Quality Assurance / Quality Improvement Programme for Academic Units 2002-2003

Peer Review Group Report for the School of Biotechnology

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Introduction

This Quality review has been conducted in accordance with a framework model developed and agreed through the Irish Universities Quality Board (IUQB) and which complies with the provisions of Section 35 of the Universities Act (1997). The model consists of a number of basic steps.

1. An internal team in the School/Unit being reviewed completes a detailed self-assessment report (SAR). It should be noted that this document is confidential to the School and to the Review Panel and to senior officers of the University
2. This report is sent to a team of peer assessors, the Peer Review Group (PRG) – composed of members from outside DCU and from other areas of DCU – who then visit the School/Unit and conduct discussions with a range of staff, students and other stakeholders.
3. The PRG then writes its own report
4. The School/Unit produces a School/Unit Quality Plan in response to the various issues and findings of the SAR and PRG Reports.
5. The PRG Report and the School/Unit Quality Plan are considered by the University Executive, which makes a formal response to both, after consultation with the School/Unit and the Director of Quality Promotion. The School/Unit Quality Plan and the Executive Response become incorporated into what is termed the Quality Improvement Plan (QuIP)
6. A summary of the PRG Report and the QuIP is sent to the Governing Authority of the University, who may approve publication in a manner that they see fit. The summary report will then be published on the Quality Promotion Unit website.
7. Following the approval of the summary report by the Governing Authority, the full text of both the Peer Review Group Report and the Quality Improvement Plan are published on the Quality Promotion Unit website.

This document is the report referred to in Step 3 above.

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1. Profile of the School of Biotechnology

Location

The School of Biotechnology is a strategic unit in the Faculty of Science and Health at Dublin City University. It is located in a new state of the art building that incorporates both teaching and research facilities together with a bioprocessing pilot plant. The School is unique in having Process Engineers, Biochemists, Microbiologists, Geneticists, a Molecular Parasitologist and a Pharmacologist within a single departmental unit, thus encouraging interdisciplinary approaches to teaching and research.

Staff

The following table details the composition of staff within the School.

Staff	**Permanent**	**Temporary**	**Total**
Academic	16	1 [1]	17
Administrative	1		1
Technical	6	6 [2]	12
Research (Postdoctoral)	5 [3]	13 [4]	18
Research (Other)	1 [3]	5 [3]	6
Other	1 [5]	2 [5]	3
	30	**27**	**57**

1. Contract covering permanent member of staff seconded elsewhere in DCU
2. includes 3 contracts covering permanent members of staff on leave of absence from DCU
3. in NCTCC
4. includes 5 in NCTCC
5. in City Biologic

Programmes and Activities

The School's central activities of teaching and research are managed by the Head of School in conjunction with the Chairpersons of the Degree programme boards and by means of a committee system.

Specific objectives of the School include:

- Development of the teaching programme to encompass the strategic plan of the university.
- Expansion of the school research base to foster collaborative links universally and, in particular, with other schools and research centres within the university.
- Encouragement of entrepreneurship – the application of scientific discovery as a product of basic research.

Teaching
In summary the School is solely or jointly responsible for the following undergraduate and postgraduate programmes: -

	Programme	**Total Numbers**	**FTEs**
Home Degrees	BSc in Biotechnology Grad Dip/MSc in Biological Sciences	162 9 **171**	121 18 **139**
Joint Degrees	BSc in Analytical Science (Common 1st & 2nd Year) BSc in Analytical Science (Chemistry Option in 3rd & 4th Year) BSc in Analytical Science (Biology Option in 3rd & 4th Year) BSc in Environmental Science and Health (to commence 2003)	82 29 37 **148**	21 4 18 **43**
Service Teaching	Common Entry into Science (1st year only) BSc in Chemical & Pharmaceutical Sciences BSc Science International BSc Science Education BSc in Sports Science & Health BEng in Medical Mechanical Engineering BSc Nursing Grad Dip/MSc in Instrumental Analysis Grad Dip in Safety & Health MSc in Science Communication	54 47 5 45 106 39 163 18 22 12 **511**	13 8 1 5 15 2 2 3 5 0 **54**
Research	MSc and PhD by Research	**69**	**207**
	Totals	**899**	**443**

Research
The School is an active centre of basic and applied research. Members of staff have collaborative links with national and international research laboratories and attract funding from many sources including, The Health Research Board, The European Union, The Welcome Trust, HEA, The World Health Organisation, Enterprise Ireland, The Irish Cancer Society, The Department of Agriculture, Teagasc and Industry.

The main groups in the School are now affiliated to:

- National Centre for Sensor Research (NCSR)
- National Institute for Cellular Biotechnology (NICB)
- Vascular Health Research Centre (VHRC)
- National Cell and Tissue Culture Centre (NCTCC)

The groups include virtually all members of the School.

These centres form the cornerstone of current and future research in the School.

<u>Centres</u>

- **NCSR** - **National Centre for Sensor Research** – The NCSR, directed by Prof. Brian Mac Craith, was established in 1999 with an award of over €12m from the Irish government under the HEA Programme for Research in Third Level Institutions. It is a multidisciplinary research facility, focused on the development of biological and chemical sensors for medical diagnostics, food quality assurance and environmental monitoring. The centre currently has

over 150 researchers with a multi-disciplinary team of academic staff members from the Schools of Physical Sciences, Biotechnology, Chemical Sciences, Mechanical Engineering as well as the Institute of Technology Tallaght.

- **NICB - National Institute for Cellular Biotechnology –** The **NICB**, directed by Prof. Martin Clynes, is a multidisciplinary centre of research excellence in Fundamental and Applied Cellular Biotechnology, Molecular Cell Biology and Biological Chemistry drawn from Biologists, Biotechnologists, Chemists, Computer scientists, and experts in Bioscience Communication. The Institute is a major research collaboration between Dublin City University, NUI Maynooth and IT Tallaght which aims to be a centre of world-class expertise, in cellular and molecular biotechnology, in the synthesis of novel molecules with biological applications and in related areas including bio-ethics, science communication and bio-computing.

- **VHRC** - **A University Designated Research Centre** - The **Vascular Health Research Centre**, directed by Prof. Paul Cahill, is a multidisciplinary team of Vascular Biologists (School of Biotechnology), Exercise Physiologists (Centre for Sport Science and Health) and Design Engineers (School of Manufacturing and Engineering) that collectively address the role of Vascular Health and Disease in society by promoting Vascular Health through exercise and diet and by developing novel therapeutics to treat this disease.

- **NCTCC –** The **National Cell and Tissue Culture Centre**, directed by Prof. Martin Clynes, was established as a BioResearch Ireland centre of excellence for animal cell biotechnology in 1987. The centre is located in a stand-alone facility with custom designed laboratories on the campus of Dublin City University. The NCTCC is one of Ireland's foremost research institutes and has a wide range of research projects, originating from its expertise in oncology and cell culture. The NCTCC also has close links with a number of clinical research groups based in the cancer units of five Dublin hospitals. A key objective of the NCTCC is to commercialise its research through patenting and its close links with Irish and international companies. This has resulted in contract and collaborative research, the provision of technical services and the formation of a spin-off company, Archport Ltd., which operates fermentation and downstream processing facilities to cGMP.

Campus companies

A number of enterprises have developed from the research interests of particular members of staff. City Biologic, a public microbiological testing laboratory, was initiated in the late 1980's, followed by the campus companies Archport, Ildana and BioObservations.

2. The Self-Assessment Process

The Quality Co-ordinating Committee
Dr. Patricia Carty [Head Technician]
Dr. Stephen Daly [Postdoctoral Fellow]
Ms. Barbara Drew [School Secretary]
Dr. Ciaran Fagan [Lecturer]
Mr. Cormac O'Cleirigh [Postgraduate Student]
Dr. Michael Parkinson [Lecturer]
Dr. Brid Quilty [Head of School; Chairperson of Quality Committee]
Dr. John Tobin [Senior Lecturer]
Dr. Jane White [Research Assistant]

The Quality Committee was established early in 2002 to oversee the preparation of the self-assessment report of the School of Biotechnology. Membership of the committee was representative of all the constituencies within the School. The committee met once a week for approximately one hour in order to review progress of the report and to plan future activity. The School conducted a series of wide reaching surveys evaluating the following:-

- Quality of Teaching and Learning for the Biotechnology Degree for 1997-2002
  1) Analysis of Academic Performance
     a) Intake qualifications
     b) Student grades
     c) Analysis of pass rates and withdrawal rates
     d) Analysis of pass/fail rate per module
     e) Analysis of first year grades

  2) Student Feedback
     a) Incoming Survey of Students
     b) Student survey of Teaching (SSOT)
     c) Student Survey of Academic Programme (SSOAP)
     d) Structured Discussions with student class groups
     e) Course Experience Questionnaire (CEQ)

  3) Educational Initiatives in the School of Biotechnology
     a) Support Materials/Courses Run
     b) Educational Development

- Quality of Service provided
  1) The School surveyed a diverse range of service providers including: Library, Innovation Business Relations (IBR), Computer Services, Education Services, Buildings Office, Security, Faculty Administration, Registry, Personnel, Finance, Management (Central Committees – Executive, Resource Review Group, Senior Management) and other central services, to establish its level of satisfaction with the services provided.

3. The Peer Review Group Process

The Peer Review Group (PRG)
Prof. Andrew Booth, Professor of On-line Learning, Faculty of Biological Sciences, University of Leeds
Dr. Barbara Cantwell, Operational Risk Manager, Diageo Ireland, St James's Gate, Dublin 8
Prof. Emer Colleran, Head, Department of Microbiology, National University of Ireland, Galway [Chair]
Prof. Tony Moynihan, School of Computer Applications, Dublin City University
Ms Muireann Ní Dhuigneáin, Careers & Appointments Officer, Student Affairs, Dublin City University [Rapporteur]

Overall Methodology
The Review process consisted of three discrete activities: -

1. Familiarisation with the self-assessment report provided by the School in advance of the site visit.

2. A comprehensive site visit conducted over a period of 2 days to review and validate details of the self-assessment report.

3. The preparation and delivery of a review report documenting the findings and making recommendations for future development.

Schedule of Activity
Preliminary meeting
An initial meeting of the PRG was held on Wednesday 3rd April 2003 with the objectives of allocating key tasks and to agree the schedule of activities for the site visit.

Site Visit
Day One, Thursday 4th April 2003, began with a series of meetings with the staff of the School to consider and validate the self-assessment report. This provided the PRG with the opportunity to meet a wide representation of academic, administrative and technical support staff. These meetings were followed by a visit to the core facilities of the School. A further series of meetings was then held with Undergraduates (1st, 2nd and Final Year), Postgraduates, Postdoctorates, Researchers, Graduates and Entrepreneurs of the School.

The PRG noted the enthusiastic and open discussions held with representatives from both staff and students. This contributed to a successful and comprehensive site visit and optimised the validation of the self-assessment report.

On the second day, Friday 5th April 2003, the PRG met with the President, and other senior officers of the university including, Deputy President, Secretary, Director of Finance and Director of Human Resources to discuss strategic issues arising from the group's analysis of the self-assessment report. This was followed by a meeting with the Director of Library Services and the Science Librarian to discuss information delivery and service provision to the School. The meetings phase of the site visit concluded with a discussion with the Vice President for Research and Dean of the Faculty of Science and Health.

View of the Self-Assessment Report
Clearly, a tremendous amount of work was put into the preparation of the self-assessment report, and the members of the team are to be congratulated on the result of their efforts. The style of reporting is both open and refreshing. The report has a very authentic and honest feel about it. The involvement of all the stakeholders in the gathering of information for the report is apparent,

and adds substantially to the credibility of the report. The recommendations at the end of each section were particularly helpful to the PRG, and served to give focus to its work. It is worth noting that the conclusions and recommendations in the self-assessment report almost invariably mirrored those reached by the PRG. Subsequent to the scheduled meetings with staff, two groups, the technical staff and the postgraduate research students, helpfully provided the PRG with additional material that they wished it to have.

The self-assessment report had a few shortcomings. A little more description and evaluation of the management structures and processes in place within the School, and of the 'interface' between the School's management system and that of the Faculty, and of the wider-University would have been welcome in the report. The PRG had some difficulty in estimating work-loads of staff members from the tabular information provided in the self-assessment document and it was not clear how staff workloads are calculated and allocated. Finally, the PRG would like to have seen more comment and recommendations on the adequacy (or otherwise) of the financial resources made available to the school, and on any 'gaps' in resources such as laboratories, plant and equipment. All of these points were pursued over the two-days the PRG spent in the School.

4. Findings of the Peer Review Group

Organisation and Management

In terms of management structures and processes, the University is going through a period of radical change. The PRG is of the view that the sooner the new faculty management structure (and thus that at school-level) is agreed and implemented the better. The current uncertainty is unsettling for staff in the School of Biotechnology and this is making the task of managing the School more difficult.

The School of Biotechnology has in place a good set of processes and roles for the administration of individual academic programmes but currently lacks a transparent, coherent structure for the overall management of the school. There is an urgent need to put structures in place, but there is at present a chicken-and-egg situation regarding school structures and faculty-level structures ("Which comes first?"). It is our view that the Heads of School in the faculty and the new Dean should pursue the debate on new structures without delay.

An important objective of any new school management structure must be the achievement of a high degree of involvement and communication across the multiple groups that exist in the school. In other words, the new management structure must provide a sense of real involvement to the various stakeholder groups including academic staff, technical staff, post-doctoral students and postgraduate students. At present, this sense of involvement seems to be lacking, particularly among the latter three groups. The PRG feel it is particularly urgent that steps be taken to integrate more fully the technical staff into the life of the school, both work-related AND social. This is in line with the recommendation within the self-assessment report on the need to improve the "social interaction between academic staff, technicians, postdocs and postgrads within the school."

Because of the tight time constraints on the review process, there was no opportunity to systematically explore the relationships between the school and its associated research-centres. However, the PRG agrees with the opinion expressed by many staff members that academic staff and postdoctoral researchers in the various centres should be actively involved in the teaching mission of the school… "Good researchers usually make good teachers…every researcher should do some teaching." Suitable financial/budgetary arrangements would need to be put in place to facilitate this.

There is a pressing need for an uncomplicated and transparent 'system' for calculating and assigning staff work-loads. This system would need to take into account the wide variety of

activities that need to be covered (INTRA, course 'marketing', health-and-safety, new course development etc.), in addition to the teaching and research functions of the school. The PRG realises that this is somewhat of a "holy-grail"…perfection will never be achieved! But some moves in this direction are needed.

Despite the absence of a formal 'system' for calculating work-loads, it became obvious to members of the PRG that workloads across the School are very high, and are probably unsustainable in the medium to long-term. The implications of this point will be revisited later in the report.

A lack of administrative support within the School for externally-funded research projects was identified. From the discussion with the newly appointed Executive Dean, the PRG understood that it is the intention to introduce such support at faculty-level in the (yet-to-be-agreed) new faculty structure. The PRG also felt that the allocation of a single Grade Two secretary to the school does not adequately reflect the school's secretarial support needs.

Negative points relating to career-progression / promotional opportunities for both academic and non-academic staff, and the lack of a career-structure within DCU for post-docs, were raised repeatedly over the two days. These topics will be returned to later in this report.

The above observations may suggest that the PRG has some strong negative feelings about the school. This could not be less true. In terms of its teaching and research mission, the school is highly effective, and given its level of resourcing, is doing an excellent job. These observations are made in the spirit of making working-life less stressful and more rewarding for everyone in the school.

Programmes and Instruction

The School of Biotechnology is involved in teaching undergraduate degree and diploma programmes and also in taught postgraduate degree programmes. Graduates and students at all levels confirmed that the School staff were 'very approachable' and 'student-friendly'. The PRG compliments the School on the introduction of effective innovative teaching methods, such as peer-tutoring and e-learning and urges the School to extend their use as widely as possible.

The PRG endorses the concerns of staff that the School does not have a transparent system for allocating workloads. Without such a system, the resources needed for new developments will be difficult to identify and the risk of increasing staff overload is high.

The School's flagship course is the B.Sc. in Biotechnology. The PRG notes that this received praise from previous graduates and the School should feel justifiably proud of this course and its rigorous attention to the practical aspects of the subject. However, levels of recruitment, entry standard and student retention give cause for concern. Some of the causes of these problems lie beyond the School's control, but they are not helped by an external portrayal to potential applicants that emphasizes the biological aspect of the course and downplays the considerable engineering component. This results in the recruitment of students with inappropriate qualifications and expectations, causing problems, particularly in the second year, where demanding courses, notably in chemistry, make no concession to the non-specialist.

The four year Biotechnology and Analytical Science degrees include a six month industrial placement at the end of the third year (INTRA). This programme is supported by INVENT which has four full time coordinators, one of whom focuses on finding placements for Science students. The graduates regarded INTRA as a highlight of their degree course at DCU and they were very appreciative of the exposure it provided to a diverse range of employment prospects both in Ireland and abroad. The range of industries accepting INTRA placement students includes brewing and distilling, dairy and food processing, pharmaceuticals, enzyme and fine chemical manufacture, production of diagnostic reagents, production of alcohol and organic acids, waste

treatment and industrial Research & Development. During the placement period, students are visited by a member of the academic staff, which, helps to focus the students' efforts and also serves to strengthen the links with industry, which are so essential for the continuation of the programme. The PRG acknowledges the burden this programme places on academic staff members but, nevertheless, believes it to be very worthwhile and wishes to strongly support the efforts made to ensure the experience is positive and rewarding.

The PRG notes that while the undergraduate students have access to PowerPoint, they do not seem to be allowed to use it via data projection for their presentations. This places unnecessary reprographic costs on the students. Undergraduate students also reported that in some cases, it was difficult to obtain feedback, particularly after examinations or after giving presentations.

New courses are proposed at B.Sc. and M.Sc. level. The B.Sc. Genetics and Cell Biology will provide an opportunity for students with qualifications in biology, rather than mathematics and the physical sciences. The PRG would view with concern any move that would place this course as a replacement for the B.Sc. in Biotechnology. The PRG has reservations about the overall viability of the proposed B.Sc. in Environmental Science & Health in an already crowded market for courses in this area. The reasons behind the introduction of the new courses are clear, but without the provision of significant additional resources, the PRG fears for their sustainability and for the long-term viability of the School.

In view of the problems in maintaining the quality of student intake to undergraduate courses, the PRG urges the School to consider the development of courses at M.Sc. level, where the quality of entrants may be more easily controlled. In this respect, the PRG notes the favourable comments of the students enrolled on the M.Sc. in Biological Sciences.

The School has a large cohort of postgraduate students, whose representatives provided the PRG with a well-prepared and cogent account of issues that need to be addressed. The PRG largely agrees with the postgraduate students that urgent attention is needed here. These issues include:

- The need for transparency in the allocation of demonstrating duties and in the mechanism for its remuneration.
- The need for a system to ensure that University procedures for progression from M.Sc. to Ph.D. are followed and monitored.
- The need for postgraduate training with an appropriate induction programme for both research and teaching.
- The rules and regulations relevant to postgraduate students should be clearly laid out in a university postgraduate handbook that provides guidance on what the postgraduates can reasonably expect from their supervisors and *vice versa*.
- Support mechanisms need to be provided for 4th year postgraduate students whose PhD programmes cannot be completed within the three years normally funded.
- Security and out-of-hours access to facilities should accommodate the needs of research postgraduate students.
- When information is provided to/by the School, postgraduate students need to be included in the distribution lists.

Scholarship and Research

The School of Biotechnology has promoted excellence in scholarship and research since its foundation in 1980. This is evidenced by the fact that the first Ph.D. graduates from DCU, in 1985, came from the school of Biotechnology. Currently, 69 postgraduate students are engaged in graduate research under the supervision of School academic staff. All academic staff are research active and the School has reason to be proud of its high complement of M.Sc. and

Ph.D. and post-doctoral researchers, its peer-reviewed publication record, and its proven ability to attract significant national and international research funding.

The varied disciplines and research interests of the School academic staff have allowed the development of significant research strengths in a number of different and relevant fields and have also promoted interdisciplinary and collaborative research activity within the School and other Schools and Faculties within DCU. Members of staff also have active collaborative links with researchers in other Universities and Research Institutes both within Ireland and abroad.

Members of the School of Biotechnology have played a central role in the submission of DCU proposals to the HEA PRTLI funding programme, which resulted in the establishment of the National Centre for Sensor Research (NCSR) and the National Institute of Cellular Biotechnology (NICB) in 1999 and 2000, respectively. Staff from the School are engaged in the supervision of postgraduate and postdoctoral researchers in the NCSR and the NICB and benefit from the facilities, equipment and specialist technical support provided under the PRTLI funding. The establishment of the National Cell and Tissue Culture Centre (NCTCC) in DCU in 1987 and its subsequent growth and development of expertise in oncology and cell culture also facilitates and supports the research of school academic staff and their postgraduate and postdoctoral researchers. Involvement of School staff in the Vascular Health Research Centre (VHRC) enhances the interdisciplinary nature of ongoing research and provides the opportunity for staff to engage in the exciting new application of proteomic and functional genomic technologies.

The applied nature of the research activities of School academic staff, together with the encouragement of entrepreneurship, has led to the development of campus companies (Archport, Ildana and BioObservations) and the Microbiological Testing Laboratory, City Biologic. The presence of these companies on campus contributes significantly to the research experience of postgraduate and postdoctoral researchers in the School of Biotechnology. Given the applied nature of the B.Sc. in Biotechnology, the presence on campus of these companies also provides a unique experience for undergraduate students to gain an appreciation of their potential careers in Biotechnology.

Social and Community Services

The School of Biotechnology is committed to promoting its activities at local, national and international levels and does so by contributing to a wide range of initiatives including:

- Centre for Talented Youth (CTYI)
- Access Programmes for pupils from disadvantaged areas
- Summer school in Dochas Women's prison in Mountjoy
- Organisation of the National, European and World Biology Olympiads
- Student retention programme developed by the HEA
- Provision of opportunities for second level pupils to access laboratory facilities
- Supporting the Biotechnology elements for the Pfizer Science bus for primary schools
- Participation in public lectures and exhibitions
- Visits to schools
- Involvement with Young Scientist Exhibition (judges and interactive stand)
- Involvement with RDS Youth Science Programme (Irish Times RDS lectures, Busary Lectures, Science week, London International Youth Science Forum)

Members of the school are also involved in consultancy work, have engaged in on-site training in industry and have facilitated in-service training for Biology secondary school teachers. In addition, all members of staff are contributors/participants at the DCU Open Day.

All of these activities serve to encourage potential young scientists and afford an excellent opportunity to recruit new students into the School of Biotechnology. In the light of the current

fall-off in students taking Science, Computer and Engineering subjects at third level, it is particularly important that all activities targeted at promoting interest in Science and Technology among young people continue. The PRG encourages the provision of resources to work with second level students and would like to see due recognition awarded to members of the School providing such community service.

Staffing, Accommodation and Resources

Staffing

The total staff complement now stands at 57, of whom 30 are permanent. The School is unique in having a multi-disciplinary team comprising Process Engineers, Biochemists, Microbiologists, Geneticists, a Molecular Parasitologist and a Pharmacologist all working within a single unit and servicing the needs of 443 (FTE) undergraduate and postgraduate students.

Among the academic staff the senior:junior ratio is about 59:41 against a background University agreed ratio of 60:40. Two of the senior staff are at full professorial level and two are at associate professor level with a further six at senior lecturer level. There are concerns re academic staff promotion opportunities to senior lecturer level arising from the 60:40 ratio block and the PRG is of the view that this ratio is archaic and should be reviewed to allow able young lecturers with high profile to progress their careers. Without some movement on the overall ratio there is a real risk that some of them will leave and they may not be readily replaced. It was also noted that promotion to Associate Professor level, when it does occur, tends to be based primarily on Research capability, possibly because it is easier to measure. In the opinion of the PRG, there is a real need to rate teaching, administration and student support on an equivalent basis when considering candidates for promotion.

Another PRG concern is the academic staff age profile. With the majority in the 40-50 age group it is envisaged that as many as two thirds of the academic staff will retire within a 10 year period leaving a potential experience gap if succession planning is not carefully managed.

The technical staff comprise of one Laboratory Attendant, 10 Technicians at grade T2 and one Head Technician at grade T3. Promotion opportunities for technical staff are virtually non existent and some positions, occupied by technicians on temporary contracts, are blocked because permanent staff are on extended leave of absence. While this facility is highly valued by the technical staff and should be continued, the length of the period of absence does need to be managed. The day to day duties of the Technical Staff do not encompass their involvement in Research and this is an area where they could make a significant contribution in the future.

A secretary grade 2 provides local administrative support for the school.

There are eighteen postdoctoral fellows in the School of whom ten are associated with NCTCC (5 permanent and 5 temporary). Typically post-docs are employed on one year contracts; however, it was noted that at least four of them have been in a post-doc post at DCU for 3 years or more. This raises the thorny issue of entitlements as this group has no security of tenure and no benefits *e.g.* pension, health scheme, bonus scheme. Post-docs are not currently represented at Faculty level or on the University wide Governing Authority and were not included in the recent review of structure by DCU. The PRG recognises the need for the School to attract good researchers to carry out research at the level required in the Research Centres and regards the lack of a career path for Research track people as a risk.

Accommodation

The School is located in a new spacious and well equipped Biotechnology and Chemical Sciences building on the east side of the campus, which incorporates both teaching, research and office facilities. Teaching is not limited to the rooms in this building but is carried out campus wide. The NCSR occupies new laboratories in the Research and Engineering building – their

allocated space consists of specialist equipment laboratories, cleanrooms, biohazard facility, staff offices, seminar room and project laboratories.

Specialist facilities available to the School of Biotechnology include a Bioresource unit, a state of the art facility for housing laboratory animals, a radiation suite, designed to meet international specifications for safety, and a Bioprocessing pilot plant.

The main concern expressed by staff was in relation to the lack of a common room area but it is believed that this problem could be addressed within the space currently available. Some comments were also noted regarding poor standards of building maintenance.

Resources
The standard of lecture theatres and laboratory facilities is good and the School's students have access to computers in the basement (belonging to the School), the third floor (belonging to the School of Nursing) and in the library. The School's computers, while no longer state-of-the-art, are adequate, though consideration should be given to their replacement in the next year. The School needs to address the loss of the computers on the third floor when the School of Nursing moves to its new building.

The School is served by a University Library that provides an up to date service with good facilities including well-designed computer clusters and teaching/mentoring accommodation. The Library also provides induction in information management to all students in the School and an individualized web-based portal to its services for each student. Other areas, which were commented on favourably by staff members, were the Faculty administration and the INTRA office.

Poor security and lack of 24/7 access to buildings for researchers were issues raised by postgraduate students.

5. Overall Analysis of Strengths, Weaknesses, Opportunities and Concerns

Organisation and Management

Strengths
- An enthusiastic and committed group of staff who have the best interests of the school at heart
- Well-developed structures and roles for academic programme management

Weaknesses
- Lack of a coherent overall school management structure
- Lack of a transparent 'system' for calculating and assigning staff work-loads
- Technical staff and postdocs' sense of isolation
- Need to strengthen secretarial and administrative support

Opportunities
- Capitalise on the current state-of-flux in university structures to get the structures which school staff consider most beneficial and least bureaucratic

Concerns
- The current uncertainty/hiatus regarding new faculty/school structures
- High current staff work-loads and planned new undergraduate programmes, which will add further to work-loads

Programmes and Instruction

Strengths

- B.Sc. in Biotechnology is well-regarded
- School staff perceived as approachable and 'student-friendly'
- Innovative teaching methods
- Good infrastructure and library support

Weaknesses

- Student recruitment, entry standard and retention
- External perception of the content of the B.Sc. in Biotechnology

Opportunities

- Development of new courses

Concerns

- Overcrowded market for B.Sc. in Environmental Science & Health
- New courses may threaten rather than complement B.Sc. in Biotechnology
- Declining student numbers
- Lower entry standard for students
- High drop out and failure rates in first year and high failure rates in second year of Biotechnology degree course

Scholarship and Research

Strengths

- Involvement of all staff in research and postgraduate supervision
- Interdisciplinarity of research and collaborative interactions within DCU and with external national and international research centres
- Involvement of staff in PRTLI funded centres and Institutes of Research Excellence
- Evidence of entrepreneurship with respect to the establishment of campus companies
- Synergy of research, teaching and entrepreneurship

Weaknesses

- Poor promotional opportunities for academic staff, with consequent impact on morale
- Lack of clarity and implementation of the University policy for progression from M.Sc. to Ph.D.
- Lack of clarity regarding the requirement of postgraduate students to act as demonstrators for undergraduate practical sessions
- Some degree of alienation by the technical staff who feel that their potential professional input is not maximised within the School

Opportunities

- The School has access to dedicated buildings and new equipment funded under the HEA PRTLI programme
- On-campus companies provide a unique experience of Biotechnology application to both undergraduate and postgraduate students
- National and International Research funding facilities support of a strong postgraduate and postdoctoral research cohort in a variety of individual and interdisciplinary biotechnological research fields

Concerns

- Excessive teaching and administrative workloads of academic staff

- Lack of permanency, retirement policies, and promotional opportunities for postdoctoral researchers
- Absence of a career structure for technical staff and of a constructive working relationship between technicians and academic staff, postdoctoral and postgraduate researchers
- Concern was expressed by some postgraduate students working in the research centres that they had little ongoing contact with School of Biotechnology staff, postgraduates and postdocs

Social and Community Services

Strengths

- Well developed programmes to introduce second level students to Biotechnology and to DCU
- The school is well represented on National bodies relevant to Biotechnology disciplines
- Staff members engaged in on-site training in industry and in-service training for Biology secondary school teachers

Weaknesses

- Failure to give due recognition when selecting candidates for promotion

Opportunities

- The network of graduates of the School has not been fully utilised to assist in the promotion of Science and Technology to second level students

Concerns

- Staff overload due to significant administrative burden associated with community service

Staffing, Accommodation and Resources

Strengths

- Multidisciplinary unit with an enthusiastic and committed staff
- Active Research environment with total research income (1998-2002) of €23.5m (excluding PRTLI funding)
- Members of the School active in University Research Centres, notably the NCSR, NCIB and UDRC
- Two campus companies (Ildana and BioObservations) developed by staff members
- The school houses City Biologic, a commercial environmental monitoring facility
- The school is located in a modern, well equipped, purpose built, facility.
- Specialised facilities include the Bioprocessing pilot plant which is unique in National terms

Weaknesses

- Lack of a designated common room area where all groups within the School can interact socially
- Ageing computer equipment on top floor of building
- Buildings maintenance not adequately resourced
- Poor security
- Lack of 24/7 access to buildings

Opportunities

- The Biotechnology sector is growing nationally providing improved employment prospects for students and INTRA placement opportunities
- Scope exists to involve the technical staff in Research to a greater extent than heretofore
- Ability of the Faculty Office to provide additional support for managing research budgets

Concerns

- Lack of promotional opportunities for academic and technical staff
- Lack of any career structure for postdocs

6. Recommendations for Improvement

General

The work done by the School on the self-assessment exercise is excellent and provides the basis for a comprehensive strategic planning exercise. We strongly recommend that the School consider what would be needed to move to the next level of quality as part of their Strategic Long Range Plan.

While recognising the excellence in scholarship, research and entrepreneurship of the School of Biotechnology, it is recommended that the following issues be addressed in order to ensure a better research environment, facilitate staff and student interaction and provide a working environment whereby contribution to teaching, scholarship, research and technical support is appropriately rewarded by a career promotion structure. This should benefit the individuals involved and ensure the growth and future enhancement of the School of Biotechnology at DCU.

Organisation and Management

1. There is an urgent need for a coherent overall management structure for the school.
2. The University is going through a period of radical change. The sooner the new faculty management structure (and that at school-level) is agreed and implemented the better. The Heads of School in the faculty and the new Dean should pursue the debate on new structures without delay.
3. Any new school management structure must promote an increased sense of real involvement in the various stakeholder groups, including the technical staff.
4. Researchers in the affiliated research centres should be more actively involved in the teaching mission of the school. Suitable financial/budgetary arrangements might need to be put in place to facilitate this.
5. There is a pressing need for an uncomplicated and transparent 'system' for calculating and assigning staff work-loads.
6. Staff work-loads across the School are high, and are probably unsustainable in the medium to long-term. For this reason, the school should be very cautious about taking-on additional programmes.
7. The level of administrative and secretarial support available to the school seems to be very much on the 'light' side. The needs of the school in these respects should be reviewed. This might be done in the context of Point 1 above.

Programmes and Instruction

1. There should be a transparent system for the allocation and monitoring of teaching workloads within the School.
2. The PRG is aware of the current problems with respect to student recruitment, entry standard and student retention within the BSc in Biotechnology Programme, This course remains a flagship programme within DCU of which the School should be justly proud. The PRG strongly recommend its retention but suggest that attention be paid to the following:
    - More accurate portrayal of course content and objectives in promoting and marketing the programme (A better balance between the engineering, chemical and biological aspects)
    - That consideration be given to a smaller intake – cohort with higher level qualifications.
    - Revision of the 2nd year programme with respect to the engineering and chemistry syllabi, without altering the programme objectives.

3. The PRG recognises that the proposed B.Sc. in Genetics and Cell Biology will complement the B.Sc. in Biotechnology, respond to student demand and maintain school undergraduate numbers. The PRG advise proceeding with caution with respect to any significant contribution to the proposed B.Sc. in Environmental Science and Health. Environmental undergraduate programmes are already available from other Universities and the proposed B.Sc. may not attract students of a high calibre. Alternatively, consideration could be given to a focused Masters programme in Environmental Science building on existing strengths within the school.

Scholarship and Research

1. Ensure that the regulations governing progression from M.Sc. to Ph.D. are understood and implemented within the School by staff and that graduate students are correspondingly informed.
2. Ensure that clarity and fairness in the allocation of practical demonstration duties of postgraduate students is implemented and that an equitable and transparent remuneration system is put in place.
3. An induction programme for postgraduates, with the provision of a Postgraduate Handbook, should be provided. This would create the opportunity for postgraduates to gain experience of research techniques and develop expertise with specialist equipment, while also providing the training needed for their role as undergraduate practical demonstrators.

Social and Community Service

1. The members of the School are to be commended for their involvement locally, nationally and internationally in various external activities. The PRG advocate the continuation of these activities and trust that their value will be recognised with respect to staff promotion.

Staffing, Accommodation and Resources

1. The current target senior:junior academic staff ratio (40:60), which is operated on a University wide basis is an unreasonable constraint on academic staff promotion and is leading to a lowering of morale within the School. The PRG urges University management to actively lobby for a review of the HEA imposed rules governing this ratio. The PRG also recommends that University Management introduce some flexibility to reward particular excellence in research and teaching. Teaching, administration and student support should be considered on an equivalent basis when considering candidates for promotion.
2. Put in place, as a matter of priority, a career structure, with appropriate benefits and entitlements, for postdoctoral researchers. The PRG understands, from discussions with the Vice-President for Research, that this issue is currently being addressed.
3. Address the current lack of a promotional career structure for School of Biotechnology technicians i.e. provision of promotional scientific officer positions; specialist technical support positions etc. Take steps to ensure that the working and social interaction of technical staff with academic staff and postgraduate/postdoctoral researchers is improved.
4. In general the teaching and research facilities available are excellent but some consideration should be given to replacement of the aging computers in the School within the next year and the replacement of the IT facility on the third floor when the School of Nursing moves to its new building.
5. Designation of a suitable area to be used as a common room by all members of staff and postgraduates would provide an opportunity for groups within the School to interact socially.
6. There is also a need to review security particularly at night when students are working alone in the building. It is understood that a new after hours policy has just been launched – it is recommended that feedback is sought on this policy when it has been is operation for about 6 months to determine if it has been effective in addressing the concerns expressed by postgraduates within the School.

Reflections on Peer Review Process

This Quality Review Process was conducted in accordance with the legislative requirements of the Universities Act (1997). The PRG felt that the two-day review process was too short a time to permit an in depth analysis of the range of activities offered by the School. However, the PRG review report reflects our understanding of the School, its strengths, weaknesses, opportunities and concerns presented to us within the limited time frame. Our recommendation is that the peer review process begin a.m. on the Wednesday and be completed at the exit review presentation on the concluding day of the review i.e. Friday. PRG members would have appreciated time to speak on an individual basis with academic, technical and administrative staff as appropriate. In addition, PRG members would like to recommend that secretarial support be available to the PRG in conducting its work over the review process period, facilitating the full involvement of all peer reviewers in discussions, dialogue and drafting the Peer Review Report.