Breaking Barriers
WEBINARS KIT
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“Every girl deserves to take part in creating the technology that will change our world”

Malala Yousefzai, co-winner of the 2014 Nobel Peace Prize
LETTER FROM THE EXECUTIVE DIRECTOR

Thank you for joining the Australian National Committee and Avanade in exploring the issue of the vast underrepresentation of women in the fields of science, technology, engineering, and maths (STEM).

The underrepresentation of women in STEM fields is a global problem. It is economically inefficient and means that STEM fields, which will determine how the world faces huge challenges such as combating infectious diseases and ensuring food security in the future, are missing out on half of the population’s talent.

Together, we can change these statistics.

When more women work in STEM fields, everyone benefits. Not only will more women get to experience the exciting and diverse range of jobs that STEM fields have to offer, but STEM companies will also benefit from having more diverse teams, which are proven to result in better performance. The fact that STEM jobs are generally well paid means that more women in STEM will help to address Australia’s current wage gap of 17.9%. More women working in STEM will also bring benefits to other women generally, as technological advancements, medical breakthroughs and engineering advancements will increasingly be made to benefit women and girls.

We believe that one way to increase the representation of women in STEM is to inspire young women and girls who have a passion for science, maths, engineering and technology. We hope this webinar has nurtured your interest in STEM and encouraged you to pursue a career in one of these diverse and exciting fields.

Kind Regards,

Julie McKay
Executive Director
Australian National Committee for UN Women

ABOUT UN WOMEN

The Australian National Committee for UN Women exists to raise funds for and awareness of UN Women’s platform to end violence against women, promote economic empowerment, advance women in leadership, ensure women’s participation in peace processes and to accelerate gender equality worldwide.

UN Women is the United Nations agency for women’s empowerment and gender equality, delivering programs and transforming policy to create a brighter future for women and girls in 96 countries worldwide.

When you empower a woman, you empower a nation.

ABOUT AVANADE

Avanade leads in providing innovative digital services, business solutions and design-led experiences for its clients, delivered through the power of people and the Microsoft ecosystem. Our professionals combine technology, business and industry expertise to build and deploy solutions to realize results for clients and their customers. Avanade has 27,000 digitally connected people across 23 countries, bringing clients the best thinking through a collaborative culture that honours diversity and reflects the communities in which we operate. Majority owned by Accenture, Avanade was founded in 2000 by Accenture LLP and Microsoft Corporation.

Learn more at www.avanade.com.
WHAT IS STEM?
STEM stands for Science, Technology, Engineering and Maths. When we talk about STEM careers, we are talking about working in one of these 4 fields. STEM careers are incredibly diverse and range from marine biologists to statisticians.

Here are just a few examples of careers that STEM fields offer:
- Marine biologist
- Robotics engineer
- Astronaut
- Computer programmer
- Software developer
- Quantum physicist
- Mechanical engineer
- Cosmetics scientist
- Statistician
- And many more!

WHY SHOULD WOMEN WORK IN STEM?
There are many benefits which result when women work in STEM fields. These benefits include that:
- STEM jobs are exciting and diverse
- STEM jobs are well paid
- The pay gap between men and women is generally less in STEM jobs
- STEM jobs are enjoyable
- Companies perform better with more diverse teams
- Women’s purchasing power means companies profit from targeting products to women
- With more women in STEM, technological advancements and medical breakthroughs will be made to benefit women
- A gender imbalance in STEM fields is economically inefficient
- More people will be needed in STEM jobs in the future
- STEM fields will be the answer to the many problems that are facing the world today

WHY AREN’T MORE WOMEN WORKING IN STEM?

STEREOTYPES
Widely held stereotypes mean that we associate certain careers with masculinity and others with being feminine. These views can have a huge impact on young girls’ career aspirations.

UNCONSCIOUS BIAS
Stereotypes mean that parents and teachers can develop unconscious bias that they can pass on to their children and students, without even meaning to.

ENDLESS DATA SHOW THAT DIVERSE TEAMS MAKE BETTER DECISIONS. WE ARE BUILDING PRODUCTS THAT PEOPLE WITH VERY DIVERSE BACKGROUNDS USE, AND I THINK WE ALL WANT OUR COMPANY MAKEUP TO REFLECT THE MAKEUP OF THE PEOPLE WHO USE OUR PRODUCTS.”

Sheryl Sandberg, Chief Operating Officer of Facebook

IN THE FUTURE, 90% OF JOBS WILL REQUIRE SKILLS IN STEM FIELDS

IN 2013 GRADUATES IN INDUSTRIAL AND MECHANICAL ENGINEERING EARNED AN AVERAGE STARTING SALARY OF $71,000.

ON THE OTHER HAND, THE AVERAGE MINING ENGINEER EARS $147,888 PER YEAR. HOWEVER, ONLY 6% OF MINING ENGINEERS ARE WOMEN.

THE AVERAGE SALARY FOR A GRADUATE STRAIGHT OUT OF UNIVERSITY = $50,000

90% OF REGISTERED NURSES ARE WOMEN.

90% OF REGISTERED NURSES EARN AN AVERAGE OF $67,600 PER YEAR.

6% OF MINING ENGINEERS ARE WOMEN.

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8 Report published by Graduate Careers Australia (GCA), An analysis of the gender wage gap in the labour market 2013
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10 Report published by Graduate Careers Australia (GCA), An analysis of the gender wage gap in the labour market 2013
Kathy Hirschefld is a chemical engineer and non-executive director of Transfield Services, Toxfree Solutions Ltd, InterOil Corporation and ASC Pty Ltd, all of which are oil, gas and waste companies.

Kathy’s executive career with famous oil company BP included oil refining, logistics, exploration and production throughout Australia, the UK and Turkey. In 2007 Kathy was recognised by Engineers Australia as one of 25 of Australia’s most influential female engineers and was awarded an Honorary Fellowship of Engineers Australia in 2014.

Kathy was recently named as one of The Australian Financial Review and Westpac Bank’s 100 Women of Influence for 2015.

1 WHAT IS YOUR OCCUPATION?
Non-executive director of listed oil & gas, waste and services companies - all of which draw on my background as a chemical engineer with 20 years’ experience working for BP in Australia, the UK and Turkey. My favourite job was as Managing Director/Refinery Manager of the BP Bulwer Island oil refinery in Brisbane – I was responsible for everything and everyone at the refinery.

2 WHAT ORIGINALLY INTERESTED YOU ABOUT ENGINEERING?
I loved chemistry, physics and maths at school, along with Ancient History. I couldn’t see myself building a career in archaeology so looked at industrial chemistry and then chemical engineering as possible careers. A 1-day school in chemical engineering at the University of Queensland convinced me to take that path, although I almost followed my father into medicine.

3 WHAT WAS YOUR PATHWAY TO FINDING A CAREER IN STEM?
• School: Maths I & II (basic and advanced maths), Chemistry, Physics, English, Ancient History
• University of Queensland: Bachelor of Engineering (Chemical)
• Australian Army Reserve: Officer training and promotion courses - fantastic leadership training.
• Mentors: Women in leadership roles at BP, Prof Don Nicklin who was head of the school of Chemical Engineering at UQ when I studied there. As important as mentors were sponsors, people (usually men) who supported my development and promotion - I had a number of these at BP.

4 WHAT DO YOU LOVE ABOUT WORKING IN A STEM FIELD?
I love science and the possibilities it creates for the world. Creating a sustainable world where everyone has access to food, water and security depends upon science and engineering to provide solutions. It is also a continually fascinating field - there is always something amazing happening to keep you interested. I love working in engineering because we make things that change the world.

5 WHAT DO YOU SEE AS THE MAJOR BARRIERS FOR WOMEN IN STEM?
Unconscious bias seems to me to be the biggest barrier for women in STEM and women in leadership. Taking on roles that most people subconsciously associate with men means that you are often singled out and/or overlooked. I think it’s really important to find others in similar roles with whom to share experiences and success stories - it’s good to know you’re not alone and also to find out what works.

6 HAVE YOU FACED ANY BARRIERS IN YOUR CAREER DUE TO YOUR GENDER?
Absolutely! Early in my career (early 80’s) I was interviewed and told that they’d give me the job if I was a man and that ‘we had a female engineer once - she got pregnant and left’, implying that all female engineers would do that.

Later on the discrimination became less obvious - opportunities or promotions given to men when I and others felt I was the best candidate, being given the ‘poisoned chalice’ - the really tough jobs that would be hard to come out of looking good, being included in HSE & HR career paths when I should have been on the Operations succession lists.

7 WHAT IS YOUR ADVICE TO YOUNG WOMEN CONSIDERING STEM CAREERS?
Go for it - you will always find work that is challenging, interesting and rewarding. Find mentors, coaches and sponsors to support you. Look for and call out discriminatory practices, but don’t be a prima donna - find the right balance. Be yourself and believe in yourself.
UN Women, in partnership with Barefoot College in India, has set up a program where women in the Pacific are trained as solar engineers and then develop solar panel technology for their villages. The women are responsible for the maintenance and repair of the solar panels in their communities and also train other women in solar technology. The training as solar engineers gives women increased influence in their villages and provides examples for other girls to challenge traditional gender roles.


“...If we don’t include everybody in the policy-making, in looking for new ideas, in innovation and research, we are missing out on solving the world’s problems with a different kind of thinking.”

Madi Sharma, founder of Madi Group
STEM ROLE MODELS:

Research shows that positive role models are a huge influence on the careers that students choose to follow. There are plenty of inspirational women working in STEM fields. Find a STEM woman that inspires you and research her career path.

JOAN CLARKE
– MATHEMATICIAN AND CRYPTANALYST (CODE-BREAKER) DURING WW2

Joan Clarke received first class honours in mathematics at Cambridge University, although she was prevented from receiving a full degree, which women were denied until 1948. She was then recruited by one of her Cambridge supervisors into the UK’s Government Code and Cypher School (GCCS), which was the headquarters for code-breaking operations during the Second World War. Joan was initially assigned clerical work, which was typical of female workers at the site. However, within a few days, her intelligence and mathematical abilities shone through, which led her to being employed as a member of an 8 person team tasked with the mission of breaking the unbreakable Nazi “Enigma” code. Joan’s main task as a cryptanalyst was decoding messages sent to and from the Nazi Navy. The messages decoded by Joan and her colleagues were much harder to break than other German messages, and largely related to Nazi submarines which targeted Allied ships carrying troops and supplies from the US to Europe. The messages which Joan decoded would result in military action being taken almost immediately, which saved thousands of lives. Because of the secrecy that still surrounds code-breaking operations during WW2, the full extent of Joan’s achievements remains unknown.

Source: http://www.bletchleyparkresearch.co.uk/research-notes/women-codebreakers/

ANN MAKOSINSKI
– INVENTOR

At just 16 years old, Ann has invented a torch powered purely by body heat. The project began when Ann was trying to think of a way of harvesting untapped energy and she realized that the warmth generated by the human body was an overlooked energy source. The aim of her project was to create a flashlight that ran solely off the heat of the human hand. Through research, Ann discovered Peltier tiles, which produce electricity when one side of the tile is heated and the other is cooled. She realised that she could use these tiles to create energy for her flashlight if she left the device hollow. So holding the flashlight on the outside would cause the tiles to heat up on one side, while the air inside the torch would cool down the tile on the inside. The power created by the tiles was enough to power an LED light, but it did not create enough voltage for more powerful light. Ann then created an electric circuit in order to increase the voltage and create a power torch light. To learn more about Ann’s invention and her passion for science, click here:

https://www.youtube.com/watch?v=hPCLNui083I

Photo Credit: YouTube
**REAPI WAITALECA**  
— SOLAR ENGINEER

Reapi Waitaleca is a grandmother in the village of Nabouwalu on the Fijian island of Kadavu. She is also a trained solar engineer who has installed solar panels for all the households in her village and established a solar workshop. She is now training an 18-year-old high school graduate as an apprentice engineer. Reapi is one of 10 Fijian women who have installed solar panels for 376 households in 12 villages around Fiji after participating in the “Rural Women Light up the Pacific” program run by UN Women, in partnership with Barefoot College in India. The program has given Reapi a source of income and more influence within her village. Reapi also now acts as a positive role model for girls in her village, through inspiring them to challenge traditional gender roles.

**DEBBIE STERLING**  
— ENGINEER AND FOUNDER OF “GOLDIEBLOX” TOY FOR GIRLS

Debbie is an engineer and the founder and CEO of toy company “GoldieBlox”. After graduating with a degree in Mechanical Engineering and Product Design from Stanford University, Debbie was disheartened by the lack of women that had been in her engineering classes throughout university. She realised that this interest in STEM started at a young age and she was troubled by the fact that toys for girls are dominated by princesses, Barbies and lots of pink. So Debbie created a toy that would introduce young girls to engineering and STEM skills at a young age.

For more information, visit the GoldieBlox website:  
http://www.goldieblox.com/pages/about

**ALEX DUNPHY**  
— CHARACTER FROM ‘MODERN FAMILY’ TV SHOW

Alex is the smartest in the Dunphy family, and is constantly teased by her older sister, Haley, for being nerdy and uncool. But Alex doesn’t care. She is passionate about maths and science and frequently tops her class. She is definitely an overachiever and ends up being valedictorian of her year. Alex then gets accepted into to Cal-Tech & MIT, 2 of America’s most prestigious tech universities.
SET UP A SCIENCE OR MATHS CLUB AT YOUR SCHOOL

A great way to encourage your interest in STEM is to interact with other people who share your passion for science, maths and other STEM related subjects. If a science, technology, maths or engineering related club exists at your school, you should join it! If there are no clubs for you to join at your school, approach your science, maths or technology teacher and ask if they would be interested in starting a lunchtime or afternoon club. You could even set up a club without your teachers’ help! All you need to do is find some fellow classmates who share your passion for STEM and arrange a weekly meeting time and place.

ATTEND A STEM RELATED HOLIDAY CAMP

There are lots of fun and cool holiday activity opportunities for young people interested in STEM fields. These holiday programs and camps are a great way to meet other people with similar interests and passions, and to make some new friends! The list below contains just a few examples of fun STEM opportunities. Ask your teachers if they know of any more.

- The National Youth Science Forum
  Website: http://www.nysf.edu.au/
- National Mathematics Summer School
  Website: http://nmss.edu.au/
- Science and Engineering Challenge
- The ConocoPhillips Science Experience
  Website: http://www.scienceexperience.com.au/
- Youth ANZAAS
- National Computer Science School
  Website: http://www.ncss.edu.au/summer_school/index.html

ASK YOUR TEACHER TO HOST A FUN STEM RELATED EVENT AT YOUR SCHOOL

If you can’t make it to a STEM related event, why not bring the event you! Ask your teachers to schedule a STEM related event at your school. There are lots of fun and educational science demonstrations that are done at schools. The list below has just a few fun examples:

- Questacon Science Circus
- Questacon’s Excited Particles
  https://www.questacon.edu.au/outreach/programs/q2u
- Questacon Virtual Excursions
- Fizticks Education Workshops
- Girls Invent
  https://www.facebook.com/girlsinventprogram/

HOST A STEM WEBINAR SCREENING AT YOUR SCHOOL

Ask you science or maths teacher if they will show this STEM webinar during class OR set up a lunch time viewing and get your friends to come along.

“In my younger days, I used to say, “How much women need exact science”. But since I have known some workers in science who were not always true to the teachings of nature, who have loved self more than science, I have now said, “How much science needs women.”

Maria Mitchell, the first female professional astronomer, famous for discovering a comet known as “Miss Mitchell’s Comet” in 1897
**FUNDRAISE FOR UN WOMEN**

Holding your own event is a great way to raise funds for UN Women and raise awareness about an issue at the same time.

**HERE ARE SOME FUN IDEAS:**

- Host a STEM webinar at your school and get people to make a gold coin donation. This way you will be raising awareness about women in STEM and raising funds to help women and girls throughout the world through UN Women projects!
- Hold a bake sale at your school with proceeds going to the Australian National Committee for UN Women. As a fun twist, you could make the baked goods STEM related. Set out cool STEM decorations that people can decorate their cakes with when they buy them.
- Ask your school to host a multi-day where students have to dress up as what they aspire to be when they grow up. This gives you an opportunity to dress up as a STEM woman and you will also discover other aspiring STEM women at your school! Gold coin donations could go towards the Australian National Committee for UN Women.

**FIND A STEM ROLE MODEL THAT INSPIRES YOU**

We have shared the stories of many inspirational women working in STEM fields, find one who inspires you and research her career path. What subjects did she study at school? What degree did she do? Did she participate in any scholarship or internship programs?

**HERE ARE SOME INSPIRATIONAL STEM WOMEN THAT YOU CAN FOLLOW ON SOCIAL MEDIA:**

- **Cady Coleman**
  Cady is an astronaut at NASA. She has made three trips into space: the first two being aboard space shuttle Columbia in 1995 and 1999 and then in 2010 she spent time aboard the International Space Station (ISS) as part of Expedition 26.
  Follow Cady on Twitter: https://twitter.com/Astro_Cady

- **Sheryl Sandberg**
  Sheryl is the Chief Operating Officer of Facebook and was the first woman on Facebook's Board of Directors. She also a feminist activist and author of the book bestselling book “Lean In” which encourages women to take up leadership positions and pursue their ambitions.
  Follow Sheryl on Twitter: https://twitter.com/sherylsandberg?lang=en

- **Lily Serna**
  Lily Serna is an Australian mathematician who you may know as the resident “numbers expert” and co-host of SBS TV show “Letters and Numbers”
  Follow Lily on Twitter: https://twitter.com/sernalily

- **Jocelyn Goldfein**
  Jocelyn is the Director of Engineering at Facebook and has worked on some of Facebook’s most well-known products, such as Photos, and the recently revamped News Feed
  Follow Jocelyn on Twitter: https://twitter.com/jgoldfein

$450 can provide financial literacy and business training for three women to create sustainable enterprises

$98 delivers a young women’s leadership training program

$68 could provide vocational training to one woman to enable her to secure a decent job

$14 can provide 1 police officer with training on how to respond to domestic violence
6 SCHOLARSHIP AND INTERNSHIP OPPORTUNITIES FOR WOMEN IN STEM

Lots of universities run scholarship and internship programs to encourage more girls into STEM degrees. Here are just a few examples:

SCHOLARSHIPS OFFERED BY THE DEPARTMENT OF ENGINEERING AT THE UNIVERSITY OF NSW

• Vida Balshaw Women in Engineering Scholarship

• Alexandria Ada Lam Scholarship in Engineering for Female Students

• DSTO Undergraduate Scholarship for Females in Science and Engineering

• Women in Engineering Research scholarship

“SCIENCE 50:50” PROGRAM AT UNSW
  http://www.science.unsw.edu.au/50-50

THE GOVERNMENT OF SOUTH AUSTRALIA, OFFICE FOR WOMEN, RUNS AN INTERNSHIP PROGRAM CALLED EDITH DORNEWELL INTERNSHIPS FOR WOMEN IN STEM

• This internship will provide one woman each year for the next three years with three months full time or six months part time fully paid employment with an organisation whose focus is on STEM

THE AUSTRALIAN SCHOLARSHIPS GROUP (ASG) SPONSORS TWO STUDENTS EVERY YEAR TO ATTEND THE INTERNATIONAL SPACE CAMP AT THE US SPACE & ROCKET CENTRE IN ALABAMA, USA

SCHOLARSHIPS OFFERED IN ENGINEERING AND INFORMATION TECHNOLOGIES AT THE UNIVERSITY OF SYDNEY

• Margaret Hamer Scholarship for Women in Engineering

• Muriel Anderson Scholarship for Female Students in the Faculty of Engineering and Information Technologies

• Winifred Margaret Neirous Memorial Scholarship
SCHOLARSHIPS OFFERED BY THE QUEENSLAND UNIVERSITY OF TECHNOLOGY

- Women in Engineering Scholarship

- Women in Information Technology (Go for IT gURL) Merit Scholarship

- Supporting Women Scholarships

SCHOLARSHIP OPPORTUNITIES AT THE AUSTRALIAN NATIONAL UNIVERSITY (ANU)

- ANU College of Engineering & Computer Science Advanced Computer Research & Development Female Excellence Scholarship
  http://www.anu.edu.au/students/scholarships-support/anu-college-engineering-computer-science-advanced-computer-research

- ANU College of Engineering & Computer Science Engineering Research & Development Female Excellence Scholarship
  http://www.anu.edu.au/students/scholarships-support/anu-college-engineering-computer-science-engineering-research

- ANU College of Engineering & Computer Science Female Excellence Scholarships
  http://www.anu.edu.au/students/scholarships-support/anu-college-engineering-computer-science-female-excellence

- Lisa Brodribb Scholarship for Women in Engineering
  http://www.anu.edu.au/students/scholarships-support/lisa-brodribb-scholarship-women-engineering

SCHOLARSHIPS OFFERED AT THE UNIVERSITY OF WESTERN AUSTRALIA

- BHP Billiton Women in Business and Engineering Scholarship
  http://www.scholarships.uwa.edu.au/search?sc_view=1&id=4743&page=1&ApplicationStatus=-1&Faculty=1&StudyLevel=1&Nationality=-1&StudyArea=1&q=engineering

SCHOLARSHIP OPPORTUNITIES OFFERED AT THE UNIVERSITY OF SOUTH AUSTRALIA

- High Achieving Women in Science, Technology, Engineering and Mathematics Grant

SCHOLARSHIP OPPORTUNITIES AT MONASH UNIVERSITY, VICTORIA

- Women in Engineering Scholarship
  http://www.study.monash/fees-scholarships/scholarships/find/merit-scholarships/women-engineering

SCHOLARSHIP OPPORTUNITIES AT THE UNIVERSITY OF TASMANIA

- Women in Maritime Engineering Scholarship
  http://info.scholarships.utas.edu.au/AwardDetails.aspx?AwardId=2357

STEM RELATED NETWORKS THAT YOU CAN JOIN:

- EmpowerWomen
  Website: http://www.empowerwomen.org/en

- The Young Scientists of Australia
  Website: http://www.ysa.org.au/

- Females in IT and Telecommunications
  Website: http://www.fitt.org.au/

- Go Girl Go for IT
  Website: http://gogirl.org.au/

- Be Curious About Science
  Website: http://curious.org.au/
STAY CONNECTED
www.unwomen.org.au

Follow us @unwomensaust
Like UN Women Australia
Subscribe to the UN Women Australia Channel
Join our group
View our photostream
Follow us @unwomensaust
Follow the Australian National Committee for UN Women

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