

**Department of Computer Science and Software Engineering
Department of Information Systems**

**Fifty Years of Computing
at
The University of Melbourne**

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On June 16, 2006, the Department of Computer Science and Software Engineering, and the Department of Information Systems at the University of Melbourne celebrated fifty years of computing at the University. The event commemorated was the June 14 1956 re-commissioning of the CSIRAC computer, the first at the University, and, until a few months later, when the Sydney University SILLIAC computer became operational, the only one in the country.

This document was prepared as part of the celebrations, to record the history of academic computing at the University of Melbourne.

The First Computer

Computing at the University commenced with the arrival of Australia's first (and at that time, only) computer, the CSIR Mark I, which was shipped down from Sydney on the back of a truck in 1955. The CSIR computer had been created by Trevor Pearcey and Maston Beard, of the CSIR Division of Radiophysics, over the period 1947–1949. It operated successfully in that group (which was located on the campus of Sydney University) from 1950 until 1955, with a range of modifications and enhancements made to it during that period.

In 1954 the University of Sydney resolved to build its own computer (SILLIAC), which became operational in September 1956. In part because of this decision, the CSIR computing project was terminated in April 1954. After some deliberations, the machine was made available to the University of Melbourne, and Dr. Frank Hirst, a senior lecturer in Physics at the University of Melbourne, was sent to Sydney to learn about the computer and bring it back. Hirst supervised the dismantling of the CSIR Mark 1 in Sydney in the first half of 1955, and arranged for it to be trucked to Melbourne.

On its arrival in Melbourne, the computer was set up in a newly created “Computation Laboratory” in the School of Natural Philosophy Building, now called Old Physics. Hirst was placed in charge of the Computation Laboratory, and two engineers attended the machine: Ron Bowles, who had shifted down from Sydney with the machine, and Jurij (George) Semkiw, who had met Hirst while undertaking a television theory course at Melbourne Technical College (now RMIT). Courses in programming commenced in February 1956, before the computer was fully re-commissioned.

At a ceremony on 14 June 1956 Sir Ian Clunies-Ross, Chair of the CSIRO, certified the indefinite loan of the CSIR Mark I to the University, and the computer, still the only operational computer in Australia, and renamed CSIRAC, was formally reopened. Vice Chancellor Professor Paton then pressed the “on” button. As part of the ceremony the computer executed a simple program that had been pre-loaded by Ron Bowles, and output this message, at five characters a second (McCann and Thorne, 2000, p46):

Mr Vice Chancellor,

Thank you for declaring me open. I can add, subtract, and

multiply; solve linear and differential equations; play a mediocre game of chess and also some music.

CSIRAC was maintained for another eight years at the University, and completed some thirty thousand hours of operations, with an average unavailability of just 10% of operational time. (Yes, that is correct – an average operating time of approximately 10 hours for every day of every week for more than eight years.)

As well as providing a computing service to the University, to CSIRO staff, and to the wider community, the Computation Laboratory provided academic courses and undertook research. One CSIRO staff member, Geoff Hill, who transferred down from Sydney with the computer, wrote and implemented an early high-level language (Interprogram). Hill's 1961 PhD thesis titled "Advanced Programming of Digital Computers", is probably the first "computer science" doctorate awarded in Australia.

In addition, University staff used CSIRAC for pioneering work in loan repayment scheduling, weather forecasting, civil engineering, and many other projects.

CSIRAC was the only computer in the University until 1964, when an IBM 7044 machine was acquired, and housed initially in IBM premises in St Kilda. Fortran IV programming was introduced using the new facilities, and the scope of the computations that could be carried out greatly increased.

CSIRAC was decommissioned on 24 November 1964, and carefully dismantled and stored. It had a period on display at Caulfield Institute from 1980 to 1992, and was then returned to storage for another 4 years. In 1996 it was displayed at the University of Melbourne for several months as part of a fortieth anniversary celebration.

Having emerged from storage again in 2000, CSIRAC is now a significant attraction at the new Melbourne Museum, where it has been reassembled, and can be viewed as the earliest intact stored-program computer in the world. The 2000 book *The Last of the First: CSIRAC, Australia's First Computer*, by Doug McCann and Peter Thorne, documents the history of this important artifact. The specifications of CSIRAC are both entertaining and amazing. It had 256 twenty-bit "words" of memory, each storing four 5-bit letters or digits, implemented using mercury delay lines (later expanded to 512 words, and then, finally, 768 words, in both cases by improving the mercury lines rather than by adding more of them). It had a magnetic drum backing store with another 1,024 words of storage. It had 2,000 valves, and using them could compute around 1,000 operations per second. And it required 30 kW of power and weighed approximately two tonnes. It truly represented a quite remarkable feat of engineering.

By the end of this initial period, academic staff in the Computation Laboratory included Frank Hirst; Bill Flower (who had joined the Laboratory in September 1961); Rex Harris (joined February 1962, who had completed a Masters degree in New Zealand, and went on to complete a PhD at Melbourne in 1974 under the joint supervision of Hirst and Dr. B.W. Thompson, in Mathematics); and Alfs Berztiss (joined January 1964 while working on a PhD in Physics). Semkiw and Bowles continued as engineers, assisted by Peter Thorne, an undergraduate Physics student who, from November 1961, filled a technical support role at the weekends. Another key contributor from March 1959 was Kay Sullivan (by 1962 Kay Thorne), who was active in a technical and administrative support role for more than fifteen years.

Computation Department

During the period 1956–1971, academic computing operations in the University were conducted by the Computation Laboratory, subsequently renamed the Computation Department.

During the 1960s, new computing subjects were developed and provided as part of the BSc degree. Undergraduate exposure to computing expanded as courses migrated from later year specialist subjects to second, and ultimately, by 1970, to first year. The June 1965 *Computation Department Report* notes that:

The academic side of the Department's activities has been extended greatly by the introduction into the University curriculum of two new subjects:

Theory of Computation I

Theory of Computation II.

Theory of Computation I and Theory of Computation II are second and third year science subjects respectively. Thus it is now possible for a student to obtain a Bachelor of Science specialising in Computation.

Bertziss departed to Pittsburgh University in approximately 1970, but the remainder of the staff were relatively constant through this period.

The IBM 7044 was a batch processing machine using punched card input and magnetic tape storage. It had 32,768 36-bit words, could add two numbers in five microseconds, could print at 600 lines per minute, and could read/punch cards at 800/250 per minute. It was used for teaching, research, and commercial processing. By 1967, minicomputers were available, and a PDP-8 was purchased for departmental research and postgraduate teaching. (It was the second such machine in the University, with one having been purchased in 1966 to support the research of Biophysicist David Dewhurst, who was later a contributor to the bionic ear project.)

An increasing number of postgraduate students undertook research studies in the Department, and many of them are still active in the computing field. At one stage the Department had more enrolled computation research students than in the rest of Australia combined.

Department of Information Science

In 1969 the University took the decision to split the Department into two components – a computing services component, and a teaching unit to be known as the Department of Information Science, located in the Faculty of Science. At this time, Dr. Frank Hirst (by now a Reader) was invited to take up the foundation chair in computing at the University of Adelaide, creating vacancies at the top of both units. Bill Flower was appointed as Acting Head of Information Science, the other academic staff being Rex Harris, and Peter Thorne (who, after his undergraduate Physics degree, had worked with Hirst to complete another of the first computing PhDs in Australia, in 1967). Ian Robinson was appointed as a further staff member in 1971. He had completed his undergraduate study at Melbourne, including several subjects in computation during 1965–1967, and completed a PhD in 1973 under Dr B.W. Thompson, in the Department of Mathematics. Robinson moved to La Trobe University in August 1975, where he is now Head of the School of Engineering and Mathematical Sciences.

It was not until early 1970 that the arrangements were settled enough for the University to move to appoint someone to head the service function – to be called the Computer Centre. In the meantime, until the Head of the Computer Centre could be appointed, the newly established Department of Information Science was required to deliver computing services on behalf of the Computer Centre, and Ron Bowles in effect operated the service until a formal Computer Centre organisation was established. After external advertising, Alan Bell was appointed in July 1970 as Controller of the Computer Centre.

The Computer Centre was given responsibility for running the University's main digital computing resource – the IBM 7044/1401. The University also used an ICL 1004 for certain administrative tasks, and purchased time on an IBM 360/30 at one of the banks in Melbourne, as it explored the development of additional computerised administrative functions.

A review in 1971–72 headed by Professor Sam Hammond, Dean of Arts, considered the future role of computing in the University, and whether it should be part of Mathematics, as the majority of the Information Science staff had strengths in the area of numerical analysis. The review also considered the future of what was at that time called “non numerical” computation. That review recommended that a professorial vacancy be created in order for an external academic to be appointed to lead the department.

A recruitment process was commenced in 1973, and an appointment made in 1974.

Department of Computer Science

Professor Peter C. Poole commenced in August 1975 as the foundation chair of computing at the University. Poole had completed an undergraduate science degree (Physics) at the University of Queensland, and a PhD at the University of Sydney in 1964 under the supervision of Professor C.B.A. McCushen, working on the SILLIAC computer. Two well-known contemporaries of Poole's at Sydney were Professor John Bennett, the first Australian Chair of Computing; and fellow PhD student Chris Wallace, who went on to become Professor and Head of Computer Science at Monash University in Melbourne, and one of Australia's most notable academics in the area. On Wallace's death in 2004, the Computing Research and Education (CORE) prize for Research Excellence was renamed the Wallace Award, in recognition of his long-term and seminal contributions to Australian computing.

At the time of his appointment to Melbourne, Poole was an Associate Professor of Computer Science at the University of Colorado at Boulder, with previous employment at the Culham Laboratory of the United Kingdom Atomic Energy Authority. His work at Culham had involved early use of time-sharing operating systems, and at the same time he had developed an interest in the design and implementation of large systems in general – the field that we now know as Software Engineering.

One of Poole's early requests of the University was a name change, and the Department became “Computer Science” in 1976, bringing it into line with the trend in English and North American universities. At the same time, Poole's chair was renamed from Information Science to Computer Science. Poole taught his first subject at the University in 1976, an honours course on Software Engineering.

As part of his appointment discussions held in February 1974 with the then Deputy Vice Chancellor, Professor David Caro, Poole had also argued for a significant injection of funds into the discipline, by way of the largest setting-up grant ever awarded at the University. As a result, Poole was able to make three immediate academic appointments: Lloyd Allison (1976–1978, now at Monash University, and who, by coincidence had also spent some time working at Culham, in the UK), Jean-Louis Lassez (1976–1985, now at Coastal Carolina University), and Prabhaker Mateti (1976–1981, now at Wright State University); and purchased a computer to be used for departmental research purposes. All undergraduate teaching continued to be carried out on machines owned by the Computer Centre.

Construction of a full suite of subjects was a priority, and 1975 and 1976 were occupied by the design and approval of a range of subjects to be taught into the BSc and BA programs of the university. Much of the new curriculum was adopted from the University of Illinois, under the stewardship of Prabhaker Mateti. The majority of the new subjects were taught for the first time in 1977.

A period of relatively rapid growth ensued, as the exciting new discipline of computing caught

the attention of both undergraduate and postgraduate students. Student numbers swelled from 100 EFTSU to more than 200 EFTSU within just a couple of years. Indeed, growth was sufficiently rapid – and the corresponding decline in other departments in the Faculty sufficiently notable – that a quota of 180 EFTSU was proposed by Caro, now Vice Chancellor. Poole argued against such limits, and believes that he won the battle at least partially because he was still in his “honeymoon” period at the University.

In the late 1970s a Graduate Diploma in Computing Studies was introduced, and attracted a range of outstanding students wishing to learn this new discipline. Many of the Grad Dip students have now moved into academic positions in Australian universities.

As student numbers grew, so too did the staff. Significant further appointments during the late 1970s and 1980s included Rao Kotagiri (1980), later appointed Professor in 1990 and Head of Department from 2002; John Lloyd (1980–1987), who left to take up a Chair at Bristol University and then returned to Australia to a position at the Australian National University; Rodney Topor (1982–1991), who became Professor and later Head of Department at Griffith University; Iain Morrison (1982–1995), who was appointed Professor of Information Systems in 1995, and served as Head of that Department from 1998 to 2000; Justin Zobel (1983–1990), who now occupies a Chair of Computer Science at RMIT; Liz Sonenberg (1984–2000), who in 2000 was appointed Professor and Head of the University’s Department of Information Systems; T.Y. Chen (1985–2000), who left to take up a Chair at Swinburne University; and Alistair Moffat (1986), who was promoted to Professor in 2002.

Other important staff appointments were made through to 1990 in the technical and administrative areas, including Julien Reid, Pinoo Bharucha, David Hornsby, John Horvath, Andrew Peel, and Thomas Weichert. With the exception of Hornsby, who resigned in 2004 on the 20th anniversary of his appointment, the others remain as members of the Department at the time of writing. More than 80 other technical, administrative, and professional staff have served the Department in various capacities for shorter periods.

A key cohort of research students graduated during the 1980s and early 1990s, and have moved on to positions of leadership in Australia, New Zealand, and internationally, in both academia and industry. Many studied under the auspices of the “Machine Intelligence Project”, a long-running grant sequence coordinated by Professor (from 1990) Rao Kotagiri, but with involvement from many other academic staff, including Jean-Louis Lassez (1976–1985, now at the Coastal Carolina University); John Lloyd (1980–1987, now at the Australian National University); Rodney Topor (1982–1991, now at Griffith University); John Shepherd (PhD 1989, academic staff 1985–1992, now at the University of New South Wales); Lee Naish (PhD 1985, appointed 1986, still in the Department); and Zoltan Somogyi (PhD 1989, appointed 1989, still in the Department). Partly because of the MIP group, the Department was at this time a leader in Australia in computing research, and a number of significant projects were underway in areas including logic programming, and document indexing systems. A further research strength during the 1980s was computer music, led by Rex Harris.

Another of Poole’s legacies was his early identification of the importance of open-source operating systems. He argued for the use of Unix (and later on authored an introductory text for Unix users) on the Department’s computers, and for portable operating systems in general. As part of this push, he appointed K. Robert Elz (widely known *kre*) during the late 1970s, having identified him as a promising student taking computing subjects after finishing a law degree. A VAX 11/780 computer (the first *munnarì*) was purchased, and Elz contributed to the development of the Berkeley Unix systems that ran on them. Because of the Berkeley connections Poole facilitated, Elz was a pivotal figure in establishing electronic mail links between Australia and the rest of the world in the 1980s, and then, in the 1990s, in bringing the internet to Australia. Elz also managed all internet domain name

registrations in Australia for several years, and set in place “reasonableness” criteria that prevented the domain name goldrush and domain name squatting in the way that happened in other jurisdictions.

The work of Elz in this regard – establishing guidelines and systems for internet domain name registration – was an essential underpinning in the successful public float in December 1999 of the company Melbourne IT, which raised nearly eighty million dollars for the University at the height of the internet boom, on an original investment of \$350,000. The roles of Elz and the Department in hosting and nurturing this operation have not been publicly acknowledged by the University.

Elz resigned in 2003, having attained a status achieved by none of the academic staff – a Wikipedia entry, see http://en.wikipedia.org/wiki/Robert_Elz.

The Department of Computer Science continued to grow through the 1980s. By this middle of the decade a full suite of subjects covering areas from numerical computing through to compiler design through to artificial intelligence was in place, with honours also available in both the BA and the BSc. The first of what became many combined degree programs was introduced in 1987, and the Science/Engineering combination was an immediate hit.

By 1988 it was clear that a second chair was appropriate, and a search and selection process was initiated. Two appointments were eventually made: Rao Kotagiri, who had been appointed a Reader in 1989, was a successful applicant; and Terry Caelli, from the University of Alberta, was also 50% funded from Computer Science (the other 50% from Psychology), and took up his position in September 1989.

Throughout his time at the helm Poole actively engaged with the University administration, always arguing his case for more resources. As part of that strategy, he served in a number of key roles, including as Deputy Dean of the Faculty of Science. He was renowned for “going out on a limb”, and making promises for delivery before the corresponding resources flowed. This sometimes led to growing pains within the Department, but Poole had the knack of dominating strategic discussions, and rarely letting cautionary voices prevail. Indeed, his authority was such that he was universally referred to within the Department as “Prof”, even when other professors had been appointed; and the administrative staff were never slow to ask “does Prof know about this” when expenditure was being requested.

Move to the Faculty of Engineering

In 1989 Poole was involved in a review of the Department of Electrical Engineering, the “Williams Report”. That review suggested a number of changes in the management structures of Electrical Engineering, and that a School of Information Technology and Electrical Engineering (SITEE) be formed within the Faculty of Engineering, to bring Computer Science and Electrical Engineering closer together. The review recommendations were implemented quickly, and by 1990 the Department was a member of the Faculty of Engineering, which was at that time under the leadership of Dean Professor Bill Charters.

While a professorial recruitment process was pursued for EE, Poole was appointed as Acting Head of EE, as well as Head of SITEE. Poole was also still Head of Computer Science, and staff throughout SITEE were prone to remark that Poole had three offices and could never be found in any of them. The EE chair was eventually filled by Professor Rod Tucker, who rapidly established a world-class research program in photonics.

Throughout the 1980s Poole had argued to the university hierarchy that computing – and IT – was here to stay, and that the University needed to put in place appropriate structures. In 1989 those arguments came to fruition, and Poole was further appointed Assistant Vice Chancellor (Informa-

tion Technology), and given oversight of all IT policies at the University. He advised the then Vice Chancellor, Professor David Penington, that a networked computer on every desk was a vision worth pursuing, and shortly thereafter arranged for such a machine (a Mac) to be put on Penington's desk. Penington rose to the challenge, and immediately learnt how to both send email to others (sometimes to their dismay), and how to manage his own, so that all incoming emails were answered by the end of each working day. Poole's initiatives in this regard paved the way for a University-wide networking policy, and the reinforcement of the need for a cohesive and long-range approach to University IT strategy. The IT policy was designed and implemented with the assistance of Professor Iain Morrison, who occupied a complex sequence of appointments that at various times involved (from 1982) a 50% fractional appointment in both Physics and Computer Science, a secondment as Assistant Registrar (Information Technology) from 1990, an appointment as Assistant Vice Chancellor (IT) from 1995, and a Chair in Information Systems from 1995.

The late 1980s also marked the beginnings of the multi-media revolution, and Poole was an enthusiastic proponent of all things "multi". At one memorable departmental teaching committee meeting, discussing (in the absence of Poole) a number of curriculum related issues, a staff member remarked that anytime you wanted Poole to appear, you simply chanted "multi-media, multi-media, multi-media". There was enormous hilarity when Poole entered the room just a few seconds later.

Given Poole's considerable University-level responsibilities, it was not surprising that the role of managing the Department of Computer Science fell increasingly on Poole's long-term Deputy Head, Associate Professor Peter Thorne. By 1990 Poole's activities were almost entirely outside the Department, and it was apparent that a formal change of Headship was appropriate. At this time Poole withdrew from the management of the Department, and Thorne was appointed as Head. Thorne's Deputy Head was the recently-promoted/appointed Professor Rao Kotagiri. Associate Professor Liz Sonenberg also served a period as Deputy Head under Thorne.

One of Thorne's most important contributions during the early 1990s was his work with the architects designing a new building for the Department. Throughout the 1980s the Department had jostled and jostled with the Departments of Mathematics and Statistics in the Richard Berry Building, with space acquired in a range of "deals", and sometimes by adverse possession. The new building, in Bouverie Street, was a chance to obtain world-class facilities for staff and students, and Thorne (assisted by technical staff Robert Elz, David Hornsby, and Andrew Peel) invested enormous effort into the design, construction, and eventual move in July 1993. The new building did have the disadvantage of being off-campus, and July 1993 also marked the commencement of efforts to have the process of crossing Grattan Street made safer for staff and students in their daily journeys. Several years later a traffic island was built, and then, when the University Square precinct was being constructed, traffic lights and a crossing were installed.

Poole retired from the University at the end of 1992, and went to Bond University to take up the post of Dean of the Faculty of Information Technology. Not long after, in 1993, Terry Caelli left for Curtin University in Perth, where he was appointed as Head of Department. Both posts were advertised, but with the caveat that the Department be subjected to a formal review, as part of the University's ongoing cycle of departmental evaluations. The review panel of Professor Andrew Lister (University of Queensland, Chair); Professor Ray Offen (Macquarie University); and Professor Keith van Rijbergen (Glasgow University); visited the Department in April 2004.

The review report criticised the Department in several areas of its performance, and a range of initiatives were undertaken in response. The review was supportive of the professorial recruitment activities that had been commenced, and the quest to make a fresh external appointment was reinforced.

In approximately 1994 – not long after the Department moved into the new "SITEE Building",

the School changed its name to Electrical Engineering and Computer Science, and became SEECS. Sometime later, the building also changed name, and the premises at 221 Bouverie Street were known for the next decade as the SEECS Building.

Department of Information Systems

Further changes in the University's IT landscape were initiated in 1994 when Vice Chancellor Professor David Penington commissioned a report into the teaching of Information Systems. Professor Peter Weill (Melbourne Business School) was the author of this report, with assistance from Associate Professor Liz Sonenberg (Computer Science) and Professor Stephen Deery (Department of Management). The Weill recommendations were accepted by the University, and the Department of Information Systems was formed in the Faculty of Science.

Professor Mike Vitale was appointed Head of the new Department, and Professor Iain Morrison, who had variously been a joint appointment between Computer Science and Physics, and Assistant Registrar (Information Technology), was appointed as Deputy Head. The first students were enrolled in 1995, and a first full cohort of entering students were accepted in 1996.

In 2000, after the 1998 departure of Vitale, and a chair recruitment process, Liz Sonenberg was appointed as Professor of Information Systems, and shortly thereafter took over as Head. (The exact date was 1 April 2000, and Sonenberg marked it by sending to all Computer Science and Information Systems staff a "first of April" email message in which she announced the formation of a Faculty of Information Technology.)

Information Systems benefitted from the same rapid growth in the late 1990s as did Computer Science, and suffered from the same stresses. In addition, it had the usual difficulties that faced a new department, including establishing a research profile, recruiting staff who could quickly move into positions of leadership, and of recruiting postgraduate students.

Department of Computer Science and Software Engineering

Peter Thorne continued as Head of Computer Science until the end of 1996, when he passed the baton on to Professor Leon Sterling. Sterling had applied for the Chair positions advertised after the 1994 Departmental review, and had taken up his professorial appointment at the University in 1995, arriving from Case Western Reserve University in Ohio. Prior to that, Sterling had completed an undergraduate degree at Melbourne (he was a student in Poole's first subject, in 1976), a PhD at ANU, and had undertaken postdoctoral investigations at Edinburgh. Three staff served as Deputy Head under Sterling – Sonenberg, until the end of 1999; Associate Professor Alistair Moffat, until mid-2001; and then Associate Professor Harald S ndergaard, until the end of 2002.

Peter Thorne continued in the Department until he resigned at the end of 2000 in order to turn his attention to his growing consulting activities. In recognition of his nearly 40 years of service, of his contributions to the computing industry in Australia over the same period, and of his efforts in cataloging and preserving important early computing artifacts (including, of course, CSIRAC itself), Thorne was awarded an honorary Doctor of Engineering in 2003.

A fourth departmental name change came in 1999, when Sterling led a move to formalise the role of software engineering in the department's charter. The new name – Computer Science and Software Engineering – reflected a growing acceptance of the positioning of the Department within the Faculty of Engineering, and a growing maturity in its understanding of the educational requirements of software engineers. The BE(SE) program was provisionally accredited by IEAust (now Engineers

Australia) in late 1993, and fully accredited in November 1996; and was the first such program in Australia to be accredited.

The Department reached its peak size during Sterling's headship, with the IT boom of the late 1990s sparking enormous interest in computing education. The Department doubled its students numbers between 1998 and 2000, and reached a total of approximately 900 equivalent full-time students in 2002. Since then, there has been a deflation in demand, and enrolments have dropped to more modest – and more manageable – numbers.

The boom also saw a number of teaching initiatives, including off-campus subjects being offered in Wodonga for two cohorts of trainees employed by Adacel Technologies Limited, a company that had established strong links with the Department through Sterling. The subjects were taught as part of the Melbourne University Private Bachelor of Software Engineering program. No students completed this degree, and the closure of Adacel's Wodonga Center in 2003 meant that the trainees were obliged to transfer into regular programs at Melbourne and elsewhere. Several of the trainees graduated from computing degrees in 2005 and 2006. Melbourne University Private was itself closed in 2005 by incoming Vice Chancellor Professor Glyn Davis.

July 2002 saw a further change of leadership, with Professor Rao Kotagiri – one of those original appointments made by Poole in the early 1980s – taking over as Head of Department. At this time the Department was again home to three professors: Kotagiri, Sterling, and Moffat, who had been promoted in 2002. A fourth chair was achieved in 2003, with the promotion of Associate Professor Peter Stuckey, who first joined the University as a Research Fellow in 1990. Stuckey had completed a PhD at Monash in 1987 in the area of constraint logic programming.

Kotagiri's experience as a researcher, and his strong links with the Department of Electrical and Electronics Engineering, led in 2004 to the establishment of a NICTA (National ICT Australia) node at the University, jointly housed in the two departments. This large research initiative, with multiple linkages, and the ability to support both additional research staff and postgraduate students, was a considerable coup, and provided the potential for a significant boost in research profile, and for a shift in the balance between undergraduate and postgraduate teaching. In 2006, with additional support from the Victorian State Government, the NICTA funding agreement was extended into the life sciences area.

Kotagiri was honoured in 2003 by being elected a Fellow of the Australian Academy of Technological Sciences and Engineering, and in 2004 by being elected a Fellow of the Australian Academy of Science. Deputy Heads under Kotagiri were Associate Professor Harald Sondergaard (2002), Professor Peter Stuckey (2003–2004), and Professor Alistair Moffat (2005–).

Accommodation

The computing departments have moved regularly during the last fifty years. This section summarises the main locations in which activities were housed.

1956 The Computation Laboratory was established in what is now known as the Old Physics Building, and remained there until CSIRAC was switched off for the last time in November 1964. The door to the Computation Laboratory is one of the key artifacts from that era that has been successfully preserved.

1964 The next home for the Computation Department (as it was by then known) was the Architecture Building, in the area on the ground floor now occupied by the Australia Post retail outlet. The move

took place in December 1964, between the switching-off of CSIRAC, and the move of the IBM to the University from St Kilda. The Department remained in the Architecture Building until early 1970s, when space was made available in the Richard Berry Building.

1972 With the burgeoning growth of computing/information technology in the early 70s (in both the services and academic senses), and the need to house the three IT-related departments – the Computer Centre, the Department of Information Science, and Administration Computer Services (ACS) in more spacious premises, the three departments were allocated space in the Old Anatomy building. At the same time, the building was renamed the Richard Berry Building. Significant building alterations were required to accommodate the staff and to establish a new, larger computer room to house both the IBM 7044/1401 (which was moved from the Architecture Building) and a newly acquired Control Data Cyber 73. The computer room was created within the Old Anatomy Hall, with a mezzanine floor created to house ACS. The newly renovated Richard Berry Building was occupied in early 1972.

The Departments of Mathematics and Statistics also moved to the Richard Berry Building.

The Computer Science Department remained in Richard Berry from 1972–1993, growing whenever possible by “borrowing” space from the Departments of Mathematics and Statistics. During this period a non-budgetary School of Mathematical Sciences was formed, and all of the first year subjects were taught via the school, with varying amounts of mathematics, statistics, and computing in them.

The coincidence of a partial collapse of the mezzanine floor into the computer room and an audit report recommending that the University’s computing services used to process payroll and other financial transactions should be more securely housed, led to a decision to construct a new building to house the University’s main computing resources and staff in both the Computer Centre (by then renamed University Computing Services – UCS) and ACS. A new building called the Thomas Cherry Building, after Professor Sir Thomas Cherry, who was one of the Executive Committee that oversaw the operations of CSIRAC from when it arrived in 1956, was built on Swanston St, adjacent to and in the same style as the Earth Sciences (McCoy) Building. In 1986, the computers and UCS and ACS staff moved across the road, vacating space in the Richard Berry Building into which the other occupants (including Computer Science) could expand.

One other useful building alteration in the Richard Berry Building was the insertion of a mezzanine floor into the Mathematical Science Library, which created a second lecture theatre space in the building.

1980s The Department continued to be housed in the northern section of the Richard Berry Building, as part of the School of Mathematical Sciences. A number of smaller removable buildings were used to house research groups and postgraduate students. Postgraduates of the era may have (or may not have) fond memories of the two rooms known as the “Dungeon” and the “Sardines”.

In approximately 1990 Poole, Kotagiri, and Professor Ron Sacks-Davis of RMIT (a 1977 Melbourne PhD student of Rex Harris) secured significant state government funding for a Collaborative Information Technology Research Centre, to be known as CITRI. The funding included an allowance for rentals, and space was leased in premises at 723 Swanston Street, in a building that had been newly renovated and then purchased by the University. Several departmental staff, including the Computer Vision group led by Terry Caelli (until this time Terry had been housed in Old Commerce), and the Deductive Databases group, led by Rao Kotagiri, moved into these premises, together with several RMIT groups. The department spent the next several years in a split configuration, which gave rise to a certain amount of frustration and inconvenience.

1993 The pressure on space in the Richard Berry Building became sufficiently great that in approximately 1990 the University committed funding to a new building for the Department. Designed initially to house Computer Science on three lower floors, and with office accommodation for commercial use on three further floors, the School of Information Technology and Electrical Engineering (SITEE) Building at 207 and 221 Bouverie Street was completed in 1993, and the Department moved in July of that year. Shortly thereafter the School was renamed the School of Electrical Engineering and Computer Science, and the building at 207 Bouverie was renamed the SEECS Building.

The upper floors of the building were vacant for some time, and were used variously for examinations, and (informally) for indoor cricket. A number of small commercial tenancies were undertaken, but none on the scale that was intended when the building was designed. The Swedish company Ericsson took a floor for a number of years, and various other University departments – including the Department of Mathematics and Statistics – were from time to time rumoured to be moving in.

In the end it was the formation of the Department of Information Systems in 1995 that completed the occupancy of the SEECS Building, when they were allocated all of the fourth floor and some of the third floor.

2000 By late 2000 it had again become apparent that having two growing departments in the same building was resulting in considerable space problems. Approximately two years earlier, the University had embarked on an ambitious building program in the University Square precinct on Pelham and Barry Streets, justified primarily by the planned student numbers for the new subsidiary university, Melbourne University Private (MUP). Four multi-storey buildings were part of these plan – Buildings A and B, for MUP occupancy; Building C for the Faculty of Law; and Building D, for student accommodation. Contracts for the first three were let, and construction started, with Building C planned through to fitout and completion, and Buildings A and B to be delivered as vacant floorspace.

Even while construction was underway, it was clear that MUP would not be of a scale to require two buildings, and they retreated from Building B, making it available for University use. During 2000 a number of possible options were canvassed, including assigning it to the Faculty of Commerce. The Departments of Information Systems and Computer Science and Software Engineering were also invited to bid for space, and drew up requirements to meet their current and anticipated needs for the next few years. Late in 2000 it was decided that the two IT departments would be moved into Building B in their entirety, and detailed planning with architects for the fitout was commenced.

The Faculty of Law moved into their building at the beginning of 2002, with the building officially named the Law Building. At the same time as it was named, it was announced that Building B would be called the ICT Building, and that Building A would be the Melbourne University Private Building. Plans for the construction of Building D were deferred.

In 2004, to honour the Vice Chancellor that had initiated both the University Square project and the MUP initiative, the Melbourne University Private Building was re-badged as the Alan Gilbert Building. In the same year, plans for Building D were awakened, and a first tranche of money – of an eventual total of \$90 million – committed to making use of the Building D site to house parts of the Faculty of Commerce.

2002 The move to the ICT Building at 111 Barry Street was carried out in December 2002, and followed a two-year process of specification, design, and fitout. The two IT Departments again shared the building, with the Australian Mathematical Sciences Institute occupying part of the ground floor. The key staff involved in the planning for the building, and in organising the move, were Alistair

Moffat, Thomas Weichert, and David Hornsby (for Computer Science and Software Engineering), and Liz Sonenberg and Gary Eddy (for Information Systems).

The building – denoted as “Building B” on the plans for the University Square development – was designed by Metier 3 for the developer Equiset, and built by Grocon. The fit-out was designed for the two departments by Lyons Architects and built by L U Simon Builders, at a further cost of approximately \$20 million. The project commenced in 1999, the building was completed mid-2001, and the fitout completed in late 2002.

University facilities in the building include lecture theatres of 180, 80, and 80 seats; an adjacent foyer area for functions; three computer tutorial rooms equipped with projection whiteboards and designed for collaborative learning; and another twelve tutorial rooms. The two departments also share a pool of project rooms for student meetings; a range of student study areas, some equipped with network data points; a staff common room; a seminar room; a range of meeting rooms; and a dedicated computer room. As well, each of the two departments have extensive laboratory space for undergraduate students; staff research laboratories; and space to house large numbers of postgraduate research students.

Electronic Addresses

The Department of Computer Science were key pioneers in Australia first of email, and then the internet. Systems administrator Robert Elz was pivotal in both of these transitions, and for many years in the 1980s and 1990s the machine `munnari` (later refined to `munnari.oz` in ACSNet, and then `munnari.oz.au`); and for a brief prior period, `muvox`) was the bridge between all Australian email users and the rest of the world. During the early days of international email under the UUCP regime, Departmental users were identified as being at “`munnari!ucbvax`”. By 1990 the Department was operating as the `cs` subdomain of `mu.oz.au`. Other departments and institutions operated similarly, for example, `ee.mu.oz.au` and `cs.rmit.oz.au`. The `oz.au` domain had been directly assigned to the control of Elz, along with many other responsibilities for internet management across Australia, and the focal point provided by `munnari.oz.au`, together with the support provided by Elz, were a service provided by the Department to the whole Australian community.

By 1998 the rapid growth of the world-wide web meant that it was no longer practical for one individual to manage the Australian internet, and various responsibilities were carved off, including to the company Melbourne IT. By now a clear convention on academic names had also evolved, with most Australian universities in the `edu.au` domain, and the University of Melbourne occupying `unimelb.edu.au`. As early as 1995 academic staff in the Department had enquired whether a migration to `cs.unimelb.edu.au` (or similar) should be made, but were rebuffed by the systems administrators. Nor was the name change in 1999 to Computer Science and Software Engineering regarded as sufficient of a trigger to alter the Departmental email addresses. It was not until 2005 that a concerted effort was made to establish the `csse.unimelb.edu.au` domain for email and web access. At that time the link with `oz.au` – and the special connection the Department had to the birth of the internet in Australia – was then lost. In contrast, the Department of Information Systems resided at `dis.unimelb.edu.au` from its inception in 1995.

Elz continues to manage the `oz.au` domain, but the nameserver for it – the host `munnari.oz.au` – is no longer part of the Department.

Into the Future

The departure of Vice Chancellor Professor Alan Gilbert at the end of 2003, and the arrival of Vice Chancellor Professor Glyn Davis at the beginning of 2005, have heralded an era of unprecedented change. A Review of the Faculty of Engineering was carried out in January 2006, the consequences of which are, as yet, unclear.

In addition, the proposed introduction of the “Melbourne Model” of undergraduate degree, and the removal of many of the previous degrees (including, for example, the Bachelor of Computer Science, the Bachelor of Information Systems, and their various combined degrees) has meant that both of the IT departments continue to face challenges. Compounding the uncertainty arising out of these course changes is the fact that student numbers in the various IT programs have declined greatly since 2000–2002.

Even so, it is refreshing to look back over the last fifty years of technological and educational developments, and to feel enthused about the tasks that are ahead. If there are as many changes over the next fifty years as over the last fifty years, there will be no opportunity – nor reason – for either boredom or complacency.

Heads of Department

The following have served as Heads of what is now Computer Science and Software Engineering:

From	Person	Destination
1955	Frank Hirst	Professor and Head, University of Adelaide
1971	Bill Flower	Remained in Department, retired in 1984
1975	Peter C. Poole	Dean of Information Technology, Bond University
1990	Peter Thorne	Remained in Department, resigned in 2000
1996	Leon Sterling	Remained in Department
2002	Rao Kotagiri	Current Head

Since its formation in 1995, the Department of Information Systems has had three Heads:

From	Person	Destination
1995	Mike Vitale	Professor in Melbourne Business School
1998	Iain Morrison	Remained in Department
2000	Liz Sonenberg	Current Head

Programming Languages

No computing history would be complete without discussion of one of the more controversial curriculum decisions required through the years – the first language used to teach programming skills to students.

From	First language	Followup languages
1970s	Fortran IV	
1980s	Pascal	C and Fortran in second year, Prolog in third year
1993	Miranda	C in second semester, Prolog in second year
1999	Haskell	C in second semester, Prolog and C++ in second year
2003	C	Haskell in second semester, Prolog and Java in second year

Different languages have been used in the Department of Information Systems.

From	First language	Followup languages
1996	Delphi	Java and Visual Basic in second year
2004	Java	.NET and J2EE in third year

Sources

Much of this material was conveyed orally by people who took part in the events described, including Peter Poole, Peter Thorne, Leon Sterling, Rao Kotagiri, and Liz Sonenberg. Alan Bell, David Hornsby, and Michael Flower also contributed useful information, including some paragraphs of text that have been included. The computing “History Team” of John Spencer, Peter Thorne, Judith Hughes, Jurij Semkiw, Doug McCann, and the late Ron Bowles, are to be commended for their extraordinary vision and dedication. They have established an archive of resources that is a treasure-trove of interest, and provided invaluable assistance during the writing of this narrative.

The book *The Last of the First: CSIRAC, Australia’s First Computer*, by Doug McCann and Peter Thorne (published by the Department of Computer Science at the University of Melbourne, 2000, ISBN 0-7340-2024-4) is a wonderful compendium of material to do with the CSIRAC computer, and sheds much light on the early staff, and the early operations of the machine at Melbourne. Additional material about the CSIRAC computer can be found at <http://www.asap.unimelb.edu.au/pubs/guides/csirac/>, <http://www.csse.unimelb.edu.au/dept/about/csirac/>, <http://www.museum.vic.gov.au/csirac>, and <http://www.museum.vic.gov.au/infosheets/10103.pdf>.

The formation and first decade of the Department of Information Systems is described at <http://www.dis.unimelb.edu.au/overview/index.html>.

The author was a staff member of the Department of Computer Science (and then the Department of Computer Science and Software Engineering) from 1986, and some of the above is drawn from the more than 15 years of email records that have (somehow!) survived several further generations of hardware change.

An interesting description of the life and times of Professor John Bennett, Foundation Chair of Computer Science at the University of Sydney, was prepared by Jennie Seberry in 1989, see <http://www.uow.edu.au/~jennie/bennett.pdf>. Jennie learnt Fortran IV programming in 1967 at the University of Melbourne, reached the rank of Reader while at Sydney University, and is now Professor of Computer Science at Wollongong University. The 50th anniversary of the Sydney SILLIAC computer is currently being planned for 12–13 September 2006, see <http://www.silliac.org>.

Despite the care that has gone into this document, it is entirely possible that parts of this narrative are incorrect. If you become aware any errors, please let me know, alistair@csse.unimelb.edu.au.