

# CELEBRATING WOMEN ENGINEERS

It's been 100 years since women became regularly involved in the engineering industry.

So what are women doing for engineering today and how did we get there?

## 1914 -1918 The First World War



The war transforms women's roles in relation to work, and more critically, engineering. Previously for 100 years there had been a ban on women being engineers backed by powerful organisations like the Amalgamated Engineering Union.

The Munitions Act of 1915 meant thousands of women were drafted in their thousands to make cartridges and for general labour.

During four years of war 38,000 Voluntary Aid Detachment (VADs) worked in hospitals and also served as ambulance drivers and cooks. Women played a key role working in munitions factories and to fill labour shortages. By the end of the war women's clinics had been established under the Maternity and Child Welfare Act and women could stand as MPs.



Women played a particularly important role in aircraft wing building factories like this one in the Garlick factory in Chelsea, 1914 (see image, left).

Check out these women engineers who played an important part in the growth of pre/post wartime engineering.

[www.wes.org.uk/magnificentwomen](http://www.wes.org.uk/magnificentwomen)



## 1919

### Stepping forwards...

The Sex Disqualification Act makes it illegal to exclude women from jobs on the basis of their gender. Also 8.5 million win the right to vote.

### ...stepping backwards

The Restoration of Pre War Practices Act forces women to leave their war time roles turning the clock backwards.

### Forward momentum consolidated

The Women's Engineering Society is formed "to enable technical women to meet and correspond... respecting the interests... of technical women". Its magazine "The Woman Engineer" stays in print for 95 years. WES holds its first international conference 6 years later.



## 1924 "Emancipation from Drudgery"

The Electrical Association for Women (EAW), an idea from a WES member Mabel Matthews, is picked up by WES Secretary Dame Caroline Haslett. Its aim is to ensure "...the voice and interests of women are not neglected" as the newly developing field of electrical technology grows.

The EAW grows quickly with branches springing up in Trinidad, Tobago, and New Zealand soon after the first branch in Glasgow is opened.

## 1933 New qualifications

The EAW developed recognised qualifications so women's opinions would carry more weight in the industry. In 1945 they organise the Women's First Electrical Exhibition followed by various university scholarships / educational openings for women in the electrical industry.

## 1935

### Aviator president

The world wide famous aviator, Amy Johnson, becomes WES president.



## 1939-1945 The Second World War

WES draws attention to how women may play a greater role in war production by "...organising a special course of instruction which enables suitable women to pursue a career in engineering. Women worked in traditionally male industries like ship building. By 1943 two million women worked in munitions alone.



## 1978 Award and recognition

The IET Young Woman Engineer of the Year Award (YWE) (initially called the Girl Technician of the Year) is created for the first time. The award "recognises a dynamic young woman who represents the very best of our profession: engineering ability and competence, initiative and ability to be an inspirational role model".

Later, in the year 2000 the Women's Engineering Society would establish its own award, the WES Prize. The award recognises a young female engineer who is able to engage and inspire young people's involvement in science, technology, engineering and maths (STEM) subjects.



Above: Michelle Richmond, Director and Fellow of the IET Winner of YWE 1990

## 2019 and beyond: Twenty first century challenges

As the IET approaches its 15th and then 20th anniversary it is as well to remember its origins stretch back to the establishment of the Society of Engineers in 1854. The Society of Telegraph Engineers (formed 1871) purchased what later became the IET's current headquarters in 1909 at the Savoy Place. Many mergers later, two organisations come to represent most engineers in the UK: the Institution of Electrical Engineers (IEE) and the Institution of Incorporated Engineers (IIE). They merge in 2006 creating the oldest in origin, and largest in size, organisation representing engineers in the world - The Institution of Engineering and Technology.

## FROM YESTERDAY...

**HYPATIA (c.370-412)**  
Great Ancient Female Scientist



Born in Africa, Hypatia is credited with inventing the hydrometer which measures the density of liquids.

**ADA LOVELACE (1815-1852)**  
Computer Pioneer



Ada Lovelace's work is one of the foundational pillars upon which computing science is built. Born into aristocracy she displayed a profound understanding of mathematics from an early age. She worked very closely with so called father of the computer, Charles Babbage and her notes were critical in helping Alan Turing make his computing breakthroughs in the 20th century.

Her achievement and genius is now recognised annually on Ada Lovelace Day. See [www.findingada.com](http://www.findingada.com)

**HERTHA MARKS AYTON (1854-1923)**  
Patent Pioneer



Born in the US, Hertha Ayton was a gifted mathematician who put her prodigious gifts to use creating engineering patents. She has at least 26 registered patents to her name.

**SARAH GUPPY (1770-1852)**  
Engineering Genius

Born in Birmingham Sarah Guppy developed a method of making bridges safer. She worked with fellow engineer Brunel on the Great Western Railway.

**ELISA LEONIDA ZAMFIRESCU (1887-1973)**  
Pioneer Engineer



Born in Romania, Elisa Zamfirescu is generally thought to be the first woman to be awarded an engineering degree in the world. Interested in sciences from an early age, she was the first female member of the General Association of Romanian Engineers graduating with an engineering degree in 1912.

## ...AND FROM TODAY

**ROMA AGRAWAL**  
Great Inspirational Engineer



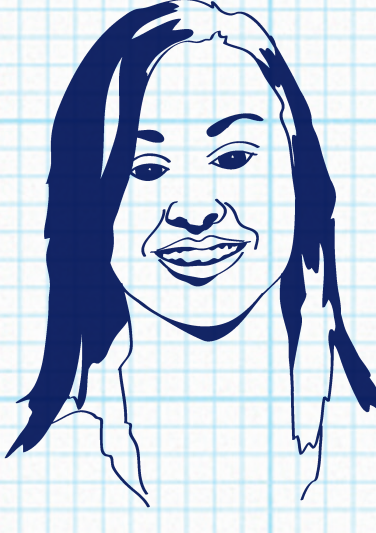
Roma Agrawal is an award-winning structural engineer most famous for helping to construct the 'Spire' on the Shard building in London, the tallest building in Western Europe. She is a founder of the "Your Life" campaign which encourages young women to pursue a career in STEM.

**PROFESSOR ANNETTE HOSOI**  
Great Mechanical Engineer



An associate professor at MIT, one of the most prestigious universities in the world, Professor Hosoi is an expert in various engineering areas including fluid dynamics. Her work is advancing our ability to access difficult to reach places like oil wells.

**RUTH AMOS**  
Great Engineering Enabler



Ruth Amos showed her great engineering acumen very early on when she developed an idea to aid people with limited mobility, while studying for her GCSEs. Her ideas eventually became a product called StairSteady that was launched in 2008. She won the Young Engineer of the Year Award for her ideas in 2006 and is a big supporter of the "Your Life" campaign which encourages young women to pursue a career in STEM.

## HIGHLIGHTING AND SUPPORTING WOMEN IN ENGINEERING

2012

### CLOSING THE GAP

The Perkins Review by the government investigating ways to close the engineering skills gap acknowledges the IET's contribution to the report and commitment to attracting young people, particularly girls, to engineering.

### MARY GEORGE MEMORIAL PRIZE FOR APPRENTICES WINNERS

2016 Gemma Dalziel, Apprentice Network Consulting Engineer, Cisco

2017 Jamie D'Ath, Apprenticeship, MBDA

2018 Shajida Akthar, Shajida pursued a career in technology/engineering straight after leaving college because she had a keen interest in computing, having studied electronics and computing at A level

2014

**NAOMI MITCHISON - Winner IET Young Woman Engineer of the Year Award, Senior Hardware Engineer at Selex Ex**

Naomi Mitchison graduated from Edinburgh university with a MEng in Electronic and Electrical Engineering. During her studies she became passionate about championing STEM careers for local students.

On graduating she worked for Thales and then went on to work for Selex Ex where she is currently a Senior Hardware Engineer. Throughout her studies she has consistently been an ambassador for STEM as a career for young people visiting schools and universities. She is currently Chair of the IET Young Professionals Committee for Scotland South East giving tours and workshops.

2015

**ORLA MURPHY - Winner IET Young Woman Engineer of the Year Award, Audio Engineer at Jaguar Land Rover**

Orla Murphy adds the IET YWE Awards to her many other achievements such as; the BT Young Scientist competition and a Special Award from the Institute of Physics.

### FIRST FEMALE PRESIDENT

Naomi Climer becomes the first female president of the IET in its 144 year history. She is aiming to convey the "excitement and fun" of engineering and dispel the "engineering is a male profession" myth.



2016

**JENNI SIDNEY - Winner IET Young Woman Engineer of the Year Award, Canadian Space Agency Astronaut**

Fellow at St Catherine's College, Jenni Sidney was a lecturer at University of Cambridge, where she worked on the latest low emission combustion devices for use in the transportation and energy sectors. She specialised in flame visualisation, emission mitigation and fuel flexibility. Her work aimed to stimulate alternative fuel development and reduce emissions. She completed her PHD in 2015 at Cambridge University. She ran a number of initiatives to encourage young girls into STEM including Robogals Cambridge through which she designed and delivered robotics workshops to young people. More recently, she was named Canada's newest astronaut by the Canadian Space Agency (CSA) competing with 3,772 candidates to get the role.

### PREVIOUS WES PRIZE WINNERS

2015 HELEN CAVILL  
Manufacturing Engineer, TTP Labtech

2016 BETHAN MURRAY  
Implementation Coach at McKinsey & Company

2017

**DR OZAK ESU - Winner IET Young Woman Engineer of the Year Award, Technical Lead at BRE**

Dr Esu completed her PhD in 2016 at Loughborough University in Wind Energy and Advanced Signal Processing while working as a graduate engineer at Cundall. Here she undertook surveys of existing buildings, and engineers coordinated electrical services for new build, refurbishment and fit-out projects. She now works at BRE as a Technical Lead, where she researches a range of topics around smart buildings. Dr Esu has run numerous engineering activities including FIRST® LEGO® League; EDT Headstart, CREST in a Day; in addition, on a voluntary basis, Ozak is a GCSE Mathematics tutor, supporting students to improve their grades and go on to pursue STEM careers. She is also a strong advocate of equality, diversity and inclusion taking a leading role on projects at Loughborough and South Bank universities.

2017 LARISSA SUZUKI

Computer scientist, inventor and engineer with a PhD in Computer Science, an MPH in Electrical Engineering and a BSc in Computer Science

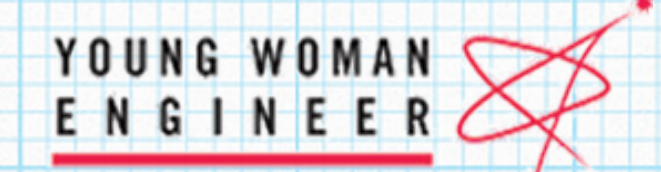
2018 LORNA BENNETT

Mechanical Engineer, Operational Performance team at the Offshore Renewable Energy (ORE) Catapult

2018

**SOPHIE HARKER - Winner IET Young Woman Engineer of the Year Award, Aerodynamics and Performance Engineer for BAE Systems**

As an Aerodynamics & Performance Engineer for BAE Systems, Sophie performs aerodynamic and performance analyses on future combat jets, as well as exploring hypersonic flight concepts and the application of emerging technologies in aviation. Apart from winning the YWE Award in 2018, Sophie also won the IET Sir Henry Royce Medal at the IET Achievement Awards. In addition, she won the Bee Beament award, which recognises an exemplar newly qualified engineer. She was also BAE SEMTA Graduate of the Year 2017, BAE Systems Technical Graduate of the Year 2016. Named as one of the Top 50 Women in Engineering, she also gained Chartered Engineering status with the Royal Aeronautical Society in 2017.



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[www.theiet.org/women](http://www.theiet.org/women)