
At an exquisitely multidisciplinary and international meeting, scientists, anthropologists, sociologists, historians and artists came together to probe how historical interpretations can inform the role of women in science today. International Innovation reflects on the highlights of this conference, which stimulated some fascinating debates and brought to light numerous connections between past and present.

Women In Science Research Network

Revealing Lives was organised by the Women In Science Research Network (WISRNet), a cross-disciplinary collective of academics, archivists and practising scientists whose mission is to examine the role of women in science from a historical perspective.

In addition to this conference, WISRNet has organised a number of workshops on subjects such as the role of oral histories in uncovering women in science and using archives for history of science research. The Network has also established a shadowing scheme for PhD students and early career researchers in the history of science.

Conference roundup

Blurring the distinction between the work of scientists, historians, archivists and anthropologists, Revealing Lives brought a wealth of enquiring multidisciplinary minds together to present, discuss and debate the historical perspective of women in science. The broadly international speakers presented their work within six different themed sessions:

- Representations of women scientists
- Women’s experiences in science
- Biography
- Gendered roles in science
- Gender identities and science
- Scientific networks
Panel discussion: Doing women’s history in a digital age

In a lively and engaging debate, representatives from digital initiatives established to document, disseminate and analyse the experience of women in science discuss the challenges and opportunities that digital and social media present for understanding, investigating and engaging with others. Here, International Innovation presents extracts from their project introductions.

Psychology’s Feminist Voices

PhD student JacY Young explains the premise of the Psychology’s Feminist Voices project at York University, Canada.

www.feministvoices.com – @FeministVoices

This is an online encyclopaedia and digital archive that started in 2004 as an oral history project to try and capture some of the voices and experiences of feminist psychologists. [...] The project is run by Dr Alexandra Rutherford at York University but the bulk of the work is done by undergraduate and graduate students.

The ‘Women Past’ section of the site features 122 women who received their PhDs in Psychology prior to 1960 and, for many of these women, there is no relevant Wikipedia entry and they would be otherwise lost to any individual looking for them on the Internet. The other half, ‘Feminist Presence’, contains profiles of contemporary feminist psychologists.

Oral History of British Science

Dr Sally Horsnocks from the University of Leicester, UK, is Senior Academic Advisor to the Oral History of British Science.

www.bl.uk/historyofscience

The Oral History of British Science project is based at the British Library. [...] From the outset it was very important to tell the story of British science through the words of those involved. [...] The full interview and transcripts are on the British Library Portal, [...] which scholarly users might come to if they are interested in 30 hours of interview and they can listen to it or read the transcripts [...] The other key thing was creating a website to show people why the material is interesting and important, and to make it accessible for a range of users.

On the website you can click through and search interviewees, themes and disciplines, and it starts off with a few selected clips from interviews. There was very strong pressure to make women more prominent on the website than they actually are in the interview collection [...]. It is a great resource for material on women in science, not least because a lot of the men talk about their relationships with female colleagues.

H-Word blog at The Guardian

As a blogger for The Guardian’s ‘The H Word’ blog, Rebekah Higgitt describes her experiences of tackling the issues surrounding the history of women in science.

www.theguardian.com/science/the-h-word

My interest is in getting the history of science to wider audiences. The H Word sits within The Guardian Science Blog network and, [Rebekah Higgitt and Vanessa Heggge] are historians [...] When the history of women in sciences arises on the blog, issues of gender are not presented in the context of specifically looking at women in science in the past, but instead we cover topics of great interest such as Ada Lovelace Day.

In one blog post I wrote on the topic, I said that, although there were problems associated with trying to seek out women, one of the positive outcomes is that it makes us think about history in a different way, and what contributions might count in science.

Darwin Correspondence Project

Dr Charissa Varma from the University of Cambridge is involved in the Darwin Correspondence project – turning the great naturalist’s letters into an educational resource.

www.darwinproject.ac.uk – @MyDearDarwin

The Darwin Correspondence Project finds and researches all known letters to and from Charles Darwin. We transcribe and publish letters, along with notes and appendices, in order to make them understandable and useful to today’s readers. The archives are located in the Cambridge University library.

The project published the first volume of the correspondence in 1889 and we keep publishing them. You can read the introductions of the published volumes on our website, where you can also search the letters. We have sorted the letters into themes where you can read short illustrative essays on topics such as Darwin’s life, geology, life sciences, gender, nature and religion. We have teaching resources for schools and universities that come complete with carefully selected letter sets.

TrowelBlazers

Bioarchaeologist Dr Brenna Hasset introduces TrowelBlazers – a celebration of historically unrecognised women in ‘trowel wielding’ professions.

trowelblazers.com – @trowelblazers

Trowelblazers is a project that is focused on finding archival images of women in the three ‘trowel wielding’ fields – archaeology, palaeontology and geology. The project started as a conversation between four people on Twitter, who decided there was not enough celebration of these sorts of women who had made such contributions to the field. What we’ve found is an extraordinary network of women that we had no idea existed. [...] This is how Trowelblazers has evolved from a side project into something of an obsession! [...] We are largely crowd sourced; we interact with people and hope that they can tell us about women that we should feature. A lot of this has been people who are involved in journalism and science writing; but also members of the public who have known a woman who was very impressive.
Can you briefly explain your academic background and experiences that have led you to become a champion for women in science?

I have an education and general background in physics: I did my first and second degrees at the University of Cambridge, UK, followed by four years of postdoctoral research at Cornell University, USA, before returning to Cambridge where I became a professor in 1998. As a physicist my research has been on polymers and, more recently, at the interface of physics and biology, for which I have been awarded prizes from a variety of bodies. I was elected a Fellow of The Royal Society (FRS) in 1999.

Wherever I have worked, the percentage of women has been small, as is usually the case in physics. I was always conscious of this but I didn’t see it as an issue until relatively late when I realised (in part due to reading the 1999 report on the status of women at Massachusetts Institute of Technology, USA) that

The historical obstacles have largely been overcome in the sense that there are no explicit hurdles that can stop you in your tracks, but there are so many intangible ones – anything from stereotyping to unconscious bias.

– Professor Dame Athene Donald
women are frequently systemically disadvantaged. This led to me becoming more outspoken on the subject, facilitated by the fact that I was a credible, highly respected scientist in the UK. In 2007, I became Director of the University’s Women in Science, Engineering and Technology Initiative (WiSETI) and subsequently, in 2010, the Gender Equality Champion.

Working in the male-dominated field of experimental physics, are there particular challenges you have faced?

Initially I wasn’t really conscious of this as an issue. The matter became more acute when I started serving on committees where I felt my voice was less heard than it should have been. A crucial thing to do is to find supporters, friends and mentors you trust with whom you can share experiences and from whom to seek advice when the going gets tough. In my case most of these have been men; I think it is important to realise it isn’t only women who will support women.

What activities do you undertake to promote gender equality in STEM?

I write a lot on the subject, both on my personal blog and elsewhere, and I use social media (notably Twitter) to share thoughts on the subject. I think it is these activities, much more than my formal role as University Champion, which have given my voice relative prominence.

My role within the University means that I host many events organised by our Equality and Diversity team; I chair our local Gender Equality Group and talk to different departments about their progress.

How do you think the challenges experienced by female scientists in the present day can be better understood by considering the historical perspective?

I think it is important to realise that there really has been progress! Looking back, it is extraordinary just how few opportunities women had, given to get an education, let alone pursue a scientific career; it is also useful to consider why women have not seemed ‘naturally’ to belong to science. Unconscious bias, still so rife today, stems from these sorts of ‘natural’ attitudes that both men and women are coloured by. This also means that many of the challenges women still face are determined not just by the STEM environment but, much more generally, by our societal values.

Let me say something about unconscious bias – women are just as susceptible as men about falling for the assumption that women don’t do science. Some research was done in the US in which the researchers sent out identical CV’s, labelled with either a male or female name, to male and female faculty members. Both men and women were far more likely to hire the man and pay him more. This demonstrates just how much we are internally programmed to think that a man is better – something I think is a very severe problem because it’s hidden. If you know you have this bias then you are in a position to work a little harder to overcome it.

Going back to my days as a student; when I graduated as an undergraduate, there were women around. I did not realise at the time that they were on soft money – they weren’t ‘real’ academics. I was the last year that there were no mixed colleges; I could just look around and see lots of great, successful, encouraging women so I didn’t feel it was a problem; now I’m not so sure.

After completing my PhD I went to the US to an engineering department and, naturally, I was the first female postdoc there. I found it very hard; the person I was working with just didn’t know what to do with me, it was quite curious actually! I was eventually offered an affirmative action position – they had no female faculty members across the whole of engineering – but I turned it down for many reasons and in hindsight I’m delighted. In the US many women hired at that time were told you’re in The Royal Society surrounded by women! Science, like any field, has all kinds of problems: anything from isolation, lack of mentoring, lack of confidence, lack of support networks, bullying, unconscious bias, stereotyping and family. Of course, women in different situations will experience a different mix of those issues. In physics, because the numbers are so low, isolation really can be a problem, and the lack of any evidence that a woman can get on and succeed – if you’re never lectured to by a female as an undergraduate, you may think that’s just not something that you can do; for some people that’s really important.

So what’s changed? We’re past the position of it being hard – now, in principle, anyone can get a PhD. But I believe we still have massive discouragement acting at every stage, which puts girls off from studying science and discourages women from continuing their careers.

We’ve come a long way but there is still a long way to go. I think the historical obstacles have largely been overcome in the sense that there are no explicit hurdles that can stop you in your tracks, but there are so many intangible ones. It’s important not to think that the remaining gender imbalance is a typical deficit problem. We don’t fix the women, we fix the structure, we fix the system, and that’s what we absolutely have to do.

Athene Donald explains her experiences of tackling gender discrimination head on

I have to say first of all that it’s a very strange experience to be in The Royal Society surrounded by women! Science, like any field, has all kinds of problems: anything from isolation, lack of mentoring, lack of confidence, lack of support networks, bullying, unconscious bias, stereotyping and family. Of course, women in different situations will experience a different mix of those issues. In physics, because the numbers are so low, isolation really can be a problem, and the lack of any evidence that a woman can get on and succeed – if you’re never lectured to by a female as an undergraduate, you may think that’s just not something that you can do; for some people that’s really important.

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Can you briefly explain your broad research interests and how they came to fruition?

I read Physics at the University of Oxford. In my year there were over 200 physics undergraduates, of which eight were women. After graduating, I moved into the field of computing. Now, I’m an 18th Century historian. Because there aren’t many great scientific names in this era it’s very under-researched, but around this time many changes happened that made science important in society. This is what I’m interested in.

Women aren’t the primary focus of my research but I have become interested in the role of women in science from having a senior administrative position at the University of Cambridge. I hope that by understanding what happened in the past, we can see how historical attitudes have been perpetuated into the present.

Is there a particular female scientist who inspires you?

Yes, her name is Émilie du Châtelet, a French woman who lived in the 18th Century. She was very clever and extremely hard working but was also very good looking, and loved dancing and beautiful clothes. She once said that the whole meaning of life was to have pleasure, and by that she meant not just partying and having fun, but also intellectual pleasure. I think that’s a terrific philosophy to live by, that you can be both a very gifted academic and a normal woman.

Despite being married to the Marquise de Châtelet, for many years she lived with playwright and essayist Voltaire, and together they wrote a book called *Elements of Newton’s Philosophy*. It was a...
I do not agree with sex being brought into science at all. The idea of ‘women and science’ is completely irrelevant. Either a woman is a good scientist, or she is not.

- Hertha Ayrton (1854-1923)

Can you elaborate on the books you have written on the role of women in science?

In *Pandora’s Breeches: Women, Science and Power in the Enlightenment*, I set up pairs of great men and women. I tried to write a different version of history in which, instead of having a great single hero, I looked at how science spread, changed and was communicated, interpreted and translated. It’s not that we should go back to the past and claim women scientists as great forgotten geniuses, but if you think how it is that science became important in society, then women come to hold very important yet different and crucial roles from men.

The other book, *Scientists Anonymous: Great Stories of Women in Science*, is aimed at teenage girls from about 10 years and upwards to give them important role models, make them think about their own position, encourage them to enter science, and provide examples of women who have succeeded in the past.

During the war Hertha Ayrton – a 20th Century British engineer, mathematician and physicist – invented a special type of fan that was designed for soldiers to clear the poisonous air in the trenches. Although it seemed like a very good invention, the War Office was very slow to even consider it and she was essentially ignored. People are very motivated to rescue great heroines from the past; they want to tell these success stories and show how important women have been in the history of science. But it is important to also look at the structures that are in place to explain why it’s been so difficult for women to achieve impact in science.

I started looking into women in the early 20th Century – the time during which Virginia Woolf had written *A Room Of One’s Own*, a foundational feminist text based on two lectures she gave at Cambridge. The students listening to these talks, however, were very unimpressed.

It’s easy to look back at the past and see women as one homogeneous group, but of course there are all sorts of different women. Woolf was writing from a position of great middle class privilege; the main way the war impacted her was that she couldn’t get hold of any servants and there was food rationing. Looking back at the war, Woolf claimed that it represented a complete break from the past – a time of liberation for women. After all, at the end of the war, the vote was given to women over 30.

There were two groups of women with great enthusiasm to sign up for the war. Firstly, the daughters in middle class families who were intensely bored at home and for whom going away had a huge aura of glamour and gave them something to do and a new identity. Secondly, in far greater numbers, the women who were essentially in domestic slavery – the women who worked as cleaners and cooks in middle class and aristocratic houses; this was an opportunity for them to escape and do something different. Unfortunately, for the women who had enjoyed the work they were able to do, and change from their everyday lives, once the men came home they had to go back to being wives and mothers.

It’s certainly true that women’s employment rocketed. By far the largest number of women in science and engineering were involved in making munitions, which was extremely repetitive and dangerous. The women working in Gretna – the UK’s largest munitions factory during the war – were called canaries because they were working with so many toxic chemicals that their skin became bright yellow and their health deteriorated; many of them died relatively young.

Over 100 years have gone by since Hertha Ayrton was refused membership of The Royal Society because she was married, and under modern gender legislation you obviously couldn’t get such overt discrimination. On the other hand, although equality of opportunity is now firmly entrenched, the problem of unequal numbers remains unresolved, especially at the higher levels. So it seems to me that glass ceilings and leaky pipelines still present very tough challenges for ambitious women in science.