the different requirements of those engines, as well as the requirements of the customers using them,' she explains.

She applied to BP's graduate scheme for chemists. It appealed because of the variety of roles available across a broad range of chemistry disciplines. She secured a position at BP's technology centre in Pangbourne, UK, where the company develops new fuel and lubricant products. 'Product development was what attracted me – using technology to make things that people can actually use,' she says.

The work involves every part of the recipe that makes up, for example, an engine oil – from performance-enhancing additives to choosing and blending the base fluids.

'When I joined, I didn't have any background in lubricants, and that's where the training really kicked in,' Turner says. She was surrounded by a mixture of specialist automotive engineers and tribologists, as well as more general chemists. 'The intention is to have a variety of different people, which generates a lot of new ideas.'

Through two years on the graduate scheme and a further three in product development, Turner worked on lubricants

Driving success

When an opportunity arose to transfer to a different team, Turner saw a chance to get involved in the next stages of the product lifecycle – transforming the recipes she'd been developing into commercial-scale products and getting them to customers. 'You need a technical background to do that, because you need to understand what goes into the product and how to optimise the manufacturing,' she says. But it also involves awareness of marketing – to recognise the properties customers are looking for, analyse trends, spot where there is a need or an opportunity for a new product, and feed those requirements back to the development teams.

Within Europe and Africa there are over 100 territories, with very diverse cultural, economic, geographic and climatic conditions. These pose different challenges and require different products – while European sports cars may need high-performance oils, they don't have to deal with the abrasive sand, harsh climate and extended service times that a mining vehicle would, for example. 'A lot of my role now is about developing technical claims,' Turner says. Business customers need to be convinced that a new product will deliver the performance they need, and want data to back up marketing statements.

Coping with these varied demands draws on skills developed throughout Turner's career, not least her chemistry background. 'I used to think that my PhD research was a very niche area, only interesting to me and a few other people in the world,' she says. 'I've since realised that what I learned then is applicable to a lot of other areas of chemistry, and is still applicable to my job now, although at the time it seemed a million miles away.'

Curriculum vitae

Employment

2012–present
Technology manager for lubricants, Europe and Africa, BP, UK
2010–2012
Senior product development technologist, lubricants, BP
2009–2010
Product development technologist, lubricants, BP
2007–2009
BP graduate technologist in lubricants product development, Pangbourne, UK

Education

2004–2007
PhD in surface science and catalysis, University of Cambridge, UK
2001–2004
MSci Natural sciences (chemistry), University of Cambridge

Interests

Choral singing, cookery