



Professor Emma Johnston AO shares her experience as a visible female role model with the Superstars of STEM.



Professor Johnston gathers in Sydney with the leaders from STA member organisations, working across all scientific and technological disciplines.

Smashing assumptions:

Supporting and celebrating female scientists and technologists

Science and Technology in Australia (STA) are one of many organisations who have recognised the difficulties women can face in the world of science, technology, engineering and mathematics (STEM). With the pressure of stereotypes and the need for more female role models, more needs to be done to incubate and acknowledge the talent of women.

According to research from the United Nations Educational, Scientific and Cultural Organization (UNESCO), less than 30% of the world's researchers are women. It has become clear that the conditions for women working in STEM areas are not equitable to their male peers. Women in these fields have been found to be paid less for their work, have fewer published studies and do not progress as far as men.

Science & Technology Australia (STA) is a leading voice in Australia, contributing to and leading public debate on technology and science. In addition to working with government, policymakers and business, STA is also driving initiatives forward to include female representation in STEM fields. We spoke with STA's president, Professor Emma Johnston, about their Superstars of STEM program.

Can you tell us more about Superstars of STEM and why it was established?

Superstars of STEM was established in 2017 as a practical response to a range of concerning statistics on the visibility of female STEM professionals: 1 in 5 people speaking about science in the media were women; 2 in 3 young children drew a man when asked to draw a scientist; female students were dropping out of STEM subjects in part due to a lack of visible female role models in science and maths; and in a 2014 list of the most influential scientists on Twitter, only four were women.

Superstars of STEM aims to smash society's gender assumptions about scientists and increase the public visibility of women in STEM. STA started the Superstars of STEM

to create a critical mass of celebrity Australian female scientists and technologists, role models for young women and girls, and to work towards equal representation in the media of women and men working in STEM. 30 Superstars of STEM were chosen for the pilot year, and this has expanded so that we select 60 Superstars every two years. Applications for the next intake will be in late 2020.

Over five years, we will have equipped 150 female scientists and technologists with advanced communication skills, connected them with leaders in all sectors, and created genuine opportunities for them to use their new skills: in the media, on the stage and in speaking with decision makers. Each of the Superstars also visits and speaks with students in at least three schools.

Why did you become involved and what does your role involve?

I have personally suffered from a lack of confidence during parts of my scientific career and I put it down to a lack of visible role models with whom I could identify. I have often been in the extreme minority. For example, when I was a junior lecturer I was the only permanent female academic in the entire school of Biological, Earth and Environmental Sciences. For the Superstars program, apart from oversight as President of STA, I also provide mentoring and share my insights and strategies with the superstars.

What have been your own experiences as a scientist in terms of working your way through the ranks to where you are today?

It's been important for me to listen to supportive mentors and to follow my passions. This has helped to quiet the nagging self-doubts that might have otherwise held me back. Another useful realisation was that great science does not need to be done alone. Working in diverse teams gives great satisfaction, greater productivity and it is enabled by more flexible and family-friendly workplaces.

Can you tell us about some of the superstars who have become involved and the impact they have had? The first cohort of Superstars of STEM

achieved the following:

- Reached more than 330 million people via the media and online
 - 1,400+ media mentions in one year
 - 12,000+ school kids spoken to face-to-face
 - 70% of the superstar cohort experienced career progression
- Many of the women who participated have made progress in promoting their work internationally, amplifying the impact of the Superstars of STEM program through activities of their own, and opportunities to further themselves professionally.

Dr Tien Huynh, for example, came to Australia as a young Vietnamese refugee and found a passion for the

since starting the program, appearing in major media outlets in Australia (SBS, Gardening Australia, Cosmos Magazine, the Conversation) and on the front page of Vietnam's most highly circulated newspapers. She now mentors and supports numerous women in Australia and Vietnam, and says the program has given her credibility and profile that is allowing her to make a bigger difference.

Dr Francesca Maclean has begun the Fortem Project, an initiative sparked by her participation in the Superstars of STEM program. It empowers STEM professionals to be engaged advocates for equity and diversity by bringing together easy-to-access

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science of plants. Now a researcher with RMIT working on medicinal plants, she regularly returns to Vietnam to connect with female researchers and has expanded her profile significantly

resources designed to achieve better understanding of gender equity in STEM through lived experiences, best-practice research, and relevant statistics and information.



Professor Emma Johnston AO.

Finally, bioarcheologist Ronika Power said that her participation has helped her build a strong social media presence from scratch, accelerated promotion at work, an invitation to give a TED talk and innumerable public lectures; and the opportunity to serve on national and international advisory boards at high-profile institutions. She has also been awarded the Max Crawford Medal from the Australian Academy of Humanities in recognition of her outstanding achievements.

In 2014, you won the very first Nancy Millis medal for women in science.

Do you feel having a specific prize for women is a positive thing?

I'm extremely proud to be the inaugural winner of the Australian Academy



The second cohort of Superstars of STEM gather for their first workshop.

representation. Specific prizes for women help redress this imbalance and will contribute to culture change. Everyone should think about nominating women for awards, if you don't make a conscious effort then the dominant cultural paradigm might mean you nominate a high-profile male scientist when there is an equally deserving female.

about where they come from, and build the skills they need to overcome them. Superstars of STEM is also addressing imposter syndrome by building a supportive network of women to share experiences and advice; connecting them with successful and ambitious mentors; and providing comprehensive training to build communication and influencing skills among participants.

Superstars of STEM is just one of the initiatives of Science and Technology Australia. What are the other projects the organisation is working on?

- Science meets Parliament
- Parliamentary Friends of Science
- STEM Ambassador Program
- Submissions and statements as the collective voice for the STEM sector
- Ambition to support the creation of national STEM Pride Network and Australian Indigenous Science Association

What are the implications of the election of the new government for science and technology?

There are good opportunities in having a government that is already established, in stable leadership and experienced in implementing policies. We were pleased to welcome back The Honorable Karen

Andrews MP as Minister for Industry, Science and Technology. Karen is a longstanding supporter of the science and technology sector with a deep understanding of our strengths and our challenges. The government have done useful foundational work creating the 2017 National Science Statement, and we are looking to them for leadership and clear direction for the sector's role in their next term. For the science and technology sectors, it is important that we avoid partisanship because our sector needs long term, secure support to create the truly ground-breaking discoveries and innovations that provide solutions to some of the big challenges facing our communities, economy and environment

A recent review commissioned by Science and Technology Australia suggests that STEM-representative organisations 'were catalysing grassroots change for the better'. Can you tell us more about the importance of these mainly volunteer-run societies and organisations in supporting STEM growth and development?

It is STA's role to empower STEM organisations to connect with business, government and the broader community

to further the impact of science and technology in Australia. This review sought to identify the important contributions of science and technology representative organisations and the elements leading to their success. These organisations make significant contributions, achieved through the financial support of major events and conferences, the provision of professional development and formal recognition for the science and technology workforce, and through positive and effective influence on public policy. This review will inform training, resources and targeted support to ensure all STEM representative organisations thrive in a period of rapid disruption and represent their members most effectively.

What do you feel are the challenges for science in terms of competing for government funding, and what part does commerce play in scientific development? Do you think science has to get more business-savvy?

A major challenge is to build a stronger business investment in research. This can be achieved by having:

- A government that leads through action and detailed long term plans. We must be ambitious in our research and development investment,

striking a balance between creating and applying knowledge.

- Strong and direct incentives for businesses to invest in research and development.
- A strong and well supported academic sector empowered to collaborate with industry.
- Clear messaging about genuine returns on science and technology investment.

For more information about STA, please visit their website at <https://scienceandtechnologyaustralia.org.au/>



Science & Technology Australia
PO Box 259
Canberra ACT
Australia 2601

E: info@sta.org.au

W: <https://scienceandtechnologyaustralia.org.au/>

W: <https://scienceandtechnologyaustralia.org.au/what-we-do/superstars-of-stem/>

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of Science's Nancy Millis medal for excellence in my research area. When you are trying to make a workplace more diverse and inclusive it is important to make visible and celebrate the diversity that you have. Only 24% of recipients of the three most prominent science prizes in 2018 were female (excluding female-only awards); and over the life of the Prime Minister's Prizes, for example, only 20% of recipients have been female; a recent study published in Nature looked at the recipients of awards in biomedicine in the USA, and it found a stark gap in gender

Can you tell us more about 'imposter syndrome' and why it can be such a limiting factor for women in science and in other walks of life? How are Superstars of STEM working to counteract this?

Women are often encouraged by our culture and society to make themselves smaller, quieter, less obtrusive. This can be exacerbated by everyday sexism and exclusion in male-heavy disciplines and industries. The Superstars receive specific training from professional facilitators who help them address these feelings, learn