SECTION A – Project title

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Scoping and piloting a peer mentoring scheme for international postgraduate coursework students in GPEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Team:</td>
<td>Dr Ann Peterson (GPEM), Ms Hilary Macleod (Advanced Studies Coordinator, GPEM), Dr Chris McGrath (GPEM)</td>
</tr>
<tr>
<td>List team members and their School/Faculty/Unit</td>
<td>Ms Janey Saunders (Executive Officer, Office DVC1)</td>
</tr>
<tr>
<td>Funding sought from FoS</td>
<td>$14,010</td>
</tr>
<tr>
<td>School Funding Provided</td>
<td>$4670</td>
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SECTION B – Contact details

Project Leader

<table>
<thead>
<tr>
<th>Name</th>
<th>Dr Ann Peterson</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>GPEM</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:a.peterson@uq.edu.au">a.peterson@uq.edu.au</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>336-53979</td>
</tr>
</tbody>
</table>

Financial/Administrative Contact (contact for financial transfer arrangements)

<table>
<thead>
<tr>
<th>Name</th>
<th>Ms Christina Jack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td><a href="mailto:c.jack@uq.edu.au">c.jack@uq.edu.au</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>336-56514</td>
</tr>
</tbody>
</table>

SECTION C – Project Summary

This proposal aims to develop and pilot a contextually relevant and sustainable peer mentoring scheme for international postgraduate (PG) coursework students in the School of Geography, Planning and Environmental Management. The project team will engage collaboratively with a working party consisting of existing students to develop a mentoring plan and support materials. The scheme will be piloted with a small group of students and a plan will be developed for its ongoing evaluation and sustainability. The overwhelming evidence from the literature (see below) is that peer mentoring programs must be contextually based and involve all stakeholders in the design and implementation. Hence GPEM’s proposed peer mentoring pilot will be based on research evidence and wide student and staff input.
SECTION D – Rationale

Describe the innovation/problem(s)/issue(s) your project is trying to address and what the project is trying to achieve.

Demonstrate alignment of the project to faculty and/or University key teaching and learning priorities

Will the project contribute to the enhancement of student learning outcomes? (if appropriate, please refer to peer reviewed literature to support your claim)

Approximately 44% of students in PG coursework programs in GPEM are international. Full time international PG coursework students have a maximum of three semesters to complete their program (in the case of Masters’ students) and less for graduate certificate and diploma students. Therefore the transition process for these students is compressed i.e. they have to quickly adapt to a new country, new learning styles and assessment expectations and unfamiliar systems.

Initial outcomes from GPEM’s PG transition research project (FoS funding 2010) indicated that the international students in GPEM, in particular and in common with studies elsewhere, face acute issues of social isolation, cultural and ‘academic shock’ (Baron & Carr 2008) during the transition period. Glaser, Hall and Halperin (in Husband & Jacobs 2009) suggest that social networks are a key success factor in transition, thus these issues impact on GPEM students’ abilities to succeed and identify them as ‘at risk’ students.

A basic literature search indicates that mentoring is a key to student engagement, retention and success (Crisp & Cruz 2009; Husband & Jacobs 2009; Ross 2008). Students’ involvement in mentoring schemes result in higher levels of success and likelihood of identifying with the institution (Husband & Jacobs 2009). Peer mentoring schemes also enhance intercultural understandings amongst participants (Devereux 2004; Ross 2008).

There is significant diversity in definitions of mentoring and approaches to mentoring (Crisp & Cruz 2009; Husband & Jacobs 2009). Peer mentoring is one subset of mentoring. Any scheme developed for GPEM PG coursework students should develop clear and shared understandings of the aims, objectives, parameters, processes and procedures as well as the roles and responsibilities of mentors and mentees. This can be done only in collaboration with existing students.

The literature indicates that peer mentoring schemes can be harmful to both mentors and mentees if not grounded in research and carefully planned (Husband & Jacobs 2009). Since the majority of literature and studies on peer mentoring programs is based largely on the first year undergraduate experience and context there is a particular need to carefully plan and pilot a peer mentoring scheme for PG coursework students in GPEM that takes into account students’ needs within the school’s context. The process will be conducted in consultation with knowledge of existing programs to ensure it enhances, but does replicate, existing UQ initiatives e.g. MATES@UQ.

This proposal addresses the recognition in UQ’s Strategic Plan 2011 that by 2020, our PG research higher degree (RHD) and coursework student population will comprise 40% of the UQ student body. Support of PG coursework students is therefore a priority area. In particular the focus on engaging international PG coursework students addresses Learning Strategy 3.1 “Develop strategies to ensure the retention and success of an increasingly diverse student body.” The proposal also addresses the Faculty’s key funding priority ‘Transition, engagement and retention’.

References:
Baron, R & Carr, R 2008, ‘Building a connected community of learners: The postgraduate peer mentor program’,
SECTION E – Approach
Provide a step-by-step action plan describing the activities you will undertake during the project. State the key milestones, major phases and timeline of the project. Please include project START date and project COMPLETION date

Project start date: November 2011

Key milestones:
1. Establish working group composition, aims, objectives and schedule
2. Extended literature review and interviews
3. Survey students
4. Resource development (e.g. mentor training materials and program materials)
5. Pilot scheme (semester 1 2012)
6. Evaluation of pilot
7. Funding plan for ongoing implementation within GPEM
8. Guidelines for implementing peer mentoring

Project completion date: July 2012

SECTION F – Sustainability of project outcomes.
How will outcomes be sustained after the project ends? eg How will new practices be embedded? What will be the potential impact and benefit across the faculty?

This proposal is for the development and piloting of a peer mentoring scheme relevant to international PG coursework students in GPEM. Evaluation during the piloting phase will reveal issues for the sustainability of a full and continuing implementation.

The peer mentoring scheme will be developed in light of evidence from the existing literature, the school’s context and student needs. It will be a collaborative process involving students and external advisors and this will ensure that the resulting scheme will work within the postgraduate coursework context and can be funded in the long term.

The process undertaken for the development and evaluation will generate lessons for similar initiatives in other units across the Faculty.

Devereux, L 2004, 'When Harry met Sarita: Using a peer-mentoring program to develop intercultural wisdom in students', Higher Education Research and Development Society of Australasia.
SECTION G – What are the strategies for evaluation and dissemination of information on the expected outcomes of the project?

- Students will be surveyed to assess their mentoring needs.
- Evaluation of the process and pilot scheme will be documented to provide guidelines for implementing peer mentoring schemes with postgraduate coursework students.
- The results of this project will be presented at relevant conferences, as has been the practice with all successful FoS funding grants (e.g. Pacific Rim First year in higher education conference, UQ Teaching and Learning week).
- Peer reviewed publications will be prepared (e.g. peer reviewed conference paper and journal publication) to ensure wider dissemination of the project outcomes and implications.

SECTION H – Budget for Project

Include a table outlining all expenses and sources of funding (from Faculty and School)

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Assistant (300 hrs x $40)</td>
<td>$12,000</td>
</tr>
<tr>
<td>(Literature review; survey development, upload, monitoring and analysis; developing mentoring project resources; developing evaluation material; analysing results; development of guidelines to underpin the project; and project administration)</td>
<td></td>
</tr>
<tr>
<td>Development of guidelines and project resources</td>
<td>$1000</td>
</tr>
<tr>
<td>Project administration costs (e.g. meetings, transport)</td>
<td>$1000</td>
</tr>
<tr>
<td>Conference presentations (registration &amp; minimal costs x2)</td>
<td>$3000</td>
</tr>
<tr>
<td>Peer Mentors (3 mentors x 14 weeks)</td>
<td>$1680</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$18,680</strong></td>
</tr>
</tbody>
</table>

SECTION I – ENDORSEMENT

This endorsement indicates my support for the project and that internal resources as required will be available (eg administrative support and workload allocation).

Head of School Endorsement (or attach written endorsement)

Name: [Signature]

School: [School]

T&L Chair Endorsement (or attach written endorsement)

Name: [Signature]

School: [School]
The project falls under the “Enhancing staff professional development” funding priority. The aim of this project is to establish an ongoing support mechanism for a science SoTL writers group at UQ. This group began operations in 2011 using seed funding from FoS, SCMB, and DVCA. It is intended to foster regular contact and writing time for the TF academics to increase the quality and the quantity of their SoTL publications. The yearly activities we suggest for the writers group are as follows:

1) One off-campus writing retreat of three days per year.
2) Monthly on-campus writing sessions that run for 4 hours. Two or three sessions per year will also include a 40-60 minute discussion session with a SoTL expert/mentor (from within UQ or an external visiting scholar). Selected scholars who visit UQ to give workshops and seminars can be invited to participate in this capacity.
3) Three writing sessions per year will be open to student participation. These sessions will be timetabled as close as possible to Week 11 of Semester 1 and Semester 2, and Week 6-7 of Summer Semester to allow students time to write as part of the group. These students will be those who are enrolled in a SoTL project for course credit (URE, honours, masters,
or PhD). The higher-level students may be included in the sessions on a more regular basis at the discretion of their academic supervisor.

4) Six-monthly reporting of the scholarly output from these sessions will be provided. This provides accountability to the FoS and places deadline pressure on the SoTL academics to produce manuscripts in time for the reportal deadlines. This ongoing reportal can be placed on the FoS website as a link to (i) increase the profile of FoS T&L research at UQ and (ii) encourage new members to join the SoTL writers group.

**SECTION D – Rationale**

Most recently-appointed teaching-focussed (TF) academics in the FoS have been extensively trained in the ‘traditional’ or ‘hard’ science research culture. Aspects of these ‘hard’ research skills are transferrable to SoTL, however there are two major SoTL components that are emerging as barriers to the success of the TF academics. Firstly, SoTL project design, implementation, and evaluation uses methodologies that are different from those used in the ‘hard’ sciences. Secondly, writing and publication in the SoTL field requires skills that have not been developed in many of the TF academics. TF academics working in isolation or in an unmentored environment are likely to struggle while trying to build the required SoTL publication skill set. As a consequence, the quality and quantity of their scholarly output may be limited.

Publication is particularly important for a TF academic in a GO8 research-intensive university. Peer-reviewed publication is viewed with respect by other faculty in a TF academic’s school and it is important in the promotion and tenure process. In addition, publication impact is a benchmark used to support the GO8 universities’ claim to the “leading universities” title (http://www.go8.edu.au/go8-indicators). A recent study of TF academics at UQ found only 12.5% had engaged in publication related to T&L (Gannaway, Berry, & Webster-Wright, 2010).

There is a clear need for an intervention that overcomes the barrier to publication of SoTL research. A professional development forum which sustainably catalyses the successful publication of SoTL research outcomes offers multiple potential benefits including: (i) enhancing TF academic career progressions; (ii) publicizing innovative T&L practices within Schools and the FoS; (iii) encouraging other T&R faculty to engage with TF academics in SoTL projects; (iv) supporting UQ’s membership of the GO8 and (v) enriching learning environments for students as multiple academics engage in further research.

We have trialed this intervention in 2011 using a pilot writing retreat at UQ’s Moreton Bay Research Station on June 22/23 2011. Eleven academics participated; nine were TF or T&L academics from five FoS schools (SCMB, SBS, SBMS, SMP, SVS) and two were TEDI academics. The structure of the retreat evolved to be multiple intensive writing sessions linked by focused discussion groups around issues and strategies in SoTL publication. Participants initiated and developed their articles; nine committed to a submission date in 2011 at the end of the retreat. A post-retreat workshop was facilitated by Prof Merrilyn Goos on Aug 23 2011.
Our current proposal seeks to establish an ongoing support mechanism for the writers group. This includes funding from the FoS and in-kind support with scheduling and room bookings from a FoS staff member (team-member Robyn Evans). The project team will remain in charge of running the workshops and retreats.

SECTION E – Approach (Proposed activities and timeline)

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-Nov 2011</td>
<td>MOSTLY COMPLETED as part of pilot: Online survey of TF academics to determine (i) interest in membership of the writing group, (ii) publishing experience, success, and support needs (including frequency of retreats and writing sessions and amount of formalised mentoring required during the writing sessions). All survey respondents invited to form the core “writing group” cohort.</td>
</tr>
<tr>
<td>Nov-Dec 2011</td>
<td>Formulation of best-consensus writing session model based on literature, existing examples, and survey outcomes in collaboration with TEDI academics in team over a 2 week period in November to develop the writing group format.</td>
</tr>
<tr>
<td>Jan 2012</td>
<td>Delivery of the retreat at a venue which enables participants to isolate themselves from their commitments at UQ for 1-2 days thereby generating time to focus on their progress towards publication (this is the agreed model based on the responses of the pilot participants).</td>
</tr>
<tr>
<td>Jan-Jun 2012</td>
<td>Evaluation of the impact of the writing sessions and retreats through participant reflections at the end of the retreat and measurement of the submission of publications over 6 months after each retreat will provide data that will assist TEDI academics to assess the efficacy and the sustainability of this initiative.</td>
</tr>
</tbody>
</table>

SECTION F – Sustainability of project outcomes.

The pilot of this project is ongoing until Dec 2011. Progress in publication by participating individuals is being mapped. Currently, four papers have been submitted to peer-reviewed journals and one is accepted with minor changes. Four more are close to submission (one is an invited editorial). Publication is essential for academic tenure and promotion, so we do not envisage problems with sustaining the interest in the writers group or its activities. Evaluation to date indicates the initiative is highly valued by the participants for time to write and peer support. Seasoned writers group members can mentor new members and non-TF staff who are considering SoTL projects related to their teaching. This will likely increase the T&L scholarly output of the FoS, which will act as a driver for more general faculty interest in publishable pedagogical improvements.

SECTION G – Evaluation and dissemination

<table>
<thead>
<tr>
<th>Evaluation Goal</th>
<th>Evaluation Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify factors that will</td>
<td>Collate feedback from the monthly sessions in the first year</td>
</tr>
</tbody>
</table>
**promote sustainability of the initiative and engage new participants in the Writing Group.**

**Determine drivers for academic attendance and session effectiveness for future Writing Retreats.**

- Maintain a database of progress towards publications by participants in the groups through structured reflective blogs
- Reflections from both participants and facilitators at the end of each retreat to develop an understanding of the drivers and readiness for change to enhance dissemination.

### Dissemination Purpose

<table>
<thead>
<tr>
<th>Information Provision/Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engagement of a wider group of stakeholders in this professional development model.</strong></td>
</tr>
<tr>
<td>We aim to produce a framework for a sustainable, productive writing community which can be embedded at UQ and at other institutions. The pilot framework will be upscaled at UQ (delivery in FoS through this proposal, and in other faculties through TEDI). Faculty from potential partner institutions will be invited to attend the retreat.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provision of SoTL tool and past workshop repository for use by UQ T&amp;L scholars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online resource (through FoS website) that disseminates SoTL materials, workshop and retreat slides, and other items found useful by Writers Group members.</td>
</tr>
</tbody>
</table>

### SECTION H – Budget for Project

<table>
<thead>
<tr>
<th>Detailed Budget</th>
<th>Requested From FoS ($)</th>
<th>Rolled over from pilot grant ($)</th>
<th>Project Total ($)</th>
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</thead>
<tbody>
<tr>
<td>Annual Retreat (3 year cycle): $2000 pa</td>
<td>6000</td>
<td>6000</td>
<td></td>
</tr>
<tr>
<td>Monthly Writing Group Meeting resources: Administrative support &amp; refreshments for meetings with visiting academics. $800 pa</td>
<td>2400</td>
<td>1250</td>
<td>3650</td>
</tr>
<tr>
<td>Evaluation: Data collation and processing.</td>
<td>1200</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Dissemination: Engagement of external partners through transfer of project outcomes.</td>
<td>1200</td>
<td>750</td>
<td>1950</td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>$10800</strong></td>
<td><strong>$2000</strong></td>
<td><strong>12800</strong></td>
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</table>

**Budget Justification:** An outcome of the pilot retreat was that a model of 12 academics plus two facilitators resulted in effective practices. Funding for an annual retreat at UQ Gatton campus has been formulated on this basis (transport to MBRS was costly in time which could be used for writing). A budget for refreshments for Writing Group meetings involving a guest SOTL speaker has been included (three times per year estimating 25 attendees). Evaluation will involve an annual report to the FoS T&L committee so administration costs have been included to assist in preparation of the report. Dissemination costs include facilitation of representatives for two potential tertiary partners to visit UQ and engage in the Writing Retreat.
SECTION I – Endorsement

This endorsement indicates my support for the project and that internal resources as required will be available (eg administrative support and workload allocation).

Head of School Endorsement (or attach written endorsement)

Name:
School:
Signature:

T&L Chair Endorsement (or attach written endorsement)

Name:
School:
Signature:

SECTION J – Application Submission

Robyn Evans in the Faculty Office, robyn.evans@uq.edu.au.
Applications should be:
- in electronic form (Word or PDF)
- one file per application

Application closing date: Friday 23 September 2011
SECTION A – Project title

<table>
<thead>
<tr>
<th>Project Title</th>
<th>A review of the curriculum and capstone experience for the UQ Biochemistry and Molecular Biology Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Team: (all members from School of Molecular Biosciences, SCMB)</td>
<td>Leader: Dr S. Rowland, Team: A.Prof B. Carroll, Dr J. Fraser, Prof E. Gillam, Dr L. Grondahl, Prof S. Hamilton, Prof S. Kellie, Dr G. Lawrie, Dr J. Ridge, A.Prof J. Rothnagel, Prof R. Smith, Dr S. Worrall.</td>
</tr>
<tr>
<td>Funding sought (FoS)</td>
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<tr>
<td>School Funding</td>
<td>$5,271.40</td>
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</table>

SECTION B – Contact details

<table>
<thead>
<tr>
<th>Project Leader</th>
<th>Susan Rowland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Susan Rowland</td>
</tr>
<tr>
<td>School</td>
<td>SCMB</td>
</tr>
<tr>
<td>Email and Telephone</td>
<td><a href="mailto:s.rowland1@uq.edu.au">s.rowland1@uq.edu.au</a>, 33654615</td>
</tr>
<tr>
<td>Financial/Administrative Contact (contact for financial transfer arrangements)</td>
<td>Belinda Forbes</td>
</tr>
<tr>
<td>Name</td>
<td>Belinda Forbes</td>
</tr>
<tr>
<td>Email and Telephone</td>
<td><a href="mailto:b.forbes@uq.edu.au">b.forbes@uq.edu.au</a>, 33651936</td>
</tr>
</tbody>
</table>

SECTION C – Project Summary

The aim of this project is to review the curriculum, learning outcomes, and pedagogical quality of the Biochemistry and Molecular Biology majors (BMBM) program courses at UQ. We intend to define the “required” and the “ideal” curriculum for a BMBM at UQ (with particular emphasis on creating work-ready BMB graduates), then map the curriculum of the core courses in the program against these components. SCMB is renaming and re-building the BMBM capstone course (BIOC3000); this project will provide the basis for the revision and will also be the impetus for some modifications to other BMBM courses to develop program cohesion and modernity while maintaining best possible pedagogical practice. It will also provide a curriculum for submission to three national-level education groups in Australia, giving UQ a voice in the future of Australian BMB programs. PI Rowland is convenor for the UQ BMBM program, and will assume head of T&L duties for SCMB in 2012. The project addresses funding priorities 4, 5, and 6 for FoS T&L Round 2, 2011.

SECTION D – Rationale

The academic standards for Science [1] have just been released and endorsed by the Australian Council of Deans of Science as “a generic, high-level statement of Bachelor of Science threshold learning outcomes” (or TLOs) which are “a platform on which specific sub-discipline standards may be built”. Five ALTC-funded working parties are now developing TLOs and curriculum suggestions for programs in biology, biomedical science, mathematical sciences, and pharmacy. TLOs for chemistry are complete. The Go8 have questioned the value of the ALTC-funded TLO project [2], and have implemented their own
Quality Verification System (QVS) [3]. This involves cross-institutional grading of sample papers, and review of marks given by each institution.

It is unclear how the newly-formed TEQSA will benchmark the educational outcomes for graduates [2], but there will likely be some attempt to standardise program quality across different institutions. At this stage, the Australian BMBM curriculum and program structure is individualized at the University level [4]. Educators risk, however, having TLOs, curricula, and learning activities defined and restricted by external entities unless they are pro-active about (i) monitoring and justifying the quality of their graduates and (ii) clearly defining their curricula with a view to defending their content, conceptual reach, and pedagogical value.

The Go8 have indicated that the current government policy designed to protect quality in Australian education may actually involve counterproductive “regulation and intrusion which […] will stifle diversity, erode quality and reduce the flexibility” of programs [2]. As a University which is dedicated to training a large, diverse cohort of students to a high standard with a concentration in research, UQ needs to take a role in defining what content, concepts, and skills are appropriate for its students so that they are work-ready upon graduation. We also need to ensure that our course teaching and learning activities are pedagogically sound so that our students gain maximum learning benefits. We suggest, with these ideas in mind, that a collegial review and discussion of the UQ BMBM curriculum is timely. We propose the funding requested in this proposal be used to support this process.

We have recently published an approach to BMBM curriculum development [5]. The ASBMB (USA) and other US researchers have also made recommendations for the BMBM curriculum and pedagogy [6-10]. PI Rowland has collected extensive, unpublished data from over 300 academic employers regarding their desired graduate attributes (both generic and field-specific) as part of a prior FoS-funded project. These academics also all gave feedback on suggested BMBM curriculum components. This work will be used as foundation material for the new study. We aim to define “essential” and “desired” content, concepts, and skill sets for the UQ BMBM graduate, and map each of these to the required and recommended courses in the program. Instances of weakness will be identified and dealt with (the UQ reportal is also a helpful resource here, as will the recommendations stemming from the recent UQ BSc review). This process will allow us to develop a coherent BMBM program, while also defining a curriculum that can be tabled for discussion at three fora (VIBEnet, CUBEEnet, and the ASBMB (Australia) yearly heads of discipline meeting). Since there is no national Australian curriculum established for BMBM programs, this project will allow UQ to be a pedagogical leader. We will set the agenda for this important discipline, rather than being forced to follow recommendations for BMBM programs that may not align with the UQ pedagogical philosophy, our T&R strengths, or the needs of our graduates’ employers.

**SECTION E – Approach**

**November-December 2011 (START):** Preliminary discussions with course convenors for mandatory BMB major subjects to define a draft curriculum of material which is already covered in the courses. Incorporate prior data collected by PI Rowland into this discussion. Identify areas of curriculum and pedagogical weakness and note these for action.
November-December 2011. Plan 2-day off-campus retreat meeting with as many UQ biochemistry academics as possible. Plan of action is (1) Send out call by email for participants with retreat slated for early-mid February 2012. (2) In consultation with potential participants, decide on date and book retreat venue (eg: Brisbane convention centre). (3) Send out draft curriculum with request for feedback and mapping to courses by course coordinators before the meeting. Compile feedback and mapping into presentation document for tabling at the February meeting.

Early-Mid February 2012: Conduct retreat. Activities will be
1) SoTL experts within UQ (eg: TEDI and PI Rowland) will advise attendees on the theory and implementation of good pedagogical practice (particularly the use of learning objectives, inquiry learning, and constructive alignment).
2) Results from in-school research programs related to BMB teaching and learning will be presented (by SCMB TF academics).
3) Industry representatives from the SCMB industry liaison group will be invited to present and be part of a panel to discuss their workplace requirements in graduates.
4) The new regulatory T&L framework (LTAS and TEQSA) will be discussed, with reference to selected data from the UQ Dashboard reportal.
5) Academic course coordinators will appraise and refine the proposed curricula, then map the agreed curricula to their courses.

The aims of the retreat are (i) to support a collegial atmosphere that allows free sharing of ideas and opinions about the BMB curriculum at UQ, (ii) to inform academic staff about the incoming “nationalisation” of T&L and the consequent benchmarking activities that involve UQ, (iii) to update faculty on some T&L initiatives that are happening in SCMB and encourage their engagement in the projects, (iv) to further develop an understanding of good pedagogical practice in our T&R faculty who are teaching and coordinating courses, (v) to make faculty more aware of the needs of industry employers, (vi) to use the input from all biochemistry-related faculty at UQ refine the draft BMB major curriculum in a manner that is inclusive of our diverse skills and opinions, (vii) to map the components of this curriculum to existing courses, (viii) to begin the process of change in the “lived” BMB curriculum at UQ to include the new curriculum and good pedagogical practice (including developing constructive alignment between learning objectives and assessment).

February-September 2012: PI Rowland will continue relevant discussions on a one-to-one support basis with coordinators of the key BMBM courses.

September 2012: PI Rowland will present the revised curriculum at ASBMB ComBio 2012.

July and November 2012: Students in BMBM core courses in first and second year will be surveyed for their self-rated skills and understandings related to the required and ideal curricula we have devised. Academics will be requested to provide a small mark value (eg: 1%) for student completions of the curriculum surveys to enhance response rates at the beginning and end of each course. These responses will be used to build a map of how students’ skills and understandings develop during the lived BMBM program.

November-December 2012: A one-day retreat will be held to (i) review how the proposed curriculum changes have been enacted (including how they have been incorporated into the assessment of each course), (ii) examine the results of the student surveys, and (iii) discuss
the response to the curriculum from ComBio participants. Recommendations for further modifications will be made and enacted with ongoing support from PI Rowland.

**December 2012:** The re-written curriculum will be tabled for discussion with VIBEnet and CUBEnet, and will be distributed to members of the ASBMB Heads of Discipline group which meets yearly (PI Rowland attends this meeting regularly as BMB major convenor).

**SECTION F – Sustainability of project outcomes**

The retreat and discussion process outlined above is designed to allow input from all participating faculty, to raise the profile of good pedagogy and T&L scholarship in SCMB, and to support willing faculty in their efforts to strengthen the BMBM curriculum. Change will be embedded in the revised curricula, and this will require ongoing discussions between the BMB program convenor (Rowland) and course coordinators (team members) as per normal practice. Some faculty may engage in further SoTL related to their courses.

**SECTION G – Evaluation and dissemination**

**Evaluation and dissemination are concurrent in this project:**

1) Development of curriculum will be an iterative process in which feedback and comment will be consistently sought from academics at UQ. We will retain all draft-related documents.

2) Evaluation of curricular coverage and the success of constructive alignment throughout the program via student self-efficacy responses for each course.

3) Presentation of draft curriculum for comment at ComBio 2012, to VIBEnet, CUBEnet, and ASBMB Heads of Discipline meeting 2012.

4) The steps for this process of curriculum review and revision will be made available as a report to the FoS for use by other academics. PI Rowland will also be available to work with other faculty who are considering reviewing their curricula. Such a framework was planned in the UQ TLEP 2008-2010, but it does not appear to be publicly available online.

**SECTION H – Budget for Project**

<table>
<thead>
<tr>
<th></th>
<th>SCMB Funds</th>
<th>FoS Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retreat 1 (25 people for 2 days + hire of AV materials)</td>
<td>-</td>
<td>$6000.00</td>
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<tr>
<td>Admin assistant (HEW level 3.1, casual+ 25%) 6 h/week @ $28.80/h, 52 wks</td>
<td>-</td>
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<tr>
<td>Retreat 2 (25 people for 1 day + hire of AV materials)</td>
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<tr>
<td>Funding sought</td>
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<td>$15814.20</td>
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</table>

**Full cost of project = $21085.6**

**Justification:** The administrative assistant will help with building and editing of the draft, agreed “required”, and agreed “ideal” curricula, including incorporation of faculty suggestions and mapping of all course activities into a spreadsheet for both first and second semester. Also includes admin associated with retreat and checking, recording, and analysis of student submissions to the course surveys. **Dissemination** cost covers conference registration, travel, and accommodation for ASBMB ComBio (23-27/9/2012) Adelaide. **Retreat** costs are based on quotes for very recent UQ events at Brisbane Convention Centre.
This endorsement indicates my support for the project and that internal resources as required will be available (eg administrative support and workload allocation).

**Head of School Endorsement**
*Name:* Prof. Melissa Brown  
*School:* SCMB  
*Signature:*

**T&L Chair Endorsement**
*Name:* A. Prof. Joe Rothnagel  
*School:* SCMB  
*Signature:*

### References

SECTION A–Project title

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Demonstrating the applicability of elab assessment Wiki environments in wider laboratory assessment contexts.</th>
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</thead>
<tbody>
<tr>
<td>Project Team:</td>
<td>List team members and their School/Faculty/Unit</td>
</tr>
<tr>
<td></td>
<td>Gwen Lawrie, Lisbeth Grøndahl and Ian Gentle (SCMB)</td>
</tr>
<tr>
<td></td>
<td>Kirsten Zimbardi (SBMS)</td>
</tr>
<tr>
<td>Funding sought from FoS</td>
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SECTION B –Contact details

**Project Leader**

<table>
<thead>
<tr>
<th>Name</th>
<th>Gwen Lawrie</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>School of Chemistry &amp; Molecular Biosciences</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:g.lawrie@uq.edu.au">g.lawrie@uq.edu.au</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>3346 7848</td>
</tr>
</tbody>
</table>

**Financial/Administrative Contact (contact for financial transfer arrangements)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Belinda Forbes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td><a href="mailto:b.forbes@uq.edu.au">b.forbes@uq.edu.au</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>3365 1936</td>
</tr>
</tbody>
</table>

SECTION C –Project Summary

Assessment of laboratory learning outcomes using an elab notebook hosted in a Wiki environment has been piloted in SCMB in semester 1 2010 with excellent outcomes in terms of evidence of student learning within this online environment. The aim of this project is to adapt, translate and embed this assessment strategy into new laboratory learning contexts in SCMB and into SBMS, by engaging additional Science academics in the project. Demonstrating the applicability of this assessment strategy in new contexts will enhance its transfer and sustainability within the Faculty of Science and ultimately improve laboratory assessment practices.
SECTION D – Rationale

Describe the innovation/problem(s)/issue(s) your project is trying to address and what the project is trying to achieve.
Demonstrate alignment of the project to faculty and/or University key teaching and learning priorities
Will the project contribute to the enhancement of student learning outcomes? (if appropriate, please refer to peer reviewed literature to support your claim)

A Faculty of Science funded pilot study has enabled virtual laboratory notebooks to be successfully implemented in a third level chemistry nanoscience course supporting lab learning during group research projects. PBWiki was identified as the most versatile collaboration and collective writing forum and a set of instructions were developed to assist students to become proficient in editing their Wikis. Students found that the ‘living’ nature of the collaborative Wiki document increased their efficiency in planning and data processing. The Wikis also enable tutors to engage with the groups, providing feedback outside the laboratory environment. The history function provided a mechanism which can be developed into an assessment strategy for measuring and rewarding individual contributions. The original proposal for this project received seeding funding from the Faculty of Science Teaching and Learning Committee, with an invitation to submit a larger application to translate the pilot into more widespread outcomes. We now propose to apply this assessment model to other contexts by supporting two course coordinators in the implementation and evaluation of the initiative. The project aligns with the Faculty of Science T&L priorities of Transition, engagement and retention based on evidence that student learning and engagement was enhanced during the pilot and Enhancing Staff Professional development as we propose to work collaboratively in supporting key academics in implementing web-based assessment [1]. Mechanisms for enhancing and assessing essential student learning outcomes that align with the ALTC-developed disciplinary Learning and Teaching Academic Standards (LTAS) are also an outcome from this project.


SECTION E – Approach

Provide a step-by-step action plan describing the activities you will undertake during the project. State the key milestones, major phases and timeline of the project. Please include project START date and project COMPLETION date

The project involves the extension of an online assessment tool into new contexts and applications. Three course coordinators (project team members) who have varying levels of experience in T&L development have indicated willingness to trial the elab assessment model in their courses.

• Prof Ian Gentle is coordinating a second level chemistry course which currently involves lab assessment by the traditional method of report sheets. Translation of our web-based assessment model into this context will provide insight into the factors that enable uptake of web-based lab assessment by academics who have not previously engaged in SOTL projects.
- Dr Kirsten Zimbardi (SBMS) has extensive experience in developing and implementing T&L initiatives and her involvement as a coordinator of physiology courses at 1st, 2nd and 3rd year levels offers valuable opportunities for insights into the transferability of the assessment model in a different science discipline.
- Dr Lisbeth Grondahl implemented the initiative in her course during the pilot and will further embed the assessment in her course by making adjustments based on feedback from students during the 2011 study, thereby demonstrating the sustainability of the assessment model.

Timeline:

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer 2011/12</td>
<td>Formulation of the assessment for the semester 1 courses (CHEM3013)</td>
</tr>
<tr>
<td>Semester 1 2012</td>
<td>Implementation and evaluation. Formulation of the assessment for the semester 2 courses (CHEM2056 &amp; BIOM3015)</td>
</tr>
<tr>
<td>Semester 2 2012</td>
<td>Implementation and evaluation. Reporting</td>
</tr>
</tbody>
</table>

SECTION F– Sustainability of project outcomes.

*How will outcomes be sustained after the project ends? eg How will new practices be embedded? What will be the potential impact and benefit across the faculty?*

This project represents a model for measuring the transferability and sustainability of the outcomes of the original pilot study. In this respect it is an important initiative in providing information to the Faculty of Science Teaching and Learning committee of what represents transferable and sustainable practice/activities. Indicators of project success will be the degree of effective translation to new contexts in different schools and factors that influence the continued engagement of academics in this form of assessment.

SECTION G – What are the strategies for evaluation and dissemination of information on the expected outcomes of the project?

**Evaluation:**

<table>
<thead>
<tr>
<th>Evaluation Goal</th>
<th>Evaluation Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify factors which support uptake of web-based assessment in laboratory learning environments.</td>
<td>Monitor the processes of implementation and document feedback from academics throughout.</td>
</tr>
<tr>
<td>Evidence the efficacy of the intervention.</td>
<td>Access data logged through the Wiki environment. Evaluate student learning outcomes through reports and related assessment (orals or exams). Map against benchmarks.</td>
</tr>
<tr>
<td>Determine learning outcomes from the perspective of the students</td>
<td>Focus Group interviews.</td>
</tr>
</tbody>
</table>
Dissemination: (based on D cubed Dissemination Framework [3])

<table>
<thead>
<tr>
<th>Dissemination Purpose</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Embedding: Disseminate how web-based assessment can measure essential student learning outcomes.</strong></td>
<td>Disseminate through information provision via seminars and conference presentations.</td>
</tr>
<tr>
<td><strong>Upscaling: Disseminate for transfer of the project outcomes through extension of the resources into additional contexts beyond the faculty of science.</strong></td>
<td>Engage in new media networks to engage with academics interested in developing these assessment approaches. Make the resources available via Chemistry Discipline T&amp;L Network website available in 2012.</td>
</tr>
<tr>
<td><strong>Sustainability: Disseminate for benchmarking outcomes.</strong></td>
<td>Engage in partnerships addressing the impending changes due to LTAS.</td>
</tr>
</tbody>
</table>


SECTION H – Budget for Project

Include a table outlining all expenses and sources of funding (from Faculty and School)

<table>
<thead>
<tr>
<th>Detailed Budget</th>
<th>$ Amount Requested From FoS</th>
<th>$ Amount contributed by SCMB</th>
<th>Project Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personnel: HEW Level 4_02 (Casual)</strong>&lt;br&gt;Approx 100 hours total (incl 28% oncosts)</td>
<td>4000</td>
<td>1000</td>
<td>5000</td>
</tr>
<tr>
<td><strong>Evaluation:</strong> Analysis of quantitative data, Wiki data &amp; focus group data.</td>
<td>1000</td>
<td>1000</td>
<td>2000</td>
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<tr>
<td><strong>Dissemination:</strong> Publication, Attendance by project team members at a national higher education conference.</td>
<td>2500</td>
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<td>3000</td>
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<tr>
<td><strong>GRAND TOTAL</strong></td>
<td><strong>$7500</strong></td>
<td><strong>$2500</strong></td>
<td><strong>$10000</strong></td>
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</table>

Justification for Funding Requested

A casual research assistant is required to provide support both in adapting the Wiki tool for the different assessment conditions and for extracting data for evaluation after each implementation. Evaluation represents the costs of focus groups across three separate courses. It is intended that the outcomes of the initiative are disseminated at two appropriate national meetings: higher education research forum and a discipline education meeting.
SECTION I  ENDORSEMENT

This endorsement indicates my support for the project and that internal resources as required will be available (eg administrative support and workload allocation).

Head of School Endorsement (or attach written endorsement)

Name: 
School: 
Signature: 

T&L Chair Endorsement (or attach written endorsement)

Name: 
School: 
Signature: 

SECTION J  APPLICATION SUBMISSION

Applications should be submitted via School T&L Chairs. Schools should submit all applications to Robyn Evans in the Faculty Office, robyn.evans@uq.edu.au.

Applications should be:

- in electronic form (Word or PDF)
- one file per application

Application closing date: Friday 23 September 2011
SECTION A – Project title

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Expanding the Virtual Human Body for smart phones.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Team:</td>
<td>Dr Hardy Ernst (SBMS) project leader, Dr John Harrison (SJC), Mr Mathew Taylor (CBIT)</td>
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<tr>
<td>Funding sought from FoS</td>
<td>14,713</td>
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<td>School Funding Provided</td>
<td>8,104.92</td>
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SECTION B – Contact details

**Project Leader**

<table>
<thead>
<tr>
<th>Name</th>
<th>Dr Hardy Ernst</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>SBMS</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:h.ernst@uq.edu.au">h.ernst@uq.edu.au</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>51753</td>
</tr>
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**Financial/Administrative Contact (contact for financial transfer arrangements)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Mr Don Weerheim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email</td>
<td><a href="mailto:d.weerheim@uq.edu.au">d.weerheim@uq.edu.au</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>52610</td>
</tr>
</tbody>
</table>

SECTION C – Project Summary

This project aims to expand the Virtual Human Body, a scenario-based mobile learning application for smart phones. The project’s significance and innovation lie in the attempt to create an interactive mobile learning interface that allows the learner to approach a biomedical scenarios via multiple decision making pathways. The interface will allow individual decisions and present the learner with the consequences of their actions. Thus, Virtual Human Body aims to promote deep learning through consolidated understanding and application of physiology, anatomy and pharmacology. In 2010 the Virtual Human Body received partial funding from FoS. This funding allowed development of a new HTML-based touch screen interface and development of four learning scenarios. Additional funding is sought for further development and evaluation of new learning scenarios for the Virtual Human Body that include cardiovascular, endocrine, gastrointestinal, neuronal, renal and respiratory physiology and pharmacology. Also, linking the Virtual Human Body to the UQ username and password system would be highly advantageous.
This project aims to expand the web-based Virtual Human Body (http://spider.cbit.uq.edu.au/hardy/) [only works on smart phones; username: student, password: ipswich]). It ensures common access across handsets by working within the mobile browser environment, thus allowing leverage of student-owned technology for academic benefit.

To date, and to the project team’s best knowledge, a scenario-based interactive smartphone/iPOD/iPAD touch screen application has not been developed, which offers high impact active learning opportunities (Kuh, 2008) away from formal teaching environments and at times that suit the learner, enabling anywhere anytime learning. Thus, the project aligns with the strategic priority of the University to “Develop an e-Learning Strategy that facilitates an integrated ‘blended’ learning environment using new generation technologies” (UQ Strategic Plan & UQ Teaching and Learning Enhancement Plan), with the FoS priority of “transition, engagement and retention”, and demonstrates “innovation in learning and teaching including, but not limited to, the role of new technologies”.

Learning is an active process (Michael and Modell, 2003). Scenario-based learning is recognised as active learning, and the efficacy of scenario-based learning in health science education is well documented (Hoffman et al 2006, Thomas et al 2009).

Mobile learning is defined as learning that occurs not at predetermined locations using mobile technologies (O’Malley, 2003). Mobile learning also “must view the learner as the one being mobile and not his/her devices! What needs to move with the learner is not the device, but his/her whole learning environment” (Laouris and Eteokleos, 2005).

In 2010 the Virtual Human Body was partially funded by a Faculty of Science Teaching and Learning Grant with a very modest $6000. At that time it was envisaged that the Virtual Human Body would be based on a new Scenario-based Learning interactive™ (SBLi) mobile prototype template recently developed earlier this year by the same research team. Unfortunately, evaluation of the efficacy and ease of usage of this new SBLi mobile prototype template revealed that the existing structure of SBLi with its location, environment, task/collection and content windows does not suit a mobile learning environment. Consequently, we migrated away from the SBLi mobile prototype template for the Virtual Human Body and developed a new HTML-based touch screen interface. The funding from the 2010 Faculty of Science Teaching and Learning Grant allowed that new HTML-based touch screen interface development and the development of four new learning scenarios (see http://spider.cbit.uq.edu.au/hardy/).

Additional funding is sought for further development and evaluation of new mobile learning scenarios for the Virtual Human Body that include cardiovascular, endocrine, gastrointestinal, neuronal, renal and respiratory physiology and pharmacology.

It is expected that the learner’s actions will include, among others, the delivery of common medicinal drugs covered in undergraduate SBMS courses and used in the treatment of major diseases, and the prescription of different exercise or diet regimes. The consequences of the learner’s actions will be in form of vital signs (i.e. heart rate, respiratory rate, urine output) and physical symptoms such as peripheral/central cyanosis, paleness, pain or events such as myocardial infarction, renal or respiratory failure. Tests available to the learner will be procedures that are being taught by SBMS and will include blood pressure determination by auscultation, electrocardiography (ECG), nerve conduction velocity, reflexes and lung function tests.

In addition, linking the Virtual Human Body to the UQ username and password system would be highly advantageous.

It is hoped that the Virtual Human Body will provide high impact active mobile learning
opportunities. If this new mobile learning application proves to be successful, its uptake at other national and international tertiary institutions seems highly likely. The project team has already been invited to participate in the forthcoming New Media for Science ATLC project workshops in November 2011.

SECTION E – Approach
Provide a step-by-step action plan describing the activities you will undertake during the project. State the key milestones, major phases and timeline of the project. Please include project START date and project COMPLETION date

December 2011 to March 2012
- Recruitment of Research Assistant; secondary literature review; ethics approval; preparation of pre and post tests; drafting assessment criteria and standards; alignment of course profiles;
- Conceptualisation and design of additional scenarios for the Virtual Human Body.

April 2012 to June 2012
- Compilation of reference resources for the project, video and still photography capture for the creation of the newly created scenarios for the Virtual Human Body.
- Software development to link into the UQ username database.

June – July 2012
- Populating the Virtual Human Body with data, text and images;

August 2012 – June 2013
- Monitoring, recording and analysing student internet traffic on Virtual Human Body for evaluation purposes.

October 2012 – June 2013
- Obtain student feedback;
- Analyse student feedback, and learning outcomes as measured by assessment performance;
- Start dissemination process.

SECTION F – Sustainability of project outcomes.
How will outcomes be sustained after the project ends? eg How will new practices be embedded? What will be the potential impact and benefit across the faculty?

The Virtual Human Body is ideally suited for BIOM1000 Physiology of the Human Body and BIOM2015 Physiology and Pharmacology of Human Disease. These courses introduce the learner to the concept of homeostasis, and to the physiology of major systems (nervous, respiratory, vascular, renal) and how disruption of homeostasis can lead to acute illness, chronic health disorders and/or death. Students will be introduced to integrated pathophysiology and related pharmacology in human disease relevant to allied health sciences thereby becoming familiar with common medicinal drugs used in the treatment of conditions mentioned in these courses. In addition, students undertaking these courses will have gained understanding in human anatomy as ANAT1000 is assumed knowledge for BIOM1000. Thus, the existing curricular structures assure sustainability of this project. Furthermore, the Virtual Human Body could be made available for different student cohorts that study science as part of other heath science programs and to students enrolled in the Bachelor of Biomedical Sciences and Bachelor of Science.
Both, BIOM1000 and BIOM2015 are being taught at Ipswich Campus, and, due to the remoteness of the campus location, will potentially benefit from this new flexible mobile learning approach.

**SECTION G – What are the strategies for evaluation and dissemination of information on the expected outcomes of the project?**

**Quantitative evaluation** will be based on student feedback on perceived efficacy of the *Virtual Human Body*, and on comparison of year-to-year learning outcomes as measured by student performance in summative assessment and grade distribution. **Qualitative evaluation** will be based on student focus groups and staff feedback plus a critical evaluation of future pedagogical application using a Delphi Panel of experts.

- Pre- and post-tests of student learning and experience, including two student focus groups;
- Year-over-year (Y0Y) comparison of grades;
- Feedback from teaching staff involved in project;
- Delphi Panel of experts.

**Dissemination** of the progress made in design and development has occurred at the 2011 HERDSA conference last July, with further dissemination of more recent development at the 10th World Conference on Mobile and Contextual Learning (mLearn 2011) conference in Beijing in October this year. Further dissemination include:
- November 2012, UQ Teaching Week;
- Web dissemination through ALTC Exchange, UQ SoTL ezine;
- Conference presentations in 2012 and 2013 (mLearn and ascilite conference).

**SECTION H – Budget for Project**

*Include a table outlining all expenses and sources of funding (from Faculty and School)*

<table>
<thead>
<tr>
<th>Item</th>
<th>FoS ($)</th>
<th>SBMS ($)</th>
<th>Other ($)</th>
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<tr>
<td>Casual Research Assistant (HEW 5.4) 400 hrs @ $39.85/hr + 16.8% on-costs</td>
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<td>4,654.92</td>
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<tr>
<td>Software development by CBIT</td>
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<td>International conference presentation</td>
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**Overall Total Requested**

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<tbody>
<tr>
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</table>

**Budget Justification**

- (a) Media production support in kind from the School of Journalism and Communication.
- (b) Research Assistant responsible for: secondary literature review; preparation of pre and post tests; administration and compilation of data collection instruments; compilation of reference resources for the *Virtual Human Body*; support of video and still photography capture; and support in populating the *Virtual Human Body* with data, text and images.
- (c) Software development required to link *Virtual Human Body* into the UQ username database.
- (d) Dissemination will include presentation at one international conference (mLearn 2012).
**SECTION I ENDORSEMENT**

This endorsement indicates my support for the project and that internal resources as required will be available (e.g., administrative support and workload allocation).

**Head of School Endorsement (or attach written endorsement)**

Name: Prof Wally Thomas  
School: SBMS  
Signature:

**T&L Chair Endorsement (or attach written endorsement)**

Name: Prof Mike Bennett  
School: SBMS  
Signature:

**SECTION J APPLICATION SUBMISSION**

Applications should be submitted via School T&L Chairs. Schools should submit all applications to Robyn Evans in the Faculty Office, robyn.evans@uq.edu.au.

Applications should be:
- in electronic form (Word or PDF)
- one file per application

Application closing date: **Friday 23 September 2011**

**References**


Science at UQ took bold steps in 2008 to build quantitative skills (QS) with the introduction of SCIE1000 and the inclusion of STAT1201 as a compulsory BSc requirement. Building a solid knowledge base in mathematics and statistics is critical for students to then apply that knowledge in the context of their biology and chemistry courses; however cross school and discipline links to build QS has been limited. This pilot project aims to address this challenge by identifying the needs for, and current practices in teaching, QS in 1st year biology and chemistry, and to trial some strategies for how these might align with STAT1201 and SCIE1000 to support student learning. Recommendations arising from the project will provide insights into how QS can be structured across the curriculum, which could be applicable to other core curricular skills/outcomes (i.e., writing).
SECTION D – Rationale

The deterioration of mathematics and associated student confidence at secondary and tertiary levels is well known, and is a particular challenge for science education\(^{(1-4)}\). The 2007 UQ BSc review called to address this decline by embedding QS into the revised curriculum, this resulted in the introduction of SCIE1000 and the compulsory course STAT1201. Students and academics typically view courses in isolation\(^{(5-6)}\), hence the challenge of how to support student learning and facilitate curricular connections of QS across discipline boundaries remains.

This pilot project aims to initiate discussion to (1) identify the needs for QS in 1st year biology and chemistry; (2) identify current QS related teaching practices and gaps, and; (3) align these with STAT1201 and SCIE1000 to further build QS in science. The outcomes from the project will inform models of implementation for teaching core skills across courses, and related recommendations will be made to the Faculty TLC.

The project aligns with National priorities via two links: (1) ALTC Science Learning Threshold Outcomes (underpinned by QS) and (2) ALTC QS in Science project led out of UQ. Alignment to Faculty of Science priorities include (1) building QS; (2) learning outcomes for programs; and (3) quality assurance and assessment.

References

SECTION E – Approach

**Definition:** QS relate to numbers and how they are applied e.g., for measuring, recording and analysing data, or performing mathematical or statistical calculations. More specifically, QS refer to the application of mathematical and statistical thinking and reasoning in a given context.

**Specific aims** of this project are to:
AIM 1: Explore, identify and document QS requirements for BIOL1020, BIOL1030, BIOL1040, CHEM1020, SCIE1000 and STAT1201.
AIM 2: Explore, identify and document links to QS skills taught in STAT1201 and SCIE1000.
AIM 3: Develop, implement and evaluate some small educational strategies to better build QS in the context of these courses, most likely in context of laboratory learning.
AIM 4: Develop ways to better link and articulate the QS learning standards across courses.
AIM 5: Report on the success of the resulting strategies to the Faculty TLC as a means of working across courses to build QS, and potentially other core skills e.g., writing.
Sustainability is challenging; however, this project has broad buy-in as evidenced by the project team, and is positioned around a challenge that is central to the BSc (i.e. not a fade). The recommendations of the project will be strongly influenced by pragmatism and sustainability.

It is hoped that the project will benefit and impact the faculty by:
1. An improvement in the QS of first year science students, and
2. Trialled/tested recommendations for a model for teaching other core skills across courses e.g., writing.
SECTION G – What are the strategies for evaluation and dissemination of information on the expected outcomes of the project?

Strategies for evaluation and dissemination include:
- Critical input and feedback from, and dissemination to Anthony Harradine and Carmel Coady, both of whom are involved in similar projects at other tertiary education institutions
- Involvement of the TEDI via Kelly Matthews in evaluating specific educational strategies
- Dissemination via national ALTC *QS in Science* project and its network, National Conference as well as to UQ Faculty of Science teaching and learning committee
- Publication of the approach and findings in a peer-reviewed science education journal

SECTION H – Budget for Project

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
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<td>Line 2</td>
<td></td>
</tr>
<tr>
<td>Line 3</td>
<td></td>
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</tbody>
</table>

SECTION I  ENDORSEMENT

This endorsement indicates my support for the project and that internal resources as required will be available (eg administrative support and workload allocation).

**Head of School Endorsement (or attach written endorsement)**
Name: Prof Mark Blows
School: School of Biological Sciences
Signature:

**T&L Chair Endorsement (or attach written endorsement)**
Name: Sassan Asgari
School: School of Biological Sciences
Signature:

SECTION J  APPLICATION SUBMISSION

Applications should be submitted via School T&L Chairs. Schools should submit all applications to Robyn Evans in the Faculty Office, robyn.evans@uq.edu.au.