

**IN THE FAIR WORK COMMISSION**

*Fair Work Act 2009*

**s.156 - Four Yearly Review of Modern Awards - Education Group**

**HIGHER EDUCATION INDUSTRY - ACADEMIC STAFF - AWARD 2010 (AM 2014/229) and HIGHER EDUCATION INDUSTRY - GENERAL STAFF - AWARD 2010 (AM 2014/230)**

**WITNESS STATEMENT OF PROFESSOR SIMON BIGGS**

I **PROFESSOR SIMON BIGGS** of Level 2, Hawken Engineering Building, The University of Queensland, Brisbane in the State of Queensland, Executive Dean, STATE as follows:

1. I am the Executive Dean of the Faculty of Engineering, Architecture and Information Technology (**Faculty**) at The University of Queensland (**UQ**).
2. I make this statement in respect of claims made by the National Tertiary Education Union (**NTEU**) on 11 March 2016 for proposed variations to the Higher Education Industry - General Staff - Award 2010 (**General Staff Award**) and the Higher Education Industry - Academic Staff - Award 2010 (**Academic Award**).
3. I have been provided with a copy of extracts of the NTEU submissions. The matters set out in this statement respond specifically to the following parts of the NTEU submissions:
  - (a) Part A and the proposed variation to include a new clause 22 - Hours of Work in the Academic Work which seeks lengthy and detailed regulation of hours and overtime payments for Academic work for academic staff (**Academic Hours of Work Claim**); and
  - (b) Part B and the proposed variation to provide casual academic staff with:
    - (i) a payment for "Policy familiarisation" (**Reading Policies Claim**); and
    - (ii) a payment to "maintain currency in the employee's discipline and relevant pedagogy" (**Discipline Currency Claim**).
4. I make this statement in support of the position of the Group of Eight Universities (**Go8**), which comprises the University of Western Australia, University of Adelaide, University of Melbourne, Monash University, Australian National University, University of New South Wales, University of Sydney and University of Queensland. The Go8 are recognised as research intensive Universities.

## **Employment and knowledge of the University and the sector**

5. I have held my current role as Executive Dean since June 2014 when I commenced employment at UQ. In this role, I am responsible for the academic leadership and management of the Faculty. This includes accountability for all aspects of academic programs, staff management and resource allocation for schools and centres in the Faculty, as well as representation of the Faculty and University to the wider community.
6. Prior to my current role and employment with UQ, I was the Pro-Dean for Learning and Teaching at the University of Leeds in the United Kingdom. I held that role since 2006. I was appointed to the Royal Academy of Engineering/BNFL Chair in Particle Science and Engineering at the University of Leeds in September 2002 after spending eight years at The University of Newcastle in New South Wales.
7. Prior to my appointment at Newcastle, I developed my research career through post-doctoral positions at the Institut Charles Sadron (Strasbourg, France) and the University of Melbourne. My undergraduate and doctoral education was undertaken in the UK at the University of Bristol from where I received a PhD in Colloid Chemistry.
8. I have been the chief investigator on numerous research projects and am an author of over 150 refereed publications. I am currently a Director of Escubed Ltd, a spin-out company from the Faculty of Engineering at the University of Leeds. I received the 2005 Beilby Medal from the RSC/IMMM/SCI for my substantial contribution towards research of practical significance. I am a Fellow of the Royal Academy of Engineering, the Institution of Engineers Australia, the Royal Society of Chemistry and the Institution of Chemical Engineers.
9. A copy of my Curriculum Vitae is attached to this statement and marked "**SB-1**".
10. My extensive experience in these leadership roles, and as an academic across various universities both nationally and internationally, has given me significant understanding of the nature of academic work, academic culture as well as the requirements and regulation of academic work not only within Australia but internationally, particularly in the UK. I have a detailed understanding of work in the disciplines in my faculty.

## **Academic Staff and the Faculty**

11. The Faculty at UQ comprises 5 Schools: Architecture, Chemical Engineering, Civil Engineering, Information Technology and Electrical Engineering and Mechanical and Mining Engineering. Across the Faculty, there are approximately 437 continuing and fixed term academic staff employed (368FTE academic staff) and approximately 1000 (52FTE) casual staff engaged over the course of the year (this includes tutors, demonstrators and sessional lecturers). These staff are employed in teaching and research roles, teaching only and research only roles. There are also many different disciplines covered within the Faculty and within the Schools. Currently the Faculty covers 24 disciplines for teaching purposes including

single and dual majors. The number of disciplines in the research space would be even greater but it is difficult to estimate exactly. The Faculty is responsible for a number of research activities which span across two or more Schools and across all 6 faculty groupings at UQ, including research institutes.

12. Some academic staff work across a number of disciplines both within and outside the Faculty. The Faculty has a number of strong groups of academic staff who work across a range of disciplines. For example, one group working across software/IT, robotics, psychology and social science and another group working across electrical engineering, medical imaging and the brain institute. The area of mechatronics spans mechanical engineering and software/IT. In the teaching space, the Faculty offers a number of degrees which span multiple schools and faculties. For example, the Faculty is working on a new degree in data science that spans IT, mathematics, business, commerce, law and social science. As mentioned above, examples of academic staff working across disciplines are numerous in the research space. It is common for research projects undertaken within the Faculty to cross a number of different academic disciplines. For example:
  - (a) the Faculty was recently awarded Australian Research Council (**ARC**) funding to conduct a research project into timber structures which encompasses the academic disciplines of civil engineering, architecture, software and IT; and
  - (b) the Dow Centre for Sustainable Engineering Innovation which works across a number of disciplines including chemical engineering, mining engineering and mechanical engineering.
13. Accordingly, work being done by a particular academic will often span a number of disciplines and there is also scope for differing views as to what particular discipline or disciplines a particular activity or research task falls within.

## **Academic Work**

### ***Nature of Academic Work***

14. Academic staff are highly skilled professionals who are paid an annual salary for the entirety of the work activities undertaken, irrespective of time worked. Fundamental to the nature of academic work are concepts such as autonomy, freedom, flexibility and self-direction. Outside of timetabled student teaching and academic committee work, staff enjoy the flexibility to arrange their work as they see fit to maximise outcomes. Some staff are more heavily involved in classic blue-skies research whilst others spend more time on translation of research into industry and society. Other academic staff spend a greater proportion of their time on the scholarship of teaching and teaching innovations. An academic staff member may focus (and spend a greater proportion of time) on one or more of these activities at different stages throughout their academic career. A change in focus is often in response to

unforeseen opportunities that arise or developments in a particular research activity or area. The ability for academics to have flexibility in how they organise and allocate their time and work activities is crucial to the agility they need to be successful and maintain personal motivation and to pursue a successful academic career.

15. Academic work for a teaching and research academic is typically made up of 3 components: teaching, research and administration. Other than specific hours that they are required to teach or undertake teaching-related duties, academic staff largely self-manage their work. In particular, the research component of academic work is largely self-directed and academic staff work autonomously in pursuing research in their chosen academic discipline(s). A degree of academic freedom and flexibility in the performance of their work is necessary in order to facilitate and drive quality research. For many academics, including myself, we are getting paid to pursue our passion. If my research grants were taken away, I would still do it. I would do it at home, on the weekend, because I am passionately interested in what I do. It also advances my international standing and reflects my vocation not just "my job". In my experience, this reflects the views of a large proportion of academics.
16. Academic work, particularly teaching-related activities, is cyclical across the year and is predominantly undertaken during the two 13 week semesters throughout the year. There are therefore 26 weeks of the year where the majority of academic staff generally do not have any allocated teaching hours but may undertake some teaching-related activities such as marking assessments. Otherwise, academic staff are then largely free to identify and undertake their research and/or scholarship activities.
17. Academic staff are not required (nor would they be willing) to complete timesheets or otherwise record their hours of work or attendance for work.
18. These features of academic employment are, based on my experience, consistent across the sector both within and outside of Australia.

### ***Academic Workloads***

19. Whilst academic hours of work, other than for sessional staff, are not recorded and/or monitored by Universities, there are mechanisms, workload guidelines and policies in place at Universities to assist in allocating academic work. Such mechanisms, guidelines and policies do, to a certain extent, regulate academic work allocation and provide academic staff with access to review of "excessive" or "unreasonable" workloads. However, none of those mechanisms or guidelines, to the best of my knowledge, reflect the clauses and regulation now sought to be imposed by the NTEU Academic Hours of Work Claim.
20. At UQ, clause 59 of *The University of Queensland Enterprise Agreement 2014-2017 (UQ EA)* deals with academic workloads. Amongst other things the clause provides:

- (a) a set of guiding principles to ensure that workloads are allocated fairly and distributed equitably amongst staff in the particular school, institute or centre;
- (b) that workload models within particular schools, institutes or centres be implemented in consultation with academic staff;
- (c) that the workload models give reasonable consideration to the individual circumstances of academic staff members including, but not limited to, their time fraction, personal and family responsibilities and early career status; and
- (d) that staff may raise any concerns they have about their workload in the first instance through the Staff Grievance and Resolution Procedure.

21. In recent times, I have been involved in the development of workload allocation models within the Faculty. Each of the Schools within the Faculty has its own workload allocation model in place which take into account the variations in practice and teaching methods of teaching delivery between each School. In accordance with a requirement under the UQ EA these models represent an agreed method of calculating comparative workloads of academic staff and ensures fair and equitable distribution of work amongst staff. The workload models must have been developed in consultation with academic staff and contain a typical workload range (minimum and maximum thresholds) for teaching and teaching-related duties. This is because these types of duties are able to be meaningfully measured and quantified. I was responsible for verifying that this process had in fact been adopted and for approving the workload models.

22. Whilst many academics may say they work long hours, the majority of their activities are not directed, monitored or recorded. We can however determine their actual teaching contact hours. Across the Faculty the typical contact teaching hours that are allocated are similar across all schools and range between approximately 5 to 8 hours per week per staff member on average across the 26 week teaching period per annum.

(a)

23. Based on my experience and direct observation of workload allocation within the Faculty, including the teaching contact hours allocated as part of the workload models, the teaching contact hours and associated activities of preparation and assessment for most if not all academic staff within the Faculty would account for approximately one-third of an academic staff member's work for the year. A significant proportion of the remainder of the year is spent on productive self-directed work related to research, and academic staff have the freedom to determine what research or other activities and questions they pursue, what approach/method they will use to do this and how and when this work will be performed.

24. The only hours of work of an academic that we do monitor (and can reasonably be monitored) is whether academic staff actually turn up to their timetabled teaching activity. There is so

much variability in terms of research related activities which makes the monitoring of hours much more difficult and virtually impossible. I have elaborated on this further below.

25. I have seen a multitude of academic workload models in Australia and the UK and they all vary to certain degrees. However, they are all largely consistent and are based around allocation of teaching and associated activities, do not require the recording or monitoring of all hours of work or activities performed by an academic and do not seek to prescriptively regulate research or other non-teaching activities.

### **The Academic Hours of Work Claim**

26. Having regard to the matters I have referred to above regarding the nature of academic work generally and the way in which work is allocated and undertaken within the Faculty, I see a significant number of issues with the NTEU's Academic Hours of Work Claim, which I have set out below and consider the NTEU's clause is misconceived and unworkable.

### ***Inconsistent with Nature of Academic Work***

27. The Academic Hours of Work Claim is fundamentally inconsistent with the nature of academic work, particularly research as such work cannot be sensibly allocated or determined in hours. Universities do not allocate research activities to academic staff and never have. Academic staff use their own professional judgement as to how they are going to contribute to the collective and personal goals from a research perspective. Whilst Universities may provide some guidance and opportunities, it is ultimately up to the individual academic staff member what research activities they will undertake, the research question they wish to pursue and how they will go about it.
28. There is so much variability in research activities across disciplines, within disciplines and person-to-person. There are many factors that can impact upon research and the time it takes to do particular activities. Some of these include:
- (a) each academic staff member sees things differently and equally "competent" academic staff can take different approaches and paths to do the same piece of work and ultimately get to the same outcome, with significantly different "hours" to do so;
  - (b) the amount of effort an academic staff member chooses to put into a particular task;
  - (c) how much reflection time an academic staff members spends before writing. Some academics prefer to start writing immediately whereas others spend considerable amount of time reflecting and thinking before writing;
  - (d) the nature and complexity of the particular research task;

- (e) the field in which the research relates and the speed of progress in that field. In some fields if you don't publish your research results quickly then somebody else will jump ahead of you. In other knowledge-based fields such as architecture, the papers published tend to be longer and therefore more time is taken in relation to every aspect of preparing the paper;
- (f) how rapidly the individual academic staff member wants to get their work published;
- (g) the requirements of a particular research grant and the complexity and experience of the team of academics engaged to work on the project;
- (h) how efficient and effective academic staff members are with the use of their time and their experience;
- (i) the availability and input of other staff here and overseas with whom they may be working or collaborating;
- (j) the ability of academic staff members to recognise when something is good enough and that extra work will not change the quality of the output;
- (k) the capacity and willingness of an academic staff member to take a risk with their research and reputation; and
- (l) whether the research has commercialisation opportunities which can impact on the strategies taken to pursue that work and publish the findings.

29. It is therefore impossible to be able to reasonably allocate and/or determine in hours how long research activities and projects should take. To highlight these difficulties I have provided some examples below:

- (a) If I am tasked with writing a research grant for the ARC, there are defined sections that need to be completed, concepts and lengths. The research proposal itself is 10 A4 pages at 11 point font and you are required to complete various additional sections including a budget, research record and history of applicants. This task usually takes me approximately 1 to 2 weeks. However, I know other Professorial staff who take at least 1 month to write such research grants. The task is largely the same and the other staff member is at the same level and in the same/similar discipline to me and they perform the task in a "competent and professional manner", but it takes them longer.
- (b) I have worked with a large number of academic colleagues on my published journal papers and amongst those colleagues some take considerably longer than others to write equivalent length and complexity sections in those articles. In my

judgement the quality of the end product was the same but the time taken to achieve it can vary widely.

- (c) If I set up a consortium project with a number of companies and a number of other academics at different universities, there is a large amount of work involved in establishing the team and the project scope, and you need the professional freedom and autonomy to be able to judge how to manage that into your day-to-day work and the time you need to invest to achieve it.
- (d) Based on my experience supervising more than 30 PhD students to completion, I have observed similar variations in the time it takes students to complete certain tasks. For example, some of my PhD students took more than 12 months to write their final thesis whilst others completed the same task in 4 months (without any noticeable reduction in quality). Similarly each student took a different amount of my time to supervise. Each student was unique based on their approach, the stage of their PhD and individual circumstances.

#### **Academic Hours of Work Claim is unworkable**

- 30. As well as being inconsistent with the nature of academic work, the Academic Hours of Work Claim is unworkable.
- 31. The definition of "required work" encompasses "the specific duties and work allocated to an employee", "any work necessary to meet performance standards expected" and "any work necessary to achieve any promotion expectations of the employer". As mentioned above, teaching and related duties can reasonably be allocated to academic staff members (and indeed they are) as can administrative duties but this is not the case for research-related activity for the reasons I have discussed above. It is up to the individual academic staff member's professional judgment as to how they are going to most effectively contribute in terms of research.
- 32. In regards to performance, an academic staff member's performance is often assessed/measured over a number of years as a staff member's effort and output can vary greatly from year to year depending upon the work being undertaken and other factors. Academic performance is assessed holistically against the complex nature of a particular academic role. For example, an academic who is focusing on translation of research rather than publishing will necessarily experience a drop in paper outcomes. This is understandable and would form part of a discussion about the academic staff member's current career objectives and what is reasonable to expect as visible outcomes against those objectives. Discipline differences are also critical to assessing performance. As mentioned above, in my Faculty there are a wide variety of disciplines and the nature and type of research outcomes vary enormously. Performance is assessed broadly against discipline norms and academic level. Broadly speaking, we may tell academic staff what research success might look like at

their level by identifying a number of published articles, citations, invited presentations and how much income/funding they should bring in. However the fact that we have performance expectations, including in relation to research, does not mandate or dictate the number of hours or work required to be performed because of the nature of academic research and the autonomy that researchers have over what they do and how they do it. Ultimately how long they take to do the work and perform these activities is a matter for them. Further, performance expectations are not binary targets. It is not the case that if a staff member doesn't hit the target then they are failing or unsatisfactory. Rather it is a basis for discussion with that person and consideration of their overall contribution will be taken into account along with factors that may have hindered their outputs, for example loss of a key post doctoral researcher.

33. Further, Universities would like academic staff members to achieve promotion and I certainly encourage all of my staff to aspire for promotion because that's a way of, I think, encouraging them to have a healthy and productive working life. However, promotion is not an automatic expectation or requirement. If an academic staff member is happy to continue to work at their particular appointment level, say senior lecturer, and does not wish to pursue promotion, then that is perfectly acceptable. It is not a requirement of their current role that they meet the standards to be promoted to a higher role. When we think about promotion for staff we also look at multiple years rather than just one year and assess whether there is a decline in output of the academic staff member or an enhancement and their capacity and academic standing to be promoted to a higher level, such as Associate Professor or Professor. Have we seen a steady performance over a period of time because single types of output can vary greatly from year to year. If I look at my publication track record for example, some years it was 12 papers, and some years it was 2. How do I explain why it went from 12 to 2? It will depend a little bit on things such as how many PhD students you've got, how many grants you have, whether work was coming to a culmination or you're starting new work. It's such a complex equation.
34. The Academic Hours of Work Claim also refers to "ordinary-hours workload" as meaning "that amount of required work such that employees at the relevant academic level and discipline could with confidence be expected to perform that work in a competent and professional manner within an average of 38 hours per week". This is problematic as it is virtually impossible to be able to identify with confidence how long particular work should take (other than in relation to formal teaching contact hours and related duties). This is the case even taking into account the "relevant academic level" and "discipline" of the academic staff member. This is because, as I have indicated above, there is so much variability in research activities across disciplines, within disciplines and person to person and there are a range of factors that impact upon how long a particular research activity or task may take. Further, as stated above, it is often not always clear what discipline the work relates.

35. In practice this will require someone or even a panel of people to assess how long a "competent and professional" person would take to perform the broad range of work activities they are intending to undertake. This also gives rise to all sorts of problems and difficulties and has the potential to lead to disputation. If different people were required to allocate or estimate hours that the particular tasks would take a "competent person", it is highly likely that there will be significant differences in opinion. The example referred to above at paragraph 29(a) demonstrates the difficulty in reaching a consensus view as to the amount of time it would take a "competent and professional" academic to complete an ARC research grant application.
36. The Academic Hours of Work Claim also appears to distinguish between "required work" and "productive self-directed work" but there is no clear distinction between the two based upon how "required work" has been defined. Other than teaching and related duties, and some administrative duties, most if not all research related work is productive self-directed work and will often be taken into account when that staff member's performance is being assessed and/or they are being considered for promotion.

### ***Significant regulatory burden***

37. If Universities were required to apply the Academic Hours of Work Claim it would impose a significant regulatory burden on the University and its academic staff. The Academic Hours of Work Claim suggests that Universities will be required to put in place a "fair and rigorous system for ascertaining" hours of academic staff to avoid breaching the clause. The University would face significant difficulty and expense in developing and implementing appropriate and effective systems to estimate, measure, monitor and validate academic hours of work. It will also impose a substantial burden on academic staff as it will require them to perform additional administrative duties - being the recording of their time and, in the case of supervisors (presumably) reviewing and approving timesheets and potentially supervising academic staff.

### ***Undermine relationships***

38. If Universities were required to apply the Academic Hours of Work Claim it would likely undermine the relationships of trust within the academy and be met with significant resistance from academic staff. Academics highly value their freedom, autonomy and flexibility to perform their work and pursue their research passions. The reality is that academia comes with many privileges and the freedom and flexibility to be able to spend time thinking is one of those. I could spend all day thinking and say I've been very busy but I haven't necessarily achieved a concrete outcome.
39. Academic staff do not like to be micro-managed and the practical effect of the Academic Hours of Work Claim is that it will result in some form of additional reporting requirements by academic staff. If academic staff were required to work within more tightly defined hours they will lose the autonomy, flexibility and thinking time that they all enjoy and value and they will

not be very happy about this. Not only does this signal a sign of distrust but it also questions the professional judgement of academic staff necessary to ensure the quality of their research or academic activities.

### ***Impact on international standing and competitiveness***

40. Another implication for Australian Universities if the Academic Hours of Work Claim was accepted would be the detrimental impact it would have on the international standing and competitiveness of Australian Universities. Any infringement on the academic freedom of academic staff would inevitably result in high achieving academic staff pursuing employment and/or opportunities overseas and in particular the United States, Canada and the UK.
41. The very best academic staff are in high demand and regularly receive alternative opportunities from overseas institutions. If these staff were to be further burdened by an unproductive and onerous administrative system of monitoring and allocating research time, it would be viewed as a massive intrusion into their professional judgement and they will likely look to go elsewhere where they will have more freedom and less scrutiny to pursue their research passions. Similar outcomes would result if Universities in order to comply with the clause and avoid breach, regulated research time, laboratory access and directed activities not to be performed to avoid unfunded "overtime" costs.

### **The Reading Policies and the Discipline Currency Claims**

#### ***Reading Policies Claim***

42. In relation to the Reading Policies Claim, in the Faculty we conduct induction sessions for all of our casual academic staff. During induction, we tell staff what our expectations are, what we expect them to be doing and how we expect them to do it. This can include identifying specific policies and procedures that they need to familiarise themselves with so that they are aware of their responsibilities and the University's expectations in that regard. For example, I insist that health and safety forms part of induction for all casual academic staff so that they are aware of their responsibilities to themselves, to their colleagues and to students.
43. The Faculty pays all staff for time spent on induction training. The costs are split between the Faculty and the University. All tutors in my Faculty must attend 4 hours of training before they are able to be employed to deliver tutorials. The training covers relevant policies and procedures that they are required by the University to adhere to during their employment. .
44. Other than the policies and procedures that are specifically drawn to the attention of casual academic staff and which they are required to familiarise themselves with, casual academic staff are not otherwise required to read and understand all other University policies and procedures. They are available as a resource to such staff if a situation arises. The University also provides staff members with access to support services and other University resources

(e.g. their supervisors and HR advisors) to seek advice about policies and procedures and what to do in certain situations.

### ***Discipline Currency Claim***

45. In relation to the Discipline Currency Claim, UQ has a broad spectrum of sessional staff that it engages to teach, including PhD students, industry professionals and experts. Generally, we engage such staff at the start of each semester and on the basis that they have the necessary skills, knowledge and/or experience in the particular subject they are going to teach. If the person is not capable of doing the job then they would not be engaged in the first place.
46. Further, the preparation and reading to deliver a tutorial or lecture in a particular subject is narrower than the requirements of continuing teaching and research staff to have a great breadth and depth of knowledge across a discipline.
47. Each casual staff member has an allocated full time teaching and research academic staff member responsible for the overall course delivery and the contribution and work of the casual academic staff member.
48. In many cases, the sessional rates of pay provide sufficient preparation time for such staff to ensure that they are across the relevant lecture and tutorial materials and to ensure that they can deliver the quality that is required and expected of them. However, if a particular sessional staff member requires additional funding to allow them to do certain things to bring their skills up for a particular lecture, tutorial or course provided it is sensible to provide it, there is nothing preventing that staff member from negotiating an additional payment of some sort.
49. Having regard to the above situations in which we engage our sessional staff, the Discipline Currency Claim is not reasonable as the expectation is that they are up-to-date and relevant in their discipline area and if any additional preparation work is required for a particular tutorial or lecture this is taken into account and reflected in their sessional rates of pay.

**Professor Simon Biggs**

**Date: 6 June 2016**

## *Curriculum Vitae*

**Name:** Simon Biggs FEng FIEAust FICHEM FRSC CEng

**Qualifications:** BSc (Hons) Chemistry, University of Bristol, UK, 1986,  
PhD, Chemistry, University of Bristol, UK, 1990.

**Current Appointment:** Executive Dean for the Faculty of Engineering, Architecture and Information Technology, The University of Queensland, Brisbane, Australia.

### **Employment History:**

**2002 - 2014: University of Leeds (UK):** Professor of Particle Science and Engineering, Institute for Particle Science and Engineering, School of Chemical & Process Engineering

**1994 – 2002: University of Newcastle (Australia):** Lecturer/Senior Lecturer/Assoc. Professor in Chemistry

**1992 – 1994: University of Melbourne (Australia):** Research Fellow in Physical Chemistry

**1990 - 1992: CNRS Institut Ch. Sadron (Strasbourg, France):** Royal Society European Research Fellow

**1987 - 1990: University of Bristol:** PhD in Colloid and Polymer Science (advisor: Prof. B. Vincent)

### **Major Prizes and Awards:**

2005 RSC/SCI/IMMM Bielby Medal

2006 Election as a Fellow of the Institution of Chemical Engineers

2011 Election as Fellow of Royal Academy of Engineering

2011 IChemE Core Chemical Engineering Prize

2012 IChemE Core Chemical Engineering Prize

2015 Election as a Fellow of the Institution of Engineers Australia

### **Directorships:**

- Escubed Ltd.

### **Board Membership:**

- Board of Professional Engineers Queensland

### **Academic Leadership:**

I was Head of Chemistry discipline during 2001/02 at the University of Newcastle (Australia). Responsible for all aspects of departmental functions including strategic leadership, financial and business planning, staff development and welfare [25 FT staff, 5 PT staff, 50+ researchers and post-graduate students]. Was a member of a number of University management committees responsible for the strategic development of the faculty/university. I was a member of the university Research Management Committee from 1999 – 2002.

From 2003-06, I was a member of the School of Process, Environmental and Materials Engineering (now School of Chemical & Process Engineering) Executive Management Board (Leeds U). The school EMB is responsible for the strategic development and leadership of all aspects of the school as well as the financial and business planning processes. Within Leeds, my parent school is responsible for 25% of the University of Leeds' EPSRC research and has substantial industrial support. It is home to over 40 FT academic staff, more than 100 FT staff in total plus over 600 UG students and 150 PG students. During the period 2003-06, I was the school's Director of Learning & Teaching responsible for all aspects of teaching and its administration and support within the School. In this role I was also directly responsible for the teaching QA requirements within the school and was a member of the Faculty Learning & Teaching Committee.

From 2006-14 I was the Pro-Dean for Learning & Teaching (a 0.5 FTE position) in the faculty of Engineering. In this role I was responsible for leading and developing the strategy for L&T within the Engineering faculty at Leeds. The faculty consists of 5 schools and has more than 200 academic staff; annual UG intake is around 700 students and there are over 2400 UG students in total plus 400 PGT students. During my tenure, we streamlined the number of modules and programmes being taught providing greater focus and clarity of offering to both staff and students. The total taught student population increased from 2300 to its current level of 2800 during this time; simultaneously, we dramatically increased our published and actual entry grades without seeing a decrease in student numbers. We also saw a 100% increase in our international UG student numbers during this period (to 240 students this year) which was linked with our strategic market-informed focus on key degree areas. Finally, I note that during my tenure the number of students completing a 4-year engineering degree (MEng/BEng) instead of the 3-year variant (BEng) increased by 150% (270 students in 2013); this was a key strategic aim associated with our increase in overall quality of the students and their experience.

I was also a member of the faculty executive committee from 2006-14, contributing to the strategic leadership for the whole faculty across the range of its activities. In the same period I was also a member of Learning & Teaching Board and Senate for the university. I was also a member of Graduate Board 2006-08 and a member of Knowledge Transfer Board 2008/09

From 2005 to 2009 I also held an appointment (0.1 FTE) as the Director of the Knowledge Transfer Account; a £4M fund for the development of industry focused research and training programs. I had overall responsibility for the strategic management and leadership of this fund. After 2009, this fund was replaced by the Knowledge Transfer Secondments fund, a £900k grant from the EPSRC for which I led the bid, and for which I provided academic leadership (until end 2012).

In 2013-14 I was given the role as the Head of the Institute of Particle Science and Engineering (IPSE), one of the major research groupings of the faculty of engineering. At this time, IPSE had 20 academic staff and over 130 full-time research staff and post-graduate students.

From 2003 – 2010 I held the position of Director of the University Research Alliance in Particle Science and Engineering at the University of Leeds. This was initially a strategic research alliance between the University and BNFL (2000 – 2007), before being taken over by the National Nuclear Laboratory (NNL). I was responsible for the development and growth of the Alliance during this time. When I assumed the leadership, the Alliance had an annual research project income of £100k; within 2 years we successfully increased this to an annual income of £1.2M. As Director, I was responsible for the management and implementation of the strategic direction of this research centre. The centre was reformulated in 2010 as the Collaborative Research Centre for Nuclear Engineering with a new business plan and strategic research partnerships with both NNL and Sellafield Ltd..

From 2008-13, I was also the Principal Investigator for a large (£4.3M) 4-year/6 University Research Consortium (known as Diamond) funded by EPSRC in the area of Nuclear Waste and Decommissioning. This was reformulated with additional partners and was recently (Oct 2013) funded by the EPSRC and NDA for a further 4-years with a total support package of nearly £10M. As PI, I was responsible for providing leadership on the research direction of this consortium, which consists of 30 linked projects and includes over 40 academic members. I was also required to liaise with the EPSRC and a wide range of industrial sponsors to ensure that the consortium fully satisfies the aims and needs of these key partners. In 2013, I also led a successful bid for an EPSRC Centre for Doctoral Training at Leeds in the area of "Complex Particulate Products and Processes". This is a 9-year grant providing funds (\$6M) to train 50 PhD students and involves over 30 academic partners. I have also been a member of two large EU FP7 consortia, ASGARD and SACCESS, in the area of nuclear waste and more efficient processing of nuclear fuels.

Since June 2014 I have been employed at the University of Queensland as the Executive Dean for Engineering, Architecture and Information Technology. This is a full-time role as part of the University Senior Management Group and I am responsible for leading the development and implementation of strategy for the

faculty. Currently, the faculty has over 800 staff and more than 6000 students with an annual budget of approximately \$180M.

### **Professional Affiliations:**

Fellow of the Royal Academy of Engineering; Fellow of the Institution of Engineers Australia; Fellow of the Royal Society of Chemistry; Fellow of the Institution of Chemical Engineers; Member of the International Association of Colloid and Interface Scientists. Past member of Editorial Boards for Colloids & Surfaces A and the Journal of Colloid & Interface Science. Regular reviewer for the Journal of the American Chemical Society, Langmuir, the Journal of Colloid and Interface Science, Colloids and Surfaces, Macromolecules, Chemical Engineering Science and Journal of Adhesion.

### **Research Interests:**

Main research interests are in particle, colloid and interface engineering. My research group has a strong interest in the control and manipulation of interparticle forces to allow more efficient process engineering of particulate systems and better control of dispersion formulation and stability. I also have extensive research experience concerning polymer flocculants and dispersants for use as stability control aids in fine particle dispersants for use in processing of solid-liquid systems.

My research interests also include the full 3-dimensional characterisation of adsorbed surfactant and/or polymer layers at the solid liquid interface. This research is used to better understand adsorption mechanisms and adsorbed layer properties for these systems. In particular, we are interested in combining in-situ imaging with direct measurements of both adsorbed amounts and adsorption kinetics. The research involves both fundamental investigations, using precision instrumentation such as light scattering and atomic force microscopy, and applied problem solving related to industrial issues (such as detergency and personal care product applications).

We are also using our knowledge about polymer interfacial layers to synthesise new types of block copolymers for use as novel coatings and capsules. In related research, we are exploring how to develop technology for the design, synthesis, scale-up and manufacture of functional microparticles & microcapsules.

More recently we have developed interests in the application of ultrasonic technologies for the in situ analysis of complex solid-liquid systems within process engineering applications.

### **Main research achievements:**

Recognised as a pioneer in the application of atomic force microscopy to the study of colloid and particle engineering. A significant number of my papers were the first of their kind in the open literature, especially the work on the influence of polymers and surfactants on inter-particle forces. I was awarded the 2005 Beilby medal from the RSC/IMMM/SCI for "a substantial contribution towards research of practical significance". The citation from the Royal Academy of Engineering for my Fellowship states that I am "Distinguished for achievements in the application of colloid and interface science to the development of new functional materials and innovations in the engineering particulate systems in the chemicals, minerals and nuclear sectors".

In addition, I was a key member of a team that won the IChemE 'Core Chemical Engineering' award in 2011 for a project on the "Development of Fluidic Mixers for Processing of Intractable Sludge" and also the 2012 Core Chemical Engineering Award for a project on 'Jet Interactions and Resuspension of Solids'. Both these awards were from the partnership between the University of Leeds and Sellafield Ltd. and arose as a result of the translation of our basic research into process engineering applications at Sellafield Site.

**Peer-Reviewed Research Publications: TOTAL: 260**

*Refereed Journal Articles* – 160 (with a further 3 submitted); *Refereed Conference Articles* – 96; *Book Chapters* - 6; *Review articles* - 4.

I have also been involved in 19 Patents, of which 10 have been granted or are at PCT stage whilst 4 have been recently filed in partnership with a key industry collaborator.

The 152 journal articles have received over 5500 citations; I have a H-index of 43 and an i-10 index of 105. Since 2008, I have received 2680 citations with an H-index of 27. (*source Google Scholar*).

### **Research Funding: 1996 - 2014:**

**TOTAL of over AUS\$ 50 000 000** from industrial contracts, government research grants, and consulting work as a named Principal (Lead) Investigator. Includes grants received in both Australia and the UK. I have been continuously supported by either the Australian Research Council or the EPSRC since 1996 (coincident with my first academic position) through a variety of grants.

I also undertake a wide range of short-term consultancy projects across a number of industries. Typically I undertake around 20 days consulting per year and have recently led a number of large consultancy projects with a value of more than £100k per annum.

### **Synergistic Activities**

*Consulting experience:* Orica Explosives 1995 to 2002, Sanitarium Research 1997, BHP Coated Products 1996 to 1998, One Steel 2001/2, Rio Tinto 1998 to 2002, BHP Iron ores 1998 to 2002, BNFL 2002 to 2008, Unilever Research, 2002-05, Syngenta 2004 - present , P&G 2004-present, Swallowfield Cosmetics 2005, Nexpress 2005, Rosemount Pharma 2007/08, Chamelic Ltd. 2010., Sellafield Ltd., 2009 – present.

*Expert Witness:* Act as an expert witness in core areas of expertise.

*Community activity:* Chair RSC Colloid Division Committee 2010-13.

*Knowledge Transfer:* Have set up 2 spin-out companies (Chamelic Ltd.; and Escubed Ltd.) to commercialise IP opportunities arising from the research in my group. Escubed Ltd. has a turnover of >£500k p.a. and has 7 employees; Chamelic Ltd. is working to actively commercialize technology on smart polymers for a range of applications.

*Conference organization:* Member of organising committee and session chair for 4<sup>th</sup> World Congress of Particle Technology in July 2002. [5 day meeting with 600 delegates]; Session chair: Royal Society of Chemistry Particulate Systems Analysis 2003 conference in September 2003. [4 day meeting with 300 delegates]; Session chair: 7<sup>th</sup> World Congress on Chemical Engineering; July 2005. [5 day meeting with 1200 delegates]; Session chair: 5<sup>th</sup> World Congress of Particle Technology in April 2006. [5 day meeting with 600 delegates]; Co-chair of Royal Society of Chemistry conference on "Nanoparticles" held in April 2007. [3 day meeting with 200 delegates]; Co-chair of Royal Society of Chemistry Colloid Division conference to mark the retirement of Prof. B. Vincent in April 2008. [2 day meeting with 120 delegates]; Member of International advisory committee for 13<sup>th</sup> IACIS meeting held in June 2009. [5 day meeting with over 1300 delegates]; Co-chair of RSC meeting on Nanoparticles in September 2009 [3 day meeting with 150 delegates]; Chair of Rideal Symposium for SCI/RSC in March 2010 [1 day meeting with 85 delegates]. Chair of UK Colloids 2011, July 2011 [multi-day meeting for 250 delegates].

### **Supervision**

Supervised 32 PhD and 3 Research MSc students to completion. Also supervised more than 50 final year BSc(Hons)/MEng/MSc students in major research project.

Have supervised over 20 post-doctoral fellows during my career.

Currently directly supervise 4 Post-doctoral fellows and 10 PhD students plus 3 other staff members in research team.

PhD students (current position shown in parentheses for science/technology relevant roles): Bremmell (Post-doc @ Uni SA), Cain (US Spin out company), Burns (consultant Arthur Andersen), Macaulay (Dyno Nobel Explosives), Fleming (Post-doc @ Monash U), Notley (Post-doc @ ANU), Atkin (APD @ Sydney U), Webber (Post-doc @ Melbourne U), Glover (BHP Billiton), Keane, Reitsma (NIST, USA), Habgood (non-science), Olsen (Patent Agent), Yates (non-science), Kilpatrick (Post-doc @ Trinity Dublin), Ferguson (Orica Explosives), Smith (Post-doc @ Newcastle U), Nabi (Cadbury R&D), Tindley (non science), Mantzana (Industry R&D), Harbottle (Post-doc @ CCNY, USA), Omokanye (industry, Canada), Addison (P&G R&D, UK), Xu (P&G R&D, UK).

### **Academic Collaborators**

*Sabbatical visitors:* A/Prof. Kevin Galvin, University of Newcastle (NSW), July – December 2004; Prof. Paul Slatter, Cape Technikon University (South Africa), January – April 2005; Dr. Naoyuki Ishida, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba (Japan), February 2006 – February 2007; Dr. Veruscha Fester, Cape Technikon University (South Africa), October 2006 – April 2007, Prof. Ahmad Zaki, KFUPM (Saudi Arabia) July 2009, Grieser, University of Melbourne (Australia), May-June 2012.

*Active Co-investigators:* Mike Fairweather (Chem E, Leeds); Steve Armes (Chemistry, Sheffield, UK); Erica Wanless (Chemistry, Newcastle, Australia); Jeff Peakall (Earth Sciences, Leeds); Richard Williams (Chem E, Leeds); Lynn Walker (Chem E, CMU); Robert Tilton (Chem E, CMU); Dennis Prieve (Chem E, CMU); Ray Dagastine (Chem E, Melbourne Uni, Australia); Vince Craig (ANU, Australia).

### **Editor and journal responsibilities**

Past member Editorial Advisory Board for Journal of Colloid & Interface Science.; Past member Editorial Advisory Board for Colloids & Surfaces A; Guest editor for "Current Trends in Colloid and Interface Science." [2002]; Guest editor for "Chemical Engineering Research and Design". [2005]; Regular reviewer for Nanoletters [impact factor (IF) = 9.847], Advanced Materials [IF=9.107], Journal of the American Chemical Society [IF=7.419], Journal of Physical Chemistry B [IF=4.033], Langmuir [IF=3.705].