I want to talk to you today about a topic close to my heart – women in science.

This is a topic of special interest for me, not only because I am the Vice-Chancellor of Swinburne University of Technology – a university with particular expertise in science, technology and innovation – but also because I myself have worked in the sciences – specifically, the health sciences.

The main reason I was keen to address this topic today is because there is disturbing data that shows that women are less likely to choose a career in science – and may steer away from science for the wrong reasons.

Now this might prompt you to ask – Is there a right/good reason to not pursue a career in science?

Well, I think we would all agree that a career choice is a pretty personal decision – and ideally should be guided by a person’s passion, curiosity, talents and aptitudes. I have raised three children – one daughter who is a physiotherapist, a son who is a graphic designer and a daughter who is pursuing her education to become a dietician. They are all good people doing good things – my job as a mother was to be sure that doors were open to them and they felt able to pursue their interests or follow their curiosity.

If a person is passionate about a career that follows an arts or business or humanities, or performing arts focus – this is terrific. Society needs artists, designers, social workers, marketing experts, accountants, lawyers and a range of other professions that are not science-focused.

However, when too few of any group – and in this case women – are not choosing a field such as science – this suggests that there is a systematic bias that is re-directing women away from science – and women who might otherwise contribute to science and discover an exciting career are dealing themselves out of the science game.

I will say more about this in a minute – but first, let me share a little with you about my own personal story.

I am the oldest of four children, raised at a time in Canada when girls were not encouraged to pursue a science degree – and technology meant coloured TV. I was heavily influenced by my Icelandic grandmother, a woman who had only every achieved a year 3 education …her message – obtain an education and make a contribution.

As a nine year old little girl two things happened – I was given a microscope for Christmas – and subsequently examined everything I could find in the house – from dust particles to saliva.

That same year I also read a book called, Nurses Who Led the Way – not a series of tales about hand maidsen or obedient women in starched white uniforms and caps – but stories of heroines who made advances in health care, germ theory, and social welfare.

Women such as Florence Nightingale and Clara Barton (Red Cross) – inspired and motivated me – I was hooked – a career in nursing was my goal.
I pursued this plan – obtaining a four-year Bachelor of Nursing Degree (packed with courses on microbiology, chemistry, anatomy and physiology) as well as ethics, psychology and nursing practice units. The course combined my curiosity with biological sciences and my concern for people.

I then did a two-year Master of Nursing degree, specialising in caring for people with cancer and later went on to the University of Arizona to obtain a PhD with a focus on clinical palliative care research.

Through my work as a Clinical Nurse Specialist, educator and researcher I came to Australia to take up the role as the Cancer Council of WA Professor of Palliative Care. In this role I educated nurses, doctors and other health professionals to provide the best possible pain management, symptom relief, and emotional comfort to terminally ill patients and their families. However, my primary efforts have been to develop knowledge to inform that care – leading me to be the first palliative care researcher to receive competitive research funding from the National Institute of Cancer in Canada and later other national scientific bodies such as the National Health and Medical Research Council.

At the centre of our work has been the discovery of ways to improve care for patients with a terminal illness and their families. Some of the outcomes and innovations include:
- Development of a simple and reliable way to measure the symptoms experienced by terminally ill patients so we would be better able to assess their needs and treat their distress
- A touch-screen computer based program for use in paediatric cancer clinics that helps parents communicate relevant information about their child’s care.

In order to find solutions to the problems faced by my patients I found myself increasingly reaching out to people in other fields – engineering and computer science to name a few. I later found myself in leadership roles in research and science, becoming the Deputy-Vice-Chancellor in charge of research at Curtin University in Perth – and now am the Vice-Chancellor at Swinburne.

Over the years I have learned that there is really very little truth in whether people are science or arts types. We are all both and by combining both we solve problems more effectively.

But let me return to the issue of women in science.

Science, technology, engineering and maths are areas that are critical to all careers in this century yet the numbers of student graduating from these disciplines has declined dramatically.

Take for example the field of information and communications technology or ICT. The student body is predominantly male and there is a visible lack of diversity in the student cohort. ICT needs more graduates as well as greater diversity to insure a successful and profitable future for Australia.

The Australian Computer Society predicts that Australia will not produce enough graduates to satisfy demand.

In secondary schools significantly fewer students are studying senior ICT courses now than there were ten years ago.

In 2001 there were more than 16,000 successful completions of the Unit 4 VCE IT subjects in Victoria, and of those 36 per cent were female students.

In 2011 the total number had declined to just over 4000, and only 15 per cent of these successful completions were female. This is a trend similar to other parts of Australia and overseas.
This clearly indicates that by the time students leave secondary school there is a large gap between males and females studying IT computing subjects. Australia needs more people – especially women – with science, technology, engineering and mathematics skills. We need more scientists, researchers and engineers in order to remain globally competitive.

To attract more women in science, engineering and related fields, we must have more women graduating from universities with these qualifications.

To get there, though, we need to see more students in secondary schools choosing these subjects. That means they need to be studying those subjects in years 11 and 12.

For all of you here today and other young girls in schools around Melbourne, Victoria and Australia, you need to know what career options are available.

There are hundreds of career opportunities that are available to people who have science qualifications and skills, be it in business, industry, medicine or research.

We cannot afford to see talent wasted because Australia needs more scientists and researchers to set about solving problems such as Alzheimer’s disease and the increase in extreme weather events.

To do this we have to work to discard some of the stereotypes that may be making science an unappealing area for young women, such as you, to pursue.

If I were to ask you what you think of when I say a scientist? Do you think of a man in a white lab coat looking into a microscope?

What do you think of when I say engineer? A man wearing a hard hat and fluorescent vest?

What about someone in IT? Does computer nerd come to mind? Did you know that the movies, “The Lord of the Rings” and “Avatar” are actually big IT projects? And industries such as the aviation business rely heavily on ICT.

It is worthwhile to think about the usual stereotypes associated with different careers and ask yourself if these stereotypes may be unconsciously influencing you away from certain career paths.

Let me tell you about Jacqueline Savage, a Swinburne student who is currently undertaking a Bachelor of Engineering - Product Design. She has already designed and engineered an interactive knee model for Johnson and Johnson Medical, which was showcased at the Australian Orthopaedic Association exhibition last year.

Jacqueline believes a focus on user-centred design will assist in her developing medical products to improve patient care. She was recently touted by Women’s Agenda as one of the 16 female graduates to watch in 2014.

In an industry that’s still heavily male-dominated, Jacqueline also hopes she can pave the way for other women through great product innovation and continually building on her own designs.

Many women have made their mark in science over the years, and Australians have been right up there amongst them.

Ruby Payne-Scott, was an Australian who was an early leader in the fields of radio astronomy and radiophysics. She was one of the first radio astronomers and the first woman in the field.
Penny Sackett, who is an astronomer, became the first female Chief Scientist of Australia in 2008. And the Vice-President of IBM is Janet Matton – a graduate from Swinburne.

At Swinburne we are doing our part to encourage more young women to take up careers in science, technology, engineering and maths.

Digital Divas is a girls-only elective in the Year 8 program that involves about an hour each week over one semester. This school based program builds girls’ ICT skills and confidence and increases their motivation to continue studying ICT.

We also have Girls in IT Day, where secondary school students can get involved in interactive workshops, hear from inspirational female industry speakers, and have an opportunity to hear from female ICT students.

Swinburne also introduced an IT Taster Day this year, which gives students from years 7 to 10 the opportunity to spend a day on campus where they can participate in interactive programming and design workshops, as well as a range of other activities.

A career based in science, engineering, technology or mathematics opens up numerous doors with careers that allow you to make a difference.

But be alert to door-shutters. These are messages in your own heads or message conveyed by others that sound like this:
- you probably are not science-oriented
- you probably don’t have the grades to do science
- science careers are difficult for women to combine work and family
- science is boring
- I did badly in year 8 science so I will never be able to learn science now
- people can be classified as strictly science or arts types.

Not true.

Sciences ought to be accessible to anyone with the curiosity to learn.
We learn things – even challenging things because we want to – because we are questioning, because the answers to our questions matter.
So – stay open minded and curious – explore what might be possible – keep your doors open and don’t bail out on yourself.

The world needs your ideas, talents, creativity and good energy. We need people who can help us tackle climate change, chronic diseases, food security, energy solutions, water safety and supply challenges, biosecurity threats, and natural hazards.

We need people who can build buildings that are able to withstand earthquakes, devise smarter transportation systems, and methods to better monitor elderly patients cared for at home.

I encourage you to go back to your classrooms, friendship networks, teachers and families and talk about career paths that you may have discarded or not have known existed.

When 50 per cent of the population – that is – women – do not contribute fully to fields underpinned by science and technology – we all lose.

So think forward today – and consider the possibilities.