

Succeeding in a man's world

If we had more role models like Ann Moffatt, then there would be more women in ICT today

On May 13, the University of Southern Queensland (USQ) conferred an honorary Doctor of Engineering on Ms Ann Moffatt in recognition of her distinguished career and significant achievement in the Information Technology and Communications (ICT) field (graduation pic).

When Ann was at school in Harrow, UK, she was told she was clever enough to complete a PhD but her plan to start a university degree at London University in 1958 came to a tragic end when she sustained a fractured skull and brain injuries as a result of a cycle accident. Prior to the accident, Ann had become interested in computers as her employer, the Bureau of Meteorology, intended to augment their Monroe calculators with a computer and selected Ann to attend a course. During her lengthy period of recuperation, Ann read all the computer books held by London University – 10 in total! – and then went on to be hired as a programmer by Kodak UK in the quality control unit.

When Ann started with Kodak Ltd (UK) in April 1959, she did not know that the pioneering programming work she was involved in would signal the start of a career spanning more than 45 years. In learning how to program the Ferranti Pegasus (pic 1), she was taught by mathematician Conway Berners-Lee whose son Tim went on to invent the worldwide web. In late 1959, Ann moved from Quality Control to the Operations Research group. Kodak UK could not justify the purchase of its own computer and used the Pegasus computer at Ferranti's Portland Place bureau and later the Ferranti Mercury at Shell Petroleum and London University at Gordon Square for process control, production control and operations research applications. Complex mathematical programs were written to advise Kodak where to locate a new distribution centre for the whole of England; how the production process could be streamlined; and optimal film coating, slitting, and chopping to match to the market. The accountants at Kodak were amazed that computers could be used to save the company millions of pounds.



Pic 1: Pegasus at the Science Museum London - the oldest working computer in the world (Photo courtesy of Len Hewitt)

At Portland Place, a novel but effective security measure was devised: “there was a plastic bag with a red silk cord in it, and there were 3 or 4 brass stands, and if you wanted to keep security while you were working on the computer, you just took the cord out of the bag and put the stands around so nobody came near you, and then you just cleared all the registers to zero when you got off the computer.”

In those early days of computing, job titles such as programmer, analyst and operator did not exist. Everyone did everything – “you punched your own tape, made up your own data, did your own systems analysis”. There were just as many women writing programs as men: “girls were considered to be very good at programming, proficient at patching the paper tape and were meticulous, especially with testing”. By the time of her 21st birthday, Ann was on the senior staff at Kodak. She was earning £1,000 pounds per year, equivalent to three times a teacher’s salary. She married shortly afterwards and her dream of going to university stopped right there “because married women didn’t go to university”.

Ann worked on Atlas, then the most powerful computer in the world and developed with significant investment by the British Government. At this time, Ferranti was being taken over by ICL and it was hoped to sell three of the Atlas computers (at £3,000,000 each) to the Russians “to serve their computer needs to the year 2000.” The Atlas computer, comprising 50 metres of cabinets on each of 5 floors – it was too heavy to locate all on one floor – was less capable than a PC today. The Atlas was the first computer to have an operating system – named the ‘supervisor’. Up until then, programmers would write their own drivers, or use the best on offer from their colleagues. Atlas pioneered the use of memory paging and needed a drum learning program to optimise what should be put in memory ready for the users (to minimise page swapping). Kodak UK loaned Ann to Ferranti and Ann wrote a lot of the drum learning program at Manchester University. Many years later at the launch of the 360/158, IBM tried to claim it had the first operating system, but the patents for the IBM 158 go back to Atlas.

Kodak UK wrote to the US headquarters with a proposal to purchase 10 percent of the London University Atlas but Kodak US decided to standardise on the IBM 360. Ann and her colleagues were not aware of the IBM 360 and when they were sent the specifications, could not see how it could be of use as it couldn’t do the complex mathematical modelling they were doing on the Atlas. When they enquired about the capability of the 360, they were told it could do invoicing and were amazed: “We couldn’t imagine anyone would use a computer to do invoicing - we had a typing pool that does invoicing”!

By 1963, Kodak UK established a ‘computer department’. All ‘programmers’ were forced to join that department. Ann left Operations Research and joined the Computer Department. Kodak was now using the EMIDEC computer – the first large commercial transistorised machine in the UK.

Ann noticed that the computer industry had undergone a transformation. It had become stratified with tasks allocated to specific positions. Previously, in the flat structure, men and women had equal status but now the industry had been taken over by men. The men took the top jobs and women were either pushed out of the industry or down the hierarchy to menial tasks.

In 1965, Ann’s daughter, Claire, was born. Ann continued to work from home writing programs but the people at Kodak kept forgetting to give her information about changes to be made to the programs. Although the pay was good, the work was frustrating so she decided to leave Kodak and be a full-time wife and mother.

After three months of what seemed like post-natal depression, Ann realised she needed to return to work and joined freelance programmers ltd (fpl), later called the FI Group. There was a shortage of programmers and it took a long time to train programmers, so this firm had been set up to tap into the resource of mothers who could write programs from home. fpl was awarded the contract to write the programs to analyse the Concorde black box, a large project with a budget of £20,000 (pic 2). Because Concorde was a new type of aircraft, initially the black box had to be analysed after each flight before it was allowed to fly again. The programs were complex machine code and ran on two special purpose computers performing statistical analyses on the outputs from 40,000 instruments on the Concorde. The project was completed under budget.



Pic 2: Ann working at home with Claire watching. She is writing a program to analyse the black box flight recorder for Concorde. Note the slide rule for calculations and pencil and coding pads.

As the FI Group grew, Ann was asked to manage the home-based programmers. She realised the key was to have accurate estimates and to understand the individual working style of each programmer. The productivity of the home-workers was double the average office-based programmer, and the company grew under the guidance of founder Steve Shirley (pic 3). Contracts poured in from the British Government, Esso, Birds Eye, and Littlewoods. The panel expanded to include carers and people with disabilities.



Pic 3: Management team at FI in 1972 (left to right): Steve Shirley (now Dame Steve Shirley), Ann Moffatt and Dee Shermer

In 1968, after the birth of her son Stephen, Ann was back at work in 10 days supported by a nanny, secretary, and driver. Ann's marriage ended when her husband, a Kodak executive, decided he wanted to work for Kodak in the USA but Ann did not want to bring up the children in the United States.

From 1971 to 1973, Ann headed the technical division of FI Group and supervised 400 staff and 40 projects at any given time. One of the projects was a Professional Executive placement system for the Government employment service. At the launch, the Minister asked for a demonstration so Ann (the only woman at the event) input some outrageous criteria. Later, the Director informed her that she was matched with a position close to her home and with a top salary, so Ann rejoined the conventional workforce, firstly as Product Executive at Computer Technology, then in an IT Strategic Review role with BP's subsidiary Scion Ltd.

Although Ann was a Fellow of the British Computer Society (BCS) and recognised as an authority in her area, she found it difficult working in a large consultancy: "it was so peculiar, it really was a 'boys' club. It was as if the men expected me to get the tea and punch cards". One of the large projects she worked on was to develop a complete strategic review of computing needed to

underpin the reorganisation of British Steel which had rationalised all the steel plants (from 260 companies to 5 locations). At that time, computer networks were just coming in, Ann was an active member of the OSI British standards committee SC6 which was working on low level communications standards including X.25.

It was a difficult time for Ann to cope with a young family as a single mother as life in London was disrupted by the security measures due to the IRA bombings. Ann hoped Scion would proceed with its plan to relocate to the country, but these plans were shelved.

In 1974, Computer Sciences Australia (CSA) approached Ann – they wanted to recruit database experts. Ann was highly recommended to them but she wasn't interested. They were very insistent and over lunch at the Ritz they doubled their offer and Ann was persuaded to move to Sydney with her 2 children then aged 6 and 9.

The database expert was needed for CSA's client AMP. There was a perception that the database development was not being performed correctly, but Ann could not fault the work of the DBA, Dr Neville Black. CSA disregarded her opinion and sacked Black. However, Ann was concerned about a project to develop a Transaction Control System (TCS). This was to be based on the government's Common User Data Network (CUDN) Packet Switching system which had been aborted. The new TCS was tightly linked to the Univac Operating System and required the operating system to be heavily modified. It was a key component in AMP's AMPNET project. Ann had worked on a complex operating system on Atlas and on the experimental packet switching system (EPSS) in the UK and believed the AMPNET project was headed for disaster.

Ann decided to look for another job and soon realised that Australia was at least 10 years behind England in terms of women in management. "The idea of having a woman in a senior role was unheard of, they didn't believe the salary I was on – they thought I was mad"! She decided that before returning to the UK, she would inform the AMP Deputy General Manager of her concerns related to the AMPNET project. His response was to threaten her that if she made trouble she would never work in Australia again. "That's OK", she said, "I am leaving anyway. But answer this question. The AMP Board approved \$6 million for this project. How is it that \$12 million has been spent and the project is nowhere near completion?"

AMP checked Ann's UK credentials and realised they had underestimated her ability. They asked her to stay and rework the AMPNET project estimate to complete the project (\$64 million) for the Board. Eventually the project was cancelled after an investment of \$96 million.

Ann was offered a position as an Executive at AMP. As the first woman executive she was the target of malicious rumours about whom she had slept with to get the job. She "cleaned up lots of messes" at AMP and took on the role of IT futurist looking ahead 5 to 20 years to advise AMP how not to cut themselves off from the future. It was a very interesting job involving much international travel, for example finding out about 5th generation systems in Japan.

In late 1986, AMP management asked her to organise the recruitment of 200 IT staff (it was difficult to find IT staff in the mid 80s). One of the head-hunters told her they had the perfect job for her at the Australian Stock Exchange (ASX). Up until that time, each Australian State had its own stock exchange with different trading rules and different computer systems. An Act of Parliament in April 1987 called for the creation of one national stock exchange. Ann's job was to bring all disparate systems together and develop an IT strategy to take them to the year 2000.

The project started out as a nightmare. The stock market was streaming ahead just before 1987 crash and the systems could not cope with the volume of transactions. SEATS, the automated stock

exchange trading system was under development but that team was not allowed to communicate with Ann's people who were responsible for the complex back-end systems. Eventually, Ann was allowed to formally hold discussions with the SEATS team and confirmed what she had found out informally, that the back end systems needed much amendment to facilitate the introduction of SEATS. This further delayed the introduction of SEATS much to the annoyance of ASX. Her insistence on rigorous testing by IT staff and Brokers was met with opposition but paid off in spades. The system went live on Monday October 19, 1987 with the Prime Minister Bob Hawke cutting the ribbon. The next day, the stock market crashed and although systems in New York, Tokyo and Hong Kong all failed, the Australian Stock Market system was one of the only systems in the world to continue operating flawlessly.

Although Ann achieved hero status for the success of the ASX project, after the crash the volume of share trading dropped by at least 50 percent and the value of the stock market by 30 percent. As a result, the other strategic initiatives could not be implemented. To Ann's horror, at the age of 48, she was made redundant, but delighted when 12 job offers arrived. "But I chose the wrong job – as a consultant with DMR – and hated the marketing aspects of it".

As a consequence of Senator Button's partnerships for development program, IBM outsourced most of its training to the University of NSW (UNSW). Ann was asked to take on the role of Director, Institute of IT at UNSW as a bridge between the Industry partners and the academics who taught the industry courses. To ensure the viability of the institute, Ann expanded the Institute to undertake training and AI and Metrics research for Digital as well as training for Apple. IBM were so impressed with the achievement of the Institute, they invited Ann to explain her methods to IBM trainers in the US. Ann believes it was the honesty of the Australian trainers in how they portrayed IBM's products, as well as their practice of encouraging students to bring their problems to class and helping them solve the problems after class that made the difference. In a first for IBM, the Institute was awarded research of the management systems for the Farm research project – known now as grid computing. It was the first time IBM had awarded a research project to a University outside the USA.

During the previous 5 years, women were beginning to take leadership roles in ICT. Statistics showed that at that time only about 1 in 400 of top ICT jobs in Australia were held by women. These women would often tell Ann that they felt insecure in their management role. Many had noticed the differences in the way men and women operated in top jobs and wondered whether they should adopt the generally male 'command and control' behaviours or the "collaborating, cooperating" behaviours that women felt more comfortable with. Also, fewer and fewer women were choosing ICT as a profession and they seemed to be mainly in the 'lower level' jobs.

In 1989, Ann called a meeting of 16 of the top women in ICT to discuss how they could encourage more women to consider ICT as a profession and share strategies for success and things to avoid when women actually got to the top of the profession. This led to the formation of Females in Information Technology and Telecommunications (FITT), which is a highly successful self-help network for women in the ICT industries.

In 1992, IBM "hit a sticky patch" and withdrew the training contract, causing the closure of the Institute. Ann was made redundant again: "I knew at 52 years of age I would never get another high powered job." However, her staff had other ideas. In January 1993, together with other professionals from the Institute, Ann established Technology Solutions (TS), an IT systems services company delivering systems development, support, consultancy and education in UNIX for all platforms, the complete range of IBM architectures, business re-engineering, management and education. The vision of the enterprise was to deliver high quality IT services provided by professionals working on a flexible part-time basis from a home base.

After 10 years at the helm of TS and seeing it grow to a \$4 million/year business, in 2000, Ann decided it was time to retire beachside at Burrum Heads, Queensland.

Ann had considered studying for her first degree while at UNSW but as she had been a guest lecturer there and at Sydney University, it was suggested she enrol in a Masters program at Macquarie University. After making satisfactory progress in the Masters program, she was accepted as a PhD candidate. The productivity of her remote staff at FI Group was very high and she applied the same management principles at AMP with great results (high productivity, people stayed longer, produced high quality work). Her thesis at Macquarie was if you put in place the same strategies of home-based workers in an office environment then you could get at least 20 percent increase in productivity. She had done the literature review, and despite initial offers of cooperation from large Australian companies, could not achieve the required number of 150 workers for an experiment to confirm her thesis. Ann felt it imperative that a large sample be used to counter effects of individual differences. Her supervisor urged her to complete the study with a small sample or do that part of her research in the USA but she was not satisfied with that – she wanted to prove her theory, so she withdrew from the program.

Ann believes that her career demonstrates that a fairly ordinary person can get to quite extraordinary places if they want to, so long as they seize the opportunities. There are ups and downs, but it is not all up or all down. “Even if you are the only woman in the IT area, you can do it, look for the opportunities.” She is very concerned that women are drifting out of the IT industry, and that when she talks to women, they think that the industry is dominated by men, that it is geeky, and that it is all too hard. Senior women have confided that they feel they are not valued by men, not respected and not allowed to do what needs to be done.

“I wish we had more women in the industry because it is a good career opportunity for girls, and if we are not careful, we will get the systems men build for us.” Ann believes that generally, women do think differently from men, women are much better at project estimating, programming and testing. “Men often under-estimate to get the project because they know that once you start, people will just keep pouring money into it. Women are more meticulous, more careful and want to get it right. Men hope to get away with it, are more egotistical, to hell with the organisation whose money it is. Men think if they estimated accurately the project would never start and they wouldn’t have any fun, but the girls don’t think that way, they worry more about programming and testing and all possible routes. Boys don’t test side routes, they like to get called in like a knight on a white charger when things go wrong.” “However, I’m generalising,” she laughed, “some of the best ICT people I know are men.”

Ann believes we need to create an atmosphere that is supportive to women. The workplace at the top is tough for men as well as women. The politics and power games are a waste of energy that can be better channelled to supporting the enterprise and making life outside the workplace better. In senior roles, men tend to choose people like themselves so while they are doing the choosing women have a distinct disadvantage. However, Ann has observed that when women get into a “control” role they often choose men to be on their teams rather than women because they see that as giving them more status and power so they, too, do not help women grow. “We really need people to realise that power doesn’t come from “control” but from work done well and successful, happy teams”.

Ann’s contribution to the BCS and ACS is in line with a quotation of Francis Bacon: “I hold every man a debtor to his profession.” The computer industry has been good to Ann, but she has tried to give back too.

Contribution to Industry	
1960-1974	Active member of the British Computer Society
1970	Awarded Fellow by the British Computer Society in recognition of her contribution to teleworking and towards the development of international standards for programming languages.
1973	First woman elected to the British Computer Society Council
1974	Joined the Australian Computer Society
1985-7	Elected Chairman of the NSW branch
1996	Awarded Fellow by ACS based on her 'prominent role in Australian IT since the late 1950s, especially in promoting IT as a career for women. Her career spans a broad mix of consulting, industrial and technical assignments and professional activities and she is highly regarded as a presenter and writer.'
1998-2000	Board Member of the NSW TAFE Commission. During this time, Ann was instrumental in formulating the Return project, providing computer skills to women throughout Greater Western Sydney to enable them to re-enter the workforce. This partnership involved NOIE, ACS, Western Sydney's Institute of TAFE. Ann's contribution to this project was mentioned in the NSW Parliament in 1999
1999-2000	Board member of the Information Technology and Telecommunications Industry Training Board (IT&T ITB)
2001	Appointed Board member of the ACS Foundation
2002	Inducted into the IT Hall of Fame at the IT&T Awards. Not only was Ann the first woman to be recognised in this way, but she was also the first living person to be inducted into the Hall of Fame
2002	Established a Young Computer Professional Group and a Chapter of the ACS at Hervey Bay. The group comprises University and TAFE students as well as business people
2003	With USQ, Wide Bay Institute of TAFE and the Queensland Department of State Development, Ann established an Innovation and Incubation Centre in the Hervey Bay, the FACTOREE, for which she is the Director
2004	Appointed Chairman of the Wide Bay Burnett Regional Leaders Conference focus group on Infrastructure
2005	Elected President of the University of the Third Age (U3A) in Hervey Bay
2005	Advisor to Minister Helen Coonan on the Federal Government's initiative to promote teleworking to revitalise Regional Australia