Faculty of STEM Quality report 2019/2020

Table of Contents

FACULTY OF SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) EXECUTIVE SUMMARY

Little did we know on writing about 'doing things differently' in the opening statement of the Faculty Quality report of 2018/19 just how different things would be.

2019/2020 was a year like no other. It was a year of change, in which the world was turned on its head while staff and students under the banner of the newly named Faculty of Science, Technology, Engineering and Mathematics walked bravely forward.

In March 2020 as the pandemic stretched its hand across the globe and firmly into Ireland, we had to take action, moving all aspects of our educational and research programmes on-line. In the subsequent 12 months, as Health Service Executive (HSE) guidelines flexed and evolved, it was the ingenuity and commitment of staff that saw this Faculty rise to the many challenges. In keeping with our mission, as individuals and as a community, we did what we do best, innovate and problem-solve.

Staff and students throughout this Faculty, have worked tirelessly to maintain the continuity of learning. We have learnt together, to measure and live with uncertainty, to calculate and mitigate risk, to respond and adapt to external requirements, and to share and create knowledge in different ways. In so doing, in this new COVID-19 inflicted environment, we have gained a deeper understanding of ourselves and our need of each other.

The ongoing delivery of excellence in teaching and research during this challenging year would not have been possible without the inspiring contributions of so many of our staff (academic, technical, and administrative) and students. My sincere thanks to each and every one. It was your determination, resilience, compassion, and hard work that made the difference.

2020: a year of doing things differently

In 2020 the Faculty of Engineering, Mathematics and Science (FEMS) changed its name. Its new name, the Faculty of Faculty of Science, Technology, Engineering and Mathematics (STEM) resonates more clearly with our diverse stakeholders and enables us to showcase more explicitly just how these disciplines contribute to the technologies, devices and materials that make a difference to our lives, and the health of the planet.

The name change brought with it a good deal of preparation and self-reflection. This included the changing of email addresses and the re-doing of websites and materials. It prompted us to think anew, to look forward and to consider what we do and how we project ourselves, internally and externally.

This is best illustrated by our first Faculty Forum on 1st March 2021. This online event served as a platform from which to launch our name change and to celebrate STEM. Keynote talks delivered by recently appointed Professors in Geography, Physics and Mechanical Engineering, introduced us to three new faculty faces and their areas of research. The student voice was ably represented by the editor of the undergraduate-led science ISBN journal, the Trinity Student Scientific Review (TSSR) (volume VI), and by presentations, given by the PhD students (in Chemistry and the Trinity College Institute of Neuroscience (TCIN) who were drivers for the College-wide Green lab initiative. Finally, a recorded video of the two winners of our E3 Global Challenges Award (funded annually by the Faculty as part of the BT Young Scientist and Technology Exhibition (BTYSE) gave us a window into the future.

As an action from last year's Quality report we set out to use online and social media platforms

to promote the many achievements of Faculty staff and students. We created content and/or hosted a series of events with audiences varying in size from 80 to 280 people (e.g. Trinity BT Young Scientists Exhibition stand and educational videos, International Day of Women and Girls in Science, the STEM Provost-election husting, International Women's Day, a Green lab event, a STEM image competition). We dramatically increased our participation in other outward facing activities e.g. E3 forum and the Trinity Development and Alumni Inspiring Ideas' Salons and webinars. The resulting YouTube videos can be found on the TRINITY YouTube channel. One simple measure of success is that the number of users of our Twitter account https://twitter.com/TRINITYFacultySTEM has tripled.

We also used our online activities to promote the innovative COVID-19 research that is being led by STEM researchers. This work varies from an understanding of the biological mechanisms of the disease through to investigating, airflows, anti-viral coatings, modelling community infections, or the biomimetic replication of lung tissue. Each project illustrates how STEM is fulfilling its mission **'to tackle the global challenges facing society and help us all to live better, more fulfilling lives on a healthy planet.'**

Throughout the pandemic, STEM-based researchers have actively engaged in communicating evidence-based information to the public, and to decision-makers with responsibility for generating governmental policy. The expertise of some of our leading researchers e.g. Profs Kingston Mills, Luke O'Neill, Ed Lavelle among others served to inform all aspects of the national debate on COVID-19, while our schools and research institutes (Chemistry, Biochemistry and Immunology, Genetics and Microbiology, TCIN, CRANN and many others) made donations of Personal Protective Equipment and materials to frontline staff in St James' Hospital.

2020: a year of organizational and formative change

On a local level, staff within the STEM Faculty were at the fore in formulating extensive and detailed COVID-19 policy documents to underpin the safe operation of teaching and research in Schools, Institutes and Research Centres. They drafted effective COVID-19 practices in complex, multi-purpose, laboratory, and shared spaces. As the pandemic followed its uncharted course, COVID-19 facilitators and safety officers worked through their Schools and the Faculty of STEM safety committee to update staff and students' safety handbooks. Heads of School and the Faculty Dean met biweekly, shared experiences, best practice, problems, and solutions. School safety plans and handbooks were published and placed on blackboard.

Over the course of 2020, the Faculty Office re-organised aspects of its operations so as to address increased workloads and promote new on-line efficiencies. Changes took account of the need for GDPR compliance, making extensive use of share drives, encryption, calendar inventories and data storage reviews. Submissions to the Faculty Ethics Committee were moved on-line and streamlined for progression in a timely manner. Faculty Executive Committee agendas, minutes and actions were actively reviewed, and consultative processes involved inviting and accepting submissions, faculty level compilation, physical discussion and review. Topics addressed included Student-led Faculty student surveys, Faculty Research metric data, Erasmus+, Faculty Risk Register, Faculty staffing and recruitment.

The Trinity Education Project now entering its 4th year required the reconstruction of the STEM entry courses into 4 streams, (TR060, TR061, TR062 and TR063) and the reconfiguration of module offerings (core, elective and optional) within the a newly quantized ECTS framework. The transition to and implementation of the new course structure was effectively coordinated through a new management structure headed by the Associate Dean of Undergraduate Science

Education (ADUSE) established in 2018. The ADUSE working in conjunction with the newly appointed programme directors, is administratively supported by staff in the Science Course Office and was appointed to the Faculty Executive Committee in 2019 to ensure a feedback loop into the Heads of School (HoS) and Faculty Dean. This change was critical during COVID-19 as the ADUSE became a member of the Continuity of Learning and Student Activities Working Group (COLSAG). It allowed the Dean, HoS and ADUSE to amend and communicate teaching plans (e.g. accommodation for and provision of face-to-face learning in Schools). One measure of success is the decision to replicate this structure within the Faculty of Arts, Humanities and Social Sciences.

2020: a year of educational innovation

In 2019/20 STEM schools provided 511 undergraduate (UG) modules of which 92% (469) underwent student evaluation, and 40 postgraduate (PG) taught programmes, of which 95% (38) were subject to student evaluation. The return of external UG examiner reports across the Faculty was 100% with some minor delays resulting in 74% of the PGT external examiners' reports being received at the time of writing.

The evolution of the Trinity Education Project (TEP) spawned a number of assessment changes and a considerable degree of curriculum redesign. It also triggered pedagogically supported innovations across the STEM schools e.g. the use of the 'flipped classroom' implemented in the SF Biological Sciences module 'From Molecules to Cells' in TR060/TR061 (65% of students preferred this over a traditional format). Within the new 'pillared architecture' new joint honours undergraduate degree offerings have become possible e.g. Computer Science and Geography (first intake in September 2021, 57 applications through CAO at time of writing). The implementation of TEP also brought challenges both in terms of timetabling (Mathematics, where it remains unclear whether mathematics can continue in joint honours programmes without conflicting with the single honours degree) and significant changes in student-related income (Chemistry). STEM is very well represented in the 39 Trinity electives (5 ECTS courses) e.g. recent inclusions are the Chemistry of the Periodic Table, Becoming Human – the Science of Us, Decoding Genetics: The building blocks of Life, Emergence of Technologies, Energy in the 21st century, From Planets to the Cosmos.

The Faculty Dean as sponsor of the E3 Initiative has had a formative role with the HoSs and the Directors of PG and UG teaching and learning in the schools of Engineering, Computer Science and Statistics, and Natural Science, in driving institutional change in research and teaching. In 2019 and 2020, STEM schools have been at the forefront of developing innovative new courses. Supported by E3 and by the Human Capital Initiative (HCI), they are in the process of adding new strand offerings and developing ten new programmes. These are at both undergraduate level (e.g. a new B.Sc./MAI programmes in Environmental Science and Engineering, first intake Sept. 2021, 2020 CAO applications: course places 13:1) and postgraduate level. The latter vary from blended or on-line postgraduate certificates and diplomas (e.g. in Zero-carbon Technologies, Data Science and Statistics or Immunotherapeutics) to M.Sc. courses (in Quantum Science or Smart and Sustainable

Cities) with planned first intakes of students in September 2021.

There is increasing evidence of industry informed curricula emerging. Many schools have industry partners associated with their courses e.g. via industrial placements (Engineering), or in programme design e.g. in Music & Media Technologies (MMT) which partnered with PreSonus Audio Electronics on adapting to an online lecturing format this year. Such creativity represents a response from STEM to the growing demand for courses that recognize that future economic health and the health of the planet are intimately connected and interdependent.

Photo: Investigating the impact of rising CO_2 levels

Underpinning these courses are multi-disciplinary challenge and solution-based curricula which require a new level of cooperation and collaboration between disciplines, schools, faculties and end-users. They also address student demand for higher order critical thinking and learning strategies within their courses (see table 1).

STEM (overall)	2020	2019	2018	2017
Higher-order thinking	36	36	37	37
Reflective and Integrative Learning	29	28	29	28
Quantitative Reasoning	28	27	28	27
Learning Strategies	31	32	29	28
Collaborative Learning	33	32	30	30
Student-Faculty Interaction	10	11	10	11
Effective Teaching Practices	31	31	29	30
Quality of Interactions	36	36	35	37
Supportive Environment	27	28	26	29

Table 1: STEM data extracted from ISSE report 2019/20 page 22.

E3 'Engineering, Environmental and Emerging Technologies' is a project at scale, financially support by the Higher Education Authority (HEA), philanthropic donations and a 30-year business plan. It will see a new teaching building on campus (the Martin Naughton E3 Learning Foundry, 7000 m^2) open its doors in 2023/4 and a growth in staff, and students (1500 additional student FTE (or 40% growth) across STEM). In the main this planned growth appears not to have adversely affected student: staff ratios (which range from 13:1 (Physics) to 22:1 (Maths) in 2019) but this is being carefully monitored. The E3 initiative has also served to catalyse recent and upcoming surveys of staff which aim to understand (i) the motivations and barriers to staff in supervising Ph.D. students (PhD by research student numbers have remained static across the STEM faculty and declined in some schools) and (ii) the adoption of effective new UG and PGT teaching modalities (e.g. discussion fora, pre-course skills evaluations, peer-led learning, take home laboratory experiments).

75% of STEM schools report an active staff/student liaison committee (exceptions are Maths and Natural Science, where students have representation on course committees e.g. Theoretical Physics course committee). In 2020, with the consideration on new courses and the move to on-line processes of examination and assessment (e.g. real-time, virtual, take-home and open book examinations), it has been vitally important to ensure that the student voice is constantly within hearing. Schools have been more vigilant than ever in communicating changes in the delivery of existing courses (notifications to students were shared across schools and courses, via email and Blackboard).

On the Faculty Executive Committee, the re-elected Students' Union, STEM convener (Daniel O'Reilly) and a newly appointed SUPG student representative (Nilki Aluthge Dona) were key figures in our consideration of the quality and effectiveness of our on-line teaching modalities. Quality dialogue was supported through the STEM SU student surveys (November 2020 and whole College survey February 2021) which provided a further mechanism for in-term feedback, and direct access to students' views.

Schools report increased student participation in tutorials using Blackboard collaborate and staff and students adapted quickly to using Microsoft teams, Zoom, Blackboard and Panopto for lectures. Turnitin, - as an indicator and deterrent for Plagiarism, Blackboard ally, – a tool that helps content authors to ensure that the uploaded lecture materials meet accessibility standards, and Panopto – a cloud-based software that provides live streaming, lecture capture (recording) and post-processing facilities were extensively used. There were mixed experiences on the use of Panopto for captioning and live recording.

The majority of STEM schools report that remote attendance and participation at the Court of Examiners by external examiners worked well (75% were able to access Blackboard to obtain exam material) and there is clear evidence of Schools responding to external examiners' recommendations at each point of interaction.

STEM Schools have a long history of success in the Provost's Teaching Awards. The 2019 recipients for a Lifetime Achievement Award was Professor Celia Holland, School of Natural Sciences with Professor Conor McGinn, School of Engineering, receiving an Early Career Award. Such innovative and committed teachers were needed in 2020 as delivering laboratory and face-to face teaching was a particular challenge. Plans were revised interactively for the period. Notable are the inventive ways in which Schools met some of the experimental skills needs of their students under a lockdown 5 scenario which precluded close human interactions and public travel. Just some of the myriad of 'take-home' experiments are the virtual microscope practicals (e.g. JS Petrology in Natural Science) and online resources for laboratory teaching (e.g. in BYU11101 involving 550 students). All schools prioritized face-to-face activities for final year capstone projects and JS students. Engineering (mechanical and construction) and Natural Science (fieldwork) faced particular difficulties due to the nature of the practical elements of these disciplines and the physical layout of their undergraduate teaching laboratories. The latter are housed in older buildings with insufficient space to facilitate the circulation and access of frequent, small groups of students.

Despite the best efforts of academic and technical support staff, STEM students have reported slightly higher levels of stress in relation to their studies (TRINITYSU surveys, National Student Surveys 2018/19 (PGR, PGT and UG)) than their peers in other faculties. This remains a focus of concern.

In 2020, STEM UG and PGT students (May/June 2020 TRINITY survey report on emergency response to COVID-19 and preparations for teaching, learning and assessment) indicate feeling less prepared and concerned about the reduction in hands-on experimental skills

training. They are seeking a more supportive environment. The PGR national student survey for TRINITY noted that 30% mostly or definitely disagreed that there was someone they could talk to about day-to-day problems.

Schools have been very active in communicating their plans to address any shortfall in core practical skills with their student cohorts and to respond to issues raised through student surveys, modules, courses and programme feedback loops. Several students report using chat rooms, and Q&A functions to 'facilitate informal corridors of learning and peer-to-peer support'.

2020: a year of increased gender representation

This year has seen a lot of activity in the Faculty that aims to increase awareness of the visibility of women and under-represented groups within STEM. The Dean authored an Irish independent article in Dec 2020 and the Faculty office hosted an online event to mark the International Day of Women and Girls in Science on 11th February 2021. Both staff and students from across the Faculty participated in the panel and we had over 100 attendees. This success was followed by a cross-faculty on-line event to celebrate International Women's Day. It received incredibly positive and enthusiastic feedback and responses.

8 out of 8 Schools in STEM have reported active Gender, Diversity and Inclusion, Self-Assessment Teams (SAT) this year, compared to 7 in the previous year and 4 in 2018. School SATs promote best practice e.g. via the acquisition of gendered disaggregated data and their analysis across the Faculty. Student participation has increased in relation to PG and PDR representation on key committees and it is clear that Athena SWAN-has prompted activities that are resulting in a deeper and more nuanced understanding at School level of student and staff induction, training, progression and retention. All newly appointed staff are matched with mentors from a cognate discipline and all unsuccessful staff applicants for progression, retention or promotion (at associate professor and professor level) are given one-on-one feedback by the Faculty Dean. The latter is important to staff development and success.

Despite the termination of the specific performance contract of the Faculty's Athena SWAN Officer in 2020, the Faculty and its 8 constituent schools have actively pursued their Athena SWAN goals. Four STEM schools held a bronze award in 2020: Chemistry (renewed in 2019), Genetics and Microbiology (awarded in 2020), Natural Sciences (renewed in 2018) and Physics (awarded in 2020).

In addition, applications made by the Schools Computer Science and Statistics and Engineering in November 2020 are known to have been 100% successful (announcement March 2021). As a result, 75% (6/8) STEM schools now hold Athena SWAN bronze awards. Of the two remaining schools, the School of Biochemistry and Immunology is planning to resubmit its application (June 2021) and the School of Mathematics is preparing its first. The latter is boosted by the professorial appointment of its new female SALI Chair (the successful outcome of a School/Institutional application in 2020 to the HEA Strategic Academic Leadership Initiative).

2020: a year of research challenges and outputs

It is apparent that the schools, three research institutes (Trinity Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), Trinity College Institute of Neuroscience (TCIN) and Trinity Biomedical Science Institute (TBSI) and three TRINITY hosted SFI funded research centres (AMBER, ADAPT and CONNECT) in STEM have continued to produce high-quality, impactful research outputs in 2020. Evidential data can be gleaned from the many competitive research awards and international marks of distinction bestowed upon STEM based researchers (e.g. Professors Luke O'Neill (Biochemistry and Immunology): the Feinstein Institutes' Marsh Lecture; Mathias Senge (Chemistry): the Hans Fished Senior Fellowship, Conor McGinn (Engineering): selected in the MIT Innovators under 35 Europe List).

There are many research successes that could be called out including the winning of awards funded by Science Foundation Ireland, Health Research Board, Enterprise Ireland, Environmental Protection Agency and the Irish Research Council, however perhaps most deserving are the eight researchers who together secured €19 million in ERC funding in 2020 (Consolidator Awards (4), Advanced Grant two Starting Grants (one) and two were among a team that secured a Synergy Grant (the first for an Irish Institution)) who joined others including Conor Buckley (Engineering), Redmond O'Connell (Psychology and TCIN) and Matthew Campbell (Genetics and Microbiology) who won ERC Consolidator Grants in 2019.

Although there were no dramatic changes in the QS world-rankings in 2020 and 2021, there was some slippage within the broader subject areas (see Table 2) where Universities are scored according to academic reputation, employer reputation and research impact (h=index, citations). In discipline specific domains STEM schools continued to perform well in 2020. Trinity is ranked in the QS top 100 in the world in each of the following subjects: Computer Science & Information Systems, Biological Sciences, Chemistry, Materials Science.

	2021	2020
Arts & Humanities	59	53
Engineering & Technology	142	111
Life Sciences & Medicine	113	110
Natural Sciences	207	191
Social Sciences & Management	115	110

Table 2: Comparison of Trinity's QS rankings in 5 broad subject areas

Several schools report concerns around their growing space requirements, the availability of technical and research supports and the impact of COVID-19 delays on their PhD cohorts. Many PhD students have continued to access on-site laboratories and facilities during the pandemic (e.g. large-scale and shared research facilitates such as the animal research services provided by the Comparative Medicine Unit) however this represents a huge drain on staff resources and has been at a considerable cost.

Restrictions in room occupancies, face-to-face training, pod-working and on-site working have reduced the amount of in-lab time for postgraduate students. They have meant considerable revisions to planned research projects, timelines, outputs, conference and workshop attendance, collaborative visits and the curtailing of access to other national or international facilities. There is no indication from on-going external PhD examiner reports and virtual viva processes that there has been

any diminution in the quality of the PhD thesis produced in 2019/20. This report however does highlight the significant drawdown of HEA COVID-19 research funding to enable costed extensions (6 months) for PhD (and postdoctoral researchers) across many STEM schools.

The PGR national student survey report 2018/19 indicates that STEM students in TRINITY were positive about the research training they had received (73% had presented a paper at a conference, 53% had submitted a journal article, 83% understood research integrity and 90% felt they had been supported in their supervisory/demonstrating roles). The report however would suggest that a key motivation for students to undertake a PhD by research is the desire to improve their career prospects in non-academia environments or in industry (43% of respondents placed this within their top three motivators). The on-going work in the faculty to provide opportunities for PGR to work collaboratively with industry (2018/19 at 22%) and to gain training in entrepreneurship and innovation (2018/19 at 23%) are therefore important actions.

2020: a year of new partnerships and beginnings

This Faculty Quality report details several new partnerships with international institutions and organisations. These are wide-ranging in terms of geography and purpose. Engagement with external partners is supported by the Schools' Directors of International Students, the Global Office and the E3 marketing team. Schools are working hard to provide UG students with opportunities to spend one year abroad (e.g. Biochemistry and Immunology – JS year) to avail of summer internships (Microbiology) and to carry out SS final year capstone research in industry or academia (6 – 12 weeks, Physics, Chemistry)).

It is evident that the Schools are looking outward and creating positive and valuable connections across the globe. Several 2+2 matriculation agreements have been entered into successfully e.g. with Columbia University (see Table 3) with a new 2021 proposal to add Mathematical Sciences at undergraduate level.

Non-EU Undergraduate registrations on Columbia Dual Degree Programmes in STEM			
	2020/21	2019/20	2018/19
TR060 Biological and Biomedical Sciences	32	21	16
TR062 Geography and Geoscience	2	1	1
Total	**34**	**22**	**17**

Table 3: Non-EU registrations in STEM Columbia dual degree programmes.

In addition, partnerships have provided a source of well-qualified students in M.Sc. programmes (e.g. with Soochow and USTB in the MSc in Energy Science).

The Irish Survey of Student Engagement report (ISSE 2019/20) quantifies the growth in non-EU students in STEM (UG and PGT) from 32% in 2015/16 to 38% in 2019/20. Of the 192 non-Irish domicile students in 2019/20, students from India (75), China (29) and US (29) were the largest cohorts. This suggests a dependency on student mobility from these countries. In 2019/20 international and non-EU student applications remained strong, but challenges were experienced particularly in PG taught courses, where deferrals were up several fold. Securing conversion of non-EU student offers into registrations (e.g. Thapar student numbers in Engineering and Computer Science and Statistics) during the pandemic were also problematic. The three Faculty Deans engaged in a CNBC India webinar (19th November 2020) to help address the concerns of incoming students and their parents.

New opportunities for summer schools with US partners are being explored by E3 schools and Chemistry. The International Student Barometer gathers data in a 2-year cycle and during 2019/20 schools have relied on their own and national student surveys to inform their supports and actions for this cohort (e.g. the provision of improved induction information around work visas for engineering students).

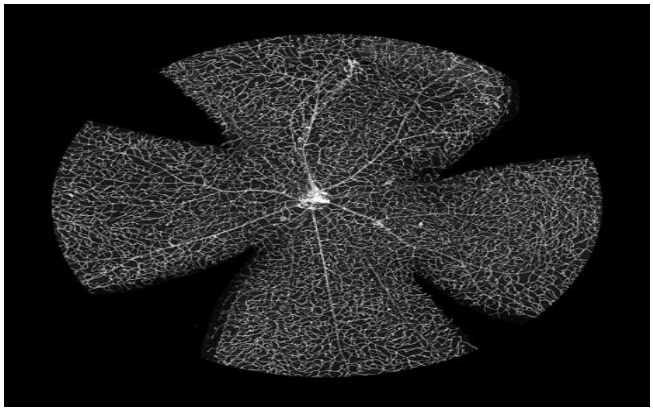


Photo: The beauty within: a microscope view of a retina

Looking forward to 2021

The many notable achievements of staff and students in STEM schools in 2020 are a testament to their abiding determination, commitment, ability and self-belief. They believe that that the actions they take shape not only the next generation of STEM graduates but the future.

2021 will be the same and yet different. There will be new decisions to be made about the allocation, use and prioritization of space. Such decisions will reflect which elements of which courses will remain on-line and which research activities expand and which contract. The significant investment of STEM schools in the E3 project and the HCI-initiative will affect staff and student numbers and course offerings. The latter are likely to become streamed, with stacked micro-credentials that can combine to provide the learner with a personalized qualification. Particularly challenging will be the financial sustainability of STEM schools that are heavily involved in delivering scientific and technological advances. At current levels, research overheads barely cover the research infrastructure costs required to make such advances.

Staff and students have given of themselves in 2020, they have absorbed uncertainty and shouldered responsibility for implementing dramatic changes in their personal and professional lives. 2021 will be a year to take stock, to decompress and to reflect, before moving bravely forward in some new directions.

Professor Sylvia Draper
Dean of the Faculty of Science, Technology, Engineering and Mathematics (STEM)

Acknowledgment: This quality report was written by Prof Sylvia Draper (Faculty Dean) and Dr Katie O'Connor (Faculty Administrator) in collaboration with Heads of School, Directors of Postgraduate and undergraduate Teaching and Learning, School administrative managers and input from the student representatives who sit on the Faculty executive committee.

SECTION 1: Undergraduate teaching

All Head of Schools (pictured), Directors, School and Faculty Administrative staff contributed greatly to the content in this report.

Prof Patrick Wyse Jackson
Head of School of Natural science

Prof Sinead Ryan
Head of School of Mathematics

Prof Daniel Bradley
Head of Genetics&Microbiology

Prof Michael Lyons
Head of School of Chemistry

Prof Henry Rice
Head of School of Engineering

Prof Jonathan Coleman
Head of School of Physics

Prof Derek Nolan
Head of School of Biochemistry & Immunology

Prof Carol O' Sullivan
Acting Interim Head of School of Computer Science & Statistics

SECTION 1 UNDERGRADUATE TEACHING

Steps taken by Schools to ensure quality of programme provision during COVID-19 (AY 1920)

1.1 Collective Summary

Many Directors of Teaching & Learning and Heads of Schools commented on the significant increase in workloads arising from the number and accumulation of multiple assessments. Uncertainty from one month to the next about restriction levels and COVID-19 case numbers greatly impacted how teaching and assessments were conducted. This uncertainty increased the stress on students to perform continuously and on staff, to cater for exceptional circumstances.

There were concerns about the timetabling of modules online and face to face teaching. Health and safety was at the forefront of planning. The Dean of STEM worked with Schools to help communicate and address their concerns directly with the Senior Lecturer and Vice-Provost. The ADUSE as a permanent member of the Faculty Executive Committee also worked to organize constructive dialogue around the pillaring options within the structured timetable.

In the following section, the Heads of Schools and Directors of Teaching & Learning Undergraduate outline changes to Undergraduate education as a result of COVID-19. They describe the steps the Schools took to ensure the quality of programme provision during COVID-19.

School of Biochemistry and Immunology

We are responsible for the Sophister years of 4 degree programmes (Biochemistry, Immunology, Molecular Medicine and Neuroscience). Most of the academic content of the year had been given prior to lockdown in March 2020. The additional lectures etc. were moved online.
We spent a lot of time figuring out and then implementing the best way to deal with exams. We kept things are similar as we could to actual annual exams in terms of material covered, dates etc. However, this was all delivered through Blackboard which we would not have been able to do with the extraordinary efforts of key staff members including Ms. Bernie Butler. As exams were now open book, we replaced our 'quickies' section with an essay question. We allowed double the time in line with college guidance, although our experience (and that of college) is that this was too long, and the timeframe should be more similar to actual exam length (plus a bit extra for technical issues). The questions were all anonymized and the staff accessed scripts through Blackboard. The final year students all had their answers put through the Turnitin software package which worked well. We focused on giving credit for evidence of understanding and demonstrating a critical understanding of the work, rather than providing 'hard facts. We moderated scripts rather than double marking everything.

We kept the students informed and were in contact with our various external examiners in the run up to exams. We held remote vivas by zoom and held the court of examiners also by zoom. Only a few of our students opted to repeat exams to improve a grade – most individuals at the supplemental period were first attempts. Overall, students were happy and although it was a huge burden to set up and implement, everything went relatively smoothly. The admin staff in the office were superb and a combined effort of academics, admin and support staff deserve a lot of credit.

School of Chemistry

- All lectures were moved to online format, lectures were prerecorded using Panopto
- Staff were requested to upload lectures in line with the teaching timetable so that students would not be overwhelmed with lecture content.
- Additional tutorials were scheduled (increase of ca. 50% in the number of scheduled tutorials compared to a normal year), to assist students with online material and exam preparation.
- Tutorials were run in real time using Blackboard collaborate (overall attendance at tutorials was high, student engagement was strong, and feedback was very positive).
- Teaching labs were retained in f2f format as much as possible, in particular for JS where there is a significant practical training element, 100% of teaching labs were retained. This was achieved by running all our JS teaching labs twice which resulted in a significant increase in teaching hours for staff. Freshman labs were cut by 30-50% and some Freshman labs were delivered online, but all cohorts received f2f lab time (this was highlighted as a major positive in student feedback).

School of Computer Science and Statistics (also referred to as SCSS)

Following the suspension of lectures on 11/03/2020, SCSS took the decision to move all teaching (including labs and tutorials) online as it was our view that continuing labs and tutorials represented an unnecessary risk. Following this decision, SCSS was able to commence online teaching in most modules within 48 hours and in all modules with a week. A "Yammer" group was established to allow staff to rapidly share experience and practice while adapting to online teaching, learning and assessment.

Special meetings of the SCSS Undergraduate Teaching and Learning Committee were held on 13/03/2020, 01/04/2020 and 17/04/2020 to consider the latest policy, procedures and regulations and implement these in the context of SCSS programmes and modules.

A small group consisting of the Head of School, Directors of Undergraduate and Postgraduate Teaching and Learning and the head of the SCSS Teaching Unit met on a few occasions to review and approve revised methods of assessment in each module. A summary of the revised methods of assessment for every module was circulated to students in advance of the examination period.

Adjustments were made to the assessment of Final Year Projects and Dissertations to compensate for planned in-person assessments (e.g. poster/pitch sessions). Planned in-person project demonstrations were replaced with video conference presentations.

School of Engineering

Developed a mix of online and face-to-face learning, with all essential teaching components online and recorded, or delivered face-to-face and recorded. The staff and students should be commended on flipping to online lectures and assessments relatively quickly. This happened as quickly as in a week's time in many cases. Modules already assessed 100% with Continuous Assessment did not see much difference in the integrity of the assessment. Small group (< 10) live assessment online worked well because the module coordinator was able to be in constant touch with the students and observe them while they took the examination.

School of Genetics and Microbiology

In AY 2019/20 in response to COVID-19 all assessments were moved online though Blackboard. Consequently, exams in the SS year changed their format to open book exams and JS year modules were evaluated through essays. Exam questions had been agreed before March 14th Lockdown in order to adapt them to the new format they were revised and changed if required to adapt to open book assessments. Nevertheless, it is possible that grades have shifted upwards due to the new assessment methods.

School of Mathematics

We provided guidance and training for remote teaching and liaised with the student representatives but did not separately evaluate the online teaching in the last few weeks of Semester 2.

School of Natural Sciences

Alternative, including hybrid, modes of teaching were discussed at programme and discipline level prior to lockdown. Module coordinators took the lead in devising alternatives to the classical 'sage on stage' mode. Learning aims and outcomes were maintained, with alternative assessment provided to ensure the quality of teaching and learning was ensured even in remotely taught modules. Difficulties, daily issues arising, and opportunities are now discussed regularly in reformed teaching and learning Committee with a view of ensuing uniformity of procedures across the School, while respecting discipline identity.

School of Physics

The School adapted its teaching methods and, for example, exam preparation procedures with dynamism and extreme dedication by the staff involved. MS Teams proved indispensable in the early stages of this process. We were conscious throughout of the need to achieve learning outcomes, avoid any disadvantages for students, while maintaining our accredited and externally reviewed standards. The School undertook a very detailed analysis of examination and module component performance across years and cohorts, in an attempt to identify the result of any adverse effects on teaching or any significant systematic discrepancy in grades. The External Examiner's report reassures us that we have done all that we could have in 2019/20 to maintain teaching excellence in the face of severe Covid-19 restrictions.

1.1.1 Conduct of Courts of Examiners

School's experience of the virtual Courts of Examiners

This year marked a move away from normal well established practises as we moved much of our activities online thus it was vital to monitor and record the manner in which Examiners participate in the examination process during these unprecedent times.

Overall, the Schools are consistent regarding the conduct of the court of examiners. Examiners tend to engage with blackboard while attending the Court of examiners (CoE) remotely. Additional IT support would be welcomed in order to allow all examiners avail of the systems provided. For the most part, these IT issues are not considered challenges as they are dealt with locally and the required information is provided.

Table 4 depicts the current operations in each School in respect to the conduct of court examiners.

STEM Schools: conduct of court examiners	Did the External Examiner(s) have/request access to Blackboard. If yes, how did this work? What was the School's experience of the virtual Courts of Examiners?
Biochemistry and Immunology	Yes, the External Examiner(s) accessed blackboard. It didn't work well. We tried to get this but could not do it in a timely manner. We should have been informed earlier that it was not going to work. In the end, we had to manually download and send scripts to externs.
Chemistry	No, the External Examiner(s) did not access blackboard. The virtual court of Examiner's worked out well and overall the external examiners reports were very positive. The examiners had access to most of the material requested but SS projects for example were not available. We plan to fully address this in 2020/2021 (see key actions below). The vast majority of the externs' comments relate to changes that could be made to enhance and improve the online exam process and the online external examiners' process. It is the opinion of the School that all of the suggested improvements can be introduced in time for 2020/21. There are a small number of outstanding concerns in relation to the marking of written assignments and to calculation of project marks that can be addressed in full through writing of a detailed protocol that can be shared with both staff and externs. **Key Actions** • Move away from MCQ-style questions for Sophister exams (return to problem-based assessments). • Ensure that all exam material is available to externs in electronic format. • Put in place suitable procedures for facilitating online vivas. • Prepare more detailed rubrics for written assignments.
Computer science and statistics	Yes, the External Examiner(s) accessed blackboard. The process of obtaining access for External Examiners to Blackboard modules could be improved at College level to ensure timely access. The overwhelming view was that online/virtual Courts of Examiners worked very well, with staff able to access the information required and engage in an equivalent manner to in-person Courts of Examiners. This view is reflected in the reports of our External Examiners.

Genetics & Microbiology	Yes, the External Examiner(s) accessed blackboard.
Mathematics	Yes, the External Examiner(s) accessed blackboard. This worked partially. There was an issue with Blackboard erasing comments on some marked scripts. There was no time to re-enter those comments. There were some issues with Teams on the day. They didn't prevent us from doing everything which needed to be done, but there were delays and the external examiner never managed to get video to work. He had the spreadsheets though, and so was able to follow along even without video.
Natural sciences	Yes, the External Examiner(s) accessed blackboard. Generally, very good. General perception is that efficiency and productivity is increased. Very well, particularly because of the extended timeframe under which the external examiners could access all teaching and learning materials, facilitating a more extensive assessment of extant teaching provision, including both reference (i.e., lectures, recordings, programmes, feedback structures, etc.) and assessment materials.
Physics	No, they did not have access to blackboard. Exam papers, scripts and Examiner comments were shared using OneDrive / SharePoint. These went smoothly, with no discernible reduction in communication with respect to normal physical CoEs. Courts of Examiners were held over MS Teams using devoted Channels and screen-sharing. The facility for the Chair to take the meeting through each spreadsheet with no ambiguity as to the current position was arguably a bonus. External Examiners (a different person for each of Physics and Physics & Astrophysics, Theoretical Physics, and Nanoscience) participated without apparent difficulty, and some indicated that they were satisfied with the format. One Examiner indicated that they felt that it was excessive to go through each student individually, preferring to discuss marks only where discussion was necessary, but we maintain that all students do require and deserve explicit mention in our CoEs.
Engineering	Yes, the External Examiner(s) accessed blackboard. This was a success. This was introduced in 2018/19. External examiners requested and were given access to blackboard.

1.1.2 CAO entry points

Comments on CAO Entry Point trends and any new programmes introduced in 2019/20

School of Biochemistry and Immunology: n/a

School of Chemistry The School of Chemistry is pleased that the CAO points for TR061 appear to be on an upward trend, despite an increase in the number of places available (CAO points for TR061 were 510 after round 2).

School of Computer Science and Statistics No new entry routes were introduced in 2019/2020. Points for entry in 2019 increased for all SCSS programmes.

School of Engineering: Points for engineering slowly rising. No programmes introduced in 2019/20.

School of Genetics and Microbiology : Biological and Biomedical Sciences 2020 CAO points: 543

School of Mathematics: n/a

School of Natural Sciences

Demand for TR062 has increased slightly, but it is difficult to accurately describe a trend given the paucity of data to date. CAO entry points for TR062 increased to 473 in AY 19/20 from 435 in AY18/19

School of Physics TR063 Physical Sciences saw its second intake in 2019/20. The School was happy with no. of 1st preferences in CAO (2018: 100 and 2019: 99) and accepted students over quota while keeping points at an acceptable level (~500). For TR035 Theoretical Physics the demand in 2019 remained high with a 1st preference: quota ratio of >2 and points ~540.

1.2 Technology Enhanced Learning Initiatives

In 2020, technology-enhanced learning (TEL) became vital in delivering teaching and learning. This section outlines the TELs applied such as blackboard, zoom, Microsoft teams (MS Teams), including the software like Turnitin which aided in accommodating online assignment submissions. Schools also reflect on the utilisation of open modules embedded in the programmes and courses. In this section each school reflected on their practises around

(i) TEP mainstreaming

(ii) experience with the Blackboard suite

(iii) experiences using MS Teams/Zoom

(iv) utilisation of Turnitin in Blackboard

School of Biochemistry and Immunology

TEP mainstreaming in the School of Biochemistry and Immunology in 2019/20

Open modules were designed and set up. The Trinity Elective on Vaccines: Friend or Foe ran successfully.

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.?

Very steep learning curve. Some staff engaged better. We still have staff asking other staff/admin to set up virtual lectures. Out of the tools above, most people learned Panopto early on due to recording of lectures but required support for uploading them.
Relatively few engaged with Blackboard collaborate with very mixed reports. I think it might work well for a traditional 'live' lecture but not so well for discussions/feedback/tutorials. Recording is easy though. I don't know 3 of the other 4 packages and I'm relatively up to date compared with most of my peers in this area. I haven't asked but I suspect that only a few people know anything about Blackboard assignments (those with either flipped classrooms or electives that promote different forms of assessment).

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

People didn't really like Teams. Internally, it was used more for staff meetings. It is another piece of software to learn how to use and as staff already had to learn panopto/minimal blackboard, I don't think the will was there. Zoom was and remains popular as most people encountered and learned it externally and could then apply it to work. It is also intuitive and simple to use.

Has the School adopted the use of Turnitin in Blackboard?

Yes, this is critical. We found evidence of plagiarism and are better equipped to deal with it this year.

School of Chemistry

TEP mainstreaming in your School in 2019/20

Overall, the roll out of TEP in 2019/2020 was very successful and well received by both staff and students.

- Students entering JS had already received some specialized teaching on their moderatorship subjects in SF and this was very beneficial for the transition to JS
- The vast majority of students were able to choose their preferred moderatorship, although there was a high demand for places in MedChem and not all of these students were offered a place (the School will investigate if more MedChem places can be made available in 2020/2021)
- There were some issues with students being unable to choose the Trinity Elective that they were interested in due to oversubscription. TEs may need to be reviewed for next year.

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.?

The School's experience with Blackboard Learn was overall very positive, staff fully engaged with the range of learning tools available and this resulted in a homogeneous learning environment for students. Unfortunately, it was not possible for staff to provide captions for pre-recorded lectures as it was taking 4-6 hours per lecture to do this and the automatically generated captions were of such poor quality that they could not be used. This remains an outstanding matter for the next semester.

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

A number of staff used Zoom for tutorials, it appeared to offer a robust platform and the chat function was widely used by students for asking questions. Blackboard collaborate appears to be the preferred platform for tutorials.

Has the School adopted the use of Turnitin in Blackboard?

Yes.

School of Computer Science and Statistics (also referred to as SCSS)

TEP mainstreaming in your School in 2019/20

Revised Senior Freshman curricula in SCSS undergraduate degree programmes were introduced in 2019/2020. Unfortunately, well-documented problems with the implementation of online module enrolment across College meant that many Senior Freshman SCSS students were not offered their intended choices, requiring SCSS to put alternative measures in place. This was outside the control of SCSS.

Approval was obtained for a new Minor award in Statistics to be offered as an optional award pathway for Senior Freshman Mathematics students.

The transition of Computer Science and Business to become a subject combination within Trinity Joint Honors was completed and will take effect for new entrants in September 2021. New Trinity Joint Honors subject combinations of Computer Science with Geography and Linguistics were introduced, also for new entrants in September 2021.

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.?

Overall the experience of the use of these tools in SCSS was satisfactory. This report only considers the use of these tools in 2019/2020 and the five weeks of teaching that remained after the suspension of on-campus teaching and learning did not provide sufficient time to explore the use of use of tools and the best methods for employing them. However, the experience was invaluable in preparing for the 2020/2021 academic year.

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

MS Teams and Zoom were not widely used for teaching in the 2019/2020 academic year.

Has the School adopted the use of Turnitin in Blackboard?

This question is quite vague. TurnItIn is used where appropriate and is not used where it is not appropriate. The implementation of TurnItIn Direct in Blackboard is quite inflexible. SafeAssign is used as an alternative in some modules. Other discipline-specific tools for detecting similarity are more appropriate in programming modules

School of Engineering

TEP mainstreaming in your School in 2019/20

No issues encountered. TEP introduced in Engineering in 2018/19.

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.?

Generally positive within the limitations of online teaching.
Blackboard Collaborate Ultra worked seems to have worked very well for many colleagues. Student engagement with live online lectures (streamed via Bb) worked well, and according to a HoD students were more engaged with online resources in Bb than before. Chatbox helped to encourage more interaction. Bb Ultra Collaborate was surprisingly robust for up to 230 students at once. Guest lecturing (live from outside Ireland) worked well. Panopto was also widely used and suited some people more. Students liked the access to recorded lectures. Panopto on Blackboard was flexible in allowing different kinds of playback which was appreciated by the students. Just using Powerpoint with voice-over worked well for our many external lecturers (relevant to our PG diplomas).

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

Generally positive within the limitations of online teaching.

Has the School adopted the use of Turnitin in Blackboard?

Yes.

School of Genetics and Microbiology

TEP mainstreaming in your School in 2019/20

n/a

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.?

All lecturers use Blackboard and different associated tools with Blackboard Assignments being the most widely used.

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

In 2019/2020 MS Teams, Zoom and Blackboard were primarily used for assessments and meetings as College closure happened when Lecturing was almost over.

Has the School adopted the use of Turnitin in Blackboard?

Yes.

School of Mathematics

TEP mainstreaming in your School in 2019/20

There continued to be issues with this. We raised a number of concerns via email, but often did not receive responses. There are a number of timetabling issues which won't become acute until next year, but which we raised last year. None of those were really resolved last year, though some progress has been made this year. There was also a misunderstanding regarding our Statistics minor option, which took several months to sort out.

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard

Other than the problem mentioned above, our main problem with Blackboard was incomplete exam submissions. It appeared to notify some students uploading via a phone that their file had uploaded successfully when it hadn't. For teaching Blackboard and Panopto generally worked well enough.

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

While some staff have started to use those for teaching this year, I'm not aware of any doing so last year.

Has the School adopted the use of Turnitin in Blackboard?

No. The nature of our assignments means that it would be useless to us.

School of Natural Sciences

TEP mainstreaming in your School in 2019/20

- Some teething issues with semester scheduling identified previously have been reduced as implementation of TEP beds in.
- Adaptation to lockdown rules was facilitated by enhancing flexibility on scheduling and moving toward a school-wide load model in terms of assessment demand.
- Some legacy issues remain in T&L management, in particular the concern of some disciplines in what is perceived as a risk of identity loss when single entry moderatorships phase out.
- The Joint Honours (ex-TSM) intersection with School Programmes (TR060, TR062) in this regard is potentially clunky.

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.?

Blackboard Collaborate Ultra seems to have difficulties handling large numbers of students in a single class, and video tools do not allow virtual face to face presence for large numbers. Several reports of freezing coms, drop in bandwidth, etc. ensued after the first few weeks.

Zoom was used more extensively as a result, with excellent feedback, particularly when Q&A sessions took place.

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

As above.

Has the School adopted the use of Turnitin in Blackboard?

Yes.

School of Physics

TEP mainstreaming in your School in 2019/20

Semesterised examinations continues to be unfavourable for our School staff and students. It is particularly inappropriate for JF cohorts in Science, who are just finding their feet at the end of Sem1. It contributes to the sense of permanent crisis that seemed to start with the first Semester 1 examination, only to be enhanced by Covid-19 restrictions, and which we fear is unsustainable in the long run. This was compounded in our School in 2019/20 by chronic understaffing on the administrative side, with respect to our normal FTE complement. Before Covid-19, in Sem1 2019/20, we were already under extreme pressure around examination paper preparation and implementation of Examiner's comments. Most importantly, in Sem1 we encountered anomalously low pass rates in some core-topic exams e.g. JS Quantum Mechanics, which we attribute to students now having insufficient time to process concepts.

The phasing-in of TEP at the teaching and module architecture level has been relatively smooth following a long period of negotiation with our partner Schools prior to implementation. There remains a continued ambiguity as to the division of powers and responsibilities between Schools and Courses, and this was exacerbated by the introduction of the new TEP-compliant entry streams in Science. It has led to a proliferation e.g. of UG Handbooks and Student Cases query email recipients, uncertainty for UG students about who to contact and who decides things, as well as other new inefficiencies.

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.?

The crisis has required significant labour and up-skill by staff (academic, administrative, technical) but these tools have also shown their power and flexibility. Our use to date has been limited to Blackboard proper, Blackboard Collaborate Ultra, and Panopto. Teams is also used for tutorials.

A serious technical problem known to Panopto but long unsolved causes its lecture capture to crash at random intervals on machines running OSX using the native camera. This adversely affected several of our staff, in terms of their valuable time but also morale.

Comment on the School's experience of teaching through the use of MS Teams/Zoom or any other similar platform you may have used.

In 2019/20 our experience was limited but MS Teams has proven very valuable as it integrates with the class mailing lists etc. and can be used for tablet share screen etc.

Has the School adopted the use of Turnitin in Blackboard?

Yes. Moving forward College may consider an integrated handwriting recognition solution within Turnitin, for plagiarism checking in areas where hand-written submission is commonplace, e.g. in exams

1.3 Comments from Director of Undergraduate Teaching and Learning

The Director of Undergraduate Teaching and Learning in the respective Schools provided their feedback on the year and considered the steps the School took to ensure the quality of programme provision during COVID-19.

School of Biochemistry and Immunology

It was a very tough year but those academic staff more engaged in teaching rallied tremendously and with excellent admin and support from colleagues internally, were able to graduate our normal cohort of excellent students.

We are responsible for the Sophister years of 4-degree programmes (Biochemistry, Immunology, Molecular Medicine and Neuroscience). Most of the academic content of the year had been given prior to lockdown in March 2020. The additional lectures etc. were moved online.

We spent a lot of time figuring out and then implementing the best way to deal with exams. We kept things are similar as we could to actual annual exams in terms of material covered, dates etc. However, this was all delivered through Blackboard which we would not have been able to do with the extraordinary efforts of key staff members including Ms. Bernie Butler. As exams were now open book, we replaced our 'quickies' section with an essay question. We allowed double the time in line with college guidance, although our experience (and that of college) is that this was too long and the timeframe should be more similar to actual exam length (plus a bit extra for technical issues). The questions were all anonymized and the staff accessed scripts through Blackboard. The final year students all had their answers put through the Turnitin software package which worked well. We focused on giving credit for evidence of understanding and demonstrating a critical understanding of the work, rather than providing 'hard facts. We moderated scripts rather than double marking everything.

We kept the students informed and were in contact with our various external examiners in the run up to exams. We held remote vivas by zoom and held the court of examiners also by zoom.
Only a few of our students opted to repeat exams to improve a grade – most individuals at the Supplemental period were first attempts.
Overall, students were happy and although it was a huge burden to set up and implement, everything went relatively smoothly. The admin staff in the office were superb and a combined effort of academics, admin and support staff deserve a lot of credit.

School of Chemistry

All elements of the programme were delivered during Covid-19. Taught elements of the PGR programme were conducted online during the latter part of 19/20. The traditional postgraduate 3rd year symposium was held at its usual time in May, with the entire programme online and involved presentations from students from Trinity, UCD and TUD. PG research was impacted due to restricted access to labs and the set-up of pods to ensure safe numbers and physical distancing. The appropriate PPE and sanitization products/protocols were made available to all PGR students. The deadlines for progression were extended to take account of the lost lab time.

School of Computer Science and Statistics

The final quarter of 2019/2020 was dominated by Covid-19 and our response to ensure continuity of teaching and learning at the beginning of the pandemic. In the context of this *Annual Faculty Quality Report*, the extraordinary lengths to which staff (academic and professional) went to maximise the quality of the learning experience for our students should be noted. Staff showed immense ingenuity, resilience and team-spirit in adapting modules and programmes for online teaching and assessment in very challenging circumstances. This ensured that most (if not all) learning outcomes could be achieved and assessed. The time and effort needed to achieve this at very short notice was considerable.

At the same time, the School continued to follow our normal quality procedures, surveying all Semester 2 modules as usual and conducting meetings with student representatives. Indeed, this was an essential component of our response to Covid-19 in 2019/2020 and our planning for 2020/2021.

SCSS continues to undergo a period of significant growth in student numbers, in line with the E3 Business Plan. With a high proportion of lab-based modules, the School relies heavily on PhD students engaging in teaching activities as Demonstrators and Teaching Assistants. A decline in PhD student numbers has resulted in less support for the delivery of some modules and the School has continued to seek innovative ways to accommodate this, most recently with the introduction of a new School policy aiming to involve more PhD students in the teaching activities of the School. The School would welcome Faculty and College support in this area.

Delayed re-accreditation of the Integrated Computer Science programme is likely to be scheduled for the second half of 2021.

School of Engineering

Generally positive experience with online teaching and examination, but we reacted in crisis mode to the pandemic outbreak and were really only able to deliver lectures online. More or less all tutorials and laboratory sessions were cancelled. Lectures online went okay, but our discussions with students indicated limited engagement, so the educational benefits are unclear.

There have also been reports of “collaborative efforts” by groups of students for some modules, especially in year 3. Some evidence of plagiarism was brought to the attention of the DUTL. We think that long examination windows and lack of invigilation did not help with this aspect.

School of Genetics and Microbiology

The School conducted all second semester assessments though Blackboard with Turnitin and court of examiners through teams. Not all assessments for the year had been submitted through Blackboard and were shared with external examiners through MS Teams. Overall the experience was positive.

School of Mathematics

In general, I think we coped well with a year which ended in a way no one could have anticipated. I think it's worth pointing out though that this was largely possible because Covid appeared late in the academic year and both teaching and admin staff were willing to work at a level which is not sustainable long term. There were a number of issues with the Covid mitigation measures, since SITS lacked the functionality for some of them and the functionality for some others had been removed. These were all sorted in the end, but took up admin staff time in schools, the TSM office and academic registry. See the TEP section above for most of the TEP-related issues. One additional problem was that our SF students had to choose their SF modules without knowing their JS options, even though the JS options depend on the SF ones.

School of Natural Sciences

Management of Teaching and Learning within the School is being reorganised and reformed, aiming at more streamlined communication structure, increased standardisation of procedural decision and execution, and improved communication with students. This reform is ongoing. Transition to remote or hybrid teaching format for a School in which most practical, hands-on skills are delivered in the field faced and still faces significant hurdles. Engagement with SL and VP opened some options to explore as alternative solutions, but in general even partial virtualisation of these teaching modes effectively tripled and, in some cases, quadrupled staff workload. Moving into second semester, the staff that take these responsibilities are already significantly overworked, so special attention is being brought upon these, with increased reliance on school-wide discussion support structures for decision making with regards to teaching and learning. Some aspects of the forced transition to hybrid teaching modes triggered more intensive reflection on personal procedures, methodologies and strategies of content delivery and assessment, with some positives from current developments identified.

School of Physics

An unusually low rate of UG module evaluation was performed in 2019/20, due to a coincidence of administrative staff turnover and Covid-19 restrictions. We normally aim for 100% survey by module and undertake paper-based surveys in dedicated class time, since online surveys have proved relatively less effective in the past due to low completion rates.

1.4 Comments from Head of Schools

School of Chemistry

This has been a year like no other. Since March 2020 the School has had to contend with, and adapt to, the new reality of an ongoing COVID pandemic. Our academic, professional, technical and support staff have responded and given their all in ensuring that the delivery of academic content was both professional and rigorous, thereby ensuring that the academic experience of the students was the best that it could be under very challenging circumstances. Some semester 2 lectures and tutorials were largely delivered online. F2F laboratories were delivered . Exams were changed to render them suitable for remote assessment. The School continues to provide a world class education in Chemistry in all of its facets. This was coordinated by our dedicated and committed staff who continue to excel and innovate under very difficult circumstances. I would like to take this opportunity to state my profound thanks to them all.

School of Computer Science and Statistics

Acting interim Head of School, Prof Carol O'Sullivan was in agreement with the Directors of teaching & learning at both undergraduate and postgraduate level.

School of Mathematics

The School is exploring a new 2+2 dual degree in mathematics with Columbia university - discussions are positive and ongoing. In addition, a new PGT – an M.Sc. in Quantum Fields, Strings and Gravity will begin in 2021. This has been welcomed by our UG students who feel they will be more competitive for international PhD programmes with an M.Sc. The School has faced significant difficulties to align our TSM Mathematics curriculum in TEP. The combination of shared modules by single honor mathematics and TSM students is not feasible under the TEP pillar arrangement. It remains unclear whether mathematics can continue in JH without conflicting with the single honor degree.

School of Physics

The School was very proactive in most directions related to teaching, research, student recruitment and engagement with UG and PG students. We followed the best international examples of practice in these areas and were not shy to pioneer in some areas ourselves. We could mention Walton Club, a shining example of engagement with Secondary School students for the benefit of raising the profile of the College, the School and also as a recruitment effort.

The greatest factor limiting the quality of our teaching and research is the lack of efficient supports provided by College, without which the School can not provide high quality teaching and research.

School of Biochemistry and Immunology

All our sophister degree courses continue to be in high demand and attract a high proportion of high achieving SF students. Successful launch and delivery of a new MSc: The MSc in Immunotherapeutic in 2019/20, despite the effects of Covid. Continued high level performance in Research: Covid award run jointly with school of Medicine, plus 3 SFI investigator awards.

School of Engineering

The School will be challenged to bridge international recruitment over the Covid period but we expect it to recover provided support administrative staff are in place. The School is expanding and consolidating partnerships with Manipal University and Columbia University. The response to Covid on teaching and learning has been reassuring and has provided us with high quality delivery opportunities post Covid.

We are looking forward to the establishment of the new five year programme, Environmental Science and Engineering, in collaboration with Natural Sciences under E3. The first intake will be in September 2021. Research activity, both publications and grant income, has been very robust under Covid.

School of Genetics and Microbiology

The school continues to publish at a high level. E.g. Over a quarter of the publications from TRINITY in *Nature* or *Science* in the last 5 years come from our School. One Department, Genetics, has had eight ERC grants awarded of which four are currently held – probably a record nationally for a unit of this size.

School of Natural sciences

Much of the laboratory and teaching space remains below standard for effective teaching delivery and research-based teaching. The development of the E3 Learning Foundry and refurbishment in the Zoology Building will enhance the teaching facilities, but those remaining in core School buildings – Museum Building, Botany Building will require upgrading. Our school has engaged in other strategic initiatives such as a reform of the School UG T&L Committee and associated programme and course committee will lead to a transparent reporting line and it is hoped less stress for students and staff alike when dealing with administrative matters pertaining to teaching. An Inclusivity Office is due to be appointed in the School.

1.5 Staff Student Ratios

The staffing needs of the Schools and Faculty move faster than the Human resources (HR) recruitment process. There are concerns that the issues with the HR process may negatively impact the Faculty's ability to the recruit staff and researchers in a timely manner. Each of the Schools offered insight on their current staffing, all Schools were in agreements that the current HR systems is slow and overly complex.

School of Biochemistry and Immunology

Figures for 2019/20 are as follows:

STAFF FTE: 26.36

Student FTE:UG : 285.5; PG taught: 32; PG research 80.6 Combined student FTE: 389.1

STAFF/STUDENT FTE: 15

According to figures provided in the report by Dr Fiona Killard of the office of Dean of Research (slide 6) the figures for TRINITY in 2020: Students FTE 15,281, Faculty FTE: 1,367: Faculty/Student ratio: 11.18.

School of Chemistry

The current School SSR is 15. This is a slight improvement from AY 18/19. The SSR in 2018/19 was 16 (same level as in 2010/11 and 2011/12). In previous years, the SSR was slowly improving from a high of 21 in 2014/15 (2017/18: 18; 2016/17: 14; 2015/16: 19 and 2014/15: 21). This indicator compares well with Oxford University Chemistry (16.7), Imperial College London (16.2) and QUB (15.9) but is still higher than Durham (14.6), Bristol (13.9) and Manchester (13.8). We would like to achieve the SSR in Liverpool Chemistry (11.1) as a long-term aspiration.

School of Computer Science and Statistics

The SSR in the School has remained at 17:1 for the past three years:
2019/20 - 17 :1 (Computer Science 16:1 and Statistics 24:1)
2018/19 - 17:1 (Computer Science 15:1 and Statistics 29:1)
2017/18 - 17:1 (Computer Science 16:1 and Statistics 21:1)

As a comparator, the top six UK Universities for Computer Science have the following SSRs: Cambridge 10.2, St Andrews 12.3, Oxford 7.3, Imperial College 15, Warwick 16.4 and Edinburgh 11.3

School of Engineering

Current levels are 1:15. This includes demonstrators and teaching fellows.

Under the E3 expansion the student numbers are projected to increase and staff hires will increase accordingly and we will maintain our current staff/student ratios and improve economies associated with scaling.

School of Genetics and Microbiology

Due to increased teaching to large classes in the first two years of the TR060 degree an increased student to staff ratio is expected (a BBM uplift was accordingly awarded this year). Also the commencement of the Genomic Medicine taught MSc is expected to impact positively.

School of Mathematics

The SSR in the School of Mathematics continues to compare poorly with competitor departments nationally and internationally. In 2019/20 the SSR was 1:22.3, a ratio that has not improved in the last 3 years. For comparison the SSR in Mathematics at Durham University is 1:15.6 and at Imperial College it is 1:12.5. Nationally, Mathematics at Trinity is the smallest Mathematics department in Ireland. To match the SSR of Durham would require an additional 13 -14 staff FTE. Looking to the future with the expected increases in student FTEs planned under E3 and a new PGT M.Sc. starting in 2021 the SSR will deteriorate further unless staff numbers are increased.

School of Physics

There is financial pressure to increase the UG student numbers and also the pressure to increase PG numbers to increase research productivity.

We have been able to maintain Student: Staff ratio of approx. 13:1. through opportunistic recruitment of academic staff who have brought large research grants (often covering their own salaries). While not bad, this value is higher than in the UK where top physics depts typically have values around 10:1.

Because the numbers of PGR students reduced in the period 2015-2018 (this decrease offset the increase in UG numbers. Both are now increasing. Note, however, that the numbers of PGR student has now recovered to >100 and we have an increasing trend in the Student: Staff ratio in 2019/20.

School of Natural sciences

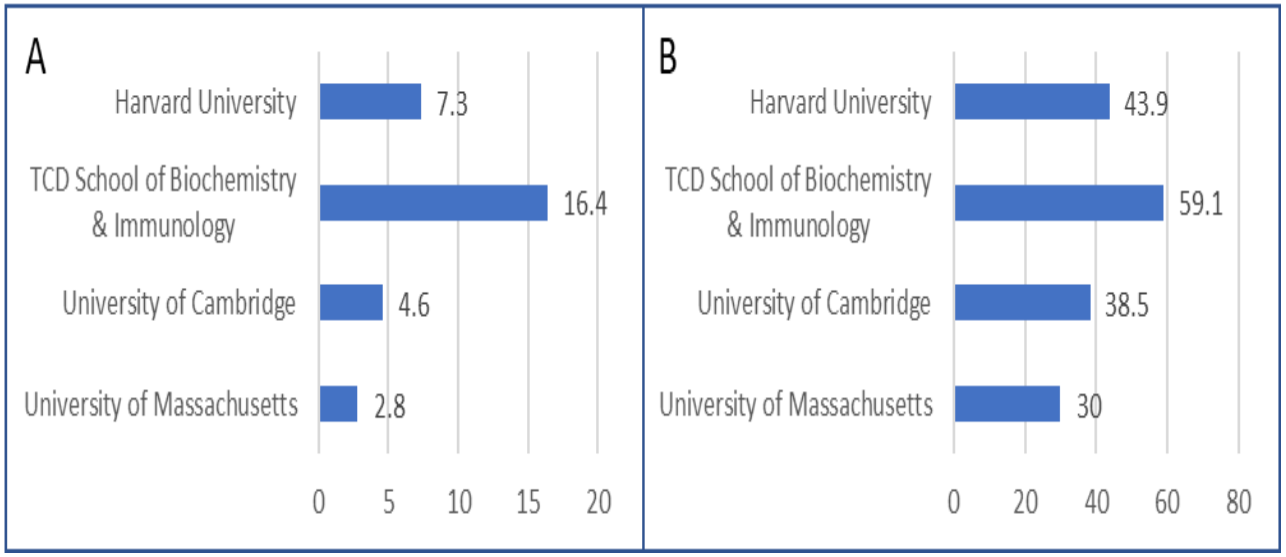
Staff student ration in 2018 was 1:18. The current figures are not available to me.

1.6 Rankings

Trinity is ranked in the QS top 100 in the world in each of the following subjects: Computer Science and Information Systems, Biological Sciences, Chemistry, and Materials Science. According to the QS World University Rankings by Subject 2021: Engineering & Technology. Trinity College Dublin placed in 142nd place with a score of 72.3, compared to 2020 in TRINITY placed 111 with a score of 75.4. Each of the Schools provided feedback on their rankings.

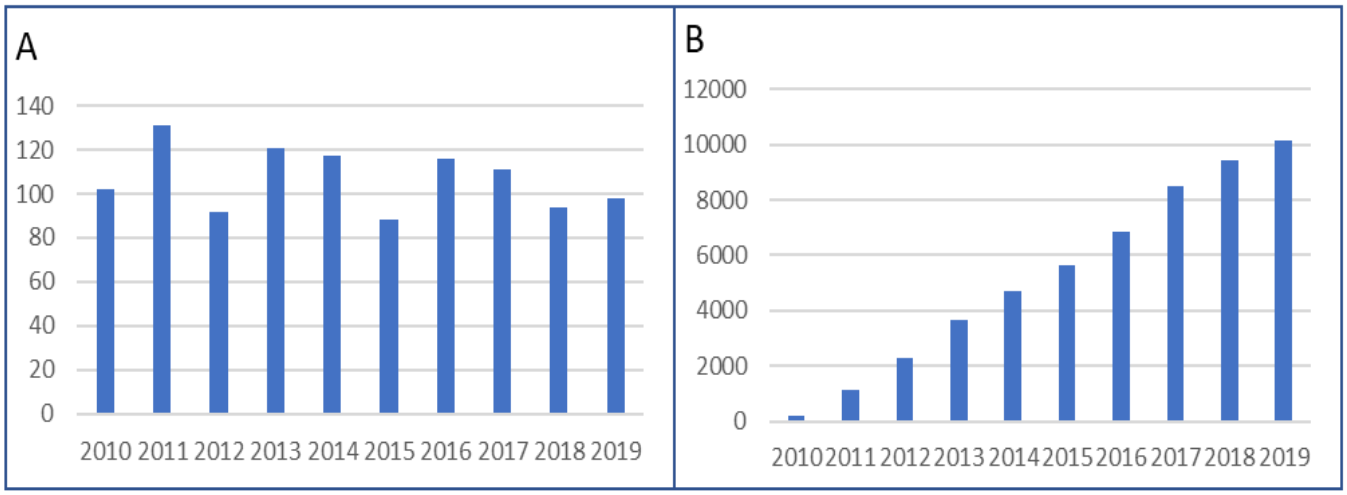
School of Biochemistry and Immunology

The School of Biochemistry & Immunology is a research leader within Trinity, but also ranks as the leader when compared to similar themes from other national and international universities. When benchmarked against other international research universities that have similarly themed research programmes, the School of B&I ranks as a leader.



% Publications in (A) the top 1% and (B) the top 10% most cited papers (Immunology, 2000-2018) (Source: SciVal).

In terms of overall publication numbers (measured in December 2019), the School of B&I has published an impressive total of 1696 publications, with an overall number of 115, 206 citations in the 2000-2019 time period. As graphically outlined below, on average this equates to over 100 publications every year.



Numbers of (A) Publications and (B) Cumulative Citations from the School of Biochemistry & Immunology (as measured December 2019) (Source: SciVal).

Other indicators of the international standing of B&I researchers are reflected in the invitations to speak at international conferences, organizing and chairing conferences and editorships of international journals. A number of PIs within the School of B&I are performing at the highest level in this regard, with others building international reputations. This is unrivalled in a national context and very competitive internationally.

Our School provides doctoral training through the provision of a structured programme of research and study. This year (2019/20), we have 76 registered PhD students in our School. Given the college-wide reduction in PhD numbers over recent years, the capacity of the School to maintain numbers in this vital student cohort is a reflection on our competitive research and attractive learning environment.

2019/20 was the launch year for our new M.Sc. in ImmunoTherapeutics (1 Year Full-time) with a class size of 14 students (7 female and 7 male; 9 EU and 5 NON-EU). The program competed successfully in Aug 2020 with the following grades awarded 5 distinctions, 8 II.1, 1 II.2.

School of Chemistry

The School is ranked in the band 51-100 in 2019 QS University rankings for Chemistry. This compares very favourably with UCD, which is placed in the band 151-200, the University of York (also ranked 151-200) and QUB (ranked in band 201-250). Our aspiration is to re-enter the band 1-50.

School of Computer Science and Statistics

The School was ranked in top 100 Schools for “Computer Science & Information Systems” in the 2018/19, 2019/20 and 2020/21 QS Subject Rankings.

School of Engineering

Engineering and technology have been rated as 111 by QS world rankings and all subjects are top rated nationally. The staff: student ratio is the weakest element in ranking determination.

School of Genetics and Microbiology

Note we are due to have a school review which will address this.

School of Mathematics

The School of Mathematics is a single discipline school comprising faculty approximately equally split between mathematics and in theoretical physics. Publications in theoretical physics are however considered in Physics rankings, artificially reducing the School's rankings.

School of Physics

The teaching and research in TRINITY Standard operating procedure (SoP) is divided between Physics/astronomy and Materials Science. In the QS rankings (2020), TRINITY is ranked 101-150 in Physics and 51-100 in Materials Science. The average between these values is very close to the overall ranking of TRINITY (101).

School of Computer Science and Statistics

The School was ranked in top 100 Schools for "Computer Science & Information Systems" in the 2018/19, 2019/20 and 2020/21 QS Subject Rankings.

School of Natural Sciences

QS 2020:

Natural Sciences: 191 (down from 152 in 2019)

Geography: 50-100 (same as 2019)

Biological Sciences: 51-100 (same as 2019)

Earth and Marine Sciences: 151-200 (same as 2019)

Environmental Sciences: 201-250 (same as 2019)

1.7 Teaching & Learning Environment-Space/utilization

School of Biochemistry and Immunology

The School of Biochemistry and Immunology is located on six floors of the Trinity Biomedical Sciences Institute (TBSI). The space occupied by the School by function and floor level is outlined in Table 5 below.

TBSI Floor Level	6	5	4	3	-2	-3	Total
Offices	8	12	7	5	0	0	32
Individual PI Laboratories	0	1	3	0	0	0	4
Combined PI Laboratories	2	1	1	1	0	0	5
Reading rooms	1	3	3	2	0	0	9
Tissue Culture Laboratories	2	4	8	2	0	0	16
Instrument rooms	2	3	3	1	5	4	18
Containment Level 2 TC Labs	0	0	0	0	0	3	3
Containment Level 3 TC Labs	0	0	2	0	0	0	2
Radioisotope Laboratories	0	1	0	1	0	0	2
Cold Rooms	1	3	3	1	0	0	8
Seminar/Meeting Rooms	1	1	0	1	2	0	5

The School is fully located within the TBSI building. It shares the building with other units from the Schools of Chemistry, Medicine, Pharmacy and Engineering that are engaged in research in the BioSciences. There are nine research laboratories. Four PIs have stand-alone laboratories and 24 PIs share the five combined laboratories. In addition, there is a range of dedicated facilities to support the teaching and research activities of the School.

Most of the spohister year teaching (lectures) are delivered in house in seminar rooms on L5 & 6 and -2. These are used on an almost continuous basis during term time (pre covid, up to March 2020).

Teaching Laboratory (Level 3)

The state-of-the-art teaching laboratory (Level three) caters for a large number of undergraduate and post-graduate students affiliated to a wide variety of degree courses. These include Pharmacy, Biological Sciences, Medicine, Radiation Therapy, Dental Science, Human Health and Disease, Biochemistry, Molecular Medicine, Immunology and Neuroscience. Normally, the teaching laboratory can cater for over 100 students per practical session and up to nine individual sessions per week. An average of 500 students attend the teaching laboratory each week during the first

semester and an average of 300-450 students attend weekly in the second semester. Eighteen percent of all Trinity College students come through the School's teaching laboratory at some point throughout their degree. This figure indicates the importance of this facility to both the School and the University.

School of Chemistry

The major f2f teaching adopted by the School was undergraduate laboratories, which were utilized to their fullest extent. Laboratory sessions were increased to facilitate smaller student groups and effective social distancing. Lecture materials were all delivered online from March 2020 until academic year end

School of Computer Science and Statistics

Prior to the covid outbreak, there had been a lack of large lecture theatres to accommodate some classes, otherwise space is adequate although spread across too many locations. A new replacement undergraduate PC Lab was opened in Trinity Central to replace the ICT Huts (which were temporary since 1996). Additional space will be needed soon for more academics (E3 Strategic Plan) and research staff (eg ADAPT). The School's move into the TR&I space has been delayed. The Bursar is exploring alternative arrangements but to date no progress has been made. The planning for the E3 Learning Foundry, scheduled for completion for the 2022/23 academic year, is continuing. This will be a significant boost in the quality of the School's teaching space.

School of Engineering

School space is currently over 15 locations. The School is actively engaged with the Planning Officer. Aras an Phiarsaigh refurbishment is complete and is being occupied as part of the ramp up phase for the E3 Learning Foundry due to open in 2023. The squeeze is now on teaching space and lack of access to large teaching space has limited our blended learning offerings under covid. Due to positive experiences with online teaching, we hope to be able to improve this post-covid.

School of Mathematics

The School has an ongoing shortage of space – both offices and seminar/teaching. The main school buildings, including faculty offices and teaching space, are not universally accessible. The Hamilton Mathematics Institute, housed within the School, has received 2 Simons Foundation grants supporting new visiting professors, postdocs and a programme of international workshops with no additional space for these activities. Current teaching space includes the Salmon and Synge lecture theatres, 1 seminar room, computing room and 1 teaching lab for the M.Sc. in HPC (also space-constrained and impacting on any expansion of numbers on that course). The Maths Help room (open to all TRINITY students) does not have a dedicated, or accessible, space.

School of Physics

Pre COVID: The quality of our teaching lab space is good and compares favourably with other universities.

However, we do have issues with space (the size of our lab space). Our teaching labs are now at capacity and we have had to reduce the number of lab sessions (e.g. for JS Physics) or increase the number of teaching sessions (e.g. for Computational labs) in order to accommodate all students (in subgroups).

SECTION 2:
Postgraduate teaching

SECTION 2 POSTGRADUATE TEACHING SUMMARY

2.1 Collective Summary

In this section Director of Postgraduate Teaching & Learning reflect on the steps the Schools took to ensure the quality of postgraduate programme provision during COVID-19. PGR completion rates are high, with most completing their studies within 4 years (FT) and 6 years (PT). If required, students were provided with a grace period and additional extension periods in light of the knock-on-effects the pandemic may have had on their research. PGR completion rates and student registration numbers are highly dependent on the provision of PG experimental laboratory teaching and practical laboratory supervision. This became a point of focus this year as face to face teaching was limited and had to be carefully scheduled in order to comply with restrictions and social distancing guidelines.

2.1.1 Comments from Director of Postgraduate Teaching & Learning regarding postgraduate programme provision during COVID19

School of Biochemistry and Immunology

2020 was an extremely challenging time for our PG students but the resilience demonstrated by both our PGT and PGR students over the last year has been very impressive. I think this is testament to the high quality students we are lucky enough to attract to our school and also the enormous effort put in by our academic staff to ensure that our 2 MSc programs were delivered to the highest standards possible under the circumstances and to ensure that our PGR students were supported as well as possible during the year, especially during the three months when the labs were shut down.

We were fortunate enough to have completed all lectures and the majority of assessment for our MSc in Immunology and MSc in Immunotherapeutics before the March lockdown. Unfortunately, the students had just embarked upon their research projects and so steps had to be taken very rapidly to convert all wet projects into dry projects (2 projects within the MSc in Immunotherapeutics which were being undertaken with industry were already up and running and these students had the opportunity to continue to work on-site in the industry partners labs). This was a big challenge and of course a big disappointment to the students because in the vast majority of cases our students want to obtain wet lab experience, as many of them are hoping to pursue PhD opportunities after completion of their MSc and are seeking wet lab experience. Supervisors made a big effort to convert the projects being offered to dry projects which included computational based studies, extensive literature reviews and the provision of virtual data to the students which the students were then required to analyze and interpret. The assessment of the projects did not deviate significantly but instead of presenting their research posters at a live poster presentation event, this was moved online and actually worked very well. We graduated all students in both our MSc: 22 students in MSc Immunology and 14 students in MSc Immunotherapeutics. The research labs in TBSI were closed for 3 months from March until June 202. After this point the labs reopened but with restricted access. This naturally had a very big impact on our PGR students as they effectively had to down tools for 3 months. Following that, it probably took a further 3 months to get things back up and running in the lab for most projects. Even now students are having to operate under restrictions which is impacting the progress of

their research. However, students are very well supported by their supervisors. During the period of lockdown supervisors made extra efforts to stay engaged with their PhD students and many engaged in writing of manuscripts during the period when they were unable to access the lab. Additionally, all our second-year students completed their confirmation process during the period of lock down and we competed all our confirmation vivas online via Microsoft Teams during May 2020. This meant that when students did return to the labs in June their focus could be on getting back to lab work knowing their confirmation process was completed.

School of Chemistry

This has been a very difficult year and staff and students have dug deep to allow everything to proceed as smoothly as possible. Continued flexibility will be needed with regard to all progression deadlines (reports, transfer, and PhD submission). The transition to online testing and oral examination (transfer and PhD vivas) has gone smoothly. We must be vigilant that we do not allow a drift towards an impersonal and more formal approach to viva examination. A particular concern is ensuring the safety of PG demonstrators, who are so critical to the delivery of the UG teaching mission. The School has run UG labs with fewer students over multiple sessions but this has resulted in the need for additional PG demonstrators, which has not been factored into the College's Covid response.

School of Computer Science and Statistics

The School took a number of steps in March 2020 to respond to the COVID-19 situation. We ensured that all staff were familiar with the online learning environment (many were already very familiar with Blackboard but had less experience with Collaborate Ultra and Panopto). All lectures and labs were fully facilitated online. Supervisors were encouraged to proactively engage with dissertation students and all dissertation supervision sessions were moved online, via tools such as Teams and later Zoom. The assessments planned for each module were fully reexamined to explore alternative online arrangements that would still assess all learning outcomes. An important note is that the School, through me and the Course Directors, communicated continuously with students to keep them informed of the ongoing situation.

School of Engineering

Since COVID-19 came as an unanticipated event emergency measures had to be taken in the PG T&L activities to react to the challenges imposed by the unprecedented event while ensuring the quality of the PGT programmes run in the School.

Most of the lectures had to be moved on to an online platform. The students interacted face/face with the lecturers online. College VLE platform Blackboard was used for this purpose with recordings in Panopto. Majority of the lectures were time synchronized with some additional online materials made available to the students in same cases for asynchronized learning.

Both the staff and the student community alike should be commended because of their adaptability and flexibility to accommodate and move to online lectures, assessments, and interactions, given the short notice.

A variety of assessment formats for the end semester exam were used, ranging from take home to 100 % continuous assessment, and the results broadly reflected the academic abilities of the assesses.

School of Genetics and Microbiology

Our School worked rapidly with Estates and Facilities to ensure the lab space for postgraduate research students was sufficiently identified for occupancy. In this regard, each lab also set up an online booking system to ensure only the maximum number of people allowed occupied a given area at a given time. This organization gave comfort to staff and students alike to ensure that research could continue. Students were also contacted by the Director of Postgraduate Teaching and learning to inform them of the provisions being made in academic registry for extensions to submission deadlines for theses and continuation reports. The School is now in a position where all postgraduate research students have clarity that the quality of their research will be maintained. Added to this, the Masters in Genomic Medicine began in September 2020 and while these classes have been delivered remotely, students have been largely positive on the quality of the programme thus far.

School of Mathematics

Regarding PhD students: Special provision for the use of office space in line with governmental restrictions due to the pandemic was made. Regular weekly or bi-weekly meetings through online platforms between supervisors and Ph.D. students were established to ensure continuity of research. Regarding the HPC Master's programme, the last few weeks of teaching took place following online. Extension to end-of-year projects was granted when necessary and take-home exams devise.

School of Physics

- Two Microsoft TEAMs are created to facilitate remote communication with PGR supervisors and PGR students.
- Guidelines regarding getting new PGR started were issued to supervisors and students in September.
- TRINITY/SoP Covid Guidelines of onsite research were implemented for PGR students to allow onsite research.
- PG seminars and PGR taught modules are arranged online to ensure the delivery of learning outcomes.
- Viva examinations were conducted online via Zoom, following College regulations.

School of Natural Sciences

The response to Covid-19 was coordinated through the PGTL committee within the School. The Director PGTL communicated ongoing changes to college policies responding to public health guidelines. These guidelines and appropriate responses were discussed and agreed upon with the PGTL committee.

There was ongoing discussion with both the Dean of Graduate Studies and the Head of School, both of whom organized meetings with PGT course directors regarding the delivery of teaching. Course directors put in place detailed strategies for delivering blended teaching approaches (including face to face inasmuch as possible), which were agreed upon by both the Dean of Graduate Studies and the Head of School. Further to escalating case numbers ahead of reopening in September, the Course Directors once again put in place revised plans to provide teaching in a mainly online format. New changes were again relayed to the Head of School and Dean of Graduate Studies. These teaching delivery plans ensured that students would experience the highest quality possible educational experience (e.g. a high proportion of small group teaching

delivered live online) under Covid-19 restrictions.

PGR discipline coordinators were responsible for communicating with PhD cohorts within their respective disciplines. This included frequent communication both individually and as a cohort. Issues of home working were responded to within discipline specific contexts via, for e.g., the provision of a small fund for the purchase of office equipment. Any larger issues of concern were fed up through the PGTL committee to both School Executive Committee and Graduate Studies Committee via the Director PGTL.

PGR thesis submission and viva arrangements were continued under Covid-19 restrictions. In consultation with the Dean of Graduate Studies, discipline coordinators and the Director PGTL developed a protocol for conducting viva examinations remotely, which has been very effective.

2019/20 was a busy and challenging year regarding PGT and PGR in the School, due to Covid-19, as well as the creation of new courses.

MSc courses continued to recruit well in 19/20. For the two unchanged courses:

Biodiversity and Conservation 14 (6 NonEU, 8 EU)
Environmental Science 12 (6 Non EU, 6 EU

The Masters in Development Practice (MDP) was changed from a two-year to a one-year structure ahead of 2019/20 intake. MDP numbers for 19/20 were:

EU – 9 (year 1 = 4, year 2 = 5)
NON-EU – 11 (year 1 = 6, year 2 = 5)
Total = 20 (year 1 = 10, year 2 = 10)

As noted above, the work of the PGTL committee in 19/20 was dominated by the response to Covid-19, ensuring the quality of teaching and learning activities continued. New procedures for electronic submission of PhD thesis as well as protocols for electronic vivas were rolled out.

In addition, the School led the launch of a new E3 MSc in Smart and Sustainable Cities. The School has also agreed to host the new MSc in Global Challenges for Sustainability as part of the CHARM EU initiative. Both courses will begin intake in 2020/21.

2.2 PGR students

STEM Schools: **PGR students**	Did the School provide documentation to AR to comply with the **new PGR progression/confirmation requirements** prior to annual registration for continuing PGR students?	Are School PhD students being informed of the need to enrol in the 'Research Integrity and Impact in an Open Scholarship Era' module?	Is the School promoting the new Postgraduate Research Student Handbook to Doctoral Students? If so, how?
Biochemistry and Immunology	Yes.	Yes.	Yes. All PGR students attend an orientation session (online this year) with the DPGTL and at this session they are directed towards the handbook.
Chemistry	Yes	Yes	Yes
Computer science and statistics	Yes	Yes	Yes
Genetics & Microbiology	Yes	Yes	Yes
Mathematics	Yes	Yes	Yes. The Postgraduate research student handbook is promoted through notification emails from the DLTP to the PhD students as a source of necessary information.
Natural sciences	Yes.	Yes	Yes
Physics	Yes	Yes. We note that the administration and communication of the marks relating to this centrally run module has been inadequate. The School is still waiting for results over one year later.	Yes. In an induction meeting at beginning of the year.
Engineering	Yes	Yes	Yes. The Doctoral students are made aware of this by the Director PG T&L in the welcome address to the students starting the programme. In addition, there are emailed about the document and the usefulness of consulting the document.

2.2.1 Completion Rates for PGR students

Comment on trends in Doctoral students completing studies within 4 yrs (FT) and 6 yrs (PT). Has the School noted any issues with non-completion/ withdrawal or late completion (>6years) e.g. due to Covid-19, or with PhD fails or awards of lower degrees

School of Biochemistry and Immunology

All students due to complete their PhD in Sept 2020 and March 2021 were granted an automatic 6 months extension by the Dean due to the impact of COVID19. 3/10 Sept 2020 registrants and 7/11 March 2021 registrants have already completed. We expect the majority of the remaining students to submit within the 6mth extension that has been provided. Moving forward we expect that all PhD students affected by the COVID19 shutdown and restrictions will require approximately 6 months extension to complete their PhD research.

School of Chemistry

Of the 31 4th-year PGR students progressing towards a PhD, 13 have submitted and passed vivas, 15 have been granted extensions and three have yet to seek an extension. Four PG students have left the programme, two of whom did so for financial reasons and returned home (Australia), one left for personal reasons and a fourth left but completed a MSc.

Our PGT course in Energy Science (co-delivered with the School of Physics) had a total of 9 registered students, 8 of whom were awarded the MSc (four of them with distinction after achieving an overall grade over 70% in taught modules and research component), and one who deferred the final research component as a result of the COVID pandemic.

School of Computer Science and Statistics

There have been several extensions, typically in the order of 6 months, requested due to COVID-19.

School of Engineering

There has no issues so far with students completing their studies within 4 years (FT) and 6 years (PT) of commencement of their PhD programme. However, due to the impact of Covid-19 there will be some impact in the coming years.

School of Genetics and Microbiology

All students in our school are enrolled in full time courses and the general trend is that students will complete their PhD within 4 years. There have been no cases this year of students requiring more than 6 years to complete their studies. There have been no PhD fails or awarding of lower degrees. Some students have been granted short (6 months) extensions to submit their theses based on delays with lab work in the early months of the COVID outbreak.

School of Physics

- Prior to COVID: Vast majority of PhD students complete the programme within 4 years with occasional extensions of extra 6 months are granted (6 out 115 current students in the prior 3 years). There were no PhD fails or lower awards in 2019/20.
- Since COVID many students have suffered delays (especially die to closure of labs from March 2020 and phased re-opening. For example, 5/13 (38%) expected these submissions in Autumn 2020 required C-19 related extensions.

School of Mathematics

Based on funding availability, 4-year PhD completion is not uncommon among our PhD students. It is in line with what happens worldwide and in most renowned institutions in

Theoretical Physics and Mathematics. There are no occurrences of 6-year studies. There was only one case of non-completion of PhD, due to grave illness. None due to covid-19.

School of Natural Sciences

The vast majority of students within the School complete within four years. Some PT can go over the allotted 6 years, though the absolute number of PT is small. During Covid-19, students have continued submission of PhD and MSc by Research theses. A schoolwide protocol for conducting remote viva examinations was developed and applied. This has resulted in minimum disruptions for those students in their final stages. For students in earlier years there have been some delays due to Covid-19. These delays are being remediated through adjustments to projects as well as application for fees and stipend extensions.

2.3 New Postgraduate programmes

Implementation of new PGT programmes that commenced in 2019/20. Have these programmes met their student recruitment targets?

School of Biochemistry and Immunology: A new Msc in Immunotherapeutics began in Sept 2019. We recruited 14 students, 6 of whom were non-EU. The recruitment target for the course was 10 students.

School of Chemistry: There were no new PGT course introduced in 2019/20

School of Computer Science and Statistics: none

School of Engineering: none

School of Genetics and Microbiology A new masters course in Genomic Medicine between our School and the School of Medicine began in September 2020. This course met its initial target of recruitment.

School of Mathematics: No new programmes

School of Physics: none

School of Natural Sciences: none

2.3.1. POSTGRADUATE Blackboard/MS Teams/Zoom

How was the School's experience with the Blackboard Learn suite of tools e.g. Blackboard Collaborate Ultra, Panopto, Blackboard Community Engage, Panopto, MyReadingList, Blackboard Assignments, Articulate etc.? Comment on the School's experience of teaching through the use of MS Teams/Zoom/ any other similar platform you may have used.

School of Biochemistry and Immunology

Lectures are pre -recorded using Panopto and the majority of face to face interaction with PGT and PGR takes place via Microsoft Teams or Zoom.

School of Chemistry

Extensive use was made of the Blackboard suite of tools. While both Ultra and Panopto are fine for recording, there are issues with Ultra in the case of live delivery.

(i) it is not possible to use powerpoint slides, the animation is too slow to be useful,
(ii) the syncing between the audio and video can be an issue, and
(iii) there needs to be an effective and reliable way to use an iPad and have it mirrored on Ultra as a whiteboard.

We have found both Teams and Zoom to be useful. There are sometimes issue getting sound/video to work on Teams and so, in my experience at least, Zoom is more reliable.

School of Computer Science and Statistics

Generally positive. The School held a weekly 'virtual coffee morning' each week where colleagues could discuss their experiences with the tools and in engaging in teaching online. Teams and Zoom have tended to be used for smaller group engagements. They work well.

School of Engineering

The general experience of the School with Blackboard and other VLE's has been good. We have received positive response from the colleagues with satisfaction about IT support. In particular, Blackboard supported all file sharing and submissions, and online sessions.

School's experience of teaching through the use of MS Teams/Zoom/ any other similar platform has been generally positive. However, some colleagues preferred using Blackboard as it linked with Panopto and SITS comfortably. An advantage of using Teams is that it allows students not yet registered to have a guest access (which was not so relevant for 2019/20 but may be a useful consideration for future years).

School of Genetics and Microbiology

The use of the Blackboard platforms for the delivery of course material has been largely successful amongst both taught and research postgraduate students. We have had very positive feedback from our Masters students in relation to the online content and students have provided very constructive comments.

Online delivery of postgraduate taught lectures using MS teams and zoom has been overtly positive and our School has worked with students to get the most form this online form of delivery. Added to this, the use of these online platforms for regular research meetings with PhD students has been excellent and while each lab has their own specific schedule of meetings, informal feedback from students suggest that regular interaction with their supervisors is continuing. The faculty wide subscription to Zoom has been hugely important for facilitating online lab meetings.

School of Physics

For the PGT ES programme, fortunately, the pandemic only impacted the last lectures of some of the courses in Semester 2 and the final research component. The affected modules were delivered as online recorded lectures in the VLE, and Semester 2 exams were set as online open-book exams using the VLE.

School of Mathematics

The School's experience was positive. Other than the minor Microsoft teams problem, our main problem with Blackboard was incomplete exam submissions. It appeared to notify some students uploading via a phone that their file had uploaded successfully when it hadn't. For teaching Blackboard and Panopto generally worked well enough.

School of Natural Sciences

Overall PGT courses within the school have adapted extremely well to online learning tools. Different tools have been employed for different modules, depending on specific teaching and learning requirements. Course Directors and module coordinators have been satisfied that the delivery of teaching via online tools has been successful, though all also note their preference for face to face delivery. For smaller class settings, zoom was the preferred option as it allowed for more students to see each other at any one time and facilitate class discussion.

Table 6: Turnitin used for Postgraduate Teaching & Learning

STEM Schools: **Turnitin used for Postgraduate Teaching & Learning**	Has the School adopted the use of Turnitin in Blackboard?
Biochemistry and Immunology	Yes.
Chemistry	Yes.
Computer science and statistics	Yes.
Genetics & Microbiology	Yes
Mathematics	No
Natural sciences	Yes
Physics	Yes
Engineering	Yes

2.3.2 Director of Postgraduate Teaching & Learning general comments & further reflections

School of Biochemistry and Immunology

It was a very challenging year but thanks to the significant efforts of the course directors on both of our MSc courses, we successfully graduated all our students and student satisfaction was relatively high. This was a particular achievement for our MSc in Immunotherapeutics given that is was the first year of a new course.

The impact of the COVID19 restrictions on PGR students will continue to be felt over the next number of years. Students at all stages of their PhD will have been severely impacted by the shutdown of research labs and due to the nature of biological research, the delay in getting research protocols and tools fully operational after the labs reopened continues to impact a number of students.

School of Chemistry: As stated in section 2.2.1.

School of Computer Science and Statistics

The MSc in Computer Science, comprising four strands, remains our flagship offering and is attracting a significant number of applications which is yielding a high quality cohort of students. There have been some issues with regards to the timely closing of applications and this seems to be a result of the number of people needed to make this decision. In 2019/20 this resulted in 134 students accepting offers onto the programme, with is over 10% more than the target of 120. This has led to a significant strain on supervision capacity within the School. Staff numbers are down in the School going in to the 2020/21 AY and there was a need to reduce the quota on this programme from 120 to 100.

The MSc in Interactive and Digital Media continues to be a strong programme, attracting a diverse cohort of students. This programme had specific challenges when COVID-19 struck as some of the modules were designed to be very hands-on and there is also a lot of engagement amongst the cohort. The staff in the programme adapted well to the challenges presented.

COVID-19 impacted all of our programmes, but the School has adapted strongly and flexibly to ensure students were offered a high quality experience.

Regarding the School's structured PhD programme, it is functioning well and students are mostly progressing as anticipated. The tightening of the tracking of progression has resulted in more timely confirmations and completion of annual reports. We have seen a drop in the relative proportion of students requesting a continuation year, meaning most are completing with in the 4 year (FT) or 6 year (PT) timeline.

PhD numbers are declining overall, despite new funding mechanisms, such as the SFI Centres for Research Training (CRTs). The decline is mostly attributable to a very strong employment market for Computer Science (and related) graduates. With a large proportion of the School's students being funded by SFI we are having increasing difficulty finding the resources to cover the difference between what the funding agency with support with respect to fees and the College's non-EU fee. This will likely result in us not being able to offer funded PhD opportunities to the best candidate if they are not eligible for EU fees. This will have an impact on the quality of our PhD graduates.

School of Engineering

The response of the School, overall, reacting to the pandemic outbreak in continuation of the teaching & learning efforts must be commended. The agility and flexibility of the staff in the School and the robustness of our PG programmes has been clearly evidenced. Having said that, a 'fully online' approach to teaching, as was only mode possible at that time can work temporarily as an emergency measure, may not be suitable from a 'motivational' point of view as has been reported from various feedback from students. The additional support and interaction needed to complement an online delivery were not completely possible to be made available, primarily due to resource constraints. The challenge was furthered due to a significant number of non-EU students in the PG programmes, and matters were complicated due to essential restrictions that had to be put in place for public health reasons.

Some specific comments on the Teaching & Learning aspects from the student surveys highlighted the necessity of more frequent online tutorials, interaction with individual students either online or via emails and availability of recorded lectures. While the first two comments require additional resources (which is under consideration), the School is encouraging all staff to record lectures and make those available on the College VLE on time, to facilitate the students.

PGT programmes in the School continue to grow and are upgraded to appropriately incorporate new relevant elements targeted to cater for the academic, industrial and market needs. We plan to start 4 new PG programmes soon and work is under progress.

School of Genetics and Microbiology

While the early days of the COVID outbreak were very challenging for some students, especially postgraduate research students, we have now adapted our labs to working under social distancing guidelines. Additionally, each lab has established a shift schedule to ensure the maximum number of people are working within a given space. The new Masters in Genomic Medicine course also started in September 2020 and the feedback to date has been very positive, with students very happy with the online delivery of lectures.

All students in our school are now aware of the regulations regarding yearly progress reports and the 18 month continuation report. We have also implemented a thesis committee for each student in the school which is working very well.

School of Physics

PGT MSc Energy Science

In 2019-20 we had a total of 9 registered students, 8 of which were awarded the MSc (4 of them with distinction after achieving an overall grade over 70% in taught modules and research component), and 1 who deferred the final research component as a result of the COVID pandemic.

The research component (30-credit module) was conducted mostly online, and only at the very end some ES students could were able do limited lab work on-site when restrictions allowed, following all the C-19 safety protocols that the School had carefully planned.

PGR

The pandemic caused a research interruption to the PRGs. The majority (74%) of PGR students claim it is challenging to conduct research remotely, experiencing emotional and/or logistical difficulties. There is a consensus among the students that they need to work on site. The Covid measures and the resumption strategies/approaches from SoP/TRINITY work satisfactorily and the majority (85%) of the PGRs feel safe to come back to campus. All the students have been meeting with their supervisors regularly, and 75% report they have sufficient access to research facilities.

The significant impacts on the quality of PGR experience are two-fold:

(1) extension to complete the thesis is expected due to the limited access to research resources and

(2) students face uncertain financial situations in the extension. (Their stipends have been static for many years while rents in Dublin continue to grow – see Quality report for 2018/19.)

School of Mathematics

I retain some reservations with regards to the assignment of the thesis-committee - especially in a School with lectures of highly diverse specialisations.

School of Natural Sciences

As stated in section 2.2.1.

SECTION 3: External Accreditation

SECTION 3 External Accreditation

For the academic year 2019/2020, COVID-19 resulted in scheduled external accreditation being postponed. We are hopeful that these accreditations will be adapted as appropriate to be conducted remotely. Below each of the Schools in the Faculty of STEM provide an update on the accreditation over the past year.

School of Physics: n/a

School of Biochemistry and Immunology: A Quality Review of Genetics & Microbiology and Biochemistry & Immunology was scheduled for March 2020 but was postponed due to COVID19.

School of Chemistry Reported as n/a

School of Computer Science and Statistics Accreditation of the Integrated Computer Science programme was scheduled for October 2020 but was deferred by one year due to Covid-19.

School of Engineering: Accreditation was postponed due to Covid 19. Now planned to take place in reading week of Michaelmas term in 2021-22 (exact dates to be confirmed).

School of Genetics and Microbiology A Quality Review of Genetics & Microbiology and Biochemistry & Immunology was scheduled for March 2020 but was postponed due to COVID19.

School of Mathematics Our only externally accredited programme is Theoretical Physics. The site visit was in the previous year.

School of Natural Sciences Reported as n/a

SECTION 4: International student experience

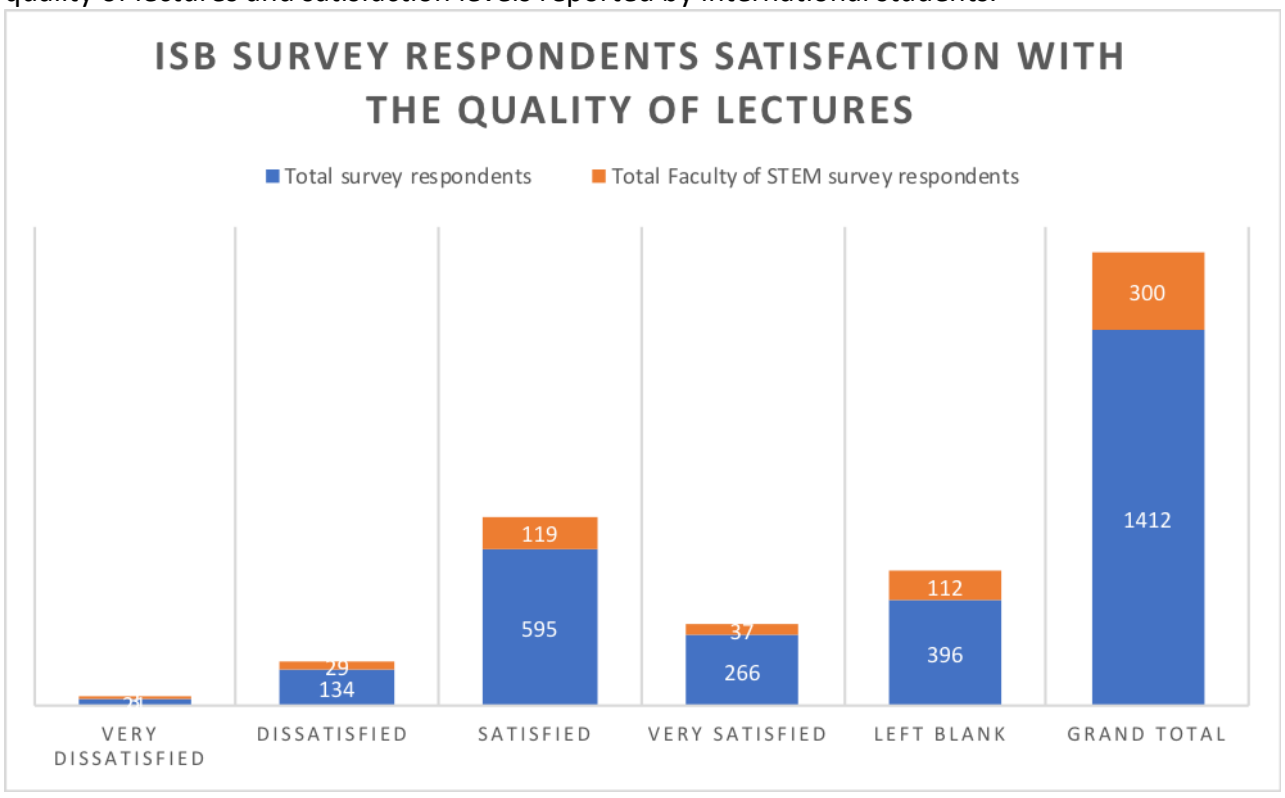





SECTION 4 International student experience

In light of the pandemic, the International Student Barometer (ISB) survey did not run in 2020. Therefore we have provided comments based on the ISB from Autumn 2018 as this is most recent iteration of the survey. The survey takes a holistic approach to the student experience from living accommodation to the quality of teaching. Overall, 1412 international students participated in the International Student Barometer (ISB) survey, from which 300 international students completed the survey from the Faculty of STEM as illustrated in Figure 1.

Figure 1: Survey findings for the Faculty of STEM and overall survey responds in respect to the quality of lectures and satisfaction levels reported by international students.

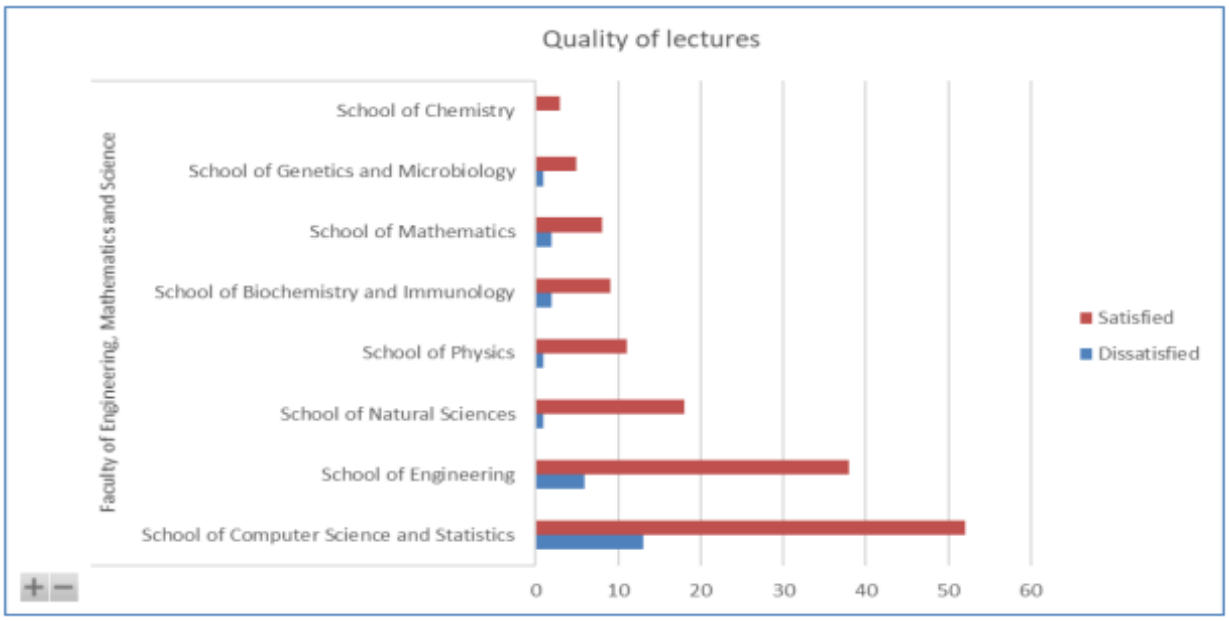


On reviewing the ISM survey, only the following eight findings related to the Faculty of STEM:

1) The quality of lectures and Satisfaction level
2) organisation and smooth running of the course and Satisfaction level
3) the subject area expertise of lecturers/supervisors and Learning Satisfaction
4) Getting time from academic staff when I need it/personal support with learning and Learning Satisfaction
5) Feedback on coursework/formal written submissions and Learning Satisfaction
6) Advice/guidance on long-term job opportunities/careers from academic staff and Learning Satisfaction
7) Learning that will help me to get a good job and Learning Satisfaction

In each of these 7 areas the Faculty of STEM tended to be on par with the other faculties.
From the 300 Faculty of STEM international students who participated, 188 of them responded to this survey question, 83% of whom reported they were either satisfied or very satisfied (n=156). This is on par with the overall satisfaction level reported by all survey respondents across the Faculties with 1,016 international students answering this survey question and 861 of them reporting they were either satisfied or very satisfied (85%). Figure 2 shows the breakdown of the level of satisfaction with the quality of lectures across the different STEM schools.

Figure 2: International student survey respondents indicate level of satisfaction with quality of lecture across STEM schools.



The survey feedback aided the Faculty in focusing on particular areas to improve upon in the coming years such as providing additional work experience and career advice. However, there was not a vast amount of supporting qualitative data so analysis was limited.

Comments on International Student Experience Outcomes

Schools highlighted specific international student experience issues that are re-current and which would benefit from further discussion with the Global Relations Office

School of Biochemistry and Immunology

In 2019/20 the feedback we received from one semester or full year visiting students (UG) as well as MSc (Immunology and Immunotherapeutics) was universally positive on their experience. Two issues that might need attention:

1) Speed of approval/acceptance process and registration (at taught MSc level)
2) Closer co-ordination between school/student on module choice at UG level, some UG Modules that have practical components have limited spaces for visitors and sometimes this is not immediately obvious. The school is reworking the website to make this issue clearer for future applicants.

School of Genetics and Microbiology

No specific international student experience issues are re-current in the School that require particular action.

School of Chemistry

One problem that is recurrent for international students is finding accommodation as the cost of living in Dublin becoming more expensive annually.

School of Computer Science and Statistics n/a

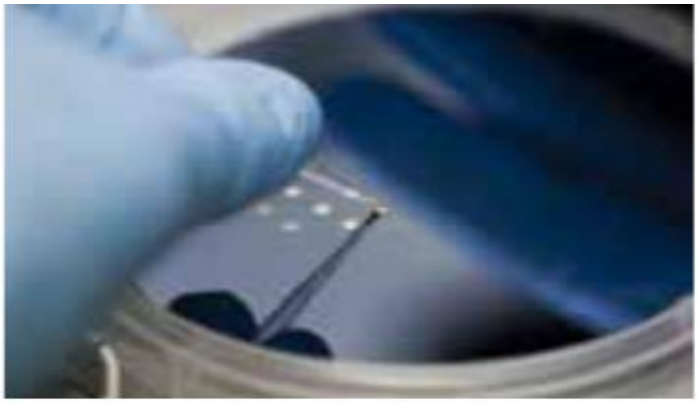
School of Engineering

The two areas of development for the School of Engineering based on the feedback from the 2019 ISB were 1) welcome/orientation and 2) work opportunities.

Welcome/Orientation-
Increased and improved pre- and post-arrival communications with international students was prioritized by the School Global Officer. Welcome and orientation at the start of 2020-21 was dominated by pandemic-related arrangements.
Work Opportunities-
Work has begun in the School to ensure that International students receive support in understanding their working eligibility in Ireland, and in the workplace culture of finding employment. It is intended that the Global Officer will arrange an information session at the start of the academic year to advise international students on their work eligibility, as well as tips on finding meaningful employment, as students and as they prepare for their careers.

School of Natural Sciences Insufficient data for School of Natural Sciences was provided in the ISB. It is expected that we will survey our students at the end of this academic year

SECTION 5: International Partnership/ articulation arrangements



SECTION 5: International Partnership/ articulation arrangements

This section summarises the School's activity in respect of programmes of education with international partners under formal approved arrangements that may include Dual and Joint Awards, or Articulation Arrangements but excludes Erasmus/exchange agreements.

5.1 What Partnership/Articulation is your School engaged in?

School of Biochemistry and Immunology

Outgoing: Students in Biochem and Immunology may spend half a year or one year abroad during the third year in one of the partner universities studying biochemistry in the following universities: University of Zaragosa, University of Aix Marseille, University of Grenoble, Jagellonian University Crakow, Johannes Gutenberg University of Mainz, University of Florence, and University of Siena.

Students also have many opportunities to take part in research internships outside of their official course. For third and fourth (sophister) years, there are opportunities to undertake relevant work experience of six to eight weeks in an approved organisation or institution, or an alternative agreed with the exchange coordinator. Trinity has exchange agreements with a range of leading universities and institutions worldwide. Each year, 1-2 JS students compete to be accepted for a placement in Immunology at the University of Massachusetts (UMass), Boston, and 1-2 students are accepted for a placement in Harvard Medical School. Trinity is also establishing a new partnership with labs in Australia, including The Hudson Institute at University of Melbourne, as well as a paid internship for 90 days at the Lowry Cancer Research Center in University of New South Wales, Australia. These internships are usually performed during the summer months as students in their final year undertake an 8-week research assignment in TRINITY labs.

Joint degree:

The School of Biochemistry and Immunology have established a dual degree in "Neuroscience & Behavior", in partnership between Trinity College Dublin and Columbia University (New York, USA). All students spent the Freshman years at Trinity College Dublin, and their Sophister Years at Columbia University. They then are awarded two degrees, one from each university. This course began in the 2020/21 academic year. Over 80 excellent international candidates applied, of the order of 30 were interviewed, and 10 were offered places. All applicants who were offered places either accepted or deferred. Currently, 8 students are enrolled in the Junior Freshman year of the program (1 from Ireland, 1 from China, 1 from Turkey, 5 from USA). A large volume of applications has been received for the 2021/22 academic year.

School of Chemistry

The new Partnership with Villanova University (USA), to be integrated within a summer school in Chemistry as an entry for further studies, was completed. We had planned to start in the second semester of the 2020/21 academic year. However, due to the COVID19 pandemic, it was agreed with them that this was not viable and the starting date has been pushed back to Spring 2022.

The initial contacts with Syracuse University (USA) for a partnership in the degrees of Chemistry and Medicinal Chemistry have not progressed significantly due to the COVID19 pandemic, but the mutual interest is still there.

Members of the School indicated strong interest in participating in the overseas scholarship programme between the Irish Universities Association (IUA) and the Ministry of Research, Technology, and Higher Education (MoRTHE) in Indonesia to supervise PhD students and accordingly several research proposals were submitted.

We continue to engage strongly with the Erasmus agreements programme and Erasmus+ internships programme. However, the COVID19 outbreak, and the corresponding lockdown, has had a very negative impact on student numbers under these programmes in the period between March and July 2020.

The total number of students in our School to date who have entered under a formal partnership arrangement i.e. an articulation agreement, or as part of a dual or joint degree (includes all student cohorts, and all student entering in previous years i.e. not just in 2019/20) are:

Columbia: 0

Thapar: 0

CSC-TRINITY: 1 incoming PhD student

Erasmus/Erasmus+: 0

(add others as required)

The School of Chemistry is not involved in any dual or joint degree.

School of Computer Science and Statistics

The School has an arrangement with Thapar University.

The number of students that entered these programmes in our School under partnership arrangements in 2019-20 (all cohorts) were:

Thapar: 22

Thapar: 51 in 2019/20 (year 3: 22, year 4: 20, year 5: 9)

Thapar cumulative since 2015/16: 117

School of Engineering

The number of students that entered these programmes in our School under partnership arrangements in 2019-20 (all cohorts) were:

INSA Lyon (France) – 0 - Dual Degree

Thapar University (India) – 27- Articulation

UM-SJTU, Shanghai (China) –2- Articulation

Total: 29

The total number of students in our School to date who have entered under a formal partnership arrangement i.e. an articulation agreement, or as part of a dual or joint degree (includes all student cohorts, and all student entering in previous years i.e. not just in 2019/20) are:

INSA Lyon: since 2004 – 44

Thapar: since 2015 – 129

UM-SJTU, Shanghai: since 2018 – 3

School of Genetics and Microbiology

Currently the School is not engaged in a Partnership/Articulation Arrangement. However, the School offers support for Undergraduate student international exchange. The Genetics Department offers financial support and identified labs in the US for six Genetics/Human Genetics UG students through the American Ireland Funds (Billy Vincent Bursaries). The Microbiology Department has identified three European Labs (Lyon, Würzburg, Birmingham Universities) that agreed to host a total of four UG Microbiology students for a summer internship. Both internships are non-credit-bearing.

School of Mathematics

We are currently not involved in any partnership/articulation arrangements but have initiated the process of creating a dual degree programme with Columbia and are actively considering other possibilities.

School of Natural Sciences

Currently our School is engaged in the following Partnership/Articulation Arrangement:

- TRINITY/Columbia Dual BA Degree in Geoscience began (2020-21)
    - Columbia: 2 (registered in 2020-21)

- New Erasmus+ agreement signed with the University of Tromso - The Arctic University of Norway (UiT).
    - For Erasmus in general (2020-21), a total of 4 students took or are taking part (Full year Geog 2; Hillary term 2; this is a huge decrease from normal as most withdrew because of Covid). In 19-20 a total of 12 took the Full Year and 1 HT with 3 Withdrawals. Six students have applied for Erasmus in Geology in 2020-21.

Total number of students that entered programmes in your School under partnership arrangements in 2019-20 (all cohorts): Total: 13 (for 2019-20)

Ongoing but slow because of Covid:

a) We are in discussion with Jiangnan University regarding the possibility of a partnership in Environmental Science. Global Relations has had some engagement with this university previously and discussed various types of partnership. Jiangnan are part of Project 211 which is a Chinese government endeavour aimed at strengthening 100 select institutions and already have some 2+2 type arrangements in place with other European partners. This is an opportunity for a partnership that might bring in a small number of Chinese students each year.

b)Taylor's University (No. 1 private University in Malaysia) which might lead to small number of students per year to year 3 and 4 of our programmes; 2+2 type.

c) Attempts were made to explore a Joint/dual MSc degree in Global Environmental Studies with Kyoto University Japan, and collaborative teaching and student mobility arrangements with Keio University Japan - however, the official delegation from Kyoto postponed their March visit to TRINITY last year due to COVID and nothing further has been actioned. With the Japanese border closed to all non-residents (incl. students) there is currently no appetite to explore this for the time being.

School of Physics

2+2 UG BA Physics Degree Programme with USTB, PR China. Despite the best efforts of School staff it has been difficult to recruit the students from their home university. Crucial for this is the engagement of the home university staff and the necessity for a 'champion'. The quality of the students who did apply was excellent but all but one student satisfied the English language requirements. Given the trajectory of the pandemic there has been no recruitment possible in 2019/20 for the subsequent years.

USTB: 1 (one student)

5.2 Benchmarking

School of Biochemistry and Immunology

The school does not formally benchmark against other schools or HEIs. This situation is under consideration.

School of Chemistry

The School does not currently benchmark itself against other Schools nationally or internationally.

School of Computer Science and Statistics

The School regularly reviews the programmes and outputs of other top CS schools in the UK and compares them with ours. Accreditation of the Integrated Computer Science programme by the Institute of Engineers in Ireland (IEI) was scheduled for October 2020 but was deferred by one year due to Covid-19.

School of Genetics and Microbiology: N/a

School of Mathematics

The School is not externally benchmarked other than the Theoretical Physics degree which is accredited by the Institute of Physics. Against informal benchmarks including international markers of esteem (publications, international plenary invitations, international grant awards and philanthropy and profile of applicants for faculty positions) the School has significant impact.

School of Physics

All physics schools/department in Ireland (Republic) share (gender segregated) statistics which include numbers, grades and contract status of staff, numbers of students, proportion of higher grades achieved (II-1 and better), numbers of graduates at UG and PG levels.

School of Engineering

The School continues to be active within the Cluster and UNITECH network which includes leading technological Universities across Europe. These focus on masters 1 level Erasmus exchanges and international internship programmes. See cluster.org and UNITECH.org. The School hosted the UNITECH mid-term week in January 2021. All major programmes in the School were accredited by Engineers Ireland / Washington Accord Protocol in 2016. Accreditation process deferred until Autumn 2021 due to Covid.

School of Natural sciences

Our School and its teaching programmes are benchmarked against international universities through the External Assessor scheme. In 2019 as part of an E3 assessment all our programmes were evaluated by the Knowledge Partnership who provided valuable feedback on where or programmes stand in relation to those of the Russell Group and other universities.

SECTION 6: STRATEGIC STAFFING PLAN- RECRUITMENT/ VACANCIES

Section 6: Strategic Staffing Plan-Recruitment/Vacancies

School of Biochemistry and Immunology

Administrative support: While the scale and complexity of School teaching activities has significantly expanded over the last 10 years, our administrative support has not. The school is also currently without a school manager.

During 2019/20 the school has the following staff, a school manager (1/2 time), an EO (1/2 time), one member of technical staff and one member of the academic staff and a full-time teaching fellow. Another member of staff has taken a three-year career break. The effects of effects of these losses are being felt across the activities of the school.

The school plan is to address these losses and their effects on key activities within the school by seeking to appoint:

A full-time school manager and EO

A replacement member of staff to teach core biochemistry components of the course (Enzymology and Kinetics at freshman and spohister level)

A two-year appointment to run the MSc in immunology (to cover the full career break period), currently we have a one-year appointment in place.

School of Computer Science and Statistics

The School is attempting to work through its E3 Strategic Staffing plan. We have lost multiple staff due to retirements and resignations. In the last quality report, we had 12 new and replacement academic appointments, including a Head of School, in progress or planned for completion by the end of the 2019/20 academic year. The hiring process is very slow (this process needs to be streamlined) and only some of these positions were allowed to proceed. We are finding that some academic posts are very hard to fill in the current circumstances. We also find ourselves now in a position that we must make new business cases for positions that had already been approved. The outlook for the 2021/22 academic year is very worrying, as we will be starting with approximately 4 fewer staff members than we had in place in 2018/19. Given the increased demand for places in SCSS, this will impact greatly on our ability to deliver our programmes.

School of Chemistry

The School will need to ensure that its technical/attendant staff profile does not dip significantly over the next years (we have lost 4 in 19/20 with only two replacements). These are essential front-line personnel which ensure successful provision of the laboratory component of our teaching mission. The School intends to obtain Royal Society Accreditation in the short term. Success in this aspiration will require a full cohort of technical staff in the undergraduate laboratories.

The executive officer admin position has been vacant for over a year, with starting salary the deciding factor in successful candidates turning down the position (2 competitions). With a small admin team (4 at present), this has resulted in staff being put under huge pressure dealing not just with their normal workload but the additional administrative duties that have been introduced as a result of Covid (safety planning; set-up and running exams online; additional HR-related duties etc.). This situation is unsustainable.

While the academic staff numbers in 2019/20 look reasonable, they do not take account of 2.5 staff members having largely administrative roles in College and therefore not being available to take on a full teaching load. The School has since lost one permanent Assistant Professor (and one Teaching Fellow, whose contract was not renewed as a result of the hiring embargo even though an Officer allowance could have been used to cover the salary costs.

With the School's budget decimated under the BBM model and the devastating deductions for non-existent NEU students in 2019/20, the School is being asked to develop new courses and ways of increasing revenue while not being given the human resources to deliver any additional programmes, without abusing the goodwill of staff who already go above and beyond to deliver a quality service.

Having staff so busy that there is no bandwidth to innovate and present the school's offerings in the best light is a false economy.

School of Engineering

3 vacant Chairs have been filled.

The academic staffing level in Electronic and Electrical Engineering is improving (Three new APs have been appointed in this area).

Due to the hiring freeze, we are having difficulty filling administration posts particularly in Electronic and Electrical Engineering.

The hiring freeze has also caused delays in hiring for other areas which has required ad-hoc teaching solutions to cover the vacancies.

Recruitment in some PG courses has suffered as a result of these vacancies not being filled.

School of Genetics and Microbiology

The school has just secured permission to make an important replacement teaching position in the Dept Microbiology. Also, it has secured a 5-year Asst. Prof. Position through the HCI. It has also had its application for a SALI chair selected to be put forward by TRINITY.

School of Mathematics

The School is recruiting a new professor of mathematics awarded under the Government SALI initiative. We expect that the new hire will provide strategic leadership in pure mathematics and enhance the UG and PG teaching and the research profile of the School. It remains crucially important for the quality of the mathematics programmes that all faculty posts are filled – including replacement of retired staff and the established Erasmus Smith Chair.

School of Natural Sciences

The current recruitment freeze and reduction in budget in 2020-21 has resulted in the distinct possibility that it will be impossible to fill all core positions as they become vacant. Currently several positions remain vacant. This will have a knock-on effect in increasing the staff: student ration and the ability of the School to deliver on all of its teaching programmes even as some E3 staff are being recruited. It is also having a demoralizing effect on the staff across the School and will lead to increased workloads as pressure is brought to bear to increase student numbers in existing programs and as new E3 programmes are being rolled out. Areas such as the ability to supervise capstone projects are now at a pinch-point and current staff cannot take on more.

School of Physics

It is very difficult for us to recruit the very top level of academic staff. Attempts to recruit high-level senior staff have often failed with (informally) cited reasons being the relatively poor standard of research facilities and the low level of support (technical and admin). We cannot compete with Cambridge, Oxford and Imperial.

Nevertheless, the School has been able to fill its academic positions with high calibre staff. We are seen as a relatively high-profile research organization and remain competitive in the academic labour market. The big problem is the unavailability of space to accommodate research groups of the incoming academics and support the growth of successful current academics. We will recruit 2 new academics this year under the Human Capital Initiative and, despite repeated requests, College has still not provided space. The College needs to have uniform and transparent policy for allocation of space to Schools to reduce inefficient use of space.

The main risks are associated with the reduced autonomy of the School to secure its support staff within the allocated budget. We are struggling to fill in the support staff vacancies at the level that is appropriate to the task. The decisions on this are taken at the centre of the College and the responsibility for these decisions are allocated to the School. This struggle has left us desperately short of admin staff. We are currently 7 FTES below full complement. While we have applied to EOG RSC to fill 4 of them, inefficiencies in the system and the constraints imposed have meant that none has been appointed (in one case we have been waiting since July). This support staff problem has resulted in the severe overburdening of the staff we have. This has led to the knock-on effect that additional workload is placed on academics to fill the gaps and this reduces efficiency of the organization.

SECTION 7: Athena SWAN

SECTION 7: Athena SWAN

In 2020, the Faculty of Engineering, Mathematics and Science (STEM) has 8 out of 8 Schools with an active Self-Assessment Teams (SAT). In the following pages we provide a summary of the progress regarding Athena SWAN in each of the Schools.

School of Biochemistry and Immunology

The school application for an Athena SWAN bronze award in 2019 was not successful and we are now preparing to resubmit in June 2021. We have reconvened the Self-Assessment Team and we have a new Chair and new members of the SAT. Feedback from the reviewers was helpful in addressing shortcomings in the application and we are confident of success with this application and a rejuvenated SAT. The loss of the dedicated STEM AS project officer is regrettable -she was extremely helpful to us and particularly to those STEM schools who got awards in 2020. The appointment of a college Athena SWAN data officer is welcome and we hope that this will streamline the delivery of data considerably.

School of Chemistry

As noted in the last quality report, the School retained its Athena Swan Bronze award in 2019. During the year 2019/20 the newly formed Equality, Diversity, and Inclusion (EDI) Committee met remotely a few times. This committee is chaired by Prof. Graeme Watson and has a remit both to submit an AS Silver application in November 2021, and to progress Equality and Diversity best practice throughout the School of Chemistry. This is a core committee of the School, whose terms of reference and membership have been approved by the School Executive. The AS champions in the School for the period 2019-2022 are Profs. Graeme Watson & Larisa Florea. Professor Watson sits on the School Executive Committee as Senior Chair of the EDI committee (and Prof. Florea as the Junior Academic Staff representative). The EDI committee inaugurated a few important School policies during the year which have been approved by the School Executive. These policies include:

1. The right to disconnect from work.
2. A policy to hold core business meetings between 10 .00 and 16.00.
3. A hybrid meetings policy (for implementation when Covid-19 restrictions are no longer required).
4. A committee management and representation policy.

School of Genetics and Microbiology

The School of Genetics and Microbiology at Trinity College Dublin has been granted a Bronze Athena SWAN gender equality Award by Advance HE/Athena SWAN. This award recognises a commitment to advancing gender equality for women in science, technology, engineering, and maths (STEM) and creating cultural change within the School. The award, granted September 2020, is valid until April 2024.

School of Computer Science and Statistics

The Athena Swan Bronze application has been approved by the School Executive and the School Committee. It will be submitted on or before 29th January 2021. Implementation of actions will begin immediately thereafter.

School of Engineering

Application for Athena Swan Bronze Award was approved by the School Executive Committee on 19th January 2021 and will be submitted by the end of January. The School continues to be active in the SALI Chair application process but not successful. There has been no significant increase in the number of female applicants for academic posts.

School of Mathematics

The School continues to work towards an Athena Swan bronze application coordinated by the School's Athena Swan champion and committee and in coordination with College.

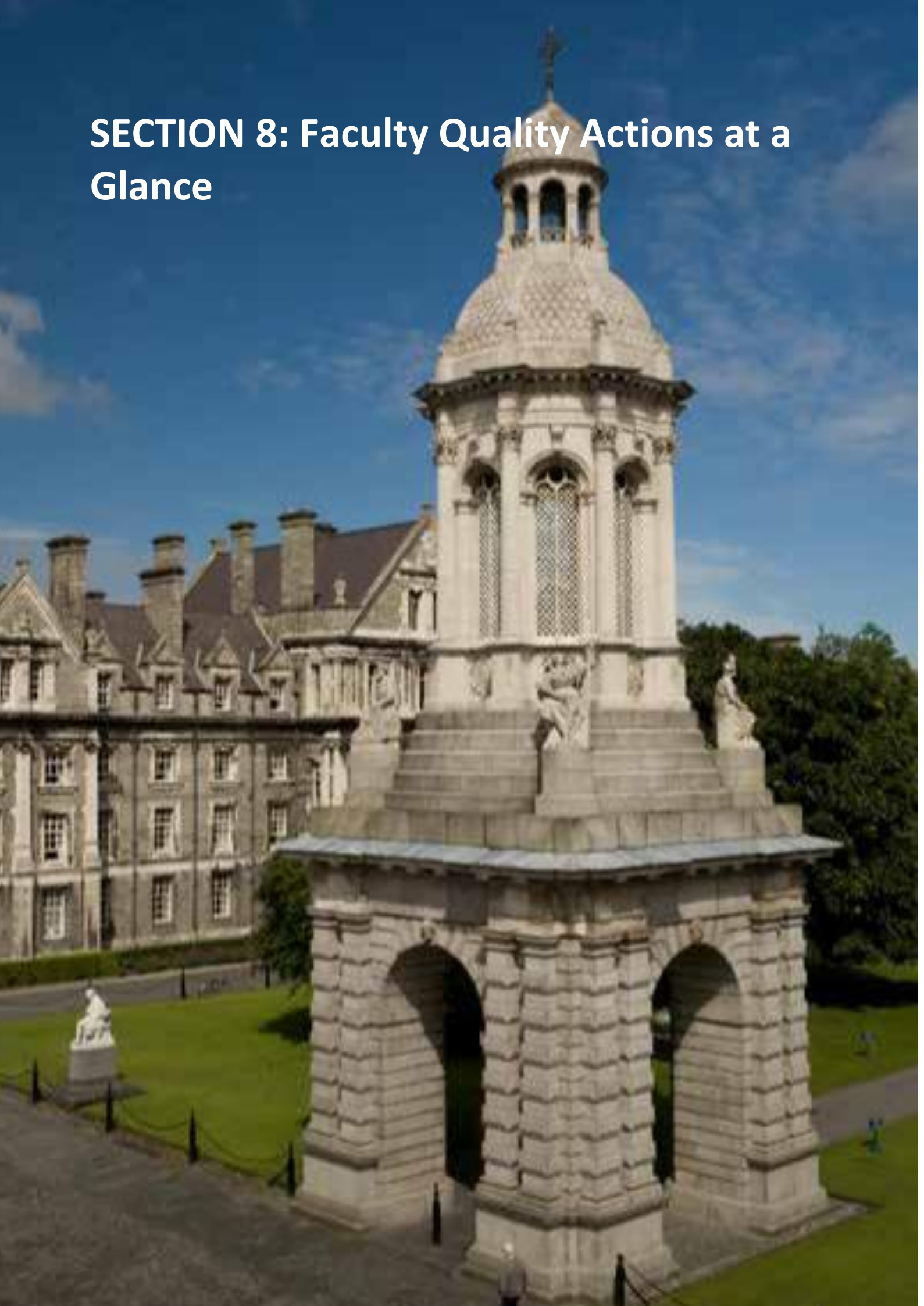
School of Natural Sciences

The School of Natural Sciences currently holds a Bronze Award and is working towards submission of documentation for a Silver Award.

School of Physics

The school has an Athena Swan Champion who chairs a working group dedicated to retention of AS. This group has identified data collection as the major hurdle in the process of AS retention. Much so the data required for AS applications is time consuming to collect at school level. This might be simplified by college adapting data collection/storage systems to make data related to AS easier to access. In addition, there is a feeling that more support from College could be provided, for example guidance in survey design.

SECTION 8: Faculty Quality Actions at a Glance



SECTION 8 Faculty Quality Actions at a Glance

8.1 Risks to Quality

Resources: The individual school reports highlight the very varied needs and foci of STEM schools. Some are growing rapidly and are seeing an unprecedented increase in academic staff recruitment (Physics, Engineering, Natural Science) and some are expressing serious concerns about the retention and recruitment of core staff posts (Chemistry). To a degree these differences reflect the economic and financial outlooks of the individual Schools.

During 2019/20 the pay budgets of the majority of STEM schools were overspent and Schools were drawing upon financial reserves to maintain their staff numbers and student:staff ratios. In 2020/21 under the backdrop of a dramatic reduction in commercial revenue to the College, budgets were cut further and STEM schools (where approx. 6.7M euro of annual income is from research overheads) have struggled to operate in a sustainable manner. A hiring sub-group chaired by the VP/CAO was established to review every application for staff recruitment across the College. Each School submission includes an organizational chart, a business case and a statement from the Faculty Dean. This has meant a slowing down in the HR approval process which Schools have found challenging. The financial backdrop has also prompted Schools to seek alternative revenue opportunities (e.g. E3 philanthropic donations, HEA Human Capital Initiative). Just over 6 posts Assistant Professorships have been funded through philanthropic sources to date and a further 9 will be HCI funded over the next four years. The development of the associated new courses is being carefully monitored in terms of the student experience, the demand and the allocation of resources, but this does represent a dramatic increase in activity and will directly affect 7 of the 8 schools in the Faculty.

On-line teaching: The quantum and quality of the space available to Schools during this period of growth will also impact on the quality of the student experience. Many of the STEM schools occupy a physical footprint that extends over several sites and buildings. The consolidation of this space is a feature of the College's Estate Strategy and requires a series of concerted moves across the Faculty and College.

The provision of new courses and the acquisition of additional research active staff will require the re-thinking our use of space and the nature of our physical interactions. The Trinity Futures report urges us to consider how the learnings from the pandemic will impact our way of working, living and teaching and there is no doubt that aspects of the on-line, blended, synchronous and asynchronous delivery of lecture materials will continue.

STEM students have clearly indicated that they do not want all aspects of teaching to return to how it was before and the response to the pandemic has some very positive examples of why it should not. How we apply this knowledge will affect the delivery and quality of our course offerings.

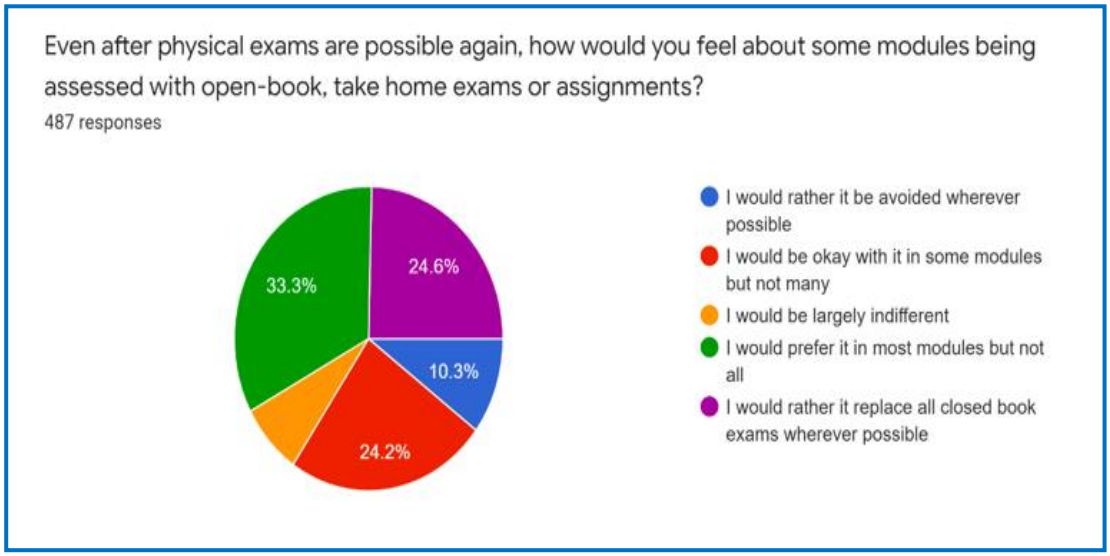


Figure 3: STEM SU student survey result 157 respondents (November 2020).

Multi-disciplinary Activities: There is a growing emphasis on multi-disciplinary research and challenge-based learning. This can be seen externally in the emergence of cross-disciplinary funding awards within the EU Green Deal, Horizon 2020, the EU Green Missions and the focus on climate science and climate resilience under the UN sustainable development goals. STEM staff are directing their research manifestos and teaching portfolios to respond to societal need. They are designing a range of new course offerings under a broad sustainability theme, and enthusiastically engaging with new funding opportunities (e.g. E3 Kinsella Challenge-based PhD awards). Multi-disciplinary programmes also bring new challenges and risks in terms of the nature and quality of our PhD supervision and the extent to which our courses deliver disciplinary depth and multi-disciplinary understanding.

8.2 STEM Faculty Actions in 2020/21

Prioritised Actions within the Faculty Office and under the direction of the Dean of STEM will seek to address how to:

- Support staff and student's resilience and wellbeing post COVID.
- Improve communications between staff/student cohorts, and feedback from Faculty representatives across the College.
- Analyze the opportunities and risks that emerge from online and blending learning and teaching, and multimedia forms of assessment.
- Bolster the financial sustainability of the Faculty by leveraging the opportunities afforded

though the philanthropic Campaign for Trinity, and recent Faculty-led submissions within the Human Capital Initiative.

- Further embed the Athena SWAN objectives, and progress actions for promoting gender, equality, and inclusion across all 8 Schools
- Continue to drive forward the E3 project and to use the E3-dedicated marketing team to pilot and test effective marketing strategies to the benefit of the entire Faculty e.g. virtual Open Day materials and career webinars.
- Enhance data acquisition, analysis, testing and scenario planning at Faculty and School level.
- Work across multiple College committees to support (i) PhD student recruitment (ii) equipment and physical infrastructure needs within STEM schools (iii) the timely allocation and distribution of resources including space.

8.3 Present Realities and Risks

Writing a quality report is challenging.

How do we objectivity capture the quality of teaching and research using a combination of qualitative and quantitative questions which are continuously changing?

In preparing this retrospective annual report, the Schools and Faculty are made to reflect on the past 12 months whilst also preparing for what lies ahead. Whether we categorise quality by examining the outcome, or the process, it is evident that the Schools and Faculty are continuing to achieve at their best under extremely challenging conditions.

Annual changes to the quality template mean that benchmarking is not always feasible from one year to the next. The timeframe for the collation, analysis and presentation of the Faculty Quality Report to the Quality Committee remains a challenge. The current process and the template do not allow for responses to be consistent across years and data acquisition and its analysis, form part of our future actions.

8.4 FACULTY AT A GLANCE QUANTITATIVE DATA

Tables 7 and 8 summarises the course and module evaluation for undergraduate modules and postgraduate programmes.

Table 7: UG Student Module Evaluations

STEM Schools: UG Student module evaluations	No. of UG module taught	No. of UG module evaluated	% of UG modules evaluated (%)	Average response rate to module evaluations (%)
Biochemistry and Immunology	49	28	< 50%	Varies 10-60%
Chemistry	35	35	100%	17%
Computer science and statistics	86	74*	100%	37%
Genetics & Microbiology	30	21	100% in Microbiology and 70% across school	93% in Microbiology and varies across school
Mathematics	55	55	100%	48%
Natural sciences	84	84	100%	Evaluations carried out in class and electronically (especially since COVID) with 100% response
Physics	46	46	37%	65%
Engineering	126	126	100%	100%

**Modules provides to the BAI degree (10 modules) and Mathematics (2 modules)have been excluded as these are surveyed by the School of Engineering & School of Mathematics respectively.*

Table 8: PG Student Programme Evaluations

STEM Schools: PGT Student programme evaluations	No. of PGT programmes taught	No. of PGT programme evaluated	% of PGT Programmes evaluated (%)	Average response rate to PGT Programmes evaluations (%)
Biochemistry and Immunology	20	20	100%	90%
Chemistry	0	0	n/a	n/a
Computer science and statistics	3	2	67% (2/3)	71% & 79%
Genetics & Microbiology	0	0	n/a	n/a
Mathematics	1	1	100%	68%
Natural sciences	3	3	100%	80%
Physics	1	1	100%	100%
Engineering	12	11 (Note: MSc in Bioengineering course will be evaluated after students' complete course (extensions granted due to Covid)	92%	80%

External Examiner Reports are depicted in Tables 9 and 10.

Table 9: Undergraduate (UG) Programmes Externally Examined (EE) by School

STEM Schools: UG External examiners	No. of UG EE reports expected	No. of UG EE reports received	% of No. of UG EE reports returned (%)
Biochemistry and Immunology	4	4	100%
Chemistry	5	5	100%
Computer science and statistics	5	5	100%
Genetics & Microbiology	3	3	100%
Mathematics	2	2	100%
Natural sciences	8	8	100%
Physics	3	3	100%
Engineering	6	6	100%

Table 10: Postgraduate (PGT) Programmes Externally Examined (EE) by School

STEM Schools: PGT External Examiners	No. of PGT EE **reports*** expected	No. of PGT external examiner **reports*** received	% of PGT external Examiner reports returned (expected 100%)*
Biochemistry and Immunology	2	2	100%
Chemistry	0	0	n/a
Computer science and statistics	4	4	100%
Genetics & Microbiology	0	0	n/a
Mathematics	2	2	100%
Natural sciences	3	3	100%
Physics	0	0	n/a
Engineering	12	9 (Note: MSc Bio & MSc EIE reports delayed due to Covid. MSc Mech are waiting on official approval of their extern from AR (issue has been raised a number of times)	75%

Table 11: Staff/Student Liaison Committee

STEM Schools: **Staff/Student Liaison Committee**	Does your school have a Staff/Student Liaison Committee
Biochemistry and Immunology	Yes
Chemistry	Yes
Computer science and statistics	Yes
Genetics & Microbiology	Yes
Mathematics	No
Natural sciences	No
Physics	Yes
Engineering	Yes

Table 12: Graduate Teaching Assistants

STEM Schools: **Graduate Teaching Assistants**	No. of Teaching Assistants (TA) in the School	Ratio of TAs to students e.g. on School programmes / in labs	No. of TAs who have enrolled in/completed the GTA online module
Biochemistry and Immunology	GTAs are recognized in the school as demonstrators and engage in paid teaching in practical classes. This varies in semester. In 2019/19: Sem 1: 40 Sem 2: 37 In house training is provided for direction and assessment of practicals.	Average Demonstrators to student ratio these sessions varies depending on year Ranges 1/12 -1/15	Several students have enrolled and completed the 5 credit module.
Chemistry	90 (78 excl. service teaching)	1 demonstrator:6-12 UGs	30 completed it in 2019/20; all PGs (except Polythea ones) required to complete by end of their 2nd year for credit
Computer science and statistics	17	n/a	N/A for 2019/20***
Genetics and Microbiology	There has been a large amount of flux in our teaching commitments. I prefer to defer comment on this until figures are available that reflect these changes (an increase in FTSE is anticipated).		
Mathematics	16	Approx. 130	None
Natural sciences	0	0	0
Physics	60	Average 15 Students:TA Experimental labs Average 13 Students:TA Computational labs Average 18 Students:TA	Data not captured for students taking (i) However all TAs completed a 5 Credit (ECTS) module in PYU5025 in 2019/20 or prior years.
Engineering	97	Approx: 1:5 for labs* Approx: 1:40 for tutorials* * pre-covid numbers	6 enrolled for credit, 4 completed. No data for self-directed mode (students enrol themselves)

**Modules provides to the BAI degree (10 modules) and Mathematics (2 modules)have been excluded as these are surveyed by the School of Engineering & School of Mathematics respectively.*

***NB this calculation should be based on the number of External Examiner reports expected rather than the number of External Examiners, as individual Examiners may produce multiple reports i.e. on more than one strand or year within a programme.*

****SCSS will require mandatory completion of the CAPSL course (Teaching and Supporting Learning as a Graduate Teaching Assistant)for TAs in addition to its own local requirement s from 2020-21.*

APPENDICES

Appendix A: Action by action plan

School of Biochemistry and Immunology

No	Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
1	UG module evaluations	Spacing/timing of in course MCQ assessments for JS students in all school moderatorships.	*Completed for most of the core modules.* *Will be completed for open modules in 2020/21*	*To ensure equal distribution of student work load throughout the term*	JS course coordinators	Avoid a situation where multiple assessments occur towards the end of the semester	*End of 2021*	*Course coordinators and staff agree with this objective* *Important to co-ordinate with modules that run simultaneously.* *Need to co-ordinate with other moderatorships in case of open modules.*
2	ISSE Survey (UG) Address concerns on Acquiring job- or work-related knowledge and skills 78% replied either very little or some	*Introduction of a new core Skills module (10 credit) in JS To develop critical analysis and communication skills for graduates.* *Will include workshops by experienced staff (school and external*	Survey students on response to new module at end of Sem 2 year 20/21	To address student concerns re job related skills re presentation, analysis and communication; opportunity to hear from professionals and former graduates working in academic and nonacademic	HoS, DUTL course co-ordinators	Increased student satisfaction on issues relating to employment skills and opportunity to meet and hear from professionals outside of the school.	2020/21	Wide support for Training in presentational skills, specifically oral presentations and for the policy of bringing in external non academic professionals working in the filed or allied areas to meet and discuss career options with students.

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
UG External Examiner reports	*Request to provide model outline answers/guidelines to assist second markers*	Implemented for all senior sophister exams	To ensure transparency and consistency in assessment process	Senior Sophister course co-ordinators	To assist second markers	Completed 2020	While staff agree with the request it is essential that second marking process is independent. This is not a marking scheme nor will the second examiner know in advance the grade awarded by the primary marker
ISSE Survey (PGR)	*Revision of PhD handbook, a full orientation day with input from staff, Director PGTL and introduction and greeting by HoS.*	Completed and implemented for academic year 2020/21 Online. Will be further developed for 2021/22 by walk though building and introductions to technical , admin and support staff	To address concerns revealed in survey: "I received an appropriate induction / orientation to my research degree programme" 46.2% definitely disagreed or	Director PGTL and HoS, CTO	Increased student satisfaction in survey on this point	Sept 2021	Higher positive response from PG Research students

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
PG External Examiner reports	*To increase the number of projects offered by PIs within the school*	Continue to encourage this and consider holding a project fair day where labs can "promote" their research to students	Increase engagement of students with PIs within the school	HOS, DPGTL, Course directors	Increase number of projects within the discipline of Immunology	2020/21	
	Amended handbook to include more explicit instructions as to what is required for project presentations	Provide further instructions to students at end of project and coaching on presentation techniques	External examiner suggested students could have been better prepared for their project presentations	Course directors	Ensure students are better prepared to give their final project presentations	2020/21	

School of Genetics and Microbiology

No	Identified issue	Planned Action to be taken	Problem/Opportunity action responds to	Trigger/ Source (e.g. EE report, module evaluation, ISSE PGR etc.)	Responsibility (e.g. DUTL, DTLPG, Programme Director etc.)	RAG Status Progress	Comment
1	Action(s) taken in response to UG module evaluations	Reorganise final year research projects in Microbiology so that they are split evenly between semesters 1 and 2. This action was addressed in 2020	In 2018, Microbiology SS students requested this change so that they could reflect on their results and start to write them up before planning the second phase of the project. In 2020, Micro projects were split between semesters	Feedback from SS students	Microbiology course director	Completed	
2	Action (s) taken in response to ISSE Survey (UG)	Encourage student participation	Low student response rate	Survey report	DUTL	Pending	
3	Action (s) taken in response to UG External Examiner reports	Reduction of word count for SS project reports in Genetics/Human Genetics.	EE found the reports too lengthy. Word count in Genetics SS submissions was reduced in response to external examiners comments.	Court of Examiners meeting	Genetics/Human Genetics course coordinator	Implemented	

School of Physics

No	Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
1	UG module evaluations	UG module evaluations		Full semesterisation of module evaluations	More rapid response to student feedback			
2	ISSE Survey (UG)		DUTL, UG administrator	Evaluations collated and communicated to module coordinators	End Sem1			
3	UG External Examiner reports	ISSE Survey (UG)						
4	PG module evaluations	UG External Examiner reports	Adapt exam question style to be more suitable to Open book 'take home' exams		Achieve appropriate assessment	DUTL, Examiners and collators.	Positive feedback from Extern examiner	Sem 1 Exams and Sem 2 exams
5	ISSE Survey (PG)	PG module evaluations	External Generic Module (EGM) was approved by GSC	Simply module enrolment and implement EGM	Improve effectiveness of PG administration	DUTP, PG administrator	Positive feedback from PGs	Sem 1
6	ISSE Survey (PGR)	ISSE Survey (PG)						
7	PG External Examiner reports	ISSE Survey (PGR)						
8	Accreditation reports	PG External Examiner						
No	**Actions taken in response to:**	**Actions taken since previous report**	**Further planned action to be taken**	**Rationale**	**Responsibility (e.g. DUTL, DTLPG, Programme Director)**	**Success criteria (i.e. required outcomes)**	**Timeframe**	**Comments**
9	ISB Survey report	Accreditation reports	Allocate Capstone projects randomly to students if more than one student selects the same project	Review of allocation following completion of project and student feedback.	Achieve fairness in allocation for all students (not just high performing ones)	SS Year Head.		End Sem 2
10	Retention data	UG module evaluations		Full semesterisation of module evaluations	More rapid response to student feedback			
11	Other		DUTL, UG administrator	Evaluations collated and communicated to module coordinators	End Sem1			

School of Engineering

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
UG module evaluations	The covid-19 pandemic changed the picture radically. Less labs/tutorials given live diminished the need of TA being involved.	School proposing to make it a requirement for PhD students to teach.	Decline in number of Teaching Assistants and impact on lab/tut teaching	DUTL			
ISSE Survey (UG)	The covid-19 pandemic changed the picture radically. We engaged with class reps as frequently as possible and special provisions indicated by the SL were applied.	Keep on interacting frequently with class reps to flag issues/concerns and act timely.	1st year student experience	DUTL			
UG External Examiner reports	The covid-19 pandemic changed the picture radically. We interacted with External examiners online and implemented their recommendations insofar as possible and relevant.	Keep informing the external examiners and working on suggested changes to our programmes, insofar as possible and relevant.	New academic year structure and timing of exam sessions (problems with compressed exam session)	DUTL			
PG module evaluations	Feedback were provided within the framework of online lectures and limitations in interactions due to Covid-19.	School is considering ways to increase interaction with students and provide timely		DPGTL			

School of Engineering (continued)

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
ISSE Survey (PG)	Feedback on coursework is being provided more regularly and timely.	Encourage staff to upload materials and recordings on time.		Course Directors			
ISSE Survey (PGR)	Doctoral Committee has been implemented.	Performance review of Doctoral Committee in the School is planned.		DPGTL			
PG External Examiner reports	Recommendations were implemented within the restrictions and limitations imposed by Covid-19.	Course directors are in touch with the examiners and updating them about actions taken/to be taken.		Course Directors			
Accreditation reports	NA (accreditation process delayed due to Covid)						
ISB Survey report	The covid-19 pandemic changed the picture radically. We engaged with class reps as frequently as possible (a class rep sits in the School curriculum committee). Improved pre- and post-arrival communications	Review CA deadlines to coordinate them, insofar as possible and relevant.	Coordinated scheduling of CA deadlines Students benefit from	DUTL Global Officer	Students performing better in Semester 1	June-Sept annually	Disrupted by Covid in 2020

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
Retention data	None required. Retention rates are good and consistent year on year.						

School of Chemistry

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
UG module evaluations	UG module evaluations	Students requested more detailed feedback on grading of practicals.	Sample write ups will be provided for JS labs in 2020/2021	Sample write-ups will help students to better understand the level of write-ups required and how the marking scheme operates. It will help demonstrators to be more consistent with their marking.	DUTL to liaise with HODs to prepare sample reports and tutorial on report writing for 2020/21	Improved overall grades for JS students in S1	*12 months*
ISSE Survey (UG)	Number of tutorials for PChem has been increased.	Higher level of tutorials applied during pandemic may be retained.	Students benefit from having more tutorials and smaller group tutorials.	DUTL to schedule more tutorials, in particular for JF PChem where some students struggle with maths.	Improved grades in JF PChem modules	12 months	
UG External Examiner reports	Exams structures for JS and SS have been adjusted to remove MCQ components as requested by external examiners	Blackboard will be made available to external examiners	Examiners require access to all exam scripts and project write-ups so as to fully assess grading and quality of student answers.	DUTL to arrange access to Blackboard for externs	Improved external examiner feedback	6 months	

School of Mathematics

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e required outcomes	Timeframe	Comments
UG module evaluations	some minor changes to MAU22200 to include some things needed in other modules, but more extensive changes to the Analysis modules will have to wait until things return to normal.	**Discussion of content for analysis**	**Opportunity to improve of analysis procedures**	**DUTL, UG Maths Committee**		**ongoing**	**Maths**
ISSE Survey (UG) **Address concerns on** **Acquiring job- or work-related knowledge and skills** **78% replied either very little or some**	The only substantive change in 2019-2020 was that we didn't hold the poster session. Students still prepared posters and those were sent to the examiners, but there wasn't a public session. For 2020-2021 the situation will probably be similar, but no final decision	**Discussion of format of final year projects**	**Forward planning**	**DUTL**	**Discussion of format of final year projects**		

School of Computer Science and Statistics

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
UG module evaluations	Regular meetings of SCSS Undergraduate Student Representative Forum each semester	Regular meetings of SCSS Undergraduate Student Representative Forum each semester	Standard SCSS quality procedure	DUTL and Associate DUTL	Constructive engagement with student body	Recurring	
ISSE Survey (UG)	Initial analysis of SCSS data from ISSE survey	Item for February SCSS UGTLC meeting	Address areas of concern highlighted in ISSE survey	DUTL and Associate DUTL	Improve metrics	2-3 years	
UG External Examiner reports	Discuss variation in exam paper rubrics	Further discussion of standardization of exam marking framework	Potential for student confusion arising from variations in exam paper rubrics	DUTL	ongoing	1 year	Although External Examiners have raised this matter on several occasions, students have repeatedly told the School that it is not an issue for them.
PG module evaluations	Discuss Student Evaluations	Matters of concern raised at PGTLC in response to evaluations	Monitors quality of PG modules offerings	DPGTL	Positive student feedback	Continuous	This is a continuous check on the quality of the modules offered.
ISSE Survey (PG)	Discuss Student Surveys	Matters of concern raised at PGTLC in response to survey	Monitor external input on programme quality	DPGTL	Feedback loop to ensure programme is meeting student expectations	Continuous	This is a continuous check on the quality of the programmes

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
PG External Examiner reports	Discuss External Examiner Reports and Feedback	Matters of concern raised at PGTLC	Ensure External Examiner Feedback is considered	DPGTL	Assessed with External Examiner in following years	Continuous	This is a continuous check on the quality of the programmes offered.

School of Natural Sciences

Actions taken in response to:	Actions taken since previous report	Further planned action to be taken	Rationale	Responsibility (e.g. DUTL, DTLPG, Programme Director)	Success criteria (i.e. required outcomes)	Timeframe	Comments
ISB Survey report	None	Survey required for SHS international students	ISB insufficiently detailed at School level	DGR	High response	End of Academic Year	

Appendix B: Quality Review Cycle

School, Programme or Trinity Research Institute	Date of Quality Review	Type of Quality Review (S, P, R)*	Current Status (RR, IP, PR)**	Next review due
Chemistry	16-18 November 2015	S	Progress Report approved by Council in February 2018	2022/23
Computer Science and Statistics	15-17 February 2016	S	Progress Report approved by Council in June 2018	2022/23
Trinity College Institute of Neuroscience (TCIN)	25-27 April 2016	R	Progress report approved by Council in June 2018 (PR)	2022/23
CRANN	May 2018	R	Review Report approved by Council in June 2018 Implementation Plan approved by Council in October 2018	2024/25
Biochemistry and Immunology	March 2020	R	Deferred	postponed to 2021
Genetics and Microbiology	March 2020	R	Deferred	postponed to 2021

Appendix C: Faculty Retention

		1				2				3				4				5				Grand Total
		Female		Male		Female		Male		Female		Male		Female		Male		Female		Male		
	Retention	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	
Biological and Biomedical Sciences	Progressed Same Course	139	18	66	2	143	8	78	4													458
	Repeat Same Course							1														1
	Transferred to Another Course	3		2																		5
	Not Retained	3	1	3				3														10
Chemical Sciences	Progressed Same Course	34	1	28	1	35		27														126
	Repeat Same Course					1																1
	Not Retained	1		2																		3
Chemistry with Molecular Modelling	Course Completed														1							1
	Progressed Same Course									1		1										2
	Transferred to Another Course									2												2
Computer Science	Course Completed																			17		17
	Course Completed-Exit Award													15		44	4					63
	Progressed Same Course	12	6	73	13	6		72	9	14	2	62	5	3		22	1					300
	Repeat Same Course			1		2																3
	Transferred to Another Course					1																1
	Not Retained	3	1	7	1	2		1					1	1								17
Computer Science and Language	Course Completed													4		6						10
	Progressed Same Course	4		10		3		4		5	1	3										30
	Repeat Same Course			1										2								3
	Transferred to Another Course									1												1
	Not Retained			3										1								4
Earth Sciences	Course Completed													8		7						15
	Progressed Same Course									10		4										14
	Not Retained											1										1
Engineering	Course Completed																	36	5	74	9	124
	Course Completed-Exit Award													7	6	18	16	1				48
	Progressed Same Course	45	4	134	3	52	5	131	7	48	2	104	31	30	2	97	2					697
	Repeat Same Course				1			2														3
	Transferred to Another Course		2	3																		5
	Not Retained	1		5		1		1			1	1		1		1						12
Engineering - Double Diploma	Progressed Same Course														1							1
	Not Retained															1			3			4
Engineering with Management	Course Completed																	1	7			8
	Course Completed-Exit Award													2		6						8
	Progressed Same Course	5		20	1	5	1	20	1	7	1	11		3		10						85
	Not Retained			1																		1
Geography and Geoscience	Progressed Same Course	24		23		22	1	21														91
	Transferred to Another Course	1				2																3
	Not Retained	2						1														3
Human Genetics	Course Completed													7	1	6						14
	Progressed Same Course									9		1										10

		1				2				3				4				5				Grand Total
		Female		Male		Female		Male		Female		Male		Female		Male		Female		Male		
	Retention	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	
Management Science and Information Systems Studies	Course Completed													12		12	1					25
	Progressed Same Course	15	2	19	2	7		19		4		22										90
	Repeat Same Course				1																	1
	Not Retained									1												1
Mathematics	Course Completed													6	1	28						35
	Progressed Same Course	6		33		11		13		6		25										94
	Repeat Same Course			1		1										1						3
	Transferred to Another Course			2		1																3
	Not Retained	1		1								1										3
Medicinal Chemistry	Course Completed													13		6						19
	Progressed Same Course									14		7										21
Nanoscience, Physics and Chemistry of Advanced Materials	Course Completed													4		16						20
	Progressed Same Course									5		20										25
Physical Sciences	Progressed Same Course	12	3	43	2	18		37	1													116
	Transferred to Another Course	6		2				1														9
	Not Retained					1		2														3
Science	Course Completed													161	6	131	2					300
	Progressed Same Course									164	11	122	3									300
	Repeat Same Course											3		1								4
	Transferred to Another Course											3										3
	Not Retained									1		2		1								4
Theoretical Physics	Course Completed													5		24						29
	Progressed Same Course	7		31		7		33	1	3		24	1									107
	Repeat Same Course							1				1										2
	Transferred to Another Course							5														5
	Not Retained	1																				1
Grand Total		**325**	**38**	**514**	**27**	**321**	**15**	**473**	**23**	**295**	**18**	**418**	**41**	**287**	**17**	**435**	**28**	**38**	**5**	**101**	**9**	**3428**

Appendix D: Faculty Risk register 2020

Ref / Risk Number	Faculty / Department / School	Risk Description	Opportunity Description	Mitigating controls / actions /strategies currently in place
		Please ensure the format "Risk of" ..... "Due to" is used in every risk - separate the symptom from the cause	This is defined as the opportunities that are obtained by engaging in the risk	Insert specific activities that are currently performed in relation to the risk. Ensure they are tangible and stated as facts.
1: Large-scale equipment failures	FEMS: Phys./Chem./B&I	Large-scale equipment failures due to (i) insufficient resources for replacement at local level (ii) dependency on expert knowledge (iii) effects of unforeseen events (iv) poor maintenance and/or obsolete software	Opportunity to strategically coordinate priorities for (i) equipment renewal and maintenance plans (ii) staff continuity planning to explore opportunities for shared/co-located personnel (iii) developing contingency plans (iv) improved maintenance contracts at procurement stage.	SFI large-scale equipment applications are reviewed at College level. Upskilling of technical support staff supported by Schools e.g. creation of experimental officer posts in recognition of specialist skills. Schools actively engaged in (i) cross-institutional centres with large-scale equipment infrastructures (ii) financial and research planning (iii) income-generating and philanthropic activities to support equipment.
2: Inadequate or unsuitable space for teaching and research	FEMS: all schools	Inadequate or unsuitable space for teaching and research due to (i) age and historic inheritance of buildings (ii) multiplicity and dispersion of sites occupied by single schools	Opportunity to (i) raise collective issues (e.g. Goldsmith Hall, E3 student and staff expansion spaces (ii) to act responsively and co-operatively with Space Allocation Committee (e.g. to consolidate School spaces via decanting and refurbishment opportunities).	Space allocation policy approved. Inclusion of refurbishment costs in recent new funding applications and income-generated activities e.g. E3. Space needs not addressed fully in HCI application. Frequent update and revision of a FEMS-based space atlas. Provide consistent data for school and faculty purposes.
3: Ill-conceived and costly staff recruitments	FEMS: Chem/Phys/SCSS	Ill-conceived and costly staff recruitments due to (i) changes in implementation and HR policies (e.g. COID, retirement) (ii) school-led hiring stragies need to be reconsidered e.g. opportunistic rather than strategic (iii) repeated and failed recruitment attempts. (iv) job sizing (v) staff retention	Opportunity to further (i) communicate HR policies in a consistent and transparent manner (ii) integrate school staffing and finanical plans at FEMS level (iii) critique school/College hiring processes and HR service provision	All recruitment is managed through the FEMS Office, which includes panel composition and FEC approval. Separate Chair recruitment process developed.

Ref / Risk Number	Faculty / Department / School	Risk Description	Opportunity Description	Mitigating controls / actions /strategies currently in place
		Please ensure the format "Risk of" ..... "Due to" is used in every risk - separate the symptom from the cause	This is defined as the opportunities that are obtained by engaging in the risk	Insert specific activities that are currently performed in relation to the risk. Ensure they are tangible and stated as facts.
4: Over-reliance on untested revenue streams	FEMS: all schools	College policies drive over-reliance on untested revenue streams due to (i) justification for school expenditure primarily based on income generation (ii) uncertainities around research funding (iii) increased expectations and ambitions of junior staff pushing risk. (iv) Utilisation of a BBM that is transparent and consistent to enable school planning	Opportunity to (i) stage gate and pilot revenue-generating activities (ii) share best-practise across Schools (iii) implement Career Development Planning and self-relfection processes at school-level.	Constant review of STEM, school and RI budgets and capital projects. FEMS oversight of financial exposures and deficits. Quaterly finance meetings with schools. Numerically-based strategic planning. Targetted strategic rather than opportunistic recruitment at School level. Monitor research diversity and variance in funding streams of PIs.
5: Significant and imbalanced resource issues on the implementation of TEP	FEMS: all schools	Significant and Imbalanced School-level resource issues due to (i) E3/HCI growth strategy (ii) variance in sFTSEs on the implementation of TEP (iii) time-lines for USSHER hires (iv) excessive expenditure against diminishing reserves (v) lack of adequate resources	Opportunity (i) to promote greater shared financial responsibility (ii) to further diversify income streams (iii) to increase the management and understanding of fixed costs and asset depreciation.	Planning Group/FEMS/E3/TEP steering group oversight. Gradual opportunities to exploit new TEP infrastructure e.g. Columbia dual-degree programmes, Computer Science + programmes
6: Serious accident/event/disclosure arising from legislative non-compliance	FEMS: all schools	Serious risk of accident/event/disclosure arising from legislative compliance failure e.g. (i) Health and Safety (ii) Dignity & Respect (iii) HPRA (iv) QQI (v) external accreditation e.g. Professional bodies, Athena SWAN (vi) external recommendations, policies and procedures. (viii) increase the risk of legacy chemicals	Opportunities to advance understanding of legislative obligations through (i) appropriate committee structures (ii) effective ownership and governance (iii) obligatory training and workshops (iv) active engagement with legistlative bodies.	Obligatory training and workshops for staff e.g. School safety Officers - laser/safety training, HR, Dignity and Respect event, HoS - induction. Regular and minuted committees with appropriate escalation routes e.g. CMU, AWB, RSC, Athena SWAN.Focussed single agenda FEC are now routine (e.g. Safety/Quality/Gender and Equality/Compliance/Performance, risk....). Faculty Ethics Committees, Radiological Safety and Safety Committees all meeting regularly with up-to-date terms of reference.

Ref / Risk Number	Faculty / Department / School	Risk Description	Opportunity Description	Mitigating controls / actions /strategies currently in place
		Please ensure the format "Risk of" ..... "Due to" is used in every risk - separate the symptom from the cause	This is defined as the opportunities that are obtained by engaging in the risk	Insert specific activities that are currently performed in relation to the risk. Ensure they are tangible and stated as facts.
7: Loss of key personnel	FEMS: all schools	Loss of key personnel due to (i) systemic underfunding of 3rd level education sector (ii) increased competition from Dublin-based and international institutions (iii) unattractive or insufficient retention opportunities	Opportunities to (i) lobby funding agencies including governnment (ii) identify recognise and reward key personnel (iii) engage in succession management	Retention by promotion policy in operation. Stategic recruitment policies. Remote operation of promotion and progression processes. Clear transparency in terms of timelines for calls.
8: Diminishing institutional research profile	FEMS: all schools	Falling institutional research profile due to (i) dropping QS world-rankings (ii) polarised research eco-structure e.g. centres vs schools (iii) competitive research/administrative/teaching demands on academic units	Opportunity to (i) promote QS beneficial actions and articulate competitive, global nature of the education sector (ii) construct a positive co-shared operational framework for RI and schools (iii) develop School-based workload models to promote equity/transparency to support career development.	Discipline-level QS ranking tracked. Specific hosting agreements in place. Unofficial workload distribution implemented in schools.
9: Inability to respond effectively to external events and evolving student markets	FEMS: all schools	Inability to respond to external events/market forces due to (i) inflexibility in course offerings e.g. over-dependence on 4 year UG degree model (ii) modes of delivery e.g. on-site student/lecture format (iii) staff engage in upskilling/new technologies/performance review in a very short timeframe with very few resources and supports	Opportunity to pilot new models of programme delivery e.g. on-line, microcreditionalling, accumulative degree offerings through HCI funded initiatives (ii) to learn from private colleges and Open University (iii) to tap-into digitial media and marketing expertise ((iv) to engage in end-user/alumni co-creation.	Induction and upskilling workshops offered. Tagent and on-line education units within College. Dramatic change in this risk due to new on-line, remote, hybrid and blended delivery of course materials across the Faculty.

Ref / Risk Number	Faculty / Department / School	Risk Description	Opportunity Description	Mitigating controls / actions /strategies currently in place
		Please ensure the format "Risk of" ..... "Due to" is used in every risk - separate the symptom from the cause	This is defined as the opportunities that are obtained by engaging in the risk	Insert specific activities that are currently performed in relation to the risk. Ensure they are tangible and stated as facts.
10: Decline in PGR numbers across FEMS	FEMS: all schools	Decline in PGR numbers across the Faculty due to (i) rising PG fee gap (ii) unattractive stipend provision (iii) preferential PD recruitment by PIs (iv) increasing demands on academic time e.g. pastoral care, structured PhD couse provision, advertisement, training.	Opportunity to (i) connect PG with teaching outputs of schools (ii) drive innovation (iii) engage in longer-term/exploratory research investigation (iv) create future TCD ambassadors	PhD supervision required by RSS and for teaching in promotion criteria. PG supervision in workload models. Quantify UG teaching dependency on PGR numbers. Consider PDR role in teaching/laboratory supervision. Quantify and communicate financial benefit of PGR (EU and non-EU) to schools' income
11. Risk of increasing and escalating costs of doing STEM-based research due to Brexit.	FEMS: all schools	Risk of increasing and escalating costs of doing STEM research due to Brexit. This may arise in the form of (1) additional import/export costs and procurement issues as TCD look to suppliers outside of UK to ensure the supply of goods and services in a timely manner. (2) Delay in the provision of services and goods required for research projects. (3) research contract/ grants issues for TCD/ UK collaborations that are ongoing (4) Brexit may result in fewer students from the UK wishing to attend TCD following brexit.	Opportunity to (i) broaden collaborative network outiside of the UK (ii) move away from synthetic on-site research in favour of small scale exploratory research and/or computational or theoretical research (iii) apply a cross-institutional response	(1) TCD is reviewing its number of UK suppliers and the supplier contracts (2) TCD is experiencing delays from the UK in supply of services and goods yet the entire nation is experiencing such delays so this is being addressed at a higher level (3) TCD will conduct targeted marketing in order to recruit students from the UK.
12. Reduced ability to retain and recruit UG students	FEMS: all schools	There is a risk of students dropping-out of courses given that courses are mainly online and there are adverse consequences particularly for non-EU students in the light of COVID19 and restrictions.	Opportunity to (i) revisit what is distinctive and important about Trinity education in a more homogenous on-line offering (ii) reflect on the experiences that matter (iii) identify and prioritise the essential teaching (iv) rethink space requirements and how usage of teaching spaces.	(1) additional student support services are being provided along with more online facilities. (2) Greater focus on student wellbeing in these challenging times (3) Trinity Futures and student survey results discussed at Faculty level (4) Schools developing responsive and evolving teaching offerings for each UG course programme (5) Mechanisms adoped for constant communication with student cohorts through staff/liason committees and student representatives.
13. Risk of staff and students burnout	TCD	Risk of staff and students burnout under the additional personal and professional pressures of remote and on-site working due to COVID19 regulations. Productivity is likely to suffer and there is a risk of long-term effects for some individuals	Opportunity to work with HR professional and support services in a targetted and strategic manner	HoS and senior line managers offering continuous and personal connections e.g. outside of work and via on-line meetings.

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

www.tcd.ie/stem

Faculty of STEM Quality Report

Written by Prof Draper and Dr O'Connor but only feasible due to contributions from STEM Head of Schools, School administrative managers, Directors of Teaching & Leaning (PG &UG).