



University College Dublin

Quality Improvement Plan

UCD School of Chemical and Bioprocess Engineering

November, 2009

Contents

1. Introduction	3
2. Recommendations for Improvements - Follow-Up Action Taken and/or Planned	4
3. Prioritised Resource Requirements	14

1. Introduction

The date of the original review was March 30th – April 2nd 2009 and the initial meeting for the preparation of the Quality Improvement Plan was held on October 27th, 2009 at 16:00. At this meeting, the following staff members, who were also involved in the preparation of the original Quality Assessment Report, agreed to serve on the Quality Improvement Committee. The Committee was subdivided into three sub-committees, each of which was given the responsibility to review the commendations and recommendations of the Review Group in the categories outlined in the QIP template.

Category 1:

- Academic Staff = Prof. Don MacElroy, Dr Dermot Malone
- Technical Staff = Mr Brian Turner

Category 2:

- Academic Staff = Prof Brian Glennon, Dr Niall English
- Technical Staff = Ms Sinead Kerins

Category 3:

- Academic Staff = Dr Frank MacLoughlin, Dr Damian Mooney
- Technical Staff = Mr Tom Burke
- Administrative Staff = Aoife Carney

The QI Committee met on regular occasions to ensure that the final QIP was coherent across all three categories and the completed Quality Improvement Plan is reported on the following pages.

2. Recommendations for Improvements – Follow-Up Action Taken and/or Planned

Please outline the Unit response using the template contained in this section (see below).

CATEGORY 1: Recommendations concerning academic, organisational and other matters which are entirely under the control of the unit

- **Category 1(a)**

Recommendations already implemented

1. Recommendation:

The School has been very productive and successful in attracting research funding and should continue to advance its case for availability of funding from overhead income received in order to maintain and enhance its research equipment and infrastructure.

Action taken: This is ongoing. At this time overhead is primarily being employed to offset School deficit. It is anticipated that the response to recommendations 1-3 in category 1(b) will help to resolve this issue in the coming year. The School has also been informed that overhead income from the SFI grant for the Professorship will be provided to the School on an annual basis.

2. Recommendation:

The School should continue to embrace the PMDS scheme, with which it is already engaged, as a mechanism for the annual review and development of staff. This review process should also cover the training needs of staff in relation to achievement of the School's research and teaching objectives.

Action taken:

The PMDS scheme is in place and requests for training in a number of activities (computer skills training (effective Microsoft project software, training in PowerPoint and Excel) and training on specialised apparatus such as the SEM, AFM and Sorptometer) have been provided; selected staff have also been trained in e-Procurement. Budgetary constraints however limit the possibility of training programme options and it is hoped that this will ease in the next 2-3 years.

3. Recommendation (Undergraduate):

Planned introduction of bioprocessing experiments, notably in fermentation should be introduced as a matter of priority.

Action taken:

Professor Mohamed Al-Rubeai has responsibility for the enhancement of the undergraduate Unit Operations Laboratory to include at least two new experiments on Bioprocess Engineering. The Laboratory in the Biopharmaceutical Masters Programme also has a suite of experiments associated with it.

4. Recommendation:

The Head of School should consider the implementation of an academic work load model in order to formalise what seems to be a fair and appropriate balance of staff involvement in teaching and research.

Action taken:

An academic workload model has been formulated and is now in place.

5. Recommendation:

The School should periodically review both the quality and impact of its research outputs in consultation with the industrial user community.

Action taken: This is already in place through industrial partnerships in three SRCs (the UCD led SRC in Advanced Biomimetic Materials for Solar Energy Conversion (Director Prof Don MacElroy), the UL led SRC in Crystallization (PI Prof Brian Glennon) and the DCU led SRC in Plasma Technology for Advanced Manufacturing. Close ties also exist with (1) NIBRT, (2) the EI Process Analytical Technology (PAT) ILRP and (3) in individual industrial collaborations. This is also continually under review to establish new opportunities for academia-industry linkages.

- **Category 1(b)**

Recommendations to be implemented within one year

1. Recommendation:

The RG suggests that options for increasing income and the cost benefits should be considered and that the School consider defining an appropriate portfolio of the following:

Recommendation:

Capitalising on the School's international reputation to attract a cohort of full-fee-paying international students

Action planned:

The School currently attracts 2-3 JYA students. In association with the Engineering Programme Office it is planned to increase this number to 4-6. The taught Masters Programmes also serve as possible programmes of interest to international fee-paying students and this is being addressed through the College Office targets agreed with Principal of EMPS. In September 2010 the MEngSc in Biopharmaceutical Engineering will become a full time 90 credit Masters and will be open to as many as 10 international students (with the current focus on China). A new full time 90 credit Masters in Chemical Engineering will also be offered starting in September 2011 with up to 10 places for international fee-paying students.

Recommendation:

Increasing undergraduate student numbers

Action planned

Efforts in this are ongoing. We have availed of the opportunity to advertise our programmes on the careers portal web-site www.careersportal.ie which allows us to bring these courses to the attention of 2nd level students, their parents and Guidance Counselors. The site was officially launched in April 2009 and we have had a presence on the site since September 2009 as a guidance service to 2nd and 3rd level students and teachers and those in the workforce or seeking to get into the workforce.

Dr Patricia Kieran has also been particularly active in a range of programmes directed at attracting student to the undergraduate programme including:

'Experience Engineering', a week-long, hands-on, annual event at UCD for 40 Transition Year students (aged 15-16) from Dublin and around

Ireland. This event introduces students to Engineering as a diverse and exciting discipline with rewarding career opportunities and has been running since 2007;

'Thinking about ... Careers in Chemical Engineering', and annual one day, event for up to 50 5th Year students (aged 16-17 which has been running since 2003);

With Dr Dermot Malone, the production of a series of short videos in 2007 about Chemical Engineering, featuring academic staff members, undergraduate students and post graduate students. The videos are available for viewing on the UCD website and are featured (by IChemE request) on the IChemE's 'whynotchemeng' site;

With Dr Dermot Malone, the coordination of the UCD contribution to the production of a video promoting Chemical Engineering (representing UCD and Cork Institute of Technology (CIT) in 2000);

Building productive working relationships with Chemistry teachers, targeting teachers from selected schools and providing them with relevant information. The most recent marketing campaign included UCD-crested laboratory coats, reminding wearers about 'Chemical Engineering ... Bringing Science to Life';

Making regular presentations to secondary school students around the country on Engineering careers.

Recommendation:

Increasing post-graduate student numbers

Action planned:

As noted earlier, international students are currently being targeted for enrolment in taught Masters Programmes. In addition there has been, and will continue to be, expansion in the research student numbers at PhD level.

2. Recommendation:

The School should consider increasing the use of its growing population of research students and Research Fellows in the delivery of taught degree programmes. This would benefit academic staff by freeing up more of their time for research and innovation and would also benefit the researchers by providing opportunities to develop a broader range of skills and experience.

Action planned: The policy on Career Pathways for post-doctoral researchers is currently under development in the University and will be implemented.

3. Recommendation:

Students embarking on the BE in Bioprocess Engineering should be strongly encouraged to take options in biological sciences.

Action planned:

An undergraduate committee has been established and will review available options/electives which may be open to the undergraduate students. This committee will provide a draft document on its deliberation for presentation at the School Council meeting early in the New Year.

4. Recommendation:

Consideration should be given to the establishment of a Staff Student Consultative Council for postgraduate students.

Action planned

This will be established this year along lines similar to the undergraduate SSCC with two categories of student involvement Early researchers (1st Year PhD/Masters) and mature graduates (full time PhD students in Phase 2 of their programme).

5. Recommendation:

Membership of doctoral studies panel should be more evenly spread among the academic staff to relieve some of the workload on academic staff and, in particular, on the Head of School.

Action planned:

This is currently being established.

6. Recommendation:

The School should establish formal mechanisms for consultation with the PG research students as a means of obtaining and documenting important feedback. This will be increasingly important as the number of PG research students and Research Fellows increases.

Action planned:

This is being acted upon through Recommendation 4.

7. Recommendation:

The RG endorses the School view that an electronic register of its graduates be developed so that not only their first destination, but also complete career pathways, can be documented.

Action planned:

A register of graduate has been in place for many years. This is now being collated, updated and recorded electronically.

8. Recommendation:

The School should be more forthright in highlighting to all stakeholders (staff, students, employers, policy-makers) the extent to which it is highly ranked and regarded for its educational provision and research quality.

Action planned:

A School brochure is currently under development and the School website will also be updated this year. Through outreach activities such as Open Days, as well as outreach relating to the Solar Energy Conversion SRC (Director Professor Don MacElroy) the SRC on Crystallization (UCD PI Professor Brian Glennon) and the SRC in Plasma Technology for Advanced Manufacturing (UCD PI Professor Mohamed Al-Rubeai), the School's teaching and research portfolio is being highlighted to stakeholders.

9. Recommendation:

The School should consider developing more events of a social nature to further develop informal contacts with graduates and employers. This will help cement existing relationships and develop new ones and, with time, can develop into fund-raising opportunities.

Action planned:

This is an ongoing activity (informal gatherings with industrial personnel during interviews and presentations in seminars, the 40th and 50th Anniversary Dinners in 1996 and 2006, and the celebration for Professor John O'Donnell). Further planned activities this year will arise through

efforts to establish the Chemical and Bioprocess Engineering External Advisory Panel.

- **Category 1(c)**

Recommendations to be implemented within five years

1. Recommendation:

Provision of modules which would be attractive as electives to students outside the School

Action planned:

This year two of the academic staff are participating in a new Masters Programme in Energy Systems. These staff are responsible for 50% of the content in one module (Fuel Processing and Carbon Capture) and 100% of the content in a second module (Renewable Energy with a particular emphasis on Solar Energy). Future developments in the structure of the Masters in Biopharmaceutical Engineering (see recommendation 2) will also play a role in responding to this recommendation.

2. Recommendation:

While there are some restrictions within the accreditation framework for introducing new modules, consideration should be given to developing courses in drug formulation and delivery, an area felt by some of the external panel who met the RG to offer substantial opportunities to other student cohorts across UCD. Such a development would capitalise on existing research activity.

Action planned:

In 2010 the Masters Programme in Biopharmaceutical Engineering will become a 12-month full-time programme. A partial restructuring of this programme will be undertaken to meet this recommendation and offer elements of the course as elective components.

3. Recommendation:

Working with the Development Office to enhance relationships with alumni (especially those of high net worth) with a view to philanthropic support.

Action planned:

This is currently underway as mentioned in Category 1(b), Recommendation 9.

4. Recommendation:

Development of a themed PhD programme in Bioprocess Engineering which ensures that students have a sufficiently deep understanding of relevant topics in Biology by completing appropriate modules available in the University.

Action planned:

The development of a themed PhD programme in Bioprocess Engineering is currently on hold for resource reasons. The School is currently involved in a thematic Doctoral Programme in (Bio)pharmaceutical and Pharmacological Sciences initiated by CSCB which is funded by PRTL Cycle 4. Another thematic doctoral programme in Biotechnology (SBBS) is also under review (see also Recommendation 5 below).

5. Recommendation:

As the School's teaching and research activities in the biotechnological areas increase, it may be appropriate for students to take greater advantage of the availability of courses offered by Schools associated with the Conway Institute

Action planned:

Our PhD students are currently provided with a background in Biology by selecting from several courses that are annually provided inside and outside the university. There are two themed programmes as well as courses provided by the College of Life Sciences and Conway Institute. For example the (Bio)pharmaceutical & Pharmacological Sciences programme offers a course on "Animal Cell Culture Technology" among several other biology/biomedical courses. In the Biotechnology programmes the School offers 7 courses in Bioprocess Engineering including Bioprocess Scale up, Bioreactor Design and Animal Cell Culture Technology.

- **Category 1(d)**

Recommendations None

CATEGORY 2: Recommendations concerning shortcomings in services, procedures and facilities which are outside the control of the unit

- **Category 2(a)**

Recommendations None

- **Category 2(b)**

Recommendations None

- **Category 2(c)**

Recommendations to be implemented within five years

1. Recommendation: In conjunction with Library staff, the School should consider the possibility of sharing resources among the Universities in the Dublin area as a way of dealing with increasing subscription costs.

Action planned: The University, specifically the Library, is already engaged in a number of national initiatives (e.g. IReL, SCONUL and ALCID) which benefit from economies of scale from consortium purchasing and from centralised negotiation and administration. We propose to bring the above recommendation to the attention of the College Library Committee (March 2010) where clarification will be sought regarding existing joint subscription measures (across the Dublin-based Universities) and the extent to which these can be further extended to include Chemical & Bioprocess Engineering-related resources. It is proposed that this will become a permanent agenda item to be updated on an annual basis. In addition, because of the current financial situation, it should be expected that cost reductions can be sought from publishers. At the same time, the School will investigate the extent to which external funding streams can assist in adapting needs to available resources (see 3(b)).

2. Recommendation: In order to capitalize on opportunities in research and education, the administrative support available to the School requires to be maintained at least at its current level.

Action planned: A part-time administrative post has been eliminated since completion of the review. A replacement for this position has not been approved to date. However, in keeping with the recommendation of the review committee, it is expected that this position will be filled as the financial situation improves.

3. Recommendation: Once the financial situation improves, the College should seek to match the School's success in competitively won staff funding by allowing the replacement of academic staff and provision of one to two new academic staff positions. These appointments will be essential in order to achieve the planned increase in research activity and to maintain critical mass.

Action planned: No new academic positions have been approved since completion of the review. However, in keeping with the recommendation of the review committee, it is expected that this position will be filled as the financial situation improves.

4. Recommendation: The College needs to address the inadequate administrative and technical support available to the School. At a minimum there is the need for one extra administrator and one technical Research Manager.

Action planned: No new positions have been approved since completion of the review. However, in keeping with the recommendation of the review committee, it is expected that this position will be filled as the financial situation improves.

5. Recommendation: The appointment of a technical officer with skills in the biological sciences should be a priority.

Action planned: No new appointment has been approved since completion of the review. However, in keeping with the recommendation of the review committee, it is expected that this position will be filled as the financial situation improves.

6. Recommendation: The constant upgrading of the School's computational facilities would benefit greatly from the appointment of a High Performance Computation specialist who could also serve a number of other Schools, and ways to fund such a position should be explored.

Action planned: No new appointment has been approved since completion of the review. However, in keeping with the recommendation of the review committee, it is expected that this position will be filled as the financial situation improves.

- **Category 2(d)**

Recommendations None

CATEGORY 3: Recommendations concerning inadequate staffing, and/or facilities which require recurrent or capital funding

- **Category 3(a)**

Recommendations already implemented

1. Recommendation: None

- **Category 3(b)**

Recommendations to be implemented within one year

1. Recommendation:

Funding for new undergraduate teaching equipment is urgently required and priority should be given to the purchase of equipment for bioseparations, especially membrane filtration and chromatography.

Action planned: Professors Glennon and Al-Rubai will coordinate the specification and associated costs for said equipment, prioritising the purchase of that which will impact greatest on undergraduate teaching. Mr Tom Burke will assess the possibility of the construction of equipment in-house. While the country currently experiences a challenging fiscal position, public and private sources will be explored to fund either direct purchase or self-build options (See 1(b)-1).

Included in this funding, provision should be made for the replacement of existing unit operations equipment which are now over twenty years old such as a new refrigeration unit, new concentric tube heat exchanger, new fluidised bed unit, new centrifugal pump demonstration unit, new cooling tower unit along with funds for new instrumentation on existing 4th Stage undergraduate project equipment.

2. Recommendation:

The School, together with the College, should seek to achieve an appropriate level of workshop provision.

Action planned: While this recommendation has been largely achieved (following on from School and HEA funding), including the purchase of a new CNC lathe, it is proposed that Tom Burke, in association with the Head of School, will continually benchmark current needs against existing workshop provisions (See 1(b)-1). The School workshop provision will be formalised and put on an accepted and agreed School-wide system of operation between the technical staff and any potential users of these workshop facilities.

- **Category 3(c)**

Recommendations to be implemented within five years

1. Recommendation:

The School should develop a plan for the phased replacement and updating of key teaching equipment and implement it once appropriate resources become available. Consideration should be given to engaging industry and alumni in the support of equipment replacement.

Action planned: As is highlighted elsewhere, particularly in 1(b)-1 and 3(b)-1, 2, there is an urgent need to leverage funding sources, including industry and alumni, to maintain and update facilities. Academic staff with responsibilities for Laboratory-based subjects, in conjunction with Mr Tom Burke and Ms Sinéad Kerins will be charged with developing said plan, with a view to generating a list of (prioritised) equipment and expected costs (updated when appropriate). All staff will help in identifying funding sources, and representations will be made to College and University for enhanced overhead contributions.

- **Category 3(d)**

Recommendations which will not be implemented

1. Recommendation: None

3. Prioritised Resource Requirements

This section should only contain a list, prioritised by the Quality Improvement Committee, of recommendations outlined in the Review Group Report, which require additional resources. The planned action to address each recommendation with an estimate of the cost involved should also be included.

These points are highlighted below under two headings: (A) Laboratory Resources and (B) Staffing.

(A) Undergraduate and Research Laboratory Resources:

There were four major recommendations in this area made by the Review Group:

- The School should develop a plan for the phased replacement and updating of key teaching equipment and implement it once appropriate resources become available. Consideration should be given to engaging industry and alumni in the support of equipment replacement.
- Funding for new undergraduate teaching equipment is urgently required and priority should be given to the purchase of equipment for bioseparations, especially membrane filtration and chromatography.
- Planned introduction of bioprocessing experiments, notably in fermentation should be introduced as a matter of priority.
- The School, together with the College, should seek to achieve an appropriate level of workshop provision.

The action plans in response to these recommendations have been outlined in the body of the Quality Improvement Plan. However we would again reiterate that there is an urgent need raise the necessary funds internally and externally including the leveraging of funding sources (e.g. industry and alumni) to maintain and update facilities. Staff with responsibilities for Laboratory-based subjects will be charged with generating a list of (prioritised) equipment and expected costs (updated when appropriate). All staff will help in identifying funding sources, and representations will be made to College and University for enhanced overhead contributions.

In terms of School prioritisation:

1. The School would like to note that with the exception of a relatively small injection of funding from the HEA in the last decade, the equipment within the undergraduate laboratories is over 20 years old and in some cases in excess of 40 years. In 1989 when the School moved from Merrion St. to Belfield, approximately £750,000 was provided to upgrade the laboratories. A similar upgrade today would cost approximately €2,500,000 (Note that in 1989 there were less than 10 postgraduate students in the School and no post-doctoral researchers – the laboratory costs including refurbishment and provision of office space has therefore grown commensurately since 1989 and full upgrades would in fact be significantly greater than €2,500,000 when postgraduate research is included).

With reference to the estimate of €2,500,000 the costs accrue as follows:

Unit Operations Laboratory (€885,000):

Equipment including:

Upgrades across a range of equipment items including the Triple Effect Evaporator, Distillation Column, Heat Exchangers, Pumps, Gas Absorption rig, Process Control etc - €320,000

Gas chromatograph, pilot crystallizer with on-line NIR/FTIR, Gas fluidised bed reactor with on-line GC and CSTR/BR homogeneous reaction rig - €225,000

Miscellaneous measurement and control instrumentation - €40,000

Refurbishment costs:

Installation of dedicated, metered (e.g. N₂) gas lines, liquid N₂ generator, IP45 ports, chemical flooring, lighting. Upgrade of benching, sinks and safety washes, as well as security (access and monitoring). Optional air conditioning - €300,000

Undergraduate Projects' Laboratory (€965,000)

Equipment:

Bioreactor (animal cell) = €85,000, Bioreactor (plant cell) = €75,000, 2 HPLCs = €130,000, In-situ FBRM (focused beam reflective method) = €40,000, Bench-top NIR analyzer = €30,000, PVM (particle volume monitor) = €45,000.

Miscellaneous Equipment including: conductivity meters, electronic scales, autoclave, liquid N₂ fridge, fridge = €60,000.

Refurbishment:

Significant upgrade works are required to convert to international bio-research standards. Including surface cladding, clean-room area, air-conditioning, bio-hazard handling. installation of dedicated, metered gas lines, IP45 ports, chemical flooring, lighting. Upgrade of benching, sinks and safety washes, as well as security (access and monitoring) - €500,000

Physical Chemistry Laboratories (€220,000)

Equipment:

Viscometer = €20,000, surface tension balance = €10,000, Bomb calorimeter = €25,000, KF titration rig = €18,000, Bench-top reactor = €15,000, Electrochemical cell/fuel cell rig = €12,000

Miscellaneous Equipment: including conductivity meters, electronic scales = €20,000.

Refurbishment:

Includes installation of dedicated, metered gas lines, IP45 ports, chemical flooring, lighting. Upgrade of benching, sinks and safety washes, as well as security (access and monitoring). Optional air conditioning. - €100,000

Instrument Analysis Room (€465,000)

Equipment

Upgrades of 2 GCs = €80,000, GCMS = €100,000, Atomic Absorption Unit = €40,000, UV-Vis + diode system = €50,000, HPLC = €65,000

Refurbishment:

Installation of gas detectors/alarm. air-conditioning. cladding of surfaces, flooring. Upgrading of benching, as well as renewal of electrical and gas lines - €130,000

All of the above costs add to €2,535,000 and do not include VAT, legacy costs or warranty/maintenance costs etc. Also not included here are costs for re-equipping the Bioprocess Engineering Laboratory which is on loan to NIBRT until the Institute moves to its new premises. An important element of the research activity in the School (both undergraduate and postgraduate) involves high performance computational modeling and no provision is provided in the above estimates for maintaining and upgrading the HPC computer clusters (the replacement of a single cluster every 3-5 years is approximately €50,000). The recommendations by the Review Group for the inclusion of equipment for bio-separations and fermentation over and above available resources would also expand on these costs significantly in view of the highly specialised nature of such instrumentation.

2. As an example of the needs to respond to the increasing demand for utilities such as steam in the school's undergraduate teaching laboratories and the post-graduate research laboratories the School would like to emphasise that the existing boiler, which services the present demand, is working at its limits. Any further demand of steam would not be met with the present boiler. A budget price for a small boiler including VAT would be about €20,000. Budget

- price for large replacement boiler is being sought. All other utility requirements in the laboratories such as compressed air and electrical power are servicing the current demand and should do so for future demands.
3. With regard to teaching facilities an upgrade of T&L facilities in Rooms 130 & 142 within the Engineering and Materials Science Centre with Teammate Lectern & ancillary equipment €26,000 per room would be very desirable.
 4. The issue of workshop resources remains an open question. While modest resources exist within the School, the possibility of access to the larger building facility still needs to be addressed at College level.

(B) Staffing:

In addition to a number of recommendations made with regard to expansion on the provision of new modules (particularly in Bioprocess Engineering) which have resource implications, there were four primary recommendations made by the Review Group in this area:

- Once the financial situation improves, the College should seek to match the School's success in competitively won staff funding by allowing the replacement of academic staff and provision of one to two new academic staff positions. These appointments will be essential in order to achieve the planned increase in research activity and to maintain critical mass.
- The College needs to address the inadequate administrative and technical support available to the School. At a minimum there is the need for one extra administrator and one technical Research Manager.
- The constant upgrading of the School's computational facilities would benefit greatly from the appointment of a High Performance Computation specialist who could also serve a number of other Schools, and ways to fund such a position should be explored.
- The appointment of a technical officer with skills in the biological sciences should be a priority.

The School's prioritisation for staffing is as follows:

1. Within the last 6 months the School has suffered a 12% reduction in staffing which is much greater than the 3.2% staffing reduction reported across the University. Replacement of these staff is not possible at this time in view of financial constraints, however, the School earnestly requests that these posts be filled immediately the embargo has been lifted in addition to the one or two additional academic as well as administrative staff positions recommended by the review group. The costs of reinstatement of the two academic posts would come to approximately €210,000 per annum (including employer's contributions) and the addition of two new junior Lecturer posts (one in Chemical Process Engineering (in Energy or Pharmaceuticals) and one in Bioprocess Engineering (Downstream Processing)) would come to approximately €160,000 per annum. While the EA post lost in 2009 was a half-time position, the School is requesting that a full-time EA post be provided to the School when this is possible in view of the greater workloads associated with the recent dramatic increase in postgraduate student numbers and the increase in undergraduate/postgraduate taught students in the coming years. A full-time EA would cost €45,000. In addition, the appointment of a technical Research Manager would come to €60,000. The total cost of new staff would therefore come to €475,000 per annum (including employer's contributions).
2. In response to the second recommendation above made by the Review Group the School would also request that prioritisation of be given on equal footing to the appointment of additional technical staff, particularly in view of the significant importance of laboratory practice in both Chemical Engineering and Bioprocess Engineering. It is envisaged that two additional technicians one each in Chemical Engineering and Bioprocess Engineering would be need at a cost of €120,000 (including employer's contribution).

3. The appointment of a High Performance Computing (HPC) specialist is becoming necessary, given the large drain on the School's academic and technical staff's time in administering and supporting these facilities. This has been recommended a number of times to the Research IT group, who are in agreement that this indeed would be a welcome development, in that many research groups across several Schools and Units could be serviced by this. However, the Research IT group does not have the resources to hire a HPC specialist. It is to be hoped that the university could make funds available for this, perhaps through research overheads, as such a specialist would have a large positive impact across many research groups and Schools. The salary of the IT specialist would come to €60,000 (including employer's contribution) and it is possible this person could be costed on a shared basis with other Schools within EMPS.

Note: The Quality Improvement Plan should be used to inform School/Support Unit and College level academic, support service and resource planning activities.