

# BMSS Medal Winner: Prof Gareth Brenton

**Q** How did you first get started in mass spectrometry?

**A** My first two degrees were in Physics; during my PhD (1974-77) I built a magnetic sector spectrometer to study positron-atom scattering. At that time universities provided great workshop facilities which postgraduate students could access and use for their research, and I often fixed parts of my VW Beetle car there when required. On completing my PhD I was advised by Peter Thonemann (Director of the Oxford ZETA (fusion reactor)) to work in CERN or PostDoc with a good group. I applied to the Canadian Research Council and also to Professor John Herbert Beynon FRS. I remember that interview with John Beynon in September 1977, as if it was yesterday. An Oxford PhD and I were interviewed together; I thought it rather strange that the two candidates were interviewed at the same time? Beynon didn't probe us with

detailed MS questions; we cheerfully talked about different aspects of science. Both of us knew little about mass spectrometry and later that afternoon Beynon offered me a position, and asked that I accept, or not, in double quick time.

The laboratory he showed us around fascinated me, I couldn't believe that I would be allowed to handle these fascinating devices called mass spectrometers. It was the first time I'd seen a double focussing MS, it looked just like the starship Enterprise with a console, flashing lights, levers, valves and dials everywhere. I accepted his offer and worked there for two years. Research focussed on physical mass spectrometry, chemical physics and instrument development, particularly on the new ZAB mass spectrometer recently acquired on a joint grant to Beynon (Swansea) and Dudley Williams (Cambridge). John was always at the forefront of developments; the work was

both interesting and challenging. He taught his PostDocs and students how to conduct research in a thorough and critical manner; writing up research was the highest priority and I would work back late to get a draft in early for his close inspection. Beyond that he largely relied on one or two PostDocs to run his group, supported by numerous visiting scientists (and friends) and a large troupe of PhD's who he relentlessly drove. I took the opportunities and was grateful.

**Q** What are you most proud of in your career?

**A** PhD students and PostDocs I have trained. As most enter Industry I feel that we've made a significant contribution to mass spectrometry manufacturing and analytical industries throughout the UK and the world. There have always been great career prospects for trained mass spectrometerists of any flavour.

**Q** What makes you want to come to work in the mornings?

**A** This is really simple - 'money'. At the start of my career it was certainly about the challenges and interesting research projects; that lasted until I was 45. Then I became more involved in administration, it happens, and that is scientifically dull, but well paid.

**Q** Who are your scientific heroes?

**A** Richard Feynman, the flamboyant American physicist who made quantum chromodynamics 'simple' with his Feynman diagrams. He reduced the complexity of the maths to simple interaction diagrams requiring only hand-drawn cartoon-like line sketches to describe fantastic sub-atomic interactions



and transformations. That's the essence of good science - reducing the complex into something simple, a method I try to incorporate into teaching and research. Feynman was also 'an interesting character', he played the bongo drums, caught the FBI's attention in the cold war anti-American hysteria of McCarthyism and was single-minded enough to brush off political forces to solve the 1986 space shuttle disaster. That is one disappointment of modern times that we are kept too busy to become 'interesting'.

Other notable heroes are Graham Cooks, in mass spectrometry, and the many engineers in industry who develop the instruments and methods we all enjoy.

At an academic level a great hero is Bertrand Russell, a fellow Welshman, philosopher, logician and mathematician. During my degree I looked very briefly at some of the work of Russell and Whitehead and found it took them approximately 300 pages to prove that  $1 + 1 = 2$ ! It was at this stage I gathered pure mathematics was too tricky and obscure for me.

**Q** What advice would you give a scientist starting out in mass spectrometry?

**A** Follow your instincts, do what do you think is 'fun' and challenging. It is most important that you incorporate fun in your working life. Otherwise, I provide the advice



of my good friend Robert Boyd - "Gareth, the only thing worse than giving advice, is to give good advice!". Be numerate, keep up to date by reading and writing, as "Brains and bulls\*\*\* will beat most of your adversaries".

**Q** What does the BMSS mean to you?

**A** I have been a member of many societies and BMSS is by far the best amongst those because of its connections with Industry, its broad membership base and comradery. BMSS's early constitution was well written, enforcing regular turnover of those who lead the Society. That has led to a healthy Society not dominated by long serving individuals or groups. I only encourage BMSS to continue to have low membership fees and bursaries for students. Long may that continue.

**Q** What has been your contribution to the development of the next generation of mass spectrometerists?

**A** Training young scientists in instrumentation development, ion optics and fundamentals. I'm well aware that there are few academics prepared to take on large-scale instrumentation projects, particularly from scratch! These can be challenging for even the finest students (they don't realise this at the start 😊), as progress can seem interminably slow with equipment being built only functioning satisfactorily towards the end of the project. However I do believe it is important to train scientists to understand the fundamentals of ion optics, instrumentation, computing and all the other techniques that we rely upon to solve problems.

Ruth Godfrey and I also developed the first UK Masters course, in 2010, entirely devoted to Mass Spectrometry and its Applications.

**Q** What do you think the future holds for mass spectrometry?

**A** I see a great future for mass spectrometry, although many consider it a mature technique. There are so many aspects of the

subject that if one area declines another is probably already emerging. I see the application of mass spectrometry becoming more robust with routine instrumentation widely applied within health sciences and analytical sciences - 'A mass spec in every clinic or every lab or fume cupboard'. Mass spectrometry's sheer sensitivity and versatility means it will be around for a long time to come - your job is to seek out and develop applications employing the new generation of reliable instruments that will steadily come through. Perhaps you might even be brave enough to make your own equipment or modify one stuck in the corner.

