The Woman Engineer
WOMEN'S ENGINEERING SOCIETY
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Annual Conference

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The Eastside Rooms
Woodcock Street, Birmingham

April 28 - 29 2025

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Dr Katherine Critchley, president of the Women's Engineering Society

Welcome to the Winter 2024 issue

It's that time of year when we hold the Annual General Meeting (AGM) and look at the work we've all achieved.

I wish to again thank the Trustees; Emily Spearman, Chrisma Jain and Mamta Singhal who have now completed their time with the Woman's Engineering Society (WES) at the AGM. They have all dedicated time and energy to supporting WES in its activities, and I hope that they will continue to do so in whatever role they take forward. Being a trustee is an amazing privilege, but it is not the only way that you can support WES. I would encourage everyone to get involved in whichever way is appropriate to them. Be that participating within a Directors Committee, Special Interest Group/ Cluster, or being a mentor.

I also get the delightful opportunity to welcome three newly elected Trustees; Caitlin McCall, Judith Abolle and Susan McDonald. I am looking forward to our first board meeting and getting you all involved within the work of the trustees.

We also announced the internal awards:

1. The Gillian Skinner Award for behind-the-scenes work at the Society was awarded to Sharon Jones.
2. The Isobel Hardwich Medal for sustained services to the Society was awarded to Paula McMahon.

Congratulations to both Paula and Sharon.

AGM is a great opportunity to reflect on the year, and it's when you pull these activities into the annual report that you fully appreciate all the great work that happens at WES.

We also remembered the two Past Presidents we lost earlier this year; Dorthy Hatfield and Milada Williams, both of whose funerals were attended by a WES representative. Both Jan Peters and I had the honour of speaking about WES and our fond memories of Milada at her funeral.

As I start my second year as WES President, I look forward to the Student and Apprentice Conference and the Caroline Haslet Lecture, and especially meeting the awardees - The Karen Burt Memorial Award, for the best newly qualified chartered engineer, as well as the newly incorporated engineer and newly technician engineer. And of course, the Men as Allies and Amy Johnson Inspiration Award recipients.

Such a great evening, I hope to see as many of you as possible there - Geological Society in London, 11th December from 6.30 – 9.30pm.

K L Critchley

Dr Katherine Critchley
President of the Women's Engineering Society
www.wes.org.uk

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Welcome to the Winter issue of The Woman Engineer

This issue will cover Women's Engineering Society (WES) activities which include; the Annual General Meeting and some special annual awards to those who have made a significant contribution within WES and the engineering community.

We're also focusing on digitalisation and artificial intelligence. How will it affect engineering in the future? Turn to page 10 for the further details.

Ageism is another topic close to many of our hearts and Vince Pizzoni, long time supporter of The Women's Engineering Society and Adrian Hurley, President of the Building Engineering Services Association (BESA) address this.

As always, I look forward to welcoming your feedback and suggestions for topics, articles and features; **julietl@warnersgroup.co.uk**

All the very best

Juliet Loiselle MInstR
Managing Editor

In this issue:

An introduction from Susan Robson

Interim CEO for the Women's Engineering Society

As the newly appointed CEO of the Women's Engineering Society (WES), I am thrilled to join an organisation with such a rich legacy of promoting women in engineering. Over the past few years, WES has achieved some great progress that I intend to build on.

Our achievements include expanding membership, building out a successful mentoring program, and hosting impactful events that brought together women engineers from diverse fields. We have made significant strides in increasing visibility and providing a supportive network for women in engineering.

Looking ahead, we aim to amplify these successes by building out relationships and becoming a network of networks. Already, in my first few weeks, I have been reaching out to key players in industry to gather a widening opportunity set for us to grow our impact with. As a charity, our goal is to extend the work being done in the industry to support women in having fulfilling careers in engineering. We are committed to working with businesses and organisations to foster inclusivity, enabling them to attract and retain the talent necessary for their innovation and growth goals.

Feedback

Looking within, I have started to gather feedback from our partners and members to understand their experiences of our products and services, so that we can look to strengthen what we do and create even greater impacts for our Members and Partners alike. Joining me in this work is Tristan Holland, who steps up into a new role which brings our Partners and Members together. This will allow us to make sure that everything we do at WES is connected and working towards our vision of creating an engineering industry that reflects the diversity of the society, and ensures it serves to address the biggest societal challenges of our time.

Finally, we are excited to be working on some new campaigns designed to shape the debate with industry and government on engineering. These initiatives will ensure that WES remains at the forefront of driving systemic change within the engineering sector. We will share more about these as they develop.

"I look forward to working together and making a lasting impact."

WOMEN'S ENGINEERING SOCIETY AGM

On the 26th October the One Hundred and Fifth Annual General Meeting (AGM) of the Women's Engineering Society (WES) was held online.

During the AGM we heard from the new interim CEO Susan Robson MBE as well as current WES President Dr Katherine Critchley. The AGM was an opportunity to find out about the work of WES over the past year, and current Trustee Vince Pizzoni attended to give an update on the boards. The Tyne and Tees Cluster also gave an overview of their work.

Retiring Trustees Mamta Singhal, Chrisma Jain and Emily Spearman were thanked for their hard work and we welcomed new trustees Caitlin McCall, Judith Abolle-Okoyeagu and Susan Macdonald to serve on the board.

Award winners

During the AGM, the Gillian Skinner and the Isobel Hardwich Awards were presented.

The Gillian Skinner Award

This accolade is for WES members who help make a difference nationally or within their local cluster.

This year the award was given to Sharon Jones of the Dorset and South Cluster.

Previous winners:

2023: Laura Luckhurst
2022: Susan Robson
2021: Alexandra Knight
2020: Jennifer Glover
2019: Caroline Carslaw and Holly Goodwin
2018: Alison Carey
2017: Adriana Vargas and Jo Douglas
2016: Jon Cable and Fiona Neads
2015: Sophie Parsons
2014: Anne Madsen and Angela Shackcloth
2013: Helen Charles Morgan
2012: Dawn Bonfield
2011: Joanne Lamour
2010: Fareen Mahmood
2009: Carol Marsh and Julie Winnard
2008: Kevin Quigley, Roseni Dearden and Betty McCarthy
2006: Karen Quigley
2004: Claire Rees and Ruth Carder

The Isobel Hardwich Medal

This award was presented to Paula McMahon. This is a presentation to a WES Member who has made an outstanding and sustained contribution to the Women's Engineering Society over a number of years and gone above and beyond the call of duty.

Previous Winners:

2023: Jo Douglas-Harris
2022: Katherine Critchley
2021: Sally Sudworth
2020: Dawn Bonfield
2019: Petra Gratton
2018: Nina Baker
2017: Milada Williams and Linda Maynard
2016: Dawn Fitt and Jackie Longworth
2015: Carol Marsh and Anne Wiseman
2014: Alexandra Walker
2013: Grazyna Whapshott
2012: Jan Peters
2010: Pam Wain and Betty McCarthy
2007: Dorothy Hatfield
2005: Connie Shirley
2004: Michael Sanderson[b]
2003: Sue Bird and Nicole Rockliff
(Temporary cessation of the award from 1993 to 2002)
1992: Hilda Blount
1991: May Maple
1990: Cicely Thompson
1989: John Hardwich
1988: Elizabeth Laverick
1987: Sheila Waddell

Women's Engineering Society Award Winners 2025

Our awards programme includes awards for individuals who have made significant contributions within WES and the engineering community.

The Women's Engineering Society were delighted to present the Caroline Haslett Lecture 2024 at the Geological Society in London on 11th December. In addition, winners of 5 prestigious awards, about rewarding members who have gone above and beyond, were announced.

Karen Burt

The Karen Burt Memorial Award is for the best newly qualified chartered engineer.
Winner: Kerry Evans
Highly Commended: Fatimeh and Natasha Highly Commended

Newly Incorporated Engineer

Is open to all practising engineers who have recently achieved the required standard of competence and commitment with a Professional Engineering Institution required to use the title of Incorporate Engineer.
Winner: Lucy Davies
Highly Commended: Judith Gilpin

Newly registered technician

Is open to all practising technicians who have recently achieved the required standard of competence and commitment with a Professional Engineering Institution required to use the title of Registered Technician.
Winner: Isobel Howe
Highly Commended: Lizzie Jones

Amy Johnston Inspiration Award

Launched in 2016, honours an individual not currently working as an engineer or within the applied sciences who has made a truly remarkable achievement in furthering diversity within these fields.
Winner: Laura Hughes
Runners up: Helen Allen and Natalie Thomas

Men as Allies

The Men as Allies Award seeks to celebrate a male working within the engineering, technical and applied sciences sectors, who has gone above and beyond the call of duty to support his female colleagues, and address the gender imbalance within engineering and applied sciences in general.
Winner: Vince Pizzoni
Runner-up: Edward Rochead

NEW MEMBERS

The Women's Engineering Society (WES) are delighted to welcome our new members:

Alexandra Martin
Aneta Zawada
Anna Reid
Baran Razieh Khaksari
Bensu Desdina Karacaoğlu
Carol Hussey
Chisom Paschal-Ndubuisi
Daniella Okoh
Eleanor Clapp
Elianna Rabinowitz
Elmira Alimohammadzadeh
Elnaz Hassanzadeh Amin
Emily Middleton
Emma Dewberry
Emma Shah
Eve Sherwood
Florah Waithaka
Funmilayo Adeleke
Hollie Burton
Inès Tunga
Jessica Maldonado Gomez
Julie Graham
Julie Newton
Kemi Lawal
Khadeejah Dawood
Lauren Foster
Leago Bopape
Leah Kitteridge
Louise Jones
Louise Morran
Madelaine Coffey
Mai Sayed
Maria-Emilia Ariciu
Mariam Guirguis
Mariam Guirguis
Mark Keen
Mindula Illeperuma
Neha Master
Ourania Tsolaridi
Patrycja Sędor
Rashmi Devsi
Roshini Sunny
Samira El Kassimi
Sophie Blackwell
Susanna Bloodworth-Race
Syeda Nida Hassan
Tracy Vaughan
Xiaobo Shen
Zahra Mohamed

Innovation in STEM: EMPOWERING WOMEN TO LEAD THE FUTURE

From a young age, my involvement with the Women in Engineering Society (WES) has been a cornerstone of my career development.

My name is Kelly Princess Shungu, and I've had the privilege of serving as a WES council member and attending the WES annual conference multiple times. The support and inspiration I've garnered through WES have been instrumental in shaping my journey as a Solution Engineer and as the host of the "Women in STEM Podcast", a platform dedicated to amplifying the voices of women in science, technology, engineering, and mathematics worldwide.

Innovation in STEM (Science, Technology, Engineering, and Mathematics) is not just about groundbreaking technologies; it's about who is driving these advancements and how they are making a difference.

As a solution engineer, I see firsthand how emerging technologies are transforming industries. Artificial Intelligence (AI) and Machine Learning (ML) are revolutionizing data analysis, automating complex processes, and creating smarter systems. In biotechnology, innovations such as CRISPR and gene editing are opening new frontiers in medical treatment and disease prevention. Renewable energy technologies, from solar panels to wind turbines, are advancing rapidly, promising a more sustainable future.

Research & Development

Women are at the forefront of these innovations, leading the way in research, development, and application. However, their stories often go untold. Through my podcast, I have had the honour of interviewing many remarkable women who are making significant contributions to STEM. These women not only excel in their fields but also inspire others to pursue careers in STEM, breaking down barriers and challenging stereotypes.

> BY EMPOWERING WOMEN AND CELEBRATING THEIR CONTRIBUTIONS, WE CAN INSPIRE THE NEXT GENERATION TO PUSH THE BOUNDARIES OF WHAT IS POSSIBLE IN STEM, CREATING A BRIGHTER, MORE EQUITABLE WORLD FOR ALL.

One such innovator is Dr. Jane Smith, a pioneer in AI research, whose work is paving the way for more ethical and transparent AI systems. Her journey from a young girl fascinated by computers to a leading researcher highlights the importance of early exposure to STEM. Dr. Smith's story underscores the need for educational programs that encourage young girls to explore STEM fields, providing them with the tools and confidence to succeed.

Innovation

Innovation in STEM also has a profound impact on society. Technological advancements improve quality of life, enhance efficiency, and solve critical problems. For instance, renewable energy technologies are not only mitigating climate change but also providing energy access to remote and underserved communities. Women like Dr. Emily Green, who works on sustainable energy solutions, are driving these changes. Her work in developing affordable solar power systems is transforming lives and fostering economic development in rural areas.

Another critical area of innovation is FemTech, a sector dedicated to developing technologies that address women's health and wellness. FemTech encompasses a wide range of solutions, including fertility tracking apps, menstrual health products, pregnancy and nursing care, and solutions for menopause management. These innovations are not only improving health outcomes for women but also breaking down long-standing taboos and fostering a more open dialogue about women's health issues.

For example; companies like Clue and Flo are revolutionizing menstrual health tracking, providing women with valuable insights into their cycles and overall health. Innovations in fertility technology, such as Ovia and Ava, are helping women understand and manage their reproductive health better. FemTech pioneers like Ida Tin, co-founder of Clue, are leading this charge, leveraging technology to empower women with knowledge and control over their health.

In the realm of maternal health, innovations like wearable monitors for pregnant women, telehealth services for prenatal care, and advanced diagnostic tools are enhancing the quality of care and reducing risks. Startups like Maven Clinic offer comprehensive health services for women, providing support from conception through postpartum care. These advancements are crucial in ensuring that women receive the best possible care during one of the most critical periods of their lives.

The impact of FemTech extends beyond individual health benefits. By addressing gaps in women's healthcare, these innovations contribute to broader societal benefits, including improved productivity, economic growth, and gender equality. When women have access to better health information and services, they are more likely to thrive in their personal and professional lives, driving positive change in their communities and beyond.

To sustain and accelerate these innovations, it is crucial to address the challenges women face in STEM careers. Despite the progress, women are still underrepresented in many STEM fields and often encounter obstacles such as gender bias, lack of mentorship, and work-life balance issues. Organizations like WES play a vital role in supporting women through networking opportunities, mentoring programs, and advocacy.

Mentorship

Mentorship is particularly important in helping women navigate their careers and overcome barriers. Experienced professionals can provide guidance, share valuable insights, and offer support, helping mentees build confidence and resilience. Programs that connect aspiring female engineers with role models and mentors can have a lasting impact on their career trajectories.

Looking ahead, the future of engineering and technology is filled with exciting possibilities. Fields such as quantum computing, nanotechnology, and space exploration are poised for significant breakthroughs. Preparing the next generation of female engineers to tackle these challenges is essential. Encouraging curiosity, providing robust education, and fostering inclusive environments will empower young women to lead the innovations of tomorrow.

Educational initiatives that emphasize STEM subjects from an early age are crucial in sparking interest and building foundational skills. Schools and communities need to create supportive environments where girls feel encouraged to explore STEM fields. Additionally, addressing and dismantling stereotypes that portray STEM as a male-dominated domain is vital in ensuring that young girls see these fields as viable and exciting career options.

In conclusion, innovation in STEM is driven by diverse perspectives and inclusive practices. As a member of WES and through my work with the Women in STEM Podcast, I am committed to highlighting the achievements of women in STEM, sharing their stories, and advocating for a more inclusive and innovative future. By empowering women and celebrating their contributions, we can inspire the next generation to push the boundaries of what is possible in STEM, creating a brighter, more equitable world for all.

The advancements we see today in AI, biotechnology, renewable energy, and FemTech are just the beginning. With continued support and encouragement, women in STEM will continue to break new ground, leading us into a future where innovation knows no gender, and the benefits of technological progress are shared by all. Together, we can create an environment where every aspiring engineer, scientist, and technologist, regardless of gender, has the opportunity to contribute to and benefit from the incredible advancements in STEM.

DIGITALISATION AND ARTIFICIAL INTELLIGENCE

Shaping the Future of Heating and Cooling

Lisa-Jayne Cooke FInstR FWES, President of IOR, STEM Ambassador and WES Top 50 Women in Engineering (2019) looks at the impact of AI, and how it'll affect heating and cooling within buildings in the very near future.

We find ourselves at a critical juncture, where the rapid rise of Digitalisation and AI is reshaping industries and societies alike, while simultaneously tackling the escalating fight against climate change. Nowhere is this transformation more urgently needed than in the heating and cooling sector - a significant, yet underappreciated contributor to global energy demand and greenhouse gas emissions.

At COP28, leaders highlighted the urgency of decarbonising heating and cooling through AI-powered, renewable-based, and energy-efficient HVAC systems. Beyond optimisation, AI holds the potential to drive climate justice by equitably distributing benefits, especially for vulnerable populations facing energy poverty.

AI-driven solutions enable real-time optimisation of energy systems, using predictive algorithms to forecast demand, adjust operations, and minimise waste. Technologies like digital twins enhance system monitoring, reduce downtime, and extend lifespans. As AI-driven solutions evolve, inclusive and sustainable governance is vital, as emphasised by UN Secretary-General António Guterres: "The race to zero emissions must be a race for every community, not just for the privileged."

> "THE RACE TO ZERO EMISSIONS MUST BE A RACE FOR EVERY COMMUNITY, NOT JUST FOR THE PRIVILEGED."

The Environmental Impact of Heating and Cooling

The IEA forecasts that energy use for space cooling alone could triple by 2050 due to population growth, urbanisation, and rising global temperatures. Currently, these systems account for nearly 50% of the energy demand in buildings worldwide, with much of this energy still being sourced from fossil fuels. Consequently, the building sector - heavily reliant on heating and cooling - is responsible for around 40% of annual global CO_2 emissions. The Urban Heat Island (UHI) effect further exacerbates cooling demand in urban areas, driving up energy use and emissions. Addressing these challenges requires AI-driven smart energy systems, improved building insulation, and renewable integration, as discussed at COP28.

AI's Role in Reducing Environmental Impact

AI has the potential to significantly reduce the environmental impact of heating and cooling. Advanced AI algorithms can analyse energy consumption patterns in real time, allowing systems to predict and adjust dynamically to fluctuating demand, minimising energy waste. AI-powered Building Management Systems (BMS) optimise operations by responding to external factors such as weather conditions and occupancy levels, ensuring energy is utilised only when necessary. According to a study by McKinsey & Company, AI-enabled BMS can cut energy consumption in buildings by 20-30% (McKinsey, 2018).

Real-Time Optimisation and Predictive Systems

AI optimises real-time energy consumption and predicts future needs. In commercial and industrial settings, the power of AI is transformative. Smart monitoring systems reduce energy waste by learning user habits, utilising data sources such as occupancy and weather forecasts for dynamic adjustments.

One of the most impactful applications of AI in heating and cooling systems is predictive maintenance. AI-driven systems continuously monitor equipment performance, using real-time data to predict failures before they occur. This proactive approach not only extends the lifespan of heating and cooling systems but also reduces downtime and energy waste. According to the American Society of Heating, Refrigerating and Air-Conditioning Engineers, AI-driven predictive maintenance can lower system energy consumption by 10-15% while extending equipment lifespan (ASHRAE, 2019).

Decentralisation and AI-Driven Energy Systems

AI has the potential to revolutionise energy systems through decentralisation. By integrating AI into smart grids, local communities can manage their energy use independently, leveraging renewable sources such as solar and wind. These decentralised systems reduce reliance on centralised power grids and fossil fuels, enabling regions to become more energy self-sufficient. AI plays a crucial role in this process by predicting energy production based on weather patterns, ensuring renewable energy is efficiently utilised when available.

This approach also promotes energy equity by providing underserved regions with access to affordable and sustainable energy. Organisations like the World Resources Institute use AI tools to expand energy access and foster equitable development in rural areas.

Policy and Governance in AI-Driven Heating and Cooling

Achieving climate goals in energy-intensive sectors like heating and cooling requires breaking down traditional silos and fostering collaboration across multiple disciplines. The integration of Digitalisation and AI in this industry demands cooperation between technology developers, environmental scientists, policymakers, and industry stakeholders. Together, these groups can create solutions that are not only technologically advanced but also environmentally sustainable and socially responsible.

Policies such as carbon pricing, tax incentives, and subsidies are vital mechanisms to drive AI adoption in heating and cooling. Financial incentives, such as Germany's KfW energy efficiency program, demonstrate how policies can bridge digitalisation and sustainability. Additionally, global standards like ISO 50001 offer frameworks for integrating AI-powered systems to meet energy efficiency targets. Policymakers must also address data privacy and ethical concerns related to AI-driven systems, fostering transparency and accountability.

Evolving Landscape

The rapid advancement of Digitalisation and AI in the heating and cooling industry is transforming the skills required to remain competitive and sustainable. To meet these new challenges, both the current workforce and the next generation must adapt by acquiring digital literacy and interdisciplinary skills. Upskilling is essential for navigating the transformation of heating and cooling systems driven by AI.

As routine jobs decline, demand for roles focused on AI, sustainability, and digital transformation grows. Continuous learning, upskilling, and adaptability are essential to prepare for industry shifts driven by AI. Educational institutions and industry training programs must focus on developing AI, data management, and energy efficiency skills, while fostering an understanding of environmental impacts.

In 10 years, heating and cooling engineers will be at the forefront of technology-driven, sustainability-focused solutions in the sector. The role will evolve from traditional, hands-on system management to one that requires expertise in AI, automation, IoT, and environmentally friendly practices.

Cybersecurity Risks and Ethical Considerations

The adoption of AI in energy management brings cybersecurity risks and ethical challenges. As AI-driven HVAC systems connect to smart grids, they become vulnerable to cyberattacks. Robust cybersecurity measures and training are critical for safe AI integration. Ethical concerns, including data privacy and algorithmic bias, must be addressed to ensure equitable energy solutions. ▶

Responsible data governance, transparency, and inclusivity in AI deployment are vital. Policymakers must establish global standards that balance technological innovation with ethical considerations, ensuring equitable energy distribution and data protection.

Addressing the Digital Divide

As AI transforms the heating and cooling sector, there is a growing concern that not all populations will benefit equally from these advancements. The digital divide could prevent underserved communities from gaining the benefits of AI-driven solutions. To address this divide, governments and industry stakeholders must invest in infrastructure and digital literacy programs that expand access to AI technologies, particularly in rural or economically disadvantaged areas. Partnerships and open-source AI tools can promote broader adoption, ensuring equitable energy access and resilience.

Conclusion

The integration of digitalisation and Artificial Intelligence in the heating and cooling sector marks a pivotal shift towards a more sustainable, energy-efficient future. AI technologies such as machine learning, predictive analytics, and computer vision optimise energy use, reduce emissions, and decentralise energy systems.

For these innovations to reach their full potential, concerted efforts from governments, industries, and educational institutions are essential. Supporting AI-driven research, developing policies that foster innovation, and ensuring the workforce is equipped with the skills to manage intelligent systems are all critical steps.

Yet, the true potential of AI extends beyond mere technological innovation. To fully harness its capabilities, we must ensure that its benefits are equitably distributed, helping to bridge the digital divide and uplift vulnerable populations. By prioritising inclusivity and addressing ethical concerns, AI can drive climate justice and deliver energy-efficient solutions to underserved communities. This transformation will create a more equitable, resilient, and sustainable energy future, positioning AI as a catalyst for systemic change in the fight against climate change.

In the next decade, the role of heating and cooling engineers is likely to evolve dramatically, driven by advances in AI, automation, IoT, and sustainable technologies. As industries shift toward greener practices and integrate smart systems, the responsibilities of engineers will become more diverse, technologically advanced, and sustainability focused.

By embracing digitalisation and AI, we stand on the brink of a new era—one where technology serves not only to mitigate climate change but also to foster greater equity and inclusion. Together, we can shape a world that is not only energy-efficient but also more just, equitable, and resilient for generations to come. To achieve a sustainable, equitable future in heating and cooling, we must act collectively - embracing AI-driven innovation, fostering collaboration, and prioritising inclusive policies. Let's work together to drive change and ensure technology benefits all.

TOO YOUNG, TOO OLD!

Winning in an ageist workplace!

The role of mentoring, reverse mentoring, and sponsorship, by Professor **Vince Pizzoni**.

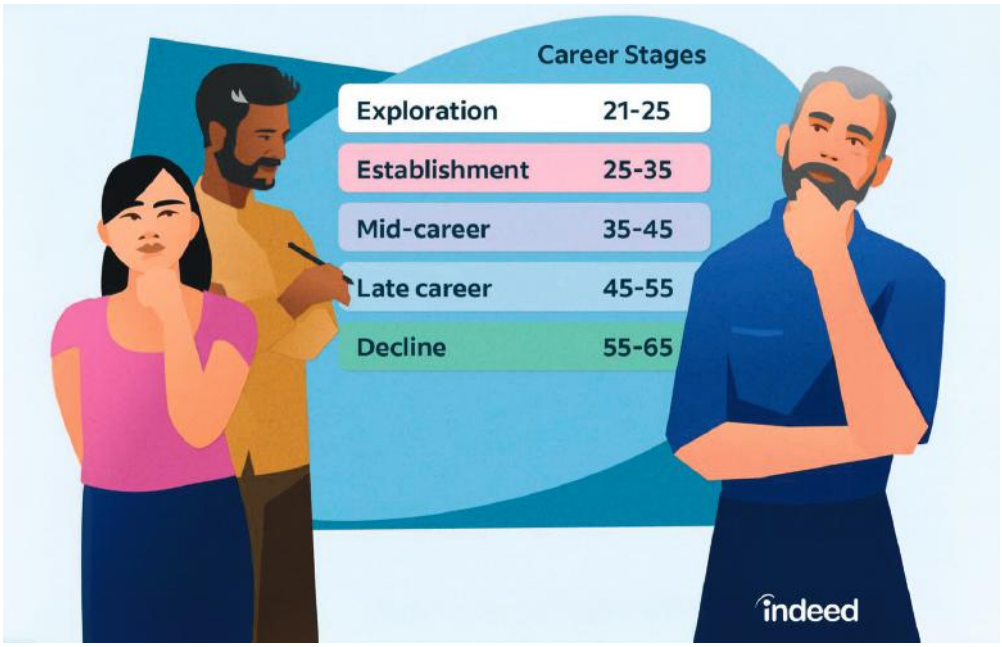
Today I tried renewing my car insurance and found out that my recently retired wife, who is a named driver, has increased my premium by 5%! What on earth is going on! She hasn't changed, is still a better driver and younger than me but of course this is yet another example of ageism rife in our society.

I rarely get angry but a recent infographic from Indeed on career stages got me going!

Quite insulting to see me pictured in my "Decline" and later years particularly as I still work full time in a portfolio career and spend considerable time in the gym keeping in shape! But it did get me thinking about the impact of ageism at both ends of the spectrum.

I mentor many women who are both students and in their early careers and what I often hear is that when they get in the workplace they are treated poorly. Talked over at meetings, opinions not counting for anything, ideas pinched by others and generally made to feel that their knowledge, expertise, and views count for nothing or very little. One of my mentees recently experienced this behaviour on an industry placement and it has put her off the sector for life.

> "PEOPLE LEAVE MANAGERS AND NOT COMPANIES"



▼ *Indeed Infographic.*

Unfortunately, poor management exists everywhere and in fact a recent CMI survey indicated over 80% of managers were "accidental" and had experienced little training either. The relationship with your line manager is critical to your career success in an organisation and as is often quoted "people leave managers and not companies."

The success of an organisation

So, what can we do to move the dial on this? Firstly, there has to be a recognition that everyone in the workplace can play a part in the success of an organisation. I am just reading a very interesting book called "Five generations at work" by Rebecca Robins and Patrick Dunne. For possibly the first time we have 5 generations working together and the onus is on leadership to make it work. I work in just this scenario at my university where a number of experienced professionals from industry were hired to mentor current undergraduates in both their technical design projects and in my case, in supporting them to get internships, year in industry placements and graduate jobs. Between the 5 of the professionals hired we bring ca 250 years of career history and experience. You couldn't buy that and I know the students value greatly what we bring.

It also needs to work the other way and young people and particularly women and those from other underrepresented groups must not be overlooked for roles in engineering that traditionally might have been only opened to someone with more years of experience. In recent years we have seen the rise of shadow boards that complement main boards. ▶

I have met many who are on just such boards and they bring a huge amount to the organisation. In fact, one of my own charities, MyBigCareer, recently brought two young people on our main board and they bring a perspective and insight that the rest of the board doesn't have. My advice is no matter how junior or senior, you should go for board roles. You may bring something to the table that is unique.

Mentoring & Sponsorship

This leads me on to the importance of mentoring, reverse mentoring, and sponsorship for women in engineering and particularly as it relates to career development and opening up opportunities that might not normally be on your radar. I recently had an article published on this in the Chemical Engineer.

Everyone should have a mentor, in fact at least 2 in my view. One is likely to be in your current company or organisation and the other external. The former can be of great help in developing your career internally and helping navigate the company culture or "way things are done here." The external mentor enables you to keep a foothold outside and potentially can open the door to areas you might not have even considered.

The magic happens in a mentoring relationship when both mentor and mentee learn from each other. I often get asked who is my mentor and the answer is the many, many mentees I work with! I learn something new from each conversation I have and often find that nugget or two of wisdom has been useful in many later conversations with others. Some might call this reverse mentoring which has been around for many years although was formally noticed when introduced by a former CEO at GE, Jack Welch. This turns the mentor/mentee relationship upside down whereby junior employees' mentor more senior and the reasons can be varied. For example; where the junior has greater knowledge with new technology or often where the senior managers have lost sight of what is happening with women and those from underrepresented groups in those important early years.

Reverse mentoring is proven to improve intergenerational relationships, allow greater knowledge sharing and increase staff retention. I recommend it in organisations and in particular where women are in the minority such as engineering, energy, and tech.

Under sponsored

My experience in industry is that women are often over mentored and under sponsored. In fact, a number of women I mentor many not have come across sponsorship, or don't know who might be sponsoring them or how to find one. While mentors can help develop careers, sponsors can accelerate them. They speak for you "when you are not in the room." You find them by developing and implementing a networking plan. This can be through internal networks and opportunities to get in front of key people or perhaps using your external network to help support in showcasing what makes you special to a wider audience. Make sure you have developed a short sponsorship speech or "30 second elevator pitch" to be used at the appropriate time and never let a sponsor down. They are going out on a limb for you.

So, my closing thoughts:

1. Get yourself a mentor (and become a mentor yourself)
2. Look at developing reverse mentoring in your workplace.
3. Find at least one sponsor.
4. Apply for trustee/board roles and don't assume you are not ready yet.
5. Think and act "can do" rather than "can't do".

I'll leave you with one of my favourite quotes on mentorship:

"In order to be a mentor, and an effective one, one must care. You must care. You don't have to know how many square miles are in Idaho, you don't need to know what is the chemical makeup of chemistry, or of blood or water. Know what you know and care about the person, care about what you know and care about the person you're sharing with."

Maya Angelou

WHY IS THE NUMBER OF WOMEN IN ENGINEERING FALLING AGAIN?

Building Engineering Services Association (BESA) President **Adrian Hurley*** was shocked to learn that after several years of improvement, the number of women coming into engineering professions was declining again with many also leaving in the middle of their careers.

According to EngineeringUK's latest workforce data the number of women in engineering professions dipped last year. They now make up less than 16% of the workforce and, strikingly, the average age at which a female engineer leaves the profession is 43 – for men it is 60.

Of course, there are a variety of reasons for this, but it reveals a big problem: We are still not recruiting, and retaining, properly from half of the population.

A sizeable number of women are leaving engineering between the ages of 35 and 44 which means they are not reaching their full potential and, in many cases, the leadership positions they would have achieved.

According to EngineeringUK's data, out of the 6.3 million people working in engineering and technology occupations in the UK last year just 15.7% were women down from 16.5% in 2022. This equates to a drop of around 38,000, and shortages are particularly pronounced between the ages of 35 to 64, highlighting that we have a serious retention issue.

Family

As the Managing Director of a family firm, founded by my grandfather 75 years ago, I am acutely aware of the need for businesses to draw on the most diverse range of talent. Family businesses are fortunate that they can turn to the whole family when looking for inspiration and new ideas and we have been particularly fortunate at F P Hurley & Sons to have maintained strong family continuity since my grandfather's time.

However, just like other companies we need to attract talent, ideas and skills from a broad cross-section of the population. One of the building engineering sector's greatest weaknesses is its lack of diversity. The 'male, pale, stale' image seems to be a self-perpetuating curse that restricts our ability to reach outside of our traditional recruitment fields.

It is very hard for a business to properly serve its community if its workforce does not reflect the ethnic and gender make-up of that community. We might think we know what people want and need, but we can't know for sure if we don't properly understand the challenges and priorities of whole sections of the population.

We also miss out on great ideas. While Hurley's is lucky to have a strong balance between young and more experienced engineers, we can't expect them to know everything or be up to date with all the latest technological and social advancements if they don't have direct experience of them.

▼ *F P Hurley & Sons female staff celebrating International Women's Day 2024.*

Attracting talent

The EngineeringUK figures show that many of our technical professions are fishing in a much smaller talent pool than they should be, and we simply must address that if we are going to have access to the best minds for solving some of our biggest challenges, including net zero and the health and wellbeing of people in buildings.

Attracting talent is not enough on its own. We must provide rewarding career paths for our best people and encourage them to stay on the journey as we seek to create a better and more resilient built environment. We cannot afford for good people to become disillusioned and go off to seek other opportunities just when we are starting to see the results of their training and experience.

Struggling to retain talent

Despite several initiatives aimed at encouraging women to enter engineering, including some highly successful campaigns run by the Women's Engineering Society (WES), the sector struggles to retain female talent. Women leave the profession at twice the rate of men, often citing a lack of support, career progression, and challenging work-life balance.

Another self-perpetuating part of the cycle we are in is the shortage of female role models, and limited awareness of the diverse opportunities in engineering, both of which discourage women and girls from pursuing and continuing in these careers. People often say that if they don't see anyone who looks like them working in an industry, they assume it is not for them. This is as true for ethnic minorities and people with disabilities as it is for the potential female engineers we are failing to attract.

The gender disparity seems to become embedded during education, where women make up only 21% of students enrolled in engineering and technology courses. This underrepresentation in STEM education translates into a smaller pool of women entering the profession.

So, what do we do? Several employers are reaping the rewards of introducing more flexible working policies and dedicated support programs that focus on giving employees a more appropriate work-life balance.

Appeal

We also need to promote our industry and its broader appeal more successfully. For example; many young women have no idea about the role we play in addressing climate change, tackling indoor air quality in a way that can have huge healthcare benefits, or adapting the built environment to make it more accessible to people with disabilities.

They also are often unaware of the breadth of career opportunities linked to our sector and that we work with cutting edge, digital tools, despite our rather staid image.

BESA recently launched a training programme to help building services firms work more closely with schools and inspire future generations of building services engineers, including reaching out to more girls to try and grab their interest at a young age so they might consider an engineering career in the future.

The BESA School Engagement and Engineering Discovery (SEED) Programme is fully funded by the Association and was developed by the schools engagement specialists Built Environment Skills in Schools (BESS) which has worked with more than 4,000 schools across the UK.

Addressing these challenges is crucial not only on a social inclusion level but also for our efforts to innovate in tackling the big global challenges. Diverse perspectives enhance problem-solving capabilities, making it vital for the engineering industry to bridge this gender gap.

The truth is that most established working practices within engineering were first established by men and continue to be revised and used by men when seeking solutions to engineering problems. Even if unintended, this gender imbalance means things like set temperatures, ventilation rates and lighting levels may not be suitable for everyone using the indoor space being designed.

This is a long-term and ongoing problem, but addressing diversity is a key part of BESA's new skills policy developments and will be a major preoccupation for me during my presidential year. I am not unaware of the irony of a white man of a certain age talking about diversity, but as a business manager I recognise that the future of our industry depends on getting to grips with this once and for all.

www.theBESA.com

*Adrian Hurley was elected BESA President for 2024/25 at the Association's AGM in September. He has been a director of the highly respected design, installation and maintenance contractor FP Hurley & Sons since 1990 when he established the company's Bristol office.

In 2017, he was appointed Managing Director of the Bridgend-based company which was founded by his grandfather Frank 75 years ago. He has been a powerful advocate for improving skills and training across the sector and empowering young engineers to help the country achieve its net zero and building safety goals.

WHY IT IS TIME TO GIVE MUM BRAIN A REBRAND

Associate Member of the Women's Engineering Society and Leadership Coach, **Suzanne Lindsay Holt**, invites employers to flip the narrative and promote mum brain as a leadership advantage.

Whether you call it mum brain, baby brain or birthing parent brain – it is a phrase we often associate with feeling frazzled, forgetful and overwhelmed. From memes to the media, it's an image and concept we see repeated. Busy mums running late, losing their car keys and forgetting appointments. You might even have used it to explain forgetting your password (again).

80% OF MUMS REPORT BRAIN FOG

In fact, up to 80% of mums report brain fog as a symptom of early motherhood but when researchers test this out in lab conditions, there are rarely any measurable differences in performance between parents and their child free peers. And in those quiet labs where it's easy to concentrate– that brain fog clears!

Discrimination against Mum's

The risk of continuing to share the frazzled and forgetful stereotype is how it feeds into workplace bias.

"In the workplace this ability to put ourselves in others' shoes helps us to put forward inclusive ideas and create solutions that take multiple viewpoints into account."

After starting a family, many mums are perceived to be less committed to their career. They are less likely to be hired and promoted than fathers or childless women and are perceived as being less competent. Researchers refer to this as maternal bias. Worryingly over three quarters of mother's report having a negative or discriminatory experience during pregnancy, maternity or on return from maternity leave and maternal bias and the motherhood penalty are big contributors in the gender pay gap.

This is a life stage where organisations lose a lot of talent. If we are serious about retaining talented mums in engineering, construction and tech it is time to focus on the positives and give mum brain a rebrand.

What is mum brain?

Matrescence is the term coined in the 1970s by anthropologist Dana Raphael to describe "becoming a mother". It is the biggest change since adolescence, with shifts in our identity, body, social life and our brain. These changes are long lasting with some claiming they last a lifetime.

But far from making us frazzled and forgetful, it is a time of intense learning as our brain adapts to meet this new challenge head on. Research shows that this is the time that the adult brain is most plastic. Neuroplasticity is the brain's ability to form and reorganise synaptic connections helping us to learn new information and adapt to new roles and situations.

As brain scanning technology develops, we are starting to see more information about the changes in the brain through pregnancy and parenting. Research reveals that there are measurable positive changes in the areas of the brain involved in social cognition, emotional regulation, empathy, assessing risk and predicting the behaviour of others. These changes happen through a process of fine tuning and strengthening of our neural connections giving mums a leadership skills boost.

Which skills get a boost?

Emotional intelligence / quotient (EQ) includes understanding and managing our own emotions and being able to interpret and influence the emotions and behaviours of others. Leaders with higher levels of emotional intelligence are better at building effective teams, communicating with others and promoting a positive work culture. They are adept at inspiring and motivating others, resolving conflicts and responding to change. The positive brain changes in social cognition, emotional regulation and empathy give mums an EQ boost.

Social cognition is the term that psychologists use to describe the way we process, interpret and respond to social signals, verbal and non-verbal cues. It helps us to understand the perspective and thoughts of others and to respond appropriately. Mums learn, pretty quickly, how to interpret and respond to a wide range of cues and signals from their child.

"My risk assessment brain has got even better since having kids and my thought process around wheeled access exists, where before it did not"

Emotional regulation refers to our capacity to influence how we experience and express emotion and is a key part of emotional intelligence. Shifts in brain structure and function support mothers to manage their own emotions whilst soothing and comforting their child, in moments of heightened stress and pressure. In fact, both mums and mediators have grey matter changes in the orbitofrontal cortex which is the part of the brain linked to emotional regulation. It is no wonder maternity returners often report increased levels of patience and understanding.

Empathy is another area where mum brain gives us a skills boost. The area of the brain responsible for empathy, self-monitoring and reflection grows during pregnancy and parenting. Empathetic leaders focus on identifying with others and understanding their point of view. Taking a genuine interest in the people around them and understanding their priorities, needs and feelings. They are viewed as higher performers – not just by their team but also by managers.

Clear communication is vital for setting goals, successful projects, allocating workloads building relationships and encouraging teamwork. Without it we leave room for expensive mistakes and misunderstandings. Mum brain changes the way we communicate with others. Giving us an even greater ability to understand and respond to nonverbal cues, provide clear instructions and to check understanding. We can also raise our voice to an impressive level – handy on a noisy site!

Communication skills and empathy are a huge part of successful negotiation. Julia Barr (Commercial Manager at Mott MacDonald) says: "parenting frequently involves reminding ourselves that children have a very different view on life to adults and we develop a strong ability to empathise and comfort them. In the workplace this ability to put ourselves in others' shoes helps us to put forward inclusive ideas and create solutions that take multiple viewpoints into account. This is particularly relevant to negotiating contracts – coming up with a workable compromise or an entirely new solution that suits us both"

Risk management gets a skill boost too. Researchers found that during pregnancy, mothers become better at detecting danger (with a particular sensitivity to angry faces).

They also found positive changes in the area of the brain that helps us to predict the behaviour of others. The benefit of this is clear to anyone who has spent considerable time with a young child. Quite simply, they are a magnet for danger!

Becoming a parent gives you the chance to experience the built environment in a new way too. In fact, Katherine Evans (Women's Equity Consultant and Founder of Bold As Brass) says: "My risk assessment brain has got even better since having kids and my thought process around wheeled access exists, where before it did not".

A fresh perspective

If you've got a recent maternity returner in your team, invite them to look over your projects and plans. Their fresh perspective is likely to spot something you've missed.

All of these improvements translate into the workplace too allowing mums to develop a deeper understanding of their team, communicate effectively, deliver better schemes and build strong working relationships. The great news is these aren't limited to mums who give birth. Many of these changes are a response to spending a lot of time caring for a young child. Meaning that all parents and their organisations can realise these benefits.

You might not be in a position to solve all of the challenges that mums face in the workplace but you can focus on the benefits of mum brain and the leadership skills of parenting.

I invite you to flip the narrative and promote mum brain as a leadership advantage.

IT'S ALL IN THE PAST

Why Heritage Matters

BY HELEN CLOSE, THE WOMEN'S ENGINEERING SOCIETY HERITAGE MANAGER

"If I have seen further, it is by standing on the shoulders of giants."

Isaac Newton, 1675, recognising those who had made discoveries before him.

This quote is well known, but the women's historian in me wants to scream "Yes, thanks to the mothers that raised them, the wives that supported them and the sisters that filled their shoes, and the daughters who went ahead and did it anyway. If we have made progress, it has been at the expense of the women who have been trampled over, forgotten, and whose ideas have been stolen."

In crises such as the First World War and Second World War and more recently Covid, women have stepped up to the mark and have shown what they are capable of. But time and time again their achievements have been by passed by and overlooked.

Why should we be interested in the past? It's gone…we can't change it. Why is relevant?

A lot of people don't like history, but that's probably because they were bored by the subject they were made to study in school. It didn't feel relevant, the situations and the people weren't relatable. When you look for representation of women in the National Curriculum, (not just History as a subject) you're hard pressed to find them, and there's even fewer in STEM. The ABSENCE of women is just as telling as the few we do find. We need better representation of women engineers in schools and the National Curriculum.

Heritage is different from history. Heritage is the accumulative narrative of people or society over generations. Our Centenary Trail Project in 2019, and the years preceding it began to throw more light on the women engineers who have gone before us and the obstacles they overcame. The all women factories that were up so that women could gain hands-on engineering experience, the colleges and institutions that were formed because women were barred from joining the mainstream ones.

WES is the longest running society dedicated to supporting and celebrating the achievements of women in engineering in the world. Today's news, is tomorrow's history and becomes part of the heritage of Women in Engineering. Be the change today.

Heritage Open Days 2024

In September, WES once again took part in the Heritage Open Days Festival, with a series of in person events and online talks, as part of our Electric Dreams 2024 celebrating the role of the Electrical Association for Women and the role of electricity as a domestic energy source. A big thank you goes out to our members and associate members who volunteered to deliver these; Dr Nina Baker (OBE), Sarah Yates, Fiona Gleed, Prof Graeme Gooday, Dr Eleanor Peters, Dr Katie Carpenter, Dr Patricia Fara and Anne Locker. Our thanks also go to Swindon Archives, Pontefract Civic Society, Bristol Libraries, and the Whipple Museum of Science History for collaborating with us this year.

Some feedback from participants:

Electric Wonderland? Women and the 1930s Modern Home by Sarah Yates

- I really enjoyed the talk finding out about women and electrics. Very well presented and I learnt about institution and histories I haven't heard of before.

Hertha Ayrton - A Shining Light by Dr Patricia Fara

- I found the talk very interesting. The speaker was very engaging and the photos and illustrations were extremely useful and informative. A perfect hour of learning.
- It was a very interesting and well-presented talk.

Electrical Networks Then and Now - talk by Fiona Gleed

- New information. Very enthusiastic speaker.

Next year's theme will be announced soon. If you are interested in getting involved and giving a talk or holding an event during the festival next Sept 2025, please get in touch.

Heritage Special Interest Group

Our Heritage Manager has previously held Heritage Strategy Group meetings and we are looking at reviving this into a Special Interest Group. The group will look at opportunities to research and share the history of women in engineering. If you were previously part of the Heritage Strategy Group or would like to be part of the new Heritage Special Interest Group, please let us know on heritage@wes.org.uk.

Watts in A Home Ingenious Project Update

We are pleased to announce that the Watts in A Home project, funded by the Royal Academy of Engineering Ingenious Fund is now underway. We have 40 engineers involved in what should prove to be an exciting journey of self-development, learning, public engagement and being the WOW factor.

Curtiss-Wright welcomes the South Coast Cluster

The South Coast Cluster visited Curtiss-Wright for a Meet the Cluster session in November. The Christchurch site houses three business units of the wider corporation. During the session, members heard from women working in each of the business units about their experiences and the company culture.

Avionics, Video and Systems produce 200 'black boxes' a month, together with computing systems, video management systems and air data computers. The flight recorders comply with recent US legislation requiring 25 hours capacity. Hannah Bartlett shared her journey to Lead Quality Specialist, having started with the organisation as an Electronic Engineering Apprentice.

Mobility Control Systems develop scooter controllers and powerchair controllers. After hearing about the business, attendees joined a tour including the test courses for wheelchairs. A real point of interest was understanding the challenges and need for medical approval for these controllers.

This was a great session to network and learn and were really grateful to the team at Curtiss Wright, and particularly Paul, Hannah, Jo and Carisha for supporting our session.

Young students quiz Northern staff about careers in rail industry

A group of 30 students from Fairfield High School for Girls in Droylsden, Greater Manchester have quizzed Northern staff about career opportunities in the rail industry during a visit to a train maintenance facility earlier today.

The visit was organised by Northern and Community Rail Network as part of Community Rail Week 2024. The train operator invited the girls, who are all studying science as part of their GCSEs, to Newton Heath TrainCare Centre in Manchester, which is home to 139 of the 345 trains in the Northern fleet.

They were kitted-out in personal protective equipment before being taken on a tour of the facility by Northern's performance improvement specialist, Tom Power.

They met the engineers that maintain Northern's Class 150, 156 and 195 trains before sitting down for a question-and-answer session with Northern and Community Rail Network staff. Topics discussed included career opportunities in the rail industry, travel confidence, sustainable travel and how barriers to travel can be overcome.

The first train maintenance facility opened at Newton Heath in 1876. In 2020, Northern completed a £20m revamp to significantly increase the maintenance capability of the TrainCare Centre. Since 2022, it has been the home of Northern's Intelligent Trains programme, a project to make journeys by railway safer and more efficient.

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NES Fircroft are delighted to present the 2024 edition of the Women in Energy Global Study, a critical guide for business leaders, managers, recruiters and D&I professionals to what women want, need and can offer in the global energy workplace.

Our report dives into the data to reveal the nature and aspirations of the female energy workforce. It explores the kinds of jobs women are doing and the level of seniority they are reaching, the career issues they face, what motivates them to contribute their skills to the energy transition and what they need to truly thrive.

This year the survey also tracked attitudes to:

- The work-life interface and flexible working
- What women want from their employer to help them thrive
- Company attitudes and commitments to diversity, equity and inclusion
- Skills and strengths for the energy transition
- Job mobility, transferable skills and the evolution of the sector

DOWNLOAD THE REPORT

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