

Profile: Professor Saiful Islam

Professor of Computational Materials Chemistry, University of Bath (from Jan 2006)



Saiful Islam grew up in Crouch End, north London and studied at University College London obtaining his PhD in 1987

under Professor Richard Catlow FRS. He then held a postdoctoral fellowship at the Eastman Kodak Labs, Rochester, New York, working on superconductors and inorganic phosphors. Saiful returned to the UK to become Lecturer at the University of Surrey, where he was promoted to Reader. In Jan 2006, he takes up a new appointment as Professor of Computational Chemistry at the University of Bath.

Saiful's interests lie in the field of inorganic solid-state chemistry, and has established an international profile in computer modelling studies of new energy materials related to fuel cells and lithium batteries. He has served on the Editorial Board of the *Journal of Materials Chemistry* and sits on the Council of the International Society of Solid State Ionics. He is currently Chairman of a RSC Faraday Discussion meeting on Atomic Transport and Defect Phenomena in Solids (2006).

Saiful is married with two young children and enjoys family life, art exhibitions, *The Guardian* and football. He has twice run the Windsor half-marathon, raising funds for the charity 'Afghan Reading Project'.

When did you decide to study chemistry? Did you have any other early ambitions?

I remember as a 15 year old being excited about a project on growing crystals and also going to the Royal Institution to hear an inspiring lecture on colours and light given by the late Professor George (Lord) Porter. Until then I hadn't realised that you could do chemistry as a job. However, there was a bit of parental pressure to become a doctor. Thankfully I resisted, although I did marry one! Other ambitions? Apart from the usual footballer dreams, I loved English Literature at school largely due to the exam text 'To Kill a Mockingbird', but I didn't have the confidence to take English as a degree.

Your work involves computer modelling. Where would we be in your field of research without this tool?

As someone once said: 'You may be a chemist, but you don't wear a white lab coat!'. Computer modelling tools have allowed us to probe complex materials (ceramics, catalysts) on the atomic- and nano-scale. Modelling can reveal information that is difficult to extract from experiment alone; for example, unravelling the motion of ions in solids. My work has strong links with experiment, where we aim to guide and stimulate research on functional materials such as lithium battery electrodes. In general, modelling techniques are important in revealing the intricacy and beauty of matter at the atomic level. I think this can be as creative and visually aesthetic as the arts.

Much of your work is related to fuel cells - do you think these will be the most important source of sustainable energy in the future?

Reducing the environmental problems and geopolitical effects of using fossil fuels are major challenges. I think that in the future we will require a more diverse, sustainable mix of cleaner technologies from renewables (wind, wave, solar) to fuel cells and rechargeable batteries. Both hydrogen fuel cells and batteries are being developed for cars, while solid oxide fuel cells are suitable for heat and power in homes. Yes, there are still oil reserves, but I'm reminded of the quote: 'The Stone Age did not end because of the lack of stone'.

What do you think has been the most significant breakthrough in the chemical sciences in the last 10 years?

It's difficult to pick just one. My highlights include: nanomaterials such as functional nanotubes; metal-organic frameworks; superconductivity in MgB_2 ; organic LEDs; decoding the human genome and widely usable computational chemistry tools.

What are your ambitions for your research? What would you like to achieve over the next 10 years or so?

It would be great to be part of significant breakthroughs on new materials for sustainable energy technologies. I would like to expand the computational-experimental synergy into innovative areas such as novel

apatites for lower temperature ceramic fuel cells, unusual oxyfluorides and nanostructured battery materials (for hybrid electric vehicles), all helped by the growth in supercomputer power. My battery research will form part of the new EPSRC Supergen Energy Storage consortium. As an unlikely achievement, how about discovering the first room temperature superconductor!

Chemistry in the South has taken a hit with the closure of Exeter, Kings and QMUL. Has this had a knock on effect at your university?

After a tough period, student demand is up with record chemistry intake this year at Surrey and Bath. I'm always optimistic and think that the future should be good. Recent closures are largely due to the high costs of teaching chemistry and insufficient funding (from HEFCE). The RAE is also leading to a concentration of research funding. Unfortunately, some university vice-chancellors only look at the short-term financial bottom line. Chemistry underpins so much of modern science and the chemical industry is still one of the most successful UK manufacturing industries.

Is there a particular ability or talent that you don't have that you have always wanted?

I wish I could play a musical instrument really well. I tried to learn to play the guitar during my A-levels. I only managed a few chords of some Beatles songs, but would love to play like Johnny Marr from my favourite band, The Smiths.

Do you have a favourite author? What are you currently reading?

Fiction: the South American author Gabriel Garcia Marques. His rich, dazzling 'One Hundred Years of Solitude' is still my favourite novel. More recently, Ian McEwan for his intricate, gripping book 'Atonement'. Non-fiction: the evolutionary biologist Richard Dawkins. His 'Unweaving the Rainbow' is essential reading for conveying the sense of beauty, wonder and excitement of science. Lately, however, I've become terrible at finishing books apart from my children's bedtime stories!