# International **Women's** Day 2022

BioTrib

## Why engineering?

Choosing a professional career has a significant impact on an individual's future. It can potentially impact a person's identity, personal fulfilment, lifestyle, earnings, family, and retirement. Engineering's job prospects are predicted to grow 18% between 2016 and 2026, which bodes well for individuals considering a career in the field. However, how canone make the right career choice? Is it really as easy as saying, ***"follow your dreams, the rest will follow"?***

Here are some reasons why our interviewee women, who are changing our world, pursue engineering as a career:

- **willingness to solve problems -** *Cecilia Persson, Professor at Uppsala University, Charlotte Merrell - PhD student at The University of Leeds*
- **personal interests and curiosity- how things work** - *Charlotte Merrell, Afrina Khan Piya, PhD students at The University of Leeds*
- **the opportunity to learn new technologies and being able to transfer the skills** - *Beril Saadet Yenigul-University of Leeds/PhD Student*
- **the potential in the field to make real changes** - *Edona Hyla, Early-Stage Researcher in Bioengineering*
- **understanding the power of STEM education to change the lives of individuals and communities for the better** - *Dr Lisa-Dionne Morris, Associate Professor of Human Activity & Product Design Development*
- **public welfare, and the environment** - *Cecilia Persson, Professor at Uppsala University*
- **have the potential to make meaningful contributions to individuals and communities locally, nationally, and beyond** - *Fjolla Sylaj - System Engineer for E-Mobility Infrastructure*
- **money** *Charlotte Merrell - PhD student at The University of Leeds*

## Women of Impact: Empowered women, empower women.

Women smash glass ceilings in laboratories, factories, newsrooms, boardrooms, courtrooms, and classrooms, and they are changing the way we see the world and the way we perceive it. Here are some remarkable women who broke the boundaries in varying fields and inspired our interviewees:

**Marie Skłodowska Curie** was the first woman to win a Nobel Prize, the first person and the only woman to win the Nobel Prize twice, and the only person to win the Nobel Prize in two scientific fields.

**Edith Clarke** was the first woman to be professionally employed as an electrical engineer

**Maya Angelou** was an American poet, memoirist, and civil rights activist.

**Rosalind Patricia-Anne Howells, Baroness Howells of St Davids** OBE is a British Labour politician, who formerly served as member of the House of Lords.

*Dr Lisa-Dionne Morris, Associate Professor of Human Activity & Product Design Development,* says she was inspired by Maya Angelou and Rosalind Patricia-Anne Howells Baroness Howells of St Davids.

*Afrina Khan Piya, a PhD student at The University of Leeds,* declares Madam Marie Curie was her inspiration from her childhood that drove her towards this field of studies."-

*Fjolla Sylaj - System Engineer for E-Mobility Infrastructure,* states Edith Clarke was her role model, the way she made a difference in the world of the electrical engineering field and for women across the world. Just as Clarke invented and patented the Clarke calculator in the twentieth century, a device that solved power line problems, her desire and dream are to be a "Clarke" of this century, solving electrical system problems!"-

The responses we gathered from the women at their different career stages show that their inspiration was not only famous/successful women who lived years ago. We quite often get inspired by our family members, as Isobel Pollock, Issy Rees, Beril Saadet Yenigul, Cecilia Persson state. Charlotte adds that she got an inspiring A-level physics teacher that made her want a career in STEM. In brief, we inspire our community every day so let's keep inspiring and empowering women.

## What did you expect your experience of engineering to be like, and how does that compare to reality?

Imagine an engineer, what do they look like? For many women, their preconceptions of engineering are of middle aged men taking engines apart. We asked women in the field what their expectations were like versus the reality of their field.

A majority of the women we spoke to shared that an overall concern was how practical and hands on the field would be. Several people reported that they thought engineering would be working in production or factories and having to be handy. Contrastingly, the reality was much more research based for many, with more women in the field than people had expected.

Another key takeaway is that work in the field is greatly different to work carried out in an undergraduate degree, whether it's the type of work or the number of women around. "*Undergraduate was not so much of a practical experience*" – Afrina Khan Piya, whereas after graduation, there were far more opportunities - "*I guess if you're open to developing, your discipline can take you into other fields and business areas*" – Dr Lisa-Dionne Morris. A lot has changed in the field over time, even just in terms of how technology has changed everyday tasks - "*Engineering (and many other subjects) has changed so much. There was no CAD when I started, only pencil and paper on which to design*." -Isobel Pollock Institution of Mechanical Engineers, President 2012 – 2013.

Here are some of the expectations versus reality that women had working in engineering:

*Judith Schneider – BioTrib Project Administrator*

**Expectation**: Middle aged men in lab coats taking engines apart

**Reality**: Talented and enthusiastic people of all ages and with women among them (though not enough… yet).

*Cecilia Persson, Professor at Uppsala University*

**Expectation**: I would have to be practical and "handy", which I had no talent for, nor for solving problems.

**Reality**: You use your brains more than your hands in research - handiness and practicality can be learnt. I'm much more creative and better at problem solving that I expected – which partly comes with experience, but also with confidence once you realise your only limitation is you.

*Beril Saadet Yenigul – PhD student at University of Leeds*

**Expectation**: I always thought I would be in the industry, have more production-based jobs and work in a male-dominated area. During my bachelor's degree, my internships in varying factories also led me to think that was the case.

**Reality**: After graduation, I worked in an R&D department where the women/men ratio was more or less equal, and my job was dominantly lab-based.

*Edona Hyla – PhD student at University of Leeds*

**Expectation**: I thought of engineering to include more physical activities and field work

**Reality**: Sitting at a laptop, researching and designing, I enjoy it very much! When I joined engineering I was not aware of all the branches, it is way broader than I thought it would be.

## What skill(s) in particular have helped you during your career?

When asked about which skill(s) have been most helpful during their career, confidence and resilience stood out:

"Being resilient and navigating diplomatically enough." *Cecilia Persson, Professor at Uppsala University*

"I feel like women are more likely to struggle with imposter syndrome in STEM fields than their male counterparts. Having self-confidence (even when that can be hard) has definitely helped me feel more like I belong." *Charlotte Merrell, PhD student*

"Working towards dreams, adaptability, and self-confidence." *Fjolla Sylaj, System Engineer for E-Mobility Infrastructure*

But there are plenty of other skills that the women we asked mention as helpful:

"An enquiring mind together with being able to work well with people and taking the lead when required." *Isobel Pollock Institution of Mechanical Engineers, President 2012 – 2013*

"... cognitive thinking and problem solving" as well as "networking are very necessary to be able to evolve in the path." *Edona Hyla, Early-Stage Researcher in Bioengineering*

"... patience, perseverance and thrust to achieve goals is one of the driving factors for me. …. good communication, management quality and leadership are also important..." *Afrina Khan Piya, PhD student at The University of Leeds*

"Engineering involves a lot of teamwork, and so knowing how to bring people out of their shell, what to say to motivate people or how to avoid conflict is crucial." *Issy Rees, PhD student at The University of Leeds*

From the responses we received from women in STEM in various stages of their career it is apparent that a broad range of soft skills and believing in yourself and your abilities are key.

## What advice would you give to your younger self about entering STEM?

The fundamental idea that arose when asked what advice people would give to their younger self was self-confidence in their own abilities. Afrina Khan Piya, a PhD student at The University of Leeds said, "I would advise my younger self to be more confident, utilize every moment and communicate more. Enjoy every aspect of studies as each part can open a new horizon". Additionally, Issy Rees, another PhD student at The University of Leeds, advised her younger self to remember that "The best things happen when you are out of your comfort zone. You can't grow without pushing yourself.". But above all, Edona Hyla recalled a common experience of impostor syndrome that many engineers experience in which she advises her younger self to "never feel like you don't belong in the field.".

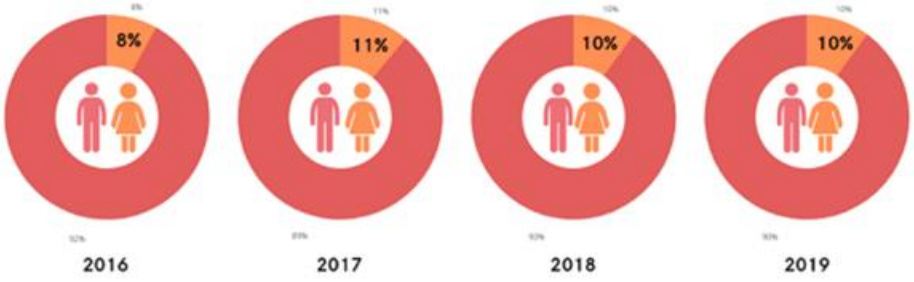
Another concept echoed throughout was to have resilience. Isobel Pollock, Institution of Mechanical Engineers, President 2012-13, reiterated that "It's not how you get knocked down, it's how you get up again that matters", while Beril Saadet Yenigul, a PhD student at The University of Leeds, said, "Do not be afraid of making mistakes. Take every opportunity to travel, learn new languages and interact with people from different engineering disciplines and cultures".

Dr Lisa-Dionne Morris, Associate Professor of Human Activity & Product Design Development, advised her younger self to, "Say the word, "no" more. Identify what you don't want to do, then everything else is on the table.". Similarly, Cecilia Persson, Professor at Uppsala University, said "Believe in your own ideas. Your gut 'feeling' is actually a combination of observations you've made, so trust it, or at least consider it until you know why something feels wrong (or right).".

The overall message received was to follow your interests and to believe in yourself and your abilities. This was summarised by Fjolla Sylaj who said, "Don't worry about the future. Love your career choice even it might take a lot of hard work to form, but it's worth the effort and missed television."

## Do you think that the proportion of women in your field has changed over the course of your career?


It is well known that during history women have always been underrepresented in STEM (science, technology, engineering, and mathematics). Based on UCAS data provided by HESA, in UK (United Kingdom) at higher education 35% of STEM students are Women.Taking statistical data of the enrolment of Women in STEM, we can see a slight increase during the years, however if we consider the rapid growth of male in the field the percentage fluctuates from 25% in 2015 to 24% in 2019. When we asked several women with a career in STEM about what they think, if the proportion of women in their field has changed over the course of their career? We receive a uniform opinion. "**Not that much, or at least very slowly**." - *Cecilia Persson, Professor at Uppsala.* Likewise, *Beril Saadet Yenigul-University of Leeds/PhD Student* said, **"I think the number of women in mechanical engineering slightly increased, but I wouldn't say it is still equal.", Fjolla** *Sylaj - System Engineer for E-Mobility Infrastructure* **"…women in my field are growing at a slow pace."** and *Afrina Khan Piya, PhD student at The University of Leeds* **"Yes. I believe now women are more engaging themselves in engineering field that previous time. But the number is still low in comparison with men. "This** is even more pronounced in the Engineering fields where numbers show an even larger gap.




It has been noticed that the gap gets smaller with the level of education, *Charlotte Merrell - PhD student* from University of Leeds said that **"the proportion of women in engineering PhD's feels much higher than at undergraduate level"**. According to *Dr Lisa-Dionne Morris, Associate Professor of Human Activity & Product Design Development* - **Improving visibility of women is not enough. Also increased numbers of women is not enough. There must be opportunities for people regardless of their gender to succeed in waged employment across all sectors. It is more than clear that awareness has to be raised to reduce the gender gap in STEM.** In support of this, nowadays, we can see a lot of campaigns and workshops that support the involvement of females in the "male dominated fields." "**As I grow through my career, it gave me pleasure to see all the interest the younger woman were having towards Science and Engineering. Therefore, yes, I think year by year we are getting more aware of considering all the options not only the once "meant to be"."** said *Edona Hyla - Early-Stage Researcher in Bioengineering.* A year-on-year increase of degrees obtained by woman in STEM fields shows a positive outcome on the effort to

encourage females. Quoting *Isobel Pollock, President 2012-2013 of the Institution of Mechanical Engineers* **"There were 4 of us on my course, now it is much higher. More women need to consider engineering as a worthwhile career."** As our world grows more digital, we will require a higher number of individuals with technical and scientific backgrounds, and as a man's brain processes are dominated by the left, he is more likely to depend on logic and fact-based methods, as well as having a more detailed perspective, women who employ both hemispheres are more likely to have a broad viewpoint and a big-picture focus.

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