Why aren't women flocking to science?

By Alison Maitland

If we think women have a hard time making careers in science and engineering today, the Oscar-nominated film *Hidden Figures* puts that in dramatic historical context. It's the compelling story of three gifted African American women whose technological and mathematical brilliance underpinned US successes in the Space Race in the 1960s. The women worked at NASA's segregated headquarters in Virginia and experienced raw sexism and racism every day.

In those days, being intelligent was often more a hindrance than a help for women. Like Joan Clarke, the mathematician who worked as a code-breaker at Bletchley Park in the Second World War, clever women had to overcome immense hurdles before their abilities were fully recognised by their colleagues, and even then, they took second place to men. The NASA trio had the additional barrier of being 'coloured'.

We've moved on, somewhat. Yet women remain heavily underrepresented in the STEM (Science, Technology, Engineering and Maths) professions. Overall, they account for just a quarter of UK graduates with core STEM degrees. They make up just 8% of engineering professionals, and 18% of ICT professionals.

Caroline Taylor OBE, Chief Marketing Officer, IBM Global Markets, notes that the UK will need 1.3 million STEM professionals by 2020 but is producing only 71,000 graduates a year. "If we could encourage far more women and girls to engage in STEM careers, they could help us to close the gap and be more successful and more equal as a society," she says.

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Why is the problem so persistent and what can be done? There is already a big investment in efforts to redress the imbalance, with campaigns such as **WISE**, which brings education and business together, the Athena Swan project recognising commitment to advancing STEM women in higher education and research, and the **Next Tech Girls** work experience initiative of recruitment agency Empiric.

Clearly, though, even more is needed. The problem is not one-dimensional. It needs

to be tackled early in schools, but also in the media and public perceptions, and crucially in science and technology workplaces.

The lack of **role models** is often cited. But there is no shortage of inspiring role models, both older and younger. There are fascinating women who feature regularly on radio and television, such as space scientist Maggie Aderin-Pocock and neuroscientist Susan Greenfield.

I watched *Hidden Figures* at an evening hosted by IBM to showcase talented young women in science and technology. The 10 women working in a variety of exciting roles briefly shared their stories. Most are not yet public faces, but they should be. That will depend partly on whether the media take them seriously and feature them as experts. I spoke to a woman television journalist at the event who planned to do just that. But we're still up against the fact that much **media coverage** of women is about beautiful bodies rather than amazing brains.

These women had arrived in their current careers via very different paths, and a science education was not absolutely essential. Fabulous teachers were a big factor, but not all the women had been fortunate to have them.

"My teachers weren't particularly inspiring," said Sonia Cyrus, who helps clients to use the Cloud to innovate at IBM's Bluemix Garage. "My career started in non-profit and my passion was about inclusion and diversity, working with private companies and government to open up opportunities for disadvantaged communities." Someone from IBM approached her at an event and asked if she would like to work for them. Savvy employers know to look out for talent in unusual places.

Early intervention is crucial. There's growing evidence that encouraging girls to go into science subjects when they are teenagers is leaving it too late. Maila Reeves, Director of Forward Ladies, a support network for female entrepreneurs, said: "By the age of 8, girls are saying [science] is too hard, or it's for boys".

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Getting girls interested needs to start at five or even younger. Ben Howlett MP, who campaigns on the topic, **writes** on the Women in STEM website: "Most studies show that girls have already decided their future career path by the age of 14, therefore action must be taken in primary schools and early years. Campaigns like 'Let Toys be Toys' enable a non-gendered environment to be built around girls from an early age

helping them to make a free and fair career decision."

Misconceptions about science in schools reflect those in society – it's often seen as dry subject matter, suitable only for geeks. The young women at the IBM event said it was important to **emphasize the creativity** of STEM careers. "Digital is all so creative," said Moya Brannan, an IBM Thought Leader and Application Architect. "A lot of girls think it's not exciting, but you can bring art into it as well."

An international campaign illustrating the creative, problem-solving nature of science and technology would be helpful. We know that girls are often motivated by the applications to which science and technology can be put. Caroline Taylor spoke of how data tracking could help prevent human trafficking, for example. "When we can see it, we can stop it."

The same could be said for **bias** against women in STEM subjects, which sadly persists. A **study** by Corinne Moss-Racusin and colleagues at Yale sent a fictional student's application to science professors at top research universities in the US. Unbeknown to the universities, the applications were identical, except that half were from "John" and half from "Jennifer". The results showed that both male and female Faculty were biased against "Jennifer" and were willing to pay "John" about $4000 more per year on average.

The study recommended that universities standardize how often professors meet students and institute third-party checks to ensure all students had the same level of support from academic advisers.

Looking behind the headline numbers on women in STEM, it's also clear that more women *are* going into these professions, but not fast enough to keep up with the growth of these sectors or the **heavy loss of women** from them. The WISE campaign says, for example, that there has been a big increase in female electronics and mechanical engineers, but not enough to offset the loss of more than 5,000 women since 2015.

Addressing the reasons behind those losses is crucial. That requires employers to take a serious look at their **culture**, expectations and work styles to ensure that they retain and promote the talented women they have invested so heavily in recruiting and training. As Caroline Taylor puts it, "employers need to be focused on skills … Shame on you if you don't do everything to keep those skills!"