

# History of Biochemistry and Molecular Biology at Monash University: Part 2 (1992-2011)

Phillip Nagley\*

Department of Biochemistry and Molecular Biology, Monash University, Clayton, VIC 3800

\*Corresponding author: [phillip.nagley@monash.edu](mailto:phillip.nagley@monash.edu)

## Prelude

The Department of Biochemistry and Molecular Biology at Monash University celebrates its Golden Jubilee in 2011. In the first thirty years of its existence, the Department of Biochemistry (as it was then known) established itself as one of the premier departments of its type in Australia. The history of this Monash department from its inception was published in the profile appearing in the March 1992 issue of the *ASBMB Newsletter* (1). Twenty years ago, the foundations seemed solid, based on three extended research groups each focussing on their chosen major theme in biochemistry or molecular biology, with considerable accomplishment and recognition for the department and its staff.

Monash University had been established in 1960 and soon made its mark on the national and international scene, in much part due to the generous funding extended to the research activities of its academic staff. However, like many longer established universities in Australia in the throes of the Dawkins era, where many new universities were being created in the late 1980s without the proper financial support from the Federal Government to support these developments (2), Monash was feeling the pinch financially. In the face of declining faculty and departmental budgets, the Biochemistry department in the early 1990s, with Tony Linnane then as Head, had begun to downsize its staff complement (both academic and professional). This was to be achieved through a mix of retirements and redundancy packages, and was accompanied by reductions and rationalisation of expenditure patterns (e.g. on equipment). However, it was other internal pressures that set into motion the tumultuous events of that decade, rocking the department to its core during the mid-1990s.

Fortunately for the department, these events ended with a totally new structure for departmental organisation and management. The new mode of governance under Christina Mitchell, who became Head in 1999, and her hugely successful strategies for recruiting talented researchers to the department, underpinned the enormous strides made over the past ten years. In the face of profound changes that have taken place over the past twenty years in the areas of research and teaching, Monash Biochemistry and Molecular Biology is placed once again at the forefront amongst its sister departments (and schools of various names and formats) across Australia.

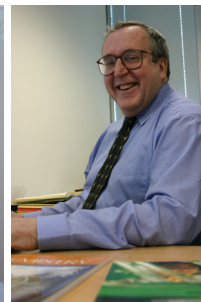
## Descent into Crisis

At the start of the 1990s there were three large research teams in the Biochemistry department: the Mitochondria group under Professor Tony Linnane had morphed into the Molecular Biology group, expanding into interferon research

and biogerontology, with the Centre for Molecular Biology and Medicine (CMBM) already having been established from this research base in 1983; the Macromolecular Structure and Function group led by Professor Milton Hearn also had its own Centre of Bioprocess Technology (CBT) established in 1988; and the Connective Tissue group's leadership passed from Professor Dennis Lowther (retiring in 1991) to Associate Professor Barry Preston. In spite of the successes gained through the partitioning of research into these extended groups, there were deep feelings amongst many sub-professorial staff that the days of governance by the old patriarchal system were numbered, emphasised by the perception that such staff did not control their own destinies. Many departmental staff also considered that the interests of the department, as such, were not being served by the two embedded research centres, because research grants and PhD student enrolments in these centres were no longer being attributed to the department. In an era where budgetary allocations were increasingly being made on the basis of grants achieved and postgraduate student enrolments, the departmental profile was starting to look rather thin (although the centres were prospering and strengthening their own research profiles).



Tony Linnane



Milton Hearn



Barry Preston

In view of these inherent tensions, an external review of the department took place in early 1994. Linnane thereby activated a process through which he would step down as Head of Department later that year solely to become Director of CMBM. The report of the review panel and its recommendations opened the flood gates of democracy. Over a series of open meetings of all academic and professional staff, and postgraduate students, each recommendation of the review panel was discussed in great detail. Personally, I was privileged to chair these meetings in June 1994 as Acting Head (Linnane was overseas at the time), whereby for the first time the future of the department was being decided by a majority of its personnel. Key recommendations of the review supported by the staff were: the two centres should be separated administratively and financially from the department (and the Head of Department should not be a director of such

a centre), although intellectual and technical links between the centres and the department should be maintained; postgraduate students in centres should be enrolled through the department; the name of the department should be changed to Biochemistry and Molecular Biology; and that a new Chair and Head of Department position should be advertised. All these outcomes came to pass, with the department changing its name by 1996 (after some minor skirmishes at Faculty Boards over the generic name 'molecular biology'). Finally, a strategic planning process was to be put in place involving sub-professorial academic staff – as it eventuated, the impact of this was borne out more on teaching than research. The departmental research directions and its organisation were to be subsequently determined by two successive newly appointed Heads of Department.

But in the second half of 1994, in spite of the empowerment of the academic staff in these broad terms, the crisis was not yet over. Tensions continued to escalate over demarcation of departmental and centre assets culminating in disputes over access to departmental resources by staff of CMBM. In November 1994, a confrontation led to a series of intense personal, political and legal battles that beset Tony Linnane for the next two years. In the end, he won a legal victory against the university and was bestowed with the title Emeritus Professor. The CMBM moved from Monash in 1995, being located at the Epworth Hospital for many years. Milton Hearn remained in the department until 2002, when he moved to become Director of the ARC Special Research Centre for Green Chemistry at Monash University.

### Interregnum - Twice

Barry Preston took over as Head of Department in late 1994 and, under his leadership, the department tried to regroup with depleted staff and reduced income, exacerbated by limited external funding from research grants. A retreat of the academic and senior administrative staff was held at Warburton in 1995 to plan for the future, the first time this had happened in the history of the department.



*Departmental retreat at Green Gables, Warburton in 1995.*

*From left, back row: Ron Maxwell, Steve Ralph, Barry Preston, Ian Macfarlane, Rod Devenish, Ian Bouch; second row: Frank Ng, Clem Robinson, Dianne Tweeddale, Phillip Nagley, Chris Handley; third row: Merrill Rowley, Milton Hearn, Marie-Paule van Damme, Mibel Aguilar, Alfons Lawen; front row: Gabrielle McMullen, Vivien Chia.*



*Stuart Stone*

*Christina Mitchell*

*Rob Pike*

The search for a new Head of Department (always an extended process) resulted in the appointment of Stuart Stone in 1996. With a PhD from the University of Sydney, Stuart had a distinguished research career in protein biochemistry and enzymology in Australia, the US, Switzerland and the UK. He was recruited from the Department of Haematology at the University of Cambridge, where he had established his reputation in thrombin and its receptors, and serine proteinase inhibitors (serpins). In establishing his group at Monash during the second half of 1996, he brought out a number of colleagues from the UK, including Rob Pike, Steve Bottomley and James Whisstock. Tragically, Stuart passed away in December 1996, only a short time after his appointment. The young researchers who came with Stuart continued to work at Monash and soon forged themselves into the core of a highly successful research enterprise in protein structure and function, which has contributed much to the department's recent success.

Barry Preston immediately resumed his role as Interim Head as of the beginning of 1997. The subsequent search for Professor and Head resulted in Christina Mitchell's appointment in 1999. Christina is a physician scientist trained at the University of Melbourne (in clinical haematology). Her PhD was carried out on anticoagulants at The Alfred hospital working with Hatem Salem, after which she worked in St Louis, USA, on intracellular signalling. She returned to Australia to continue her work at Box Hill Hospital (Monash Department of Medicine), from where she was recruited to Monash Biochemistry and Molecular Biology. Her main research interests are inositol phosphate signalling, with many applications in biology and medicine, together with SLIM proteins involved in muscle differentiation and cardiac failure.

### Rebuilding and Reinvigoration of Research

Christina Mitchell set about building a new model of organisation in which departmental staff members were empowered with, and responsible for the success of, explicit duties. This apparently 'looser' management style belied the strict attention to responsibilities that the Head of Department maintained, which led to a great improvement in motivation and quality of collegiate work amongst the staff.

Mitchell actively recruited top-class researchers, with their own salary and laboratory support either from Monash sources (such as the Logan Fellowships), or with fellowships from NHMRC, ARC or other national funding bodies. Many of these research-only staff took on particular responsibilities within the department related

## History of Biochemistry and Molecular Biology at Monash University: Part 2 (1992-2011)

to the development or management of research and postgraduate training, as well as equipment and special facilities. This integration of such research-focussed staff into the departmental structures alongside academic and professional staff was central to the success of this strategy. As laboratory heads in the department, many went on to great success in research across a range of topics including structural biology (Jamie Rossjohn, James Whisstock and Matthew Wilce), protein misfolding and disease (Steve Bottomley), biomedical proteomics and peptide biology (Ian Smith), haematology (Michael Berndt and Robert Andrews), nuclear protein trafficking (David Jans), cellular signalling and human disease (Tony Tiganis), neurodegenerative disease (David Small) and protein interaction and cancer (Martin Lackmann). It is striking that many of the longer standing senior departmental academic (teaching-research) staff who remained from the early 1990s era (e.g. Mibel Aguilar, Rod Devenish, Phillip Nagley and Milton Hearn) and other academic senior staff who joined later (e.g. Rob Pike, Christina Mitchell, Phil Bird, Tim Cole and Martin Stone) achieved research success commensurate in many respects with the research fellows.

Some of the notable research achievements during the past ten years include the participation of departmental staff in an NHMRC Program Grant on proteases headed by James Whisstock and including Rob Pike, Phil Bird, Steve Bottomley, Ashley Buckle and Ian Smith. There has been participation of staff in other NHMRC Program Grants, including David Small and Phillip Nagley (on separate neuroscience topic areas), Tim Cole (developmental lung function) and Trevor Lithgow (cellular microbiology). Departmental staff have been involved in an ARC Centre of Excellence on Structural and Functional Microbial Genomics, based at Monash, including James Whisstock, Jamie Rossjohn, Rod Devenish, Ian Smith and Phillip Nagley, together with staff from the Department of Microbiology. Staff members David Jans and Kate Loveland are also involved in the ARC Centre of Excellence in Biotechnology and Development.

Research staff who have achieved highly prestigious fellowships and national research awards include three ARC Federation Fellows: Jamie Rossjohn, 2006 (structural biological basis of infection and immunity); James Whisstock, 2008 (bioinformatics and structural biology); and Trevor Lithgow, 2008 (protein targeting and membrane assembly). Jamie Rossjohn now holds an NHMRC Australia Fellowship, 2011. Both Whisstock and Rossjohn have received the Science Minister's Award for Life Scientist of the Year and also the Health Minister's Award for Excellence in Health and Medical Research. Departmental staff to have received ASBMB awards for research carried out at Monash include Phillip Nagley (Lemberg Medal, 2001), David Jans (GE Healthcare Bio-Sciences Award, 2006), Jamie Rossjohn (Roche Medal, 2003), Travis Beddoe and Natalie Borg (Applied Biosystems Edman Award, 2006 and 2010, respectively).



## *ASBMB Applied Biosystems Edman awardees*



*Travis Beddoe*



*Natalie Borg*

## *ASBMB Inoitrogen Education awardee*



*Janet Macaulay*

Numerous departmental staff have been involved in ASBMB in recent years. Victorian State Representatives have been Rod Devenish (1995-8), Noelene Quinsey (2005-7) and Sheena MacGowan (2011). Editors of the *Australian Biochemist* have since 1998 all been Monash-based (Phillip Nagley, 1998-2003; Clem Robinson, 2004-5; Rebecca Lew, 2006-present), ably assisted by ASBMB Editorial Officer Liana Friedman. Phillip Nagley was President in 2005-6, overseeing the Golden Jubilee celebrations of the Society, and has been FAOBMB representative since 2008. Rod Devenish was Convenor of the 1997 ASBMB National Conference and Phillip Nagley was Co-Chair of the Melbourne OzBio2010 Conference combining ComBio2010 with IUBMB and FAOBMB Conferences.

The details of the current research programs, staff and facilities may be found on the departmental website (3). A snapshot of the department in 2010 shows that it accrued \$16.5 million in research grants and generated 165 research publications that year (of which ten were recognised with the 'Double Digit Impact Award' for publications in journals of impact factor of 10 or greater). Collectively, the numerous research projects in this department cover many aspects of contemporary biochemistry, cell biology and molecular biology. The work is primarily focussed on biomedical issues and the research is funded through many grants from NHMRC and ARC, plus a wide range of other funding sources. The department at Monash has much sophisticated equipment and specialised technical facilities, some of which are more broadly engaged with the Biotechnology Research Platforms at Monash University (4), with Scientific Directors from our department. These include Biomedical Proteomics (Ian Smith), High Throughput Protein Production Facility (Steve Bottomley) and Structural Biology Facilities (Matt Wilce). The last named facility includes a High Throughput Robotic Protein Crystallisation Facility housed in a renovated space dubbed 'Crystal Palace'. In addition, Ed Nice is Director of the Monoclonal Antibody Technology Facility. The Synchrotron at Monash (opened in 2007) provides an excellent boost to the structural biology and other research programs in the department. The success in attracting grants has been enhanced in recent years by a mentoring process for grant writing (especially for early career researchers) initially overseen by Steve Bottomley and now run by Tony Tiganis.

Another feature of research in the department has been the engagement with commercially funded research. Not only has this been achieved with ARC Linkage Grants, but also research by companies has been hosted within the

department for many years. These company-based applied research programs have contributed positively to our departmental budgets over the years (see comments made in ref. 2), but in recent times the global financial crisis has reduced the ability of companies to sustain their part of this engagement.

## *Teaching and research professors in the department (in addition to Christina Mitchell and Rob Pike).*



*Phillip Nagley*



*Rod Devenish*



*Phil Bird*



*Mibel Aguilar*

## *Research professors of the department.*



*Steve Bottomley*



*David Jans*



*Trevor Lithgow*



*Ed Nice*



*Jamie Rossjohn*



*Ian Smith*



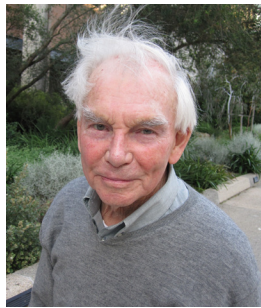
*Tony Tiganis*



*James Whisstock*

In 2006, having seen the quadrupling of the size and research budgets of the department under her leadership, Professor Mitchell took on the role of Head of the School of Biomedical Sciences (she has recently been appointed Dean of the Faculty of Medicine, Nursing and Health Sciences at Monash). The Head of Department role was taken over by Rob Pike, a South African PhD graduate with research experience in the USA, who had come to Monash, via Cambridge UK, together with Stuart Stone in 1996. Rob's passion is proteases and his current research interests encompass regulation and control of the complement system in immunity, as well as bacterial proteases involved in periodontal disease. His leadership of the department over the past five years has been marked by his thoughtful and considerate approach to all matters in teaching, research and administration, enabling Biochemistry and Molecular Biology to grow further and to maintain its place as one of the leading departments both at Monash and nationally in our field. Currently the department has six professors amongst the teaching and research academic staff and eight professors from the research-only academic staff.

This history could not be complete without mention of Ian Mackay. Since his retirement from WEHI in 1985, he has been associated with Monash for the past quarter century, first in the CMBM and now in the department. His wisdom and insight in medical research and his understanding of people in general have provided mentorship to many colleagues, past and present. The laboratory of Merrill Rowley, in particular, has benefited from Ian's collegiality.



*Ian Mackay*

### Teaching and Training

The organisation of education in the department was consolidated in 1993 by the establishment of an Education Committee, with Chris Handley as Chair. This committee has been the mainstay of the management of coordinated teaching and learning in the department for two decades. Not only has the Education Committee served the department well in providing a forum for discussion of all aspects of teaching and learning, but it has enabled a concerted approach to deal with a rapidly changing environment at Monash. Moreover, our departmental Education Committee became a template for such educational organisation in other departments of the faculty. When Chris Handley left Monash in early 1996 to take the Foundation Chair in Human Bioscience at La Trobe University, the Chair of the Education Committee was ably filled by Rod Devenish (1996-2004), followed by Phil Bird (2004-8) and Janet Macaulay (2009-present).

At the end of the 1980s, the department basically had two sets of undergraduate teaching responsibilities, in the medical (MBBS) course and the science (BSc) course. In 1991, for a revamped MBBS program, we had restructured our pre-clinical medical teaching (1) into a unit (subject) called Principles of Biochemistry and two subsequent units entitled Cellular and Molecular Biology. Ten years later, further extensive changes took place when a five-year

medical course was introduced in 2002. Basic biomedical science teaching was compressed extensively in the face of expanded first- and second- year themes of clinical skills, personal development and health promotion. Our medical education delivery became much more interdisciplinary, as biochemistry and molecular biology took its place alongside other basic biomedical topics vying for the highly constricted spaces in the early years of the undergraduate medical curriculum. The underlying teaching paradigm for this course remains patient-centred learning (mostly case-based). One innovation led by our department was the development of Student Project Cases in which small teams of students research and present medical topics integrating basic science and clinical aspects (5).

The teaching of the Science course also underwent changes with the introduction of points weightings for units in the early 1990s. As a result, the department needed to develop four third-year units covering appropriate curriculum content. Later changes in the degree structure led to two new units in Molecular Biology (MOL) at second-year level, devised in conjunction with the Departments of Microbiology and Genetics. This subject area was collaboratively taught, allowing more discipline-specific teaching in the individual departments to proceed. These MOL units continue to this day, but new curriculum planning in Molecular and Cell Biology (MCB) led by Phil Bird seeks to integrate more substantial cell biology into the foundation teaching aimed at all students taking undergraduate majors from biomedical departments at Monash. Historically at Monash, cell biology teaching, as such, had been insufficiently linked to molecular aspects. With current leadership from Biochemistry and Molecular Biology staff, this imbalance will eventually be redressed in the planned new second-year MCB units.

Third-year teaching has also evolved in various directions. In the early 2000s, a bioinformatics unit led by Ron Maxwell (deceased in 2003) was introduced for specialist study, with an emphasis on project work. This topic was later merged with another third-year unit on protein structure and function. Evolution in an entirely different direction took place, with the Faculty of Science seeking to enhance the attractiveness of its course offering by introducing specialist streams, including one in Biomedical Sciences. This process was partly driven by the perceptions among biomedical department staff (within the Faculty of Medicine)



*Shane Reeve loads a sample for protein sequencing in the Biomedical Proteomics Facility.*

that we were excluded from full participation in the delivery and marketing of our role in the Science course (even though almost half of third-year and Honours science students were taking biomedical units, including our own!). With the advent of a tagged degree in 1997, Biochemistry and Molecular Biology introduced a specialist unit, which only students enrolled in the BSc (Biomedical) could take. Although this stretched our teaching loads, many of the students who took this unit went on to Honours and PhDs in the department.

After only four years, the strains on teaching staff and resources became even more pronounced when the Faculty of Medicine, Nursing and Health Sciences (MNHS), as it had then become, introduced a Bachelor of Biomedical Science (BMS) degree to replace the BSc (Biomed) degree. From 2000, Biochemistry and Molecular Biology took a leading role in the new BMS degree, with two core units at first year (Biomedical Chemistry, Molecular Biology), two at second year (Biochemistry of Human Function, Introduction to Bioinformatics) and one at third year (Molecular Medicine and Biotechnology) with a particularly strong focus on research. Some of these units are taught co-operatively with other departments. This led to a greater teaching load all round, not only for lectures but also for small group activities and, for some units, practical activities. The rewards from putting in such an effort into the BMS degree program came not only with additional departmental budget for this undergraduate teaching but also an enhanced flow of students into the Honours program. Indeed, the BMS Honours program across the Faculty of MNHS has had convenors from our department (Rob Pike, Tim Cole)

The Honours training programs (Science and BMS) have been a stronghold of early research training. About 20-30 students each year undertake Honours, many going on to undertake PhD studies at Monash or elsewhere. The Honours cohort of BSc and BMS students is being supplemented by students enrolled in a Bachelor of Biotechnology (with Honours) degree led by Lynne Mayne. Convenorship of the Honours course is a very important responsibility, undertaken by Rod Devenish (1992-1997), Terry Spithill (1998-2000), Rob Pike (2001-2006) and Tim Cole (2007 to present). A third-year research unit (BCH3990) was introduced some years ago, which helps prepare students for the Honours experience, alongside similar units in other departments.

Monash staff have been at the forefront of educational developments in biochemistry and molecular biology. A workshop on Innovative and Flexible Teaching in Biomedical Sciences in the 21st Century was held in April 2000, convened by Marie-Paule van Damme, Janet Macaulay, Ron Maxwell and Kaye Trembath. The workshop attracted 70 participants, many from outside Monash and interstate. In December 2007, in association with the National Forum on Education in Biomedical Sciences (convened by Phillip Nagley), Monash hosted an ASBMB Heads of Department and Education Representatives meeting on Developments and Challenges in Education in Biochemistry and Molecular Biology in Australia. Trevor Anderson (South Africa) was a keynote speaker at both events, at which participants attended from all states in Australia. In 2010 Janet Macaulay

received the Invitrogen Education award of ASBMB and in 2011 she also became Convenor of the ASBMB Special Interest Group on Education. Phillip Nagley is currently Director of Education in the School of Biomedical Sciences.



*Nik Sotirellis and Noelene Quinsey work in the Protein Production Unit.*

### Postgraduate Training

Biochemistry at Monash has always had a very strong emphasis on postgraduate training. Most postgraduate students work towards their PhD or Masters degrees in laboratories of the department on the Clayton campus. A proportion of students enrolled through this department carry out their work under the supervision of adjunct staff of the department in laboratories in various affiliated medical research institutes across Melbourne. Currently there are about 100 departmental postgraduate students enrolled, with around 25 graduating with PhDs each year. The department was innovative in 1991 in establishing its Graduate Matters Committee to oversee all matters pertaining to enrolment and progress of postgraduate research students. With Rod Devenish as the inaugural Chair (1991-2007), this committee became a benchmark for similar committees in other departments of the faculty. Mibel Aguilar took over as Chair in 2008. The departmental emphasis in this area enabled it to provide several Chairs of the corresponding wider graduate matters committee in the Faculty of MNHS, including Phillip Nagley, Rod Devenish and Mibel Aguilar. Rod Devenish is currently Deputy Director of the university-wide Monash Graduate Research School.

### A True Department

The School of Biomedical Sciences (with the somewhat unfortunate acronym of SOBS) was inaugurated under the leadership of Warwick Anderson in the early 2000s. The Department of Biochemistry and Molecular Biology resisted the drive to merge all departments into a monolithic school structure, yet the pressure to integrate as much as possible into school processes was irresistible in many respects. There were benefits from merging many administrative and financial activities between departments but there was general resistance to the dissipation of disciplines, particularly in the educational context. Anderson, however, succeeded in realising his vision for a new building complex in which many of the researchers of SOBS could be housed, in place of the older buildings they were occupying. When Anderson moved to Canberra to become CEO of NHMRC and Christina Mitchell became Head of School in 2006,

what then emerged under her leadership was a shared services model for administrative staff in the financial and human resources sectors, as well as infrastructure and building management. Nonetheless, departments retained their budgetary responsibilities and managed their own teaching and research activities. This model has served the Department of Biochemistry and Molecular Biology well over the past five years, but there are continuing pressures on our budget as the university faces severe financial challenges. What is critical in the view of many of our staff is the retention of biochemistry and molecular biology as a defined discipline area in its own right – the avoidance of a merger into an ‘amorphous’ school structure is clearly seen as a strength.



*Old buildings. The seven-storey Building 13D was built in 1965. The older wing at left (13B) was originally the Faculty of Medicine offices (from 1961) with undergraduate practical labs underneath. This wing was occupied by the CMBM in the early 1990s. The teaching unit of the department now occupies part of the upper level, with research labs below.*

This collegiate feeling maintained the identity of the department up to and beyond the long-awaited move in 2009 into the new Buildings 76 and 77 at the western edge of the Clayton campus. The researchers who moved into the new labs were organised into clusters of activities, intermingled with cognate researchers from other departments of SOBS, notably Anatomy and Developmental Biology as well as Microbiology. This co-localisation has fostered much research interaction and also has facilitated joint academic and research staff appointments between our department and the other two mentioned. Some research groups from Biochemistry and Molecular Biology remained in the older Buildings 13B and 13D (this group of staff, as well the education-focussed staff in 13B, are fondly dubbed as ‘Remainians’). While some of the upper floors of building 13D were temporarily given up to other departments to accommodate their urgent space needs, efforts are being made not to allow disbandment of the laboratory facilities. Indeed, as pressure on space in Buildings 76 and 77 continues with expanding research groups in Biochemistry and Molecular Biology, moves to reoccupy some of this space may be seen in future. Regular meetings of staff, both in the new building complex and the older building, maintain the cohesion of the department. These staff meetings emphasise the close links between

research and teaching, which is very important for the longevity and continued success of the department.

### Acknowledgements

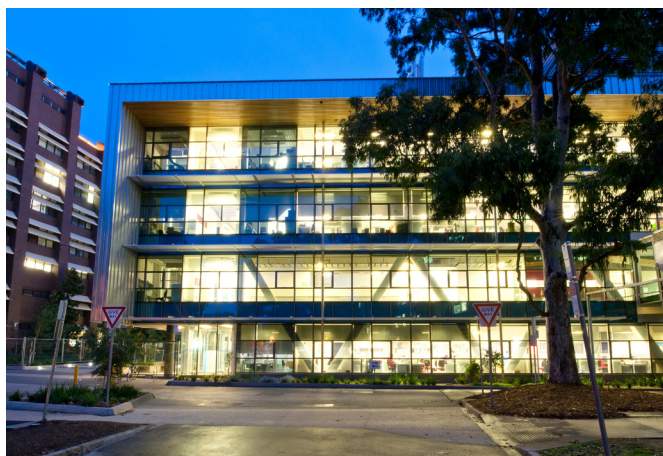
I thank Lesley Cheng for assistance in gathering materials for this article, plus many of the staff of the department, past and present, for their generosity in sharing photographs, documents and recollections. I thank Monash University for the portrait photos of staff. Images of buildings 76 and 77 and those of the labs in the Biotechnology Platforms were provided courtesy of MNHS Multimedia Services, Monash University. I apologise to those whom I am unable to name individually in this brief history, much of which I have experienced personally over more than 40 years teaching and researching at Monash.

### References

1. Nagley, P. (1992) *ASBMB Newsletter* **23** (March), 1-15, <http://www.med.monash.edu.au/biochem/biochem-history-part-one.pdf>
2. Proske, U. (2008) *AuPS News* (March), 5-7 <http://aups.org.au/Newsletter/200803.pdf>
3. <http://www.med.monash.edu.au/biochem/>
4. <http://bioplatforms.monash.edu/assets/documents/biotech-booklet-2010.pdf>
5. Macaulay, J.O., and Nagley, P. (2008) *Medical Teacher* **30**, 23-33



*Front of the new buildings 76 and 77 in which many research labs of the department are now located.*



*Research laboratories in the new Building 76.*