TERTIARY TEACHING EXCELLENCE AWARDS
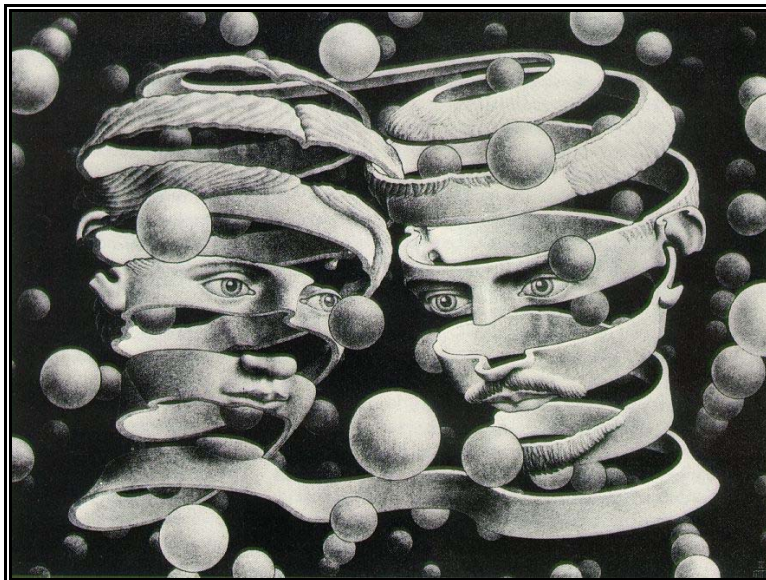
2008

Nomination for:

Professor John Hosking

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Contents

1 Personal statement

I have been a University educator for 27 years, something that constantly surprises me. When I started as a Junior Lecturer in the University of Auckland Computer Science Department in 1981, I saw the position as an opportunity to improve my public speaking ability and little more. I was unprepared for the intense personal satisfaction that results from assisting others to achieve their life goals, and quickly changed my career aspirations. The privilege and responsibility of being part of my students' life process has encouraged and sustained me in my teaching roles since then.

That I became an educator is, however, not that surprising. I come from a family of teachers and, as a result, have had a lifelong interest in effective teaching and learning. With my sister Beth being a new entrant teacher, and brother Bruce an adult educator, it was perhaps natural for me to occupy the middle ground[1]. We each deal with major life transition points: for Beth, the foundations of learning, literacy and numeracy; for Bruce, career change and retirement; for me, adulthood and career initiation. For each, formal "chalk and talk" teaching is insufficient. Education for such life transitions must include significant yet sympathetic experiential learning to allow students to contextualize and operationalize more formal teachings.

As a result I have become less reliant on the classroom emphasising instead asynchronous, informal, often action-based learning, an approach particularly relevant for digital natives where modes of communication and learning opportunities are many and varied. I have been led to focus on learning outside, yet adjacent to, the formal curriculum. The resulting multi-disciplinary programmes provide a holistic integration and contextualization of more formal curriculum-based learning in real world situations. They deliberately blur the line between institutional and in-situ professional education while providing a "duty of care" safety net via efficient and effective mentoring.

I believe the best experiential learning is accompanied by good mentoring. I have had some outstanding educators: Alison Campbell (intermediate school); Merv Sharfe and John Sealy (college); Gary Bold, Murray Johns and Dave Stow (university studies); and Bob Doran, Peter Gibbons, and John Hood (academic development). I realised quickly that these, my most effective teachers, were also my mentors and each had the gift of effectively and personally mentoring not just

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[1] Other family members fill early childhood, primary, and secondary education roles. All have influenced my development as a teacher.

me, but many others at once. They each provided frameworks for me to make and learn from mistakes and through this process develop self-efficacy. They gave me lessons well outside the curriculum, how to behave professionally, ethically, humbly, and with good humour, and by their own actions were role models. They showed me the curriculum is just a guide; that there is so much more that young adults need to learn. I have, as much as I have been able, modelled myself on them.

My aim is to turn students into colleagues

This aim guides all of my approaches to teaching, formal and informal. I want the students I teach to be effective professionals, whether as academics or working in industry. *I want them to become the sorts of professionals that I would want to work with.* They need a thorough grounding in the processes and methodologies of their discipline *but must also understand the context of their work, the need to act responsibly and ethically and be able to collaborate effectively with other professionals and the public.* This implies a responsibility to teach beyond the normal curriculum, to facilitate learning outcomes more professional than knowledge-based in nature. This aim and my resulting approaches derive from the applied nature of the disciplines I work in, but are equally recognisable in other practice-based disciplines.

With colleagues and former PhD students, Robert Amor (left, HOD Computer Science) and Santokh Singh (3rd left) at Santokh's graduation.

2 Teaching experience

2.1 Formal lecturing

I have lectured at all levels and over many topics in both the Computer Science (CS) and Software Engineering (SE) programmes including:

- Software Tools and Techniques (700 level CS)
- Extending Software Innovation (700 CS & SE)
- Software Development Methodologies (400 SE)
- Functional Programming (300, 700 SE)
- Artificial Intelligence (300, 700CS)
- Logic Programming (300 CS)
- Database Systems (300 CS)
- Software Engineering (200, 300 CS & SE)
- Algorithms and Data Structures (200 CS)
- Object-Oriented Systems (200, 700 CS)
- Introductory and Advanced Programming (100, 200 CS)
- Introductory and Advanced Computer Organisation (100, 200 CS)
- Introductory Computer Science (100 CS)

Class sizes have ranged from more than 500 students at introductory level to ten in specialised postgraduate courses. Typically I teach large classes, even at graduate level. My graduate Software Tools and Techniques course (COMPSCI 732) consistently has over 40 enrolments, making it often the largest postgraduate Computer Science course.

I have led introduction of many new courses including:

- 300 and 700 level Artificial Intelligence
- 300 and 700 level Functional and Logic programming
- 700 level Object Oriented Systems
- 700 level Software Tools and Techniques
- 700 level Extending Software Innovation

I had a major role in development of the curricula for the Bachelor of Engineering (Software Engineering) and Bachelor of Science (Computer Science) majors.

2.2 Research supervision

I have supervised six PhD, 23 Masters and more than 50 research project and dissertation students to completion. I currently supervise five PhD and three Masters students. Nineteen students I have supervised are pursuing, or have completed, a PhD.

2.3 Mentorship

My passion for the broader personal development of my students (and colleagues) has given me an equally passionate interest in the process of mentorship. Research supervision is the most obvious example of this, but I have also developed several innovative mentor based programmes including the CSI Academy internship, Extenda research culture development, and part of the Heads Up leadership development programmes. All provide experiential learning opportunities for participants.

3   Design for learning and facilitating learning

My aim, as described above, is *to turn students into colleagues*. This aim has underpinned and guided my teaching approaches over the years. The teaching methods for achieving this aim vary depending on the teaching situation.

3.1   *Application to formal teaching*

Traditional pre-mass education involved one-on-one mentorship via apprenticeships or Oxbridge tutoring. Achieving similar aims in large classes is challenging. *My approach is to make early and deep connections to my research and professional consultancy, making material as professionally relevant as practicable.* I base my teaching on practical assignment work, using it to motivate introduction of course content and with assignment tasks derived from research my group has undertaken or industrial problems I have encountered. The assignments typically have an open-ended component to challenge brighter students, and reinforce the lesson that real problems are hard, considered and documented compromises must be made, and multiple design alternatives need to be considered. I regularly use anecdotes, usually amusing but always with a moral, from my professional activity (research or industrial) in lectures to reinforce the "real life" impact and relevance of material covered and the sometimes quirky nature of its practical application.

Bachelor of Engineering (Software Engineering) Part IV Course

This undergraduate Software Development Methodologies course which I teach with Professor John Grundy is about model driven engineering and meta-tools, an area in which we both undertake research.

Model driven engineering uses diagrammatic approaches to model software requirements and then *generate* software from these models rather than using hand coding, thus improving productivity. Meta-tools go a stage further allowing software *tool* designers to specify tools diagrammatically and generate them (a model driven approach to software tool implementation)[2].

Much of the lecture material derives from and includes recent research literature, including my own, and industrial solutions I have been involved in developing. The assignment (an example is in Appendix 5) makes use of a leading edge toolset developed by my research group. Students must use this to construct a software tool. A minimum set of requirements is specified, but students select the type of tool and the design and implementation approach. They develop the tool

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[2] This layering of abstractions – solving a problem, then stepping up a level to solve a more generic and more abstract type of problem, is very common in Computer Science – understanding and dealing with these abstraction layers is both an important element of learning and a major contributor to the "elegance" of the subject.

in small teams, and write an individual report describing the tool and their approach to it, and suggesting improvements to the research toolset. Through this they experience the need to work around imperfections in leading edge toolsets, choice of ideas to pursue, consideration of design alternatives, teamwork, communication of their achievements and provision of reflective analysis: all of the aspects of a commercial or research project in miniature.

Suggestions for tools to develop are provided and many students select one of these. However, a significant minority, with my strong encouragement, design novel tools; one fascinating example I would never have thought of myself configures a sound/effects environment for the "Guitar Geeks" site to visualise custom guitar sound systems (Dave Grohl's Foo Fighters set up [7] is right).

This approach has a by-product of assisting to identify students with research potential. I use positive assignment feedback (written and verbal) to nurture their potential. This approach in my COMPSCI 732 course recently led to two refereed international conference publications (students were lead authors). Assignment ideas, inspired by needs observed from other courses (database design and statistical surveys), were extended in a subsequent project course in which I encouraged the students to enrol and the results developed into publications. The students received exposure to the full research cycle and, as a result, were motivated to further study. One, Chul Kim, undertook a Masters thesis in a related area, which I co-supervised[3]. The other, Nodira Khoussainova, gained a Microsoft Research internship and PhD entry to the University of Washington. Many of my other thesis students have been attracted into research through this mechanism.
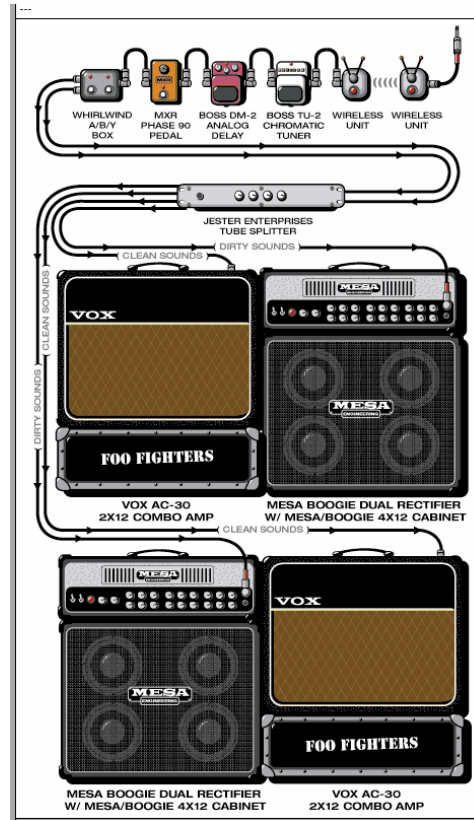
3.2 Application to degree major design

I have been heavily involved in designing two degree majors. The Computer Science major in the BSc was being established as I joined the Department in 1981. A small department meant I had influence on the programme development beyond my Junior Lecturer status. The Software Engineering major in the BE commenced in 2000. With colleagues Rick Mugridge and Bruce MacDonald, I

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[3] He has subsequently been employed in a Swiss consultancy firm. The company principals have been so impressed with his work and our meta toolset that they are partnering with us in the latter's open source "productization".

designed the curriculum for this degree; this design, despite recent degree restructuring, has survived relatively intact.

In both cases I advocated strong experiential/action learning components to the programmes. This is evident in the Software Engineering programme with mentored project courses at each level and a strong industry interaction theme throughout. The projects holistically combine learnings from the other more formally taught programme components with each level providing increasing: work scope; reliance on teamwork; and realism of project scenarios.

My advocacy is also evident in the heavy practical work requirements in the Computer Science programme. This, unlike the BE(SE), is not a "programme" degree, so the level of experiential learning students receive varies with course choices. This unevenness of experience, and hence the difficulty of attending to some of the less "academic" degree profile requirements such as teamwork and communications ability, was a prime motivation for developing the Academy and Extenda programmes, described below, to supplement formal courses with an industrial/experiential overlay.

3.3 Application to mentorship

I have helped develop several mentorship programmes aimed at "colleague development". They each incorporate a traditional mentorship model but have several innovative aspects to them, including building strong links between the University and industry.

3.3.1 CSI Academy

NZ ICT companies have a poor record in providing internships, yet complain graduates are insufficiently work-ready. This is compounded by the many Small to Medium Sized Enterprises (SMEs) in the sector that lack understanding of how to run internships. To address this, my colleague John Grundy and I developed the CSI Academy, a structured summer internship, using seed funding from the TEC's Growth and Innovation Pilot Initiative [3]. The Academy is now self-funded.

The Academy aims to make senior undergraduate students more work-ready and companies more receptive to graduate recruitment and internships. The focus is experiential learning via summer internships, but with academic and industry mentor support and professional project management. This provides "real world" professional experience for the students within a supportive mentoring framework that assists students in negotiating and delivering on clear milestones/deliverables. Students' personal development is enormous; the lessons of adaptation, compromise, teamwork and communication prove invaluable to them and form an important step in their transformation into colleagues. Their change in confidence is often breathtaking.

Companies propose 2-3 student projects and provide a project sponsor, mentor, and funding. The mentor is often someone the company is eyeing for a leadership role. Projects are typically off critical path "technology exploration" projects; successful outcomes may provide a new product direction or enhanced capability. Students are selected on grades and communication ability and matched to projects by skill needs. They receive a scholarship and undertake projects over summer embedded in the company. The Academy provides academic mentors and project management. The latter involves careful scoping, milestone setting, regular meetings, project tracking, and variation management.

A seminar series introducing topics such as "Life after University", "Setting up a company", and "Research degrees" involves ex students, industry warhorses and other role models. These create a bond between academy members and expose them to a broader range of industry opportunities. Students present a seminar and report to the Academy on completion. The aim is to introduce students to real industry project work within a safety net of careful mentoring and project management, while also growing their "world knowledge".

Presentation at an Academy Seminar. Note the use of Access Grid technology for remote participation.

Exemplar projects include [4]:

- An e-commerce company used an academy team to investigate the feasibility of implementing a new secure e-commerce standard into their product. The company wasn't convinced they had the capability or scale to implement the standard but knew customers would require it. The student team analysed the standard, available components and in-house expertise, and proposed an architecture to implement it. Based on their report the company implemented a standard compliant product within 6 months. The company has now created a subsidiary to pursue additional R&D.

- A research laboratory had an expensive piece of mission critical research equipment controlled by an unreliable DOS application. They required

redevelopment of the software on a modern, reliable platform. An academy student team designed and implemented such a system using the LabView framework. The system, after additional development, is in production use.

3.3.2   Extenda

The newer Extenda programme was motivated by a weakness we observed in local ICT companies: a lack of research culture. Most Chief Technical Officers are Bachelors graduates with little exposure to research methods. Board level research experience is even scarcer. Many SMEs in the sector are one product companies lacking an appreciation of how research can leverage them to more complete product lines. These factors form a barrier to academic-industry research engagement (I have spent many frustrating hours attempting to interest companies in such engagement) and mean much of the sector's business R&D spend produces "low grade" results.

To address this weakness my colleagues John Grundy, Ivan Moss (KEA) and Marie Wilson (Business and Economics) and I developed the Extenda programme which aims to transform businesses through establishment of a research-led culture [5]. Extenda uses a combination of workshops with company senior managers and in-company "consultancy" by Honours level student teams. This is an interesting mix of students being mentored by academic mentors and students mentoring senior managers. The teams are deliberately a mix of IT and Business students encouraging cross-fertilisation of ideas and experience in dealing constructively with professionals in other disciplines. The experiential learning obtained is enormously valuable; access by Honours students to senior management teams is rare, let alone an opportunity to change the culture of an entire company.

Still from an Extenda promotional video (included on supplement CD)

Monthly expert-led workshops are provided to senior management and postgraduate student participants. The student teams then provide in-company consultancy helping the company to best apply workshop lessons through audit

and action planning. Findings are reviewed with the senior managers and recommendations to improve the company's innovation capacity are made. Student teams are mentored by academic staff. Assessment is via individually written reports and a brief oral exam.

The programme first ran in semester two, 2007, as a (deliberately small scale) pilot. Five companies and ten students participated. Results show the company interventions and the personal development for the students are valuable (see section 5.4).

3.3.3   HeadsUp

HeadsUp is a third mentor-based "colleague development" programme I have had significant, and passionate, involvement with. Arising from recommendations by the University's Academic Heads Taskforce, of which I was a member, HeadsUp provides workshops, projects, and peer mentoring for current and aspiring Heads of Departments (HODs). I was heavily involved in its development (with Prof Di McCarthy, Sarah Schulz and Kim Hope), spent a year as its programme leader, act as peer mentor to many new HODs, and contribute regularly to workshops. HeadsUp provides opportunities to learn from others, something I lacked as a new HOD. The programme and its resultant networks have promoted development of a mutually supportive "College of HODs" where best practice can be passed on *at the time it is needed* to the benefit of the individual and institution.

3.4   Application to research supervision

Research supervision is where my teaching aims are most obviously realised. I clearly state my role is to develop colleagues I am proud to work with. My research students are regaled with my "spoon and wheelchair" story as they commence research. I developed this for use in Centre for Professional Development (CPD) courses for new research students (which I have regularly contributed to). The spoon represents the "spoon fed" nature of a student embarking on a research degree. The wheelchair represents the end goal: I as supervisor being wheeled away by the student as they become the (world) expert in their research domain. The metaphor is well received by students, along with others, such as the Loch Ness monster (the cycle of elation and depression occurring during thesis work).

Slide from my CPD Thesis workshop presentation including spoon and wheelchair and Loch Ness monster metaphors
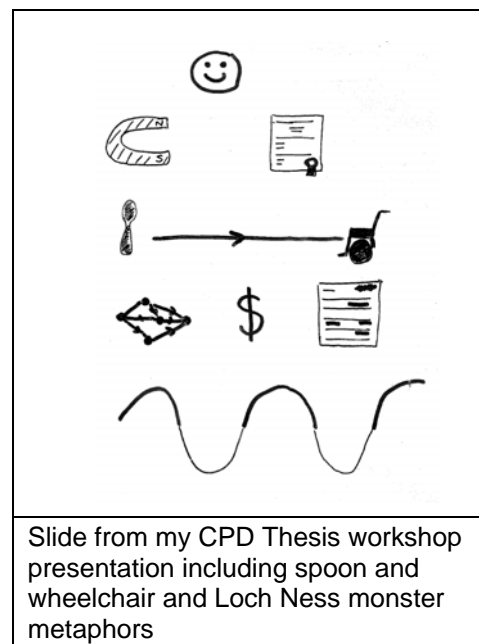
It sets an aspirational level for the student which I reinforce throughout their research.

My methods involve a series of reinforcing and interwoven contextual and action learning approaches. These derive from a set of high level set of goals articulated as a set of "c" words (another artefact from the CPD presentations):

- Context: a clear understanding of the context in which research is undertaken; the literature, professional practice, existing work within our group, etc and the benefits of ongoing research programmes rather than individual projects
- Confidence: in the students' research abilities; that their research "counts" and is of international significance
- Collaboration: recognition that drawing on strengths of others and contributing to their development is mutually beneficial
- Collegiality: that collaboration is not only beneficial but the responsibility of an academic
- Communication: that this is an essential component of research
- Celebration: recognizing and celebrating achievement
- Career: making students look beyond the thesis to career establishment (be it academia or industry)

Learning situations I use for these goals include the following. I make students write early (communication) with rigorous feedback ("red pen is good") commencing with the research proposal and literature review (context). This requires students to discuss prior work undertaken by/with other group members (collaboration).

I co-supervise most students (collaboration). This provides a healthy diversity of opinion, ensures rapid feedback is available and reinforces the need to communicate (communication). Co-supervision provides good lessons in collaboration and collegiality and opportunities for junior staff mentorship.

Our group meets weekly over a shared lunch. Quick status reports by all (communication) are followed by detailed presentations (demos, mini seminars) (communication). Supportive, constructive feedback is provided (particularly by other students - peer mentoring, celebration) (collaboration, collegiality) increasing student confidence (of those giving and receiving feedback) (confidence, collegiality). Group meetings and other communication mechanisms (wikis, project management tools) reinforce to students that they are part of a larger whole – the group research programme (context, collaboration, career). We regularly have larger scale celebratory lunches for important milestones, such as a significant paper acceptance or a thesis completion (celebration, collaboration). Group meetings are also used to establish peer mentoring where we recognise that cross learning could be beneficial (communications, confidence, collegiality).

Individual student meetings discuss more specific issues aiming to build confidence in students' abilities to plan research activities (I recommend not instruct). Increasingly students take responsibility for running these meetings which become collegial discussions (collegiality, career).

I am available on demand for my students for advice (often electronic); they know my priority is to them and they can interrupt other activities (collegiality). My students respect this, understanding this right comes with an obligation to be well prepared when seeking advice.

At the International Conference on Software Engineering in Shanghai 2006 with my PhD students Karen Liu and Richard Li who presented papers at the prestigious doctoral symposium and a web services workshop resp.

I use every opportunity to expose students to the work of others (context) and vice versa (communications, confidence, career):

- Visitors are given formal and informal presentations by students on their work
- I use all available funding sources to provide international travel opportunities. All my PhD students and many Masters students spend time abroad, ranging from conferences (the major medium for CS/SE publication) and doctoral symposiums (confidence development) to extended visits to overseas research groups.

These are important for the students' personal development, particularly to understand the "big picture" and their contribution to it. The confidence gained from appreciating that our group is highly regarded internationally and their work is regarded as important is enormously motivating. Contacts made are often useful for their career development.

I involve students (where appropriate) in my commercial and research contract activities. This provides real world validation (confidence, context) and useful income for them. There is often a fluid interchange in roles in our group; students progress from one research qualification into research assistant (RA) roles and on to subsequent research qualifications (career). Seven of my PhD students have worked as my RAs. I encourage research students to teach (all my PhD students do this). These roles (with their formal evaluation processes) increase students' communications abilities and confidence and make them more rounded academics (career).

I involve students in academic publication (communications). A very high fraction of my papers have student co-authors, typically as primary author (collaboration, context). In many cases (notably Grundy, Mugridge, Amor, Hamer) collaborations initially developed with students have resulted in ongoing partnerships as they pursue their careers. The resulting platform of research (collaboration) has been highly rewarding for all and has produced an internationally significant research group at Auckland. This is the ultimate success measure of my approach: I have helped develop the careers of many colleagues that I actively work with.

I was awarded a University of Auckland Teaching Excellence Award for Research Supervision in 2007. Included in this portfolio are letters of support from several current and former students attesting to the quality and impact of my research supervision. I was instrumental in establishing research supervision within the department. When I gained a Lecturership in the mid 1980's the prevailing attitude was to encourage good students to pursue doctorates overseas. Despite my junior position, I was determined to change this attitude, personally supervising three of the first four Department PhDs, proving, by demonstration, that this was a viable pathway for good students.

> In my opinion, he is a perfect model for student research supervisor. He dedicates his time to student priority and knows how to train and motivate students to pursue high quality research.
> - Dejing Zhao, former Masters student now undertaking PhD at Penn State

3.5   Issues specific to Computer Science

There are two areas where teaching in Computer Science differs from other subjects: the relatively low number of women and the relatively high number of English as Second Language (ESL) students. In both cases I have had to adjust my teaching strategies, in the former, to increase the number of women viewing Computer Science/Software Engineering as career options, and in the latter to help students new to English overcome this barrier of understanding as they commence their studies.

Computer Science has major problems attracting women; numbers in majoring classes are typically around 20% worldwide. The reasons are deep rooted. Women often decide in their early teens against Computer Science as an option

they wish to pursue. Perceptions that Computer Scientists are "geeks" lacking social interaction skills and spending all day in front of computers are a major contributor, despite the reality that much of a professional IT worker's role is involved in communicating with clients and end users to understand their needs and collaboratively develop solutions for them. Most commentators suggest that interventions at this early teen level are needed.

While I am supportive of such measures (including active support while a member of the Accelerating Auckland IT Skills project), my own contributions have predominantly been to improve retention rates at University level. Burnett et al's work at Oregon State [1] indicates women have a different view of self efficacy when undertaking programming tasks and this affects strategies for fundamental task such as debugging. I have adapted the results of this work into my own teaching; emphasising explicitly that there are a variety of equally valid approaches to solving basic tasks and providing asynchronous learning resource materials aimed at boosting self efficacy.

It is hard to estimate the practical effect of such interventions in isolation, but one consequence has been a large increase in the number of women working in my research group. I firmly believe that an increase in the number of women role models in the discipline is a necessary precursor for many other initiatives to work so I am delighted at this result. Of the five PhD students I am currently supervising, three are women – a much higher ratio than is typical for the discipline. Many of my recent project students have also been women.

The number of ESL students in Computer Science is high; percentages at the University of Auckland are higher than 50%. I have found that ESL students have difficulty with the rate of delivery in a formal lecture. For this, and other pedagogical reasons, I place less reliance on lectures as a means of resource delivery, preferring a variety of mechanisms including asynchronous and self directed learning and motivational assignments. The former provides a "lower bandwidth" route to knowledge acquisition for students struggling with English comprehension who require more time to acquire and understand material. This must be backed by efficient, typically on-line, mentoring and tutor support via forums, email, and face to face contact. Again, a measure of effectiveness is the research student cohort I attract – all my current research students are ESL.

These techniques are also very beneficial for lower quartile students. The multiple access routes to learnings, particularly asynchronous ones, provide a lower barrier to entry for such students.

4 Assessment

I teach at the practical end of my discipline, but the learning outcomes I am after are deep in nature, so, as with the subject itself, the assessment mechanisms I use are layered.

Much of my formal teaching involves the introduction and application of new technologies. Several levels of understanding are needed to master this type of material and the learning outcomes are similarly layered. At a surface level simple proficiency with the "programming/design games"' needed to access the technology is a basic requirement. For example a (concise version of a) relevant learning outcome for COMPSCI 732 is: "be able construct a simple visual tool using a meta tool". At a meta-level, the approaches needed for this type of skill acquisition are a basic knowledge "building block" for aspiring IT professionals. IT professionals are often required to investigate and apply new technologies so it is vital to develop self efficacy in this process (but noting the gender differences in self efficacy attitudes). Assessment of these skills is mostly formative, using a combination of un-assessed and student-driven lab exercises, self-driven tutorial material and peer support. The summative assignment assessment I use partially assesses these skills, but typically only as an "entry criterion".

At a deeper level is an understanding of appropriate design approaches to use when developing solutions using such new technologies. This may involve new *design patterns* [6] specific to that technology, a contextualisation of existing design approaches, or both. A relevant COMPSCI732 learning outcome is "be able to create interoperable software tools by identification of an appropriate design approach and applying it". Assessment of this level of understanding is the focus of the assignments that I require students to undertake. These typically include a minimal set of requirements (of the form "design and construct a system exhibiting the following minimal set of characteristics") together with an open ended component extending students. The weighting of the open-ended component increases with the student's level of study, and is a significant fraction of the assessment at graduate level.

Assessment requirements are chosen carefully, and students must possess a certain level of design knowledge to achieve them. Assessment is then relatively straightforward by examination of the solution developed and the practicality it exhibits. The creative open-ended component allows an understanding of the range of design understanding (the notion of design "elegance' is an important concept in computer science) and the degree of innovation potential exhibited. In addition, I require students to provide a report explicitly detailing their design approach (a side effect is enhancement of students' technical writing ability, another vital professional capability and degree profile requirement). Reflections in this report allow me to rapidly assess the depth of design understanding and level of contextualisation reached.

Finally, at an even deeper level, is an integrative understanding of how new technologies and their design approaches fit within the pantheon of design techniques. This requires demonstration of critical analysis (strengths and weaknesses, boundaries of applicability) and a holistic/synthetic appreciation (how to best integrate/align this technique with others). Relevant COMPSCI 732 learning outcomes include: "be able to critique in writing a research paper in the area of software tools" and "be able to evaluate software tools according to appropriate criteria (e.g., fitness for tasks, usability)". Elements of these are demonstrated by students in the assignment reports, but the major summative assessment mechanism is the final examination. Short answer and essay questions test this deeper understanding by explicitly requiring students to synthesise learnings across course sections. As formative preparation, students critique relevant research papers, encouraging them to step up from individual approaches/ technologies to a more holistic view, using the papers as exemplars.

The Extenda course adapts this approach and the requisite learning outcomes to a less technical domain. Formative assessment is provided by mentor feedback. Three essay based summative assignments provide the design focus equivalent of my more conventional teaching, focussing on application of a (business) toolset within the company. The fourth summative assignment integrates learnings from the three earlier pieces of work into a set of recommendations for the company. The oral component provides students an opportunity to "fill in" gaps observed in the essay; this proved valuable in the pilot, uniformly exhibiting that students had developed a deep appreciation of the innovation potential (or lack thereof) in the companies and the size and practicality of the culture change needed to unlock it.

The CSI Academy is quite unusual in that there is no summative element to the programme. We have experimented with enrolment of students undertaking the programme in assessed project courses but this added little value in the eyes of the students[4]. The opportunities for formative assessment for the students are many and varied: regular industry and academic mentor and project manager feedback; an oral presentation to the Academy; and a written report to the mentors. Students are sufficiently motivated that they grasp all of these opportunities without the "stick" of summative assessment. There is arguably a summative component providing strong motivation to the students: the reward of ongoing employment by the company (through better matching the broader degree profile requisites).

As outlined in Section 3.4, I afford almost continuous formative assessment opportunities to my research students prior to the summative thesis or dissertation assessment (in which, in many cases, notably for PhDs, I am only an

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[4] Student survey respondent when we had summative project assessment: "I think its all pretty cool, the stuff that's there. Its a bit of a bore having to do that summer school paper though, which really takes the fun away from the main project"

incidental player.) Regular feedback at weekly meetings; "red pen" feedback; encouragement and collaboration in academic paper writing; regular research group seminars on milestone achievements; and encouragement to participate in doctoral symposia and present conference papers all provide an integrated reinforcement that students are "on the right path" in their research activity and lead to a "no surprises" result in the summative assessment.

5 Evaluation

With the range of teaching programmes I am involved in, I have had to use a variety of evaluation mechanisms including: standard student evaluations for my more formal teaching, customised stakeholder surveys for the more novel mentor based programmes, and indicative measures, such as refereed publication acceptance rates of student papers and career tracking, for my research student supervision.

5.1 Formal teaching

My formal teaching approaches are well received, with student evaluations averaging around 8/10 for overall teaching effectiveness. My evaluations are typically in the department's top 20%. The following table summarises teaching evaluations since 2000. It is important to realise, however, that the concentrated focus I have had on developing the novel mentorship programmes and six years as HOD mean the *number* of formal lecture-based courses I have taught over that period is lower than average. The following tables provide a sample of responses to formative feedback questionnaires. Examples of comments made by students as part of these surveys are included in Appendix 5.

Overall, the lecturer was an effective teacher:

Course	Year	Number of respondents	Score /10	% of students who agreed or strongly agreed
415.333	2000	28	8.39	
COMPSCI 735	2002	14		79%
COMPSCI 732	2004	28		82%

The Lecturer was enthusiastic about the subject:

Course	Year	Number of respondents	Score /10	% of students who agreed or strongly agreed
415.333	2000	28	8.13	
COMPSCI 735	2002	14		79%
COMPSCI 732	2004	28		90%

The Lecturer had a positive attitude towards students:

Course	Year	Number of respondents	Score /10	% of students who agreed or strongly agreed
415.333	2000	28	8.66	
COMPSCI 735	2002	14		79%
COMPSCI 732	2004	28		89%

In addition to formal teaching evaluations I use informal feedback mechanisms. Included in the written report requirements for assignments I regularly include questions of a more reflective nature (e.g. suggestions for improvements in resources) that I mine for ideas for improvements (e.g. this year we have improved the ability to install our research software on lab machines, a frustration not apparent until report mining). All my teaching is done in team teaching situations and I regularly share my lecture notes with my colleagues for both their comment and their own use and refinement (as they do with their notes). This shared refinement process is an extremely important quality control and quality improvement mechanism. I learnt many years ago that it was important to remove the ego associated with "ownership" of my lecture notes in favour of collaboratively enhancing quality across the "college".

Informally, I am regularly approached by former undergraduate and postgraduate students I have taught when at industry events or visiting companies and complimented on the quality of teaching I provided. These former students are often in managerial roles and motivated to build relationships back to the University that provided them a career entrée. I also regularly provide ongoing career advice to former students as an extension of the mentoring roles I played earlier in their development. I find these linkages a rewarding affirmation of the efficacy of my approaches.

5.2 Degree majors

Degree majors are regularly reviewed as part of the Department Review mechanism run by the University. The BE(SE) programme has had additional reviews through IPENZ accreditation and a Graduating Year Review.

Both programmes are highly popular (several hundred BSc(CS) and ~60 BE(SE) graduates pa) and produce arguably the most employable Bachelors graduates of any general programme nationally. Employers are highly complimentary of graduate quality.

The 2005 Department of Computer Science review stated that "the Review Panel was impressed by the strength of the academic programme". The 2006 Graduating Year Review for the BE(SE) stated: "The first graduating class responses were positive and indicated that the programme gave them the
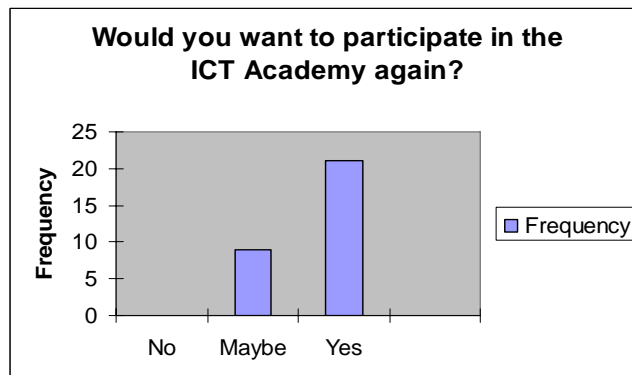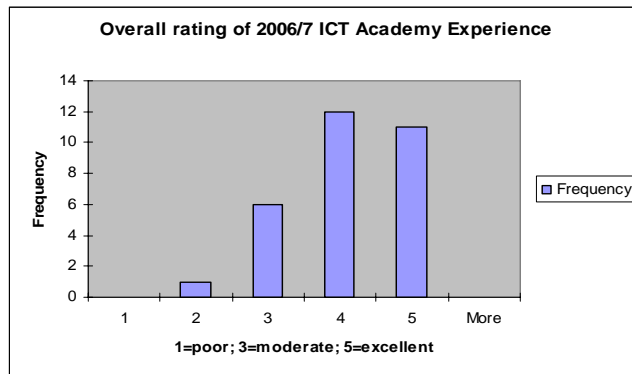
'student profile' that they had expected and they had found it easy to get employment."

It concluded: "From the point-of-view of this review, the degree is certainly meeting its academic and its stakeholder intentions, and is providing a valuable addition to the spectrum of IT programmes available in New Zealand."

The programme recently received a maximum length IPENZ accreditation.

5.3 CSI Academy

The programme, completing its fourth year, has had excellent support from students and industry, generating over $150k pa industry revenue[5]. Student project numbers have been 25-35 pa, with more than 100 students successfully completing the programme. Company feedback is strongly positive. Companies are impressed with student capability, being surprised at their productivity and work quality. This has had a positive effect on their view of student recruitment and internships. Exposure to sound project management is a beneficial secondary outcome for both students and the SMEs. Student feedback has been positive, exemplified by the over subscription rate (typically 80+ students apply pa). We annually survey participants. Two graphs from 2007 indicate a high level of satisfaction with the programme.

Overall rating of 2006/7 ICT Academy Experience

Would you want to participate in the ICT Academy again?

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[5] Minister Cunliffe was kind enough to launch our Academy as one of his earliest acts as Minister for ICT. He has retained an interest in its development since then.

Student comments included the following:

> When we started the project, we didn't have any knowledge of the field at all. It was a great learning experience, and at the end we were really comfortable with the technology we were using.

> Loved the topic. It gave me experience I would never have had without going through the Academy.

More details from the survey are in [10]. These surveys are used to continually and reflectively refine the programme. Changes include better focus for the seminar programme; a lighter weight in-house project management approach; a streamlining of the contracting process; a move to the interns being based in the industry premises (initial years used both company and University premises) and academic mentor role modifications to better fit project needs.

We have seen a high employment rate of academy "graduates" and an excellent progression of industry-academic relationships. Involvement of industry and academic mentors could be seen as overkill for an internship, but the resultant trust building is valuable. Two spinout companies have resulted from academy projects. Many companies continue sponsorship into capstone projects and research contracts, and either return in following years or, equally valuably, set up their own internship programmes. A beneficial side effect has been an increased pool of "pracademics", people comfortable in academia and industry. Industry pracademics readily provide practitioner lectures, support research contract bids, etc; academic pracademics better understand business drivers and participate in industry projects. There has been strong progression of students from Academy membership into the Spark* business planning competition: 3 of the 10 team finalists in 2007 contained Academy graduates.

The Academy has been adopted by Accelerating Auckland, the regional ICT skills development initiative, as its model for a regional internship programme. They have, with our assistance, provided the programme (under different branding) to two other TEOs and envisage a national rollout [1]. A reference from Accelerating Auckland's Judy Speight is in Appendix 7

I recently visited Otago University by invitation to advise them on development of an Academy-style scheme and am in discussion with the Wellington-based "Summer Of Code" internship programme organisers and FRST concerning a national federation of internships. Other developments I have planned include a "Postgraduate Academy" to enhance the number of industry sponsored Masters and PhD projects undertaken (FRST is very keen on this) and a part time Academy, run during the teaching semester.

A keynote speech I gave to the 2006 Australian Software Engineering Conference on industry-academic interaction featured the Academy concept,

attracting strong interest from G8 colleagues with both Melbourne and Queensland Universities keen to consult on establishment of similar programmes and an invitation to repeat the presentation at ANU [8].

5.4 Extenda

The Extenda programme piloted in semester two, 2007, with five companies and 10 students participating. The relatively small number of participants meant a quantitative survey was inappropriate. A qualitative approach used third party phone interview of stakeholders plus open ended survey forms. Results show the company interventions (company learnings) and personal development for the students have been valuable. Highlights include:

- Five students were offered jobs by their companies; one commencing work before programme completion
- Students found the programme to be well conceived and valuable, but with work required around its organisation
- One company has gained a large FRST grant which they credit to the workshop experience; The University of Auckland is the research provider
- All companies except one have instituted technology road mapping programmes; recognising they were inappropriately prioritising product features
- Two companies have implemented stage gate product development strategies
- Several companies are moving to formalise their IP management approaches

It is clear we need to: focus some of materials to a more accessible level for SMEs; more rigorously qualify companies against acceptance criteria; and apply our Academy project management approaches to Extenda. These changes will be effected in this year's programme. Student learning has been significant. Student insight into the companies' innovation approaches and changes needed demonstrated in their oral exam was typically superb (for both Business and IT students). The experience of parallel mentoring of students and senior management has been informative.

The Extenda programme has attracted considerable interest. Otago University (Professor Brendan Gray) is working with us on developing an Extenda equivalent. We anticipate collaborative development of further Extenda modules. I am also using the Extenda road mapping module standalone for in-company training of industry clients as a precursor to more substantial research relationships.

5.5 Research supervision

I evaluate my research supervision by regular interaction with my students; feedback from my co-supervisors on the adequacy of my supervision;

acceptance of the students' work in the international community and career tracking after they have graduated. Appendix 2 lists my research students and their characteristics. Features apparent include:

- Encouraging students through to research has been successful with a strong flow of students from coursework through projects and into theses
- I have supervised 6 PhD and 23 Masters and more than 50 research project and dissertation students to completion. I am currently supervising 5 PhD and 3 Masters students. I have also supervised more than 50 project/dissertation students.
- A relatively large number of the students I supervise continue onto doctoral study; 19 of my students are currently pursuing or have completed a PhD. These numbers may appear modest for some disciplines, but are very high for Computer Science, which has a low conversion rate to postgraduate study due to industry demand for graduates.
- Many of my PhD students have been attracted back from industry positions.
- Many of my research students have continued on into academic and business leadership roles. Within academia, one student is now a Professor, two are Associate Professors, two are HODs, one is a Degree Programme Leader and another a Research Manager. In industry, two of my students are now company CEOs and one a Boston venture capitalist.
- All my PhD graduates have secured Academic positions. In most cases I have had an active role in securing their early career positions.

Of my approximately 160 refereed papers, fewer than 20 are NOT co-authored with students or former students (Appendix 4). I have co-authored research publications with all my PhD students and almost all my Masters thesis students. These collaborative publications include a high proportion in the highest ranked publication avenues in my research area. There is an expectation from the research community that my students' work will be of high quality, worth understanding and worthy of benchmarking against.

My research supervision record recently resulted in an invitation to keynote at the AUT School of Computer Science Student Research Conference. There I gave a presentation on research agenda establishment and was invited to write a special issue paper on this subject [9].

5.6 *HeadsUp*

HeadsUp is regularly reviewed. Conclusions were similar across each year of my involvement; those from 2004 [11] concluded:

All of those interviewed …said that the programme was worthwhile.

Future Heads valued the opportunity to prepare for a more senior role and in general, their expectations of the programme were met or exceeded. New Heads

appreciated the induction it gave them to the role. Current Heads .. said how the skills and support the programme offered to New and Future Heads addressed the sorts of issues they personally encountered when they were new to their roles. All those interviewed had, or would, recommend the programme to others.

Future Heads ... described a number of personal and professional benefits they had gained from participating including: greater personal confidence, increased skills in handling difficult conversations, a clearer concept of leadership, sanctioned time out to think about one's career direction and a sense of being valued by the university.

6 Professional Development and Leadership

I regard professional development of colleagues (including myself) as an automatic extension of my other teaching roles: a direct application of "colleague development". My HeadsUp role has been one of my more satisfying contributions to peer professional development. Although I completed my headship in 2006, I still regularly mentor new HODs through HeadsUp, and advise mentors and mentees on structuring mentoring arrangements to maximise benefit.

During my six years as HOD, I oversaw the department's teaching programme delivery. This required monitoring my colleagues' teaching effectiveness and performance and, where necessary, proactive intervention to assist those struggling to improve performance. These interventions were typically holistic; I have found poor teaching effectiveness to usually derive from multiple underlying causes, each of which needs to be dealt with (and counter intuitively is rarely due to a lack of presentation skills).

As an example, one colleague had a sudden decline in teaching performance. I proposed a range of interventions, including a peer reviewer for teaching, CPD consultations on lecture material development, and a peer mentor for research activity (also affected). This combination of peer resources rapidly assessed the underlying problem to be a lack of time management skills rather than a curriculum design or presentation issues. After a time management course the colleague's teaching evaluations improved into the upper quartile for the department and his research productivity flourished, a truly satisfying result.

I also involve myself in much informal peer mentoring of department colleagues (in addition to the large amount I provided over six years as HOD). As evidence, I have published papers with most members of the Software Engineering Research Group; I regularly cross supervise research students; and have assisted most members to obtain research grants from a variety of sources, including: Marsden Fund; Foundation of Research, Science and Technology New Economy Research Fund and Research for Industry funding; Microsoft Research; Tertiary Education Commission Growth and Innovation Pilot Initiatives; and the Vice-Chancellor's Strategic Development Fund.

In my more formal teaching, I team teach all of my courses and, as mentioned earlier, I have a strong philosophy of sharing my teaching resources with colleagues (as they do with me) to provide an enhancement of our overall teaching abilities. Due to the rapidly changing nature of my discipline, currency of content is vital. I typically revise at least 20-30% of any course I am involved in delivering in any one year. These regular content revisions also provide an opportunity to experiment with teaching innovations; if you are revising regularly for content it is little extra overhead to reflectively revise delivery methods as well.

The non-conventional approaches of the Academy and Extenda programmes exemplify the experimentation I embrace. I also regularly use my research and study leave as an opportunity to reflect on my teaching contributions and make observations on curriculum developments and teaching approaches at other institutions I visit. Most of the new courses I have developed have resulted from such periods of observation and reflection.

7 Conclusion

Education is the key to career success. Being entrusted to provide that key to my students is a privilege I cherish and which brings with it a responsibility to deliver to them the best educational experiences I can provide. I continually seek to improve those experiences by reflective experimentation, being increasingly drawn to approaches that integrate and extend the formal curriculum in a holistic experiential manner within a safety net of careful mentoring. I was initially an accidental educator, but I am now firmly committed to this sometimes challenging, but always fascinating career. Seeing the achievements my students reach with their educational key is the ultimate in career satisfaction.

"We make a living by what we get, we make a life by what we give." Winston Churchill

Appendix 1: References

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3. CSI Academy website,
   http://www.cs.auckland.ac.nz/research/groups/ict/ict.php?module=home

4. CSI Academy project exemplars,
   http://www.cs.auckland.ac.nz/research/groups/ict/ict.php?module=furtherInfo

5. Extenda website, http://www.csi.ac.nz/services/extenda

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   http://guitargeek.com/rigview/379/

8. John Hosking, The Software Engineering Academy's Role in Industrial Innovation, keynote speech to Australian Software Engineering Conference, Sydney, April 2006 (repeated by invitation to ANU Department of Computer Science April 2006). A copy of the slide set and resulting discussion paper are included on the supplement CD

9. John Hosking, Did the Earth Move For You? Setting and Maintaining Your Research Agenda, BACIT 4(2) October 2006, http://www.naccq.co.nz/bacit/0402/ A copy of the slide set and resulting discussion paper are included on the supplement CD

10. ICT Academy report 12. A copy is included on the supplement CD

11. Sutton, A, Evaluation of the 2004 Academic HeadsUp programme at The University of Auckland, Critical Insight, June 2005

Appendix 2: Research students supervised

PhD theses supervised

Name	DOC	Title & Background	Co-supervisor	Current position
Santokh Singh	2006	Supporting web services specification using aspect oriented component engineering Commenced MSc thesis; converted to PhD	Grundy	Research Programme Manager, Auckland Uniservices Ltd (passed away Feb 08)
Xiasong Li	1999	A Petri Net Based Technique for Graphical User Interface Design	Mugridge	Lecturer in Computing and Information Technology, Unitec
Robert Amor	1997	A generalised framework for the design and construction of integrated design systems Attracted as RA after he completed MSc at VUW. Encouraged to pursue PhD	Mugridge	Associate Professor and HOD Computer Science, UoA (attracted back to UoA from Research Leader position at Building Research Establishment, UK)
John Grundy	1993	Multiple textual and graphical views for interactive software development environments Returned from industry to undertake MSc, then PhD		Professor of Software Engineering and HoD elect ECE Dept UoA (attracted back to UoA from Senior Lecturer position at University of Waikato)
John Hamer	1990	Expert Systems for Codes of Practice Commenced MSc thesis, converted to PhD		Senior Lecturer in Computer Science UoA (employed as BRANZ funded Research Fellow following PhD, then UoA Lecturer / Senior Lecturer)
Rick Mugridge	1990	Enhancements to an Object Oriented Language Returned form industry to pursue MSc. Encouraged to pursue PhD.		Formerly Associate Professor in Computer Science UoA, now CEO Rimu Research (undertook staff PhD while UoA Lecturer)

Current PhD Thesis Supervision

Name	Title & Background	Co-supervisor	Current position
Karen (Na) Li	Visual Languages for Event Integration Specification Previous Honours project, encouraged to pursue PhD	Grundy	Under examination, Senior Tutor, Student Learning Centre, UoA
Richard (Lei) Li	Process Integration Support Massey,MSc; attracted to UoA for PhD	Grundy	Completing early 2008, Project Manager, Auckland Uniservices Ltd
Hermann Stoeckle	Visual Language support for program development and comprehension	Grundy	Completing early 2008, Software Consultant Germany
Rainbow Cai	Software architecture modelling for performance engineering Previously undertook MSc (Grundy); Research Assistant position with our group then encouraged to pursue PhD	Grundy	Completing early 2009
Norhayati Mohd. Ali	Generalised critic support for metatools Malaysian scholarship student attracted to UoA to undertake PhD	Grundy	Completing early 2010

Masters theses supervised

Name	DOC	Title & Background	Degree	Co-supervisor	Current Position
Yang Max Wang	2007	Developing Efficient Mobile Agent Systems Using Aspects Previous BSc(Hons) dissertation with me	MSc	Grundy, Singh	Software developer, Auckland
Yafei (Max) Xiang	2006	View Specification of Multi-View Visual Environments	MSc	Grundy	Software developer, Auckland
Vishavdeep Sharma	2005	Comparison of two persistence technologies in Java	MEngSt	Grundy	Software developer, Auckland
Akhil Mehra	2005	Adding Awareness to Design Tools Using a Plug-In, Web Services Based Approach Previous PG project with me	MSc	Grundy	Software Developer, Orion Health, Auckland
Chul Hwe Kim	2005	A Suite of Visual Languages for Statistical Survey Design	MSc	Grundy	Software Consultant

Name	DOC	Title & Background	Degree	Co-supervisor	Current Position
		Previous PG and summer projects with me			Sofismo, Switzerland
Joe(Dejin) Zhao	2004	MUPE thin-client interfaces for Pounamu Previous PG project with me	MSc	Grundy	Pursuing PhD at Penn State University
Therese Helland	2004	Web Service-based Workflow Tool Previous PG, summer projects with me	MSc	Grundy	Senior Knowledge Engineer, Computas, Norway
Shuping (Penny) Cao	2004	Thin-client Diagramming Tools	MSc	Grundy	Software developer, Auckland
Kelvin Jin	2003	Event-handler Specification for Software Tools	MSc	Grundy	Software developer, Auckland
Qi Chen	2003	Sketching-based UML Design Tool	MSc	Grundy	IT coordinator, Auckland District Health Board
David Mapelsden	2001	Tool support for design patterns	MSc	Grundy	Senior Software Architect, Orion Health, Auckland
See Wong	1999	A Visual Object-Oriented Business Modelling Environment	MSc	Mazany	Software developer SmartSims (commenced PhD but did not pursue due to lack of funding)
Vincent Chung	1999	3DComposer - A visual builder for 3D notations	MSc	Mugridge	IT Manager, Dept of Mathematics, University of Auckland
Jarno Van der Linden	1998	Querying in program visualisation Previous PG project with me	MSc	Mugridge	Completed PhD, University of Auckland (Lobb supervisor), now independent consultant

Name	DOC	Title & Background	Degree	Co-supervisor	Current Position
Shaun Blackmore	1994	Quantum: A dual constraint propagation and multi-paradigm programming language	MSc	Mugridge	CEO Activate Technologies, Auckland
Stephen Fenwick	1994	A Visualization System for Object-Oriented Programs Previous PG project with me	MSc	Mugridge	Completed PhD ANU, Technology Development Specialist, Concept to Market, Auckland
John Grundy	1991	A Visual Programming Environment for Object-Oriented Languages See above	MSc		Completed PhD with me, now Professor of Software Engineering and HoD elect, Department of Electrical and Computer Engineering
John Clausen	1989	User Interface and Control Issues in Expert Systems	MSc	Mugridge	Lost contact
Christopher Fromont	1989	An investigation of knowledge based design	MSc	Mugridge	Employed by BRANZ (who funded thesis) as a research scientist
Steven Lomas	1988	An expert system for a seismic loadings code	MSc	Mugridge	Lost contact
Lee Booth	1987	Qualitative Reasoning	MSc	Mugridge	Lost contact
Ross Clement	1987	The Automatic Generation of Expert Systems from Examples	MSc	Mugridge	Completed PhD at Toyohashi University, now Senior Lecturer, de Montfort University, UK
Martin Buis	1986	The construction of expert systems	MSc	Mugridge	Senior Software Architect and Venture Capitalist, Connecticut

Current Masters Thesis Supervision

Name	Title & Background	Degree	Co-supervisor	Current Position
Abizer Khambati	Healthcare planning tool Previous Part IV project with Warren & Grundy	ME(SE)	Warren, Grundy	Completing March 08
Christian Hirsch	Visual wiki German exchange student. Attracted to pursue MSc thesis after taking our PG course	MSc	Grundy	Completing July 08
Espen Moeller	Service oriented adaptive enterprises Informal supervision via recommendation by other students	MSc (SINTEF, OSLO)	Arne Jørgen Berre	Completing July 08

I have also supervised more than 50 project/dissertation students including many listed above. Notable amongst additional project students are:

    Nodira Khoussainova, pursuing PhD at University of Washington
    Hadley Wickham, pursuing PhD at Iowa State University
    Blazej Kot, pursuing PhD at Cornell University
    Matthias Fischer, Research Fellow and pursuing PhD at TU Dresden
    Richard Barker, completed MSc, University of Auckland
    Anne Philpott, Senior Lecturer and Programme Leader in Computer Science, AUT

Appendix 3: Refereed publications with past and current students

Refereed Journal Articles:

1. Chen, Q., Grundy, J.C., Hosking, J.G. SUMLOW: Early Design-Stage Sketching of UML Diagrams on an E-whiteboard, *Software Practice and Experience*, in press.
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4. Stoeckle, H, Grundy, J.C, Hosking, J.G., Approaches to Supporting Software Visual Notation Exchange, invited paper accepted for publication in *Journal of Visual Languages and Computing*, **16(3**), 187-212, 2005.
5. Grundy, J.C., Ding, G., Hosking, J.G., Deployed Software Component Testing using Dynamic Validation Agents, *Elsevier Journal of Systems and Software* **74/1** pp 5-14, 2005
6. Grundy, J.C, Hosking, J.G., Amor, R., Mugridge, W.B., Li, M. Domain-specific visual languages for specifying and generating data mapping system, *Journal of Visual Languages and Computing*, vol. 15, no. 3-4, June-August 2004, Elsevier, pp 243-263
7. Grundy, J.C., Hosking, J.G., SoftArch: tool support for integrated software architecture development, *Int Journ Software Eng and Knowledge Eng*, Volume 13, Number 2, 125-152, April 2003
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Appendix 4: Sample assignment resource

SOFTENG 450
Assignment #1
Due by 5pm, Thursday 5th April 2007

Introduction

In this assignment you will develop a simple multiple view, visual software development support tool using a meta-tool technology developed at the University of Auckland, called Marama[*]. You will write a short report that describes the motivation for the choice of your tool, how you built it with Marama, and its strengths and weaknesses.

You may work individually or in a group of two or three for this assignment. However, you will all each **individually** submit a report of your own for assessment. I expect you to spend roughly the same amount of time and put in the same amount of effort on the assignment whether working individually or in a team. Those working in a team will indicate whether any group member spent significantly less time/effort than others and this may influence overall grades for individual reports.

Software Tool Construction Task

Building software engineering tools is a time-consuming, complex task. Particularly challenging ones are those that involve the use of diagrammatic notations, multiple representations, or views, on a notation, code generation, reverse engineering and collaborative work support. Meta-tools are software engineering tools developed to make building such tools somewhat easier. We have been developing a software meta-tool called Marama, which you will use in this assignment to develop a simple multiple view software tool.

Obtain the Marama core meta-tool from the SOFTENG 450 assignment web page and read the short paper. Work through the tutorial to familiarise yourself with the key facilities of the meta-tool.

Decide on a small multiple view visual software engineering tool that you will develop a prototype of using Marama. I don't mind much what the tool is. Some example application areas I have indicated below:

- Software process modelling – www.cs.auckland.ac.nz/~john-g/papers/ic98.pdf
- Software architecture design – www.cs.auckland.ac.nz/~john-g/papers/ijseke2003.pdf
- Aspect-oriented design – www.cs.auckland.ac.nz/~john-g/papers/ncws2003.pdf
- Design pattern modelling – www.cs.auckland.ac.nz/~john-g/papers/tools2002.pdf

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[*] Marama is the Maori word for moon – the moon generates an Eclipse… ☺

- Entity-relationship modelling – www.cs.auckland.ac.nz/~john-g/papers/ooer95.pdf
- Data mapping specification – www.cs.auckland.ac.nz/~john-g/papers/hcc2002.pdf
- Statistics design tool – www.cs.auckland.ac.nz/~john-g/papers/vlhcc2005.pdf   [this is based on an extended 732 assignment from 2 years ago using a predecessor Marama…!]

A non-Software Engineering tool application is also allowable e.g. a "family tree" editor for genealogy research, but check with me first! Your prototype should have:
- At least three meta-model entity types and appropriate associations
- At least three different iconic shapes, possibly of differing complexity (of the shape image)
- At least two different shape connectors
- At least two DIFFERENT view types i.e. that show different kinds of information within the view types
- A few simple event handlers managing things like diagram layout, editing constraints, model (entity) constraints, mock code generation, data import, …

Report

Write a short report of **no more** than 3 pages in IEEE CS Press format which describes:
- The motivation for your tool – why did you choose to implement a prototype of this tool and how will it help software engineers?
- A description of your tool's facilities
- An example of the tool in use, showing appropriate screen dumps etc
- A description of how you built the tool in Marama – meta-model, shapes, view types, event handlers etc
- An assessment of your tool
- An assessment of Marama's suitability for building your prototype, together with suggestions for five improvements you would like to see with Marama
- A summary of the contributions of each team member to the project if working in a group

YOUR REPORTS MUST BE YOUR OWN, INDIVIDUAL WORK – DO NOT COLLABORATE IN WRITING THESE, EVEN ON THE CONTENTS OF THEM!!! Do not even show your report to your team members if you are working in a group. I want to judge YOUR individual ability to report on the work you have done.

Submission

Submit your individual reports as a Word or PDF document and your Marama tool project files in a single ZIP file via the assignment drop box on or before 5pm, Thursday 5th April 2007.

This assignment is worth 12.5% of your final mark for SOFTENG 450. You should aim to spend around 25 hours on this assignment.

Appendix 5: Quotes from students and other stakeholders

"John always had an answer to student questions" Anonymous student survey respondent

"He just was good at explaining things and didn't just read the slides. Very good lecturer" Anonymous student survey respondent

"Friendly and humorous attitude" Anonymous student survey respondent

"Quality of the assignment work and handout quality" Anonymous student survey respondent

"It was a very good experience, the learning curve was exponential and the surrounding help was excellent" Anonymous Academy student survey respondent

"It was a very good project and helped me build up myself and gain some good experience" Anonymous Academy student survey respondent

"Very happy with the students and the quality of the work they did." Anonymous Academy industry mentor survey respondent

"It was a real pleasure to meet you, and I was very impressed with what you're doing with the CSI Academy and trying to engage business in general." Geoff Leyland, Incremental Limited, Academy industry participant

"The presentation from you and John Grundy on road mapping and technology planning was excellent - it was the meat that Eugene, Konstantin and I got stuck into to do our work." Barry Dowdswell AARN Innovation, industry participant in Extenda programme

"You are covering some excellent material - it's great to see this coming out of the universities." David Stokes, Sopheon, industry guest at Extenda programme presentation

"Very good listener. Always able to help whether it is teaching, funding or admin business (has an amazing insight of the uni business" Anonymous respondent to 360 degree feedback survey while I was HOD

"Very capable in terms of initiating academic achievement and structural developments within the department" Anonymous respondent to 360 degree feedback survey while I was HOD

"I have known Prof. Hosking since 2004 when I attended his course about software tools. He was excellent in lecturing. The way he presented the software concepts made the abstract theory easy to understand. From then, I started to like Software Design and later decided to do my research in this area. It has been two years now since I left the University. Thanks to my experience in research with Prof. Hosking, my career has taken off. Unlike regular software programmers, I can choose to become a programmer,

business analyst, software designer and a lot of other possibilities. With the research methodology he taught me, I could think differently, be creative and stand out in the career development." Sydney Xing, former undergraduate and research project student, now Software Designer in Australia

"He dedicates his time to student priority and knows how to train and motivate students to pursue high quality research. He is a great professor in a sense of very knowledgeable on research design and methodology and loving to share his extensive knowledge with students. He provided me with great mentoring in how to identify the research questions, design research projects, design and evaluate software systems, and academic writing. These knowledge and experiences that I learnt through working with Prof Hosking provided me a very important foundation for the further research work in my PhD study." Dejin Xhao, former MSc thesis student, now pursuing a PhD at Penn State.

"During my time at the University of Auckland, John was a lead player in many research initiatives, and supervised numerous research projects. He was a very enthusiastic and motivating mentor who also worked actively with the industry, resulting in many interesting contacts within the field of his research. His research projects were therefore highly relevant and gave great opportunities for future careers." Therese Helland, former undergraduate and Masters thesis student, now Senior Knowledge Engineer, Computas, Norway.

"This is a fast moving area with considerable design challenges. John always stays beside me to offer his best support. When I was frustrated by unsuccessful applications, his encouragement was there; when I got lost in the research direction, his guidance was there; when I went too far away from my objectives, his warnings were there; when I felt nervous during the work, his jokes were there. I cannot imagine my PhD research without John's input." Richard Lei Li, PhD student

"For my PhD-studies at the University of Auckland I had chosen Prof. Dr. John Hosking as my co-supervisor. The initial reasons were his internationally well known experience on the research topic I was interested in and that he is very versed in guiding students through all stages of their research projects. Looking back from today (approx. 5 years later), this was one of the best decisions I have ever made. I have expected to obtain a good high-level guidance, hints to keep on track from time to time and a standard support during my research; but I had recognized very soon that his dedication was far beyond. He was always reachable on short call for us students when we had problems, even when he was abroad. His advice and ideas were very inspiring and very often on second thoughts the straight and more evident way to approach a problem. His guidance for thesis preparation and writing research papers was superb; his feedback was pinpointing on open issues and he gave possible hints to close the gap. Not only have I appreciated his pedagogical skills over the years, but also his very good support for us students by linking our projects with external project fundings. This gave us beside a good financial aid additional insights and practical experience into the relevance of our research projects for the industry. In retrospective, I rate his mentoring absolutely as excellent and outstanding; it was not a teacher-student relation, but rather a research colleague relation." Hermann Stoeckle, PhD student, just completing write up

Appendix 6: Letters of reference

Letters from the following colleagues are included:

Professor John Grundy, HOD Electrical and Computer Engineering, University of Auckland
> John is a former research student and currently active collaborator in both research and teaching

Karen Li, Senior Tutor in the Student Learning Centre, University of Auckland
> Karen is just completing her PhD (currently under examination) under my supervision. Karen took undergraduate and postgraduate papers which I taught, then undertook two research projects with me before enrolling in her PhD.

Dr Santokh Singh
> Santokh is a former PhD student and colleague in the Centre for Software Innovation at the University of Auckland. Santokh recently and tragically passed away. The letter is one he wrote in support of a Teaching Excellence I received from the University of Auckland. In one of the last conversations I had with him, he expressed his delight at the award and his support for this application. He unfortunately died before he was able to revise his letter, but the sentiments in the letter are ones that I treasure.

Associate Professor Robert Amor, HOD Computer Science, University of Auckland
> Robert is a former Research Assistant and PhD student. While HOD I attracted him back to Auckland from the UK and he succeeded me as HOD.

Judy Speight, director of ITT WRKZ Limited
> Judy is the leader of the Accelerating Auckland project. I have worked closely with this group to assist them in establishing their Regional ICT Internship Initiative, essentially a clone (with our blessing) of our own Academy operation

Kim Hope, director, Kim Hope Consultancy
> Kim was former co-director of the Centre for Professional Development at the University of Auckland and University Council member. I worked closely with her on the HOD Task Force and the establishment and operation of the HeadsUp programme

ELECTRICAL AND COMPUTER ENGINEERING
Faculty of Engineering

Professor John Grundy
BSc(Hons), MSc, PhD

Professor of Software Engineering

Head of Department

THE UNIVERSITY
OF AUCKLAND
NEW ZEALAND
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The University of Auckland
Private Bag 92019
Auckland Mail Centre
Auckland 1142, New Zealand

29th February 2008

To Whom It May Concern

Prof. John Hosking was my supervisor for my MSc and PhD supervisor many years ago. John encouraged me to undertake a Masters degree even though I was at that time working in industry and was not intending to complete further University study after my BSc(Hons) degree. After completing an MSc I then decided to undertake PhD study under John's supervision, completing the PhD in little over two years. I then took up a Lectureship at the University of Waikato.

John was instrumental in both ensuring I completed my PhD – which I found to be rather hard-going – and encouraging me to look at an academic career in preference to several industry job offers I had at the time. John's approach was very much one of developing a colleague rather than supervising a student, one I found both refreshing and rewarding. John put a large amount of time and effort into his mentoring of me during my PhD study, including assisting me with understanding literature review and critiquing, structuring and managing a research programme, attendance at international conferences to network and introducing me to the academic publishing game.

In recent years he and I have co-supervised over twenty Masters and PhD students together. I have been even more impressed when working with John in this co-supervisory role with his dedication, insightfulness, motivating and enthusiastic approach, pastoral care of research students, empathy, caring and sheer excellence. This is not only restricted to supervising and mentoring students to successful research degree completions, but also support and encouragement of them in publication of their work and in seeking initial positions for their academic and industrial careers. This holistic approach to research supervision is what I consider to be very much "best practice" in the University and wider academic community.

John is probably the most experienced post-graduate supervisor in Computer Science – nearly two dozen PhD and around 40 Masters students that he has or is supervising plus a number more that he has co-supervised. The benefit to the University of his excellence in supervision and mentoring is demonstrated by the number now working or have recently worked for us – PhDs including 1 Professor (myself); 2 Associate-Professors; 1 Senior Lecturer; 1 Senior Tutor, a Research Manager (for UniServices); and at least two Masters

graduates (that I know of). His reputation and popularity as a supervisor means he and I have one of the largest groups of post-graduate students in the Department.

These days we take a joint approach to supervising all of our shared PhD and Masters students, sharing the responsibility and workload. This has enabled us to maximise the benefit to students and form a true research group culture. I believe this has demonstrated a further evolution of John's supervisory approach – to one of full collaborative post-graduate supervision – with a number of benefits to students and myself – joint publications, ability to manage larger numbers of post-graduate students while maintaining quality of supervision, and improved outcomes for the students and Department. This approach will need to be pursued by other groups of academics to enable the University to realise its ambitious growth targets in post-graduate numbers. John will again be at the forefront of best practice in this regard and will be able to impart our experiences and success in true co-supervision of large post-graduate student cohorts.

John's approach to supervision is as a mentor i.e. a senior colleague to junior colleague. He allows his students great freedom to set priorities, plan research programmes, decide where to publish work and how to go about their research, but provides hands-on guidance, encouragement and support. He meets very regularly with students, very often putting their needs and issues above demands from elsewhere, even when he was Head of (a large) Department, and even to the expense of his own research interests. I have learnt a tremendous amount about research supervision from John – when to intervene; when to guide; when to support; when to be hands-off; how to mentor; how to help publish; how to support future career planning. John has been very willing to share his experiences with other Department members as co-supervisor and on CPD courses. His "Loch Ness Monster" (the ups and downs of research work and how to cope with it) and "Spoon to Wheelchair" (initially students spoon-fed; then by end of research degree as the experts they wheel their doddering old supervisors around) have become often-repeated guidance to students and staff!

John and I have regularly co-taught a number of undergraduate and post-graduate courses together, particularly over the past several years. We have developed a true co-teaching strategy where we share the lecturing between us during the same period of the course we teach e.g. each of us teaching roughly the same number of lectures but inter-mingled rather than consecutively. We have developed a large corpus of lecture notes in software engineering tools and methods, visual languages, model-driven engineering, software architecture, design and evaluation of software. We utilise in-class exercises and tutorials, laboratory exercises, and research paper analysis and class presentations, along with traditional chalk-and-talk approaches. This has proved to be a rather unique approach in Computer Science and Software Engineering teaching at the University of Auckland but one I am very keen to see more widely adopted.

John has lead the development of new ventures with industry building on his excellence in post-graduate research supervision. Two examples of note are the ICT Academy and Extenda programmes, seed funded initially by TEC GIPI grants. The ICT Academy provides an internship scheme for companies and associated careful project management

of student projects. While we have had a number of short-term post-graduate research projects using this approach John is now developing a "Masters Academy" based on this concept to facilitate industry-based research Masters degrees. The Extenda programme pairs Business and ICT students to work with small companies to assist them developing an R&D culture. This innovative venture is also being developed further to support Masters and potentially PhD research with the companies, pairing Business and Technology post-graduates to leverage their skills in a cross-disciplinary approach.

A further spin-off is an "Academic Academy" where John envisages nurturing of other academics to enable them to be more "industry savvy" and develop their capabilities for supervising Masters and PhD projects with strong industry collaborations. John is an expert in supervising applied research projects and hence this is another venue for him to impart his knowledge and skills in this area to benefit a much wider footprint of post-graduate students by developing their supervisors.

John has been very self-sacrificing in the amount of time he has devoted to the development of his post-graduate students and the supervisory skills of his colleagues, including myself. He didn't have to spend as much time as he has – often to the detriment of conducting his own research or writing up results – but when called upon to assist post-graduate students or colleagues in these areas has always been extremely willing.

In summary, John is an exceptionally gifted research supervisor, has demonstrated this excellence over many years and a very large number of students have, are and will benefit from this. Probably most importantly John has invested much time and energy in nurturing future excellent research supervisors at the University (I hope to be able to claim this label myself in due course!) and beyond via contribution to Doctoral Symposium panels, panels on post-graduate research and keynote addresses on developing post-graduate supervision.

Yours Sincerely

John Grundy, PhD
Professor of Software Engineering

The University of Auckland
Private Bag 92019
Auckland, New Zealand

THE UNIVERSITY
OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

To **The Tertiary Teaching Excellence Awards Committee**	
From **Karen Na-Liu Li**	
Date **12 March 2008**	Telephone Ext. **88964**
Email **k.li@auckland.ac.nz**	

Re: Nomination of Professor John Hosking for "Tertiary Teaching Excellence Award"

Dear Committee Members,

I am Karen Na-Liu Li, an undergraduate, postgraduate and doctoral student of Professor John Hosking over the past six years. I am writing to express my acknowledgements to John for his excellence in teaching and research supervision, and my strong desire to nominate him for the national Tertiary Teaching Excellence Award.

John has continuously been a respectful lecturer, active researcher and experienced supervisor in Computer Science and Software Engineering with well-known achievements. He has flexibly taught many students across undergraduate, postgraduate and doctoral levels, and provided us with excellent learning support. I was lectured by John initially in a stage-three undergraduate course in 2002. An excellent teacher means a lot more to me than to others, as I had previously received a complete tertiary education in my home country and had been trained in various professional ways. With this background, I knew clearly what I needed to learn and how best I could be taught to learn. John's every lecture was impressive to me. He always delivers knowledge practically based on his own professional experience in an interesting manner with the right level of detail and good supplementary resources. I believe he understands very well the need of the students from different backgrounds. He lectured in a clear and constructive way, using effective presentation tools and body language, but with a good sense of humour which, not to be neglected, made the classroom experience always full of fun and impression. The quality of his lectures was highly praised by my fellow students.

I felt very pleased to be one of John's students. When I moved on to a postgraduate course lectured by John, I volunteered to be the class representative, as I wanted, to be honest, to be better influenced by this great mentor. John's up-to-date research experience brought outstanding research values to the students in the postgraduate course. He encouraged independent and critical thinking. He not only delivered knowledge, but also mentored us to improve our performance skills, including written and oral presentation, team work, independent learning and efficient problem-solving, which were all life-long benefits to us.

I started my first research project under John's supervision in 2003. It was an unforgettable experience. At that time I was lost in my life but found myself again with John's help. As an international student, I experienced the hardship of seeking for a suitable job to start my career

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after graduating from the university. I came to John, timidly, asking whether he could accept me as a research student. John accepted me and provided me with many opportunities to develop my research experience and also helped me establish self-confidence, which were truly important for me to keep going. The knowledge I learned from John and the future I was directed to by John from the first research experience encouraged me to continue with two other research projects in the summer of 2003 – 2004, and without any surprise, I did very well in them gaining myself the First Class Honours BSc degree, and smoothly started an academic career by doing a PhD immediately, which was not the end of the story, but rather a new start for me.

As many other PhD students are aware, doing a PhD is very hard given the initial darkness in starting the research and follow-up critical arguments to justify. My PhD experience was very different though, thanks to John's excellent supervision. I still remember clearly the "spoon-feeding, wheel-chairing, and then toddling" story that John told me, which explained his role explicitly to be a supervisor, to effectively mentor me going through various stages of my PhD study. John is willing to listen, enthusiastic to share and generous to support, not only in research and publications but also in my career development.

John has a very 'students-oriented' personality. He never hesitates to give students' requests the highest priority, offering help and mentoring in a timely and friendly way. He wins trust and respect from the students as he offers the same to the students. He makes us friends, taking every opportunity to take part in our social activities to communicate and celebrate with us. I have been very impressed by John's dedication to all his students including me. During the many years of collaboration, I have learned from him a positive way to think, a diligent way to do, an innovative way to invent, and a generous way to give. I believe these are the factors that will drive me to a success in the near future. I wish that all John's hard work could be rewarded.

Yours sincerely

Karen Na-Liu Li
Senior Tutor, Honorary Researcher
Student Learning Centre, Centre for Academic Development, Department of Computer Science

Dr Santokh Singh
Research Programme Manager,
Centre for Software Innovation,
Level 4, Computer Science Department,
Building 303,
University of Auckland
New Zealand

30 October 2007

To Whom It May Concern:

<u>Letter of support for Excellence in Research Supervision</u>

This is my letter of support for Professor John Hosking for the award of Excellence in Research Supervision. Professor John Hosking, together with Professor John Grundy had co-supervised my PhD at The University of Auckland.

Professor John Hosking had been instrumental in me carrying out and completing my PhD in less than 3 years. He is very understanding, supportive and encouraged me to scale for greater heights instead of just completing the thesis. He taught me to read very widely, think critically and come up with better and more novel solutions. He showed me how to love research; he said that only when you start seeing everyday things in the light of your research, and vice versa, that you are truly in tune with your research.

He had taught me to expand my areas of expertise by discussing and collaborating with other lecturers/researchers and looking up their research. This is how I expanded my research into the areas of Mathematical Modeling and Artificial Intelligence. I am still expanding my research areas of expertise, including into other software engineering areas of specialization and management.

When things did not go as smoothly or when I felt that progress is stalled, Professor John Hosking had always encouraged me to look at the problem from different perspectives and if necessary, increase the effort, and this always helped. This counsel still helps me with my work when I carry out research for commercial companies.

The momentum from carrying out my PhD research has flowed on into my working life, where even while undertaking commercial research work, I still managed to co-author and publish 6 refereed conference papers in about 1 ½ years during my spare time after work. I was the lead author in 4 of them and this is no easy feat if you are working with industry. I attribute all this to the passion that was ignited in me by Professor John Hosking in the field of scientific research. This is the best gift that any supervisor can give his student, i.e. instil a life-long disciplined passion to undertake scientific research.

I was lecturing and doing my PhD full time and Professor Hosking advised me on how to apportion my time so that I can work and study effectively without neglecting my family

life. All the advice and wisdom that Professor Hosking had imparted to me, I still apply it daily in my current position as the Research Programme Manager at the Centre for Software Innovation at The University of Auckland. I have been passing on his advice and words of wisdom to my students and children.

Research has its ups and downs, and Professor John Hosking was always there, both in times of need and to celebrate your success with you. He is truly a great research mentor and supervisor, without him, and Professor John Grundy, I would never have learnt to love research and finish my PhD early.

I had been invited to give talks both here and internationally about undertaking scientific research effectively, including as a Keynote speaker at The University of Auckland Computer Science Graduates Workshop 2006 and another during the UoA Doctoral Forum 2006 ("Finishing Fast" – strategies for finishing within 3 years), I always point out that supervisors too play a key role in the success or failure of the research. And my PhD supervisors were the best. I fully support that the award for Excellence in Research Supervision should be given to Professor John Hosking.

Thank you.

Yours faithfully,

Department of Computer Science
Faculty of Science

Robert Amor
Head of Department (Computer Science)
Associate Professor

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THE UNIVERSITY OF AUCKLAND
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38 Princes Street
Science Building Extension
Level 4, Room 487
Auckland 1

5 March 2008

To whom it may concern

Re: Letter of reference for Prof John Hosking's Tertiary Teaching Excellence Award

It gives me great pleasure to provide this letter of reference for John with regard to his nomination for the Tertiary Teaching Excellence Award. I have known John since 1989, and, as you will see from the description below, I owe much of where I have got to today to his teaching, mentoring and guidance. As the current Head of Department of Computer Science I am also able to give an overview of where his approach sits in comparison to the 40 other academics in this department.

Personal impact
John may not recall his first interaction with me, when I was a nervous Masters student presenting at my first international conference in Sydney, representing another university. After the presentation John took the time to talk to me, complimenting the work presented, and offering advice on who I should be talking to at the conference. I was impressed by this concern for a student from another university, and the time he gave to help me in my first taste of academic conferences. After completing my masters, I spent a year as a research officer working for John. This led to me gaining a PhD Scholarship at the University of Auckland, where I undertook my PhD under John's supervision. My development over this time was marked, with John providing guidance which ensured appropriate direction, though still letting me discover the pitfalls of misdirected enthusiasm and the joys of finding successful approaches to my research goals. John supported and encouraged my publishing endeavours and worked to support my attendance at conferences, even as a junior researcher. He also supported and enabled a six month fellowship in The Netherlands at TU Delft as part of my PhD, a connection into the international research community in my domain that has moulded my career ever since.

After five years where I worked at a government research establishment in the UK, John took a key role in enticing me back to New Zealand as a senior lecturer. While my initial attempts at lecturing were not particularly successful, John, then Head of Department, provided advice on approaches to lecturing and pointed me at appropriate CPD courses. John organised for me to teach in a postgraduate course alongside him, gaining me exposure to graduate students and more importantly to new techniques of engagement with students in a research context, challenging my previous rather traditional approaches with more real-world and project-based interactions. I am now a proficient lecturer, with student evaluations that I'm proud to own up to. I was also invited to John's research group meetings, with all his postgraduate students, and having observed the range of interactions that are enabled by this mode of supervision have been able to build up a similar, though considerably smaller, grouping with my research students.

John recognised my interests in academic leadership soon after I arrived in the department, and provided a range of roles which helped build my prowess in this area. He also promoted me to the HeadsUp programme and into the role of Assistant HOD (Academic), as part of his departmental plan to grow academic leadership and provide me with a sound basis to move onto being HOD after the appropriate apprenticeship. Though this didn't work as envisaged (the then Deputy HOD had to step aside rather than taking on the HOD role as planned), I was still fortunate to have accrued administrative experience in many academic roles, training from HeadsUp and CPD courses, and had shadowed both the Deputy HOD and John as HOD prior to stepping up to my current role. Working with John as a colleague is a very satisfying experience. Discussions are frank and able to range freely over all academic and research issues. John is a great sounding board for plans and problems, and still provides me with guidance and advice based on his years as HOD, to help inform decisions that have to be made now.

Departmental impact

As Head of Department I can assess the impact that John's approach to teaching and research supervision has on our student population as a whole, and in particular those who progress through a research career. John's teaching evaluations by students are ranked as 'Excellent' according to the department's criteria for teaching performance. However, this is just a small measure of the true impact of his teaching. Of great importance are measures of retention of students for higher levels of study and research, and their completion rates. COMPSCI 732, in which John teaches, has seen a particularly high conversion rate to either research-based projects (e.g., COMPSCI 780) or further postgraduate study (e.g., Masters research). The completion rate of John's graduate students, whether in projects, Masters, or PhD, is high. This reflects the attention and support that these students gain from him. He also supervises an extraordinary number of students each year, putting him consistently at the top of the department for numbers of students supervised. The research group-based supervision of students which John facilitates works exceptionally well in providing role models and guidance by the students themselves, alongside John's input to their research development. This is a model which is being picked up by other academics within the department and is leading to a number of very strong and productive research groupings.

John has also been innovative in recognising the needs of our students and industry, and developing curricula which match these needs. He was instrumental in the development of the core BSc (Computer Science) curriculum from the earliest days of the department, through to the first IPENZ accredited Software Engineering programme in New Zealand. More recently he has focused on methods of building research capability within industry, alongside industry engagement for our research students. The CSI Academy has been particularly successful in engaging industry with our top students and academics to further the development of all three parties. We have just seen the fourth successful year of this programme, with growing interest and monetary support from industry. In the last year the Extenda programme has been launched, bringing the business and science skills of our students and academics into local companies. All indications are that this is highly appreciated by the industry as well as our students.

All of John's teaching, supervision, mentoring, and developmental support reflect a deep passion for academia and the growth of all involved. Computer Science in the University of Auckland would be a far weaker discipline without John's commitment and passion, and the lives of so many students, my own included, have benefited tremendously from his guidance. I wholeheartedly recommend John for this award.

Robert Amor
Head of Department (Computer Science)

March 3, 2008

To whom it may concern

We are honoured to support the nomination of Professor John Hosking to the National Tertiary Teaching Excellence awards and to add testament to his excellence in tertiary teaching.

Accelerating Auckland supports regional growth by ensuring that Auckland has enough workers with ICT skills. It does this by:

- Aligning industry skill needs with tertiary programmes;
- Promoting ICT programmes and careers to students;
- Fostering collaboration between industry and Tertiaries;
- Working to increase Maori and Pacific participation and completion in tertiary study.

Accelerating Auckland receives funding from the Tertiary Education Commission (TEC), other central government sources, economic development agencies, and the private sector.

From its inception Professor Hosking has been a strong supporter of Accelerating Auckland across its programme of work. When Accelerating Auckland commenced investigation into models for mentoring and internship programmes we undertook a thorough examination of models currently in use and concluded the University of Auckland's CSI Academy best practice. Professor Hosking offered the model, learnings and insights of the CSI Academy for Accelerating Auckland in the spirit of collaboration. Accelerating Auckland has now adopted the CSI Academy model along with its practical implementation in terms of support software, collateral and process templates for the rollout of the Regional ICT Internship Programme to Massey University (Albany Campus) and the New Zealand School of Education (NZSE).

In February 2008 Accelerating Auckland celebrated the graduation of the inaugural Interns from the programme along with Industry partners including ASB Bank, Navman, Vianet and Orion Health.

Beyond the Auckland region, Accelerating Auckland has now gained the mandate to deliver a nation wide Internship programme under the National ICT Skills Collaboration (NISC), based on the CSI Academy model.

Professor Hosking's far reaching vision into strategies to link academia with industry along with his huge energy and passion for this critical work to build a "talent pipeline" for the ICT sector has been a key factor in the success of Accelerating Auckland's internship programme. His culture of innovation, inclusivity and commitment to establishing long term relationships with the sector now underpins every aspect of the programme.

Yours sincerely

Judith E S Speight
Accelerating Auckland

6 March 2008

To Whom It May Concern,

Re: Letter of Reference for John Hosking's nomination for a Tertiary Excellence Award

It is my pleasure to strongly, and unreservedly, support the nomination of Professor John Hosking for a National Teaching Excellence Award.

While in the position of Deputy (and Acting) Director for the Centre for Professional Development at The University of Auckland, I had the privilege of working closely with John on the University's Academic Heads Development and Support Programme, which became known as 'Heads Up'.

John was a key member of the Academic Heads Advisory Committee appointed in 2002 by Doctor John Hood (the Vice Chancellor at that time). This group was commissioned with "creating a programme for Heads and prospective Heads to better equip them for their role".

John has made, and continues to make, an outstanding contribution to what has become a highly successful leadership programme consisting of three strands (Future Heads, New Heads and Current Heads). In addition to being a key member of the initial and subsequent advisory committees, John has also played a major role in the development and facilitation of programme itself. For example, he willingly agreed to take on the role of Academic Programme Leader for one year. This role included the selection of Future Head participants; programme planning and enhancements; the mentor and shadowing matching process; taking a leadership role in the preparations and delivery of the Vice Chancellors annual retreat for Academic Heads with the Senior Management Team; and the 'Heads Up' programme evaluation.

Of particular note is the way in which John has acted as a champion for mentoring programmes at the University of Auckland and continues to be highly sought as a mentor himself. He takes the mentoring role seriously and has been a strong advocate for the staff he has mentored. His extensive institutional knowledge, experience on University committees and decision making bodies as well as his skills in active listening, questioning and summarising are valued by those who work with him and those who are fortunate enough to have him as their mentor.

Another key contribution John has made to the Heads Up and other programmes is his willingness to respond to requests to share his expertise and experiences (including the leadership of teaching and research) with participants attending workshops and other programme events. He always prepares thoroughly and with originality, providing content which is highly relevant and accessible to the participants and delivered using an interactive learner centred approach.

In addition to the roles John has taken to support the establishment and delivery of the 'Heads Up' programme, John has also been a programme participant while in the position of Academic Head himself. He is a reflective practitioner who is always working to enhance his skills and expertise and encourages others to do the same.

John strongly enacts the principles of good university citizenship and is generous in supporting the careers of others. Those working in the area of professional development have greatly appreciated his support of professional development opportunities for general and academic staff. He has always encouraged colleagues to attend relevant programmes and events, including being a strong advocate for the Women in Leadership Programme.

In summary, John has played an integral role in the establishment and development of the University of Auckland's leadership development programme for Academic Heads. He continues to support this programme even though he is no longer in the role of Academic Head. A crucial factor in this programme's success has been the willingness of senior colleagues, such as John, to take on the role of 'teaching their own'. John is an exemplary example providing others with the confidence to follow in his footsteps.

It is a pleasure to be able to support a candidate of this calibre.

Yours sincerely,

Kim Hope