Women of WiT

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Women in Technology

Three women working in the biotech industry give insight and aspiration in interviews they gave during National Science Week 2009.

The top 10 in-demand jobs predicted for 2010 did not exist in 2004.

I have seen versions of this claim for some years and it has resurfaced on YouTube (www.youtube.com/watch?v=cL9Wu2kWwSY) as one of many mind-blowing statistics about the impacts of technological change on our lives.

I helped to start Women in Technology (WiT; http://www.wit.org.au) in 1997. It was originally formed to provide networking and professional support to women in the information and communications technology (ICT) industry, but has since expanded to embrace biotechnology in its broadest sense. The founders saw a need to promote non-traditional careers for women (because they typically offer more challenge, flexibility and higher pay) and to support women moving into decision-making leadership roles.

How do we find out what kinds of work are currently available in ICT, for example, or in biotechnology or any other field of science or engineering? The usual sources include friends, family, teachers and career guidance officers, but they all have a hard time keeping up with changes, particularly in high-tech industries.

For those of us that have an influence on the visibility of various career choices, making the most of opportunities when people from industry or research take time out to tell us about their work is mandatory. Seeking out the various industry associations, subscribing to their newsletters and going along to some events are all excellent strategies to connect with real people in work to find out more about their jobs and how they got there.

Of course, there's also the internet – have you ever looked at www.ted.com? It has clips of "riveting talks by remarkable people, free to the world" and is all about "ideas worth spreading." And they are! It's an invaluable resource of information about the very latest technologies, science and innovation of all kinds.

Another strategy is to participate during festivals such as National Science Week (www.scienceweek.gov.au) or National ICT Careers Week: STARTHEREGOANYWHERE (www.ictcareersweek.info).

National Science Week this year concluded on 23 August. For young adults there were fabulous opportunities to see into the future world of work – the kinds of careers that will be possible and the kinds of new businesses that are already happening.

I interviewed the following three women from different backgrounds who are now working in diverse parts of the biotech world. Their stories provide a glimpse of the remarkable professional opportunities for women when they dare to follow non-traditional career paths. Dig deep and there are always challenges, but the vast majority of the female members within WiT would agree that they love what they do and find ways to overcome any obstacles.

Professor Jenny Martin, Protein Crystallography

Professor Jenny Martin is one of a select few recipients this year of a prestigious ARC Laureate Fellowship. She directs the UQ ROCX (University of Queensland Remote Operated Crystallisation and X-ray) Diffraction Facility.

Professor Jenny Martin

It supports around 50 scientists, including those at her own protein crystallography laboratory within the Institute for Molecular Bioscience at the University of Queensland.

This youthful-looking professor is working on the development of anti-bacterial drugs with new modes of action that could help overcome emerging bacterial resistance, and on finding novel compounds for treating diabetes, the fifth-highest cause of death worldwide.

Born in the working-class suburb of Dandenong in Victoria, Jenny is the fourth of nine children and the eldest girl, a circumstance that Jenny feels has made her "bossy" but also reasonably comfortable working in a male-dominated environment. In common with many women pursuing scientific or technical careers, Jenny loves solving puzzles and understanding how things work.

From an early age, Jenny had wanted to become a veterinarian. Her acceptance into Pharmacy (which she applied to enter at the suggestion of the local careers guidance officer) was a blessing in disguise because, as she subsequently discovered, her love of animals was such that she couldn't even consider giving them injections!

Serendipitously, the pharmacy course included subjects that explained the molecular basis of drug action. Jenny says that "this was a revelation to me. Up until that time I had no idea how aspirin cured headaches, or how any

Fostering the Next Generation of Life Scientists

Recognising the gap between students (of biotechnology, bioscience or bioengineering) and the industry they will ultimately seek work in, AusBiotech established the AusBiotech Student Association (ABSA). The special interest group assists students to bridge the gap and connect with the Australian life science industry.

BioFutures is a week-long residential science forum for Australian and New Zealand students in their final 2 years of high school, and is held annually in Brisbane during July.

Organised by ABSA volunteers, BioFutures is part of a strategic drive to bolster the bio-science community and ensure that the skill set required by the industry remains strong in the current economic climate.

BioFutures allows students to explore cutting-edge technologies and apply these technologies to national and global challenges. With "hands on" lab visits and face-to-face contact with some of the biotechnology industry's leading research and commercial organisations, BioFutures paves the way for the next generation of excellence in biotechnology and bio-engineering.

Historically, visits have included the University of Queensland, Queensland University of Technology, Griffith University, major Brisbane hospitals and industry locations. Through key events such as a mock United Nations summit and interactive forums that focus on bioethics, health equality and the role of technology as a solution, students are focused towards how scientific knowledge can make a positive difference to significant problems in society.

"It's important that we recognise and foster the enormous potential that lies with these students," said AusBiotech CEO, Dr Anna Lavelle. "They are the future of this industry and will be key in driving bio-science forward in the coming decades."

For BioFutures alumnus Chris Gaffee the reasoning is a little simpler. "BioFutures is an amazing experience," he said. "It allowed me to explore all the different areas within bio-science and really experience first-hand what science is like."

ABSA is represented in most Australian capital cities by student-run volunteer committees under the guidance and support of AusBiotech, Australia's biotechnology organisation. For information on other ABSA activities, awards, and on membership, visit www.ausbiotech.org

Source ABSA

other drug worked – I just took it for granted that they did work… What became clear to me then was that it was possible not just to understand how drugs worked, but also to design new and better drugs."

By 1986, Jenny had completed a Masters of Pharmacy in drug design but then couldn't decide whether her future career was in pharmacy practice or in drug-related research. Before setting off on overseas travel, she applied for a number of research scholarships, even posting a last one at the airport as she left the country. To her surprise she garnered five scholarships and bursaries – sufficient reason to choose a research career.

Jenny's research has taken her to London and New York. For the past 16 years she has been at the University of Queensland. Her aim for the next 15–20 years is to focus on molecular pathways for diabetes, inflammation and infection, to validate proteins in these pathways as drug targets, and to design and develop drugs that will help to combat these diseases.

Jenny considers a major challenge for all scientists to be a lack of career paths for early to mid-career researchers. She is also concerned by the systems-wide challenge of retaining female talent at senior levels. What starts out as an even gender balance at PhD and postdoctoral level soon turns into a 10:1 male:female ratio at senior levels.

Melinda Kambouris, Immunology

In 2003, Melinda used a gap year during her Bachelor of Applied Science (Biotechnology) degree at Queensland University of Technology to earn some real money for a change and to reflect on her future directions. What she originally thought would be a brainless retail job turned out to bear unexpected benefits.

Although Melinda thought of herself as fairly introverted, she was forced to deal with a range of people, and found that she liked it! "I was surprised to find that people were willing to have amazingly open conversations if you just made an effort," she said. "At one point, I was interim manager and had to deal with staff issues and manage conflict as well as deal with customers and, looking back, I think it was a very valuable personal learning time."


Melinda Kambouris

By year's end, Melinda had made her decision: she really wanted to return to university to finish her degree. She really enjoyed scientific challenges. Within the science milieu, she soon focused on biotechnology and is in the final throes of her PhD thesis on graft versus host disease (GVHD). GVHD is a major complication in bone marrow transplants, affecting up to 85% of patients. The immune cells from the donor transplant (the graft) attack the body of the transplant patient, interfering with or preventing effective treatment.

Melinda is working in collaboration with the Adult Stem Cell and Bone Marrow Transplant teams within the Mater Medical Research Institute (MMRI) and at the Mater Hospital. She is using mesenchymal stem cells (adult cells that can be harvested from most tissues in the body) in mice to discover the how and why of clinical work that has already shown that these stem cells can be used to prevent and treat GVHD.

In 2008 Melinda participated in the MMRI's Medical Marvels Tour of regional Queensland as part of National Science Week. "It was a marvellous experience that put me on a high for 6 months!" she exclaimed. "We described and explained the work we are doing to primary and secondary students, the general public and

medicos in several regional centres," she said.

"We were given an enthusiastic reception everywhere and answered many questions. In fact, some of the informed questions pointed to new areas of research we should pursue… I can highly recommend scientists make an effort to communicate with the public about their work – you never can tell what unexpected benefits may emerge."

Melinda credits a passionate science teacher in her school on the Sunshine Coast with the original impetus to pursue tertiary science.

During her tour of Queensland, Melinda found that many students still subscribed to the outdated "nerdy" image of the scientist and were amazed that she didn't fit the stereotype. Also, perhaps not surprisingly, they were not aware of the diverse jobs and areas of work available within biotechnology, let alone within science and technology more generally.

Professor Ranjeny Thomas, Immunology


Professor Ranjeny Thomas

Professor Ranjeny Thomas is head of the Immunology Program at the Centre for Immunology and Cancer Research at the Princess Alexandra Hospital.

Her research focuses on the study of the biology and clinical use of human dendritic cells (part of blood cells). One of the most exciting outcomes of this research is the development of a promising arthritis vaccine that has been approved for clinical trials and, if commercialised, could improve the lives of millions of arthritis sufferers around the world.

Ranjeny was born in Perth in the 1960s and says that she was not especially attracted to science in her youth, possibly due to a lack of good science-based role models and teachers, but also due to a lack of interest. Ranjeny was involved in debating and creative writing during her school years, playing towards her natural strengths in the arts (part of the reason, she says, for her high success rate in garnering research grants).

Nevertheless, Ranjeny chose to study medicine at the University of Western Australia because it seemed to offer a wealth of career options. During her final rotations Ranjeny became interested in immunology and, within immunology, research into haematology and rheumatoid arthritis. These exciting fields seemed to provide some of the earliest opportunities for transitioning scientific research findings into clinical practice.

After marrying an architect in the early 1980s, Ranjeny and her husband moved to the USA in 1990 where Ranjeny pursued a research fellowship at the University of Texas Southwestern Medical Center, while her husband completed a Masters in Austin, Texas with Charles Moore, the famous humanist, post-modern architect.

The couple moved back to Australia in 1994 and Ranjeny accepted a position at the University of Queensland, based at Princess Alexandra Hospital. The household was structured around full-time work for both partners while having three children (now 14 years and 10-year-old twins). "Our children have learnt to be very independent and, unlike me at that age, they all love science – I had to smile when my then 4-year-old exclaimed that he "loved experiments" during a cooking session," Ranjeny says proudly.

Ranjeny has many interests: she and her husband perform music together, on the piano and violin respectively. They performed a concert for the Arthritis Foundation 2 years ago and play monthly at church services.

This year Ranjeny has taken on another leadership role as deputy director (research) in the Diamantina Institute. "It's a role that can be challenging, but the best bits are about facilitating young scientists to achieve their career goals – something that gives me a great deal of satisfaction and pride," she says.

When asked to reflect on the skills required to be effective in medical research, Ranjeny lists the following:

- creativity, imagination, lateral thinking;
- logical thinking;
- written and oral communication;
- problem solving; and
- working in teams.

And the qualities she sees as necessary in a leader include:

- clear thinking;
- motivating others;
- facilitating problem solving, providing options, finding logical pathways; and
- making quick decisions.

A Worthwhile Investment

WiT promotes non-traditional career choices and entrepreneurship for women as part of a larger vision: we believe that when the billions have been spent on catching up with new roads, water, electricity, gas, rail and housing infrastructure, we'll need new businesses generating new wealth to pay the interest bills.

Women of WiT could play an integral role in starting or contributing to these new businesses based on unique, innovative products and services that other countries want to buy and will find difficult to copy.

Along with offering our best opportunity to earn our way back to prosperity, it will also be a more effective way to ensure a healthy, wealthy future.

Mentored Students Embrace Careers in the Sciences

Providing students with greater exposure to practising scientists may be a key factor in persuading more young Australians to enter careers in the sciences than are currently reported. A recent study by the OECD indicated that as many as 35% of Australia's brightest young scientists are turning their backs on careers in the field.

However, a survey conducted by Canberra-based educational organisation the National Youth Science Forum suggests that students who have spent time with science professionals and acquired a more accurate perspective of the opportunities open to them are much more likely to stick with science at university and beyond.

"Although Australian students do brilliantly in international science competitions, many of them have little or no concept of what scientists do on a day to day basis," NYSF Director Geoff Burchfield said. "The dazzling range of job possibilities is invisible to them and the thought of taking on a science career too risky. Regrettably the old stereotype of being stuck in a lab persists."

The National Youth Science Forum was established 26 years ago and targets high-achieving Year 11 students from around the country. Its 12-day residential program showcases the staggering number of available fields within the sciences, and equips and motivates students to explore these options for themselves. "When I studied science at school I was only exposed to biology, chemistry and physics, with little insight of what these subjects could translate to in the 'real world'," says 2003 NYSF participant Jenna Roberts. "The NYSF made me aware that I knew almost nothing about what I could do. It led me into a career in geology, something I wasn't even remotely aware of before."

The progress of NYSF students through subsequent years is tracked. In its most recent survey of alumni the NYSF found that 92% of students who attended the forum enrolled in the sciences at university. Of those, 85% continued into a career in science- or engineering-based areas.

Partnering with Rotary, the federal government and key Australian universities and industries, the NYSF is held each January. After running two concurrent sessions in Canberra and reaching 280 students for the past 26 years, the NYSF is now expanding and will host a third session in Perth from 2010.

The National Youth Science Forum is now accepting online applications for the 2010 programs. For more information go to www.nysf.edu.au

For more information contact Lucy Wedlock, NYSF Marketing and Communications Officer, on 0429 193 181.