Inspirational Women Engineers Competition

Nominees

20 May, 2016

Department of Engineering
University of Cambridge

Athena SWAN

UNIVERSITY OF CAMBRIDGE

UNIVERSITY OF CAMBRIDGE

University of Cambridge Women in Engineering

Nominate

Inspirational Women Engineers

Win an 128GB iPad Pro

Entries should include:

A short bio (100 words) and photo of your nominated woman engineer.

Your reasons for nominating her (100 words).

What makes an eligible entry?

All students and employees (male and female) are encouraged to participate.

Women currently employed by or studying in the department are excluded from nomination.

Multiple entries are encouraged.

All entries should be submitted as a PDF or Word file to **mjm61@cam.ac.uk** by the **31st of March 2016** marked "Inspirational Women competition".

All entrants will be invited to a lunch party in the Department, where the winner will be presented with their prize by Professor Dame Ann Dowling. The winning entry and all shortlisted entries will be professionally printed and displayed in the Department.

About the Competition

The Inspirational Women Engineers competition was run as part of the Athena SWAN[1] initiative to raise awareness of some of the many amazing women engineers (past and present), and to inspire others to pursue study and careers in engineering. The winning and shortlisted entries are now displayed in the Department to help raise the profile of women in engineering.

Participants needed to provide:

- a short bio (around 100 words) about their nominated woman engineer
- a photo of the engineer
- their reasons for nominating her (not more than 100 words)

The competition was open to all students and employees of the Engineering Department, female, male, engineers and non-engineers. Women currently employed or studying in the department were excluded from nomination. The nominee's achievements needed to be recognisably 'engineering' but entrants could nominate any woman engineer from around the world and from any time.

The entries were judged on the reasons why entrants find their nominee inspiring, as much as on her achievements. The judging panel, made up of members of the Athena SWAN panel, were also looking for variety in the winning entries to be displayed.

All entrants were invited to a lunch party, where the winner and runners up were announced by Professor Dame Ann Dowling.

[1] Athena SWAN is a national scheme which recognises a commitment to supporting and advancing women's careers in science, technology, engineering, maths and medicine in higher education and research.

Nominees

Mary Anderson
Anousheh Ansari
Hertha Marks Ayrton
Kate Bellingham
Heba Bevan
Helen Augusta Blanchard
Áine Brazil
Yvonne Brill
Erin Brooks
Ruth Buscombe
Jacqueline Chen
Samantha Cristoforetti
Ingrid Daubechies
Cynthia Dwork
Irmgard Flugge-Lotz
Nike Folayan
Elizabeth Garnsey
Amber Gell
Masumeh Gholamisheeri
Lillian Moller Gilbreth
Sebastienne Guyot
Temple Grandin
Margaret Hamilton
Susan Hockfield
Grace Hopper
Hypatia of Alexandria
Mae Jemison
Karen Spärck Jones
Joanne Kennedy
Daphne Koller
Katherine Kuchenbecker
Stephanie Kwolek
Hedy Lamarr
Jennifer Lewis
Giorgia Longobardi
Ada Lovelace
Elizabeth Lurie
Mary Sherman Morgan
Mari Ostendorf
Alice Perry
Stefanie Reese
Emily Roebling
Gwynne Shotwell
Megan J. Smith
Sarah Springman
Debbie Sterling
Katie Symons
Constance Tipper
Sabine van Huffel
Adriana Velasquez Berumen
Wendy
Jane Wernick
Sophie Wilson

Mary Anderson

Short biography

Mary Anderson (1866–1953) was an American inventor who developed the first effective windscreen wiper. While visiting New York City in 1902, she saw her taxi-driver drive with the front window open to keep the windshield clear of falling sleet. This triggered her to design a device to keep a windshield clear, and after producing a working model, Mary was granted a 17-year patent for a windshield wiper in 1903. Her device consisted of a lever inside the vehicle that controlled a rubber blade on the outside of the windshield which could be operated to move back and forth. A counterweight was used to ensure contact between the wiper and the window, making it more effective than previous designs.

Reason for nomination

I am nominating Mary Anderson because windscreen wipers are integral to all modern vehicles nowadays, and are thus a hugely important invention. However this was not foreseen at the time of Mary's invention - in 1905 she tried to sell the rights to her windscreen wipers, but her application was rejected as "[the firm] did not consider it to be of such commercial value." Nonetheless, as the automobile manufacturing business grew exponentially in the 1920s, windshield wipers using Mary's basic design became standard equipment, and are still very much in use today.

Anousheh Ansari

By NASA [Public Domain]

Short biography

Anousheh Ansari is a famous Iranian-American engineer and co-founder and chairwoman of Prodea Systems. She born in Mashhad, Iran and moved with her parents to US at 1984. She received her bachelor degree in Electronic Engineering and Computer Science from George Mason University and master of science degree in Electronics from George Washington University. Her previous business accomplishments

include serving as co-founder and CEO of Telecom Technologies, Inc. (TTI). She became the first Iranian woman in space on September 18, 2006. Ansari has received multiple honors, such as listed in Fortune Magazine's "40 under 40" list in 2001 and honored by Working Woman magazine as the winner of the 2000 National Entrepreneurial Excellence award.

Reason for nomination

I choose Anousheh Ansari as she inspires everyone—especially young women, and girls all over the world, and in Middle Eastern countries that do not provide women with the same opportunities as men—to not give up their dreams and to pursue them. Furthermore, Ansari's presence in space is a great message not just for women and girls but also for all around the world that it is possible to be a successful immigrant and dream maker as far as we will persuade our dreams and hopes.

Hertha Marks Ayrton

Painting of Hertha Ayrton, the scientist and inventor, by Mme. Darmesteter. Cassier's Magazine*, 1909. [Public Domain]*

Short biography

After studying mathematics and science, Ayrton received a B.Sc. from the University of London. She patented 26 inventions, including a line-divider still used by artists and engineers today, presented papers at the Royal Society, was the first woman to talk before the Institution of Electrical Engineers and was subsequently elected as the first female member of the IEE. During WW1, her work played a key role in developing the Ayrton fan which combatted enemy gas attacks and was given the Royal Society's Hughes award and helped found the National

Union of Scientific Workers and the International Federation of University Women.

Reason for nomination

Hertha was born in a time commonly unkind to any woman choosing to pursue an education outside of the domestic environment. Her numerable achievements in her chosen field were a testament to the gritty determination of an enquiring mind and sheer stubbornness to conform to crippling social expectations imposed throughout her life. Despite being refused academic acknowledgment purely because of her gender and marital status, she managed to advance her studies in mathematics and science with astute observations and decision making thus altering the course for women in engineering. Hertha was and continues to be an inspiration to us all.

Kate Bellingham

Used with permission from Kate Bellingham

Short biography

Kate is an engineer who promotes engineering and other science subjects (STEM) to children, students and the general public. After studying physics at Oxford, she was briefly a computer programmer. However, once she realised she was more interested in

engineering, she became an audio engineer for the BBC. Later, she became a TV presenter, most notably presenting Tomorrow's World in the early 1990s, as well as some children's science TV programmes. After this, she got an MSc with distinction in Electronic Communications Systems, afterwards studying for and becoming a maths and physics teacher. She is married with two teenage children.

Reason for nomination

Kate is passionate about promoting STEM subjects and careers to girls. I attended a talk by her recently at an event for all-female future engineers, where she said her ultimate goal will be reached when this type of event is no longer needed. She is also on the advisory board for the Institution of Electrical Engineers and has received many awards, including the UK Resource Centre Women of Outstanding Achievement Award and the Royal Academy of Engineering Public Promotion of Engineering Medal. She also loves music – she is a trained opera singer and holds grade 8 in three instruments.

References

Twitter. https://twitter.com/katebellingham

Kate Bellingham Official Site. http://www.katebellingham.co.uk/about-kate/

Women's Engineering Society. http://www.wes.org.uk/content/kate-bellingham

Heba Bevan

Short biography

While studying at York University in Electronics and Computing, Heba was employed by ARM Cambridge during her vacations. After graduating from York in 2005 she was hired by ARM as a CPU engineer. She went on to co-develop ARMs most successful product, the Cortex M3 microprocessor. She returned to research in 2009, joining a Rice University DARPA project as a programmer. She began her PhD at Cambridge in 2011 in wireless sensor networks. In 2015, she started her own wireless sensor company, Utterberry Limited, and has since won numerous awards for innovation in high profile construction projects such as Crossrail.

Reason for nomination

During her PhD research, I have seen Heba reach out and help her fellow colleagues when they were in difficulty, repairing their circuit boards, and resetting their equipment on site when they are unable to do so. As a STEM ambassador she selflessly taught students engineering and mathematics in her own time. On site she is a pleasure to work with, tirelessly and methodically getting on with the task to hand, in often, noisy, dirty, wet and cold environments without as much as a complaint. Heba is an inspirational leader and mentor, brave and tenacious in doing what is right.

Helen Augusta Blanchard

Source: Willard, Frances E., and Livermore, Mary A., Eds. American Women: Fifteen Hundred Biographies with over 1,400 Portraits. *New York, Chicago, and Springfield, Ohio: Mast, Crowell & Kirkpatrick, 1897, p. 97.*

Short biography

Helen Augusta Blanchard (25 October 1840 – 1922) was an American inventor who received 28 patents between 1873 and 1915. She was recognised for her inventions involving sewing machines and sewing technology, including the invention of the spool case, which is taken as a given in modern sewing machines. Other patents filed by Mrs Blanchard included one for forming a zig-zig stitch that gave strength to a piece when closing a seam, a hat-sewing machine, a pencil-sharpener and even an improvement to surgical needles! Despite receiving no mechanical or technical education, she also started her own company and brought her family back from the brink of financial ruin.

Reason for nomination

I am choosing to nominate Helen Blanchard as although she received no official mechanical or technical education, she invented devices which improved the state of sewing technology substantially, and are still in use today. Not only that, but after the death of her father in the 1870s, her family suffered tremendous financial hardship, even losing their family home. Yet despite this turbulent and difficult period, it was then that Helen filed most of her patents and started a company, which became so successful that 30 years after losing it, she was able to buy back the family home.

Áine Brazil

Photo used with permission from Áine Brazil.

"Structural engineering is a tough one. People trust you with their buildings, so you can imagine the worries. But contributing to the vision of owners and architects by figuring out how to make their vision real is what makes this job fun." - Áine Brazil

Short biography

Áine studied Civil Engineering in Galway, Ireland and subsequently obtained a Masters in Structural Engineering from Imperial

College London where she was the only woman in her graduating class. She moved to New York City and through her work with the structural engineering consultancy Thornton Tomasetti has amassed over 30 years of experience. Key projects include over 3 million square feet of high-rise office development in New York City's Times Square area and the current development of the Hudson Yards area in the city which is the largest private real estate development in the history of the United States. The latter includes impressive structural gymnastics with a 34,000 tonne platform above the live West Side rail yards in Manhattan supporting 4 towers. While shaping the NYC skyline, Áine is also on a mission to promote the advancement of talented female engineers and to encourage their professional recognition within the industry and has founded W@TT (Women at Thornton Tomasetti) to help lead such aims.

Reason for nomination

Áine has particularly inspired me in ways beyond which I ever imagined one person would; influencing both my day-to-day working and trajectory in life. The self-belief that I can achieve anything, as instilled by my parents, sometimes wanes in the reality of the workplace. Encountering Áine continuously reminds me of that belief. Her work is founded on technical excellence, which I relish and so very much admire, and which has gained her resounding respect amongst her peers. Years ago, I excitedly showed my Dad an interview with Áine I had come across. My father's response: "I look forward to reading about you one day".

Yvonne Brill

Yvonne Brill receiving the National Medal of Technology and Innovation from President Obama. (Credit: National Science & Technology Medals Foundation/Ryan K Morris. Used with permission.)

Short biography

Yvonne Brill (1924-2013) was one of the first female rocket scientists in the United States and is most well-known for her innovation in rocket propulsion systems for geosynchronous and low earth orbit communication satellites, which greatly improved the effectiveness of space propulsion systems, for which she received the National Medal of Technology and Innovation from President Obama in 2011. She was born in Winnipeg, Canada and received her undergraduate degree from University of Manitoba and her M.S. at University of Southern California before eventually joining RCA Astro Electronics. She discovered her innovative hydrazine/hydrazine resistojet (the latter engine also known as an electrothermal hydrazine thruster (EHT)) rocket engine in 1967,

with the first being flown on an RCA Americom satellite in 1983. Since then the EHT has become the industry standard, used on communications satellites by companies such as RCA, GE, Lockheed Martin, and Orbital Sciences. In addition to the National Medal of Technology and Innovation, Yvonne has been awarded many honours including the NASA Distinguished Public Service Medal, the AIAA Wyld Award, AAES John Fritz Medal, and the inaugural Kate Gleason Award from ASME and was inducted into the National Inventors Hall of Fame.

Reason for nomination

My primary reason for nominating Yvonne Brill is her lifelong dedication to inspiring women to enter and stay in STEM fields. Early in her career, the University barred her from the engineering program so her degree was in mathematics and chemistry. However that did not hold her back from building a career in rocket engineering. Since then, she has dedicated endless time to encouraging women in STEM, from encouraging young girls to stay in maths to writing professional award nominations for accomplished female engineers. I have experienced this inspiration and encouragement on a personal level; Yvonne is my aunt and undoubtedly has been the greatest inspiration for my mother to become a Professor in Mechanical Engineering and me to be doing my Engineering PhD.

Erin Brooks

Photo used with permission from Erin Sawyer (née Brooks)

Short biography

Erin Brooks graduated from University of Michigan with a BS in Mechanical Engineering and later with an MBA from Kellogg School of Management at Northwestern University. She currently works in California as a Strategic Sourcing Manager of Core Technologies at Tesla Motors a company producing high end electric vehicles. At Tesla, she is helping to develop a long term strategy to promote and speed up the world's adoption of increasingly affordable electric cars. Brooks started out working in various engineering and management roles in the

automotive industry for such companies as Cummins Inc. and Ford Motors. She is an elected officer and active member of the Society of Women Engineers, an organisation which empowers women to succeed in a male dominated field.

Reason for nomination

Erin Brooks is a good role model for girls considering a career in engineering as well women already working in the field. She is highly successful and proactive in encouraging future generations to consider an engineering career path and is a board member of Kids' Vision, a non-profit designed to expose girls to how STEM is applied in high tech companies. She endorses the *#ilooklikeanengineer* campaign in an article for *Fortune* magazine where she talks about removing stereotypes surrounding what an engineer should look like, which shows that she is passionate about equal opportunities.

Ruth Buscombe

Photo used with permission from Ruth Buscombe

Short biography

Ruth has had very recent CUED news exposure:

http://www.eng.cam.ac.uk/news/alumna-ruth-buscombe-formula-one-scuderia-ferrari-strategist-joins-haas-f1-team

As this report indicates, Ruth graduated with an MEng Distinction in 2012 in the Aerospace/thermal part of the Tripos, and began working for Ferrari, first in developing software systems before moving to a race strategist for their Formula 1 team; she recently moved to the Hass F1 team in a similar role.

Reason for nomination

Formula 1 is male-dominated at every level but women are being represented, if somewhat gradually; Ruth's achievements and progression have their own impetus, which speak to her ambition, talent

and love for her chosen career. She combines expertise with immense affability, and despite the lofty social pretences of F1, she remains grounded in helping others, particularly women, to achieve their engineering ambitions; she is ambassador for "Dare to be Different", an organisation set up originally by Susie Wolff, a successful British racer, which aims to instruct and to help women find careers in motorsport, in general. I have no doubts about hearing further successes related to Ruth.

Jacqueline Chen

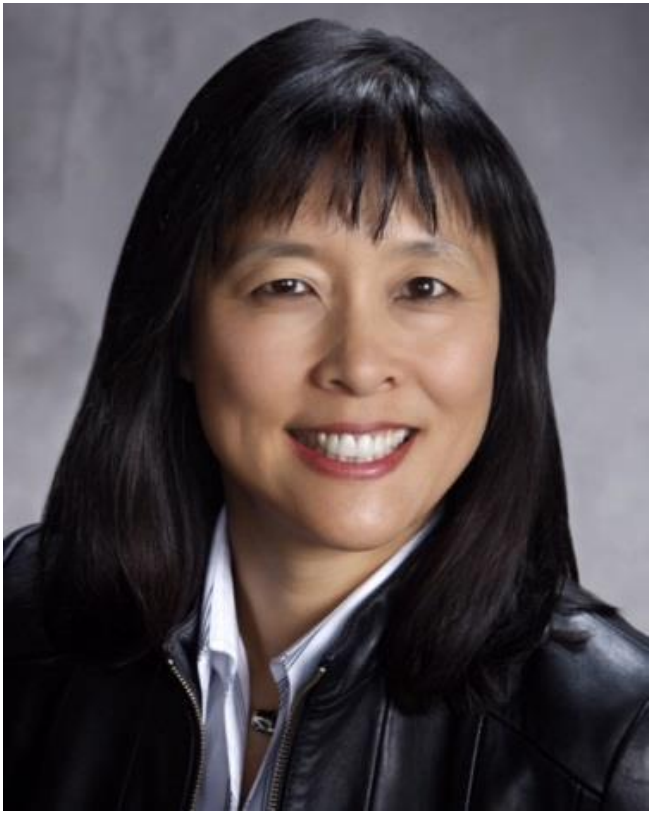


Photo used with permission from Jacqueline Chen

Short biography

Jacqueline Chen is a senior staff member at the Combustion Research Facility Sandia National Laboratories in Livermore, California and a distinguished member of the international combustion community. She received her doctorate from Stanford University and was awarded a Sandia Ph.D. Doctoral Study Program Fellowship shortly afterwards. She has worked to develop programs linking computer scientists with combustion researchers for large scale direct numerical simulation programs. In 2009, she was awarded the Asian American Engineer of the Year Award and currently acts as a member of the Board of Directors of the Combustion Institute.

Reason for nomination

I consider Jacqueline Chen to be an inspiring engineer because of her incredible success in a male dominated industry and support of younger academics in her field, including women. She has been involved in the development of Women in Combustion, a group developed to promote and advance women in the field of combustion. She also prioritises mentoring graduate students and other early-career academics, even as a senior research scientist, highlighted in her profile as a recent inductee into the Alameda County Women's Hall of Flame. As a successful yet approachable woman in a highly technical field, she continues to act as a role model for younger scientists worldwide.

Samantha Cristoforetti (1)

Photo by ESA/NASA. Used with permission.

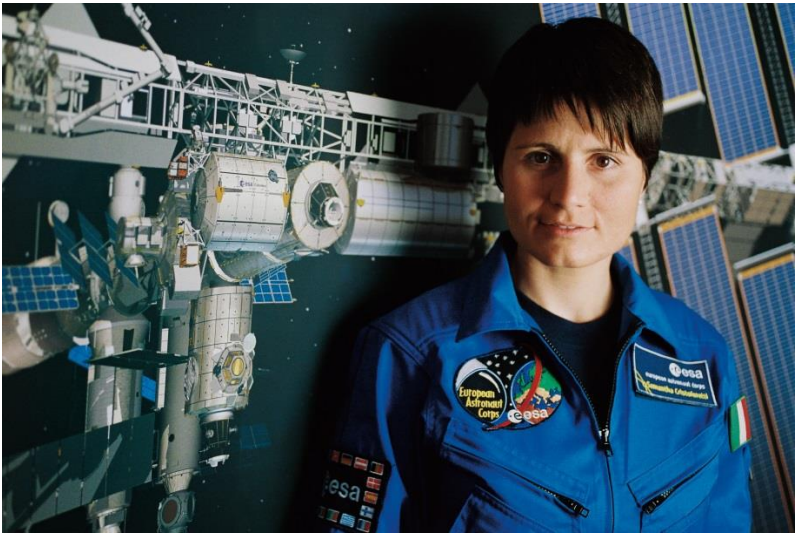
Short biography

Samantha Cristoforetti is an Italian engineer and astronaut, and she works for the European Space Agency. Samantha was born in Milan on 26 April 1977. She graduated in Mechanical Engineering at the Technical University of Munich in 2001, after having spent a period as visiting student in Toulouse, at the Ecole Nationale Supérieure de l'Aéronautique et de l'Espace, where Samantha worked on an experimental project in aerodynamics. She wrote her master's thesis in solid rocket propellants in Moscow, Russia. In 2001, Samantha joined the Italian Air Force Academy in Pozzuoli, Italy, graduating in 2005. From 2005 to 2006, she was based at Sheppard Air Force Base in Texas, USA, and then she went back to Italy, where she became Captain in the Italian Air Force. Samantha joined ESA in September 2009 and on 23 November 2014 she was launched to Space on a Soyuz spacecraft. Samantha worked and lived on the International Space Station for almost 200 days.

Reason for nomination

Samantha is a great inspirational women engineer. But she's much more than that. She has shown that a woman can go really far… and she arrived to Space. She also holds the record for the longest single space flight by a woman. During her career, and mostly during the time in the ISS, Samantha has contributed to dissemination of knowledge a lot. From Space, she has constantly been in touch with our planet, sharing her engineering research interests and her founding. I am sure that many people, including young girls and women engineering students, have been highly inspired by her.

Samantha Cristoforetti (2)



By M. Koell, copyright ESA/NASA. Used with permission.

Short biography

Born in Milan in 1977, Samantha graduated from the Technische Universität Munich with a master's degree in mechanical engineering. She also studied in Toulouse, Moscow and Naples, wrote her master's thesis on solid rocket propellants, and completed a bachelor's degree in aeronautical sciences. She is a captain in the Italian air force and has logged over 500 hours flying six types of military aircraft. Fluent in five languages, Samantha was selected as an ESA astronaut in 2009. She was the flight engineer on the Futura Expedition to the International Space Station, returning to Earth in June 2015. She holds the record for the longest single space-flight made by any woman or European astronaut (199 days, 16 hours).

Reason for nomination

I am nominating Samantha not only for her technical achievements, but also for her work in promoting engineering and science to the public. She engaged in outreach programs throughout her space-flight. She maintained a mission blog, talked to media about her work, and regularly published photos and videos of everyday activities in space in many different languages. Her enthusiasm allowed her to show how practical engineering enables incredible research and progress to happen. As a personal example, her readings from Douglas Adams' *The Hitchhiker's Guide to the Galaxy* were the first things that made me fascinated in the ISS.

Baroness Ingrid Daubechies

Photo by David von Becker. Used with permission.

Short biography

Baroness Ingrid Daubechies was born in Houthalen (Belgium) on 17 August 1954. She obtained her MSc and PhD in Theoretical Physics from the Free University Brussels (Belgium). She held positions at the Courant Institute of Mathematical Sciences (USA), AT&T Bell Laboratories (USA) and was professor at Princeton University (USA). Since 2011 she is professor of Mathematics and of Electrical and Computer Engineering at Duke University (USA).

Although trained as a physicist, her most important contribution is probably in the field of Engineering. She constructed wavelets that require only a finite amount of processing, making them useful in digital signal processing. The Daubechies and CDF wavelets are named after

her, the latter being used in the JPEG 2000 standard. For these contributions she became IEEE Fellow in 1999.

Reason for nomination

Ingrid Daubechies has received more awards than mentionable here, including honorary doctorates from the University of Oxford and 6 other universities. In 2011 she received the James Kilby Medal of the IEEE Signal Processing Society and Benjamin Franklin Medal for Electrical Engineering.

She was the first woman in many positions such as President of the International Mathematical Union, full professor of Mathematics at Princeton University and winner of the National Academy of Sciences Award in Mathematics. She has been an inspirational figure for many (women) to pursue a career in science.

Cynthia Dwork

Short biography

Algorithms that allow secure communication are now an essential component of everyday life, whether we consider financial transactions or Facebook messages. Cynthia Dwork is an information engineer who co-invented differential privacy, a concept and set of algorithms that permits datasets to be analysed without revealing the values or non-queried variables such as, for example, the identities of patients in clinical datasets.

Prior to this, Dwork made important contributions to proof-of-work, which underlies cryptocurrencies such as bitcoin as well as methods for avoiding email spam. She made early breakthroughs in fault-tolerant and distributed computing (for which she won the Dijksta prize) and has received numerous prizes and accolades since, including being elected to the National Academy of Sciences and the American Academy of Arts and Sciences. She is a member of the National Academy of Engineering and currently Senior Research Fellow at Microsoft Research.

Reason for nomination

I believe Dwork is an example of an outstanding and original engineer whose work has impacted much of the technology we rely on in everyday life.

Irmgard Flugge-Lotz

By Source, [Fair use] via https://en.wikipedia.org/w/index.php?curid=31803322

Short biography

Born in Germany in 1903, with a rare mathematical gift and impressive courage, Irmgard Flugge-Lotz was able to support her family through her teenage years by working as maths tutor, in addition to her studies. Undeterred by the absence of women in the field, she chose to pursue her interests and study applied mathematics. Over her 40-year career, she made many important breakthroughs in the areas of heat transfer, fluid dynamics and automatic control theory, contributing to the development of supersonic flight and space flight. In 1971, shortly before her death, she became the first woman chosen to give NASA's Von Karman lecture.

Reason for nomination

Irmgard Flugge-Lotz is my choice for the Inspirational Women Engineers nomination thanks to her great contributions to aero and

astronautical engineering. She did not choose the easy road through life, but in her own words “wanted a life which would never be boring - a life in which new things would always occur". She had the determination to pursue her own interests and fully apply herself, becoming a highly respected professor at Stanford in 1960, despite the obstacles she faced due to her gender. She helped to show the world that merit – not appearance – is what makes a great engineer.

Nike Folayan

Photo used with permission from Nike Folayan

Short biography

Nike has said that she knew that she wanted to be an engineer as a child, when she realised that she was interested on how images came to arrive on a TV screen (eventually breaking the TV to try and figure this out!). Nike gained a doctorate in antenna design and electromagnetics at the University of Sheffield in 2007. She then went to engineering consultancy Mott MacDonald specialising in transport telecommunications, working on the radio design and communications systems for spaces such as the London Underground. A few years down the line and Nike became a systems integration engineer with Parsons Brinckerhoff, working on projects such as the Great Western Mainline electrification project.

Reason for nomination

Nike is a modern day inspiration who has shown hundreds of young people across the UK that engineering comes in all forms, colours, and personality types of people. In addition to a successful engineering career, Nike also founded and chairs AFBE-UK, an organisation established to represent black and minority ethnic (BME) professionals in engineering and inspire young engineers into a career in engineering. She has a passion for what she does, and as a person is approachable, engaging and dedicated to supporting others into a career in engineering. She works with various industries to make engineering relevant and attract a wide variety of people.

Elizabeth Garnsey

Photo used with permission from Elizabeth Garnsey

Short biography

Dr Elizabeth Garnsey has been instrumental in building the strong university-industry links that we now experience in the high tech community here in Cambridge. Her work to understand the process of

commercializing technologies and incubating those ventures followed from her early career work on occupational structure and employment activities. Starting in the late 80's, Dr Garnsey began to focus on the new employment opportunities in new high tech ventures and has now contributed over 25 years of research to this increasingly important area of study.

Reason for nomination

Dr Elizabeth Garnsey stands out as a role model in the engineering community. In her career, she has demonstrated impressive foresight and confidence and has proven herself as an exceptional mentor. It is truly fascinating to take a look at all of the work she has done over the years and begin to comprehend the profound career path she pioneered. While her educational training was in economics and sociology, Dr Garnsey has established herself as an engineer through the problem solving that she demonstrated to understand the innovation ecosystem and then translate that learning to build the innovation ecosystem we observe here at Cambridge today.

Amber Gell

Photo by Rewelch, used under a CC-BY-SA license. Source: https://commons.wikimedia.org/wiki/File:Amber_S_Gell.JPG

Short biography

Amber S. Gell is an American space systems engineer currently working for Lockheed Martin. Gell undertakes research on human performance in extreme environments, specifically optimal crew selection for long-duration spaceflight, winning the 2010 Early Career Rotary National Award for Space Achievement. Gell is strongly involved

in inspiring people to pursue careers in STEM, and has won the 2013 Adler Planetarium Women in Space Science Award. In addition, Gell is known for being a certified group fitness instructor, Wilderness First Responder, Master Scuba Diver, and member of the Embry–Riddle Aeronautical University Mathematics Industry Advisory Board.

Reason for nomination

I met Amber Gell when I was 16 in 2008 at the Scottish Space School (SSS) held in Strathclyde University. I had a conversation with Gell about who inspired her to pursue her career where she was honest and positive about her experiences and inspirations. Gell was the first female engineer I had met. Since that conversation I have considered Amber Gell a role model and an inspiration to myself. I consider myself very lucky to have met her as many women enter engineering and physics without any female role models and meeting her has had a massive positive impact on my own career path.

Masumeh Gholamisheeri

Photo used with permission from Masumeh Gholamisheeri

Short biography

Masumeh Gholamisheeri has been a PhD student at Michigan State University (MSU) since 2013 focusing on fuel efficient, low pollutant ignition technology. She is a member of the Alternative Fuels and Combustion Laboratory on a Dr. Durbetaki Research Fellowship. She was amongst the top 0.2% candidates for university entrance in Iran and received both her MS and BS degrees in mechanical engineering from Shiraz University. She left Iran in 2011 to live in East Lansing, Michigan and join her husband Saleh, who was pursuing his PhD at MSU. They both returned to Iran on vacation half way through his program but were refused re-entry to US. Later, she was accepted to MSU for a PhD.

She left for the US on a single entry visa, leaving her husband back in Iran. Saleh is now pursuing his PhD in Sweden and Masumeh hopes to finish her PhD this year so she can finally be reunited with her husband after almost 4 years.

Reason for nomination

Masumeh left Iran in 2011 to join her husband Saleh, a PhD student at Michigan State University (MSU). Their perfect life was disrupted when after leaving for a vacation, they were not allowed back into the US. Masumeh managed to get a single-entry US visa for her PhD but Saleh wasn't so lucky. When they parted in Iran, she knew the next time she would see her husband would be after finishing her PhD, the pain of separation only those who have ever loved could understand. With their education, they'll be back together and stronger – and that's what inspires me.

Lillian Moller Gilbreth

Smithsonian Institution Archives [Public Domain]

Short biography

American industrial engineer and psychologist with a degree in English Literature, Gilbreth was also the first woman to be elected into the National Academy of Engineering. Her work focused on the improvement of productivity and efficiency in industry and together with her husband, Frank, devised the idea of 'therbligs' to describe 18 small key actions with the idea that reducing the number of therbligs involved in a process made the process more efficient. As well as having a demanding career, she was also mother to twelve children, two of whom went on to write the book 'Cheaper by the Dozen'.

Reason for nomination

Not one to let her gender dictate what she could or could not do, Gilbreth was an inspiration to women of her time as she successfully combined a career with motherhood. She has since been dubbed 'the mother of modern management' for her work on efficiency which was not just limited to industry. Through her work on domestic efficiency she helped other women by providing them with "shorter, simpler, and easier ways of doing housework to enable them to seek paid employment outside the home."[1] Even today her work on motion analysis is still being used and developed.

[1] De Léon, Michael A. (2000). Angela M. Howard and Frances M. Kavenik, ed. Handbook of American Women's History (Second ed.). Thousand Oaks, California: Sage Publications. p. 220.

Sébastienne Guyot

Short biography

Sébastienne Guyot was born in 1894 into a modest family in France. Aged 21, while she was a teacher in Britany she took the high competitive entrance exam to Top Engineering Schools, when these opened their doors to female candidates. She ranked 57 out of 425 qualified students to enter Ecole Centrale Paris. Graduated in Mechanical Engineering in 1921 she then worked for several aeronautic companies including Lioré & Olivier, manufacturing the best bombardier during WW2. She also learnt to fly and owned her own plane.

On top of this Sébastienne was a high performance athlete: she won French championship in cross country running in 1928 and was selected for 800m running at the Amsterdam Olympic Games.

In July 1940 she crossed Nazi lines to reach her brother kept prisoner in Mulsanne camp to plan an evasion. Arrested by the Nazi at the end of July, she spent six months in Mans prison causing her death in January 1941. She was awarded Médaille de la Résistance posthumously. Since 2010 École Centrale Paris has granted every year the Sébastienne Guyot scholarships to encourage young ladies to study engineering.

Reason for nomination

6 reasons why Sébastienne Guyot should inspire us:

1. She was perseverant: Being a female at her time did not prevent her from getting into a top engineering school, fly a plane or go to the Olympic Games

2. She incarnates equal opportunities: entered a top Engineering school coming from a modest family

3. She was resilient: member of the Resistance movement since July 1940

4. She showed dedication and hard work

5. She was family-oriented: tried to save her imprisoned brother

6. She was a French woman; and French women are inspirational. Think about Jeanne d'Arc, Coco Chanel, Marie Curie, Edith Piaf…

Temple Grandin

Photo by Steve Jurvetson, used under a CC-BY license.

Short biography

Mary Temple Grandin (born 1947) is Professor of Animal Science at Colorado State University, a bestselling author, activist for autism, and a consultant to the livestock industry. She did not speak until three and a half, and then was diagnosed with autism. She invented the “hug box,” to calm people on the autism spectrum, and various devices to deal more humanely and efficiently with animals in slaughterhouses. In 2010, she was listed in the “Heroes” category by Time Magazine as one of the 100 most influential people in the world. There is a film about her life, titled *Temple Grandin*.

Reason for nomination

Temple Grandin’s life is inspiring in many ways: overcoming great difficulties to design and build devices that have a major impact on the lives of people and animals. She was initially labelled as brain damaged and felt threatened by almost everything in her surroundings, yet has become a world expert on animal treatment, and a proud, public speaking autistic. She is a remarkable visual thinker, describing words as a second language. She has profoundly changed attitudes, speaking up for people who think differently, saying “the world needs all kinds of minds,” and is a strong proponent of animal welfare.

Margaret Hamilton

Winning entry

Photo by NASA [Public Domain], used with permission from Margaret Hamilton.

Short biography

Margaret Hamilton was the lead software engineer for NASA's Project Apollo and amongst other achievements, she was responsible for creating the code that let Apollo 11 land on the moon. She received NASA's Exceptional Space Act Award and also the Augusta Ada Lovelace Award for her work on those Apollo systems and is considered a pioneer in the field of computer science and software engineering.

Reason for nomination

First and foremost, Hamilton is inspiring due to the unbelievable challenge she undertook; using one of the first chip based computers with only 64k of memory she successfully wrote the code which enabled humans to land on the moon- an incredible amount of functionality into such a barebones device. Significantly however, the engineer's achievements are not just limited to this particular machine- through her scientific papers and the work of the company she later founded she also made important contributions to ideas about fault-tolerance and reliability.

However Hamilton is also a vital role model in gender equality. It was 1960, not a time when women were encouraged to seek out high-powered technical work. Even as a working mother, Hamilton would have been considered unusual; as such a ground breaking software engineer, she was positively extraordinary.

Susan Hockfield

Photo used with permission from Susan Hockfield

Short biography

Susan Hockfield is the first biologist and first woman to become president of MIT. She made fundamental contributions to bioengineering, pioneering the use of antibodies to understand the progression of brain tumours. She is a tireless advocate for science at many levels: she initiated the establishment of the Koch Institute for Integrative Cancer Research and the MIT Energy Initiative. She was the inaugural chair of the Advanced Manufacturing Partnership, a White House initiative to catalyse industry and academic involvement in advanced manufacturing.

Reason for nomination

I met Professor Hockfield in 2015 after she gave an inspirational talk on bringing biology and engineering together. Hockfield recognizes and has worked hard to dismantle interdisciplinary barriers between biomedical sciences and engineering. She has been instrumental in driving bioengineering at MIT, which is now a world-leading institute in this emerging field.

Grace Hopper

By James S. Davis/US Navy [Public Domain]

Short biography

Grace Hopper was an early programmer of the Harvard Mark 1 computer. She developed the COBOL programme language and thus revolutionised computer programming by introducing machine independent programming language and fulfilling her ambition of a programming language that was close to writing in English. After her

retirement she worked tirelessly to encourage young people, especially women, to achieve all that they could and to take risks to do so.

Reason for nomination

While her PhD was in mathematics, she was clearly an engineer and advanced progress in computing with her aim to make programming more intuitive. Less well known is her work to create standards for programming development which helped put America in a lead position in the field. Finally, her energy and drive to help young people was an inspiration. She remained fiercely proud of her position in the US Naval Reserve and much of her research was carried out for the US Navy – who had refused her a position in the Navy during World War II as she was too small!

Hypatia of Alexandria

By Jules Maurice Gaspard (1862–1919) [Public Domain]

Short biography

Hypatia of Alexandria was a Greek mathematician, philosopher and inventor. She was born between 350-370 CE and died in 415 CE. Her father was the mathematician Theon, who tutored her in mathematics, astronomy and the philosophy of the day which, in modern times would be considered science. There is little information about her life. Hypatia of Alexandria was one of the earliest women inventors, and is credited with the invention of the hydrometer. An early description of a hydrometer appears in a letter of Synesius of Cyrene to Hypatia.

Synesius requested the Greek scholar to make a hydrometer (or hygroscope). She is given credit for inventing the hydrometer in the late 4th, or early 5th century. Hypatia was murdered in 415 CE by a Christian mob who attacked her in Alexandria.

Reason for nomination

The terms engineer and engineering date from the Middle Ages, and they acquired their current meaning and usage only recently, in the 19th century. Engineering was not recognised as a formal profession during Hypatia's times, so women with engineering skills often sought recognition as inventors. Hypatia was an extraordinary woman. While all Greek women were occupied with the same type of work, that was mostly related to the domestic needs of the family, Hypatia led the life of a respected academic at the University of Alexandria, which was a position to which only males were entitled previously. She was a woman of enormous intellectual power. Even though she is not recognised as an engineer, since the profession of engineering did not exist in those centuries, I believe that the definition of an engineer fully describes Hypatia. Hypatia's example proves that women engineers have always existed, but most of them were not given the opportunity to shine in the field of engineering, due to several reasons.

Mae Jemison

Photo by NASA [Public Domain]

Short biography

"Growing up, Dr. Mae Jemison spent hours in the library reading about the sciences, which sparked her passion for STEM. She attended Stanford University, where she earned a degree in chemical engineering followed by a medical degree from Cornell University. She worked as a physician before joining the Peace Corps to serve as a researcher and

physician in Liberia and Sierra Leone. After returning to the United States, she decided to apply to NASA for its astronaut training program in 1987. In 1992, Mae Jemison became the first African-American woman to ever go to space with the Endeavour mission." (Adapted from: http://www.forharriet.com/2015/04/9-black-women-game-changers-in-stem.html#axzz44IcwCtzz)

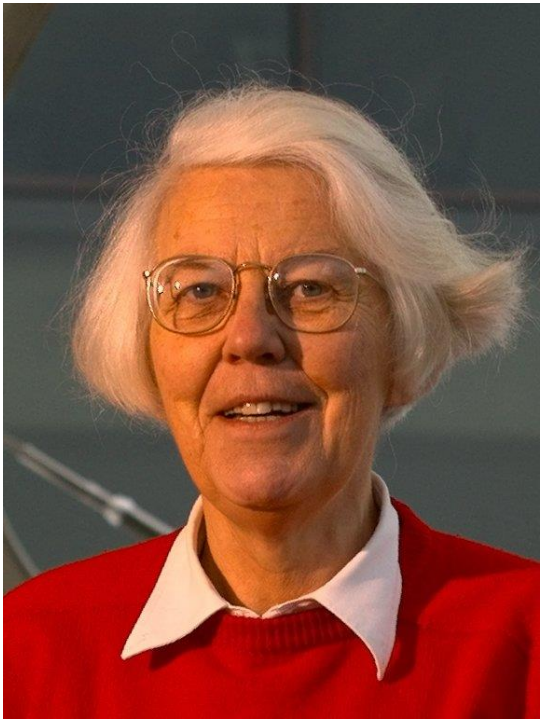
Reason for nomination

Dr. Jemison embodies the definition of a polymath, using her skills from her multiplicity of degrees to pioneer initiatives in the depth of rural villages in Africa to space travel. She achieved all of this despite the difficulty of being a minority black woman at her university where there was much racism. In her college days, she headed the Black Student Society and now continues to advocate for getting minority students interested in science. Seeing technology as being a part of society, she founded the Jemison Group that researches, markets, and develops science and technology for daily life. Her compassion symbolises the virtues of a women engineer.

References

https://en.wikipedia.org/wiki/Mae_Jemison

Karen Spärck Jones



Markus Kuhn/University of Cambridge [Used under a CC BY 2.5 license]

Short biography

Information retrieval is the cornerstone of modern research and, arguably, modern life. Professor Karen Spärck Jones was a pioneer in information retrieval and introduced the “inverse document frequency” (IDF) concept for weighting sources of information which is still used in most modern web search engines. She started work in automatic language and information processing research in the late 1950s and was active in the field up to her death in 2007. In 1994, she was President of the Association for Computational Linguistics. She was

also a Fellow of the British Academy, an AAAI Fellow and ECCAI Fellow. She received numerous awards for her research including, in 2004, the ACL Lifetime Achievement Award and in 2007, the BCS Lovelace Medal.

Reason for nomination

I had the good fortune to be personally involved with the Multimedia Document Retrieval (MDR) project at CUED which included Professor Spärck Jones as a collaborator. This was a project I worked on one summer while I was still an undergraduate and before I joined CUED. Indeed, the interface demonstration page is still up bearing the hallmarks of cutting edge, turn of the millennium web design. I can attest that Karen was an “Inspirational Woman Engineer” in that she inspired me to move forward with Information Engineering as a speciality. The breadth of knowledge she demonstrated on any subject she chose to discuss and the outspoken and direct way she engaged with everyone caused me to very much admire the “polymath” approach to education and problem solving. To this day I try to broaden my expertise at any opportunity and seek out cross-disciplinary solutions. Karen was undoubtedly one inspiration for my own love of learning.

Joanna Kennedy

Photo by Thomas Graham, used with permission from Joanna Kennedy

Short biography

If you google Joanna Kennedy, you will find some exceptionally impressive facts about her career: she gained a First in Engineering at Oxford in 1972 as one of only three women in her year; she is an OBE, a Fellow of the Royal Academy of Engineering and a Fellow of the Institution of Civil Engineers; was a Director of Arup and their Global Leader for Project Management until her 'retirement' in 2013; and now has a number of important roles including Patron of WISE, which she also happened to help set up.

Reason for nomination

I first met Jo in 2007 when she interviewed me for a grant - I didn't get the grant, but just remember being quite overwhelmed by meeting such an amazing woman. Since then I have had the great fortune to get to know her, and what has particularly struck me is that, rather than behaving with any understandable sense of her own superiority, she treats everyone with equal respect and deep thoughtfulness. In fact she behaves as if she is just a normal woman, which in many respects is also true; what Wikipedia fails to mention is that she is married (to a head teacher, no supportive wife substitute!) and has two sons and now a grandson, all of whom she is clearly hugely proud.

I am nominating Jo Kennedy for being a true inspiration - how to be a wonderful and successful engineer, while also treating everyone with kindness, fairness and respect, and while being a caring and supportive spouse and parent. Jo, you are just an inspiration to all of us to keep trying!

Daphne Koller

Short biography

Daphne Koller is a member of the US National Academy of Engineering and a professor of Computer Science at Stanford University. Her research area is the Artificial Intelligence (AI) and its real world applications, such as computer vision and medicine. In 2012, concerned about the not readily available high quality education in many parts of the world, she and a fellow Stanford professor launched Coursera, a free Massive Open Online Courses (MOOC) platform. In 2016, Coursera has teamed up with 142 educational and cultural institute partners in 28 countries and offers 1831 courses to 15 million users.

Reason for nomination

Daphne Koller could probably not have imagined how Coursera, launched as an online education academy for the underprivileged, has changed the learning habit of the world: students and teachers, scientists and artists, employed and unemployed, all like to take courses on Coursera for research, work or personal development. Providing education accessible to all, enjoyed by all, Koller inspires me and many others by showing what meaningful outcomes may occur when one's Engineering expertise meets social compassion.

Katherine Kuchenbecker

Used with permission from Katherine Kuchenbecker

Short biography

Katherine Kuchenbecker is an assistant professor in Mechanical Engineering and Applied Mechanics and the GRASP Lab at the University of Pennsylvania. She designs and controls robotic systems that enable touch to be recorded and replayed as though the object was right in front of you. This is known as haptics and has many applications particularly in medicine such as feedback during robotic surgery, teaching dental students what decay feels like and stroke rehabilitation.

But, the technology also has exciting applications in online shopping, enabling the buyer to feel what their new clothes will feel like, and giving humanoid robots an additional sense!

Reason for nomination

I nominate Katherine as my inspirational female engineer because her research is innovative, exciting and not generally what somebody thinks of when they think of engineering. The technology that she is developing has many applications in medicine and can really make a difference in teaching students and increasing the success rates of some surgeries as well as having interesting spin offs. Katherine herself is active in promoting STEM to girls at UPenn and has helped run activities using her robots. Her lab is also predominantly female because she makes such a good role model for aspiring female engineering academics.

Stephanie Kwolek

Chemical Heritage Foundation [Used under a CC BY SA license]

Short biography

Stephanie Kwolek was an American engineer who lived from 1923-2014, and is best known as the 'Mother of Kevlar'. As an employee of DuPont, Stephanie became an expert on polymers and invented Kevlar in the mid-1960s. This synthetic fiber exhibits high specific strength, heat resistance, and toughness. This unique combination of properties leads to its usage in a wide variety of applications from lightweight and tough sporting equipment to firefighter suits, high performance ropes and, of course, the bulletproof vests and armour for which it is famous. By the end of Stephanie's life, one million Kevlar

bulletproof vests had been sold – thousands of which have saved human lives.

Reason for nomination

Stephanie Kwolek combined her scientific mindset with her hobby and childhood passion of sewing to create one of the most influential fabrics: Kevlar. She is remembered as being very assertive and fully dedicated to her work, especially admirable in a time period and industry with a gender imbalance. While she was awarded many prestigious national medals for her work, perhaps the most meaningful reward was that of saving thousands of people's lives and preventing countless injuries.

Hedy Lamarr (1)

By MGM [Public Domain]

Short biography

Although better known for her Silver Screen exploits, Austrian actress Hedy Lamarr also became a pioneer in the field of wireless communications. The international beauty icon developed a "Secret Communications System", which was a means of changing radio

frequencies to keep enemies from decoding messages. This novel design helped combat the Nazis in World War II.

More importantly, the "frequency-hopping spread spectrum" technology that Lamarr helped to invent would galvanize the digital communications boom, forming the technical backbone that makes mobile phones, GPS, Wi-Fi and Bluetooth technology possible.

Lamarr was not instantly recognized for her innovative talent at the time, but recently she has been showered with praise for her groundbreaking invention.

Reason for nomination

She was much more than just another pretty face. Lamarr shattered stereotypes and earned a place among the 20th century's most important women inventors. She had a natural mathematical ability and lifelong love of tinkering with inventions, proving that interest is the best teacher. Moreover, her intellectual curiosity and consistent diligence impress me a lot and encourage me to a better engineer.

Meanwhile, Lamarr's invention enormously facilitates everyone's daily life. Owing to her technological contributions, thousands of miles is no longer distant for me and my family. We can keep in touch anytime and anywhere using the internet and mobile phones. Therefore, making life easier and better is indeed the power and beauty of engineering.

Hedy Lamarr (2)

By MGM [Public Domain]

Short biography

Hedy Lamarr was born in Vienna in 1914 and started a film career in Hollywood. Promoted by the film industry as “the world’s most beautiful woman”, she quickly came to epitomise the phrase “more than just a pretty face”. With the outbreak of the Second World War, Hedy

Lamarr used her sharp mind to develop jam-proof guidance systems for torpedoes. This technology was later patented and became the basis of FHSS (frequency hopping spread-spectrum) which reduces the likelihood of a signal succumbing to interference or intentional jamming by rapidly changing the frequency across a pre-determined series of bands. This technology and the evolutions that followed are still used today; most notably in military radio transmissions, Bluetooth, Wi-Fi, and CDMA mobile phone networks.

Reason for nomination

Hedy Lamarr is an inspirational engineer because she defied stereotypes on several levels to make a meaningful and lasting contribution to society. As a beautiful actress she was likely – yet wrongly – the last person expected to revolutionise secure signal transmission. In a biography by Pulitzer Prize-winning author Richard Rhodes, she is said to have acquired her knowledge through discussions at dinner parties with intelligent friends rather than having any formal education, and approached the world with a mindset of, “how could that be fixed? How could that be improved?”. She sends the message that to be a successful engineer, neither gender nor appearance matters.

Jennifer Lewis

Photo used with permission from Jennifer Lewis

Short biography

Professor Jennifer Lewis started her career with a BSc in ceramic engineering from the University of Illinois, she then went onto complete her PhD at MIT in ceramic science. She now leads a research group at Harvard University which is best known for its pioneering work in creating new materials as well as innovative new 3D printing platforms

for fabricating biologically functional devices and vascularised tissues. She has published 130 papers, holds 8 patents as well as founded two companies to bring the technologies she has developed to industry. She has won numerous awards including the Materials Research Society Medal and more recently the Sosman award from the American Ceramic society.

Reason for nomination

I first came across the work of Lewis group when I was an undergraduate completing a research internship and was immediately fascinated by their innovation of bioprinting and was inspired by the impact this shall have within tissue engineering. I am now pursuing a PhD of my own, focused on bioprinting and I look up to Professor Lewis, as like me she is an engineer by background, who has branched out into life sciences. She is a world authority on bioprinting and her work has been broadly applied to many fields including tissue engineering, photovoltaic power, electronics and microfluidic devices.

Giorgia Longobardi

Photo used with permission of Giorgia Longobardi

Short biography

Giorgia is a Junior Research Fellow in Gonville and Caius College in Cambridge (fellowship period Oct 2015- Sept 2019). She received her MSc with a first class distinction from the University of Naples Federico II (Italy) in 2010 and her PhD in Electrical Engineering from Cambridge University in 2014. She was awarded the EPSRC and CHESS scholarships from the U.K. funds to pursue her PhD. During her studies she collaborated with several companies such as NXP, Vishay Semiconductor. After her graduation (Sept. 2014). Giorgia won a

prestigious Follow-on-Fund from EPSRC (from Jan `15 to Sept '15) to further develop the technology she proposed during her PhD. She currently heads the research activity in Gallium Nitride (GaN). Giorgia published work in prestigious journals such as Electron Device Letters and presented at conferences such as IEDM and ESSDERC. She also gave numerous invited lectures on her subject including in Tsing-Hua Science Foundation (Taiwan), Power Electronics Centre (University of Warwick, UK), and University of Bologna (Italy). She also won a prestigious IEEE award.

Reason for nomination

Giorgia is an incredibly talented and enthusiastic engineer. Her work in fast GaN transistors is leading edge and is considered by many in the semiconductor community a breakthrough in the field of power devices.

Giorgia is also able to transmit the love and passion for her work to the people she collaborates with. She engages in lively discussions across many subjects and communities and she is able to convey her knowledge with a combination of simplicity and power that can be rarely matched.

Giorgia was able to bring together several groups working totally unconnected in the University and develop a vision for a joint research activity in GaN. At her own initiative she organised a large workshop in her field (GaN power devices) gathering researchers and academics from several departments in Cambridge. This now resulted in strong collaboration across departments and lead to several joint projects.

Ada Lovelace

Alfred Edward Chalon - Science & Society Picture Library [Public Domain]

Short biography

Ada Lovelace is often referred to as the first computer programmer. Her impressive skills in mathematics emerged during early adulthood, having been tutored by Mary Somerville and later, De Morgan. Lovelace was introduced to Charles Babbage in 1833, and after

ten years of close collaboration, when translating an article on Babbage's Analytical Engine, she appended her own notes which demonstrated substantial understanding of the machine. Among them is Note G, which is widely regarded as the world's first computer program. In the notes Lovelace also articulated a visionary perspective about the potential of the Engine in broader and further complex fields other than numerical calculations. She died of uterine cancer in 1852, aged 36 only.

Reason for nomination

There is a metaphor which compares a short but extraordinary life to a night-blooming cereus that blooms once a year just for few hours at night. Lovelace, in my eyes, is just a beautiful blossom of such, who opened a new era for programming, computation and engineering. Her story echoes my belief that whatever the length of my life is, I must live it to its full, follow my dreams and seek for truth in this world. Her analogy between mathematics and poetry also impressed me a lot, showing humanities and sciences are just an integral description of our Nature.

Elizabeth Lurie

Short biography

Elizabeth Lurie is the principal engineer in Pratt & Whitney (P&W), a leading aeroengine manufacturer. After obtaining her ScD in fluid mechanics from MIT, she joined the AmericaOne team through United Technologies Cooperation (UTC), P&W's parent company. She worked as an engineer to develop the underwater instrument of the racing yacht for the 2000 Louis Vuitton Cup. Second finished her boat, she then moved on to some leading yacht companies to pursue her dream of designing the fastest boat in the world. With the advanced fluid engineering experience, she returned to UTC research center in 2007 to use her knowledge for helping develop the aerospace high-compression units. In 2012, she was promoted to the manager of the aerothermal methods group, leading the computational fluid dynamic (CFD) software development for jet engines design. Recently, she became the first female principal engineer of aerothermal technology in the company history.

Reason for nomination

Elizabeth Lurie is the first female principal engineer of aerothermal technology in Pratt & Whitney and one of best fluid engineers in the world; She guides the evolutionary path of computational aerosciences, especially in jet engine application, and demonstrates the path in the NASA report "CFD vision 2030"; Her courage of pursuing the yacht-racing dream and the excellence inspires young engineers, not only the female but also the male.

Mary Sherman Morgan

Photo property of George Morgan, used under a CC BY license

Short biography

Mary Sherman Morgan, known as the "Rocket Girl" was born on the 4th of November, 1921 in North Dakota. After graduating high school in 1939 as a valedictorian, she read Chemistry at Ohio's DeSales College. As chemists were needed during the Second World War, she quitted school and started working at a munitions factory. Mary applied at North American Aviation where she was promoted to Theoretical Performance Specialist, studying new rocket propellants. In 1957, Mary saved the US in the space race by inventing the liquid fuel Hydyne used for the first US satellite Explorer 1. She died in 2004.

Reason for nomination

Mary Sherman Morgan was not only among the few who did not have a college diploma, but also the only female figure out of the 900 engineers that worked at North American Aviation. Mary's inquisitive sense and passion for rocket propellants led her to the discovery of Hydyne, making her America's first female rocket scientist. Besides her academic achievements, her penchant for keeping secrets and avoiding the social media is remarkable as after her death few records about her existence were barely found. Therefore, to honor Mary's accomplishments, her son George D. Morgan wrote a biographical book entitled "Rocket Girl".

Mari Ostendorf

Photo by Patrick Bennett and used with permission of Mari Ostendorf

Short biography

Prof. Mari Ostendorf, an alumna of the Stanford Signal Compression and Classification Group, joined the University of Washington in September 1999. Previously, she was in the Speech Signal Processing Group at BBN Laboratories (1985-1986), and at Boston University on the faculty of the Electrical and Computer Engineering Department (1987-1999). Prof. Ostendorf is a fellow of IEEE and ISCA. She has served on numerous technical and advisory committees. Her research interests include data compression and statistical pattern recognition, particularly in speech processing applications. She has

published over 200 papers on various problems in speech and language processing.

Reason for nomination

Mari Ostendorf has been an inspiration both in her research and her selfless mentoring and development of other engineers for over 30 years. Her world class research has been continually at the cutting edge of speech and language processing. Helped by the mentoring that Mari provides, her 25 PhD graduates have gone onto leading positions in academia and the speech industry. She continues to support and promote other women engineers around the world, for example, working to increase the number who have their work recognised by the IEEE and arranging events for women in the field of signal processing.

Alice Perry

Short biography

Alice Perry was born in Wellpark, County Galway, Ireland. She graduated from Queen's College Galway (now NUI, Galway) with a first class honours degree in civil engineering. Her father was a county surveyor in Galway and he died in 1906 shortly after her graduation. Alice took his place for 6 months becoming the first woman to hold the position of county surveyor in Ireland. Alice moved to London in 1908 and worked as a `Lady Factory Inspector'.

In 1916 she married a British soldier, Bob Shaw, who was sadly killed on the Western Front in 1917. She later moved to Boston, working in the Christian Science church, also writing and publishing poetry.

Reason for nomination

At a time when only a small number of women attended university Alice chose to enter the male dominated world of engineering. In doing so she became a marker in our history, her graduation marks the point where women engineers existed with equal qualification to their male counterparts. She paved the way for all future women in engineering, demonstrating it is a viable and worthwhile option for university study. Alice's individual achievements served to prove that women belong in engineering, and that engineering belongs to women as much as men.

Stefani Reese

Photo used with permission from Stefani Reese

Short biography

After finishing her diploma as well as her PhD with distinction, she went for a research stay at the University of California at Berkeley. When she returned to Germany a year later, she became an Assistant

Professor at the Institute of Mechanics of the TU Darmstadt. Continuing her research in Hannover, she obtained a habilitation for Mechanics in 2000. It followed a position as Associate Professor in Bochum, until she became a Full Professor in Braunschweig in 2005. Since 2009, she holds the chair of Applied Mechanics at RWTH Aachen University.

Reason for nomination

In the area of computational mechanics she is an outstanding researcher. Her theory and numerical treatment of finite viscoelasticity was groundbreaking. As a teacher - her lectures were demanding -she pushed students to surpass the fear of complex topics, which is one of the most valuable skills students can learn in universities. Many students are still using her lecture notes even after finishing their studies, because she is able to break down these complex topics in a few slides.

In summary, she is an intelligent, focussed, effective, but nonetheless kind person that is interested in people.

Emily Roebling (1)

Library of Congress [Public Domain]

Short biography

Emily was born in 1843 and died in 1903. She was responsible for the successful delivery of the Brooklyn Bridge and is thought to be

the first woman field engineer. Her husband was chief engineer on the project (his father having the same role before him). However, after her husband fell ill, Emily took over – without any prior engineering training. Emily passed on information from her husband to the builders, learning as she went along. She took detailed notes about remaining tasks, should her husband die before completion. She was first to cross the bridge when it opened in 1883.

Reason for nomination

Emily carried out all chief engineer responsibilities for over 10 years, not just being an engineer, but also a pupil, secretary, messenger, project manager and construction supervisor. She also dealt with public relations, due to the political interest in the bridge, ensuring her husband officially kept the title of chief engineer despite protests about his health. She delivered the bridge when female engineers in construction were very rare, showing great dedication to her husband and the bridge. She was presented to Queen Victoria in recognition of her achievements. Later, she graduated with a law degree, shortly before her death.

References

The Roebling Museum. http://roeblingmuseum.org/about-us/emily-warren-roebling/

Expedition Workshed http://expeditionworkshed.org/workshed/emily-roebling/

Emily Roebling (2)

Short biography

Emily Roebling's father-in-law was the chief designer of the Brooklyn Bridge, however he sustained fatal injuries onsite, and after his death his son, Emily's husband, took over the project. However, he came down with the bends, after working in a caisson, which left him paralyzed, deaf and mute. Emily took over as field engineer whilst liaising with him, and studied many complicated aspects of civil engineering so that she could take over all his responsibilities. She inspected the construction, dealt with the contractors and managed the politicians and reporters. The extent of her involvement in the project led many people to believe that she herself was the Chief Engineer, and she ultimately succeeded in building an icon.

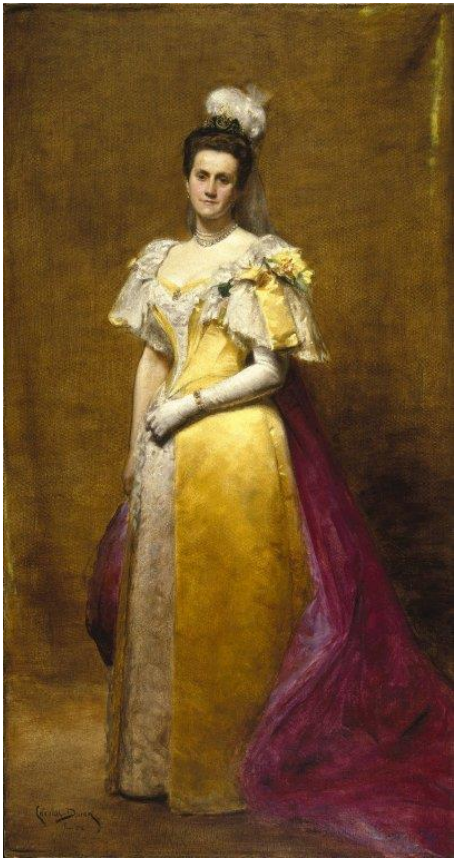
Reason for nomination

The reason that I am nominating Emily Roebling is because I am extremely impressed with the work that she committed herself to. Despite having no knowledge when she started she was not overwhelmed with the task at hand and got on with the frankly enormous job at a time when women remained out of the public eye and certainly were not engineers. Whilst the emphasis here should not be on the fact that she was supporting her husband, it is still important to note that her huge undertaking was a purely selfless act so that the Roebling name could remain linked to the engineering of the Brooklyn Bridge.

References

http://www.nydailynews.com/new-york/brooklyn/emily-warren-roebling-helped-save-complete-brooklyn-bridge-article-1.1083976

Emily Roebling (3)



By Carolus-Duran/Brooklyn Museum [Public Domain]

Short biography

Emily Warren Roebling (1843 – 1903) was the first woman field engineer and completed the construction of the Brooklyn Bridge. Her father-in-law, designer of the Brooklyn Bridge, died of tetanus and her husband, Chief Engineer of the bridge, was bed-ill from caisson disease

due to him working on the foundations of the bridge. Emily had studied the strength of materials, stress analysis, cable construction and catenary curves. This enabled her to take over her husband's duties, so that she herself became known as the Chief Engineer. She completed the bridge in 1883 and was honored by the Mayor of New York for her devotion and knowledge at its opening.

Reason for nomination

Coming myself from an architectural and structural engineering background, I chose Emily Roebling as there are still not enough woman representing the creative side of engineering, for example in building design.

Gwynne Shotwell

NASA/Kim Shiflett [Public Domain]

Short biography

Gwynne Shotwell is the president and COO of SpaceX, the famous California based aerospace manufacturer and space transport services provider. She was educated as a mechanical engineer in the university, then continued to work as an engineer on parts, then the whole system, of spacecrafts. She joined SpaceX in its founding year and through the past decade, she has played an important role in the

company's evolution from a brave vision to the successful commercial space transport provider for many countries and companies.

Reason for nomination

Cool girls study engineering, but how many stay cool as working engineers? For Gwynne, since she opened a car bonnet for the first time to understand how an engine worked, the aspiration of being a revolutionary engineer never leaves her. An aerospace engineer for 15 years, now the president of the world's most ambitious space transport company, the SpaceX, Gwynne understands the complex science and technologies to make rocket roar, but also can pack these knowledge neatly and communicate with governments, clients and the public. Of course, her confidence as an engineer comes from the successful deliveries, from delivering supplements to the International Space Station, to the fiction-like aerospace giant.

Megan Smith

By Joi Ito [used under a CC BY license]

Short biography

Megan Smith studied mechanical engineering in MIT where she first displayed her pioneering nature as a member for the student team that designed, built and raced the first cross-continental solar car across 2000 miles of Australia. She then rose to hold high-ranking positions and global companies such as Google[x], where she served as a vice-president and led successful acquisitions that created two of Google's most famous tools, Google Earth and Google Maps. She has recently been appointed as the 3rd Chief Technology Officer for the USA government, a challenge for which she seems an ideal choice with all her experience in the tech industry, leading successful teams and completing 'moonshot' projects.

Reason for nomination

I chose to nominate Megan Smith for the Inspiration Women Engineers competition because I had the pleasure to meet her personally in a Silicon Valley event in Cambridge and she fits all the title perfectly. She is a natural innovator, combining engineering knowledge with a business mind, which is a valuable skill for any engineer who wants to make a difference. Furthermore, she is one of the very few women in power and high-ranking positions in world-leading companies, which is extremely inspirational for young female engineers. She is a proof that women can succeed in career without compromising their family. Finally, she is an advocate for women empowerment and extends her own power to philanthropic causes such as promoting education for girls in Africa, for which I was invited in a meeting with her, a Cambridge NGO and a number of CEOs and her passion inspired me to pursue my own passion for development and stop thinking that I cannot make a difference.

Sarah Springman

Photo used with permission from Sarah Springman

Short biography

Professor Sarah Springman is a Professor of Geotechnical Engineering and Rector of ETH in Switzerland. Having studied at Cambridge, she then worked in industry for several years before returning to Cambridge to research into geotechnics, receiving a research fellowship from Magdalene College, not long after it started accepting women. She moved to Switzerland for a professorship in the

late 1990s, and became the second female Rector in 2014. She is also an international triathlete, and was made a CBE in 2012 for her contribution to sport.

Reason for nomination

Sarah was one of two female lecturers who taught me at Cambridge in the early 1990s (Claire Barlow being the other). Sarah cut a memorable figure, often running to lectures clad in lycra and wrap-around sunglasses. I found her enthusiasm and energy utterly inspiring, and still do. I chose to do my third year project with her, and went on after Cambridge to do research into soils at Bristol as a direct result. However I remember my male student friends being utterly terrified of her; they also found her subject rather baffling, which made me want to study it even more.

Debbie Sterling (1)

Short biography

Debbie Sterling is the founder and CEO of GoldieBlox. GoldieBlox is a fantastic construction toy for young girls inspiring them to build different structures and become the next generation of engineers. During her degree in Mechanical Engineering and Product Design, Debbie noticed the limited number of female engineers on her course and her mission has been to reduce the gender gap in science and technology. Alongside designing the toys and the accompanying books, Debbie presented an inspirational TED-talk entitled “Inspiring the next generation of female engineers”.

Reason for nomination

I think Debbie is a young and inspirational woman who is successfully trying to tackle a problem with the stereotypes of different professions. A huge problem with toys today is that there continues to be a gender divide – boys have cars and things to build and girls have dolls and make-up. I think Debbie’s work has provided a generation of girls with something new to play with and make them want to be an engineer or simply be interested in construction as they grow up and when they are older.

References

http://www.goldieblox.com/pages/about
http://www.engineergirl.org/Engineers/Directory/13512.aspx

Debbie Sterling (2)

Short biography

Debbie graduated from Stanford University with a degree in Mechanical Engineering. She is the founder of GoldieBlox. Her company is designed to get young girls to get interested in engineering and building. The idea is to address the gender balance that exists in engineering today and to change the attitudes of and by women. She has come up with a successful toy that appeals to girls, against the hardships of being a woman in engineering. In 2014 – her product was the first startup to be advertised during the Super Bowl.

Reason for nomination

I have chosen to nominate Debbie as an Inspirational Women Engineer because she epitomises the future of women in engineering. It was not easy to push through the barriers of society and convention to succeed with her invention, where she met numerous barriers caused by stereotypes along the way. But Debbie did not give up. She has inspired me to pursue a career in changing the perception of women in engineering and science of women at all ages – from those that play with toys to those that design them.

Debbie Sterling (3)

Photo used with permission from Debbie Sterling

Short biography

As one of only two female engineers on Fortune's 2015 40 under 40 list, Debbie Sterling is proving to the world that engineers take various forms and not all those forms fit into a train driver's uniform. After completing her mechanical engineering degree at Stanford

University, Sterling decided to take an active role in changing the perception of women in engineering, starting with children. She was named *TIME*'s "Person of the Moment" in 2013 and in 2014 *Business Insider's* "30 Women Who Are Changing the World" after founding the Kickstarter startup GoldieBlox, a set of interactive books and construction toys aimed at encouraging young girls into engineering careers.

Reason for nomination

It takes guts to talk about being an outsider as a female engineer, but with Debbie Sterling, what inspires most is optimism. She emboldens not because she was one of the first, like legends Lovelace or Hopper, but because she's actively helping to craft a culture where women won't be snubbed for their critical thinking skills. Instead Sterling sees girls empowered by an engineering skillset that enables them to build the dreams in their heads. Her gender is not the sum of her character or a limit to her career – Debbie Sterling is a woman engineer, and an inspiration.

Katie Symons

Photo used with permission from Katie Symons

Short biography

Katie was a CUED student, in her time here taking part in the MIT exchange and being captain of her college boat club. She is now a consulting structural engineer, previously working at Ramboll and now at Smith and Wallwork Engineers, both here in Cambridge. Her work involves the structural design of buildings at all stages of the design process, and then later supervising work on site. She says the best part of her job is seeing a building she's designed being built and used. She is also a mum and is married to one of our CUED lecturers!

Reason for nomination

Not long after graduating from CUED, Katie became a Chartered Engineer – twice! She got chartership with both the Institution of Civil Engineers (ICE) and the Institution of Structural Engineers (IStructE) – the latter of which requires taking a 7-hour exam, with a 30% pass rate! More recently, she won an IStructE travel award to undertake a study visit to New Zealand, looking at the innovative use of timber in construction there. She also published a paper on her visit in the IStructE's publication *The Structural Engineer* and then later she went on to win an award for her paper.

References

Twitter. https://twitter.com/katiesymons

CUED Graduate Profiles. http://www3.eng.cam.ac.uk/admissions/profiles/graduate/katie_symons.html

Real World Magazine. http://www.realworldmagazine.com/katie-symons-structural-design-engineer-ramboll-whitbybird/

Smith and Wallwork Engineers. http://www.smithandwallwork.com/archives/2948

IStructE, The Structural Engineer. http://www.istructe.org/webtest/files/6d/6d20559b-9ed8-41cb-ac03-e634a0887922.pdf

Constance Tipper

Photo supplied by the Principal and Fellows of Newnham College, Cambridge

Short biography

Constance Tipper is renowned for her discovery in brittle fracture. She graduated from Newnham College in 1915 as one of the first female students taking Natural Sciences Tripos. In 1943 she started to examine the cause of fracture in Liberty ships sailing across the North Atlantic. She discovered that it was not the welding but the steel itself that causes fracture: in low temperatures steel exhibits very low toughness, changing from ductile to brittle. In 1949 Tipper was made a Reader and was the only female member in this Department. She was also the first person to examine metal fracture surfaces using scanning electron microscope. In 1994 Newnham planted a chestnut, known as the Tipper Tree, to celebrate her centenary.

Reason for nomination

It was Lord Baker who praised Tipper's vigour in pursuing her work in the then male-dominated Department. I was shocked when realising that females have only taken office in this Department for about seven decades. I admire her not only because her work actually saved Britain in WWII, but also her perseverance in doing research in 1930s even though she had no official status. It is a powerful yet unpretentious fightback against the then discriminative environment, showing that women also have the same right as men to pursue truth, contribute to a better world and deserve reward.

Sabine van Huffel

Photo used with permission from Sabine van Huffel

Short biography

Sabine Van Huffel was born in Menen (Belgium) on 26 September 1958. She obtained her MSc in Computer Science and PhD in Electrical Engineering from KU Leuven (Belgium), and was a guest professor at Stanford University (USA) and Uppsala University (Sweden). Since 2002 she is a full professor at KU Leuven, heading the Biomedical Data Processing group.

Her research interests lie in the domain of (multi)linear algebra, (non)linear signal analysis, classification and system identification with special focus on the development of algorithms for improving medical diagnostics (e.g. ovarian and brain cancer). In 2009 she became IEEE Fellow for her contributions to total least squares fitting and computational biosignal processing.

Reason for nomination

Sabine Van Huffel received many awards, including an honorary doctorate from Eindhoven University of Technology (The Netherlands), Founding Fellow of the European Alliance for Medical and Biological Engineering and Science and an ERC Research Grant (more on https://www.esat.kuleuven.be/stadius/person.php?persid=17).

Her work in total least squares and biomedical signal processing is widely appreciated both by the scientific community and the healthcare environment, where it is actively applied. Apart from her scientific contributions, she helped to develop gender policy as Rectorial Advisor for Equal Opportunities and Diversity at KU Leuven from 2005 till 2009.

Adriana Velazquez Berumen

Photo used with permission from Adriana Velazquez Berumen

Short biography

Adriana is the focal point on medical devices at the World Health Organization (WHO). She is a Mexican Biomedical Engineer with postgraduate degree in Clinical Engineering from the University of Michigan. She was the founder and Director General of the National Centre for Health Technology Excellence (CENETEC) in the Ministry of Health in Mexico. She has held various honorary positions, internationally, in professional societies related to Biomedical Engineering and Health Technology Assessment. At WHO, Adriana coordinates the "Medical Devices Technical Series" and projects related to priority medical devices for clinical interventions in maternal and new born health, as well as policies for medical devices, global data on

medical devices, innovative technologies, health technology assessment, among others.

Reason for nomination

Adriana Velazquez is a global leading figure working towards tackling global health challenges with an engineering approach. Her work has focused on improving access to safe, affordable, and appropriate medical devices in the most marginalized and disadvantaged regions in the world. This has led to the recognition of the Biomedical Engineers worldwide and increased relevance of medical devices for global health. As a woman, the journey has not been smooth through her hard-work organisations like WHO has recognized the need to increase attention to health technologies. A Biomedical Engineer like myself, Adriana is a tangible inspiration – she has set up an exemplary path for women in the field to follow her.

Wendy

Short biography

Wendy is a fictional character from the children's TV programme "Bob the Builder". She has appeared on our TV screens from the first series in 1998, and has since undergone some appearance changes. She is depicted as Bob's business partner. She has crafts in design and/or technical work.

She is well known for going about things on her own, and trying (sometimes failing) to succeed when she has been doubted.

Reason for nomination

A fictitious character might seem like an odd choice for a candidate; but young children are rarely exposed to 'real engineers'. Her presence as a female builder (as it were) demonstrates to children that not only men are involved in engineering; perhaps consequently influencing girls to exhibit the creativity that is desired in an engineer. By fighting any impressions children might have that women can't do an engineer's job, this could encourage more talented women into the industry.

The modern incarnation of Wendy is that she is more technically competent than Bob — reducing the image that she is only there for administration work. All this cultivates an impression that competent engineers aren't defined by their gender.

Jane Wernick

Photo of 'Singing Ringing Tree' by David Dixon [Used under a CC BY license]

Short biography

Jane Wernick was born in 1954 and has been a Londoner most of her life. She graduated in Civil Engineering from Southampton University in 1976, then joined Ove Arup and Partners as their first female structural engineer [to be an Associate and an Associate Director][2] where she worked on numerous high profile projects including Lille TGV station and Stansted Airport terminal building. She has been the sole director of her own company, Jane Wernick Associates (recently merged with engineersHRW), for over 16 years, during which time she has specialized at the intersection of innovative structural engineering and architecture. She was awarded a CBE in the recent New Year's Honours list.

[2] Correction provided by Jane Wernick.

Reason for nomination

Jane Wernick delights in structures that delight. She has worked on some amazing projects, such as the Millennium Wheel and the Xstrata Treetop Walkway, that inspire through their innovative and ground-breaking use of engineering to realise the architects' vision. She fully understands the importance of the engineering in that respect, and she champions direct communication between all partners in the design team. But more than that, she is passionate about how the built environment can improve people's lives and consequently the direct contribution that engineers can make to people's wellbeing. She cares – and that's the real inspiration.

Sophie Wilson

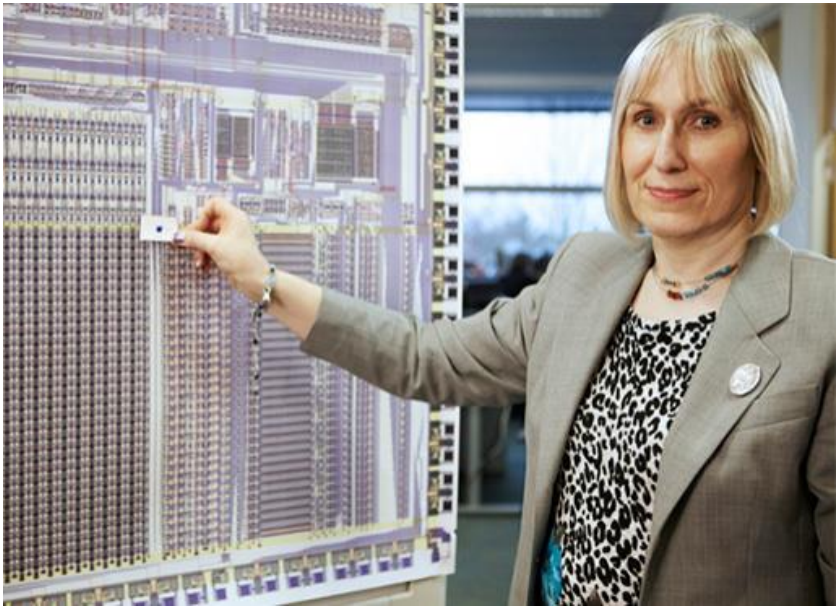


Photo by Heinz Troll/European Patent Office, used with permission from Sophie Wilson.

Short biography

Sophie Wilson FRS FREng graduated from Cambridge and was an early member of Acorn Computers. Wilson designed the first computer in Acorn's range and, most famously, the dialects of the BASIC programming language which shipped with subsequent computers. This included "BBC BASIC" whose development Sophie led for 15 years. Possibly her most lasting contribution is the design of the first ARM chip. ARM chips now power the vast majority of the world's smartphones and are found everywhere from washing machines to the even the cable used to connect the latest generation of iPhones. They also power the

Raspberry Pi computer seen by many as the spiritual successor to the venerable BBC Model B Microcomputer.

Reason for nomination

I would not be who I am today without the BBC Microcomputer and the dialect of BASIC which powers it. Sophie's language and computer designs propelled me from an interested child who liked computers into an enthusiastic teenage software developer. BBC BASIC's focus on structured program design encouraged good practice and the elegance of the ARM processor design powered the Archimedes computer systems I had at school. With the inbuilt BASIC programming language I wrote educational software for teachers. Without a focus on "batteries included" programming tools, I would've been a slave to using, as opposed to creating, software. It is no exaggeration to state that Sophie is an Engineer who made an entire generation of Engineers.

Competition Entrants

Adrian Weller
Alice Moncaster
Andrea Masi
Bingyu Zhao
Catherine De Wolf
Christiana Smyrilli
Clara Aranda-Jan
Clare Collins
Ettie Unwin
Florin Udrea
Geoff Ma
George Meakin
Hannah Baker
Hannah Sheahan
Helen Lusher
Jacky Zhao
Jeff McHugh
Jenni Sidey
Jonathan Harris
Judith Plummer Braeckman
Kate Knill
Kirsten Van Fossen
L. Jacobs
Laura Cowan
Laura Hannigan
Lizzie Gill
Louise Mirallié
Lucy Jarman
Lucy Sutcliffe
Madeleine Steer
Maria Ivanciu
Nikki Weckman
Paul Sobota
Petia Tzokova
Phil Keenan
Rebecca Ward
Rich Wareham
S. Trivedi
Sakthy Selvakumaran
Shahab Akhavan
Shan Zheng
Stefani Marnerou
Taskeen Adam
Thomas Hancock
Timothy O'Leary
Tomas Van Pottelbergh
Vere Whittome
Zhong-Nan Wang

Thank you to everyone who submitted a nomination.