



University College Dublin School of Physics



Juno Practitioner Application November 2020

*This document has been amended from the submitted version.
Some figures and confidential text have been removed.*

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1.0 INTRODUCTION

This is the first application for Juno Practitioner Status by the School of Physics (SoP) in University College Dublin (UCD). We have been Juno Supporters since 2013 and this status was subsequently extended in 2018. Throughout our time as Juno Supporters, new policies and efforts detailed in this document have been initiated. The School is committed, through the staff from junior to senior, to monitoring gender and diversity issues and challenges. The staff of the School will work to build the framework consisting of policy, implementation, monitoring and feedback, in a cycle of continuous improvement, to deliver the Project Juno goal of equality of opportunity and reward.

We present a detailed assessment of our current status in a broad range of areas from staff, students, research, roles and career advancement for the first time. In this application for Practitioner Status, we present context in terms of contributions to gender equality in UCD generally and a detailed census of the female participation in the School from staff, to postdocs, students, participation in outreach initiatives to social events etc. Data is benchmarked where possible against the Irish national figures and this is our first attempt as a School to accurately measure female participation and identify issues. A key output of this effort is a system to update these data annually.

The SoP is relatively small with 23 academic and 12 professional and support staff. In 2019, 18% of academics (four full-time female academics), 31% of professional and support staff, ~26% of the total undergraduate student group and ~40% of the postgraduate population are female. There is one female academic at the Full Professor (FP) level and 17% of staff at Professor/Full Professor level are female. The gender breakdown in the SoP from the Undergraduate to the FP level is shown in **Figure 1.1** below.

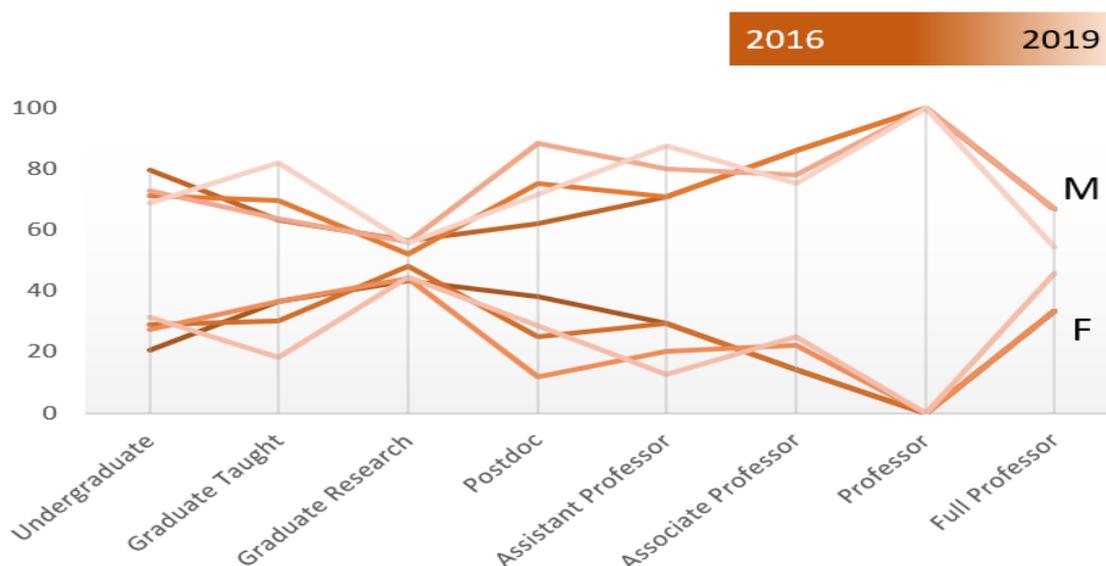


Figure 1.1 Diagram showing the percentage of females and males from undergraduate students to Full Professor.

Key challenges include the gender gap in student numbers, staff numbers in most categories, and staff progression. Over the next three years, the school will implement new policies, review their impact through the accumulation of evidence and modify where required in line with best practice.

This document is organised as follows:

In this Chapter (1), an overview of the background of the School, the committee and historical EDI work relevant to Juno is presented. Staff numbers are presented in Chapter 2. School roles and responsibilities are presented in Chapter 3. Student numbers are presented in Chapter 4. The School's teaching and research portfolio are presented in Chapter 5 and 6, respectively. Recruitment and Promotion are discussed in Chapter 7. Engagement and Outreach activities carried out by the School are presented in Chapters 8 and 9 respectively. Leave policies, data and personal experiences are presented in Chapter 10. The remaining chapter covers the consultation process with students and staff. A high level analysis is presented at the start of each chapter and action numbers are listed at the end which refer to the Action Plan.

The Action Plan contains actions based on analysis of Principles 1 to 6. The main focus of this application for Practitioner is Principle 1 however we present actions for Principles 2 to 6 in order to lay the foundation for progression to Champion. This document was prepared for the April 2020 submission. The deadline was cancelled due to the COVID-19 pandemic and it was agreed with the Institute of Physics Juno team that this document would be frozen as for the April 2020 deadline.

The COVID-19 lockdown resulted in a physical closure of UCD from 12 March 2020 and limited access is currently allowed. Childcare was closed in Ireland from 12 March to July and primary and secondary schools from 12 March to September. Working at home was very challenging for many staff and for those with caring responsibilities. Although this document does not cover that period, it will be important that the university addresses this issue explicitly and especially in applications for promotion going forward. The action **A-40 (Principle 3.2.1)** has been included in the action plan to reflect this issue.

In this Juno Practitioner Application, we do not cover Principle 6 in detail and are committed to actions in our plan to improve our policy, awareness and response to issues of harassment, bullying and sexual harassment. We wish to acknowledge the sexual harassment of a female staff member by a male staff member that occurred between 2015-17, and was highlighted in the media in the summer of 2020. The issue was not common knowledge within the SoP until it appeared in the media in the summer of 2020. The SoP fully understands that what happened is unacceptable and is committed to addressing the issue of harassment, bullying and sexual harassment in our school. It is clear that dedicated effort and time are required to educate ourselves and to address these issues and we are committed to doing so as part of our Juno journey, refer to **A-59 (Principle 6.2.1)** in the action plan. This process has begun with discussions at school level, a statement on the matter to staff and students by the Head of School (HoS), and the adoption of a SoP Code of Conduct. The Head of School has formally apologised to the female staff member. Many of the staff in the School have made suggestions

to the UCD policy and procedure documents which are currently being developed (Oct 2020) in the light of this harassment (Chp 3.12). A former Head of School makes the point that the UCD procedures were not fit for purpose in the case where a staff member from one school was engaged in harassing a member of staff from a different school. The School will work with the new UCD policies and procedures with the well-being of people at the focus of our actions.

1.1 Overview

The SoP is a leading centre for research and teaching in physics, with a strong international reputation for excellence in research and teaching, attracting students and staff of the highest international quality. The SoP is relatively small with 23 academics and 12 professional and support staff currently. However we are a growing physics department committed to meeting the educational needs of students and supporting staff development.

The SoP currently offers IOP-accredited undergraduate offerings of Physics (single and joint majors), Theoretical Physics (TP), and Physics with Astronomy & Space Science (PASS). Recently a new undergraduate programme of Physics, Mathematics & Education was introduced. Taught graduate MSc programmes are offered, which are based on the SoP's research strengths and foci in NanoBio Science, Space Science & Technology (SS&T), Nanotechnology, Computational Physics, and Applied Mathematics & Theoretical Physics (in conjunction with the School of Mathematics and Statistics). A new MSc programme in Medical Physics started in 2020.

In the past several years, the SoP has undertaken a university-led quality review with external assessors, as well as undergoing periodic IOP accreditations. These opportunities for self-reflection, combined with changes in the funding landscape, recent retirements, proposed refurbishments, new university hiring schemes (Ad Astra, seeing three new staff join the School in 2019/2020), faculty development processes, and promotion systems all in the past few years motivate us to understand and improve the learning experience of all students and the working conditions and opportunities for development of all staff.

1.2 Juno Committee

SoP Juno Committee 2016 - 2020

Work on the Juno project began informally in 2013 but a number of delays were encountered in the process. Initially the main issue was a lack of access to central data on staff and student numbers. Around that time, many academics in Ireland campaigned for the introduction of Athena SWAN. That process delayed progress in Physics but ultimately led to the availability of data centrally and support for consultations such as surveys. Some staff in Physics concentrated on that process initially which delayed the Juno progress. Sheila McBreen (SMB) was on maternity leave in 2016/2017 which postponed the application.

SMB had led the formation of the School committee in 2013 and the group began to investigate the local issues within the SoP and to gather data for the self-assessment process. Obstacles were encountered which meant that gathering data was a manual and error-prone process, onerous and unreliable. Examples include data on personnel, promotions and graduate

student numbers. The data gathering on staff and students has undergone major improvements in the last few years centrally in UCD and reports on students, staff, leave, etc. are provided to the Chairs via a UCD reporting tool. This tool runs annually and the census date is March of every year. The data presented here are from March 2020. The input for this application was provided by almost all members of the SoP by inputting data, participating in the consultation, commenting at meetings, and submitting edits to the draft. The committee acknowledges in particular work done by Associate Prof Emma Sokell and Associate Prof Luis Leon-Vintro regarding data collection and analysis of the teaching programme and student progression.

The Juno committee 2019/2020 has nine members, six females (F) and three males (M). It comprises the following: three academics (one F and two M), one technical officer (F), one postdoc (F), two postgraduate students (one F and one M) and two administrators (F). A project manager (F) was hired on an hourly contract specifically to support the committee with this application for Juno Practitioner.

Academics:

Associate Professor Sheila McBreen (Chair) (SMB) *Astrophysics & Space Science*

Professor Brian Rodriguez (Co-Chair) (BR) *Nanomaterials*

Professor Pádraig Dunne (PD) *Atomic Spectroscopy*

Technical Officer: Dr Sharon Shannon (SS) *Nano-Chemistry*

Postdoc: Dr Julia Subbotina (JS) *Computational Physics*

Postgraduate Students: Pallavi Kumari (PK) and Silas O'Toole (SOT)

Administrator: Angela O'Toole (AOT) & School Manager: Bairbre Fox (BF)

Project Manager: Orla Byrne (OB)

Members of the committee are appointed by means of expression of interest to the Head of School for a three year period. Appointments to committees should be representative of the SoP Community in terms of gender (40% minimum each of F/M), seniority (at least one senior academic) and role (different categories of staff and postgraduates and postdocs). A rotation policy will be implemented to ensure there is involvement from the whole School, refer to **A-01 (Principle 1.1.1)** in the action plan. The current committee membership is not balanced enough (six F and three M) and this will be addressed going forward in **A-02 (Principle 1.1.1)** in the action plan where an increase in male participation from three to four is targeted.

The committee may appoint a chair or co-chairs. The committee meets at least five times per year and reports to every SoP meeting. These meetings are held within UCD core meeting hours, and updates are provided as a standing item in the SoP meetings. The work of the chair(s) and committee members is accounted for by the SoP workload model. The chair(s) of this committee will undertake a key leadership role within the SoP that is comparable and equal to other leadership roles, refer to **A-03 (Principle 1.1.1)** in the action plan.

The SoP Juno Committee is responsible for supporting and mainstreaming the IOP Juno goals and values into everyday activities. This group plays an important role in mainstreaming gender equality in physics and encourages better practice for all staff throughout the SoP for faculty, staff and students. The Juno Committee has led the preparation of this document with

input from staff and students. The contribution to EDI work within the School should be broader and Juno is to be mainstreamed in all relevant SoP meetings for staff and students, refer to **A-04 (Principle 1.1.2)** in the action plan.

An annual report will be presented to the SoP each year in April, refer to **A-05 (Principle 1.1.2)** in the action plan. The committee Chair will appoint a Juno Data Officer within the Juno committee to ensure a consistent approach towards gathering and monitoring data to report on performance against the action plan, refer to **A-06 (Principle 1.1.2)** in the action plan.

The committee has been supported by the Head of School (HoS) over many years with a budget to support events (*redacted*). More recently, the HoS has provided a budget for consultation support and crucially to the preparation of this report, funding for a Project Manager to assist in this effort. The HoS has committed *redacted* per annum for the Juno effort going forward, refer to **A-07 (Principle 1.1.3)** in the action plan. The University supported this proposal via the data supplied by the Information System on students and staff, and in particular with the student survey and providing input on drafts. Budget was supplied for all areas by the Head of School when requested, e.g. the focus groups consultant and the support of Orla Byrne as project manager.

High Level Summary	
1.	Staff and students from SoP have made, and are continuing to make, a large contribution to EDI initiatives locally, in the CoS, UCD and nationally.
2.	The efforts range from policy, supporting colleagues to important outreach and engagement initiatives with primary school students.
3.	The Head of School provided resources for the focus groups consultant and project manager.
4.	The University provides data and survey support.

1.3 Contributions of Physics Staff to EDI

There has been substantial activity by some members of staff which predate this application, and which are crucial to the viability of this effort locally in the SoP. While this work is not necessarily solely part of the SoP, it has been crucial to progress in the area in UCD and provides important context to the Juno journey locally in UCD.

College of Science (CoS) Women in the Sciences (WiTS)

This group was established in 2013 in response to the lack of transparency and progress of female academics in the CoS. SMB served as chair until October 2014 and represented the WiTS on the CoS Executive committee. The committee continued until 2018 until it was replaced by Women@STEM (Chp 8.3). The initial activity for the committee was to solicit input from CoS academics and formulate a policy document for the College Executive. A number of key elements in that document that have subsequently become UCD policy include accessibility of data by gender on staff and leave, adoption of Core hours for School/College meetings from 9:30am to 4pm, the provision of maternity leave cover should be provided

automatically. The group also campaigned for a research semester to be offered after an extended period of leave e.g. maternity/sick leave and that there should be no assigned teaching/administration duties in that semester and workload should be negotiated after any period of leave. This policy has subsequently been adopted by UCD*. The Head of School in Physics (Prof Pádraig Dunne) was very supportive of WITS at local and college level, as was the College Principal.

* Note that the research semester has not been implemented uniformly in all Schools (including Physics). However it is formally UCD policy that it should be going forward.

Athena SWAN

Additionally, SMB played a role in bringing the Athena SWAN process to Irish universities. This was initially done on a voluntary basis with interested colleagues in UCD and other universities in Ireland. As a result of the efforts of this group and others, the Athena SWAN award system was rolled out to Ireland on a three year pilot basis funded by the Higher Education Authority and has now been extended indefinitely (**Figure 1.2**).



Figure 1.2 WITS members including Sheila McBreen at the Athena SWAN launch with Professor Orla Feely, President Deeks and Deputy President Roger in 2015 from the President's Report (https://www.ucd.ie/t4cms/UCD_Report_of_the_President_2014_2015.pdf).

UCD applied for the Bronze Award in 2015 and was successful on a resubmission in 2017. The award was renewed in 2020. As part of the UCD action plan, the University committed to supporting School applications and has provided Data Group and HR support with responsibility for supporting Schools. The data made available centrally on staff and student numbers, although not perfect, did facilitate this application.

SMB was nominated by the President to serve on the Athena SWAN national committee and has been a member of that committee (2014-2017). She was also nominated in 2015 as CoS representative on the University Management Team subcommittee on Equality, Diversity and Inclusion (<http://www.ucd.ie/equality/groups/>). She is currently SoP EDI rep. Assoc Prof Emma Sokell has served on the Gender Equality Action Group since 2016. Prof Lorraine Hanlon served on UCD's working group on Retention and Promotion to prepare its Athena SWAN

submission in 2015-2016. Dr Sharon Shannon currently Co-Chairs the UCD EDI Research and Curriculum committee since May 2019.

1.4 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Implementation of the Juno plan should involve the whole School.	A-01
2.	Many historical and important contributions have been mostly made by female staff within the School, University and National context.	A-02
3.	The contribution to EDI work in the School of Physics should be broader.	A-03, A-04

2.0 STAFF

High Level Summary	
1.	There are approximately 20% female staff across all levels which is in line with national representation levels.
2.	There are approximately 15% female staff at the more senior levels (Professor and Full Professor).
3.	Although not included in the statistics now, there are two new female Assistant Professors in the staff as of late 2019/early 2020 which is the result of a concerted effort within the school.

Data on the staff by gender at all grades and roles is presented in the following chapter. Annual analysis of Staff data by gender identifies gap/issues and areas for improvement, refer to **A-14 (Principle 1.2.1)** in the action plan. The data presented herein was obtained from the March 2019 UCD staff annual figures. A significant change in the hiring of new faculty, the Ad Astra programme, began in the summer of 2019 and although these data are not in the numbers, the mechanism is discussed in this section. A strategic decision was made to use this opportunity where possible to hire excellent female academics. Staff roles in the SoP are categorised as Academic, Administration, Technical or Research. Data on recruitment and selection is not readily available for all stages of the process across the SoP. It is required and should be provided by HR, refer to **A-13 (Principle 1.2.1)** in the action plan. We note that no staff members are currently job sharing and that sharing is currently not permitted for academic staff, refer to **A-52 (Principle 5.1.1)** in the action plan.

The SoP structures and roles are presented in detail in Chapter 3.

2.1 Numbers

Staff Overview

The overall staff numbers are presented in **Table 2.1** and show that females account for between 18-25% of the total Academic Staff in the SoP over the last four years. In the Professional & Support Staff, females account for 20-33% of the total.

	2016				2017				2018				2019			
	F	M	T	%F	F	M	T	%F	F	M	T	%F	F	M	T	%F
Academic Staff	4	12	16	25%	4	12	16	25%	4	16.5	20.5	24%	4	18.8	22.8	21%
Professional & Support Staff	3	7	10	30%	2	8	10	20%	3	9.2	12.2	24%	4	8	12	33%

Table 2.1 Breakdown of roles by grade and gender for **permanent** staff. Physics FTEs (Full Time Employees) are from March; annual HR data for staff. Professional & Support Staff includes admin and technical roles.

Academic Staff

The academic categories are further broken down into the grades (by gender) from Full Professor (FP), Professor (Prof), Associate (Assoc Prof) and Assistant (AP) in **Table 2.2** below. Of the three Full Professors (FP), one is female. In 2019 one male FP was reduced to a 20% FTE, pushing up the female FPs to 45.5%. It should be noted, however, that there is one female FP in the SoP. Previously another female Full Professor was part time in the SoP in the past but is associated with another UCD centre now. There are no females at Professor (Prof) level. There are approximately 15% female staff at the more senior (Prof and FP) levels. In the Associate Prof level, there are two females, one of whom was recently promoted, resulting in an increase from 14.3% to 25% since 2016. One male was promoted from Assoc Prof to Prof in that timeframe which further enhances the female percentage. At Assistant Prof (AP), there is one female at the census date which equals 12.5%, reduced from 29% in 2016 due to the promotion of female colleagues. The small number of females means that the percentages change due to the promotion of a male or female or a retirement. There are three female academics in astrophysics and one in spectroscopy. The SoP plans to increase the number of female academics (junior and senior). This process has started with the recent Ad Astra hires and will continue via the mechanisms available e.g. SALI and Research Prof (Chp 7.2). The recent Ad Astra hires are not included in these numbers (Chp 2.3).

Grade	2016				2017				2018				2019			
	F	M	T	%F												
Full Professor	1	2	3	33%	1	2	3	33%	1	2	3	33%	1	1.2	2.2	45%
Professor	0	4	4	0%	0	4	4	0%	0	3.5	3.5	0%	0	4.6	4.6	0%
Associate Professor	1	6	7	14%	1	6	7	14%	2	7	9	22%	2	6	8	25%
Assistant Professor	2	4.8	6.8	29%	2	4.8	6.8	29%	1	4	5	20%	1	7	8	13%
Postdoctoral Researchers	8	13	21	38%	4	12	16	25%	2	15	17	12%	6	15	21	29%
Teaching Fellows	0	0	0	0%	0	2	2	0%	0	1.5	1.5	0%	0	1	1	0%
Administration & Support Staff	2	3	5	40%	2	3	5	40%	2	3	5	40%	3	3	6	50%
Technical Support Staff	1	4	5	20%	0	5	5	0%	1	6.2	7.2	14%	1	5	6	17%

Table 2.2 Breakdown of roles by grade and gender. Physics FTEs are from March annual HR data for staff. A number of European Union funded PhD students were excluded from this table although they appear as staff and are instead counted as students to avoid double counting.

In UCD, the overall gender breakdown of academic staff is presented in **Table 2.3**. Given there are only four females in the SoP, it is difficult to compare the local data to that of UCD as a whole; however, they do not appear inconsistent.

Grade	%F	%M
Full Professor	25%	75%
Professor	30%	70%
Associate Professor	49%	51%
Assistant Prof / Lecturer	49%	51%
Assistant Prof / Lecturer below the bar	64%	36%
Other Academic and Teaching	63%	37%
Researcher (2017/2018)	55%	45%

Table 2.3 Breakdown of proportion of females at different academic grades in UCD (2018/2019). It is abundantly clear there is a lack of female representation in particular the Prof and FP grade.

Teaching Fellows: There are two temporary staff members (both male) dedicated solely to teaching support. The positions are full-time, for three and two years, respectively.

Administration Staff: Administrative staff comprises four permanent members (50% female): two Executive Assistants, AO2 Summer School Administrator, School Manager and Operations Manager (**Table 2.2**).

Technical Staff: Technical support staff comprises six permanent staff members (one female), on grades of Technical Officer (TO) or Senior TO (STO) (**Table 2.2**). Each workshop is staffed by one TO and one STO. In addition, one dedicated STO and two TOs support the day-to-day running of undergraduate teaching laboratories. One female TO in the SoP accounts for 16.6% of the technical staff. An increase in female representation in technical roles is desired, refer to **A-30 (Principle 2.2.2)** in the action plan.

Research and Innovation Officer: This role is to support SoP staff and students in developing research funding and to develop applied research and innovation supports to drive research commercialisation.

Postdocs: The percentage of female postdoc staff varies from 38-12% over the last four years. This should be examined by the SoP, to determine why female postdoc levels vary so widely and remain low. There are no rolling grants in Ireland so postdoc hire depends entirely on PI (Principle Investigator) grants. It should be noted there is no data available for comparison at national level.

The above categories are presented in **Table 2.4** below by gender, year and contract type. In addition to postdocs, there are two female administrators on temporary contracts.

	2017				2018				2019			
	F	M	T	%F	F	M	T	%F	F	M	T	%F
Academic Staff												
Permanent	4	17	21	19%	4	16.5	20.5	20%	4	16	20	20%
Temp	0	3.75	3.75	0%	0	1.5	1.5	0%	0	3.8	3.8	0%
Research												
Permanent	0	1	1	0%	0	1	1	0%	0	1	1	0%
Temp	4	8.8	12.8	31%	2	10.8	12.8	16%	6	10.8	16.8	36%
Admin												
Permanent	1	2	3	33%	1	2	3	33%	1	3	4	25%
Temp	1	1	2	50%	1	1	2	50%	2		2	100%
Technical												
Permanent	0	5	5	0%	1	7	8	13%	1	5	6	17%
Temp	0	1	1	0%	0	0	0	0%	0	0	0	0%
Total	10	39.6	49.6		9	39.8	48.8		14	39.6	53.6	

Table 2.4 All SoP Staff by Gender broken down by Permanent/Non-Permanent status.

2.2 Comparison to National Numbers

A **National Benchmark** of staff and students in Physics departments in Ireland is prepared annually by Dr Miriam Byrne (NUI Galway). This is not an independent dataset to the UCD numbers as they are included, however, it serves as a useful comparison in the Irish context. UCD SoP appears to be broadly consistent if the 37% in FP is split between FP and Prof.

Grade	National averaged over three years (% F)	UCD SoP - averaged over three years (% F)
Full Professor	15%	37%
Professor	16%	0%
Associate Professor	17%	21%
Assistant Professor	32%	21%
Admin Staff	88%	44%
Postdoctoral Researchers	23%	26%
Technical Staff	12%	10%

Table 2.5 Breakdown of proportion of females at different academic grades in physics departments nationally and in UCD. Note the academic grades are quoted in the UCD naming convention and the data presented are the percentages averaged over the last three years in both cases. As with all UCD data, one must be mindful of the small numbers especially at the Professor level. In UCD, there is only one female FP; nationally the number is ~6.

2.3 Ad Astra Programme

A new hiring mechanism was started in 2019, where Ad Astra Fellows / Assistant Professors were hired. The process was different in the sense that three new staff members were hired at once (two F and one M). Normally one position is advertised and the hiring process is local to the SoP (with external support via a colleague in UCD and another from outside UCD on the interview panel). In this case, the Ad Astra Fellows were advertised in broad areas and while the shortlisting was within the SoP, the interview process was more centralised.

Three new colleagues have recently started in Physics (two F and one M). They are not included in the March 2019 statistics, however, the SoP now has two new female Assistant Profs in the astrophysics and theoretical physics areas. Posters displayed at the UN International Day of Women and Girls in Science (2020) event organised by Women@STEM and CoS EDI committee showcasing our new female colleagues are presented in **Figure 2.1**. AP Nuala Caffrey is the first female theorist in SoP and AP Rebeca García López joins three other female colleagues in astrophysics. This is a very welcome development in the SoP and is evidence of the SoP strategy to hire more females being implemented, refer to **A-20 (Principle 1.2.3)** in the action plan.



Figure 2.1 Posters from the UN International Day of Women and Girls in Science (2020) featuring two new female Ad Astra Fellows in the SoP.

2.4 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Data on recruitment and selection is not readily available for all stages of the process across the SoP. It is required and should be provided by HR.	A-13
2.	The SoP plans to increase the number of female academics (junior and senior). This process has started with the recent Ad Astra hires and will continue via the mechanisms available e.g. SALI and Research Prof (see Chp 7.2) .	A-20
3.	The SoP plans to increase the number of female technical staff. Efforts have been made to improve the number of female applicants for technical roles but they have not yet been successful.	A-30

3.0 STRUCTURES & ROLES

	High Level Summary
1.	Undergraduate, postgraduates and postdocs have a voice in the SoP via class representatives and to a greater extent via post graduate and postdoc reps.
2.	Female staff are strongly represented in the laboratory and project-based module portfolio.
3.	Females hold leadership roles within the SoP in line with their number and seniority.

In the following chapter, the structure of the SoP is presented including the roles and responsibilities of staff and students by gender. Teaching allocation and the organisation of teaching teams and student representatives is also presented.

3.1 School Management Structure

An overview of the organisational structure of the SoP is given in **Figure 3.1**. The SoP's forum for discussion, planning and decision taking is the School Meeting. All academic staff and representatives for the administrative and technical staff, postgraduate students and postdoctoral researchers are invited to attend and contribute. Sub-committees (Curriculum, Communications/Outreach, Safety, Juno, Accreditation, School Quality Review) are drawn from the members of the SoP. Decisions are normally taken by consensus and ultimately by the HoS. Juno is a standing item on the School Meeting Agenda.

The HoS is supported by administrative and academic staff. Crucial administrative support is provided by the School Manager and three administrators in the SoP's front office, while key specific roles for the management of teaching and research in the SoP are taken on by academic staff. Crucial support is also provided by partners in the HR and finance units of the University. The SoP adheres to the UCD EDI policies including the social levy to cover all leave, core hours (9:30am-4pm) for meetings, seminars etc., and strives for gender balance in structures and events.

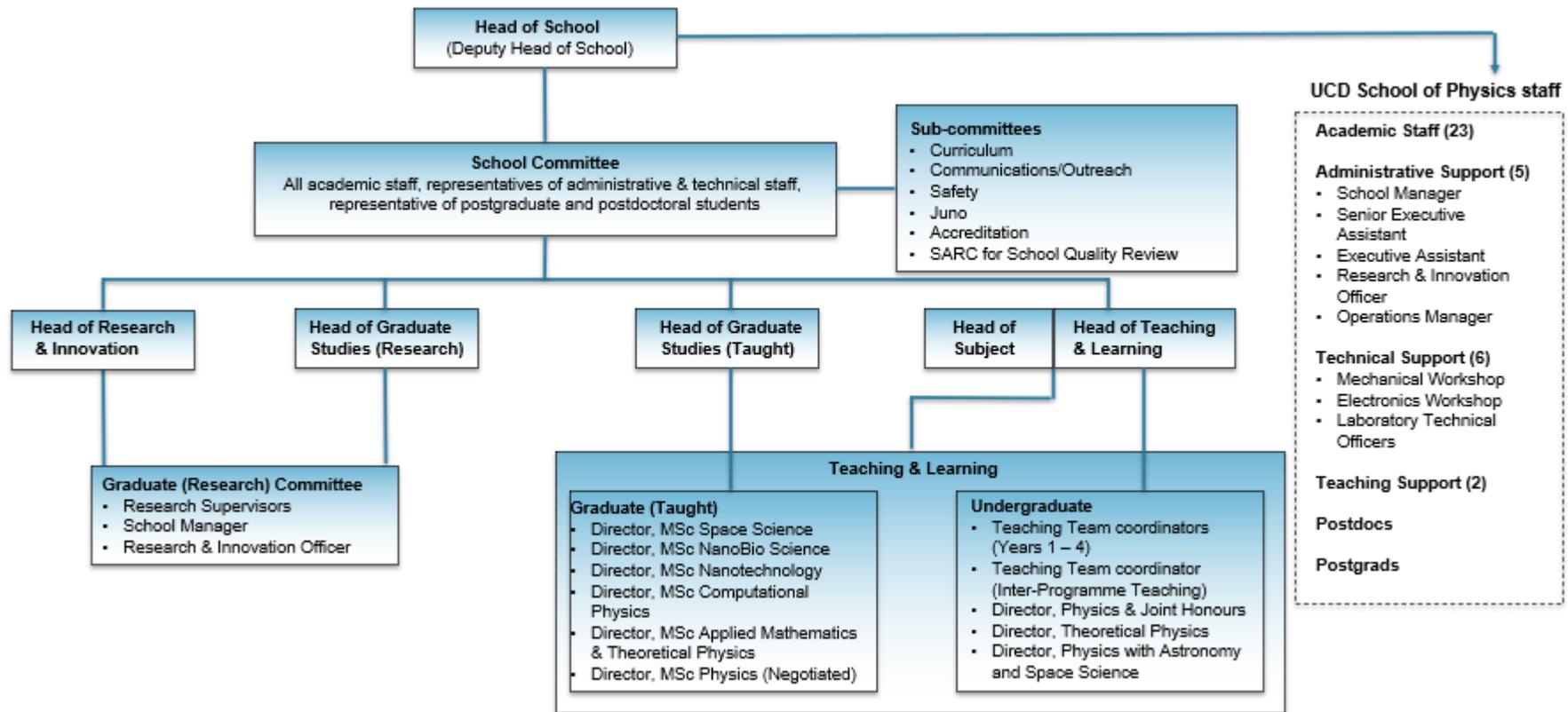


Figure 3.1 UCD SoP Organisational Structure.

3.2 School of Physics Roles

In the SoP, there are roles in the key areas of responsibility as shown in **Figure 3.1** within the School, at the College of Science and University level. These roles are presented by gender in **Tables 3.1, 3.2, and 3.3** respectively for the last four years. The roles span a wide range of activities from Ethics to Radiation protection and promotions at the university level. The CoS level roles range from Teaching and Learning, Research to EDI and normally the representative at the SoP level carries out that role on behalf of the SoP at the College level. Within the School, in addition to the roles mentioned, there are teaching coordination, infrastructure and outreach jobs. In this chapter, we present roles and responsibilities by gender.

The following three tables present the breakdown in gender of SoP staff who serve in these roles. Below and in subsequent tables the year refers to the end of the academic year.

University Level	2016		2017		2018		2019	
	F	M	F	M	F	M	F	M
UCD Radiation Protection Officer		1		1		1		1
UCD Disciplinary Committee	1	2	1	2	1	2		2
UCD Ethics Committee		1		1		1		1
UCD rep. on SFI/Nat. Facilities Access Pgm		1		1		1		1
UCD Imaging Facilities Board		1		1		1		1
UCD Pre-Masters Pgm - Academic Director		1		1		1		1
Curriculum Review and Enhancement Steering Committee		1		1		1		
Academic Council Executive Committee		1		1		1		
Chair of Academic Council Committee on Examinations		1		1		1		
Director Innovation Academy	1		1		1		1	
Assessment Appeals Committee (new 2017)				1		1		1
UCD Equality Diversity and Inclusion Committee	1		1		1		1	
Academic Council Committee on Examinations	1		1		1		1	
UCD Admin Job Grading Committee (Chair)								1
UCD Faculty Promotions Committee							1	
UCD Erasmus (Physics Sciences)								1
UCD Governing Authority (2019-2023)							1	
Total	4	10	4	11	4	11	5	10
Total roles	14		15		15		15	
% Female	29%		27%		27%		33%	

Table 3.1 SoP Staff in university roles.

College of Science	2016		2017		2018		2019	
CoS Role	F	M	F	M	F	M	F	M
Director CoS Graduate School	1		1					
Undergraduate Applications Committee		1		1		1	1	
Assoc. Dean Science Study Abroad				1				
CoS EDI Rep	1		1		1		1	
Phase-3 (Academic Lead)								1
Total	2	1	2	2	1	1	2	1
Total roles	3		4		2		3	
% Female	66%		50%		50%		66%	

Table 3.2 SoP Staff in CoS roles.

School Level	2016		2017		2018		2019	
School Role	F	M	F	M	F	M	F	M
Head of School		1		1		1		1
Deputy Head of School	1		1		1		1	
Head of Teaching & Learning		1		1		1	1	
Head of Research (incl. repr. on CRIB)		1		1		1		1
Head of Subject		1		1		1		1
Head of Postgraduate Studies (taught)		1		1		1		1
Head of Postgraduate Studies (research)		1		1		1		1
Chair School Curriculum Committee		1		1		1		1
Director BSc Physics		1		1	1		1	
Directors BSc PASS	1	1	1	1		1		1
Co-Director BSc TP		1		1		1		1
Director MSc Space Science	1		1		1		1	
Director MSc Nano Bio		2		1		1		1
Director MSc Nano Tech.		1		1		1		1
Director MSc Computational Physics		1		1		1		1
Director MSc Appl. Maths & Theo. Phys.		1		1		1		1
Stage 1 Academic Contact (new 2017)			1		1			1
Chair School Safety Committee		1		1		1		1
Timetabling		1		1		1		1
Scheduling Tutors and Demonstrators		1		1		1		1
Outreach/Summer Interns		1		1				
Outreach Coordinator & TY Coordinator		1		1		2	1	
US Summer School Coordinator		1		1		1		1
Summer Interns/Research Students						1		1
Service laboratories / Inter-prg laboratories		1		1		1		1
1st year laboratories		1		1		1		1
2nd year laboratories		1		1		1		1
Engineering Program Board								1
Chair Teaching Team Service / Inter-pgm		1		1		1		1
Chair Teaching Team 1st year		1		1		1		1
Chair Teaching Team 2nd year		1		1		1		1

Chair Teaching Team 3rd year		1		1		1		1
Chair Teaching Team 4th year		1		1		1		1
Alumni Fundraising Coordinator		1		1		1		1
Internationalisation US/Summer School		1		1				
EDI Officer (WiTS, IOP Juno, Athena Swan)	1		1		1		1	
College Career Liaison	1		1		1		1	
Representative to Academic Council		1		1		1		1
Undergraduate Applications Committee		1		1		1	1	
Phase-3 Physics Representative								1
School Seminar Organisation		1		1		1		1
School Website Maintenance/Content		1		1		1		1
Chair for School Quality Review	1			1		1		
Chair IOP Accreditation Review		1		1		1		1
Total	6	37	6	38	6	35	7	34
Total roles	43		44		41		41	
% Female	14%		14%		15%		17%	

Table 3.3 SoP staff in school roles.

The roles in the table are not all comparable effort. Some such as in the areas of teaching or graduate studies for example, require constant effort. Others such as the Chair of the Quality Review or the IOP Accreditation, require effort around the organisation and submission of a document and tracking of actions.

Roles are published every year by the HoS. New roles are advertised in School Meetings and requests for candidates are sought. All staff are encouraged to apply for the available roles and the appointments are announced and recorded in SoP meeting minutes.

The HoS is a five year role which has currently been filled by a male staff member for the last three years. There has only been one female HoS (Full Prof Lorraine Hanlon 2008-2011).

There are a lower number of females in leadership roles in the SoP, which is mainly due to the profile and number of female staff. The staff numbers detailed in Chapter 2 were frozen at March 2020 levels comprising four female academics (one Full Prof, two Associate Profs, one Assistant Prof). Recruiting more senior females who could then assume these roles would address this issue, refer to **A-20 (Principle 1.2.3)** in the action plan.

3.3 Examiners

External Examiners for the Undergraduate Programmes

In the SoP, external examiners are appointed to undergraduate programmes and rotate every three years subject to UCD central approval. There is one external examiner for Stage 1 and 2 and another for Stage 3 and 4. All externs have been male with two recent exceptions. Dr Miriam Byrne (National University of Ireland, Galway) was appointed extern for Stage 1 and 2 (2015/2016, 2016/2017, 2017/2018) and she was followed in that role by Dr Creidhe O'Sullivan (Maynooth University, 2018/2019 - for three years). A clear effort has been made to improve female representation; however, the lack of a female extern in Stages 3 and 4 is

still an issue. An action **A-15** (Principle 1.2.1) has been included in the action plan to address this.

Taught MSc programmes also have external examiners appointed in a similar way. These programmes are more recent but there have been two male and one female extern to date. One of the male examiners has been replaced by a female in September 2020 following a three year term.

3.4 Teaching Allocation

Teaching in the SoP is allocated annually by the HoS, following consultation with teaching staff, ensuring that all teaching in the School is adequately covered. The overall teaching load guides the assignment of teaching to individuals: the goal is to have the individual load within a band, approximately ranging from two to four taught modules per academic year, but close to the average of somewhat more than three modules. Short-term exceptions may be catered for (such as a request for a reduced load to prepare a major grant application). Staff engaged in the teaching laboratories/projects have a smaller number of taught modules.

Given sufficient advance notice, all staff are considered to be able and available to teach foundational and core physics modules, with front-line advanced modules preferentially taught by staff with research experience in the specific area. Changes occur when newly hired academic staff become available for teaching, staff retire, module coordinators want to change a module, staff become temporarily unavailable for teaching (owing to sabbatical, maternity, or other leave), or modules are discontinued or added to the curriculum. Notably, new staff are given a lighter teaching load when they start in UCD. This is a recent development and has been implemented in the last eight years. For the recent Ad Astra fellows (Assistant Professors) it has been explicitly stipulated in their terms and conditions that they have a slower ramp up to a full teaching load over two-three years and reach a full load at the latest in year three.

Updates to the teaching assignments are initiated through annual calls to all teaching staff, inviting them to request changes to their individual allocation. This call is issued in the spring preceding the academic year when the changes will take effect. Typically, most teaching in the School is simply carried forward from one academic year to the next, i.e., module coordinators keep their modules, allowing staff to refine and improve their teaching over several cycles. Staff know their teaching assignments for the following academic year by June, with changes for each staff member limited to at most one module per semester. For transparency, the annual assignment of all the School's teaching is circulated to all academics in the School.

UCD uses the European Credit Transfer and Accumulation System (ECTS) where credit reflects student effort rather than staff effort. According to data available in the UCD Information Hub (InfoHub), see **Table 3.4** below, there are 52 primarily teaching-based PHYC-coded modules offered by the School in 2019/20. Of these, 9.8% are coordinated by female staff. There are a further 13 primarily lab-based PHYC modules, 38.5% of which are coordinated by female staff, and four project/internship PHYC modules, 25.0% of which are

coordinated by female staff. Female staff are strongly represented in the laboratory and project-based module portfolio (recall that the percentage of female academics is 18%). The lab-based modules tend to have larger credits, hence women are responsible for slightly more credits than men. InfoHub captures module coordination and not workload or student contact hours, which may be shared with staff members within and outside the School; in a number cases, particularly in the third and fourth year laboratory-based modules, more than one academic contributes to the module. Furthermore, these numbers capture PHYC-coded modules only, not modules in other schools involving SoP staff. We note that one female academic was not assigned teaching in 2019/20 due to her return from maternity leave. Thus, there are three female module coordinators in **Table 3.4**.* One male module coordinator is not academic staff, bringing the total number of male module coordinators to 20.*

	Modules Coordinated	Avg # of Modules	Number of Module Coordinators*
Female	12	4.0	3
Male	57	2.85	20
Total	69	3.0	23

Table 3.4 2019/20 SoP module coordination allocation by gender.

Respectively, during the past three years (2017/18 - 2019/20), female staff coordinated 27.3%, 24.3%, and 17.4% of the PHYC-coded modules with a named module coordinator and registered students. These percentages are generally higher than the percentage of female academics in the school (noting again the exception of 2019/20). While acknowledging the pitfalls of linking the allocation of module coordination with workload and issues related to class size, staff effort, student credit, and so on, it is striking that female module coordinators typically coordinate more modules. In 2017/18 the average number of modules for female module coordinators (total modules coordinated by female staff divided by the number of female module coordinators) was 5.25 versus 3.29 for male module coordinators (overall average of 3.67). In 2018/19 the average number of modules for female module coordinators was 4.25 versus 2.94 for male module coordinators (overall average of 3.18). In 2019/20 the average number of modules for female module coordinators was 4.0 versus 2.85 for male module coordinators (overall average of 3.0) (**Table 3.4**). Notably, the overall average and the gap has gotten smaller; however, there is a difference in module coordination allocation (regardless of module type and not taking into account other roles and responsibilities). Factors contributing to this difference include that three of the four female academics are in the astrophysics area and implemented a new Space Science and Technology MSc course and another female academic is responsible for large modules in the third and fourth year laboratory. The addition of two new female faculty should change these statistics in the future and they will be monitored.

There are further teaching load implications if a particular teaching programme (e.g. Astro / Space Science and Technology MSc) is largely taught by female staff and the cover is

provided from within the same cohort. Having balance across teaching areas is preferred to avoid concentration of females in certain programmes for visibility and cover purposes.

The data presented above in **Table 3.4** will be included in an annual report and monitored over a longer period of time (**A-24 Principle 1.2.3**).

3.5 Teaching & Learning

The CoS Programme Board and the CoS Graduate School Board are responsible for the design, delivery and quality assurance of all undergraduate and Taught Graduate degree programmes offered by the College. The Head of Teaching & Learning and the Head of Graduate Studies (Taught) oversee the teaching effort in the School, supported by the directors of the BSc and MSc degrees. Postgraduate research degrees are overseen by the Head of Graduate Studies (Research), who chairs a Graduate (Research) Committee comprising research supervisors, the Head of Research & Innovation, the Research & Innovation Officer and the School Manager.

At undergraduate level, the Head of Teaching & Learning is supported by four Teaching Team Leaders, each of whom chairs a committee which includes the staff involved in the delivery of modules for a certain stage of the Science programme (Year 1 to 4), as well as student representatives for that stage. A fifth Teaching Team Leader oversees the delivery of modules delivered by the School to other programmes although, in this case, the committee does not have student representation. The Teaching Teams are responsible for matters concerning undergraduates in each of the years of their study at UCD. The Teaching Team structure is also used to conduct an internal review of the examination papers before they are sent to the Extern examiners, acting as an effective check on the standard of the papers and the quality of the model answers provided.

The Teaching Team meetings are the main forum for student participation and feedback. These meetings take place twice a year, typically around week five to six of each semester. By having the meetings early in the semester, any issues arising can be addressed in a timely fashion. The meetings also provide a forum to discuss and share elements of good practice in teaching and learning and to ensure that continuous assessment for the different modules are appropriately spread throughout the semester. Student representatives usually report back to the class on the outcomes of the meeting and, if required, decisions are communicated to all students using the targeted e-mail system. Minutes of the meetings are circulated to students and kept as a record for IOP accreditation purposes.

3.6 Postgraduate Reps

There are two postgrad representatives, currently Silas O'Toole (M) and Pallavi Kumari (F). Silas and Pallavi contributed extensively to the focus groups and action plans in the Juno project and their work, insights and suggestions can be found in Chapter 11.3.

Silas: I am a PhD student in my second year in the programme and 6th year in UCD as I did my undergraduate here as well. My research is on the topic of nanotechnology, plasmonics, and optics. My funding comes through the SoP as I am one of the first Thomas Preston

Scholars, a new scholarship which the SoP has begun offering. I benefited greatly from a close knit community in my undergraduate and therefore when I was offered the position of postgrad rep by one of the outgoing ones I saw this as an excellent opportunity to expand and improve the postgrad community in UCD Physics.

Pallavi: I am Pallavi Kumari, a third year PhD student in the SoP. After finishing my Master's degree from Indian Institute of Technology (IIT) Delhi, India, I joined UCD to do my PhD here in the emerging research field of Biophysics which is getting support from Science Foundation Ireland (SFI). I have been active in various activities here in UCD, such as UC Summer School, UCD Festival, etc. Having been offered one of the PhD representative posts by our School admin, I decided to work towards making the Postgraduate life better for everyone here. Getting involved in this role gave me a sense of belonging to the School even more.

Events

1. Social evening for PhDs and research Masters: March and October 2019 and March 2020. The events provided pizza, snack and beverages.
2. Launch event: "**Build Your Own Career with the Atlantic Bridge Innovator Award in the UCD Physics Maker Space**". We organized the event in July 2019 which was an opportunity for PhD/MSc students and Postdocs to win some independent funding to explore business ideas.
3. Coffee morning between current PhD students and undergraduate students: October 2019 – Aim was to make undergraduate students aware of what are the ways to apply for a PhD here and what it takes to do a PhD etc.

3.7 Postdoctoral Reps

A well-defined postdoctoral program at UCD as it exists now is a relatively new initiative the University undertook in order to support a career of young scientists. While the Learning and Development component of Postdoctoral Programs is extremely well organized, some other components, for example, various HR processes (including relocation support, hiring, proper contract definition, benefits, etc.) and officially recognized involvement into teaching processes, do still require a substantial revision to better support the career development needs for postdocs. The SoP introduced the role of Postdoctoral Representative to ensure a better representation and the engagement of the postdoctoral community within the School. The Postdoctoral Representative is a member of the monthly School meeting. A casual coffee club on a monthly basis for postdocs was also organised to build the relationships between School postdocs, to share the School updates, and to collect the feedback to the School through informal conversations. There is a postdoctoral representative on the Juno committee, Dr Julia Subbotina. Julia participates in School meetings where she raises issues pertaining to postdocs such as training available within the UCD system, the information on HR procedures and policies related to postdoctoral associates, encouraging principal investigators to support career development of postdocs. Julia organised coffee with the postdocs and asked them for input to this document.

3.8 Undergraduate Student Reps

The students elect representatives per Stage and per programme to represent them. They participate in teaching team meetings every semester to provide input and feedback to staff. Over seven years the gender breakdown of student reps is as follows:

- **Stage 3 Teaching Team Meetings (2013/14 to 2019/20 – 7 academic years)**
No. of student representatives = 22. Female = 9 (41%) Male = 13 (59%)
- **Stage 4 Teaching Team Meetings (2013/14 to 2019/20 – 7 academic years)**
No. of student representatives = 21. Female = 6 (29%) Male = 15 (71%)

The female representation is broadly in line with the student population and will be monitored with greater inclusivity encouraged in future academic years.

3.9 SoP Inductions

The SoP induction processes introduce new people to the SoP practices and procedures. For new staff, including postdoctoral researchers, one-on-one meetings are held with relevant senior staff members, refer to **A-29 (Principle 2.1.3)** in the action plan. The postgraduate induction process is a series of lectures and discussions with the Director of Graduate Studies. Recommendations from the consultation process with postgraduate students in the SoP, refer to **A-19 (Principle 1.2.2)** in the action plan, included a full campus tour with CoS student ambassadors to further help new students adapt to UCD life. This will be implemented for those starting in January 2021.

3.10 Undergraduate Orientation

UCD and UCD Student Union have worked together championing the ‘**It Stops Now**’ campaign, addressing the issue of sexual harassment and violence in third level education. Creating a zero tolerance zone requires a whole institute approach; the following actions have been taken to ensure this.

Bystander Programme

The UCD Bystander Programme enables students to develop key intervention skills and emphasises collective responsibility to promote a safe, respectful campus for all. Following a successful pilot in 2019 the programme will be rolled-out to all undergraduate first year students during orientation week 2020.

Events

To complement existing consent initiatives the University has also committed to the delivery of a series of consent workshops for students. The workshops are being delivered together with internal student groups such as UCD Consent and the LGBTQ+ Society and utilising the experience of external partners including Consent Matters and NUIG Smart Consent. There will be an evaluation of impacts of these events.

3.11 UCD Policies and Procedures

The UCD Academic Regulations are supported by academic policy, procedures and guidelines which are available on the UCD website page. There are a number of key policies which are relevant to uphold gender equality and the SoP Equality, Diversity and Inclusion values. Some of these include, Carers Leave Policy, Dignity and Respect Policy, Equality, Diversity & Inclusion Policy, Gender Identity & Expression Policy, Maternity Leave Policy, Parental Leave Policy, Paternity Leave Policy, UCD Core Meeting Hours Policy, UCD Flexi-Time Policy, UCD Gender Balance On Committees Policy. A review process is needed in the SoP to identify if there are any current gaps, refer to **A-43 (Principle 4.1.1)** in the action plan.

3.12 Dignity and Respect

A major review and consultation process is currently taking place at University level regarding Bullying and Harassment and Sexual Harassment and Sexual Misconduct. The feedback from staff and students is being actively solicited on the Dignity and Respect policy documents via a Feedback Form and facilitated focus groups (via Zoom). More details are available here: <https://www.ucd.ie/equality/support/dignityrespect/dignityrespectreview/>.

The SoP is participating in this process via individual contributions and via the CoS EDI group and the issue is being discussed more openly in UCD than in the past. UCD is also expanding the Dignity and Respect Contact Persons Panel and expressions of interest from employees are invited. It is clear that dedicated effort and time are required to educate ourselves in the SoP and to address these issues and we are committed to doing so as part of our Juno journey, refer to **A-57 and A-58 (both Principle 6.1)** and **A-59 (Principle 6.2.1)** and **A-60 (Principle 6.2.2)** in the action plan.

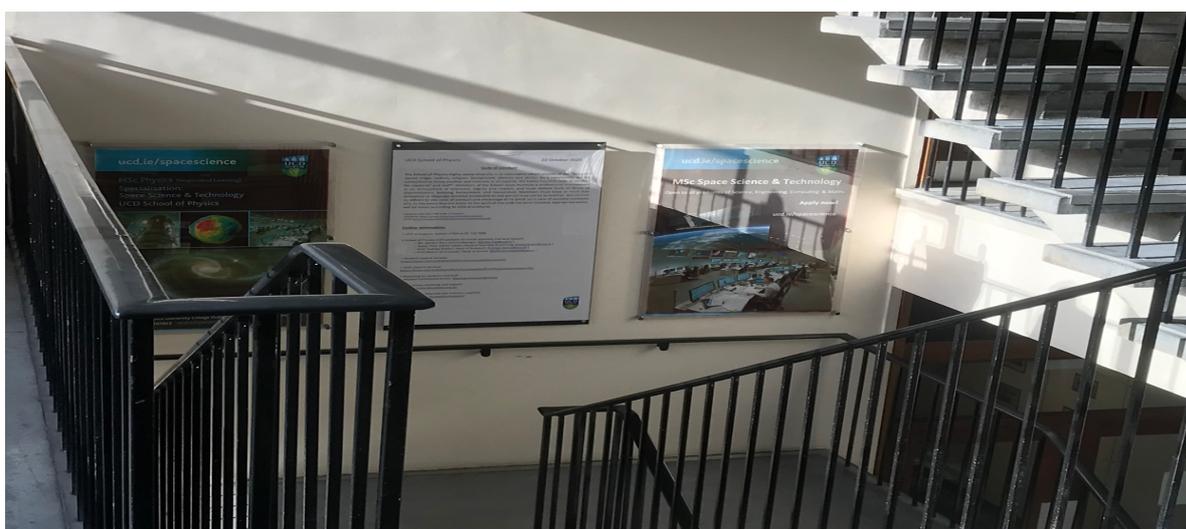


Figure 3.2 The new SoP Code of Conduct on display at the stairwell in the entrance to the building. It is also on display digitally in the SoP.

This process has begun with discussions at school level, a statement on the matter to staff and students by the Head of School, and the adoption of a **SoP Code of Conduct** which is now on display in A3 format in the stairwell at the entrance to the department (**Figure 3.2**).

Many of the staff in the School have made suggestions to the UCD policy and procedure documents which are currently being developed (Oct 2020) in the light of this harassment. The School will work with the new UCD policies and procedures with the well-being of people at the focus of our actions.

3.13 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	There are a lower number of females in leadership roles in the SoP, which is mainly due to the profile and number of female staff. Recruiting and/or promoting more senior females who could then assume these roles would address this issue.	A-20
2.	A review process is needed in the SoP to identify if there are any current gaps in the School with dissemination of EDI policies and procedures	A-43
3.	The SoP needs to develop clear communication on harassment, bullying and inappropriate conduct and to promote access to reporting mechanisms in UCD's Dignity and Respect Policy and UCD EAP for all staff and students.	A-59

4.0 STUDENTS

	High Level Summary
1.	Undergraduate participation is consistent with national benchmarks.
2.	One quarter of undergraduates throughout all four stages of the BSc are female.
3.	There does not appear to be an obvious attrition of female students in the undergraduate programme relative to males.
4.	A concerted effort has been made in recent years to address the historical lack of female externs (see also Chapter 6).
5.	Outcomes are broadly similar for M/F undergraduates in degrees, medals and awards.
6.	Female participation is highest in Astrophysics and Space Science.
7.	The medal named in 2020 after a female scientist is the first in SoP for the Space Science and Technology MSc.
8.	Female student participation is high in PhD programmes.

In the following chapter, data for the student population in UCD SoP is presented by degree, stage, undergraduates, postgraduate and by gender. In the Irish school system, students apply centrally and are allocated university places based on their grades by that central system. The SoP does not have a role in student selection for Stage 1. Broadly about one quarter of our undergraduate population is female and this is flat across stages with more females in the astrophysics course than any other. Applications to UCD are handled in the national, anonymous Central Applications Office and students study Physics via the Common Entry programme which means that the SoP does not have direct control of incoming student numbers.

We have analysed our data for losses at each stage and for signs of different outcomes by gender. Analysis of applications to Science by gender would be a very useful addition to our data set, refer to **A-08 (Principle 1.2.1)** in the action plan.

Taught graduate programmes cover a range of topics and the number of students studying at postgraduate level is also presented. Female students form over 40% of the postgraduate population.

Census data of the student population in the SoP from 2016-2019 are presented in **Table 4.1**. These data show approximately one quarter of students are female in the undergraduate programme which includes students in all years of their degrees. These data include students at all stages of their degrees including first and second year students who may not select physics as their major.

Numbers are presented in subsequent sections in terms of graduates. In taught MSc's, female participation is approximately 30% over the same time frame and there are 45% females in the postgraduate by research (MSc and PhD) group.

	2016				2017				2018				2019			
Major Level	F	M	T	F%	F	M	T	F%	F	M	T	F%	F	M	T	F%
Under Graduate	33	127	160	21%	58	142	200	29%	61	162	224	27%	65	141	207	31%
Graduate Taught	11	19	30	37%	10	23	33	30%	15	26	41	37%	4	18	22	18%
Graduate Research	23	30	53	43%	24	26	50	48%	25	32	57	44%	24	30	54	44%
Occasional									1	0	1	100%	0	1	1	0%
Total	67	176	243		92	191	283		102	220	323		93	190	284	

Table 4.1 Registered Students in the UCD SoP by gender. Undergraduates here include students in all years of their degrees.

4.1 Undergraduate

All of the physics programmes are accessed through the common Science entry (CAO code DN200). All of the Honours Bachelor of Science (BSc.) degrees have a duration of four years and are awarded based on the student's performance in the final (70%) and penultimate (30%) years of the programme. All students do project work as part of their degree. Undergraduate students can avail of the SoP internship (Chp 6.7).

In **Year 1**, students choose one of four broad subject streams within DN200 depending on their scientific interests, MPG for students with a preference for the Mathematical, Physical and Geological sciences, or no preference (NPF) for undecided students. Students can either focus on a particular area or choose to cover the core requirements for a number of subjects, but must fulfil the requirements for at least two subjects. There are 27 separate degree options including Physics, Physics with Astronomy and Space Science, and Theoretical Physics.

In **Year 2**, students cover the requirements for a minimum of two subjects. In **Year 3** and **Year 4**, students study one of their Year 2 subjects to degree level and this subject is their degree major (or a Joint Honours degree). In Year 3, students may opt to study for a semester or a year abroad. All students do project work as part of their degree. Undergraduate students can avail of the SoP internship (Chp 6.7).

The number of graduates for each of the degree programmes in the SoP over the past eight years is summarised in the following **Table 4.2**, which gives an average of **24% female graduates per year** across all undergraduate programmes.

Graduating SoP students OVERALL (PAST EIGHT YEARS)	Number	Percent
Male	154	76%
Female	48	24%

Table 4.2 Summary Graduating UCD SoP Students by Gender over the last eight years (2011-2019).

The undergraduate degree programmes are Physics, Theoretical Physics (TP) and Physics with Astronomy and Space Science (PASS). The Physics, Mathematics and Education degree was added in 2016 and approximately 62% of students registered for this degree have been female. This higher percentage of female teachers in these subjects areas could provide a positive impact on female students progressing to related degree programmes as the importance of female role models in STEM is widely reported in educational research. Female totals and percentages are presented per degree in **Table 4.3** over eight years. This table shows that PASS has the highest female participation, followed by Physics and TP. It is interesting to note that 75% of female academic staff are in the astrophysics area.

Degree	Number of Females	Percentage of Females
Physics	11	25%
Physics with Astronomy and Space Science	22	30%
Theoretical Physics	14	18%
Physics, Mathematics and Education	5	62%
Joint Honours	1	25%
Total	48	24%

Table 4.3 Breakdown of students graduating from the three degree programmes offered by the SoP over the last eight years (2012 to 2019).

4.1.1 Pathways & Student Losses

Progression analysis for the recently available graduated cohorts of students is shown in **Table 4.4** and **4.5** below from 2013 to 2019. Students entered via the Science common entry programme (DN200) and so there is no breakdown available for the number of students in each of the programmes for Years 1 and 2. Instead, the data given represent the number of students that took the requisite modules to go on into one of the Physics programmes in the following Year. In Stages 3 and 4, students select the programme, Physics, PASS or TP and can be selected on that basis.

Stage 1 based on students taking SCI10010, PHYC10080 and MATH10350 (Calculus MPS)

Stage 2 based on students taking PHYC20020, PHYC20060, PHYC20060

Stage 3 based on Major (Physics, TP, PASS)

Stage 4 based on Major (Physics, TP, PASS)

Repeats are only counted only the first time entering a given stage.

Stage	Gender	Cohort Graduating 2013	Cohort Graduating 2014	Cohort Graduating 2015	Cohort Graduating 2016	Cohort Graduating 2017	Cohort Graduating 2018	Cohort Graduating 2019	Subtotal	Total	Percent
STAGE 1	M	45	36	41	66	55	84	72	399	528	76%
	F	16	16	18	17	19	20	23	129		24%
STAGE 2	M	28	25	29	37	22	43	33	217	286	76%
	F	10	13	7	6	13	10	10	69		24%
STAGE 3	M	25	22	20	28	18	32	28	173	227	76%
	F	9	7	7	4	8	9	10	54		24%
STAGE 4	M	16	20	17	22	18	27	30	150	195	77%
	F	7	5	6	2	8	7	10	45		23%
GRAD	M	15	19	16	21	15	28	27	141	183	77%
	F	7	3	6	2	7	7	10	42		23%

Table 4.4 Pathways and Losses 2013-2019 for cohorts graduating in the years 2013 to 2019. The data indicate that the percentage of female participation remains in the low twenties for each stage and graduating cohort.

Stage	Gender	Cohort Graduating 2013	Cohort Graduating 2014	Cohort Graduating 2015	Cohort Graduating 2016	Cohort Graduating 2017	Cohort Graduating 2018	Cohort Graduating 2019
STAGE 1	F	26%	31%	31%	20%	26%	19%	24%
STAGE 2	F	26%	34%	19%	14%	37%	19%	23%
STAGE 3	F	18%	16%	18%	7%	22%	14%	18%
STAGE 4	F	30%	20%	26%	8%	31%	21%	25%
GRAD	F	32%	14%	27%	9%	32%	20%	27%

Table 4.5 Pathways and Losses 2013-2019 showing only female percentage participation per stage and cohort presented in Table 4.5. Gender Female Percentages year-on-year show higher fluctuations, particularly for later years when numbers are small.

It appears that the female number remains between 20% and 25% over all stages. Although numbers (M and F) fluctuate each year, there is no evidence for a large drop off at any stage.

In the past, between the years 2004/5 and 2006/7-2009/10 an anecdotal reduction in the number of females was recorded which correlated with a lack of female lecturers in stage one, refer to **A-22 (Principle 1.2.3)** in the action plan.

4.1.2 Outcomes

Degree class by gender is presented in **Table 4.6** and there is no difference in the proportion of females to males in any class based on five years of data.

Degree Class	Female n = 34	Male n = 108
First	56%	50%
Upper Second Class	32%	37%
Lower Second Class	12%	13%
Pass Degree	0%	0%

Table 4.6. Breakdown of degrees obtained by UCD Physics graduates over the last **five** years in terms of the percentage of females. The sample size is 142 which includes 34 females (24%).

In comparison, national numbers are divided into 2.1 above and below. In this case, **Table 4.7** shows the percentage of the total number of 2.1 and above degrees obtained by females. There is no disagreement between UCD and the national numbers.

Students with Higher Degrees II.I and above	Female	Male	%Female
UCD	30	94	24%
National	166	589	22%

Table 4.7. Breakdown of higher degrees (2.1 and Firsts) obtained by UCD Physics graduates and the total population of Irish Physics graduates over the last **five** years.

4.1.3 Undergraduate Awards (CoS)

Science Scholarships are awarded at the University Awards day annually. Over a three year period 2017-2019 there were 19 Science Scholarships awarded to SoP Undergraduates, with 37% awarded to female SoP Undergraduates, see **Table 4.8** below.

Academic Awards	F	M	Total	% F
2016/17	2	4	6	33%
2017/18	2	5	7	29%
2018/19	3	3	6	50%
Total	7	12	19	37%

Table 4.8 SoP Undergraduate Academic awards by Gender (2016/17 to 2018/19)

4.1.4 Results & Medals

Medals are presented annually to the top students in the three undergraduate programmes. The medals and prizes are named after internationally renowned physicists with strong links to the SoP in UCD, see **Table 4.9**.

The Thomas E. Nevin Medal is awarded to the candidate who has obtained First Class Honours and first place in the BSc (Honours) Degree Examination in Physics. This medal has been awarded since 1980 with 40 awardees 45% of whom are female. The Porter Medal and Prize is awarded to the student who obtains 1st class honours and first place in class in the Physics with Astronomy and Space Science BSc (Hons) degree programme. This medal has been awarded since 2010 with eight awardees 37% of whom are female. O’Raifeartaigh Medal and Prize is awarded to the student who obtains 1st class honours and first place in class in the Theoretical Physics BSc (Hons) degree programme. This medal has been awarded since 2010 with 10 awardees 20% of whom are female.

A medal was proposed by Prof Lorraine Hanlon and SMB to be awarded to the student of the Space Science and Technology (SS&T) MSc degree (refer to Chp 4.2.1) with the top mark across all modules of the programme AND with an overall programme GPA exceeding the threshold for a first class honours degree. The medal is called the McEney Medal and Award in Space Science and Technology in honour of a distinguished UCD graduate Prof Julie McEney (NASA) (F). This award was established in 2019 and is the first medal in the SoP named after a female physicist.

Discipline	Medal and Prize	Years	Total Number of Awardees	Number / Percentage of Female Awardees
Physics	Nevin Medal (Male)	1980 - to date	40	18 / 45%
Physics with Astronomy and Astrophysics	Porter Medal (Male)	2010 - to date	8	3 / 37%
Theoretical Physics	O’Raifeartaigh (Male)	2010 - to date	10	2 / 20%
Total	All undergraduate medals	1980 - to date	58	23 / 40%
SS&T MSc*	McEney (Female)	2019 - to date	1	0%

Table 4.9 UCD SoP Medal Awardees.



Figure 4.1 UCD SoP Medal winners on display in the School on the first floor.

4.1.5 Graduate First Destination

A measure of the quality of our graduates is given by what they do after graduating from their respective programmes. Each March, UCD conducts a First Destination Survey amongst all of its graduates from the previous year. A large fraction of our BSc. graduates (70.3%) embark on further study or training. These data have not been investigated by gender but will be recorded and investigated going forward, refer to **A-10 (Principle 1.2.1)** in the action plan.

4.1.6 Undergraduate Summary

We have completed the data gathering on undergraduates in the SoP for the first time for this application. Our numbers over the last eight years show that a quarter of graduates from Physics are female. The breakdown by degree programme shows that the Physics, Mathematics and Education degree has the largest group by percentage (62%) and number (five) of students registered to this degree to be female. The astrophysics graduates are the largest group by number (22) with a lower percentage (30%), followed by Physics and Theoretical Physics. We have analysed the pathways for losses of female students every year from 2013 to 2019 comparing the incoming cohort by percentage and the subsequent number of graduates. The percentage of females is fairly static at each stage and we are not seeing an obvious point of attrition. There is no significant difference between the academic performance of male/female students in the u/grad programmes to that of the male cohort and the awarding of medals reflects the number of females. Exam results should be analysed by the School Exam boards to check that there are no patterns of achievement in grades with gender, refer to **A-09 (Principle 1.2.1)** in the action plan. We note that this action depends on central action so that grades are divided by gender.

4.2 Graduate Taught

There are currently six one-year taught MSc programmes available in the SoP. Of the six Taught Graduate MSc programmes 17% have been directed by a female Academic i.e. the

Space Science and Technology programme. The programmes and degrees and participation are presented below.

MSc Space Science and Technology: Directors are Assistant Prof Deirdre Coffey (F) from 2013. Prof Lorraine Hanlon (F) from 2018 onwards. There has been one external examiner (M) who will be replaced by a female in September 2020.

MSc Applied Maths & Theo. Physics: Directors are Assoc Prof Vladimir Lobaskin (M) and Professor Adrian Ottewill (School of Mathematics and Statistics, M). There has been one external examiner (F) who was replaced by a male external examiner in September 2019. This extern covers five programmes below.

MSc Nano Bio: Director is Assoc Prof Dominic Zerulla (M). The extern as for AP&TP.

MSc Nano Tech: Director is Assoc. Prof James Rice (M). The extern as for AP&TP. .

MSc Computational Physics: Director is: Assoc Prof Vio Buchete (M). The extern as for AP&TP.

MSc Physics (Negotiated Learning): Director is Assoc Prof Dominic Zerulla (M). The extern as for AP&TP.

4.2.1 Numbers by Programme

Programme	2017/18 Overall		2018/19 Overall		2019/20 Overall		Totals (2017-2019)			
	Applic	Reg	Applic	Reg	Applic	Reg	Applic	Applic	Reg	Reg
	% F	% F	% F	% F	% F	% F	Total	% F	Total	% F
MSc Space Science & Technology F060	36%	22%	20%	15%	32%	18%	132	30%	48	19%
MSc Physics (NL) F012	33%	33%	27%	30%	28%	50%	122	30%	27	37%
MSc Computational Physics F120	31%	20%	30%	0%	26%	60%	62	29%	17	29%
MSc Nano Technology F122	32%	42%	38%	56%	38%	45%	104	42%	32	47%
MSc Applied Mathematics & Theoretical F124	48%	50%	30%	0%	38%	43%	93	40%	15	40%
MSc NanoBio Science T149	60%	73%	38%	50%	48%	60%	68	50%	20	65%

Table 4.10 Breakdown of Taught Masters programmes by Gender.

The percentage of female students varies per programme and is generally higher than in the undergraduate programme.

4.3 Graduate Research

4.3.1 Numbers by Research Area

In this section, the numbers of research students by gender are presented. It is noteworthy that the percentage of females is high for both MSc and PhD programmes.

	2016				2017				2018				2019			
Degree Level	F	M	T	F%	F	M	T	F%	F	M	T	F%	F	M	T	F%
Full-Time																
Doctorate	17	24	41	42	19	20	39	49	18	26	44	41	19	26	45	42
Master Degree	2	2	4	50	2	4	6	33	4	2	6	67	3	2	5	60
Part-Time																
Doctorate	3	4	7	43	2	2	4	50	2	3	5	40	1	2	3	33
Master Degree	1	0	1	100	1	0	1	100	1	1	2	50	1	0	1	100
Total	23	30	53		24	26	50		25	32	57		24	30	54	

Table 4.11 Breakdown of Research Postgraduate Students in the UCD SoP.

4.3.2 Comparison to National numbers

Relative to the national benchmarks, the SoP is higher in terms of the fraction of female PhD students. The number of PhD students is complicated by funding nationally and by the number of students who apply. The percentage of postgraduate females is greater than that at undergraduate level and the national number. Research supports are also discussed in Chapter 6.

Grade	National averaged over three years (2017-2019)	UCD Physics - average over three years (2017-2019)
% Female PhD Students	29% (Yearly average number of Female PhD students = 76)	44% (Yearly average number of Female PhD students = 18)

Table 4.12 Average number of Female PhD Students over three years in UCD and Nationally (2017-2019). The national data is coordinated by Dr Miriam Byrne from the National University of Ireland Galway.

4.4 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Analysis of applications to Science by gender would be a very useful addition to our data set.	A-08
2.	Examination of exam results by gender should be done every year at the School Exam board using reports provided centrally by UCD.	A-09
3.	Assess Graduate first destinations by gender.	A-10

5.0 TEACHING PROGRAMMES

	High Level Summary
1.	There is a lack of female led modules staff in Stages 1 and 2 of the undergraduate programme.
2.	Females lead a large fraction of modules in the SS&T MSc. Inevitably due to the low number of females overall, this resulted in less females in the undergraduate programme.
3.	The teaching loads should be assessed over a long period to ensure that historical information is not lost.

In the following sections, we discuss the teaching programmes in the SoP in terms of the proportion and timing of interactions of students with female lecturers and demonstrators. The main results of this analysis are presented in **Figures 5.1** and **5.2** and throughout the tables. The purpose of this section is to investigate how and when undergraduates interact with female lectures and demonstrators.

Anecdotal comments from students relate to having very few or no female lectures throughout their undergraduate degree. We have investigated the distribution of female staff throughout the undergraduate programmes and the same for tutors/demonstrators. The number of female staff and postgraduates is limited but this is nevertheless a useful exercise, particularly given that two new female staff have been hired and not yet allocated teaching loads.

Most Directorships are currently filled by male SoP staff (80%) with the exception of Physics degree and the SS&T MSc which is broadly in line with the staff profile.

5.1 Undergraduate

We have investigated when students in the three streams encounter female lecturers. The key point of interest here is to see when/if students taking Physics encounter a female lecturer. While it is not clear that meeting a female lecturer at the early stages of a degree would make a female student more likely to take physics, it is likely that the lack of visibility of role models has an effect on this process. A caveat is that these figures cannot account for optional modules (typically in Stage 3 or 4) or electives which students take in stages 1, 2 and 3. Another caveat is that some students will take Foundations of Physics where Assistant Prof Deirdre Coffey lectures half the course but is not a module coordinator. She was on maternity leave in 2018/2019 and did not teach that class this year. Students who scored highly in their school exams often do not take Foundations.

In **Figures 5.1** and **5.2** the yellow boxes highlight modules per stages 1-4 where the module coordinator is female. These data are presented in **Figures 5.1** and **Figure 5.2** by programme and year. Each Stage is presented as a row and male lecturer's modules are blue, female

lecturers are yellow, mixed are green (typically laboratory modules where approximately 25% of the lecturers are female) and grey represent modules led by the School of Mathematics.

Green boxes show modules that are shared by females. It is difficult to represent this information graphically but the rows represent the stage and the colour yellow denotes a female lecturer. There is one female staff member involved in the third/fourth year lab. All students take a laboratory module in third year, and all but those on the theoretical physics module take a lab module in fourth year.

In **Figure 5.1**, see below, students taking TP will only have a female lecturer in a core module in Stage 3 or 4 (Quantum Mechanics / Assoc Prof Emma Sokell).

In **Figure 5.2**, see further below, students taking Physics or PASS will only have a female lecturer in Stage 3 or 4 (Quantum Mechanics / Assoc Prof Emma Sokell or Galaxies, the Interstellar Medium and Observational Cosmology / Assoc Prof Sheila McBreen).

Many of the female staff have concentrated on the Space Science and Technology MSc course of the last number of years which has had the unintentional knock-on effect of reducing other interactions.

The School has hired two new female staff members and consideration may be given to the paucity of female lecturers in Stages 1 and 2 when their teaching loads are assigned for 2020/2021 onwards, refer to **A-22 (Principle 1.2.3)** and **A-24 (Principle 1.2.3)** in the action plan.

Any imbalance of teaching loads should be investigated with a baseline of at least three years, refer to **A-49, A-50 (Principle 4.2.1)** and **A-51 (Principle 4.2.2)** in the action plan.

Typical Theoretical Physics Gender of Faculty/Module Co-ordinator											
2019/20											
AUTUMN						SPRING					
Stage 4	PHYC40020 Applied Quantum Mechanics	PHYC40250 Condensed Matter Physics	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC40900 TP Projects	PHYC30090~ Nuclear Physics	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION
Stage 3	Elective	PHYC30030 Quantum Mechanics	PHYC30010 Thermo and Stat Physics	ACM30220 Partial Diff. Equations	ACM30010 Analytical Mechanics	PHYC30320 Advanced Laboratory I 10 credit 6M 1F (TP)	ACM30210 Found. of QM	ACM30200 Foundations of Fluid Mechanics	PHYC30070 Electromag	MATH30040 Functi. of 1 Complex Variable	Elective
Stage 2	Elective	ACM20050 Classical Mech & SR	MATH20060 Calculus of Several Variables	PHYC20020 Introductory QM	ACM20150 Vector Calculus	PHYC20080 Fields, Waves & Light	ACM20030 Computational Science	ACM20060 Oscill. in Mech. Systems	PHYC20060 Methods for Physicists	PHYC20090 Electronics and Devices	Science Option Elective
Stage 1	SCI10010 Scientific Enquiry (15M)	PHYC10210* Quanta, Particle and Relativity	ACM10080 App Maths:Mechs & Methods	MATH10350 MPG Calculus	Science Option	Science Option	PHYC10080 Frontiers of Physics	ACM10060 Appl of Diff Equations	MATH10340 MPG Linear Algebra	PHYC20030 Thermal Physics	Science Option Elective
* Option which may be replaced with Conditional Core PHYC10070									M		
									F		
									Mixed		
									Core Modules delivered by Maths		
2018/19											
AUTUMN						SPRING					
Stage 4	PHYC40020 Applied Quantum Mechanics	PHYC40250 Condensed Matter Physics	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC40900 TP Projects	PHYC30090~ Nuclear Physics	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION
Stage 3	Elective	PHYC30030 Quantum Mechanics	PHYC30010 Thermo and Stat Physics	ACM30220 Partial Diff. Equations	ACM30010 Analytical Mechanics	PHYC30320 Advanced Laboratory I 10 credit 5M 1F (TP)	ACM30210 Found. of QM	ACM30200 Foundations of Fluid Mechanics	PHYC30070 Electromag	MATH30040 Functi. of 1 Complex Variable	Elective
Stage 2	Elective	ACM20050 Classical Mech & SR	MATH20060 Calculus of Several Variables	PHYC20020 Introductory QM	ACM20150 Vector Calculus	PHYC20080 Fields, Waves & Light	ACM20030 Computational Science	ACM20060 Oscill. in Mech. Systems	PHYC20060 Methods for Physicists	PHYC20090 Electronics and Devices	Science Option Elective
Stage 1	SCI10010 Scientific Enquiry (15M 1F)	PHYC10210* Quanta, Particle and Relativity	ACM10080 App Maths:Mechs & Methods	MATH10340 MPG Linear Algebra	Science Option	Science Option	PHYC10080 Frontiers of Physics	ACM10060 Appl of Diff Equations	MATH10350 MPG Calculus	PHYC20030 Thermal Physics	Science Option Elective
* Option which may be replaced with Conditional Core PHYC10070 (1M/1F)											
2017/18											
AUTUMN						SPRING					
Stage 4	PHYC40020 Applied Quantum Mechanics	PHYC40250 Condensed Matter Physics	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC40900 TP Projects	PHYC30090~ Nuclear Physics	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION	PHYC/ACM OPTION
Stage 3	Elective	PHYC30030 Quantum Mechanics	PHYC30010 Thermo and Stat Physics	ACM30220 Partial Diff. Equations	ACM30010 Analytical Mechanics	PHYC30320 Advanced Laboratory I 10 credit 5M 1F (TP)	ACM30210 Found. of QM	ACM30200 Foundations of Fluid Mechanics	PHYC30070 Electromag	MATH30040 Functi. of 1 Complex Variable	Elective
Stage 2	Elective	ACM20050 Classical Mech & SR	MATH20060 Calculus of Several Variables	PHYC20020 Introductory QM	ACM20150 Vector Calculus	PHYC20080 Fields, Waves & Light	ACM20030 Computational Science	ACM20060 Oscill. in Mech. Systems	PHYC20060 Methods for Physicists	PHYC20090 Electronics and Devices	Science Option Elective
Stage 1	SCI10010 Scientific Enquiry (15M 1F)	PHYC10210* Quanta, Particle and Relativity	ACM10080 App Maths:Mechs & Methods	MATH10340 MPG Linear Algebra	Science Option	Science Option	PHYC10080 Frontiers of Physics	ACM10060 Appl of Diff Equations	MATH10350 MPG Calculus	PHYC20030 Thermal Physics	Science Option Elective
* Option which may be replaced with Conditional Core PHYC10070 (1M/1F)											

Figure 5.1. Typical Theoretical Physics Gender of Faculty/Module Co-ordinator in the years 2019/2019 (top), 2018/2019 (middle), and 2017/2018 (bottom). It is difficult to represent all this information graphically but the main point is the lack of female modules (yellow) in the separate Stages (1 - bottom to 4 - top). These students will only have one female module coordinator in a core physics module in Stage 3 or 4.

Typical PASS/SH Gender of Faculty/Module Co-ordinator												
2019/20						2019/20						
AUTUMN						SPRING						
Stage 4	PHYC40020 Applied Quantum Mechanics	PHYC40250 Condensed Matter Physics	PHYC40080 High Energy Particle Phys	PHYC/ACM OPTION	PHYC40600 PASS Lab (15 credit) 6M 1F	PHYC30090 Nuclear Physics	PHYC40890± Field Trip (Year long)	PHYC40030± Galaxies and Obs. Cosmology	PHYC/ACM OPTION			
Stage 3	PHYC30100± Stellar Astro	PHYC30030 Quantum Mechanics	PHYC30010 Thermo and Stat Physics	PHYC30020 Classical Mech and Relativity	PHYC30170 PASS Lab (20 credit) 6M 1F	PHYC30080 Optics and Lasers	PHYC30070 Electromag	Elective	Elective			
Stage 2	Elective/Option	Science Option	MATH20060 Calculus of Several Variables	PHYC20020 Introductory QM	ACM20150 Vector Calculus	PHYC20080 Fields, Waves & Light	ACM20030 Computational Science	PHYC20040± Exploring the Solar System	PHYC20060 Methods for Physicists	PHYC20090 Electronics and Devices	Science Option	Elective/Option
Stage 1	SCI10010 Scientific Enquiry (15M)	PHYC10210* Quanta, Particle and Relativity	ACM10080 App Maths:Mechs & Methods	MATH10350 MPG Calculus	Science Option	PHYC10050± Astronomy and Space Science	PHYC10080 Frontiers of Physics	ACM10060 Appl of Diff Equations	MATH10340 MPG Linear Algebra	PHYC20030± Thermal Physics	Science Option	Elective
* Option which may be replaced with Conditional Core PHYC10070										M		
Note: For PASS, SH may take the Astro Lecture Modules as options and take 20 rather than 15 Lab credits in stage 4 with more PHYC/ACM options										F		
										Mixed		
										Core Modules delivered by Maths		
2018/19						2018/19						
AUTUMN						SPRING						
Stage 4	PHYC40020 Applied Quantum Mechanics	PHYC40250 Condensed Matter Physics	PHYC40080 High Energy Particle Phys	PHYC/ACM OPTION	PHYC40600 PASS Lab (15 credit) 5M 1F	PHYC30090 Nuclear Physics	PHYC40890± Field Trip (Year long)	PHYC40030± Galaxies and Obs. Cosmology	PHYC/ACM OPTION			
Stage 3	PHYC30100± Stellar Astro	PHYC30030 Quantum Mechanics	PHYC30010 Thermo and Stat Physics	PHYC30020 Classical Mech and Relativity	PHYC30170 PASS Lab (20 credit) 5M 1F	PHYC30080 Optics and Lasers	PHYC30070 Electromag	Elective	Elective			
Stage 2	Elective/Option	Science Option	MATH20060 Calculus of Several Variables	PHYC20020 Introductory QM	ACM20150 Vector Calculus	PHYC20080 Fields, Waves & Light	ACM20030 Computational Science	PHYC20040± Exploring the Solar System	PHYC20060 Methods for Physicists	PHYC20090 Electronics and Devices	Science Option	Elective/Option
Stage 1	SCI10010 Scientific Enquiry (15M 1F)	PHYC10210* Quanta, Particle and Relativity	ACM10080 App Maths:Mechs & Methods	MATH10340 MPG Linear Algebra	Science Option	PHYC10050± Astronomy and Space Science	PHYC10080 Frontiers of Physics	ACM10060 Appl of Diff Equations	MATH10350 MPG Calculus	PHYC20030± Thermal Physics	Science Option	Elective
* Option which may be replaced with Conditional Core PHYC10070 (1M/1F)												
2017/18						2017/18						
AUTUMN						SPRING						
Stage 4	PHYC40020 Applied Quantum Mechanics	PHYC40250 Condensed Matter Physics	PHYC40080 High Energy Particle Phys	PHYC/ACM OPTION	PHYC40600 PASS Lab (15 credit) 5M 1F	PHYC30090 Nuclear Physics	PHYC40890± Field Trip (Year long)	PHYC40030± Galaxies and Obs. Cosmology	PHYC/ACM OPTION			
Stage 3	PHYC30100± Stellar Astro	PHYC30030 Quantum Mechanics	PHYC30010 Thermo and Stat Physics	PHYC30020 Classical Mech and Relativity	PHYC30170 PASS Lab (20 credit) 5M 1F	PHYC30080 Optics and Lasers	PHYC30070 Electromag	Elective	Elective			
Stage 2	Elective/Option	Science Option	MATH20060 Calculus of Several Variables	PHYC20020 Introductory QM	ACM20150 Vector Calculus	PHYC20080 Fields, Waves & Light	ACM20030 Computational Science	PHYC20040± Exploring the Solar System	PHYC20060 Methods for Physicists	PHYC20090 Electronics and Devices	Science Option	Elective/Option
Stage 1	SCI10010 Scientific Enquiry (15M 1F)	PHYC10210* Quanta, Particle and Relativity	ACM10080 App Maths:Mechs & Methods	MATH10340 MPG Linear Algebra	Science Option	PHYC10050± Astronomy and Space Science	PHYC10080 Frontiers of Physics	ACM10060 Appl of Diff Equations	MATH10350 MPG Calculus	PHYC20030± Thermal Physics	Science Option	Elective
* Option which may be replaced with Conditional Core PHYC10070 (1M/1F)												

Figure 5.2. Typical PASS/SH Gender of Faculty/Module Co-ordinator in the years 2019/2019 (top), 2018/2019 (middle), and 2017/2018 (bottom). It is difficult to represent all this information graphically but the main point is the lack of female modules (yellow) in the separate Stages (1 - bottom to 4 - top). These students will only have one female module coordinator in a core physics module in Stage 3/4.

5.2 Taught Masters

Estimates are given in **Table 5.1** for the percentage of female led modules in the six MSc programmes. We do not present detailed historical study at this time. The female-led modules in the MSc programmes excluding Space Science and Technology are likely to be Applied Quantum (Assoc Prof E Sokell) or Galaxies (Assoc Prof S McBreen).

MSc Course	Female led Modules
Space Science and Technology	~80%
Computational Physics	~30%
MSc Nano Bio	~10%
Appl. Maths & Theo. Physics	Information not available
MSc Negotiated Learning	NA: Every student takes different modules (10% - 80%)
MSc Nano Tech.	Information not available

Table 5.1 Percentage of Female led modules in the six MSc Taught programmes

5.3 Demonstrators per Programme

All PhD or MSc by Research students must take a five-credit module called Physics Tutoring/Demonstrating (PHYC40570). This module is coordinated by Assoc Prof Emma Sokell. The five-credit counts towards the 30-credit requirement and is Distinction/Pass/Fail for PhD students.

The School runs a Scholarships in Research & Teaching programme (SIRAT). Two to four students are funded per year. They can be MSc by Research or PhD students. They have a higher teaching load as part of their work and must also do the T&L module above. Historically the percentages of female teaching assistants representation across all the four stages has averaged at 30%. It should be noted that allocation of demonstrator and tutors entails a range of circumstantial constraints and it is not possible to set a mandatory 50:50 ratio. The main constraints are the number of students, that ratio and the expertise of the students. The SoP will continue to strive for the best balance possible within the constraints, refer to **A-27 (Principle 1.2.3)** in the action plan. **Tables 5.2** and **5.3** show that female demonstrators are usually present at each stage with an exception of one year where no females were available to teach in the advanced labs (stage 3 and 4).

Stage	2012/2013			2013/2014			2014/2015		
	F	M	%F	F	M	%F	F	M	%F
Stage 1	12	30	29%	11	20	35%	11	30	37%
Stage 2	3	7	30%	1	7	13%	4	9	44%
Stage 3/4	4	12	25%	6	9	40%	4	13	31%

Table 5.2 Demonstrator representation by gender in stages 1 - 4 from the years 2012 - 2015.

Stage	2016-2017			2017-2018			2018-2019		
	F	M	%F	F	M	%F	F	M	%F
Stage 1	10	21	32%	10	22	32%	10	22	32%
Stage 2	5	4	55%	4	5	44%	4	2	44%
Stage 3	0	5	0%	2	10	17%	1	7	13%
Stage 4	0	5	0%	2	10	17%	1	7	13%
Masters	4	2	67%	2	2	50%	1	3	25%

Table 5.3 Demonstrator representation by gender in stages 1 - 4 and MSc from 2016 - 2019.

5.4 Educational Research Projects and Innovations

A number of staff members are leading and involved in educational initiatives detailed below:

Investigating Perceptions of Physics in the Irish Higher Education Context: Sense of Belonging and the Gender Gap

SoP staff Dr Tom McCormack, Assoc. Prof Emma Sokell, Dr Deirdre Coffey and Dr Aoibhinn Ní Shúilleabháin (School of Mathematics & Statistics) are undertaking a study entitled “*Investigating perceptions of physics in the Irish higher education context: Sense of Belonging and the gender gap*”. This is a longitudinal study with three principle objectives, which will be conducted as three studies.

- *Study 1:* To identify students’ sense of belonging in physics in one module and to track the evolution of this sense of belonging over the semester.
- *Study 2:* To determine if a gender gap in the end of term assessment can be reduced by a simple affirmatory exercise during the semester and simultaneously investigate if the affirmatory exercise influences students’ sense of belonging.
- *Study 3:* To collect data on a student's experience of how physics was taught in School. The aim is to publish the results of this study in an appropriate scientific journal. This is a two year study using our largest first year class (Foundations of Physics PHYC10070 with 300 students)

Improving the Professional Practice of Teaching Assistants via EDI Awareness

Dr Sharon Shannon, Assoc Prof Emma Sokell, Dr Tom McCormack (SoP) and Dr Anthony Cronin (School of Mathematics and Statistics) recently received a Learning Enhancement Project Grant in 2020. This funding was secured to support undergraduate and postgraduate tutors and demonstrators, (PHYC40570 and MATH30340) modules. It intends to uphold the SoP commitment to provide an inclusive work environment for all its faculty, staff and students. Its aims are to improve the quality of the learning experience for both the student and the teaching assistant by embedding Equality, Diversity and Inclusion (EDI) training in the SoP and the UCD Maths Support Centre (MSC) which supports students throughout the entire

university. This is to support the professional development of all those who teach and increase student success rates. This proposal aims to embed EDI awareness into training courses for physics and mathematics tutors and demonstrators enabling teaching and learning enhancement within and across disciplines. Finally, this training and awareness can also be utilised by tutors in schools which operate online modules to further enhance teaching and learning in a digital world.

5.5 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	New female staff should teach in Stage 1 or 2 if possible. The HoS will take this into account with the new Ad Astra Fellows.	A-22
2.	Teaching allocation should account for best balance across stages.	A-24
3.	The best balance should be achieved in Female/Male demonstrators where possible, within the considerable constraints. Changing numbers of students every year so it is difficult to set a target.	A-27
4.	Any imbalance of teaching loads should be investigated with a baseline of at least three years.	A-49, A-50, A-51

6.0 RESEARCH

	High Level Summary
1.	Female researcher performance in funding by value and number of awards is on a par with that of male staff, contrary to national research funding trends.
2.	Female participation in PhD funding applications appears satisfactory.
3.	The percentage of female external examiners from 2010 to 2019 is 14%.
4.	Female participation in internships is above the level of applications.
5.	Female graduate research participation is higher than undergrad.

In the following sections, we investigate research areas and funding distribution by gender. In the SoP, all four female academic staff members are Research Active Staff – (six out of six including the new Ad Astra staff).

6.1 Groups

Individual Research Groups

There are individual research groups/areas within the SoP. The below list includes academic numbers where each staff member is assigned to only one area, although cross collaboration and area emphasis switching is common. The total is larger than the number of academics as some admin staff are research active and a non-full time member of staff is also counted. The purpose of the analysis is to investigate the research areas where female staff are active. Diversifying the research areas in the SoP needs to be looked at to ensure areas with better female representation globally are included, refer to **A-23 (Principle 1.2.3)** in the action plan.

Group	Staff Numbers
Astrophysics and Space Science	7 Staff, 3 female. A new female Ad Astra Assistant Prof was recently hired and will be included going forward.
Atomic, Molecular and Plasma	6 Staff, 1 female.
Condensed Matter/Quantum Information Physics	2 Staff, all male. A new female Ad Astra Assistant Prof was recently hired and will be included going forward.
Nano-Bio	6 Staff, all male.
Particle Physics	2 Staff, both male.
Radiation Physics	1 male Staff.
Theoretical and Computational Physics	2 Staff, both male.

Table 6.1 Research groups in the SoP

6.2 Funding

To see the gender breakdown of funding awards, high level data is represented as follows:

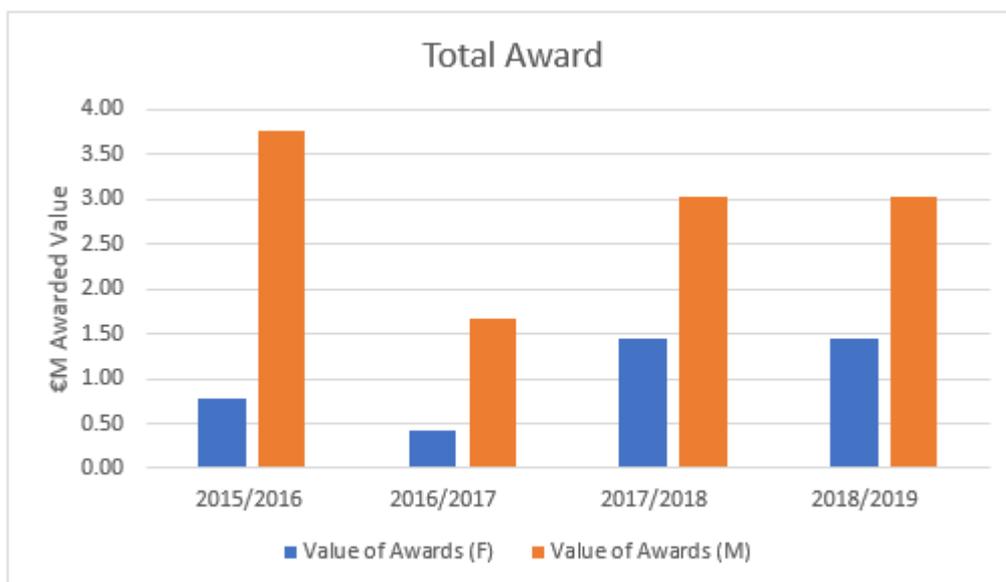


Figure 6.1 Total Value of Awards by Gender.

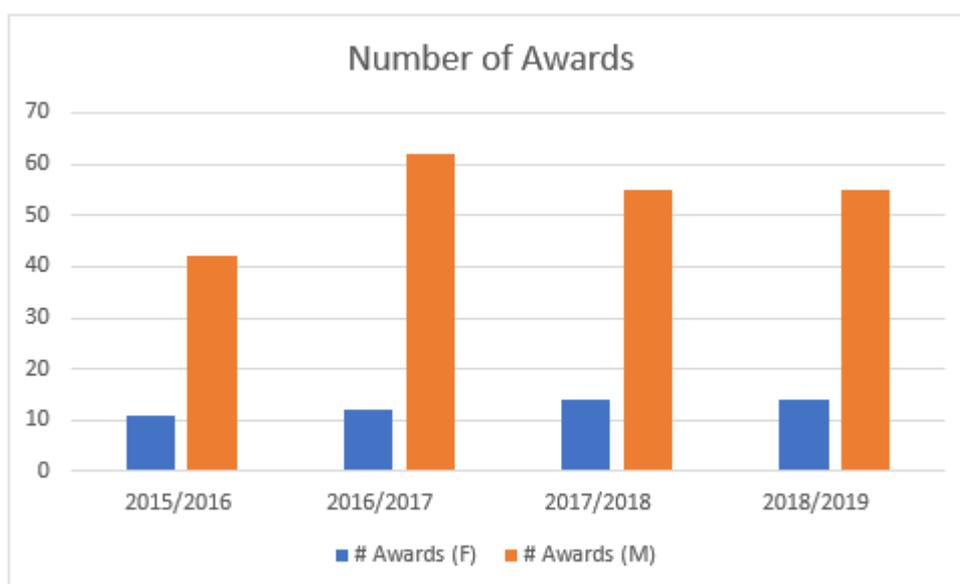


Figure 6.2 Number of Awards by Gender.

Overall, SoP female academics represent approximately 25% of the faculty, received about 25% of the total grants by value in the School and had about 20% of the number of awards, over the 2015 to 2019 period. Females had a higher average grant value than male staff. This data is lumpy, given the small sample size in the School, but shows strong female performance. The percentage success per application is not yet captured in a systematic way. There is very strong evidence that funding success for female researchers countrywide, particularly from the Science Foundation Ireland (SFI), is significantly lower than for males,

but that does not appear to be the case in UCD SoP, which reflects, amongst other things on the high quality of the female staff.

6.3 PhD Funding

Postgraduates are funded in the following ways: PI research grant funding, the SIRAT scheme (Scholarship in Research and Teaching), the Irish Research Council (IRC) scholarships, the Thomas Preston Fund - SoP local funding, and the UCD Advance scheme - PI led. The School publicises these avenues to students via Twitter, posters and the website to encourage applications. This year, Assistant Prof Steve Campbell (SC) undertook a new initiative and held a session on postgraduate funding for the undergraduate students. SC reported on the event: 17 In attendance (5 female). Only four Stage 3 students, with the largest attendance from taught MSc students. Stage 3 students indicated that likely there would have been more interest, however, as "most of their year wouldn't have read the email and so didn't know about it". The SoP will consider doing the talk and question part a second time for third years only later in the year. The informal part in the SoP Common Room was mixed success. There was some interaction between prospective students and staff. It would be useful to consolidate all available support on research funding avenues and support on SoP website, refer to **A-35 (Principle 3.2.1)** in the action plan.

Scholarship in Research and Teaching (SIRAT): The SoP offers a scheme of advanced research awards to fund MSc by Research and PhD students. The SIRAT is awarded with free fees and students are required to support demonstrating and /tutoring.

In the **2018/2019** round, four males and two females (33.33%) applied. There were three successful candidates - originally two male and one female, however one female withdrew after being awarded so three males received the SIRATs. There was one female supervisor, E Sokell. The panel comprised two female and two male faculty. In the past four years (2016-2019), eight female students were funded which is 26% of the total awardees.

Irish Research Council (IRC): The IRC postgraduate fund is an established national initiative, funded by the Department of Education and Skills and managed by the IRC that funds excellent research regardless of priorities set elsewhere. In the period 2014 - 2019, 13 PhD studentships were awarded by the IRC to six male and seven female students. The value of these scholarships is 96K.

Thomas Preston Scholarship Fund: The Thomas Preston scholarships come from philanthropic support and Summer School funding and were established in 2018. For the initial recruitment, there were four panel members plus the chair, including two women. The panel were all UCD Physics alumni, with PhDs. In this first round, there was a short advertising run so only seven complete applications were received (two female applicants). We will stress diversity as a consideration in the future and advertise earlier and more widely. An increase of 20% in female applications is sought, refer to **A-31 (Principle 2.2.2)** in the action plan. The potential supervisors in the first round were male and the successful two awardees were male. For the 2020 entry, there will be at least two female panel members.

6.3.1 UCD Advance - PI Led

UCD recently started an internal funding programme to support academics with reduced funding. Overall in UCD, the programme supported approximately 50% females and the same was true in SoP with one female and one male academic successful. One female student was recruited to start her PhD and another female PhD student was supported via additional travel support.

6.4 Research Support

The School offers support to Early Career Staff by way of start-up funding for one PhD student, and mentoring by a more senior academic, to guide the new staff member around obstacles and towards opportunities. Staff mentoring started at the end of Prof Padraig Dunne's headship for new staff and it was later promoted and adopted by the CoS as a pilot for academic hires. Also, the Ad Astra fellow T&Cs explicitly stipulate that mentors will be assigned to fellows. It is now standard UCD procedure, with support provided: mentors and mentees get training.

Post Doc Research Assistants (PDRA's) are encouraged, with their Principal Investigator, to explore their development through the Research Careers Framework (<https://www.ucd.ie/hr/rcf/>). There are Teaching and Learning Seminar Series for Postdocs, Scientific Paper Writing and Grant Proposal Writing courses. The School Research and Innovation Officer works with Early Career Staff and PDRAs to identify funding channels, and to develop funding proposals, in both commercialisation based and basic research.

A specific support for PDRAs in developing commercialisable research is currently being started, with the SoP Maker Space. This will bring the commercialisation experience of the Research and Innovation Officer together with the talent pool of late stage PhDs and Postdocs in the School, to help to develop their own independent research careers.

To enhance supports the SoP will consolidate all available support on research funding avenues and support for Early Career Staff and PDRAs to be accessible on SoP website, refer to **A-35 (Principle 3.2.1)** in the action plan.

6.5 Research Studies Panel (RSP) and Transfers

Each PhD student must have an RSP which is composed of the student, supervisor, and at least two other academics. The RSP typically meets annually but can be called at any stage by the student. The RSP gives input to the student and aims to aid their progress or aid difficult decisions. Of the currently registered students, approximately 60% have a female member of their RSP. PhD students complete a "Stage Transfer Assessment" at 18 months; we have not examined the makeup of these panels in this report but will do so in the future.

6.6 Thesis Examination Panels

Exam panels review MSc and PhD theses and comprise an internal examiner, external examiner and chair. The panels are approved locally in SoP and Graduate School Board and subsequently by the Academic Council Committee for Examinations (ACCE). Approximately

45% of Physics female Masters and Graduate students had a female on their panel and 20% of students were supervised by a female staff member. The percentage of female interns and chairs is likely to be increased given the recent Ad Astra appointments but will be recorded in the future. An action to increase the number of female external examiners can be found in **A-15 (Principle 1.2.1)**.

Academic Years 2010 - 2019	Extern		Chair		Intern	
	F	M	F	M	F	M
Totals	18	108	25	101	21	105
% Female	14%		20%		17%	

Table 6.2 Composition of PhD and MSc Examination Panels by number and percentage.

6.7 Internships

Summer Research Programme / Internships

The summer research studentship programme aims to give talented undergraduate students an opportunity to experience real-world scientific research within the SoP. Eight-week projects are offered across experimental and theoretical physics, astrophysics, and physics education. Typically, around a dozen students take part, with around two thirds from UCD, and one third from other universities. Besides offering students the opportunity to get a taste of open-ended research (distinct from the normal undergraduate experiments), the program allows supervisors to identify students who are nearing the end of their studies and who may be interested in pursuing a PhD or Masters. For non-UCD students, the program provides a chance for potential PhD supervisors to assess new potential students.

At the end of the eight weeks, the students take part in a poster competition, where they present their work in the form of a poster to a panel of judges. Care is taken every year to ensure that there is at least one female judge on the panel and that panellists comprise an experimentalist, a theorist and an astrophysicist. The poster session is attended by the majority of staff and students in the School and is advertised via the website and Twitter.

History and Numbers

The SoP Internship programme began formally in a central manner when a proposal was submitted by academics in the School to the SFI Ureka programme in 2008. The proposal was led by Dr Fergal O'Reilly and was unfortunately rejected. Despite this setback, the value of a summer internship programme was appreciated by the School and seven research groups and the School donated 2K each to establish the programme with a few internships to develop a baseline in terms of interest for the future. In 2008, eight students from UCD, France and California were hired in the programme and it worked so well that the School supported it from then onwards.

In 2012, a department budget was assigned for internships and a standardised application process with a single step application process was set-up. A list of projects is published on

the School website ~February/March and students apply for up to five projects in order of preference. This process has been followed since 2011. The School has been recording the applicant / success rate by gender since 2012 and the numbers are presented below in **Table 6.3**. In some years the data is incomplete, e.g. we were not recording the number of female supervisors who offer and/or supervised a project. These data are only recorded from 2019 onwards but will be included in the standard annual report, refer to **A-16 (Principle 1.2.1)** in the action plan. There were certainly female supervisors each year but we only have access to these numbers for the current year.

The SoP allocates a budget to fund 10 students at standard rates of 1.6K for ~eight-week internships. The stipends ensure that students from outside the local catchment area can participate. An increase in the number of applicants can be seen in 2019 and is likely attributable to the more competitive stipend.

Year	Total Applicants	Female Applicants Number / %	Successful Total	Successful Females Number / %	Number of Female supervisors Number / %	Programme Organiser M/F
2012	36	8 / 22%	14	4 / 28%		Sheila McBreen (F) and Oran Morris (M)
2013	62	15 / 24%	12	6 / 50%	1 / 17%	Patrick Hayden (M)
2014	42	9 / 21%	13	5 / 38 %		Patrick Hayden (M)
2015	136	7 / 5%	13	2/ 15%	4 / 36%	Nebras Alattar (M)
2016	75	14 / 19%	16	5 / 31 %		Isaac Tobin (M)
2017	55	15 / 28%	18	5 / 28%		Isaac Tobin (M)
2018	72	18 / 27 %	11	3 / 27%	3 / 25%	Morgan Fraser (M)
2019	92	29 / 32%	13	5 / 38%	2 / 14 %	Morgan Fraser (M)

Table 6.3 Internships since 2012 showing the applicants and successful female participation. The data are incomplete as records were not kept of the number of female supervisors. In 2015, the application number was very high with a large number of applicants from one country. In 2016, the School paid for 13 students and 3 took part on a voluntary basis. In 2017 and onwards, the School paid for 10 students and the remainder were supported by research groups.

Since 2012, there have been 35 female interns in Physics. The percentage of female interns in the cohort is 31% on average from 2012 to 2019. The percentage of females in the applicant group is 22% on average from 2012 to 2019. Females are successful in excess of the applicant rate. We have not recorded the number of female supervisors.

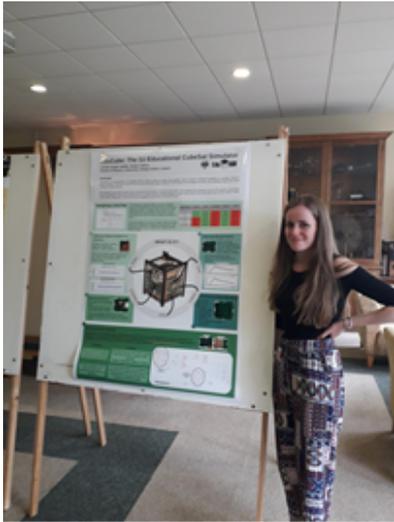


Figure 6.3 Third Year PASS student, Juliette Casals Sanders presenting her poster based on her summer internship project (left). Student participants from the 2018 poster session (right).

The 2020 internship round was cancelled due to COVID-19. For 2021, blind assessment of applications is planned. Supervisors will not see the name/gender of applicants, as this information will be revealed only after they have selected their preferred candidates.

6.8 Centres - CPHM, Thomas Preston, Space

The SoP has recently established a number of centres as part of its strategic plan. Two of these are in areas demonstrated to attract females to Physics, i.e. health and space.

The **Centre for Physics in Health and Medicine (CPHM)** was launched in November 2019 as a strategic initiative led by the SoP. The Centre Director is Dr Seán Cournane (M). The **Thomas Preston Centre** is a proposed centre (lead Prof Pádraig Dunne (M)), dedicated to progressing fundamental physics research. It is currently associated with two PhD scholarships, funded from philanthropy and School resources. It aims to increase the breadth of research at PhD level in the School, beyond what is currently fundable by state and other agencies. The **Centre for Space Research (C-Space)** was recently accepted as a new centre. Centre Director: Prof Lorraine Hanlon (F), Co-proposer: Assoc Prof Sheila McBreen (F). In addition, the UCD Centre for Japanese Studies has been approved and a physics faculty member, Assoc Prof Emma Sokell (F) is the deputy director.

6.9 Seminars

SoP Seminars are held regularly on Thursdays during Term. A Call for Seminar Speakers goes out to School staff via email ahead of Term start to obtain suggestions for speakers and to encourage staff to reach out to their contacts and collaborators for prospective speakers and extend the invitation. When inviting speakers, a seminar title, abstract, and scientific picture is asked for in advance and used for advertising on the SoP website: <http://www.ucd.ie/physics/research/seminars/>

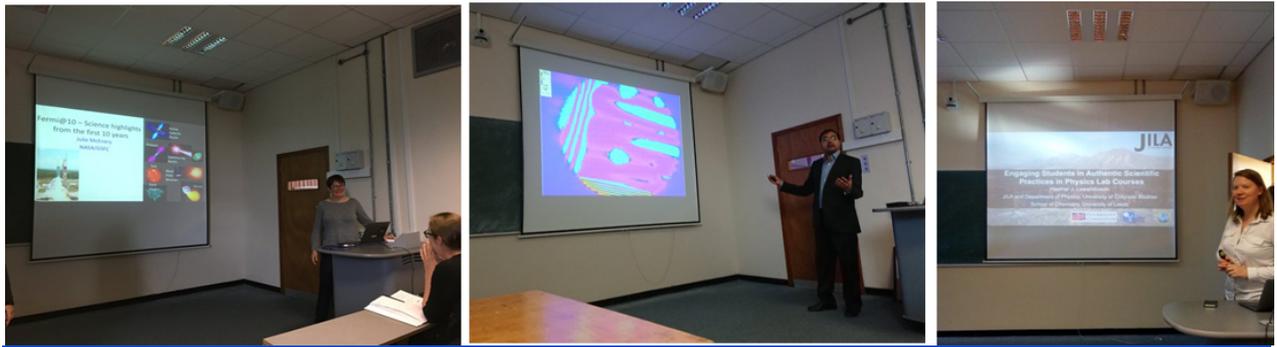


Figure 6.4 Seminar speakers L-R, Dr Julie McEnery, Dr Amit Kumar and Prof Heather Lewandowski.

Speakers are instructed to give a long and basic introduction to the subject area before delving into details, since the School Seminars are open to everyone from all fields of physics, and students will also be present. In this sense, the School Seminars are more like colloquia than individual group seminars on highly specialized or technical topics. The aim is to have a lively season of interesting and broad-ranging seminars.

Seminars 2011-2019	F	M
Speakers	41	143
Total Speakers	184	
% Female	22%	

Table 6.4 Total speakers by Gender for SoP Seminars (2011-2019)

From 2011-2019 there were a total of 184 speakers at SoP Seminars. 22% of these were female speakers. An increase in female seminar speakers and under-represented groups is desirable. Staff and students to be encouraged to utilise their contacts and collaborations to identify and invite prospective speakers, refer to **A-48 (Principle 4.1.5)** in the action plan.

6.10 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Aim to increase the percentage of female external examiners for MSc and PhD panels from 14% to 20%.	A-15
2.	Data for the number of female supervisors who offer and/or supervised an Internship was not recorded prior to 2019. It is only recorded from 2019 onwards but will be included in the standard annual report.	A-16

3.	Some research areas have better female representation than others, and vice versa – from a small sample size. Monitor to see if bias continues	A-23
4.	The Thomas Preston Scholarship is an opportunity to increase the number of female PhD applicants to all available disciplines.	A-31
5.	An increase in female seminar speakers is desirable. This may be achieved by asking appropriate female colleagues and SoP female Alumni.	A-48

7.0 RECRUITMENT & PROMOTION

	High Level Summary
1.	Ad Astra recruitment brought three staff (two female) members to the School.
2.	Apart from the Ad Astra process, the percentage of female applicants and shortlisted female applicants is below 20% for academic/research/teaching staff, often lower.
3.	There are three established opportunities for the targeted recruitment of early stage and advanced female staff; SoP should target female hires via SALI, SFI and the Ad Astra scheme.
4.	A new academic promotion system was established in 2016. It is still at an early stage and difficult to analyse progress of the small number of females in the School.
5.	In 2019 UCD launched two levels of support relating to administrative staff promotion; Job Families & Job Sizing. Along with the recently established UCD framework for all staff Performance for Growth (P4G) (the second running is delayed due to Covid-19), the impact of these measures on the SoP has not been identified.
6.	Ad Astra recruitment brought three staff (two female) members to the School.
7.	Apart from the Ad Astra process, the percentage of female applicants and shortlisted female applicants is below 20% for academic/research/teaching staff, often lower.

7.1 Recruitment

UCD follows a strict and robust hiring process to hire its workforce, an overview of this process is shown in steps 1 - 4 which will underpin all hiring practices in relation to academic and support staff.

1. Candidates apply through the online system and receive an acknowledgement.
2. The Board of Assessment reviews applications and selects candidates for interview.
3. The Resourcing Team contacts shortlisted candidates and invites them for an interview (may involve presentation).
4. The Resourcing Team liaises with the recommended candidate to complete post interview checks before issuing a contract.

Gender implications of hiring and recruitment should be assessed prior to advertising new jobs and action **A-25 (Principle 1.2.3)** is included in the action plan. This is supported with action **A-26 (Principle 1.2.3)** to introduce mandatory EDI / Unconscious Bias training for all SoP staff who will participate in interview panels.

7.1.1 Academic

The number of academic staff has increased in recent years due in part to the University's Ad Astra programme, which has seen an increase in lecturer appointments across the University (for five-year appointments with possible permanency). Cycle I of the scheme brought three new staff members; four interviewed and three hired (two F, one M). Cycle II is currently suspended due to COVID-19, however, it is less clear how many positions are available, how many candidates can be interviewed/hired. A new post in Astronomy has been created. Recent changes have slightly improved gender balance in the School, with additions expected. Two additional academic staff joined the School during the same period, both male, one part-time, and one a three-year teaching buyout. The hiring of all academic staff has adhered to the above process.

General discussions occur currently in the SoP about attracting/hiring more female candidates, but have not yet been formalised. The SoP made a concerted effort to hire female staff for the Ad Astra programme, starting from Summer 2019, meaning data is not included.

Analysis of the School recruitment is shown below in **Table 7.1** for the period March 31 2016 to March 31 2019 for academic staff, researchers, and teaching positions. The School intends to update this analysis to reflect the Ad Astra scheme to reflect improvements that are already underway in the School.

	Applicants % Female	Shortlisted % Female	Offered % Female	Accepted % Female
Academic Staff*	7.4	10.5	0	0
Research**	15.7	16.7	18.2	18.2
Teaching Only***	15.1	1	0	0

Table 7.1 (2016-2019) *Lectures above and below and prof; 81 applicants that specified gender – the 41 that did not specify gender are not included in the analysis. **102 applicants specified gender; 58 did not. ***33 applicants specified gender; six did not.

The female applicants depend on the pool of applicants and the research specialism. This requires monitoring. Refer to **A-23 (Principle 1.2.3)** in the action plan.

7.1.2 Technical

The hiring of technical (TO) and senior technical officers (STO) in the SoP has adhered to the above process. Currently there is one female TO in the SoP; one other female TO left UCD in 2017. The gender breakdown of female applications to advertised TO posts historically has shown a greater percentage of male applicants. Further analysis is needed to reflect upon this trend and what measures can be taken to mitigate this pattern, refer to **A-30 (Principle 2.2.2)** in the action plan. For the two most recent TO advertisements (one each in Mechanical and Electronics Workshops) care was taken to include the possibility of flexible or part-time working, to potentially broaden the attractiveness of the post to a more diverse applicant pool. Even with this, the number of qualified female applicants was zero. This was also done during

2008-2011 for some technical recruitment but did not have an impact on female applicant rates.

7.1.3 Administration

The hiring of all grades of administrative staff have adhered to the above process. During the past 15 years, historical gender breakdown of applicants would be four males and nine females recruited to front office roles (inclusive of JobBridge applicants). It is important for a front-facing office to have all genders represented, to accommodate sensitive queries from all student bodies. Admin recruitment beyond basic needs is dependent on revenue generated by activities such as our Summer Schools or where 0.5 FTE of a grant application can include research support.

7.1.4 Induction & Mentoring

UCD Induction

All new Staff members are required to undertake the UCD Induction Programme. This has been previously discussed within section 2.9 SoP Inductions, making clear pointers to actions needed relating to those first arriving at UCD and being unfamiliar with the environment.

A review of the current mandatory induction programme for new SoP staff, including research assistants, is required to identify gaps and recommendations and embed EDI, refer to **A-29 (Principle 2.1.3)** in the action plan. This can be supplemented with a mandatory annual EDI refresher training for existing staff, refer to **A-44 (Principle 4.1.2)** in the action plan.

Mentors for new Staff

New academic staff are assigned a mentor by the Head of School. Currently three staff members (two M and one F) mentor six academic staff, two of whom are female.

In the SoP, the policy of assigning mentors began informally with the former Head of School, Prof Pdraig Dunne in ~2016. Since then a UCD-wide formal system was established where all new academic staff are assigned a mentor. It is now standard and support is provided where both mentors and mentees receive training. Policy and process is accessible to all SoP staff, refer to **A-34 (Principle 3.1.2)** in the action plan.

7.2 Targeted Recruitment of Female staff

A number of opportunities currently exist where the School can hire senior females:

1. **SALI: Senior Academic Leadership Initiative.** This is an initiative of the government whereby universities can apply to advertise Full Prof roles in areas where there is a lack of female representation.
2. **SFI Research Professor:** This is a Science Foundation Ireland scheme to hire senior females in universities. Females have been extremely poorly (~0%) represented in this scheme and SFI seeks to finally rectify this presenting the SoP with an opportunity.

3. **Ad Astra:** UCD is running a number of recruitment mechanisms for hiring early stage and more advanced staff. This is another opportunity for SoP.

These are considered as key opportunities for the School to apply to these highly competitive schemes to recruit and increase quality female candidates to new and existing research and teaching roles. See action items **A-20, A-21, A-25, A-26 (all Principle 1.2.3)** and **A-38 (Principle 3.2.1)**.

One or two new female appointments are our realistic targets.

7.3 Promotion

7.3.1 Academic

The UCD promotion system changed in 2016. Prior to this, specific calls for promotion applications occurred irregularly, most recently in 2008 and 2012. It was not possible to submit applications at other times. Applications were paper based, requiring significant effort. Applications were ranked at faculty level and subsequently at University level; promotion slots were limited. Many issues were identified with the process that will not be further discussed here with the exception of the effect specific deadlines had for faculty on leave e.g. maternity leave or other specifically long-term leave. The previous system did not allow for faculty on maternity leave to submit applications upon their return, thereby delaying their opportunity to apply, meaning a delay (often by years) of applications by female staff.

The new system has been running for nearly four years and is an online system with associated materials available to staff online and via workshops. Applicants are expected to show a contribution in the three areas of:

- **Research, Scholarship and Innovation**
- **Teaching and Learning**
- **Leadership and Contribution**

with subcategories in each section. Applicants name a number of external referees depending on the level of the promotion being sought. Heads of School must also name a number of potential external assessors. A mix of those named by the applicant and the HoS are selected by the evaluating committee: Faculty Promotions Committee (FPC) which comprises one representative of the CoS (not necessarily a physicist), although this is currently the case (Prof Lorraine Hanlon). The FPC comprises one representative from each of the colleges and is chaired by the Registrar and Deputy President, Prof Mark Rogers. All members have received unconscious bias training. Total number of staff on the committee is 10, five of whom are female.

<https://www.ucd.ie/hr/promotions/facultypromotions/>

Applications are reviewed and commented on by Head of School and CoS Principal, for accuracy. The applications are evaluated by the FPC to determine whether a case for promotion has been established. If that is the case, external referees are selected and the

application is reviewed in full. Applicants can apply at any stage and if unsuccessful, they must wait one year before reapplying. The FPC meets nine times per year.

In the SoP, one male and one female were successfully promoted from Assistant Professor to Associate Professor and one male was promoted from Associate Prof to Professor since the new system began. There were a number of unsuccessful applications in the three year time period but it is not possible to provide detail without potentially identifying the applicants. It is too early to evaluate the new system within the SoP. At the University level, cascade model targets were achieved in relation to promotion to Assoc Prof, but not in relation to promotion to higher levels. The cascade model requires that staff are promoted in the same ratio as they are represented at the lower grade. An annual review of female participation in the promotion process is required, refer to **A-38 (Principle 3.2.1)**. A support process for pre-promotion candidates and unsuccessful applicants needs to be implemented in liaison with the CoS and HR, refer to **A-41 (Principle 3.2.2)** in the action plan.

Personal Comments by a Staff Member on Academic Promotions :

*** This section has been redacted ***

7.3.2 Technical

The Policy for Promotion to Senior Technical Officer has been developed in line with the Expert Group Report and terms of reference for the Technical Development, Reward and Recognition Group. The method of application for 'Promotion to Senior Technical Officer' is an application form emailed to the promotions unit. The assessment of applications is a rolling process and the Technical Staff Committee (TSC) meets three times a year to review applications for promotion to STO.

In all cases, the Technical Staff Committee will consider the candidate's application documents including the Head of School/Unit's commentary. The relevant Head of School/Unit or nominee may be invited to the TSC meeting to answer questions that the committee may have in relation to the application. The candidate will be advised of the outcome of their application for promotion from TO to STO by the TSC. In the interests of transparency, best practice and staff development, all candidates will be given written feedback on their application by the Chairperson, or nominee, and one other member of the TSC. This feedback will be made available after candidates have been formally advised of the outcome of their application for promotion.

To date in the SoP there have been no female technical officers who have applied for promotions, due to a lack of female representation in this area. Refer to **A-42 (Principle 3.2.3)** in the action plan.

7.3.3 Administration

The situation for administration staff is different from technical and academic. A key point to note is that across UCD, admin roles are mainly lower-paid and mainly staffed by females. The timeframe for any promotion to this category was and is viewed as unfair and in direct opposition to any EDI initiatives UCD aims to promote. It is important to present the background and current plans here in order to establish a baseline and to determine the outcome of this new process in the future career progression for administrative staff which has been notable over the last decade by its absence.

A timeline is given below:

2009: Administrative promotion at UCD ceased owing to Ireland's economic recession.

2019: Unions balloted members to strike over its reinstatement. 96% in favour of Industrial Action. 88% in favour of Strike Action.

2019: UCD emailed administrative staff to advise of its potential reinstatement (with details needing to be worked out), and that they have been lobbying government funding for 3+ years prior to this time.

2020: UCD is working on this matter. Currently UCD is offering two levels of support; (1) Job Sizing & (2) Job Families.

Job Families

Job Families demonstrates how to integrate the functional and core competencies contained in the Job Families Framework Anchor Role Profiles into job descriptions.

See policy at:

<https://www.ucd.ie/hr/t4media/Job%20Sizing%20of%20Administrative%20Roles%20Policy.pdf>

Job Sizing

Job Sizing is a management driven process for administrative posts up to, and including, SAO IV level*. The Job Sizing process is used when:

- A new post is created (temporary or permanent) for more than one year
- A vacancy arises in a post that has never been graded
- Any changes are made to an existing post that has become vacant
- A temporary post of less than one year, which has never been graded, is extended

Job Sizing is the assessment of a position, not a person. Further information can be found at <https://www.ucd.ie/hr/a-z/jobgrading/> Job Sizing, to note, is not a personal promotion scheme. What is currently in place is to address the current backlog of changed roles over a 10 year plus timeframe. Currently, the Job Sizing Committee for the university is reviewing lower grades first, working its way up to higher grades in tranches. Existing staff must be here for four years on their grade to be eligible, meaning that most of the UCD School of Physics front

office staff are ineligible. If they apply and are refused, their four year wait resets itself. If the current grade is higher than A01A, one must wait for further instruction from UCD. It is hoped that COVID-19 does not impact job sizing for those who have waited 10 years to have a forum to which they can apply to.

*To understand level/grades of admin posts see the admin section of <https://www.ucd.ie/hr/pay/payscales/>

Figure 7.1 below is a timeline on when grades/levels are first reviewed. It is from 2020.

Grade	Open Date – verification requests etc	Close Date	JSC Meeting
EA	27 th January	9 th March	31 st March
SEA	10 th March	7 th April	28 th April
A02	13 th April	5 th May	26 th May
A01	5 th May	2 nd June	23 rd June
A01A	TBC	TBC	TBC

Caveat: Volume of applications could necessitate a revision of timings

Figure 7.1 Timeline for review of grades/levels for 2020.

Membership of the Job Sizing Committee

The committee membership comprises of:

- Head of School (Chair) or other nominee of the President - currently Professor Peter Duffy, UCD SoP (M)
- Union Representative - currently Ms Margaret Brindley (F)
- Senior member of staff of UCD HR - currently Ms Elaine Hassett (F)

The following provides a university-wide summary of the number of applications received by Dec 2019 and the outcomes of these applications (**Figure 7.2**):

- EA grade – 3 applications – 3 roles upgraded to SEA
- SEA grade – 13 applications – 7 roles upgraded to AO2 – 6 confirmed at SEA
- AO2 grade – 13 applications – 10 roles upgraded to A01 – 3 upgraded to A01A
- AO1 grade – 10 applications – 9 roles upgraded to A01A – 1 confirmed at A01
- AO1A grade – 0 applications (It is TBC though!)

A total of 33 staff colleagues have now been promoted under the Job Sizing Framework arising from these role upgrades, without the requirement for a competitive process. This is due recognition of their contributions to the relevant Schools over a period of time in which the operational requirements of their roles grew in a measurable way.

This is a relatively new process and will be evaluated in the coming years by gender. Refer to **A-38 (Principle 3.2.1)** in action plan.

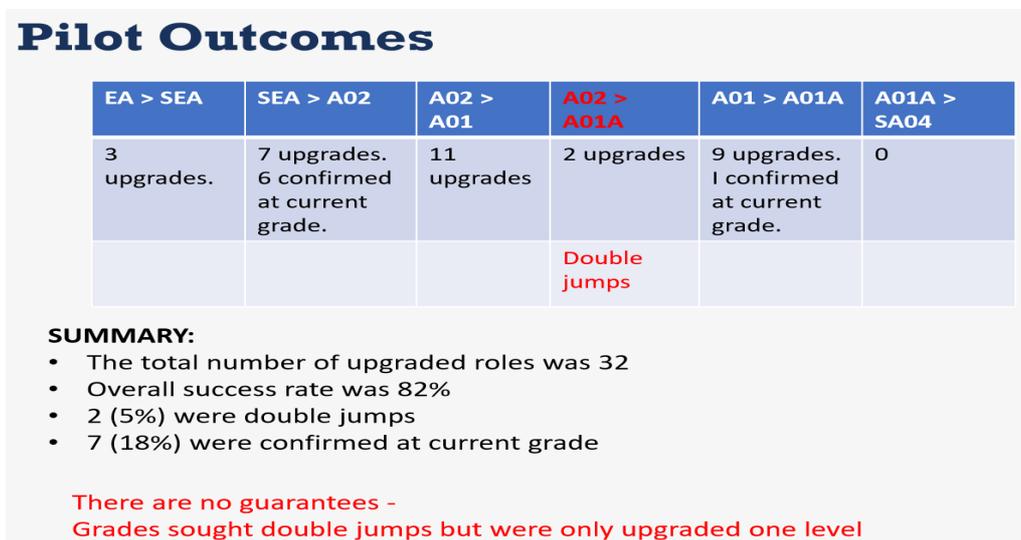


Figure 7.2 2020 - Job Sizing Framework Information Session - Pilot Outcomes.

7.4 Performance for Growth

Performance for Growth (P4G) is the UCD framework that provides the opportunity for all employees to have at least one annual conversation with their line manager, Head of School or Alternate Reviewer, within which: Achievements and challenges of the previous year are reflected on and feedback is provided; Goals and objectives for the coming year are agreed, and a development plan is discussed and agreed; Career aspirations are explored and supported where possible. The annual P4G cycle runs from 1st May through to 30th April 2019. During P4G discussions objectives are agreed for the coming year, development plans are created and future career aspirations are discussed. Refer to **A-32 (Principle 3.1.1)** and **A-36 (Principle 3.1.3)** in the action plan.

The introduction of this framework is intended to provide clarity and feedback on objectives and expectations and support career progression. It is too early to evaluate the effectiveness of this process on female staff, refer to **A-21 (Principle 1.2.3)** in the action plan.

Research staff are expected to have at least one annual conversation with their line manager and a career development plan identified. It may currently consist of informal discussions between students and postdocs/PI. There is an opportunity to formalise this, refer to **A-33 (Principle 3.1.1)** and **A-37 (Principle 3.1.3)** in the action plan. All available support on research funding avenues and support for Early Career Staff and PDRAs to be accessible on the SoP website, refer to **A-35 (Principle 3.2.1)** in the action plan.

7.5 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	The majority of females in the SoP are at Assoc Prof or below. Some of this is an issue around the age profile and in some cases long term knock-on of maternity leave. Workshops and direct support from the HoS and senior staff is required to support female progression.	A-21, A-41
2.	Recruitment and promotion of female staff is critical to improve gender balance; SoP should target female hires via SALI, SFI and the Ad Astra scheme.	A-20, A-21, A-25, A-26, A-38
3.	There have been no female technical officers who have gone for promotions. Recommendation to UCD EDI and the TSC to reflect upon this trend and produce a plan with actionable measures to mitigate this pattern. School data too small to analyse trends.	A-42
4.	EDI objective within the P4G to explicitly support female staff with career progression via feedback and promotion support.	A-35, A-36, A-38

8.0 SCHOOL ENGAGEMENT

	High Level Summary
1.	Female representation is reasonable on the website and Twitter account.
2.	Positive stories on teaching/research/engagement are often not published on the website due to time constraints. This needs to be addressed. The work is done but the final step of writing it up for the web is often not completed, refer to A-47 (Principle 4.1.4) in the action plan.
3.	It needs to be discussed whether there should be a Juno section on the website or whether that content should be included generally. It is not clear to the SoP whether a separate section on females is necessarily better than embedding that content throughout the website, refer to A-46 (Principle 4.1.4) in the action plan.
4.	There is a rich social programme in the SoP. However the SoP should further engage with the staff and student consultation information from surveys and focus groups to enhance the SoP engagement for all internal and external members, refer to A-19 (Principle 1.2.2) in the action plan.
5.	The programme is well organised and participation is high by staff.
6.	Students are supported and encouraged to organise events and these are also successful and well attended.

8.1 Website

In recent years a concerted effort has been made by all staff to ensure that there is balance in photographs of events e.g. internships etc. The representation of genders on the website was investigated and the breakdown recorded was 223 Male and 104 Female represented. If the staff and graduate student profile pictures are not included, the total website count is 164 Male and 79 Female. If the class photo on the front page is not included, the total website count is 115 Male and 68 Female. The SoP is a proud supporter of the IOP Project Juno and this can be seen on our webpage at www.ucd.ie/physics.

8.2 Twitter

The UCD Physics twitter account @UCD_physics (https://twitter.com/UCD_physics) was created in July 2017. It is managed by Assistant Prof Antonio Martin-Carrillo. Since July 2017, it has published about 1000 tweets. It follows 168 accounts, including 12 staff (seven males, five females) and 10 students (five males, five females). By the end of March 2020, the account has 570 followers. On average, a tweet normally reaches about 2000 people, with peaks of 5000 people in some particular cases. Care is taken to ensure there is representation of female staff and students in posts. An example of a tweet is seen in **Figure 8.1** from the recent UCD Physics field trip for Astronomy students showcasing our female undergrads of which 24% were female.



Figure 8.1 Tweets from the UCD SoP.

8.3 School Events

Physics 50 Series

The Physics50 series was inaugurated in July 2014, to celebrate the 50th anniversary of the move of the then Experimental Physics department to new accommodation on the Belfield campus. Over 200 people attended the first event. Each year a series of invited talks is held, followed by a social reception in the SoP. Speakers are chosen to obtain as close to a 50-50 mix of male/female as possible. The idea behind the event is to foster the community of Physics Alumni and to build support for the School from within that community.



Figure 8.2 Physics 54 featuring talks from Prof Brendan McClean, Prof Dame Jocelyn Bell-Burnell

In 2014 the SoP initiated a Summer School in Physics for life-science students from The University of California. This provides funds for new initiatives, employment for graduates in the Summer, and has grown over the years. In 2019 a second Summer School was started for students from the Big10 consortium in the US MidWest. Typically over 75% of the total student enrolment are female.

Women@STEM: The WiTS group was rebranded Women@STEM in 2018 and Dr Sharon Shannon (Figure 8.3) of the SoP Juno committee was appointed co-chair of the group. UCD Women@STEM is a network of faculty members, operations and management staff, and students supporting equality, diversity and inclusion (EDI) in STEM. This group has been active since and hosted events including a Symposium “Diversity in STEM” 12 November 2018. Women@STEM and UCD Japan Group hosted an event ‘Diversity in STEM’, inviting two distinguished speakers: Professor Yuko Takahashi and The Ambassador of Japan Mrs

Mari Miyoshi. Professor Takahashi is President of Tsuda University from one of the oldest and most prestigious higher educational institutions for women in Japan. The event also featured an informative panel discussion 'Fair Opportunities for an Inclusive Workplace within Academia' was held.



Figure 8.3 Relaunch of UCD Women@STEM Committee in 2018; Sharon Shannon is in both figures.

Women+ In STEM : The Women+ in STEM Society was founded in the summer of 2019 by three undergraduate STEM students, one of which is one of our School's 3rd Year Astrophysics students, Ruth Moore. The society, which now has over 300 registered members holds panel discussions, coffee mornings, networking events, career based workshops and feminist discussion groups, in addition to teaching outreach classes to primary school children. All of these events are developed and planned in line with their three core values of encouraging equal gender representation in STEM through their outreach program, to build a cross-faculty community for female and non-binary students in UCD, and to provide their members with key skills and opportunities for their future careers. **Figure 8.4** shows some of the committee members at their Black Women in STEM event which was held in February, and at the annual UCD Women in Leadership Conference.



Figure 8.4 Black Women in STEM event which was held in February, and at the annual UCD Women in Leadership Conference, featuring SoP undergraduate student Ruth Moore.

UN International Day of Women and Girls in Science

An annual event in the CoS is the UN International Day of Women and Girls in Science which is celebrated with a display of posters and tea/coffee for staff and students. This event is organised by the CoS EDI committee in association with the Women@STEM group. Posters of SoP role models from the 2019 event are displayed in **Figure 8.5**. Dr Sharon Shannon also organised and facilitated a physics workshop for primary school students for local DEIS (Disadvantaged) Schools each year.



Figure 8.5 Primary school students from St. Louise's, Ballyfermot and Presentation Primary School Warrenmount undertaking a research project on UCD CoS role models featuring SoP staff Dr Deirdre Coffey and Dr Nuala Caffrey for the International Day of Women and Girls in Science 2019/20. *Picture removed as permission expired.*

8.4 Staff and Students

There is a rich social programme in the SoP for students and staff and this should be maintained to the current high standard with engagement from staff and students, refer to **A-45 (Principle 4.1.3)** in the action plan.

A range of events and societies are available to Physics students at UCD, The Physics Society and The Optical Society (OSA) Student Chapter at UCD. The current female-male ratio of the student chapter membership equals 50:50. The School also runs a welcome coffee morning for all Stage 1-4 and postgraduate students during a known timetabled break in core science student classes. A coffee club exists: every day coffee is put on for 11am, with Friday being 'Cake Friday' Many celebratory events have also taken part on these Fridays as seen in **Figure 8.6**. Christmas Dinner and Coffee and Mince Pies events also take place and are open to all staff, work contacts of the department and retired staff.



Figure 8.6 Cake Friday as part of the Coffee Club celebrating retired SoP faculty Tony Scott.

8.5 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Outputs from Juno should be included on the website.	A-46
2.	A number of key stories detailing efforts in physics from seminars, medals, papers, outreach etc are not highlighted due to lack of time. It is a missed opportunity.	A-47

9.0 OUTREACH

	High Level Summary
1.	A large number and outreach and recruitment activities undertaken in the SoP not only promote gender equality but also the facilitation of access groups into physics.
2.	Both male and female staff are engaged in these activities, highlighting the sincere interest of the SoP in achieving our EDI goals.
3.	As many of these activities focus on early intervention, their success on the individual participants will not yet be statistically evident until later years to come. The SoP will also evaluate the community building aspects of these projects. This work is at an early stage but links in the community are being built.
4.	The current GDPR constraints have made tracking gender of students under 18 years of age difficult and a strategy to track this must be discussed and developed with UCD SIRC and UCD Ethics.

9.1 Introduction and Summary

The UCD SoP has undertaken outreach events in a largely ad-hoc way over the years, driven by staff interest and opportunities that present themselves via, for example the IOP, to engage the wider community with physics and spark curiosity. Over recent years this has become far more focused and professionalised. Outreach activities are targeted at a range of different groups ranging from primary school to secondary school students and members of the public. They are all working towards a main goal of increasing engagement with a scientifically informed society and are targeted at 50% female participation as a minimum. For example, in the second level Transition Year (TY) and DEIS programmes, equal numbers of male and female school pupils are selected. Further to this, individuals in the School have successfully acquired external funding from Science Foundation Ireland (SFI) to engage in additional outreach activities as shown in **Figure 9.1** and **Table 9.1** below.

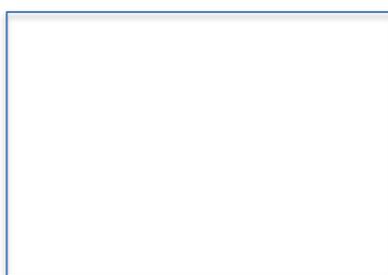


Figure 9.1. Primary school workshop with Assoc Prof Emma Sokell. *Picture removed as permission expired.*

Title	Physics Staff Involved	Project Summary
<i>Seeing the Light (2017)</i>	Assoc Prof Emma Sokell Dr Tom McCormack	Hands-on light based workshops to 10 single-sex schools in the greater Dublin area. Encourage female TY students to consider physics.
<i>Suite Science (2018)</i>	Dr Sharon Shannon	Hands-on 90 minute STEM based workshops with DEIS students in the UCD Explore Lab.
<i>Suite Science (2019)</i>	Dr Sharon Shannon	Hands-on 90 minute STEM based workshops with DEIS students in the UCD Explore Lab.
<i>Little Big Questions (2020)</i>	Dr Sharon Shannon	Podcast and STEM based workshops with DEIS students in the UCD Explore Lab.
<i>EIRSAT-1 Hub - Space for Engagement (2020)</i>	Prof Lorraine Hanlon Ms Lána Salmon Dr Sharon Shannon	Increase the awareness of space activities in Ireland and the EIRSAT-1 Project.

Table 9.1. Science Foundation Ireland Discover Funded Project

The SoP also supports the participation of schools for single visit primary and secondary school workshops organised by Dr Sharon Shannon, Dr Tom McCormack and the UCD Explore Lab programme, as seen in **Figure 9.2**.

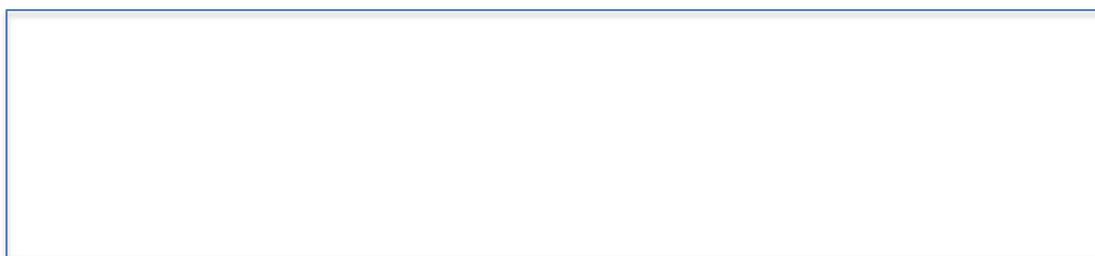


Figure 9.2 Single session visits and physics workshops with SoP Dr Tom McCormack and Dr Sharon Shannon. *Picture removed as permission expired.*

Find Your Inspiration

Since 2019 a new partnership with Inspiring the Future Ireland a group that aims to seed early ambition in young children. Dr Antonio Martin Carrillo and Dr Sharon Shannon delivered a

series of workshops and interactive talks to students from Tallaght and Clondalkin as seen in **Figure 9.3**.



Figure 9.3 *Find Your Inspiration* Talk by Dr Antonio Martin-Carrillo with students from Tallaght.

Girls in DEIS Schools: Changing Attitudes/Impacting Futures in STEM

In December 2019 Dr Sharon Shannon presented a talk entitled *The Why and Why Not of Physics* to 300 plus students from multiple schools. These female students presented and showcased over 100 female role models in STEM during their project exhibition in the O'Brien Centre for Science.

Transition Year Week

The main mechanism for outreach engagement with secondary school students is the Transition Year (TY) Week held in December. The number of TY places available each year is 96, and feedback from participants continues to be highly positive and enthusiastic. The student breakdown is a 50:50 split of male and female students from schools throughout Ireland. As of 2019 shown in **Figure 9.4** access groups were also prioritised on the programme with the overall aim to achieve a 33% representation.

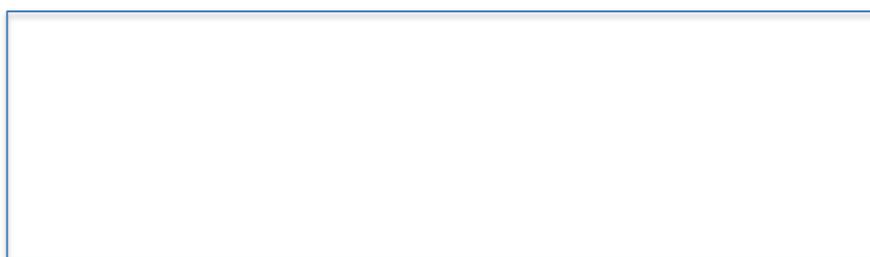


Figure 9.4 A selection of students from the UCD SoP Transition Year Week 2019. *Picture removed as permission expired.*

The Tyndall Lectures

The Tyndall Lectures, sponsored by the IOP, are held throughout Ireland every January/February, use demonstrations and interactivity to enthuse school children and show how their class work relates to modern areas of physics research. In 2019 the Physics of Waves was presented by Dr Tom McCormack, **Figure 9.5** to students and this talk not only

highlighted physics concepts but also showcased women who contributed to key discoveries such as Rosalind Franklin.



Figure 9.5 Various Tyndall Lectures, held throughout Ireland every January/February 2019.

BT Young Scientists Exhibition

The Young Scientists' Exhibition was co-founded by two UCD Physics researchers, a Carmelite Priest, the Rev Dr Burke and Dr Tony Scott in 1963. This event now invites 3,773 students from 374 schools to compete for the coveted title 'BT Young Scientist & Technologist of the Year'. The School continues to support the BT Young Scientists exhibition with judges.

International Particle Physics MasterClass

In the past six years, UCD Physics has participated in the *International Particle Physics MasterClass* for between 30 and 100 secondary school students. The Masterclass is a one day hands-on analysis of LHC data culminating with a video conference to CERN. This event overall has averaged a 50:50 gender representation throughout the years.

Early Career Physics Communicator Award

UCD PhD student Lána Salmon received the IOP Early Career Physics Communicator Award in 2018 (**Figure 9.6**). She was selected as this year's recipient for her work to promote science and break down stereotypes; doing so in blogs, essays and YouTube videos.



Figure 9.6 IOP Communicator Award for UCD physics graduate and astrophysics postgraduate student, Lána Salmon.

10 THINGS TO KNOW ABOUT

RTÉ filmed and presented a segment featuring Irish Astronauts in The European Space Agency, UCD Students who are designing Ireland's first satellite seen in **Figure 9.7**.



Figure 9.7 Assoc Prof Sheila McBreen, David Murphy, Lána Salmon, Joe Thompson and presenter Dr Aoibhinn Ní Shúilleabháin.

9.2 Student Recruitment

The development of direct, personal links with secondary schools and physics teachers in Ireland is very important for the School, which continues to support teachers in their efforts to reverse the declining trends of physics popularity in schools and to encourage more students to study physics for the Leaving Certificate. Many School staff volunteer their time to give talks and assist with recruiting efforts to promote Physics to schools. We try to ensure that there is a gender balance of staff and current students and alumni, refer to **A-11 (Principle 1.2.1)** in the action plan. The Gender Distribution of Science students from 2009-2018 is approximately 43% female. The gender breakdown of attendees by gender at the Mathematics and Physics Workshops from 2015 and 2016 was average 44% Female. Due to GDPR restrictions the CoS has not tracked the student gender recruitment statistics in recent years and so it is hard to examine this breakdown in current years. However, in terms of staff female representation (**Table 9.2**), the SoP has approximately a 33% female representation overall.

Recruitment Event	2016				2017				2018				2019			
	F	M	T	F%	F	M	T	F%	F	M	T	F%	F	M	T	F%
Higher Options Careers Fair	0	6	6	0%	1	4	5	20%	1	4	5	20%	1	3	4	25%
UCD Science Open Evening	1	1	2	50%	1	4	5	20%	1	2	3	33%	1	1	2	50%
UCD Science Graduate Studies Open Evening	1	1	2	50%	1	1	2	50%	2	0	2	100%	1	1	2	50%
Parents Evening	1	1	2	50%	0	3	3	0%	1	1	2	50%	0	1	1	0%
UCD Open Day	0	4	0	0%	0	3	3	0%	1	3	4	20%	3	3	6	50%

UCD Physics Open Evening	1	3	4	20%	2	3	5	40%	0	4	4	0%	3	3	6	50%
SoP TY week	5	11	16	31%	7	16	23	30%	2	12	14	14%	4	7	11	36%
Science TY workshop week	1	1	2	50%	1	1	2	50%	2	1	3	60%	N/A	N/A	N/A	N/A

Table 9.2 Breakdown of SoP staff representation by gender at yearly recruitment events.

For the UCD Open Day the SoP is generally not gender balanced, however the SoP has been proactive as Sheila McBreen highlighted these issues and changed how the procedure around how this event is planned, as a result the overall CoS has a greater gender balance at this event.

Strategy to Address Gender Imbalance

Within the CoS we run a Science Student Leader programme which includes students from across all disciplines including Physics. Key to our strategy is to introduce secondary school students to female physics student ambassadors and graduates. The students are involved at UCD Science events throughout the year in a variety of roles ranging from delivering tours of the Science centre, speaking at the Science Open Evening and having one-on-one interactions at our events. One of the challenges to address the gender imbalance in Physics is the number of students studying Physics for the Leaving Certificate is lower than the other lab sciences. A Science Careers Workshop will be included to demonstrate the career options available to physics graduates. The SoP has actively engaged with the CoS recruitment committee to ensure that female physics students are prominently featured not just in the pages associated with the degrees programmes offered but also on the front cover and on all additional advertisement materials used. PhD student Ms Lána Salmon featured heavily throughout UCD's Think Bigger campaign **Figure 9.8** and video material from UCD featured Assoc Prof Sheila McBreen as part of the UCD Think Bigger public campaign.



Figure 9.8 UCD Science advertisement featuring a female physics PhD student Lána Salmon.

Recently the IOP has established the Bell Burnell Graduate Scholarship Fund to support graduates who wish to study towards a doctorate in physics and are from groups that are currently under-represented in physics. The IOP website features the story of SoP PhD

student Najnin Sharmin (<https://www.youtube.com/watch?v=2AYeZj0W0JA>). Assoc Prof Emma Sokell is on the IOP committee evaluating these applications. Among the many motivations for this Juno Practitioner Application is to enable the SoP to support applications from underrepresented groups for the Bell Burnell Graduate Scholarship.



Figure 9.9 Institute of Physics visiting the research group of Dr Brian Vohnsen and doing a feature of team member Ms Najnin Sharmin in relation to the launch of the Bell Burnell Graduate Scholarship Fund.

9.3 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Recognition of outreach achievement not formalised in the CoS. The organisers and participants of outreach events should be analysed by gender.	A-11
2.	Outreach work should be valued and recognised in SoP. An increase in female academic staff would lead to a reduction in pressure on the current female academics participating in outreach events.	A-51

10.0 LEAVE POLICY

	High Level Summary
1.	Maternity leave has been difficult for a number of female staff as reflected in the case studies. It is important to the committee that these experiences are documented in this report.
2.	There have been improvements in leave e.g. Social levy for leave cover.
3.	The research semester is an important change for those academics returning from leave but has only been applied for one academic. Account for this lack for those who missed it could mitigate the negative effect on their careers and lives.
4.	Paternity leave has been extended in UCD and nationally.
5.	UCD review of Support for Miscarriages / Undergoing fertility treatment / Menopause.

In this chapter, the types of leave available in UCD are presented. Three females have taken maternity leave in the last three years and two males have taken paternity leave. Four female staff have written case studies on their experiences of maternity leave. We feel it is particularly important in this context to record those experiences and to give those staff an opportunity to explain to colleagues the challenges they faced. Improvements to the experiences are seen in the studies but this is an area which must be constantly be monitored as it has a major impact on careers and well-being.

In terms of flexibility, where it is required by staff for a variety of reasons, it is generally given. We do not have records of these arrangements.

Since 2016 three SoP staff members have availed of sabbatical leave (two male, one female).

Leave Type	Description
Adoptive Leave	Only an adoptive mother is entitled to avail of adoptive leave, except in the case where a male is the sole adopter.
Annual Leave	Annual leave entitlement for professional and support staff employees.
Career Break	Staff who wish to apply for a career break from their post. Staff can apply for a variety of reasons including to spend more time with their families, to study full-time, carry out voluntary/community work or to travel. Staff members who are permanent or hold contracts of indefinite duration, have satisfactorily completed their probationary period and have ongoing satisfactory performance are eligible to apply.
Carers Leave	Carer's Leave provides for the temporary absence from the college for an employee who wishes to give full-time care and attention to a person requiring it. Carer's leave is available to all employees of the college who have completed one year's continuous service in UCD. However, this is subject to meeting specific criteria as outlined in the college carer's leave policy.
Force Majeure Leave	Under the parental leave policy there is a provision for an employee to take force majeure leave to enable dealing with family emergencies.

	However, it is limited to circumstances where the employee's immediate presence at the place where the ill or injured person is situated is indispensable.
Maternity Leave	A female employee who is pregnant is entitled to maternity leave. All pregnant employees, who reach their twenty-fourth week of pregnancy, are entitled to twenty-six weeks leave. This period of leave is known as maternity leave. Employees, who are entitled to maternity leave, are also entitled to sixteen weeks additional unpaid leave immediately following their maternity leave. This sixteen-week period is known as additional unpaid maternity leave. It applies to all UCD employees who are in receipt of a salary under a permanent contract, a contract of indefinite duration (CID), or a fixed-term contract as defined in the Protection of Employees (Fixed Term Work) Act 2003 and who are entitled to benefit under the consolidated Maternity Protection Acts.
Parental Leave	Parental leave is available to employees with continuous service of one year who are natural or adoptive parents, and also extends to persons acting in loco parentis in respect of an eligible child. It is unpaid leave from work, taken by parents to enable them to take care of their child in accordance with the terms and conditions of the Parental Leave Act.
Paternity Leave	Paternity leave is available to those employees who are deemed to be the "relevant parent" of a child. Only one person who is a "relevant parent" in relation to a child can be entitled to paternity leave in respect of that child. There is no qualifying period for entitlement to paternity leave.
Research Sabbatical Leave	Research Sabbatical Leave may be undertaken to carry out research or scholarly work related to an individual's academic discipline. Such leave may be granted to a faculty member to engage in activity which will enhance their research/scholarly reputation and the national/international standing of the University. Research Sabbatical Leave is granted on the approval of the College Principal with recommendation from the Head of School. It is granted for a specified period but not exceeding twelve months at any one time and it is envisaged that Research Sabbatical Leave will correspond with the academic semester calendar.
Sick Leave	All permanent and temporary staff have sick leave entitlements. UCD operates a sick pay scheme for staff that are absent due to injury or ill-health. The scheme provides for Ordinary Sick Pay, Temporary Rehabilitation Remuneration (TRR), Critical Illness Provisions.
Shorter Working Year	The scheme is open to all permanent and temporary staff of the University. Under the terms of the scheme, a staff member may apply on an annual basis for unpaid special leave of up to 13 consecutive weeks. It may be taken as 1 continuous period, or as a maximum of 3 separate periods.
Study & Exam Leave	Study and exam leave is available to professional, administrative, technical and support staff, who have completed one year' continuous service with the university. It applies to courses which are directly related to the employee's work and development as a staff member.

Table 10.1 UCD leave and absence overview.

10.1 Maternity Leave

In Ireland maternity benefit is paid for 26 weeks (156 days). Maternity Benefit is a six-day week payment which covers Monday to Saturday. Sunday is not treated as a day of entitlement to

Maternity Benefit. At least two weeks and not more than 16 weeks of leave must be taken before the end of the week in which your baby is due.

The School of Physics played a significant role in the move by UCD to adopt an across-unit model to fund staff buyout during maternity leave. This involved discussion with senior management and other heads of school strongly supporting the proposal to create a UCD-wide social levy scheme which has been in place since 2016. It is designed to ensure the cost of replacement is covered when an employee goes on maternity leave. The success of this scheme needs to be reviewed for the SoP, refer to **A-54 (Principle 5.1.3)** in the action plan.

The UCD Athena SWAN application submitted in May 2020 included a suggested action regarding Policy on Sabbaticals and Research Leave such that returnees would automatically avail of a Research Semester. SoP to align with this Policy once it is signed off and to disseminate within the SoP, refer to **A-28 (Principle 2.1.1)** in the action plan.

10.1.1 Maternity Leave Case Studies

It is clear from the testimonials provided by female staff, relating to their maternity leave and associated issues, that the SoP and UCD both have improvements to make in improving the experience of female staff at these hugely important periods of their lives, including addressing the lack of research semester for staff returned from Maternity Leave before 2018, refer to **A-53 (Principle 5.1.4)** and **A-28 (Principle 2.2.1)**. The SoP will gather or facilitate gathering such testimonials from each returnee from maternity leave to assess the value of procedures and the improvements that will continue to be needed, refer to **A-54 (Principle 5.1.4)**. It is clear that improvements have been made and this is reflected in the experience of staff taking maternity leave.

A number of SoP PhD students have had children during their PhDs. Capturing their experiences would be instructive, refer to **A-55 (Principle 5.1.4)** in the action plan.

Case Studies from staff regarding their maternity leave

*The staff are very willing to share their experiences to increase understanding of issues faced. Although the names have been removed, it is very easy to identify the individuals. **All request that this information be treated confidentially.** It is the intention to remove this section if this document is ever published.
These testimonies are original and have not been edited.*

*** This section has been redacted ***

10.2 Paternity Leave

Paternity leave has been extended to four weeks paid leave for UCD staff. It was previously two weeks and before that, two days statutory leave. The SoP will monitor the implementation and effect of this leave programme by interviewing or facilitating interviews with staff returning from paternity/parental leave, refer to **A-56 (Principle 5.1.5)** in the action plan.

UCD's Gender Equality Action Plan (GEAP) 5.5.5 undertakes to encourage the uptake of family related leave, amongst males and faculty particularly, through: (a) Improved awareness of availability via websites, induction, through Vice-Principals for EDI and encouragement by line managers. (b) Identify men at senior levels and faculty that take parental leave as role models to uptake of this leave. (c) Increase paternity leave by two additional weeks to four weeks (additional two weeks unpaid), which does not have to be continuous once agreed with Line manager. The SoP will support such UCD actions. See:

https://www.ucd.ie/equality/t4media/GenderEqualityActionPlan_UCD_Final_Sept20_.pdf

10.2.1 Paternity Leave Case Studies

*** This section has been redacted ***

*** This section has been redacted ***

10.3 Miscarriages

A number of staff and students and/or partners have suffered miscarriages. Although we have limited information on these cases and people are often unwilling/unable to discuss these issues, they have a large effect on the individuals and families involved. There is a stigma associated with miscarriages that is unhelpful, and better supports are needed. The School commits to communicate with both the Employee Assistance Programme which provides counselling, and the Compassionate Leave policy which provides faculty and staff with time away from work at a time of personal or family need, refer to **A-56 (Principle 5.1.5)** in the action plan.

10.4 Sabbatical

The School's Research Sabbatical Leave for Faculty policy, in accordance with the University's Research Sabbatical Leave for Faculty policy (both dated 2017), both note the importance of sabbatical leave, which is viewed as positive for staff development and international excellence. The School's policy document provides guidance depending on the duration of the leave for research.

According to the policy, a one-semester sabbatical leave may include the Summer and a one-year sabbatical leave should correspond to the academic year. Six month's Research Sabbatical Leave (inclusive of one teaching semester) is allowed (on average) in every seven teaching semesters (3 1/2 years). One year's Research Sabbatical Leave (inclusive of two teaching semesters) is allowed (on average) every seven years. Staff who have been the longest without a sabbatical break will receive priority and should discuss with the HoS preferably at the beginning of the academic year preceding the one in which the sabbatical is requested. Staff must work with the HoS to ensure that their academic and administrative duties are covered during the sabbatical.

Options include, but are not limited to:

- Using a grant or other funds to "buy in" additional teaching support.
- Performing extra teaching activities in semesters preceding and/or succeeding the sabbatical.
- Moving advanced modules to a different semester or stage, timetable permitting.

- Organising an incoming sabbatical visitor to cover teaching.
- “Borrowing” academic duties from another member of the School which can be repaid when that other member of staff takes sabbatical leave.

Since 2016 only three staff members have availed of sabbatical leave (two male, one female). The School/university should investigate why sabbaticals are underutilised. There are many factors to consider, including family or financial responsibilities, lack of visibility/clarity of the policy, or other pressures. The UCD policy appears outdated, referring to a ‘Faculty development process’ that has yet to be ‘activated’ but likely refers to P4G. Similarly, the financial aspects appear as but a footnote, with a link to a university web page.

UCD SWAN application submitted in May 2020 included a suggested action regarding Policy on Sabbaticals and Research Leave such that returnees would automatically avail of a Research Semester. SoP to align with this Policy once it is signed off and to disseminate within SoP, refer to **A-28 (Principle 2.1.1)** in the action plan.

10.5 Taking Leave and Promotions

In 2019, and following the 2018 UCD Culture & Engagement survey, UCD reviewed support it offers to those 40% of staff identifying as carers. It links with strategic objective #5 of UCD’s Strategic Plan 2015-2020, and UCD EDI’s strategic action plan whereby providing support to ‘balance family commitments’ would enable staff with caring responsibilities to reach their full potential at work. The policy can be viewed at:

https://www.ucd.ie/equality/t4media/Support%20for%20Employees%20taking%20Family%20Related%20Leave%20Guidelines%20FINAL%2022_10_19.pdf

As per actions **A-39 (Principle 3.2.1)** and **A-40 (Principle 3.2.1)**, the SoP (in direct connection with UCD EDI & Promotions) must have a written-down, transparent policy that covers the effect of any form of leave on staff. When properly accounted for in evaluations such as promotion, there should be a fair pathway for progression.

A similar written-down, transparent form of evaluation should be on offer to postgraduate students and their workload.

10.6 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Lack of research semester who returned from maternity before 2018 should be addressed.	A-28, A-53
2.	The effect of leave on staff should be properly accounted for in evaluations such as promotion.	A-39, A-40
3.	SoP to gather/facilitate gathering testimonials from each returnee from maternity leave to assess the value of procedures and the improvements that will continue to be needed.	A-53
4.	Social levy scheme designed to ensure employees are paid, and cost of replacement is covered when an employee goes on maternity leave. Scheme has been in place since 2016. UCD/SoP to review the success of the scheme to ascertain if employees on the ground level/School who take maternity leave are being back filled in ways (including but not limited to) cost of replacement. If not, SoP to review the operation and effectiveness of the scheme.	A-54
5.	SoP to start capturing the student experience of taking leave, including maternity leave	A-55
6.	Support for Miscarriages: The School commits (when notified) to communicate with both the Employee Assistance Programme which provides counselling, and the Compassionate Leave policy which provides faculty and staff with time away from work at a time of personal or family need.	A-56
7.	Promote UCD Supports for Miscarriages/ Undergoing fertility treatment/Menopause.	A-56
8.	Promote UCD's new Parent Buddy programme upon return from any type of UCD leave https://www.ucd.ie/equality/support/supportsforparents/	A-56

11.0 CONSULTATION

	High Level Summary
1.	A large effort has been made to solicit input from staff and students for the first time. This will serve as a baseline to future Juno work. The input from this stage will enable us to direct future consultations more effectively.
2.	Postgraduates are well represented.
3.	This was the first time focus groups were used in the SoP. It was a learning experience and the questions need to be more specific next time.
4.	Same as point 3 but for surveys.
5.	The SoP needs to formulate a clear School policy on harassment, bullying and inappropriate conduct and set-up a transparent reporting mechanism.

The work detailed in this chapter was undertaken for the first time in the SoP as part of the Juno project. We used a UCD wide survey and held our own focus groups for staff. A bespoke survey was run for all students and the College of Science supported us by running focus groups. This process was a learning curve and the main action is to understand the results and to tailor our efforts in this area going forward, refer to **A-17 (Principle 1.2.2)** and **A-18 (Principle 1.2.2)** and **A-19 (Principle 1.2.2)** in the action plan. We do not have actions to address all outcomes yet. In the SoP, our training is in the areas of teaching, research etc and understanding how to best consult with staff and students was a new challenge even with some support from the university.

The SoP needs to develop clear communication on harassment, bullying and inappropriate conduct and to promote access to reporting mechanisms in UCD's Dignity and Respect Policy and UCD EAP, refer to **A-59 (Principle 6.2.1)**. In addition to review of the existing policies, consideration is needed to identify current gaps in the dissemination of such policies and tools within the SoP and develop an approach to educate staff and students on the policies and accessibility to reporting and support mechanisms, refer to **A-57 (Principle 6.1)**, **A-58 (Principle 6.1)** and **A-60 (Principle 6.2.2)** in the action plan. A major review and consultation process is currently taking place at University level regarding Bullying and Harassment and Sexual Harassment and Sexual Misconduct (Chp 3.12). The feedback from staff and students is being actively solicited.

11.1 SoP Employees

All the SoP employees were consulted via the UCD Culture and Engagement (C&E) Surveys and a dedicated, externally facilitated focus group. The findings from these reports are discussed in the coming sections below.

11.1.1 UCD Culture and Engagement Surveys

Since June 2016, UCD has been engaged in an extensive consultation process around the survey design, followed by the collection of data from the C&E survey. The detail of such reports will enable university-wide and local action plans to be developed in response to any significant issues that may be raised.

Survey responses were collected and collated by an external company. The outputs from the survey were then fed back to UCD through anonymised reports. The result summary for the SoP in 2016 and 2018 are compared in **Figure 11.1** below.

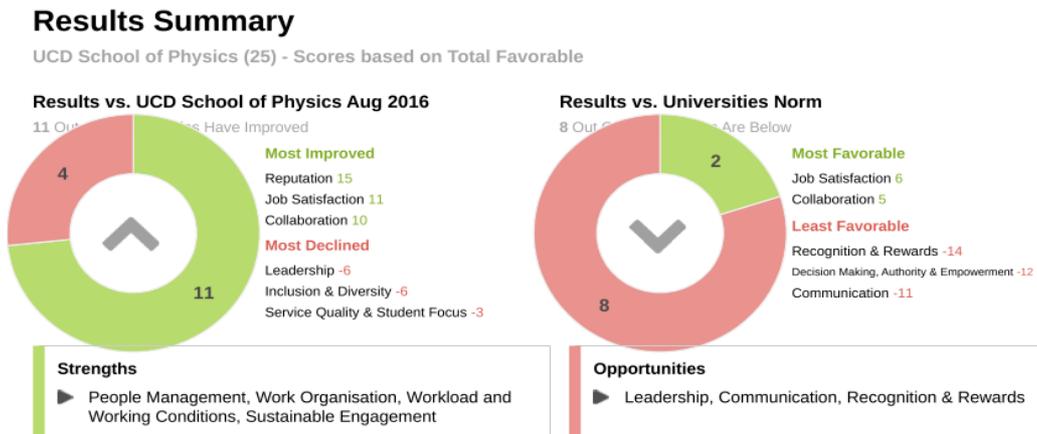


Figure 11.1 Figure of the results summary from the 2018 UCD Culture and Engagement Survey.

This survey enabled the SoP to identify a number strengths and opportunities the School needed to engage with in order to successfully develop a local action plan to try and address the issues that are raised, **Figure 11.2** below.

Strengths and Opportunities
UCD School of Physics (25)

		% Favorable	Historical (25)	Parent (247)	Overall (1,952)	Norm (37,472)
Strengths We should continue to build on these.	41 My Head of School/Line Manager is available when needed.	96	8	15	15	13
	73 I have a very clear idea of my job responsibilities.	100	12	9	13	13
	71 The people I work with usually get along well together.	96	12	7	9	11
Opportunities These are our priority areas to focus on.	37 There is sufficient contact between senior management and employees in UCD.	12	-32*	-21*	-25*	-34*
	13 The reasons behind the decisions made by (2) Senior Managers are adequately communicated to people at my level.	28	n/a	-22*	-22*	n/a
	50 UCD makes adequate use of recognition and rewards other than money to encourage good performance.	4	-8	-18*	-20*	-39*

These questions were chosen through an advanced algorithm that incorporates trends over time, difference from internal and external benchmarks, and predictive modelling of engagement and performance metrics, where available.

Figure 11.2 Strengths and Opportunities figure from the 2018 UCD Culture and Engagement Survey.

Based on the results of the Culture and Engagement Survey 2018 for the SoP, additional information was sought on the following four issues, in order to be able to take concrete action at School level.

- A) Family status affecting responses: Negative response across all areas for staff being parents/guardians.
- B) HoS Leadership: A deficit in the leadership provided by the HoS.
- C) Equality, Diversity, Inclusion: A lack of equal opportunity.
- D) Collegiality within the School: Declining collegiality.

Following on from these surveys anonymous feedback was also collected in the feedback box located in the common room in April 2019 and any issues raised here were explored by the SoP senior management. These issues along with the additional topic of Juno/Gender Equality was also reviewed in the staff focus group in the following section.

Topic Zero: Juno

- Juno Application
 - A. What are we currently doing well in his area?
 - B. What could we do to improve this in the SoP?

Topic One: Community

- Many participants responded that colleagues consistently look out for better ways to serve students but the same positivity was not noted in relation to other colleagues.
 - A. What are we currently doing well in his area?
 - B. What could we do to improve community in the SoP?

Topic Two: Work-Life Balance

- Many participants reported a lack of satisfaction in their roles and just over half of the 25 participants replied that work is fairly distributed.
 - A. What are we currently doing well in this area?
 - B. What could we do to improve community in the SoP?

Topic Three: Promotion, Recruitment and Retention

- There was an overall negative response to questions in the area of accountability, promotion of the right people and retention of staff. Less than half of the staff feel that all employees have the same opportunity to advance in UCD. Additionally there was a negative response to the use of recognition and rewards.
 - A. What are we currently doing well in this area?
 - B. What could we do to improve this situation in the SoP?

Topic Four: Communication and Decision Making

- Survey results point to dissatisfaction about how decisions are made and communicated.
 - A. What are we currently doing well in this area?
 - B. What could we do to improve community in the SoP?

11.1.2 Focus Group

Two focus groups were held, each one hour long and almost all staff attended (admin, technical and academic) ~70%. The SoP comprises four admin, nine technical and 26 academic staff – a total of 39 staff. A total of 27 staff attended with 13 participating in the morning session and 14 in the afternoon session.

A number of questions were selected from the C&E survey to focus staff and one question on Juno. On reflection, the structure of future focus group sessions will benefit from obtaining buy-in from participants along with a more targeted set of questions, refer to **A-18 (Principle 1.2.2)** in the action plan.

UCD School of Physics: Juno Staff Focus Group Monday, November 11th 2019

Objectives: This exercise aims to draw out your views on four major themes to emerge from the SoP responses to the Cultural Engagement Survey (2018) with a view to providing input and actions for the SoP Institute of Physics Juno application. All anonymised feedback was passed to the team tasked with submitting a Juno application and will feed into the SoP's EDI action plan.

Running order:

1. Introduction from Julia Rowan from Performance Matters
2. Juno
3. Community
4. Work-Life Balance
5. Promotion, Recruitment and Retention
6. Communication and Decision Making

Figure 11.3 illustrates the words that were mostly prevalent during the discussions of both focus groups, with words such as School, staff, work, promotion and information featuring in the top five. Juno and gender also featured in this discussion but not as numerous. It could be understood from this that these areas are not issues at the forefront of the School's thought process as a whole. It is recommended that further engagement with these issues is needed by all staff to achieve a greater Community, Work-Life Balance, Promotional Opportunities, Recruitment and Retention, Communication and Decision Making ethos that the SoP is lacking.

	<ul style="list-style-type: none"> • Ensure that the commitment is genuine and not about ticking boxes. • Ensure the action plan has support.
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Table 11.1 SOP Juno Staff Focus Group Themes and Sentiment summary.

Further analysis of the staff focus group report is required and it is not possible to develop actions now to address all of the issues raised. However at this stage many key sentiments have been extracted and the working group will further critically review the main report.

11.2 Undergraduate

The consultation of undergraduate students comprised a survey and focus groups.

11.2.1 Survey

The survey was prepared with the support of UCD EDI who prepared preliminary questions, a structure and guidance on confidentiality and data management. Only the chair has access to individual responses and all inputs are anonymous. A number of minor alterations were made to the survey and it was sent to students in April 2018. At that time, the intention was to submit the Juno proposal the following year but lack of resources caused the delay.

The survey was distributed to students in all Stages via email and a staff member, including in some cases the then Head of School, encouraged students to complete it verbally before scheduled lectures. There were 84 responses including 27 postgraduate students. The survey comprised of the following sections:

- **Information** about the students including Stage, course, caring responsibilities, gender, identifying as LGBT.
- **Culture** including sense of belonging, being heard, treatment of students by gender, diversity in seminar and chairs.
- **Awareness** of EDI within the student population
- **Teaching and Learning** within the School including being treated fairly regardless of gender,
- **Awareness** of EDI within the student population

The themes and sentiments from the discussion from these focus groups are summarised in **Table 11.2**. These points will feed into the SoP’s action plan for our Juno application, refer to **A-19 (Principle 1.2.2)** in the action plan, and help the SoP align with the UCD Strategy 2020-2024: Rising to the Future mission.

The findings of the survey in **Table 11.2** below show that there is a significant minority of students that are not feeling included and report other negative responses. These will be further investigated. Refer to **A-19 (Principle 1.2.2)** in the action plan.

Positive Aspects	<ul style="list-style-type: none"> • A good range of attendance at the focus group with undergraduates (approximately 70%) and postgraduate students (approximately 30%). • The gender breakdown of respondents was 55% Male, 42 %
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	<p>Female and 3% prefer not to say. This demonstrates a positive attitude by male students in engaging with the subject matter.</p> <ul style="list-style-type: none"> • The SoP gained insights into the experiences of students from LGBTQ+ community, different cultures and nationalities and students with disabilities. • In line with our experience of the First Destinations, most students plan to continue their physics studies at a higher level. Of this category, 43.5% are female. • Most students are aware of UCD's EDI goals and values. Of the 80 responses to this question, 44.4% are female. • Most students agree that they have opportunities in relation to leading group work, contribution to labs/tutorials and involvement in representing the school in activities externally/internally. • Students generally strongly agree/agree that help from staff is available to all students regardless of gender identity. • A significant number of students have not witnessed negative behaviour (~67%) relating to misogyny or homophobic behaviour.
<p>Work to Be Done</p>	<ul style="list-style-type: none"> • Most respondents appear to be content within the SoP, however there is a significant minority who are unhappy ~20%. Of this category, 33.3% are female. • A large number of students plan to continue their physics studies. Of this category, 43.5% are female. The reasons why students want to leave the field should be explored in greater detail in future focus groups. • Students were asked if they were from an underrepresented group in physics, did they feel included. Of those who are underrepresented (~48%), a significant minority do not feel included, this counts for ~16%, here 42.9% of these responses are female. Sentiments which students identified with include feelings of invisibility and that there are barriers from them in physics. • Students were asked about gender representation on committees and at seminars and events, where approximately 30% of respondents have noticed a lack of representation. Of this category, 65% are female. • About 10% of students have noticed a lack of EDI balance in promotional material. Of this category, 50% are female. This question should have been better phrased to specifically ask about the SoP materials but work still needs to be done to investigate these answers. • Most students approximately 75% are reasonably aware or very aware of EDI, with 80 responses to this question. Of this 44.4% are female, more effort needs to be made to ensure all students are aware of UCD's EDI core values. • Most students agree that they have opportunities in relation to leading group work, contribution to labs/tutorials and involvement in representing the school in activities externally/internally but again there is a significant minority ~10% that does not feel they have equal opportunity. Of this category, 46% are female. • Students generally strongly agree/agree that help from staff is available to all students. 81 responses were recorded of those (1%) disagree strongly and this group is 100% female. • A significant number of students have occasionally or often witnessed negative behaviour (~33%) relating to misogyny or

	homophobic behaviour in the SoP. Of this category, 46.2 % are female.
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Table 11. 2 SOP Juno Undergraduate and Postgraduate Student Focus Group Themes and Sentiment summary.

Sense of belonging

A summer intern student in physics reviewed data collected by physics staff in a physics education research project and studied interview data collected by a physicist in the School of Education, her poster on confidence and the physics community, won the best poster prize for the summer internship programme in 2019.

School of Physics Ms Lána Salmon alongside Dr Catherine Mooney and other colleagues from the UCD School of Computer Science conducted a survey in the School of Computer Science entitled '*Exploring the Role of Gender in Sense of Belonging and Motivations to Study Computer Science at University Level*'. Here, undergraduate students took part in the Survey in April 2017 (90 students) and again in April 2019 (36 students) which investigated the role that gender plays in making the decision to study Computer Science in UCD. The study also investigates whether there is a difference in the perceived sense of belonging between the genders. The results of the survey have been analysed and published by the group in the 1st International Workshop on Gender Equality in Software Engineering (2018) and a poster for the Innovation and Technology in Computer Science Education conference 2020 has also been present, winning the prize for best poster at the event. A comparative survey in the SoP is planned for later in the year and results will also be analysed in a wider STEM context, refer to **A-12 (Principle 1.2.1)** in the action plan.

11.2.2 Focus Group

The focus group efforts were supported by Dr Orla Donoghue and Gary Dunne from the CoS. The Chair discussed the focus group planning with Gary and Orla and the final objective was:

To assemble a group of postgraduate and undergraduate UCD SoP students to establish their views on gender balance, structures and culture within the SoP as part of an application for the Institute of Physics Juno programme. The aim of the process is working towards an inclusive environment.

Undergraduate Students – 26 September 2019

This focus group was convened on 26 September for Stage 3 and Stage 4 Physics students from 4:30pm to 5:30pm in the Common Room in the UCD SoP.

Student Profile: Five students who were all in either Stage 3 or Stage 4 took part in this focus group. All participants were female.

Core Findings: (*qualitative*).

Some points are highlighted below with conclusions at the end.

Culture

- All students agreed that a greater sense of community exists in Stage 3 and Stage 4 compared to the first two years of the programme. All agreed that they would like more activities bringing together Physics students from different years.

Awareness

- Most students did not remember the gender of staff at events they attended as a prospective student. Students instead remembered the staff who were welcoming at events. Those who did remember the gender said that they were more concerned about the topics covered and that there were UCD SoP staff present.

Teaching & Learning

- All students agreed that staff did not treat students differently based on gender.
- All students agreed that there are discrepancies in how respectful staff can be, but that gender is not related to that issue.
- All students agreed that there is a good framework within the School.

School's Commitment to Equality, Diversity and Inclusion

- One student said that this focus group was the first time that they had heard the term Equality, Diversity and Inclusion (EDI).
- One student noted that any activities relating to EDI that they were aware of did not seem to be representative of all genders. All agreed that they would welcome more input from all genders.
- One student felt that many lecturers make assumptions about the background of students and that this can isolate students from alternative entry routes or different backgrounds.

Conclusions and Recommendations

- A number of students raised issues with the sense of community within the SoP. Inviting all undergraduate students in Physics (including those in Stage 1) to research seminars and final year presentations may help foster a sense of community within Physics. Inviting Stage 1 students who have chosen the required modules for Physics would also help those students feel like a part of the SoP community earlier in the course.

An action **A-19 (Principle 1.2.2)** has been included in the action plan to follow up on the focus group recommendations.

11.3 Postgraduate

This section was prepared by Pallavi Kumari and Silas O'Toole (postgrad reps at the time):

From our experience in the focus group it came up that more useful events should be held and one of the suggestions made was several seminars on how to respond to social situations that are inappropriate. This idea was met with a lot of positive feedback as some people had been witness or directly involved in his kind of behaviour and the suggestion that there were set ways to respond to such situations seemed to be something that everyone wanted. An action **A-57 (Principle 6.2.1)** has been included in the action plan to address this.

Some additional initiatives open for participation for postdocs across the university and addressing the diversity and equality are also listed below:

- The Multicultural Network group
- Involve Mentoring group
- Aurora Leadership Development Programme. It is for staff and academics (incl. PostDocs)

11.3.1 Survey

The postgraduates were surveyed in the same way as the undergraduates with an extra question on treatment of postgrads, see below. There were 25 respondents on average.

In this School, postgraduate students are offered sufficient opportunities to the following:

Laboratory and Office Space, Training and upskilling, Career development advice

- Most postgraduate students agree that they have opportunities in relation to Laboratory/Office space, Training and Upskilling and Career Development but again there is a significant minority that does not (~16%). Of this category, 50% are female.

In this School, postgraduate students are offered sufficient opportunities to the following:

Emotional wellbeing and support

- Only 28% of postgraduate students agree that they are offered sufficient opportunities for emotional & wellbeing support (85% are female). Of those that do not agree (24%), 16.7% are female. There is a significant cohort of ~48% that don't know, 58% are female.

From the results of these two additional questions it is clear that more needs to be done in relation to Emotional & Wellbeing Support, Resources and Career Development of our postgraduate students. The school should run campaigns to engage students on these issues and ensure that all students are supported throughout their studies. An action **A-19 (Principle 1.2.2)** has been included in the action plan to follow up on the survey results.

11.3.2 Focus Group

A focus group was convened on 14 November for postgraduate physics students from 4:00pm to 5:00pm in E2.14 of the UCD O'Brien Centre for Science. The facilitators were Gary Dunne and Dr Orla Donoghue from the Science Office. The focus group took the format of a round-table discussion. Students were also handed a questionnaire at the beginning of the session. There were additional written comments included with one questionnaire and these points are noted and included below.

Student Profile

14 students took part in this focus group: two research masters students, one Stage 3 undergraduate student and 11 PhD students

Conclusions and Recommendations

- While most people agreed that the School is committed to equality, diversity and inclusion, more communication between staff and students would be welcomed to

address ongoing student concerns. A School Staff/Student committee was not mentioned by any students, but this may be a forum for discussing some of the issues raised by postgraduate students, if this isn't already in progress.

- As a number of issues were raised around demonstratorships, it is recommended that there is some forum to address the concerns raised and to take on board the suggestions and feedback.
- Workshops and training about EDI would also be welcomed to develop a more inclusive environment and to raise more awareness of EDI across the School.
- As a number of students highlighted issues with culture and community, it is recommended that there are supports provided to facilitate community building events. This could include events highlighting the various diverse groups within the SoP. Inviting all postgraduate students to seminars on topical subjects within Physics may also provide an opportunity to foster a greater sense of community.

An action **A-19 (Principle 1.2.2)** has been included in the action plan to follow up on the focus group recommendations.

11.4 Key Takeaways

	Gaps/Issues identified	Action Plan Reference
1.	Use the consultation experience to further develop the consultation questions and process for staff. This effort was a large undertaking outside the core strengths of the committee and should be made more tailored around gender.	A-17, A-18
2.	Follow-up is required with the inputs solicited from students/postgrads and use the experience to further develop the consultation questions and process for students/postgrads.	A-12, A-19, A-57, A-60
3.	Further education required for staff and students about professional conduct and inappropriate behaviour.	A-57, A-58, A-59, A-60

12.0 Summary and Action Plan

The first application for Juno Practitioner Status by the SoP in University College Dublin (UCD) has been presented in this document.

The follow topics were presented:

- An overview of the background of the department, the committee and historical EDI work relevant to Juno was presented.
- School roles and responsibilities.
- Staff and student numbers.
- The School's teaching and research portfolios.
- Recruitment and Promotion.
- Engagement and Outreach.
- Leave policies, data and personal experiences.
- The consultation process with students and staff.

A detailed investigation of female participation in the majority of SoP activities. In this proposal, we have endeavoured to present the status quo, interrogate deficiencies and recommend actions. We have mapped out actions from Principle 1 to 6. We consider this Practitioner Proposal as a first step in our journey.

The document refers to the Action Plan which contains actions based on analysis of Principles 2 to 6. The main focus of this application for Practitioner is Principle 1.

Refer to separate file with a detailed list of actions.

Glossary

ACCE	Academic Council Committee on Examinations
AT&TP	Applied Maths and Theoretical Physics
C&E	Cultural and Engagement
C-SPACE	Centre for Space Research
CoS	College of Science
CPHM	Centre for Physics in Health and Medicine
DEIS	Delivering Equality of Opportunity in Schools
EAP	UCD Employee Assistance Programme
ECTS	European Credit Transfer and Accumulation System
FP	Full Professor
FPC	Faculty Promotions Committee
FTE	Full Time Employee
GDPR	EU General Data Protection Regulation
GEAP	UCD Gender Equality Action Plan
HoS	Head of School
IRC	Irish Research Council
MPG	Mathematical, Physical and Geological Sciences
MSC	Maths Support Centre
NPF	No Preference
P4G	Performance for Growth
PASS	Physics with Astronomy and Space Science
PDRA	Post Doc Research Assistant
PHYC	Physics
PI	Principle Investigator
PK	Pallavi Kumari
RSP	Research Studies Panel
SALI	Senior Academic Lead Initiative
SC	Assistant Professor Steve Campbell
SFI	Science Foundation Ireland
SIRAT	Scholarship in Research and Teaching
SIRC	UCD Safety, Insurance, Operational Risk and Compliance
SMB	Associate Professor Sheila McBreen
SoP	School of Physics
SOT	Silas O'Toole
SS&T	Space Science and Technology
STO	Senior Technical Officer
T&L	Teaching and Learning
TO	Technical Officer
TP	Theoretical Physics
TY	Transition Year (Secondary Schools)
UC	University of California
UMT	University Management Team
WiTS	Women in the Sciences