

SPOTLIGHT ON STEM

Women can help firms bridge STEM skills gap

Why are there still so few women in STEM? Though initiatives are encouraging more females into STEM roles there is still a long way to go before we reach equality. Fiona Vlemmiks finds out what's holding women back

Men continue to vastly outnumber women in science, tech, engineering and maths roles in the UK – despite more women graduating in the relevant subjects.

According to WISE, a campaign for gender balance in science, technology and engineering, the sector is fast growing, with overall core STEM employment increasing by 6.3% in 2017 – more than six times that of overall employment overall in the UK.

Yet in 2018, women made up just 22% of the core STEM workforce – down from 23% in 2017. The WISE figures reveal that although there's been an increase in women working in STEM in the UK since 2017, there also been an increase in the number of males entering the industry, and growth rates for women is 1% lower than the growth percentage for men.

Testament to the industry's rapid acceleration, a £10m investment in the North of England's life science infrastructure was confirmed in December by Bruntwood SciTech, a joint venture between property company Bruntwood and Legal & General Capital, which owns the Alderley Park life science campus in Cheshire.

The investment will see the development of more than 50,000 sq ft of ready-to-go chemistry and biology laboratory space at Alderley Park,



Michelle Hua,
founder and CEO of
Made With Glove

which will be available from spring.

Yet a study by STEM Learning, provider of STEM education and career support, shows that current skills shortages in the sector are costing businesses a total of £1.5bn per year in temporary staffing, recruitment, training costs and inflated salaries. Businesses are facing a shortfall of 173,000 skilled workers, and 89 per cent of businesses struggled to recruit staff last year, the report says.

With bias, gender stereotypes, a lack of role models, and little support within the education system just some of the reasons cited for the shortage of women in STEM, it is important schools and businesses take a stance to help widen the talent pool.

Former lawyer Michelle

Hua is a consultant and founder and chief executive officer of Made With Glove, a wearable technology company creating fashionable heated gloves for women. She is also a STEM ambassador for the UK and a mentor at She Says Manchester, a network supporting women in the creative and tech industries.

Hua says that as the sole female founder of her company, her experiences in the tech sector have been largely positive.

However, she has faced some "bullying".

"I was exhibiting my prototype in the Start Up zone at the Wearable Tech Show in London in 2015 when a chief technical officer of a company approached me,

looked at my prototype, and asked me if I knew what I was doing, because [he said] it didn't look like I did.

"It took me completely by surprise! He proceeded to belittle everything I said for the next half an hour and I quickly realised that he was testing me, and my knowledge. In the end, he offered me a job with his company and I politely declined saying I was too busy with my own start up.

"The lack of women working in STEM could be partially due to this type of the bullying behaviour."

Hua believes that mentoring and more visible role models will help encourage female interest and participation.

"I am a STEM Ambassador and I mentor women and girls in tech by offering advice, guidance, and an ear to listen to. My role is to teach what I have learned from experience and to actively guide and offer new ways of thinking when presented with a mentee's challenges.

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"I also connect them to my network so they can be one step closer to reaching their goals. I am their cheer squad, too, when they need inspiration or motivation to overcome their challenge.

"When I entered the wearable tech industry in 2014 I found a lack of women and so I co-founded Women of Wearables (WoW), a global organisation that connects and supports women in wearables, IoT and AR/VR."

In just 18 months, WoW grew an international community of more than 8,000 members.

"We believe that without role models, you cannot be what you cannot see," adds Hua.

As tech becomes further embedded in our everyday lives, more people are becoming tech savvy and Hua believes this will have a positive impact on the gender imbalance in the industry.

"Tech is now accessible to everybody, so those building tech should be as diverse as possible. People who are coming into senior management roles now, or have become parents and teachers themselves, have been using technology since they were at university or in their 20s.

"They have gradually evolved with technology and have seen the radical and positive changes technology has had on their lives. It is inevitable that the traditional structures in schools and in organisations will change as my generation lead and pave the way for digital transformation.

"Organisations need to embrace change and move towards a diverse and inclusive culture or they run the risk of no longer being competitive in the market both in terms of customers and attracting talent."

Dr Jun Zhang is chief executive officer of Atmos International, a company headquartered in Manchester providing pipeline leak and theft detection and simulation

technology to the oil, gas, water and associated industries.

She has a BSc in Electrical Engineering, MSc in Control Systems and PhD in Fault Detection and Diagnosis. Zhang joined Shell Research in Amsterdam in 1988 and developed Shell's Statistical Pipeline Leak Detection system.

Her career journey is impressive.

"To put the system into operations, I moved to Stanlow Refinery, Ellesmere Port, in 1990. Between 1990 and 1994, I implemented the leak detection system on operational pipelines and worked on Statistical Process Control," she explains.

"In 1994 I joined Shell International in the Hague, the Netherlands, working on the design of gas treating plants where CO₂ and H₂S are removed from hydrocarbon products. I then left Shell in 1995 to start Atmos International in Manchester."

In the past 23 years, Atmos International has flourished, now employing more than 150 staff working globally. Now Zhang tries to encourage young women into engineering by offering work placements and providing career talks in schools, revealing that she faced struggles early in her worklife.

She says: "I knew I wanted to study engineering from the age of 13.

"Fortunately for me, I did not experience any challenges or prejudices throughout my education from school to university and PhD research.

"The first time that I encountered difficulty as a woman was working for a global oil company where the culture was very white and very male.

"The first annual appraisal, when your boss rated you against a set of criteria, was critical in this company. Yet as all the criteria were based on the behaviour of white males, my rating as a Chinese woman was very low.

"This meant that my boss did not believe that I had enough management potential to progress in my career. That



A new initiative launching at the Science and Industry Museum in March will tackle the STEM skills shortage which costs UK businesses around £1.5bn per year.

The Science Museum Group Academy, which launches this month, will provide training and resources for teachers to support STEM learning outside a classroom environment.

The aim is to encourage more young people into STEM careers in order to fill roles such as the 700,000 additional STEM technicians the Gatsby Charitable Foundation estimate will be needed to meet demand within a decade.

From its two sites, the Science and Industry Museum in Manchester and the Science Museum in London, the Academy will provide free courses for primary and secondary teachers, made possible by funding support from BP.

The courses will also be available to museum and science centre professionals, for a fee.

Susan Raikes, director of learning for the Science Museum Group, said: "Helping more people find meaning and relevance in science is at the heart of the Science Museum Group's mission to inspire futures.

"The Academy's vital work – which is only possible thanks to BP's support – is a critical part of this mission. Each STEM practitioner supported by the Academy will gain the tools to create incredible science engagement opportunities for a much wider audience, helping to address the challenges of low engagement with science across the UK."

Peter Mather, group regional president, Europe and head of country, UK at BP, said: "Continuing BP's 50 years of support for STEM education in the UK, we are delighted to be working with the Science Museum Group to build deeper engagement across the UK with the STEM subjects.

"As we make the transition to a lower carbon future, the STEM skills essential for our future sustainability are in scarce supply. Our work with schools, communities, families and teachers has an important role to play in helping to maintain and grow the talent needed for our shared future."



Dr Jun Zhang is chief executive of Atmos International

was hard for me to accept.

"To impress the managers within the organisation, I started to observe how the well-regarded male colleagues behaved and adapted myself to the local culture.

"Luckily my boss in the UK organisation was a lot more open to female engineers! To avoid being regarded as a "technical expert" only, I convinced my new boss in the UK to sponsor me for an MBA through distance learning.

"With the UK management support and my determination to demonstrate my high management potential, I eventually got my rating changed to a

much higher level. I was put on a fast track for career progression before I left to start my own business."

To truly make change, and open up STEM to girls in the future, Zhang believes that the education system has a strong part to play in discouraging limiting stereotypes.

"It is disappointing that schools do not encourage girls to choose STEM subjects, they do not provide role models for girls to realise that they can be just as good as boys in STEM.

"Teachers' lack of enthusiasm and passion in STEM subjects is probably another cause of few girls in STEM.

"Role models and mentoring will



help more girls and women to take STEM roles. However to have more fundamental change, society will have to alter to get rid of the gender stereotypes. This requires education of adults, parents, career advisors and teachers.”

Antonia Oxley is a graduate process engineer for Essity, a hygiene and health company with offices in Manchester that produces household tissue brands such as Plenty, Cushelle and Velvet.

She believes there is limited exposure to all the fun and interesting opportunities STEM can provide for girls.

Antonia Oxley is a graduate process engineer for Essity

“We believe one of the best ways to close that gap is to invest in talented young women”
Antonia Oxley

“People may think that careers in this area can only be dull or difficult or uninteresting,” she states.

“If young girls have a natural ability or interest in maths or science, they should be encouraged as much as possible to pursue a career in these areas by educating them about the diverse range of amazing opportunities that are out there!”

The role is Oxley’s first out of university, having graduated from Heriot-Watt University with MEng Chemical Engineering and Energy Engineering in 2017.

She says that the gender balance was 40% female out of the total students on her course, but that she is the only female engineer in her team of ten at Essity.

Nonetheless, she says Essity is passionate about supporting women and girls in engineering roles.

“The workplace culture here is brilliant,” says Oxley.

“The roles have clear career progression opportunities, everyone is friendly and there is loads of support, my gender does not affect the way I am treated.

“With a shortage of skilled female engineers, we believe one of the best ways to close that gap is to invest in talented young women.

“To do this, we have made a conscious decision to reach out to local schools and colleges and offer to lead on practical STEM-based activities which align with some of our processes within the area of tissue-manufacturing that Essity specialises in.

“At career events at colleges, career fairs and universities we talk to women about how Essity can provide that much-needed step on the STEM career ladder through our fantastic graduate or apprenticeship schemes.

“This year, we are also producing video content which we will be placing on our social channels, such as LinkedIn, in order to target young women and inspire an interest in STEM.”

All three women offer the same advice, to girls, considering STEM careers: to simply ‘go for it’.

Hua says: “It is truly rewarding to work in STEM.

“I loved all the experiences I have had, from working in one of the largest companies in the world to running an engineering business.

“Since girls have to fight the stereotypes to succeed in STEM it makes us stronger, more confident and successful.”