University College Dublin

Quality Improvement Plan

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School of Chemistry

February 2016

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1. Introduction

The SAR was prepared and submitted in March 2014, and the Quality Improvement Committee was constituted as follows:

> Dr Grace Morgan, Senior Lecturer, Committee Chair
> Professor Pat Guiry, Head of School
> Professor Martin Albrecht, Head of Research (left UCD in 2015)
> Professor Declan Gilheany, Head of Graduate Studies
> Professor Gareth Redmond, Physical Chemistry Section Head
> Professor Stefan Oscarson, Chemical Biology Subject Head
> Dr James Sullivan, Senior Lecturer, Director of Teaching and Learning
> Dr Mike Casey, Senior Lecturer
> Dr Andrew Phillips, College Lecturer
> Dr Eoghan McGarrigle, SFI funded independent Research Fellow
> Mr Kevin Conboy, Chief Technical Officer
> Ms Mary Flannery, Senior Technical Officer
> Ms Susan Muldoon, School Office Manager
> Dr Lorenzo Guazzelli, Postdoctoral Fellow
> Mr Anthony Fitzpatrick, Postgraduate Student (left UCD in 2015)

The QRG undertook the Periodic Quality Review on 14-17 April 2014. The term of the HoS that oversaw this process (Prof. Pat Guiry) ended in August 2014, and a new HoS (Prof. Gareth Redmond) was appointed in September 2014. Other significant compositional changes occurred at management and committee levels within the School at this time. In September 2014, Prof. Redmond began to prepare the QIP and consulted with Dr. James Sullivan, the new Deputy HoS. Dr. Sullivan provided many insights to the context of comments made by the QRG in the Periodic Quality Review report and also inserted specific suggestions and guidelines on actions to be taken in response to the recommendations. Further, with the establishment of a School Management Team holding monthly meetings, and in conjunction with academic staff meetings, and other regular meetings in (see section 2.10 below) and outside the School at this time, Prof. Redmond assembled a draft QIP by recording, interpreting, and integrating feedback provided by many staff members in relation to the issues, observations, suggestions, and recommendations raised both by the SAR and by the Periodic Quality Review report. This draft QIP was subsequently employed to develop a draft School Strategy 2015 – 2020 document, a rewardingly iterative process that led to the enhancement of both draft QIP and Strategy documents. Since May 2015, this text has been available to the School staff members, with invitations extended by the HoS at academic staff meetings to review, discuss, and comment. In addition, a number of committees (e.g., Management, Research, Teaching & Learning, and Outreach), populated by many of the staff members that participated in the original Quality Improvement Committee, have reviewed the text with a view to refining the priorities, goals and objectives, and, of course, to developing actual implementation plans that will address and achieve the targeted tasks. Therefore, while, as a matter of course and in the near future, significant additional operational detail will become available, particularly in relation to the Teaching & Learning and Research activities, the text of this document reflects the overall School Strategy as at 2015. This document is intended to complement, inform, and augment the School Strategy 2015 – 2020 and its associated implementation plans, and to facilitate the School of Chemistry in enhancing its environment, resources and operations to the benefit of staff and students alike.

Categories

1. Recommendations concerning academic, organisational and other matters which are entirely under the control of the unit
2. Recommendations concerning shortcomings in services, procedures and facilities which are outside the control of the unit
3. Recommendations concerning inadequate staffing, and/or facilities which require recurrent or capital funding

Timescale

A. Recommendation already implemented
B. Recommendations to be implemented within one year
C. Recommendations to be implemented within five years
D. Recommendations which will not be implemented

Report	RG Recommendation	Category	Action Taken/Action Planned/Reason for Not Implementing	Timescale
			ORGANISATION AND MANAGEMENT	
2.8	As a matter of utmost urgency, the SChem should implement a Workload Model to allow the allocation of duties among the members of academic staff to be made on a transparent and equitable basis. See also §3.14a.	1	The first stage of a workload model, i.e., the generation of a list of teaching and admin duties of each staff member has been generated. This is being held and balanced (taking also postgraduate research and admin duties into account) by the HoS. Following the 2016 curriculum review (see below), an extensive revision of teaching/admin duties is anticipated and will be carried out by the HoS. In relation to equity, an academic staff 40:40:20 model is under discussion without disagreement thus far. A staffing/recruitment plan has also been developed by the HoS and is in progress.	A
2.9	The Head of School should be empowered to deal with the issue of staff who are reluctant to teach. The Head of School should be supported, as appropriate, by advice and assistance from UCD Human Resources, key members of the University Management Team in addition to the College Principal, and other units within the University where specialist organisational management expertise may reside (e.g., UCD School of Business). See also §3.14b, §3.14f and §3.14g.	1/2	These supports have been provided and progress against the tasks is presented in the relevant sections below (sections 3.14 b, f, and g).	A
2.10	The governance structure of SChem should be redesigned to include effective representation from the Technical and Administrative staff. The Review Group	1	A new Management Team has been established with the following membership: HoS (and interim chair of Safety Committee) [Phys Chem]	A

	recommends that the SChem consider merging its Management Team and its Executive Committee. All academic, administrative and technical staff should be properly represented in governance of the School. See also §3.15d.		DHoS (and chair of Teaching and Learning Committee) [Organic Synthetic] Chair of Research and Innovation Committee [Phys Chem] Director of Graduate Studies [Organic Synthetic] Chair of Outreach Committee [Chemical Biology] Chief Technical Officer School Office Manager There are monthly Management Team meetings and, separately, monthly academic staff meetings chaired by the HoS at which management reports are made.	A
			Also, the HoS now meets all technical and administrative ("core") staff together on a monthly basis.	A
			Additionally, from 2016, each quarter, there will be an "all-staff" meeting of postdocs, administrative staff, technical officers, and academic staff.	B
			Finally, an Advisory Board will be developed to provide strategic insight to the School and its activities.	B
2.11	The School should reconsider the Terms of Reference of the Research Committee with a view to developing strategies for re-invigorating the research activities of staff that have been experiencing difficulty in obtaining external research funding. See also §5.10.	1	A Research Committee has been established and its terms of reference, activities, and objectives are outlines in sections 5.09 – 5.11 below.	A
2.12	The SChem should formulate a strategic plan with 5-year and 20-year horizons. They should also work closely with the College of Science to identify specific actions that need to be achieved within the coming 5-year period.	1	A 5-year strategy document (2015 – 2020) has been prepared in a collaborative endeavour within the School and between the HoSs of other Schools in the College of Science and with the CP and other University functions.	A
2.13	Having considered the Resource Allocation Model, the Review Group recommends that the University should consider moving to a cost allocation model that is less punitive for schools with extensive teaching & research laboratory space.	2	The new budgetary model is not significantly unfavourable towards the School of Chemistry.	A
2.14	There are a number of issues that need to be addressed at College and University levels in order for SChem to engage more fully and widely with overall University objectives:			
	The message that academic collaboration is not an impediment to promotion at UCD needs to be communicated effectively to staff.	1	We genuinely believe that all of our staff understand this point.	A

	All members of SChem need to develop an understanding of where decisions are made that affect the School's operation within UCD.	1	The HoS has taken pains to explain as much/frequently as possible about the decision making processes in UCD. The Head of Schools Forum helps greatly in this regard. Also, the extensive in-School consultations and disseminations referred to in section 2.10 above are beginning to make progress.	A
	The School needs to develop a portfolio of interactions with University senior management.	1/2	Academic staff members at the School already have interactions with a wide range of committees and assemblies within the University, e.g., programme boards, academic council, etc. To better engage, we will: • Develop a process of support for staff interested to more deeply engage with the administrative and other systems at UCD in the context of skills development, enhancement of School profile, and career progression. • Mobilise staff involvement in University initiatives, committees, representation, etc. • Provide a framework for understanding how building our engagement helps staff career development and how staff effort in this regard will be appropriately reflected and balanced in the School workload model.	(A)B
	STAFF AND FACILITIES			
3.14	a. Staff workloads are not equitable, whether one accepts the premise that research activity should reduce one's teaching and administration load or not. The supervision of undergraduate project students places different demands on staff, depending on the size of their respective groups of postdocs and PhD students. The Review Group strongly recommends the first stage of a workload model be established immediately within the School: namely a transparent list of teaching, administration, PhD supervision and other indicators of research activity. The School should use this model in the short- to medium-term (i) to divide responsibilities among staff members equitably and (ii) to implement measures to re-invigorate the research careers of staff who currently lack significant research funding. Decisions need to be taken as to what extent research income reduces teaching and	1	• The first stage of a workload model, i.e., the generation of a list of teaching and admin duties of each staff member has been generated. This is being held and balanced (also taking postgraduate research and admin duties into account) by the HoS. Following the 2016 curriculum review (see below), an extensive revision of teaching/admin duties is anticipated and will be carried out by the HoS. In relation to (i) equity, a 40:40:20 academic staff model is under discussion without disagreement thus far, and in relation to (ii) reinvigoration, we agree also – detailed supports around (ii) are provided in section 5.10 below.	(A)B

	administration loads. See also §2.8.			
	b. The University and College are strongly encouraged to help the School develop a transparent process to deal with poor performance.	1/2	• The HoS, with support of HR, is engaging in these matters on a gradual, case-by-case basis.	B-C
	c. Consideration should be given to how new academic members of staff are supported, mentored and integrated into the School and what training should be given to them.	1	• Two new academic staff members were appointed in 2015 and both meet regularly with the HoS and other officers of the School to receive briefings and information (and give feedback). The HoS and the College HR partner are also identifying training opportunities for these new staff members. A replacement technical officer will start in January 2016 and, amongst other inductions, she will shadow existing staff members prior to formal deployment.	A
	d. Members of the School are encouraged to look strategically for opportunities for collaboration with SChem colleagues as well as within the wider University and externally.	1	• The Research Demonstratorship application/review/award process has been revised to encourage and stimulate collaborations. In addition, a new and extensive research communication and collaboration stimulus package is described in sections 5.09 – 5.11 below.	(A)B
	e. The Head of School and College Principal should consider whether the SFI funded Independent Research Fellow should be offered a permanent academic position.	1/2	• The HoS, the CP, and the Director of Strategy for the College of Science collaborated on achieving this goal recently.	(A)
	f. The SFI Stokes Professor should be integrated more fully into the School. This is important for the future success of the School and will allow both the School and the SFI Research Professor to maximise their mutual opportunities and potential, particularly in the area of Physical Chemistry. If necessary, this relationship should be managed firmly with appropriate support from outwith the School and College. While the Review Group welcomed the opportunity to engage with the SFI Stokes Professor directly towards the end of its visit to the School, his lack of profile in the Self-assessment Report was unhelpful. See also	1	• This individual's teaching workload has been adjusted upwards to include in-service teaching duties. Other measures related to communications and related matters are currently in progress.	(A)B

	§2.9.			
	g. Senior professorial staff who have extremely light teaching loads have an important ambassadorial role to play in inspiring 1st year and 2nd year undergraduate students to study chemistry. This is particularly so in respect of Physical Chemistry. While the demands of leading a major research group are not always compatible with delivering a large teaching load throughout an academic year, it is imperative that staff in these senior positions recognise this responsibility and engage appropriately in undergraduate teaching. This leadership role is critical to the long-term future of chemistry in UCD. See also §2.9.	1	• The Chair of Physical Chemistry has now indicated availability for teaching duties and this discussion is being dealt with by the HoS.	(A)B
3.15	*Technical Staff* a. The Review Group recommends that the College of Science recognise the acute shortage of Laboratory Technicians in SChem and allocate the funding necessary to allow the School to recruit two technician FTEs (as permanent staff) immediately to guarantee safe and sustainable delivery of laboratory-based teaching to undergraduate students (1 for Stage 1 practicals; 1 for Stage 2+3 practicals and Synthetic Chemistry). These resources will be required to be in place in time for the academic session 2014/15. See also §4.9.	1/2	a. We welcome the appointment of a permanent and a temporary member of technical staff to the synthetic teaching labs. On moving to the new teaching labs we have assigned each floor to two members of technical staff. We believe these recruitments were directly as a result of the review process.	A
	b. The Review Group recommends that the College of Science facilitate the employment of a third technical staff member in the medium-term to provide essential additional technical cover for undergraduate practical classes and to support Physical Chemistry.	1	b. A research officer now covers these duties.	A
	c. There is a need for urgent replacement of one technical staff member to help with NMR and Mass Spectroscopy equipment. The School should	3	c. We agree that another technical appointment would be welcome.	C

	consider whether research income and external contract income would be sufficient to fund this position.			
	d. Technical staff members feel alienated from the academic management of the School. The School should include their input and strategic thinking in the decision-making process. See also §2.10.	1	d. A member of the technical staff has been added to the new Management Team (which has replaced the previous management and executive committees). Also, the HoS now meets all technical and administrative together on a monthly basis. Finally, from 2016, each quarter, there will be an all-staff meeting of postdocs, administrative staff, technical officers, and academic staff. The input and community of all staff is vital.	A
3.16	Postdoctoral researcher career development in SChem depends largely on the serendipity of the postdoc asking for and the supervisor offering opportunities. The career development of this group of staff should be formalised. Opportunities for them to meet together as a cohort should also be created in the School as they can be isolated in their groups. This could be part of the revised Research Committee remit.	1/2	• We will form a postdoctoral committee with the school – under the auspices of the head of research. We will also develop a structured offering of lecturing and tutoring (with appropriate feedback and reflection) that we would be happy for postdocs to give. We would not expect or want postdocs to teach classes in the upper levels of our degree programmes. We would also not envisage post docs covering lecturers for their supervisors.	B
3.17	*Facilities* a. More space is needed for the chemical stores.	1	a. This has worked out to be inaccurate and we believe that have no issues regarding Chemical Stores space presently.	D
	b. More suitable space is required for ongoing archives of examination scripts prior to their being destroyed.	1	b. Archiving will be addressed by the establishment of a dedicated storage space on Level 2, A3 (WEOS)	B
	TEACHING, LEARNING AND ASSESSMENT & Curriculum Development and Review			
4.8	*Strategy Away Day* The Review Group suggest the School have an away day to develop a clear strategy for teaching to guide future course revisions and also to ensure lecturers are more aware of what course material students have studied in previous modules.	1	A teaching staff away day on Sept 1st, 2014. 90% of teaching staff attended and a wide range of topics related to UG teaching were discussed. Following this meeting, a number of objectives became apparent: • The School will have a curriculum (undergraduate and postgraduate) review (2016) to develop a clear strategy for teaching to, e.g., guide future course revisions, to incorporate student feedback, to incorporate research into teaching, to incorporate blended learning approaches, and to identify and implement other best practice in teaching and use it in recruitment of students. • A teaching workload model has been drafted by and for School staff (an addendum for postdoctoral fellows and graduate students to provide	A A (A)B

				career development opportunities through teaching involvements will be developed in 2016).	
				• The School delivers service teaching to approx. 1200 students annually – this provision should now be rationalised in terms of workload allocation, teaching content, and examination formats, as a part of the curriculum review mentioned above.	B
				• On this basis, the School will continue to engage in a responsive and proactive manner with the Science Programme DN 200 and strive to better align our teaching activities with UCD strategy to, e.g., increase revenue generation through recruitment of economic fee-paying non-EU students to a taught MSc programme.	(A)B
				• An Advisory Board will be developed to provide strategic insight to the School and its activities.	B
				• An Outreach Committee is now developing an enhanced outreach/inreach offering (in collaboration with professional societies such as the Royal Society of Chemistry or the Institute of Chemistry of Ireland) to facilitate marketing of and recruitment into programmes (end 2016).	(A)B
				• Led by the HoS, we are working to develop and expand our overseas recruitment, in collaboration with the College of Science and UCD International, into summer school (UC EAP 2017), and undergraduate and postgraduate programmes, particularly with North American and Chinese (see below) universities.	(A)B
				• Mathematical competence of students may not always be sufficient for the more advanced physical chemistry-oriented courses – we will explore ways of dealing with this issue.	B
				• Students have commented that they would find it helpful to have the option of more chemistry modules available in Stages 1 and 2 and/or perhaps flexibility to take modules in more than one year – the School will explore and, if possible, address this matter.	B
				• Introductory physical chemistry not coming until Stage 2 reinforces the bias of the School in favour of synthesis – we will consider whether this is advisable both on pedagogic grounds and due to the fact that the more mathematically competent students may avoid chemistry as a result.	B
				• Current Stage 2 Chemistry students are provided with access to two 5 credit optional modules (one per semester) – we will investigate whether the offering of more 2.5 credit options would provide a greater breadth of choice and learning for the students.	B

			• Strategically expand our cohort of adjunct lecturers with academic, agency and industry adjuncts.	C
			• Develop the role of Teaching Assistant to permit deeper engagement by graduate students in teaching and learning.	B-C
			• Develop processes to recognise and encourage teaching achievements, e.g., Outstanding Achievement Awards for staff, Graduate Student / Postdoc Teaching Awards, etc.	B-C
			• Develop mechanisms to facilitate staff development in relation to undertaking research into teaching methods, developing research-led teaching offerings, or in continuing profession development.	B-C
4.9	*Technical Staff Provision* The Review Group was convinced of the need for additional technical staff provision, particularly in light of further retirements in the near future. This issue was independently raised by academic staff, PhD demonstrators, undergraduate students and support staff. Apart from the role technical staff play in providing an effective laboratory training environment, there is the issue of needing to ensure safety in the laboratory. See also §3.15a and §A1.17.	3	We have reorganized our technical staff following our move to the new laboratories and now have 2 technical staff on each of three floors. One of these is a temporary appointment and another is temporary part-time and this is not sustainable over the longer term. We believe these recruitments were directly as a result of the review process. We will address the following tasks: • Develop a plan to recruit additional technical staff, particularly in light of future retirements/turn over. • In the teaching laboratories, the distribution of technical officers is still comparatively lean introducing risks associated with maintenance of quality and safety standards for undergraduate student training. The teaching activity must be supported by recruitment of at least one additional technical officer. • With the massive growth in the use of electronic instruments, a reduction in the purchase of servicing contracts due to cost constraints, and the halving of the staff complement, the electronics support facility is greatly over-extended. There is now a strong need for a second Instrument Technical Officer (Applied Electronics) with extensive computer skills.	A B C
4.10	*Financial Consequences of Student Recruitment* The School should consider the finance modelling of different teaching options that have been recommended across the University and College to earn non-exchequer income.	1/2	• We have put 2 new MSc programmes in place: 'Synthetic Chemistry for the Pharmaceutical and Fine Chemical Industries' and 'Nanomaterials Chemistry'. It is hoped that these will generate non-exchequer funding without over-burdening our infrastructure.	A
4.11	*Teaching Equipment* The School must begin to plan for the rolling renewal / replacement of ageing equipment items in its teaching laboratories in the longer-term.	1/3	Chemistry teaching is dependent on well-managed and equipped facilities. While the School currently has excellent laboratories and a good inventory of equipment, the School must plan for the rolling renewal / replacement of ageing equipment items in the longer-term: • Physical chemistry undergraduate and taught postgraduate teaching	

			equipment is now in a particularly poor condition and a number of key systems and instruments must be replaced as a matter of urgency to maintain and enhance our Pharma/Chem and BioNanoSystems training capability.	(A)C
			• A range of analytical and preparative HPLC and GC systems are available. A number of these instruments are old, and replacements with newer systems must be arranged in order to maintain and enhance our Pharma/Chem training capability.	C
			• Purchase and replacement of major equipment by a combination of applications to major equipment funding rounds, e.g., by Science Foundation Ireland, use of the revenues obtained from selling services to industrial users, and philanthropic donations will also be explored.	(A)B-C
4.12	*New Course* The School should consider whether developing a BSc or MSc course in formulation and pharmaceutical manufacturing (including equipment used, powder flow, statistics, process control), perhaps linked with chemical engineering, is desirable. At least new modules in these areas would be valued by future employers, possibly as short courses.	1	In terms of (new) course development, we will: • As at left, consider whether developing a BSc or MSc course in 'Formulation and Pharmaceutical Manufacturing' (including equipment used, powder flow, statistics, process control), perhaps linked with chemical engineering, is desirable. • Explore the development of a BSc 'Chemistry with Nanotechnology' course. • Explore the adoption and development of the Professional Science Placement Module for our undergraduate student cohort. • Improve, extend and enhance our taught module offerings to our NL and other taught graduate programmes (including structured PhD) by curriculum review and content development. • Market and increase recruitment into the two recently launched taught MSc courses: 'Synthetic Chemistry for the Pharmaceutical and Fine Chemical Industries' and 'Nanomaterials Chemistry'. • Explore the development of a new MChem programme. • Explore the strategic development of the 'Dublin Chemistry' structured PhD programme beyond the UCD-TCD interaction and to include RCSI, DCU, and DIT. • Enhance our structured PhD programmes by internationalising our teaching collaborations with US and Asian Schools of Chemistry and Engineering. • Establish and build links with emerging markets (for Chemistry) in undergraduate and postgraduate recruitment in the Middle East and Asia. • Explore the development of a 3+1 undergraduate programme with the	All B

			Department of Chemistry at ZJNU (Jinhua City, Zhejiang Province).	

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<tr><td colspan="5" align="center">RESEARCH ACTIVITY</td></tr>
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<td>5.9</td>
<td>A strategic plan for research should be developed and cover at least the coming 5 years.</td>
<td>1</td>
<td>The School of Chemistry seeks to advance basic science and Ireland's strategic priorities through molecular innovation. The overall objective is to create the conditions that will lead to an increase in the quality and impact of our research and innovation activities and move the School to being truly research intensive, no. 1 in Ireland, and heading towards the QS top 100.

A strategy for research and innovation has been developed to cover the coming 5 years and this strategy is now being communicated within and outside the University to all potential stakeholders.
The implementation plan that follows the 5-year research strategy must take account of and leverage the School workload model.
A Research Committee has been established to develop and deliver on these strategy and implementation plans by providing policies aimed at fostering a flexible and proactive research and innovation culture which values quality and diversity and by creating initiatives that encourage productive collaboration within the School and with the wider academic and industry community.
It is necessary to identify and target suitable areas for activity and collaboration that are likely to develop in the future and in which there are possibilities to obtain substantial funding from SFI, the EU, industry, NGOs and philanthropy.
As research proposals and grants are becoming more complicated, the School must develop ways to engage with other Schools, the Office of Research, and external agencies, in order to develop and assemble applications.
In order to attract and create a critical mass of researchers in target topics and themes, the School must build a well-differentiated research 'brand', and communicate and engage collaboratively across the University and between Universities to develop networks of opportunity.

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<td>5.10</td>
<td>A number of people have slipped into being research inactive, but this is not a reflection of their intrinsic ability.

The School needs to address this issue and take measures, perhaps under the aegis of the Research Committee, to 'kick-start' the research careers of</td>
<td>1</td>
<td>It is often the case that the creation and establishment of a vibrant research community facilitates the revitalisation of flagging research efforts. In addition to the measures suggested by the Review Group (and those noted above), to stimulate the development of an open, energetic, interactive and collaborative research culture, we will:

Develop a metrics-based awareness of School research and innovation

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currently research inactive staff members (See also §2.11). The Review Group recommends such staff work in partnership with other colleagues — it will be better for the School if this is within the School. Research active staff should play a role in mentoring and engaging colleagues that are inactive in research. Sabbatical visits to world-class laboratories could be a catalyst. The Review Group recommends that SChem (with support from the College of Science) implement a programme of measures to re-invigorate the research of staff that currently lack substantial research funding. This should be coordinated to maximise the opportunity for staff to participate in this programme, and to maximise the value to the School and University. Among the measures that should be considered are: • Pairing the staff member up with another SChem colleague (the 'Main P.I.') who is well funded on the basis of a 'Co-P.I.' arrangement, taking into account existing complementarity of interests/expertise; • Identifying two world-class laboratories run by collaborators of the Main P.I. where the Co-P.I. can visit for a period of sabbatical leave (perhaps one semester plus the summer months) funded by UCD [a number of conditions would be imposed by the University such as regular monitoring & concrete outcomes]; • While on sabbatical, the Co-P.I. will develop and progress a line of research complementary to that of the Main-P.I.; • On their return to SChem, the Co-P.I. will continue to work with the Main-P.I. to localise their new research		outputs in terms of proposal activity, new awards, publication numbers, patenting activity, biblio analysis, etc., and establish metrics targets. • Develop and implement specific support measures that facilitate staff members in responding to emerging opportunities to develop diverse and sustainable portfolios of competitively awarded grant support. • Identify and target suitable areas for focus and/or diversification that are likely to develop substantial traction and funding: Potential research centre-level funding opportunities have already been identified in the areas of Pharma/Chem and in BioNanoSystems – these should be developed to proposal/initiative level. • Gradually ramp up engagement with industry partners in terms of research collaboration and strategic development of funding proposals by exploiting door-opening initiatives such as alumni network management, quick research wins, facilities access, internships, judging panels, industry oversight on research- or innovation-related graduate taught module assignments, projects, etc., development of a cohort of industry adjuncts, or development of Industry Advisory Boards for our Pharma/Chem and BioNanoSystems initiatives. • Develop a well-differentiated research and innovation 'brand' and a supporting communications plan that will facilitate the School in desseminating outputs and in engaging collaboratively with stakeholders (lobbying) and partners (identification of new opportunities). • Develop and implement a strategy for recruitment of new lecturing and research staff *via* internal budget development, targeting of extramural funding, e.g, ERC, PIYRA, etc. • Address the balance of research technical support needed for research support. The School should consider whether a business proposition ("Chemistry Core Tech"), in terms of research funding and external contract work, could be made to at least partially support and sustain the technical support and equipment infrastructure base. • Continue to encourage staff to apply for support funding that is already available at UCD, e.g., Seed Funding Scheme, Conference Travel Allowance, etc. • Emphasise the availability of support measures such as sabbaticals or leaves of absence for staff and provide a transparent mechanism of approval/workload (re-) allocation. • Develop processes to recognise and encourage research and innovation success, e.g., Outstanding Achievement Awards for staff, provision of	B-C (A)B B-C C A A A B B

	line to SChem and to make joint applications for funding.		'low-stakes/flexible' direct and indirect support to staff, Graduate Student / Postdoc Research and Innovation Awards, Best Paper/New Patent Awards, etc.	B
			• Develop light-touch initiatives to encourage sharing and discussion of research and innovation ideas and values, such as, a Research Day, brown-bag lunches for graduate students and postdocs, writing/speaking competition, 'Maker/Innovator' competition, social media interactions *via* Twitter, Facebook, etc.	A
			• Facilitate the development of an innovation culture within the School at student, postdoc, and staff levels, by assisting and supporting innovation activities, e.g., workshops, training (with Nova UCD), EI proposal activity, patenting, licensing, industry collaborations, start-ups.	B-C
			• Develop and implement a continuous improvement process by providing opportunities and mechanisms for staff to individually and collectively reflect upon the nature and strength of our research and innovation activities in a periodic, systematic, and supportive manner.	
5.11	As a priority matter for the School and the College of Science, a modest source of consumable money should identified and made available to ensure staff remain research active through a bumpy funding period.

The School and College should consider more strategic use of Research Demonstratorships, and provide a small consumable budget to accompany them. The allocation/award process needs to be transparent and made available to such staff subject to appropriate criteria (e.g., targeting new funding sources, initiating a new collaboration with a UCD colleague, etc.).

The funding for such support might usefully come from a proportion of research overhead monies retained at the College level, or from some modest industry donation, or from the resources of a well funded PI with whom a collaboration could prove to be beneficial. Such internal supports should not displace the need to pump-prime the research of newly appointed academic staff. | 1 | • The modest source of support funding referred to in the Review Group's recommendation at right has been established by the Head of School by reallocation of the School budget categories and, where appropriate, by use of OIP funds. Currently, a number of long-standing academic staff members and recently recruited staff members are being assisted using this approach.

• The Research Committee has restructured the Research Demonstratorship application/review/award process. This process is transparent and is made available to staff subject to appropriate criteria (e.g., targeting new funding sources, initiating a new collaboration with an academic or industry colleague, etc.)

• 16 Research Demonstratorships are now allocated across 21 academic staff members. 6 of these RD awards also carry associated consumables funding (which is separate to the funding support mechanism described in the first bullet point above). | A

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| 5.12 | Research technical support for NMR and Mass Spectrometry (MS) has got much worse, to the | 3 | • The NMR facility in the School consists of five Agilent NMR spectrometers operating at 300, 400, 500 (two instruments) and 600 MHz. Agilent has | B |

	detriment of the quality of research. The School should consider whether a business base in terms of research funding and external contract work could be made to at least partially support an additional NMR/MS technician to use the state-of-the-art equipment more effectively.		withdrawn from the NMR business, raising the risk of loss of continued support for servicing, PM, and parts. A contingency plan around instrument support and service provision must be developed.	
			• With the dependence of a significant number of research groups and external customers on NMR services, the NMR Technical Officer must be supported by recruitment of a second technical officer.	B
			• The School will consider whether a business proposition ("Chemistry Core Tech"), in terms of research funding and external contract work, could be made to at least partially support and sustain the technical support and equipment infrastructure base. In this regard, the School has regular contracts for routine analysis and characterization with a diverse set of private and public sector external clients. Techniques most in demand are elemental analysis, high-resolution mass spectrometry, and X-ray diffraction analysis. Clients are a mix of academic and industry agencies. Mass spectra are requested from time to time, mostly from academic users in other institutions and these are charged on a PAYG basis. New NMR spectroscopy facilities are expected to attract interest from external users as well and a cost model is in place.	B
			• The School must also provide reasonable support to staff for the development of *new* equipment, instruments, and systems that are not commercially available but must be invented for the purposes of undertaking research and solving scientific problems. In-house equipment development is often a critical factor in moving academic output up the impact factor scale. It is also a catalyst for innovation and discovery and valuable stimulus for cross-disciplinary collaboration.	A
			• Finally, the School will provide supportive working arrangements to staff competing for access to/using large-scale facilities at which their research is undertaken.	A

MANAGEMENT OF QUALITY AND ENHANCEMENT

6.9	The School must continue to explore concrete ways to 'close the feedback loop' with students once they have received feedback (whether through the centralised module surveys or through the paper-based surveys that are run within the School).	1	• The School will continue to gather, analyse and act on the extensive feedback that we currently collect.	A
			• We will also be mindful of new possibilities for the collection of feedback.	B
			• The School has initiated a curriculum (undergraduate and postgraduate) review to develop a clear strategy for teaching to, e.g., guide future course revisions, to incorporate student feedback, to incorporate research into teaching, to incorporate blended learning approaches, and to identify and implement other best practice in teaching and use it in	A

			recruitment of students.	B
			• The School is now working to leverage the new facilities and infrastructure in South: For example, the undergraduate lecture and practical experience in Chemistry is being significantly augmented by introduction and enhancement of Blackboard e-learning resources (e.g., pre-lecture material, pre-lab material, online quizes, lab practical video demonstrations, lab safety video demonstrations, module/lab blog, Q&A and FAQ forum for students, etc.)	
			• We will also work (2016) to develop mechanisms to facilitate staff development in relation to undertaking research into teaching methods, developing research-led teaching offerings, or in continuing profession development.	B
			• We will strive to develop a working and learning community of involvement for undergraduate students, postgraduate MSc. and PhD students – target outcome of our ongoing curriculum review process.	C
6.10	SChem should implement a formal system for considering External Examiner recommendations and documenting the School's responses to them. Ideally this would be driven from University level.	1	• The School has commenced a process whereby external examiners comments are responded to as well as a process whereby the reports of external examiners are responded to. We will in future merge this with any process the University proposes.	A
	SUPPORT SERVICES			
7.4	The Review Group recommends that SChem would engage in a process of dialogue with the UCD International Office to identify and agree mechanisms by which they can work together to promote the international marketing of SChem degree programmes.	1	Our goal is to be regarded as Ireland's Chemistry Training Centre. We will strive to increase undergraduate and postgraduate student recruitment activity. In this regard, we are addressing/undertaking the following items: • Working now (HoS-led) with the College of Science, UCD International and others to communicate and market UCD as a destination of choice for Chemistry education at BSc, MSc, and PhD levels. Developing media and other marketing collateral for the US, Asia, etc., as appropriate. Setting recruitment targets. • In the future, 2016/2017, we will work to further develop and refine strategic, targetted marketing campaigns, in association with the College and UCD International, aimed at attracting students to UCD Chemistry. • Articulating the 'gateway opportunity' presented by UCD Chemistry to non-EU students by consolidating internship, semester abroad, and JYA marketing and hosting mechanisms (HoS-led/2016) • Establishing and building links with emerging markets (for Chemistry) in undergraduate and postgraduate recruitment in the Middle East and Asia	All B

(HoS-led/2015 – onging):

- o Explore the development of a 3+1 undergraduate programme with the Department of Chemistry at ZJNU (Jinhua City, Zhejiang Province).
- o Market and increase recruitment into the two recently launched taught MSc courses: 'Synthetic Chemistry for the Pharma and Chemical Industries' and 'Nanomaterials Chemistry'.
- o Enhance our structured PhD programmes by internationalising our teaching collaborations with US and Asian Schools of Chemistry and Engineering.

- Incorporating additional international experience components into undergraduate or postgraduate offerings by developing placement initiatives (placements officer now appointed), collaboration with other institutions in the context of Erasmus-type or Marie Curie-type initiatives, etc., as part of current curriculum review process.
- Exploring the development of online content in the context of enhanced undergraduate and taught MSc offerings, and also, in the context of internationalisation/globalisation of the education experience of our PhD students (e.g., module provision *via* joint PhD programmes with other EU or non-EU schools of chemistry) (HoS-led/2016-2017)
- Developing and enhancing our out/inreach offerings in collaboration with the College of Science. Identifying and addressing key bottlenecks to progress, e.g., availability of equipment, technical or administrative support, levelling of academic staff involvement, funding for recruitment of an outreach/recruitment officer (ongoing)
- Extending our outreach/inreach offering (in collaboration with professional societies) to ensure inclusiveness and diversity in our interactions – led by the Director of Graduate Studies, ongoing 2015/2016.
- Increasing the number of visiting scientists, professors, and students *via* informal routes and *via* involvement in, e.g., Erasmus, COST, Marie Curie, SFI, etc., programs – planned/2017.
- Engaging with colleagues in other Colleges at UCD to identify and exploit synergetic teaching, scholarship or research linkages or other collaborative opportunities that might provide key competitive advantage to or compelling differentiation of UCD's offerings (HoT&L+HoS-led/2016).
- Developing processes to recognise and encourage commitment and contribution, e.g., Outstanding Achievement Awards for staff, provision

			of direct and indirect support to staff, Graduate Student / Postdoc Awards for International Outreach, Teaching, Research or Innovation (HoS-led/2016. • Providing a framework for understanding how building our engagement helps staff career development and how staff effort in this regard will be appropriately reflected and balanced in the School workload model (HoS-led/2015-ongoing).	
7.5	The Review Group recommends that UCD support services should consider designating individual staff members as liaison staff for individual Colleges within the University in an appropriate way that is similar to the UCD HR Partners. In support units where this may not be most effective, a minimum and less expensive alternative would be for those units to have clearly identified roles for their staff and for those roles to be properly communicated to schools. This might simply require having an up-to-date website with the names, photographs, email addresses, and telephone details. In some instances it would be helpful for those support units to visit schools and communicate their support responsibilities directly to all academic staff. An identified School link person may be useful in some cases.	1	We agree and will make this point within our College and University network.	A
	EXTERNAL RELATIONS			
8.8	The Review Group recommends that SChem identify ways in which to engage more actively with its alumni, both in Ireland and abroad.	1	We will : • Deepen and broaden our engagement with alumni and organize alumni-focused event(s) and a dedicated communications strategy. • Explore the development of an approach to alumni engagement that emphasises the global nature of the UCD environment, the sophistication and modernity of campus life, and the dynamism and pace of progress in teaching, research and innovation. • Upgrade the School website. • Establish Facebook and Twitter media for undergraduate and postgraduate students, respectively. A LinkedIn presence will be established for alumni communications and networking. • Develop a School newsletter as a means of communication and recognition of student and staff activities and achievements.	All B-C

			- Provide a web-based mechanism for timetabling of tours and provision of access to overview presentations and testimonials to interested parties. - Enhance the reputation and standing of the School within the community by communicating and disseminating information on the value and impact of our research and innovation achievements (through the provision of seminar series, research days, symposia, publications and web presence). - Support staff in increasing the School's visibility through publishing, attendance at international conferences by providing tangible support (e.g., small bursaries that complement existing available funding mechanisms) and recognition mechanisms (e.g., Research Awards). - Target strategically valuable guests *via* our School Seminar Programme. - Develop a systematic approach to securing and maintaining direct contacts with the pharmaceutical, chemical, and other industries within Ireland and worldwide through alumni management and through involvement in collaborative, inter-disciplinary research programmes, networks and centres. - Gradually ramp up engagement with industry partners in terms of research collaboration and strategic development of funding proposals by exploiting door-opening initiatives such as alumni network management, quick research wins, facilities access, internships, judging panels, industry oversight on research- or innovation-related graduate taught module assignments, projects, etc., development of a cohort of industry adjuncts, or development of Industry Advisory Boards for our Pharma/Chem and BioNanoSystems initiatives.	

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:

1. **The recruitment of one additional technical officer to support our UG/PG teaching, training, and research support duties (in particular related to large scale instrumentation such as MS and NMR).**

2. **Provision of funding to support the upkeep and replacement of (research-intensive teaching) instrumentation.**