University College Dublin

REVIEW GROUP REPORT

Periodic Quality Review

UCD School of Physics

October 2017

Accepted by the UCD Governing Authority at its meeting on 27 March 2018

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Key Findings of the Review Group

The Review Group has identified a number of key findings in relation to areas of good practice operating within the School and key areas which the Review Group would highlight as requiring future improvement. The main section of this Report sets out all observations, commendations and recommendations of the Review Group in more detail. A composite list of all commendations and recommendations is set out in Appendix 1.

Examples of Good Practice

The Review Group identified a number of commendations, in particular:

- There is a distinctive sense of belonging and identity at all levels in the School and students genuinely feel "at home" in the School.

- The School is very effective at the operational level with excellent administrative support and good relationships and collegiality within the School.

- Culturally diverse staff and student body.

- Extremely high quality undergraduate and postgraduate education with excellent students, committed to their discipline and able to access the supports they need to be successful and acknowledged as such by a range of external stakeholders.

- The number of publications in peer-refereed journals per annum is very impressive in recent years. The journals in which these publications appear are of high quality and the publications are well-cited.

- The proposed Centre for Physics in Health and the Centre for Fundamental Physics are appropriate initiatives and fit the expertise and external connections of the School well.

- There are many excellent initiatives (spinouts, Artist-in-Residence, summer schools, etc.) evident in the School.

Prioritised Recommendations for Improvement

The full list of recommendations is set out in Appendix 1, however, the Review Group would suggest that the following be prioritised:

- The School needs to be more vocal and proactive about its achievements and the supports that it requires, particularly in the areas of research and infrastructure. To that end, the School should actively engage with UMT and the relevant UMT officers on these issues, both through University fora (ELG, for example) and through individual meetings (Head of School/Head of Research could arrange to discuss issues with VP for Research, for example).

- The College Principal and Executive Committee should support the School in improving its links with other Schools, disciplines and management groups. The Review Group recommends that the College senior management should be brought into these discussions, where relevant.

- Whilst the day-to-day operations of the School are highly efficient, there is a need to embed strategic planning more securely into the School. In line with UCD Statute 6, the Review Group recommends the establishment of a small executive committee (5-6 people) tasked with articulating and implementing strategy on a rolling basis – this group should be drawn from the full range of grades and areas of specialisation in the School. Decisions/recommendations should be clearly communicated to the body of the School, and the committee should be open to proposals and initiatives from the School.

- The Review Group recommends that the School develop stronger supports in relation to career development and mentoring for all categories of staff, in keeping with the UCD Performance for Growth framework. To this end, the workload model recommended in 2.14 would support planning and career development.

- The Review Group strongly encourages the School and University to continue to engage with Athena SWAN/Juno, especially given that compliance with these frameworks will become a requirement of funding bodies.

- The Review Group recommends that the Vice-President for Campus Development should be invited to a School meeting to provide context and clarity around the refurbishment and upgrade of Science North, with particular regard to the timeline, the consultation process, and the need to take full account of the specific physical and research needs of the School.

- The School should consider ways to more clearly identify their many external activities with the School and its research.

- The School should consider setting up an external advisory board to help the School make informed strategic decisions in areas of emerging need as well as ensuring that graduates have all relevant skills for employment in a fast-developing industrial landscape.

1. Introduction and Overview of UCD School of Physics

Introduction

1.1 This Report presents the findings of a quality review of the School of Physics, University College Dublin, which was undertaken on 27 February – 2 March 2017. The School response to the Review Group Report is attached as Appendix 2.

The Review Framework

1.2 Irish Universities have collectively agreed a framework for their quality review and quality improvement systems, which is consistent with both the legislative requirements of the Qualifications and Quality Assurance (Education and Training) Act 2012, and international good practice (e.g. Standards and Guidelines for Quality Assurance in the European Higher Education Area, 2015). Quality reviews are carried out in academic, administrative and support service units.

1.3 The purpose of periodic review is to assist the University to assure itself of the quality of each of its constituent units, and to utilise learning from this developmental process in order to effect improvement, including:

- To monitor the quality of the student experience, and of teaching and learning.
- To monitor research activity, including: management of research activity; assessing the research performance with regard to: research productivity, research income, and recruiting and supporting doctoral students.
- To identify, encourage and disseminate good practice, and to identify challenges and how to address these.
- To provide an opportunity for units to test the effectiveness of their systems and procedures for monitoring and enhancing quality and standards.
- To encourage the development and enhancement of these systems, in the context of current and emerging provision.
- To inform the University's strategic planning process.
- The output report provides robust evidence for external accreditation bodies.
- The process provides an external benchmark on practice and curriculum.
- To provide public information on the University's capacity to assure the quality and standards of its awards. The University's implementation of its quality procedures enables it to demonstrate how it discharges its responsibilities for assuring the quality

and standards of its awards, as required by the Universities Act 1997 and the Qualifications and Quality Assurance (Education and Training) Act 2012.

The Review Process

1.4 Typically, the review model comprises four major elements:

- Preparation of a self-assessment report (SAR)
- A visit by a review group (RG) that includes UCD faculty and staff and external experts, both national and international. The site visit normally will take place over a two or three day period
- Preparation of a review group report that is made public
- Agreement of an action plan for improvement (quality improvement plan) based on the RG report's recommendations. The University will also monitor progress against the improvement plan

Full details of the review process can be found on the UCD Quality Office website: www.ucd.ie/quality.

The Review Group

1.5 The composition of the Review Group for the UCD School of Physics was as follows:

- Professor Danielle Clarke, UCD School of English, Drama and Film (Chair)
- Assoc. Professor Graeme Warren, UCD School of Archaeology (Deputy Chair)
- Professor Jocelyn Bell Burnell, University of Oxford (Extern)
- Professor Mervyn Miles, University of Bristol (Extern)

1.6 The Review Group visited the School from 27 February to 2 March 2017 and held meetings with School faculty and staff; undergraduate and postgraduate students; the SAR Co-ordinating Committee; other University faculty and staff, including the College Principal. The site visit schedule is included as Appendix 3.

1.7 In addition to the Self-assessment Report, the Review Group considered other documentation provided by the School and the University during the site visit, including: external examiner reports, Institute of Physics Accreditation Reports, staff survey results and sample exam scripts.

Preparation of the Self-assessment Report (SAR)

1.8 Following a briefing from the UCD Quality Office, a Self-assessment Report Coordinating Committee (SARCC) was established that ensured balanced staff representation. Members of the committee, in consultation with faculty, staff and student representatives, drafted sections of the Self-assessment Report. The School approached the quality review process as an opportunity to reflect on the changes and developments of the last five years, to recognise challenges and to plan for the future, based on the resources available.

1.9 Individual chapters were drafted by committee members based on inputs from staff, students and UCD support units. These chapters were discussed in committee and made available for all staff prior to integrating the chapters into a draft self-assessment report, which was further edited by the committee and circulated to the entire School for feedback. All staff were given the opportunity, including a facilitated session by UCDHR, to provide input and feedback to a draft version of the self-assessment report before submission. Progress reports were presented at School meetings and communicated by email.

The University

1.10 University College Dublin (UCD) is a large and diverse university whose origins date back to 1854. The University is situated on a large modern campus about 4 km to the south of the centre of Dublin.

1.11 The University Strategic Plan (to 2020) states that the University's mission is: "to contribute to the flourishing of Dublin, Ireland, Europe and the world through the excellence and impact of our research and scholarship, the quality of our graduates and our global engagement; providing a supportive community in which every member of the University is enabled to achieve their full potential".

The University is currently organised into six colleges and 37 schools:

- UCD College of Arts and Humanities
- UCD College of Business
- UCD College of Engineering and Architecture
- UCD College of Health and Agricultural Sciences
- UCD College of Social Sciences and Law
- UCD College of Science

1.12 As one of the largest universities on the island of Ireland, UCD supports a broad, deep and rich academic community in Science, Business, Engineering, Health Sciences, Agriculture, Veterinary Medicine, Arts, Law, Celtic Studies and Social Sciences. There are currently more

than 27,869 students on our UCD campus (approximately 16,684 undergraduates, 8,202 postgraduates and 2,983 Occasional and Adult Education students) registered on over 70 University degree programmes, including over 7,012 international students from more than 131 countries. The University also has over 5,591 students studying UCD degree programmes on campuses overseas.

UCD School of Physics

1.13 The School of Physics is one of seven Schools within the UCD College of Science. The other Schools are Biology and Environmental Science, Biomolecular and Biomedical Science, Chemistry, Computer Science, Earth Sciences, and Mathematics and Statistics. The academic staff and facilities of the School are located in 4 buildings on the UCD Belfield campus: Science Centre North, South & East and the Conway Institute. The School has 22 permanent academic staff members, 5 administrative and support staff, 8 technical staff (including 2 Apprentice Technicians), plus research-grant funded staff.

1.14 The School of Physics is committed to meeting the educational needs of students and supporting staff development. The School's mission, informed by the strategic plan of the University, is to:

- provide excellent physics undergraduate and graduate education;
- pursue frontier physics research, driven by fundamental issues facing science and society;
- provide researchers with a collegiate environment that respects academic freedom and supports impactful research that is equally valued wherever it lies along the spectrum from fundamental to applied;
- be active proponents of physics and its importance to society.

2. Organisation and Management

2.1 The Review Group was impressed with the collegiality and openness of the School and also with the efficiency and effectiveness of its operations – the administrative staff in the School are effective, highly skilled and supported in their work.

2.2 The primary forum for the management of issues affecting the School is the School meeting, where decisions are reached by consensus. Whilst this model is commendable in many ways the Review Group felt that this could result in a lack of strategic direction and an inability at times to respond quickly to a rapidly changing University and external environment.

2.3 There is a need for roles, responsibilities and decisions to be more transparent and more clearly communicated, and for all of the different grades and areas of interest in the School to take part in decision-making. There also needs to be better succession planning in the key roles and posts in the School, with knowledge and expertise being invested in the role rather than the person.

2.4 The School's Strategic Plan 2015-20 is a valuable, if ambitious, document, and it needs to be a "live" document, revised and implemented on an ongoing basis.

Commendations

2.5 There is a distinctive sense of belonging and identity at all levels in the School and students genuinely feel "at home" in the School.

2.6 The School is very effective at the operational level with excellent administrative support and good relationships and collegiality within the School.

2.7 The School has an ambitious strategic plan in place that is aligned with the University's Strategic Plan 2015-2020.

Recommendations

2.8 The School needs to be more vocal and proactive about its achievements and the supports that it requires, particularly in the areas of research and infrastructure. To that end, the School should actively engage with UMT and the relevant UMT officers on these issues, both through University fora (ELG, for example) and through individual meetings (Head of School/Head of Research could arrange to discuss issues with VP for Research, for example).

2.9 The Review Group felt that there was scope for closer collaboration between the School and other decision-making entities across the University, and recommend that the School develop better connections with these bodies to help the School achieve its goals.

2.10 The College Principal and Executive Committee should support the School in improving its links with other Schools, disciplines and management groups. The Review Group recommends that the College senior management should be brought into these discussions, where relevant.

2.11 Whilst the day-to-day operations of the School are highly efficient, there is a need to embed strategic planning more securely into the School. In line with UCD Statute 6, the Review Group recommends the establishment of a small executive committee (5-6 people) tasked with articulating and implementing strategy on a rolling basis – this group should be drawn from the full range of grades and areas of specialisation in the School. Decisions/recommendations should be clearly communicated to the body of the School, and the committee should be open to proposals and initiatives from the School.

2.12 Incoming post-holders should shadow the current post-holder for a period appropriate to the role (e.g., for Head, this should be a period not less than 6 months). The Headship transition should take place in June, rather than September in order to facilitate the efficient management and development of the School.

2.13 The Review Group recommends greater transparency in appointments to roles in the School and that for career development and better decision-making these roles should be rotated amongst different groups and categories of staff.

2.14 The School currently does not operate a workload model. The Review Group recommends that the School investigate existing models and adapt them to the School's needs. The workload model should be viewed primarily as a developmental tool to enable recently appointed staff in particular, to focus on consolidating their research output and profiles.

2.15 The Review Group recommends that the School develop stronger supports in relation to career development and mentoring for all categories of staff, in keeping with the UCD Performance for Growth framework. To this end, the workload model recommended in 2.14 would support planning and career development.

2.16 The Review Group would like to see better and clearer communication at all levels from UMT/College down to the School (e.g. key officers should be invited to talk to the School) but also within the School (regarding, e.g., new promotions system, building plans).

2.17 The School should review and revise its Strategic Plan on a regular basis in tandem with, but independently of, the annual reviews required by UMT and the President.

3. Staff and Facilities

Staff

3.1 The School of Physics is a medium-sized school in UCD of circa 50 FTEs on a variety of temporary and permanent contracts. Permanent academic staff makes up less than 50% of the total. 27.5% of the staff are female. This is below UCD averages but broadly comparable to other Physics institutions. The School is making some commendable efforts in this regard, especially in terms of engagement with students and potential students, but it will be difficult to fully ameliorate the situation and provide equality amongst all levels and categories of staff without hiring permanent staff at levels above Assistant Professor. The Review Group strongly encourages the School and University to continue to engage with Athena SWAN/Juno, especially given that compliance with these frameworks will become a requirement of funding bodies.

3.2 A high proportion of permanent and temporary staff is international and the School has a diverse culture. The high proportion of international staff throws into sharp relief the relocation difficulties faced by staff moving to Ireland from overseas: visas, tax status, bank accounts, accommodation etc.

3.3 The School includes important Technical and Administrative supports, and, as noted in Section 2, the operational core of the School appears to be highly efficient. The Review Group recognises the urgent need to address administrative promotions and job development, as stated strongly throughout the review process.

3.4 The School's recent staff recruitment highlights the ways in which new colleagues are integrated into the School and UCD procedures. The Review Group was not presented with strong evidence that best practice induction and probation procedures were being followed. This presents some risk to the School and the Review Group advises that an appropriate framework be developed, working in conjunction with the HR Partner. This induction would be facilitated by the development of a staff handbook as highlighted in the School's SAR.

3.5 The Review Group notes that whilst the Post-Doctoral researchers are well integrated into their own research groups, they have less of a sense of identity with the School, and may benefit from broader professional development in their chosen career path. This might be mediated by social events and encouraging access to other UCD training and supports.

Facilities

3.6 The Review Group notes with concern the sub-optimal facilities currently occupied by the School of Physics. The fabric of Science North dates from 1964 and many aspects of the building are no longer fit for purpose. As reported to the Review Group by staff, some rooms, especially on the Third Floor, may not fully comply with health and safety requirements for working conditions.

3.7 The potential refurbishment of Science North is to be welcomed but the Review Group notes the significant risks posed to the research and teaching capacity of the School that will be caused during refurbishment. In a worst-case scenario, the loss of access to research facilities for an extended period may lead to the loss of staff who are already deeply concerned about their physical infrastructure. To help mitigate the School's concerns about the potential impact of the refurbishment on their activities, the Review Group believes that it is essential that the School be given a more accurate timeline for the refurbishment, and to ensure that, at the appropriate time, School staff have input into the design and specification of the research spaces. It is also essential that the inevitable disruption to research caused by the refurbishment process is minimised and plans for the process are optimised.

Commendations

3.8 Culturally diverse staff and student body.

3.9 Despite the serious problems caused by the sub-optimal facilities, the sense of a distinctive space for physics generates a strong sense of identity.

3.10 The new 1st year labs are spacious, light and very attractive.

Recommendations

3.11 The School and University should continue to engage with issues surrounding gender representation in the School and strongly engage with Athena SWAN (see also 3.1 above).

3.12 The School should develop a policy on induction, probation and mentoring for all new staff in keeping with relevant UCD policies.

3.13 The Review Group recommends the development of practices to integrate postdocs into the culture of the School and that postdocs be encouraged to take up relevant training opportunities.

3.14 The Review Group recommends that the School develop a staff handbook detailing key processes and operations.

3.15 The Review Group recommends that the College and University reconsider the current policy on Administrative career development and promotion.

3.16 The School should lobby UCD HR and the University Management Team to ensure supports for new staff /PhD students relocating to Ireland are developed.

3.17 The School should be supported by the College of Science and UCD Estates in resolving the sub-optimal physical resources.

3.18 The Review Group recommends that the Vice-President for Campus Development should be invited to a School meeting to provide context and clarity around the refurbishment and upgrade of Science North, with particular regard to the timeline, the consultation process and the need to take full account of the specific physical and research needs of the School.

3.19 The School should be fully embedded in the development of any planned renovations and associated project management.

3.20 Notwithstanding the plans for renovation of the building, existing rooms and facilities need to be proactively maintained.

4. Teaching and Curriculum

4.1 The School is successfully producing graduates who are valued by the outside world. Their degree courses have Institute of Physics (IoP) accreditation (which expires very soon – reapplication is in process). This accreditation is *absolutely essential* for the School and the students. The School also has a large service-teaching load.

4.2 The School has recently engaged in a curriculum mapping process, with a satisfactory result. Teaching team meetings help prevent duplication and gaps. The teaching is operationally well managed, and the External Examiner reports are very positive.

4.3 At first sight there appear to be too many MSc courses with low student numbers. However, since many lecture modules service several MSc courses, in fact this is not an issue.

4.4 There is a good variety of types of undergraduate assessment methods and, importantly, there is formative assessment as well as summative. Because physics is a hierarchical (or linear) subject it is important that students understand the introductory material before progressing to the higher levels.

4.5 There are a lot of international students, which is enriching for everyone (and the School believes they could get more). There is demand for more 3rd and 4th year student places, but there is not the space (capacity) in the Advanced Labs to increase this number. Similarly, an increase in Masters-level numbers is restricted as there is a limited number of academics to supervise Masters-level students. These capacity issues must be factored into the design for the refurbished Science North.

4.6 Graduate students are, perforce, a less coherent body than undergraduate students so effective communication is more difficult. The students who met with the Review Group appear to be well integrated, however, it was noted that this is not the case for the full cohort of graduate students. These students do not always understand the rationale behind some of the obligatory modules, about limited induction, and about the rise in fees eating into conference attendance allowances.

Commendations

4.7 Extremely high quality undergraduate and postgraduate education with excellent students, committed to their discipline and able to access the supports they need to be successful and acknowledged as such by a range of external stakeholders.

4.8 There has been a dramatic rise in CAO points score of physics students – the School is to be congratulated.

4.9 The School has adapted well to the common entrance system.

4.10 The spacious modern labs for early year students give a positive impression.

4.11 Undergraduate Students are a well-engaged group, largely very happy with their programme. The 3rd and 4th year students appreciate having a physical space in the School. It enables good contact with the academic staff teaching them, which is especially valuable for the weaker two thirds.

4.12 The 3rd and 4th year labs are innovative and challenging; having a physical base for students in the School means more experienced students can (and do) help others.

4.13 There is room in the degree structure for students to take (some) modules outside physics which is appreciated.

4.14 Class representatives attend Teaching Team meetings and feel they are heard.

4.15 The Graduate students who demonstrate in the undergraduate laboratories feel that the tutors there are open to suggestions and recommendations about the experiments in those labs.

Recommendations

4.16 The School should make more explicit the transferable skills students acquire.

4.17 As more of the campus develops, the state of the building will make it more difficult to attract students. As set out in section 3 above, there is need for clarity about the likely timetable for refurbishment.

4.18 Some 'small group' tutorials have c50 students; the School needs to address this by using any budget surplus to support a better staff-student ratio.

4.19 Falling PhD numbers is impacting on the number of graduate students able to help deliver courses through demonstrating and tutoring; the School needs to find work-arounds. Proper remuneration and training would make these roles more attractive to graduate students.

4.20 The College and the School could usefully consider ways to improve the support system for postgraduate students, especially for those from overseas or on non-standard studentships. In particular, communication of available supports could be improved.

5. Research Activity

5.1 For the number of academic staff (22) in the School, a wide range of research areas in physics is undertaken: particle physics, astrophysics, space & relativity, atomic, molecular & plasma, radiation, condensed matter theory, Nano-bio. Grant income in 2016 was €4M, mostly coming from Horizon 2020 and Science Foundation Ireland (SFI). The current total number of PhD students is 55. This has declined in recent years due to reduced funding from SFI. There are currently 18 postdoctoral researchers, including fellowships. The School is engaged in several international collaborations and collaborates with a number of medical facilities around the Dublin area as well as the Conway Institute. The School has both a mechanical workshop currently with four staff (including 2 apprentices) and an electronics workshop with two staff.

5.2 The section of the Science building where Physics is located needs refurbishment to allow state of the art research activity to be undertaken (see also section 3 above).

Commendations

5.3 The number of publications in peer-refereed journals per annum is very impressive in recent years. The journals in which these publications appear are of high quality and the publications are well-cited.

5.4 The proposed Centre for Physics in Health and the Centre for Fundamental Physics are appropriate initiatives and fit the expertise and external connections of the School well.

5.5 The quality of the PhD students is high and they are much appreciated by the employers and organisations they join on leaving the School.

Recommendations

5.6 Despite the lack of SFI funding available for fundamental research in physics, it is essential that this activity continues and support for the Centre for Fundamental Physics may be a way in which funding support can be attracted.

5.7 A more comprehensive and documented induction process for PhD students should be put in place as well as ensuring that the students have annual progress meetings and give annual seminars.

5.8 The Review Group recommends that additional consideration be given by College and University to the management of research overheads in relation to long-term planning and sustainability such as keeping expensive equipment running.

5.9 There could be greater transparency at School level about how the overhead is distributed back to staff and recognition of the different types of support needed by the different research groups is important (e.g. travel, equipment, buy out, etc.).

5.10 A mechanical workshop is important for a school of physics for the construction and fabrication of novel instrumentation and devices. The School should consider how the machines in the workshop could be upgraded, including a water-jet cutter and/or a laser cutter. A high-quality 3D printer may also help in prototyping.

6. Management of Quality and Enhancement

6.1 The School utilises a number of management and quality enhancement mechanisms to evaluate the quality of their output and the experience for their students including, *inter alia*, strategic planning; programme and module design and approval; curriculum review; engagement with external accreditation processes, student feedback; effective recruitment practices and, external examining.

6.2 The School also engages with periodic quality review and it was evident from the documentation provided to the Review Group in advance of the site visit that the School

prepared well for the Quality Review. The composition of the SAR Co-ordinating Committee was representative of all groups within the School and there was clear evidence of a self-reflective process which took place as part of the School's preparation.

6.3 In general, the management of quality and enhancement was found to be of a high standard. Staff and students all were committed to maintaining the highest intellectual standards as well as the most efficient running of the School with the best possible outcomes. There is scope for some improvements in respect of the integration of the School's strategic objectives into the School's operational activities (see also sections 2 and 4 above).

Commendations

6.4 The School is to be commended for its engagement with the University periodic quality review process and the quality of its Self-assessment Report.

6.5 The School engages well with University quality mechanisms, for example, a robust external examiner system, to assure the academic standards of its modules and awards (see also section 4 above).

6.6 The School fully engaged with accreditation which is an important external validation of the quality of their educational programmes and the delivery of learning outcomes (see also section 4 above).

Recommendations

6.7 The Review Group recommends that the School develop more flexible methods for closing the feedback loop and improve ways of communicating subsequent changes to students, tutors and staff.

6.8 There are many operational committees within the School where, for example, all of the teaching team discuss activities. While this aids information sharing, the School should look for more academically time-efficient ways to do the necessary business and make time for strategic considerations.

7. Support Services

7.1 The School engages with a wide range of University support services and facilities, some provided by College, others centrally by the University. The Review Group was pleased to see a survey of staff needs included as part of the SAR, and notes important proactive moves from the School, including inviting a representative from Post Award Research to attend the School and workshop with colleagues to resolve queries. Some aspects of the School's identified areas for improvement have been wider issues for the University for a long period of time, for example, the provision of car parking, better information for Research account

holders. In particular, the Review Group notes the difficulties caused by the closure of dormant Research accounts.

7.2 The School of Physics reports a generally positive relationship with Support Services, highlighting some problems with communication. The Review Group was pleased to note the very positive reports of the School from a variety of support services.

Commendations

7.3 The School has strong and effective relationships with most support services in UCD.

Recommendations

7.4 The Review Group recommends that appropriately resourced IT support is provided in the School at a level relevant to the needs of Researchers.

7.5 The Review Group recommends that the School develop its awareness of the changing technical environment for Physics Research and Teaching and that the School resource its internal technical supports at an appropriate level.

8. External Relations

8.1 The School has a justifiably excellent reputation in respect of developing proactive external relationships. In addition to the School's positive relationships with its alumni, industry stakeholders and accreditation body, the School also engages in a number of positive and impactful activities, including, spin-out companies, Artist-in-Residence, Physics Summer Schools, secondary school outreach, engagement with the BT Young Scientist & Technology Exhibition, Athena SWAN and Project Juno, amongst others. It would benefit the School to knit these activities together into an overall vision that clearly identifies them with the School and its research.

8.2 Alumni and industry stakeholders, many of whom are graduates and work nearby, could be used more centrally in the School by forming an advisory board, including representatives from the spin-out companies. The Board might meet twice a year to provide guidance on trends outside academia and to help the School make informed strategic decisions in areas of emerging need (e.g. considering the introduction of an MSc in medical physics now that Trinity has discontinued their programme).

Commendations

8.3 There are many excellent initiatives (spinouts, Artist-in-Residence, summer schools, etc.) evident in the School.

Recommendations

8.4 The School should consider ways to more clearly identify their many external activities with the School and its research.

8.5 The School should consider setting up an external advisory board to help the School make informed strategic decisions in areas of emerging need as well as ensuring that graduates have all relevant skills for employment in a fast-developing industrial landscape.

APPENDIX 1

UCD School of Physics – Full List of Commendations and Recommendations

This Appendix contains a full list of all commendations and recommendations made by the Review Group for the UCD School of Physics and should be read in conjunction with the specific chapter above. *(Please note that the paragraph references below refer to the relevant paragraphs in the report text).*

A. Organisation and Management

Commendations

2.5 There is a distinctive sense of belonging and identity at all levels in the School and students genuinely feel "at home" in the School.

2.6 The School is very effective at the operational level with excellent administrative support and good relationships and collegiality within the School.

2.7 The School has an ambitious strategic plan in place that is aligned with the University's Strategic Plan 2015-2020.

Recommendations

2.8 The School needs to be more vocal and proactive about its achievements and the supports that it requires, particularly in the areas of research and infrastructure. To that end, the School should actively engage with UMT and the relevant UMT officers on these issues, both through University fora (ELG, for example) and through individual meetings (Head of School/Head of Research could arrange to discuss issues with VP for Research, for example).

2.9 The Review Group felt that there was scope for closer collaboration between the School and other decision-making entities across the University, and recommend that the School develop better connections with these bodies to help the School achieve its goals.

2.10 The College Principal and Executive Committee should support the School in improving its links with other Schools, disciplines and management groups. The Review Group recommends that the College senior management should be brought into these discussions, where relevant.

2.11 Whilst the day-to-day operations of the School are highly efficient, there is a need to embed strategic planning more securely into the School. In line with UCD Statute 6, the Review Group recommends the establishment of a small executive committee (5-6 people) tasked with articulating and implementing strategy on a rolling basis – this group should be drawn

from the full range of grades and areas of specialisation in the School. Decisions/recommendations should be clearly communicated to the body of the School, and the committee should be open to proposals and initiatives from the School.

2.12 Incoming post-holders should shadow the current post-holder for a period appropriate to the role (e.g., for Head, this should be a period not less than 6 months). The Headship transition should take place in June, rather than September in order to facilitate the efficient management and development of the School.

2.13 The Review Group recommends greater transparency in appointments to roles in the School and that for career development and better decision-making these roles should be rotated amongst different groups and categories of staff.

2.14 The School currently does not operate a workload model. The Review Group recommends that the School investigate existing models and adapt them to the School's needs. The workload model should be viewed primarily as a developmental tool to enable recently appointed staff in particular, to focus on consolidating their research output and profiles.

2.15 The Review Group recommends that the School develop stronger supports in relation to career development and mentoring for all categories of staff, in keeping with the UCD Performance for Growth framework. To this end, the workload model recommended in 2.14 would support planning and career development.

2.16 The Review Group would like to see better and clearer communication at all levels from UMT/College down to the School (e.g. key officers should be invited to talk to the School) but also within the School (regarding, e.g., new promotions system, building plans).

2.17 The School should review and revise its Strategic Plan on a regular basis in tandem with, but independently of, the annual reviews required by UMT and the President.

B. Staff and Facilities

Commendations

3.8 Culturally diverse staff and student body.

3.9 Despite the serious problems caused by the sub-optimal facilities, the sense of a distinctive space for physics generates a strong sense of identity.

3.10 The new 1st year labs are spacious, light and very attractive.

Recommendations

3.11 The School and University should continue to engage with issues surrounding gender representation in the School and strongly engage with Athena SWAN (see also 3.1 above).

3.12 The School should develop a policy on induction, probation and mentoring for all new staff in keeping with relevant UCD policies.

3.13 The Review Group recommends the development of practices to integrate postdocs into the culture of the School and that postdocs be encouraged to take up relevant training opportunities.

3.14 The Review Group recommends that the School develop a staff handbook detailing key processes and operations.

3.15 The Review Group recommends that the College and University reconsider the current policy on Administrative career development and promotion.

3.16 The School should lobby UCD HR and the University Management Team to ensure supports for new staff /PhD students relocating to Ireland are developed.

3.17 The School should be supported by the College of Science and UCD Estates in resolving the sub-optimal physical resources.

3.18 The Review Group recommends that the Vice-President for Campus Development should be invited to a School meeting to provide context and clarity around the refurbishment and upgrade of Science North, with particular regard to the timeline, the consultation process and the need to take full account of the specific physical and research needs of the School.

3.19 The School should be fully embedded in the development of any planned renovations and associated project management.

3.20 Notwithstanding the plans for renovation of the building, existing rooms and facilities need to be proactively maintained.

C. Teaching and Curriculum

<u>Commendations</u>

4.7 Extremely high quality undergraduate and postgraduate education with excellent students, committed to their discipline and able to access the supports they need to be successful and acknowledged as such by a range of external stakeholders.

4.8 There has been a dramatic rise in CAO points score of physics students – the School is to be congratulated.

4.9 The School has adapted well to the common entrance system.

4.10 The spacious modern labs for early year students give a positive impression.

4.11 Undergraduate Students are a well-engaged group, largely very happy with their programme. The 3rd and 4th year students appreciate having a physical space in the School. It enables good contact with the academic staff teaching them, which is especially valuable for the weaker two thirds.

4.12 The 3rd and 4th year labs are innovative and challenging; having a physical base for students in the School means more experienced students can (and do) help others.

4.13 There is room in the degree structure for students to take (some) modules outside physics which is appreciated.

4.14 Class representatives attend Teaching Team meetings and feel they are heard.

4.15 The Graduate students who demonstrate in the undergraduate laboratories feel that the tutors there are open to suggestions and recommendations about the experiments in those labs.

Recommendations

4.16 The School should make more explicit the transferable skills students acquire.

4.17 As more of the campus develops, the state of the building will make it more difficult to attract students. As set out in section 3 above, there is need for clarity about the likely timetable for refurbishment.

4.18 Some 'small group' tutorials have c50 students; the School needs to address this by using any budget surplus to support a better staff-student ratio.

4.19 Falling PhD numbers is impacting on the number of graduate students able to help deliver courses through demonstrating and tutoring; the School needs to find work-arounds. Proper remuneration and training would make these roles more attractive to graduate students.

4.20 The College and the School could usefully consider ways to improve the support system for postgraduate students, especially for those from overseas or on non-standard studentships. In particular, communication of available supports could be improved.

D. Research Activity

Commendations

5.3 The number of publications in peer-refereed journals per annum is very impressive in recent years. The journals in which these publications appear are of high quality and the publications are well-cited.

5.4 The proposed Centre for Physics in Health and the Centre for Fundamental Physics are appropriate initiatives and fit the expertise and external connections of the School well.

5.5 The quality of the PhD students is high and they are much appreciated by the employers and organisations they join on leaving the School.

Recommendations

5.6 Despite the lack of SFI funding available for fundamental research in physics, it is essential that this activity continues and support for the Centre for Fundamental Physics may be a way in which funding support can be attracted.

5.7 A more comprehensive and documented induction process for PhD students should be put in place as well as ensuring that the students have annual progress meetings and give annual seminars.

5.8 The Review Group recommends that additional consideration be given by College and University to the management of research overheads in relation to long-term planning and sustainability such as keeping expensive equipment running.

5.9 There could be greater transparency at School level about how the overhead is distributed back to staff and recognition of the different types of support needed by the different research groups is important (e.g. travel, equipment, buy out, etc.).

5.10 A mechanical workshop is important for a school of physics for the construction and fabrication of novel instrumentation and devices. The School should consider how the machines in the workshop could be upgraded, including a water-jet cutter and/or a laser cutter. A high-quality 3D printer may also help in prototyping.

E. Management of Quality and Enhancement

Commendations

6.4 The School is to be commended for its engagement with the University periodic quality review process and the quality of its Self-assessment Report.

6.5 The School engages well with University quality mechanisms, for example, a robust external examiner system, to assure the academic standards of its modules and awards (see also section 4 above).

6.6 The School fully engaged with accreditation which is an important external validation of the quality of their educational programmes and the delivery of learning outcomes (see also section 4 above).

Recommendations

6.7 The Review Group recommends that the School develop more flexible methods for closing the feedback loop and improve ways of communicating subsequent changes to students, tutors and staff.

6.8 There are many operational committees within the School where, for example, all of the teaching team discuss activities. While this aids information sharing, the School should look for more academically time-efficient ways to do the necessary business and make time for strategic considerations.

F. Support Services

Commendations

7.3 The School has strong and effective relationships with most support services in UCD.

Recommendations

7.4 The Review Group recommends that appropriately resourced IT support is provided in the School at a level relevant to the needs of Researchers.

7.5 The Review Group recommends that the School develop its awareness of the changing technical environment for Physics Research and Teaching and that the School resource its internal technical supports at an appropriate level.

G. External Relations

Commendations

8.3 There are many excellent initiatives (spinouts, Artist-in-Residence, summer schools, etc.) evident in the School.

Recommendations

8.4 The School should consider ways to more clearly identify their many external activities with the School and its research.

8.5 The School should consider setting up an external advisory board to help the School make informed strategic decisions in areas of emerging need as well as ensuring that graduates have all relevant skills for employment in a fast-developing industrial landscape.

APPENDIX 2

UCD School of Physics – Response to the Review Group Report

The School is grateful to the members of the Review Group and the UCD Quality Office for the effort put into the review process. We thank the Review Group for their time, expertise, and constructive comments, both during the site visit and in their Report. The Report commends extensively the high quality of teaching and research in the School, our sense of community, and our excellent initiatives. We welcome both the endorsement of the Review Group through commendations and their thoughtful recommendations. The School is acting on the recommendations in parallel with the process of preparing the Quality Improvement Plan over the coming months. It is important to note that any new initiative or committee necessarily takes away time from existing initiatives or committees. With specific reference to the prioritised recommendations identified by the Review Group, the School's initial comments/proposals are outlined below:

2.8 The School needs to be more vocal and proactive about its achievements and the supports that it requires, particularly in the areas of research and infrastructure. To that end, the School should actively engage with UMT and the relevant UMT officers on these issues, both through University fora (ELG, for example) and through individual meetings (Head of School/Head of Research could arrange to discuss issues with VP for Research, for example).

Comment/Proposal: The School will more actively vocalise our achievements through established communication/dissemination routes including our website and recently established Twitter feed, and through normal communication channels within the College and University that result in positive stories about the School, such as the recent article in the UCD Today magazine on the visit of NASA's Robert Lightfoot. So far, on a case-by-case basis, discussions are ongoing with the College Principal and the University VP of Research regarding both achievements and required research and infrastructure supports and, when appropriate, relevant UMT officers will be invited to the School for meetings. We will continue to participate fully in the College effort on the Science Phase 3 development.

To strengthen our connection with the College of Science and the UMT, we propose two key initiatives. First, we propose that at the College of Science Executive Committee meeting, Heads of Schools will provide updates on achievements and required supports on a rotating basis. Second, the School commits to preparing annual reports that document our achievements and required supports, which will be provided to the College of Science, the UMT, and other relevant stakeholders. We will follow-up with recipients to ensure that the information is received and to optimise its impact.

2.10 The College Principal and Executive Committee should support the School in improving its links with other Schools, disciplines and management groups. The Review Group recommends that the College senior management should be brought into these discussions, where relevant.

Comment/Proposal: We fully agree that the School should be supported by the College Principal and the College Executive Committee in improving links with other Schools, disciplines, and management groups. The School expects that the College takes note of this recommendation. The proposal to rotate Head of School updates at the College of Science Executive Committee meeting will facilitate interactions between Schools and help the College Principal identify where supports are needed and opportunities that might be otherwise missed. We propose that the College reinstate catered research meetings between schools or across the College where one School serves as host and staff mingle while discussing enhancing links during, e.g., poster presentations highlighting research activities within the School.

Since the site visit, the School has already invited College senior management to the School meeting and will continue to seek out such interactions. The School has active engagement with the College HR Partner and furthermore recently invited the Research Finance Office to meet with the School. As an action, we will discuss at a future School meeting whether sufficient links are present with Teaching and Learning at the University level and whether to request support from the College to facilitate interactions.

2.11 Whilst the day-to-day operations of the School are highly efficient, there is a need to embed strategic planning more securely into the School. In line with UCD Statute 6, the Review Group recommends the establishment of a small executive committee (5-6 people) tasked with articulating and implementing strategy on a rolling basis – this group should be drawn from the full range of grades and areas of specialisation in the School. Decisions/recommendations should be clearly communicated to the body of the School, and the committee should be open to proposals and initiatives from the School.

Comment/Proposal: As a School, we had implemented an executive committee previously; however, it did not have the desired outcomes at the time. We appreciate the need for embedding strategic planning more securely and will discuss at a future School meeting a more focused implementation of an executive committee, tasked specifically with identifying and articulating possible strategies to the School at large, could be successful. Questions about composition of the committee and terms of committee members will undoubtedly arise and require consideration. Questions regarding effectiveness arise if ~25% of staff is involved in the executive committee.

2.15 The Review Group recommends that the School develop stronger supports in relation to career development and mentoring for all categories of staff, in keeping with the UCD Performance for Growth framework. To this end, the workload model recommended in 2.14 below would support planning and career development.

Comment/Proposal: This important issue was also raised as part of the Culture and Engagement Survey at UCD. The School is committed to leveraging the growing University/HR support to enhance career development and mentorship at UCD and within the School. New members of the School participate in a University-wide induction process and have full access to and are encouraged to avail of career development information and

opportunities provided by the College and University. Locally, the School has an informal mentorship process where new hires are informed about the norms of the School and the expectations of their roles. We realise an informal process may be imperfect. To address this, the School will formally assign an appropriate mentor to all new staff for 6 to 12 months. This mentor will be a point of contact for navigating the School and University. The UCD Performance for Growth process is forthcoming and may provide a clear University-wide career development and mentorship policy as well as associated improved support for career development, career progression, and mentorship.

3.11 The Review Group strongly encourages the School and University to continue to engage with Athena SWAN/Juno, especially given that compliance with these frameworks will become a requirement of funding bodies.

Comment/Proposal: We fully agree with the recommendation and note the importance of Athena SWAN/IoP Juno both in terms of equality and future funding requirements. We are actively engaged in our IoP Juno efforts and note that the University efforts related to Athena SWAN support our data collection activities and our IoP Juno application. Strengthened ties between the School, the College, and management groups, as outlined in other prioritised recommendations, will further benefit our School's IoP Juno application.

3.18 The Review Group recommends that the Vice-President for Campus Development should be invited to a School meeting to provide context and clarity around the refurbishment and upgrade of Science North, with particular regard to the timeline, the consultation process, and the need to take full account of the specific physical and research needs of the School.

Comment/Proposal: We are fully committed to engaging with the College regarding Phase 3 development and a meeting with the VP for Campus Development took place directly following the site visit. While the engagement was positive, no concrete outcomes were established. Fund-raising efforts are ongoing with an update expected at the end of the year and we will invite the VP for Campus Development and the College Principal for discussion early in the new year. Strengthened ties between the School, the College of Science, and management groups as outlined in other prioritised recommendations and increased visibility afforded by providing School updates at the College Executive meeting should make our voice heard in the Phase 3 development and design process. As a School, we note that the importance of recommendation **3.20 Notwithstanding the plans for renovation of the building, existing rooms and facilities need to be proactively maintained** should not be overlooked: independent of our voice in future renovations, there are critical maintenance requirements that need to be addressed now.

8.4 The School should consider ways to more clearly identify their many external activities with the School and its research.

Comment/Proposal: The annual report previously mentioned in response to recommendation 2.8 will present and summarise the many external activities of the School

and its staff. Such a document also serves to update external stakeholders and alumni of the School on our activities.

8.5 The School should consider setting up an external advisory board to help the School make informed strategic decisions in areas of emerging need as well as ensuring that graduates have all relevant skills for employment in a fast-developing industrial landscape.

Comment/Proposal: The School does have an external board called the "Friends of Physics" which is actively involved in fund-raising activities, alumni engagement, and planning of our annual Physics50+ alumni event. Currently this group is heavily involved in the groundwork for the proposed Thomas Preston Centre and Scholarships. The School will consider whether this group can evolve into an advisory board that also assists the School with strategy, engagement with industry, and engagement with funding agencies to benefit the School and its graduates.

APPENDIX 3

School of Physics Site Visit Timetable

February 27 – March 2 2017

Pre-Visit Briefing Prior to Site Visit (Monday 27th Feb 2017)

17.00-19.00	RG meet to review preliminary issues and to confirm work schedule and assignment of tasks for the site visit – **RG and UCD Quality Office only**
19.30	Dinner for the RG hosted by the UCD Registrar and Deputy President – **RG, UCD Deputy President and UCD Quality Office only**

Day 1: Tuesday 28th Feb 2017
Venue: UCD Physics Library, beside Room 110 Science Centre North (SCN)

09.00-09.30	Private meeting of Review Group (RG)
09.30-10.15	RG meet with **College Principal and Dean of Science**
10.15-10.30	Break
10.30-11.15	RG meet with **Head of School**
11.15-11.30	Tea/coffee break
11.30-12.15	RG meet with **representative group of postdoctoral researchers**
12.15-12.45	Break – RG review key observations and prepare for lunch time meeting
12.45-13.45	**Working lunch** – meeting with employers and other external stakeholders
13.45-14.15	RG review key observations
14.15-15.30	RG meet with **representative group of academic staff** – primary focus on Teaching and Learning, and Curriculum issues.
15.30-15.45	RG tea/coffee break

15.45-16.30	RG meet with **support staff representatives**
16.30-16.35	Break
16.35-17.05	RG meet with **UCD Science Deans**
17.05-17.15	Break
17.15-18.15	**Tour of facilities**
18.15	RG depart

Day 2: Wednesday 1st March 2017
Venue: UCD Physics Library, first floor SCN

08.45-09.00	Private meeting of the RG
09.00-09.30	RG meet relevant **support service representatives – building and campus development**
09.30-09.55	RG meet relevant **support service representatives – general**
09.55-10.10	Break
10.10-11.00	RG meet with a representative group of **postgraduate students** (taught and research) **and recent graduates** (PG and UG)
11.00-11.15	RG tea/coffee break
11.15-12.15	RG meet with **representative group of academic staff** – primary focus on **research issues**.
12.15-12.30	Break - RG review key observations
12.30-13.15	Lunch – Review Group only
13.15-14.00	RG meet with **representative group of undergraduate students**
14.00-14.15	RG private meeting - review key observations
14.15-15.00	RG meet with **College Finance Manager, College HR Partner** and **Head of School,** to outline School's financial situation and resources
15.00-15.15	Break
15.15-16.15	RG meet with **recently appointed members of staff**

16.15-16.25	Break
16.25-17.45	RG available for private individual meetings with staff
17.50-18.10	RG meet Head of School
18.10-18.30	RG private meeting – review key observations/findings
18.30	RG depart

Day 3: Thursday 2nd March 2017
Venue: UCD Physics Library, first floor SCN / Exit presentation in Common Room

09.00-09.30	Private meeting of RG
09.30-10.45	RG continue preparing draft RG Report
10.45-11.00	Break
11.00-11.15	RG meet with **College Principal** to feedback initial outline commendations and recommendations
11.15-11.30	Break
11.30-11.45	RG meet with **Head of School** to feedback initial outline commendations and recommendations
12.00-12.45	Lunch
12.45-13.15	RG continue drafting RG Report and feedback commendations and recommendations
13.15-13.30	Short tour of second art studio
13.30-15.15	RG continue drafting RG Report and feedback commendations and recommendations
15.15-15.30	Break
15.30-16.00	RG finalise first draft of RG Report and feedback commendations and recommendations
16.15	**Exit presentation** to all available staff of the unit
16.35	RG depart