

Promoting gender diversity in engineering: challenges & possibilities

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Women In Engineering Event
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Women in engineering and technology

Women make up **46% of the UK workforce** as a whole

Women make up

- **1 in 8** of those in engineering occupations
- **less than 1 in 10** of those in an engineering role within an engineering company

Engineering workforce



Only 1 in 8
of those in engineering occupations are women

Some key facts and statistics

The UK needs to increase the number of people with engineering skills: in 2017, the **annual shortfall** of the right engineering skills was up to **60,000**

Engineering is important to the UK: it contributes **26% of our GDP** or £127,580,000,000 to our economy. The biggest contributor was **electrical and electronic engineering**



- Women in STEM workforce, WISE Campaign, 2017
- Skills and Demand in Industry 2015, IET

Some key facts and statistics

Only **35% of STEM teachers** felt confident in giving engineering careers advice, and this has remained unchanged for years

Enabling women to meet their full potential in work could add as much as **\$28 trillion to global growth** by 2025



- Engineering UK *The state of engineering*, 2017
- McKinsey Global Institute *The power of parity*, McKinsey & Co, Sept 2015
- *Why Diversity Matters* article, McKinsey & Co, January 2015

Engineering in education

Females are strongly under-represented among UK students at around **15% (UoM EEE Department: 16% in 2017/2018)**

Females account for **25% of postgraduates**: female engineering graduates tend to pursue postgraduate study rather than enter engineering employment (**UoM EEE Department: 33% PGT and 20% PGR in 2017/2018**)

However...nearly **5% growth** in the number of applicants to engineering courses, with gains in all its sub-disciplines except electrical and electronic



Challenges in engineering education

Efforts to attract girls and women into engineering are falling short

- Boys are 3.5 times more likely to study A level Physics than girls (in UK)
- Boys are five times more likely to gain an engineering and technology degree (in UK)
- Lack of faculty role models and mentors

Role models and mentors

Encouraging more women to become engineers begins by addressing the challenges they face in the educational system

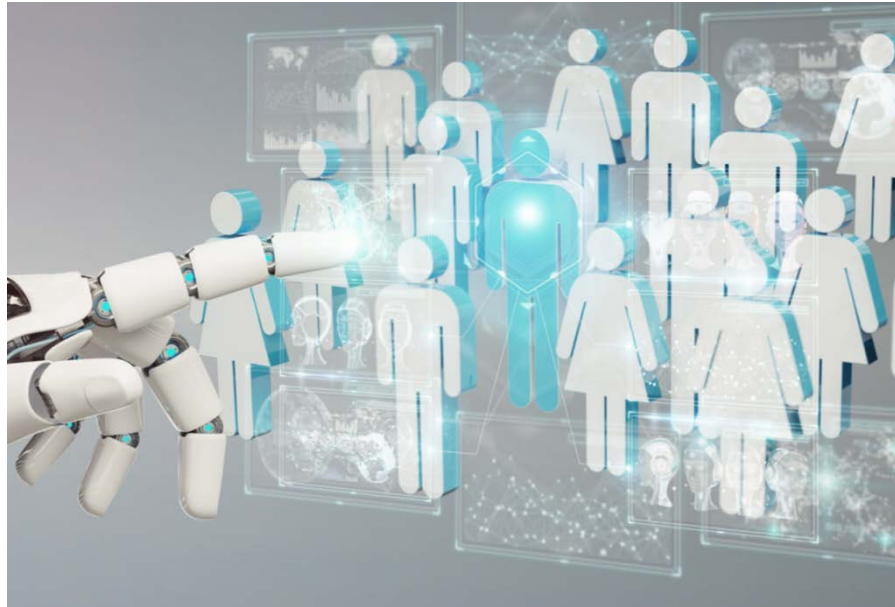
- **40% women in the Chinese engineering workforce**
- **In China girls are guided into technical careers from a young age**
- **Guidance is missing or insufficient in the Western world**
- **Lack of faculty role models and mentors is a key factor**



Importance of societal impact

Women are attracted to the life sciences, arts and medicine because they want their working lives to have a positive impact on society

Stress the social relevance - re-examine the link of engineering curricula to social relevance



Challenges in job seeking

Barriers in position and in pay, still exist

- Women engineers make 15 percent less than their male counterparts
- Women are still less likely to win a position when competing with men



Increase diversity in engineering

Example of good strategies

- Develop more active and inclusive **recruitment** approaches, promoting engineering to diverse candidates
- Develop more **inclusive workplace cultures** that include and retain women, ethnic minority people and other underrepresented groups
- Develop strategies to improve diversity and inclusion in STEM choices from **school into higher, technical education**
- Significantly **increase the routes into engineering and technology degrees** for those without A level physics

Athena SWAN Charter

Recognition scheme of commitment to gender equality across institutions

Athena SWAN Principles

- Recognise talents of all
- Advance gender equality
- Tackle the gender pay gap
- Remove obstacles to a sustainable academic career
- Make structural and cultural changes

How does Athena SWAN work?

Athena SWAN requires members to:

- Collect data on women's progression within organisation
- Critically analyse their data
- Identify reasons for exclusion and under-representation
- Develop an action plan to address these
- Show progress over time

EEE Department relevant actions

- £60k annually allocated to the new **Beatrice Shilling Scholarship** scheme for female UG students
- Entry to students who have **not studied physics at A-level** since September 2018
- **Curriculum review** with a eye on the inclusive aspects
- Diversity in **interview panels** and **job advertisement** revised to sustain gender equality
- Promoting the **Kathleen Ollerenshaw scholarship**
- **EEE Marketing and Admission teams** to make corridors and other areas of high footfall more visually demonstrative of female success
- In addition to UCAS Visit Days and the University's Open Days around **12 main outreach activities** delivered each year, which participants drawn from local schools and colleges

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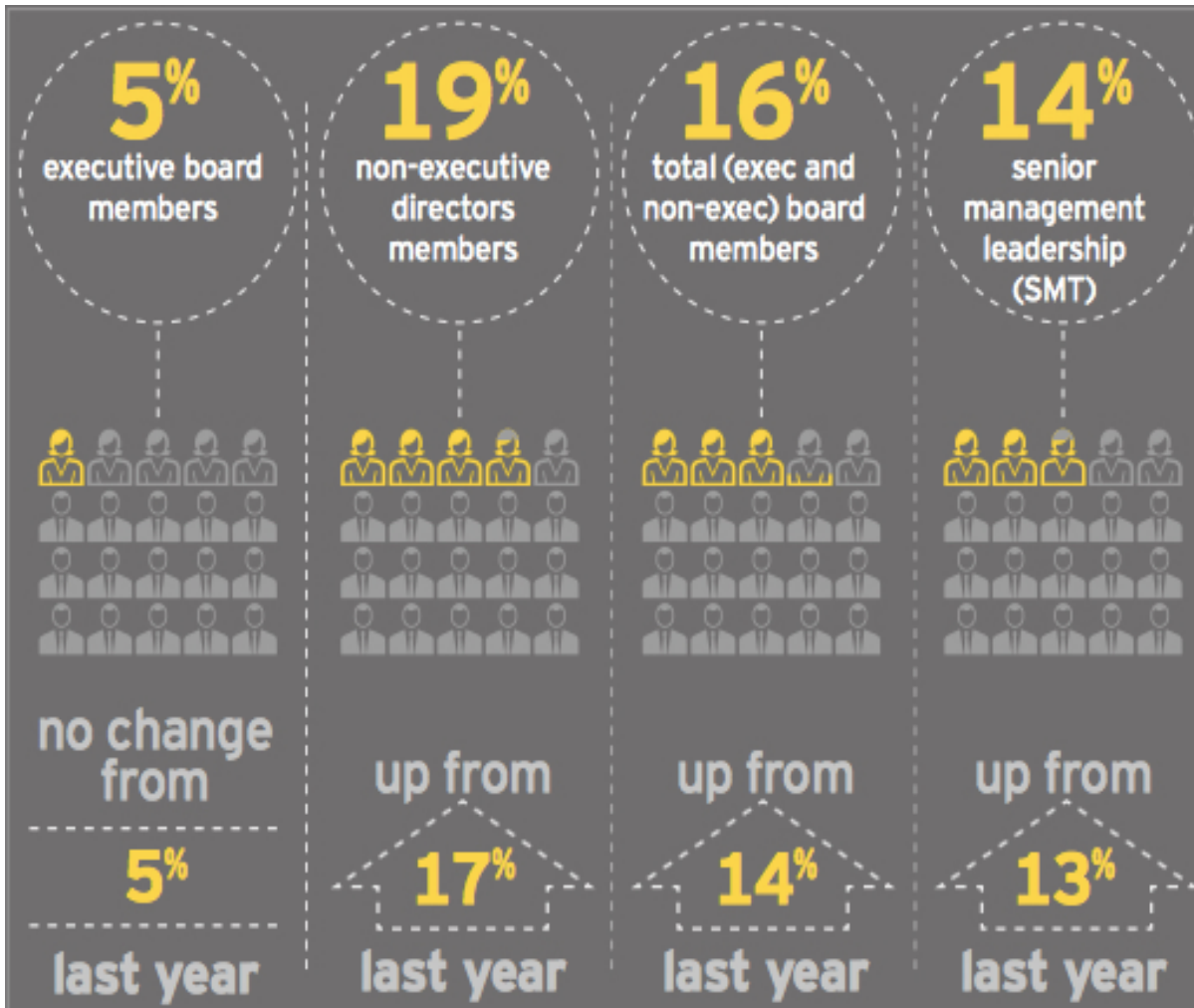
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Why diversity matters



Most utilities have 20% women on the board. Think again.

The EY 2016 *Women in P&U Index* shows the top 200 utilities have 16% female board members.

Companies are 35% more likely to perform better if they are gender diverse

- McKinsey Global Institute The power of parity, McKinsey & Co, Sept 2015
- Why Diversity Matters article, McKinsey & Co, January 2015

Why diversity matters

Innovative engineering is the key to future growth in the UK and we will have to make increasing use of our intellectual abilities and our creative talent if we are to take advantage of this opportunity

More diverse workforce will maximize innovation, creativity and competitiveness



Thank you