

# Armagh Observatory and Planetarium: Application for the Juno Practitioner Award

3 May 2019



# 1. Introduction: Function and Structure of Organisation

The Armagh Observatory is the oldest scientific institution in Northern Ireland, and the longest continuously operating astronomical research institute in the UK and Ireland. It was founded in the late 18th Century, through the 1791 Act, passed by the Irish Parliament for “... *settling and preserving a Public Observatory and Museum in the City of Armagh for ever.*”

The Armagh Planetarium was founded on the same site in 1968 to enhance the organisation’s public face and outreach activities, however, for a long time the two institutions effectively operated independently of each other. It was only in 2016 that the two organisations merged into “Armagh Observatory and Planetarium” (AOP) as a single corporate unit. AOP is one of the so-called “Arm’s Length Bodies” of the Northern Ireland Department for Communities, and has the following primary functions:

- Carrying out international-quality research in astronomy and related sciences;
- Disseminating these results widely through a programme of science in the community; and
- Identifying new ways to attract visitors to Armagh as part of its wider contribution to enriching the economic, social and cultural life of the local and national communities that it serves.

In its Corporate Plan, AOP recognises that we live in a society where much inequality still exists, and where everyone does not have an equal opportunity to develop their talents to the full, and that actions to promote equality, address poverty, tackle disadvantage and promote social inclusion are prerequisites for social progress. AOP is committed to providing access to these audiences and, in order to reach them, it will align resources and put structures in place around education, outreach, employability and communications. AOP has an operating budget of approximately £2.03m, with approximately 74% of this being derived from Northern Ireland Executive funds (i.e., Department for Communities), approximately 15% from external grant income (e.g. the Science and Technology Facilities Council (STFC)), and approximately 11% is self-generated income (e.g., Planetarium ticket sales, shop sales etc.).

AOP’s governance structure consists of two bodies: (1) a *Board of Governors* (BoG) and (2) a *Management Committee* (MC). Operationally, AOP is managed by the Senior Management Team (SMT) and the role AOP staff are roughly for one third Academic Research, one third Education and one third in governance and administration.

*Board of Governors:* The remit of the BoG is to ensure that the culture and character, history and patrimony embodied in AOP are protected and preserved. Historically, it is chaired by the Archbishop of Armagh, and is composed of the ten members of the Chapter of the Church of Ireland Cathedral of Armagh and another five members: one representative nominated by Queens University Belfast (QUB); one by the Department for Communities (DfC); and two further nominees of the BoG (the Board has also the discretion to make a third nomination). Until recently, all BoG members but one was male. This was largely due to the fact that all but one of Chapter of the Church of Ireland is male. Following representations by AOP astronomers, in April 2018 QUB nominated a female member, increasing female representation on the Board to 13%. Unfortunately, this increase was short-lived as the appointed representative has now left QUB creating a vacancy once more. In April 2019 QUB appointed a male representative to this vacancy. The term of appointment of the DfC

nominee on the Board of Governors will end in December 2019 and a new nomination will be made to fill this vacancy following a public appointment process (as outlined below for the Management Committee vacancies).

The gender balance of the BoG may improve if/when more female Canons are appointed within the Church of Ireland Chapter and by filling the third optional nomination that is currently vacant.

*Management Committee:* The Governors have delegated primary responsibility for the governance and management of AOP to the MC which comprises a publicly appointed Chair, three nominees from the BoG, six nominees from DfC, one from QUB, one from STFC and one from the Dublin Institute of Advanced Studies (DIAS). The MC may also co-opt up to three additional members, based on identified need and approved by DfC. As of March 2019, only one of the current membership of the MC is female. There are two current vacancies and the BoG and MC Chairs are committed to using this opportunity to increase female membership. In addition, three of the DfC positions are due to be replaced in December 2019. DfC appointments are advertised and appointed in accordance with the Commission for Public Appointment Northern Ireland (CPANI) procedures. Whilst outside its control, AOP has requested that an under-representation of female members be highlighted as part of the recruitment process. AOP also wishes to consider making a request to co-opt up to 3 additional members to fill identified skills gaps and will wish to include gender within the selection considerations.

Overall, in the governance bodies, a potential six to nine vacancies are available (four of these to be appointed by DfC through the public appointment process); the Chairs of the Board of Governors and Management Committee have committed to setting a target of 50% of vacant posts being filled by female members, but obviously this is dependent on the ability to attract suitable candidates. In addition, AOP has registered to participate in the Boardroom Apprentice programme designed to provide training for prospective Board Members and has specifically requested a female apprentice. Appointments to this programme will be made by 10 June 2019.

An overview of AOP Governance is included at Appendix 1.

During a meeting of the members of the Juno Committee with the MC (in September 2018) (aimed at providing an update on Juno Status, including feedback from the June 2018 application), the gender balance of the BoG and MC was discussed. The MC has made a commitment to consider gender balance when making future appointments recorded in the minutes of the meeting as follows:

*“Project Juno: Management Committee confirmed commitment and support towards achievement of Juno Practitioner Accreditation. The Chair will include improving gender balance as a criterion in ongoing discussions about vacancies on the Board of Governors and Management Committee.”*

This was further discussed in March 2019, when a commitment to set a target of 50% of appointments being female was agreed as appropriate to include in the action plan.

*Senior Management Team:* AOP day-to-day operations are managed by the AOP Senior Management Team (SMT) which includes the Director, Head of Research, Head of Corporate Services and Head of Finance and Income Generation. An Education and Outreach Manager was also appointed in February 2019.

*Organisation as a whole:* The organisation staffing is made up roughly by one third Research, one third Education and one third governance and administration. In practice, many people in AOP have more than one role: the Director also undertakes research and delivers education and outreach as well as

leading and managing; senior astronomers may have some management duties; astronomers, PDRA's and students are often engaged in education, outreach activities, various service activities such as serving in telescope allocation committees or PhD examinations. It must be emphasised that AOP is not a University, and that its double function of outreach/education and research/service institution is unique in the UK and Ireland. The staffing complement is outlined in the organisation chart attached at Appendix 2. Overall the entire organisation there is an equal gender balance (50% male and 50% female) but, as will be discussed in this document, the situation is different when we consider just the academic branch (with the exception of PhD students, this is entirely male, with staff turnover currently limited to PDRA fixed term positions).

*Academic Research:* The Research branch of AOP is about the size of a small University Astronomy department. The number of academic staff has been fairly constant in the last ten years. At 1 April 2019 there are seven astronomers with indefinite contract (including the Head of Research) and two post-doctoral research assistants (PDRA's), all male. There are nine PhD students, 55% male and 45% female. In 2018, two female students successfully completed their PhDs and one has taken up a PDRA post in Vienna.

In the past number of years AOP has submitted projects for consideration for the International Association for the Exchange of Students for Technical Experience (IAESTE) placements. In 2019 both placements have been offered to female applicants for a period of 4-6 weeks each.

Recruitment is currently underway to fill four additional studentships. Advertising materials included the Project Juno Supporter logo and included the following statement:

*"AOP is an equal opportunities employer and welcomes applications from candidates irrespective of nationality, ethnic origin, religion, gender, political opinion, marital status, sexual orientation, or disability. In addition, AOP is a Project Juno supporter and in the process of applying for Juno Practitioner status. The aim of Project Juno is to recognise and reward physics departments, schools, institutes and organisations that can demonstrate they have taken action to address gender equality in physics and to encourage better practice for all staff".*

The selection panel for the studentships includes female representation from Professor Louise Harra, who is a member of the Management Committee.

While a good gender balance is present among PhD students, it is vital to sustain this (see Table 5 on the gender balance improvement over the last number of years). It is also unlikely that gender balance amongst senior academic staff will be improved in the short-term as new opportunities are likely to be limited to grant funding for PDRA posts and a proposed new fellowship post on a three-year tenure (to replace an astronomer due to retire in June 2019). But, in spite of this difficult starting point, we are in a good position to improve. The present organisation is the result of a recent merger between the Armagh Observatory and the Armagh Planetarium and a stable staff structure is being established; a process of reviewing and implementing new policies and procedures is currently underway and revised/new policies have been approved, including Equal Opportunities, Dignity at Work, Flexible Working, Grievance and Discipline. In addition, a new Student Contract has been agreed and implemented in 2018.

Most importantly, the sense of this "Juno journey" is not simply to modify AOP demographics, but to change and educate people's perspectives as part of a cultural journey. In that respect, AOP, with its strong educational programme addressed in large part to young children at formative stages in their development, has a unique potential. Through its vibrant programme of education and outreach,

directed in particular to primary and secondary school children, AOP helps to modify the unconscious biases of our society, inspiring young girls and boys alike, but in particular teaching young girls that they are fully entitled to aspire to become scientists. Two examples are given in the following.

Ciara, an eleven year old girl, has a blog called “Ciara’s Journey” ([www.ciarasjourney.com](http://www.ciarasjourney.com)) and was invited to visit AOP in October 2018 for a VIP tour and talk with the PhD students and astronomers. She cited that her interest in Space and Science was ignited by a family trip to the Planetarium when she was younger. After she saw a Planetarium Dome show and participated in our workshop Ciara developed an interest in science, an interest that would lead her on a journey to NASA.

At our “Girls Takeover” event in February 2019, where we gave 10 lucky girls access to the Observatory, a tour and a show at the Planetarium, a mother remarked how her daughter had been inspired by the PhD students and seeing women doing science and how a career in this field is possible.

Even if it is understood that Project Juno is by physicists for physicists, and that this application will be evaluated only in relation to the academic population of AOP, it is also obvious that the principles of Project Juno must be embedded in the entire organisation. It would not make sense, for instance, that astronomers ensure gender balance among seminar speakers, while the Planetarium exhibits show pictures where only males are depicted in the role of scientist. In fact, there is evidence that the role played by the Planetarium in educating and inspiring generations of young people has resulted in influencing the career paths of successful scientists (including a female member of the MC). Dame Joycelyn Bell-Burnell has also cited early engagement with Armagh Observatory as formative in her subsequent career choice.

In practical terms, Project Juno was considered from the beginning as a great opportunity for the entire organisation, rather than a “tick box” activity for the astronomers. This is demonstrated by the fact that about 25 % of the AOP personnel have been directly involved in the Project Juno Committee (PJC), more than half coming from the academic branch of the organisation.



PhD student Erin Higgin's workstation

## 2. The Project Juno Committee

A Project Juno Committee was formed early in 2017, aiming to formally meet once every second month. In practice, meetings have happened more frequently, particularly in proximity to special events. The Committee, chaired by staff astronomer Stefano Bagnulo, is composed of representatives of staff astronomers, Post-Doctoral Research Assistants (PDRAs), PhD students, outreach and Education Officers, and administrative staff. Short reports from the Project Juno Committee are presented at the monthly AOP staff meetings.

The membership of the Committee was established with the criterion of representing the various parts of the organisation, but with participation on a voluntary basis. It is anticipated that the composition of the Committee will be turned over every two to three years. In order to maintain the current level of enthusiasm among new members, we seek to engage with potential new recruits at an early stage and invite them to attend in an observation role and involve them in Juno activities.

### 2.1 Current Members

In the following, we introduce the past and current members of the Project Juno Committee. The presence of members of the Senior Management Team in the Project Juno Committee is evidence of organisation commitment to tackling the issue of gender imbalance.

**Heather Alexander** is Planetarium Interim Operations Manager in Armagh Observatory and Planetarium, where she has worked for over three years. She has a B.A. Hons in History and an M.A. in Cultural Heritage and Museum Studies. In joining Project Juno, she hopes to bring about more awareness through public and schools' events around the gender imbalance within the STEM industry.

**Stefano Bagnulo** is a staff astronomer. He obtained his Master's Degree in Italy, and a PhD at Armagh Observatory via Queen's University Belfast. After 1-year post-Doc in Armagh, he moved to the University of Vienna, then he joined the European Southern Observatory in Chile, first as a fellow, then as staff astronomer in the Science Operations Team of the Very Large Telescope. Stefano came back to Armagh in 2007 to take up a position of staff astronomer at the Observatory, where he carries out research on stellar magnetic fields and in solar-system objects. Stefano joined Project Juno because he saw it as an opportunity to discuss equality issues and promote good practice at work.

**Galin Borisov** is a PDRA who spent three years in Armagh observatory, working on solar system science with staff astronomer Apostolos Christou. Now he is starting his second post-doctoral project. Galin is a specialist in chemical composition determination of small solar system bodies. He completed his Masters and PhD degree in Bulgaria, Sofia University and Bulgarian Academy of Sciences respectively. They were both connected with the investigation of the physical and chemical properties of cometary atmospheres. Galin is an experienced observer with almost 20 years' experience with various telescopes and instruments all over the world. He joined Project Juno team because he is aware of gender imbalance not only in science, but in other fields (such as the navy and military, where he has family members).

**Carol Corvan** took office as Head of Corporate Services in April 2017 managing the governance and support services of AOP. She has an MSc in Human Resources and throughout her career has supported and encouraged initiatives that contribute towards the achievement of gender balance in education and employment.

**Lauren Doyle** is a PhD student in her second year with a focus on stellar flares in low mass stars and solar flares. She completed her BSc and MSc at The University of Glasgow, where she was a key member of their outreach programme. While at Armagh, Lauren has been actively involved in several events both with local schools and at the Planetarium, encouraging younger generations to pursue careers in science. She hopes that being a member of the Juno team she can work with her colleagues and other institutes to bring awareness and solutions to the gender balance in Physics and Astronomy while also working towards gender equality as a whole.

**Erin Higgins** is a PhD student in the second year of her project studying the evolution of the most massive stars in the universe. Erin completed her BSc in Physics with Astrophysics at Queen's University Belfast, followed by a PGCE in Secondary level Physics teaching. Joining the Project Juno team was important as a female in a male-dominated field, while also seeing this under-representation of females in physics in the early stages of her education.

Staff astronomer **Gerry Doyle** joined the Committee in March 2018. Gerry joined the Armagh Observatory in June 1982, having done his PhD thesis at Queen's University Belfast and spent time at the Harvard Smithsonian Observatory, Goddard Space Flight Center, Mullard Space Science Laboratory and the Naval Research Laboratory in Washington DC. Gerry has served on several telescope and grant awarding bodies over the past thirty years. He is a member of the Royal Irish Academy, of the Royal Astronomical Society, and of the International Astronomical Union. Gerry has successfully supervised more than 40 PhD students and/or PDRA's and served as Acting Director of the Observatory on two occasions.

**Sinead Mackle**, with a BSc Hons in Marketing, has worked at AOP since 2010, had been acting up Interim Operations Manager in the Planetarium since April 2017 until she was appointed Education and Outreach Manager in February 2019. She joined Project Juno to bring awareness of females in science through events and educational programmes.

**Ceara Ryan**, took up a new role as Accountant at AOP in April 2018, and joined Project Juno Committee in late 2018. She realises the importance of a female presence in any industry, as her own field is historically a male dominated one.

**Jim McManus** joined the Project Juno Committee in early 2019. Jim is on secondment from the Northern Ireland Assembly and has been leading on engagement activities in AOP since 2018, including facilitating staff and student engagement events, overseeing the 2018 staff survey and analysing survey results. Jim holds a Master's Degree in Organisation & Management and a Postgraduate Diploma in Personnel & Development. With more than 12 years' experience in Business Consultancy in the Northern Ireland Civil Service, Jim is experienced in dealing with equality related matters and understands the need for organisations to have a strong and clear commitment to equality, diversity and inclusion.

**Andreas Sander** joined AOP as a PDRA in July 2018. He is an expert in developing sophisticated models for hot and massive stars and their mainly line-driven winds. Andreas is working with staff astronomer Jorick Vink, trying to uncover the secrets of the outflows of the most massive stars, a crucial ingredient for how we will look at several key signatures in our Universe, such as the implications from gravitational wave events. Andreas did his PhD at Potsdam University in Germany, where he also had the chance to get his first experiences in supervising students and participating in outreach events. Experiencing the significant imbalance between the gender mix among outreach events and students motivated Andreas to take a closer look at what encourages or prevents young people from starting a career in STEM, leading him to join the committee in early 2019.



### **3. AOP Active Engagement in Project Juno**

Since the time when AOP applied to become “Juno Supporter” (November 2016), AOP staff members have engaged in a number of activities which are evidence of the commitment of the organisation to the six Principles of Project Juno. It should be noted that these activities have sprung from the formation of the Committee and have been organised by it.

The material presented in this Section and in the next two Sections will be used to inform the self-assessments in Section 6 (Principle 1) and Section 7 (Principle 2-6) and will set a context for our action plan for Practitioner, which is presented in Section 8.

#### **3.1 Participation in Juno Network Meetings**

Stefano Bagnulo participated in the Juno Practitioner and Supporter Network meeting organised at King’s College London on 17 May 2017 and will attend the one organised on 9 May 2019. Three Project Juno Committee members (Carol, Lauren and Stefano) took part in the Irish Juno Network meeting organised at the Dublin City University on 14 November 2017. Participation was fully supported and funded by AOP and allowed members of the Project Juno Committee to attend very informative talks and engage with members of similar committees of other institutions in Ireland and in the UK. AOP invited (and funded) one of the speakers at these meetings, Dr Heather Earnshaw (Improving Gender Balance Scotland, Project Manager) to come and give a presentation about unconscious bias to AOP Staff, as well as to a wider public audience in Northern Ireland (see Section 3.5). Stefano also attended part of the Session: Equity and diversity in astronomy, at the at the European Week of Astronomy and Space Science 2018 in Liverpool. AOP will continue to support staff (members of the Juno Committee) who wish to attend meetings related to the themes of Equality and Diversity.

#### **3.2 One Day Meeting with Institute of Physics Representative**

The Project Juno Committee organised a visit from the Institute of Physics representative Angela Townsend, ensuring that most AOP staff were involved. The programme included a visit of the two branches of the organisation (i.e., the Observatory and the Planetarium) followed by a meeting with senior management (including the Director Michael Burton). Most staff attended a talk delivered by Angela Townsend about gender balance in physics, and time was allocated for staff to ask questions and interact with Angela.

#### **3.3 “Women in Science” Talk**

On 7 December 2017 AOP had the opportunity to provide a “Women in Science” talk to a group of 115 12-14-year-old young women from a grammar school in Belfast. As the students had just finished their exams, this was intended to be a fun trip out to the Planetarium. AOP saw this event as a good opportunity to engage with the group about why women should be encouraged to take science subjects further into higher education. An inspirational talk was given by Committee member Lauren Doyle. The talk began with an activity to challenge the “bon” stereotype of a male scientist with grey hair, wearing a lab coat. The role of a scientist was discussed further, using examples of work Lauren



is involved in, including images of trips to telescopes, conferences etc. The event was wrapped up with a discussion on female pioneers in science such as Marie Curie and Rosalind Franklin.

### 3.4 Discussion Meeting on Gender Bias in Science

In addition to reaching out to local students, members of the Project Juno Committee (PhD students Lauren and Erin) have also held a discussion meeting with all staff and students at the Observatory to discuss gender biases in astronomy, based on selected scientific publications. This discussion meeting was organised in December 2017. Firstly, Committee member Erin presented the results from a Nature paper (Caplar et al. 2017, *Nature Astronomy*, 1, 141) which looked at the number of citations between male and female scientists and how the trend has changed over the years. Then Lauren spoke about a paper (Moss-Racusin et al. 2012, *Proceedings of the National Academy of Sciences*, 109, 16474) which conducted a randomised double-blind study for a laboratory manager position. The overall result was that the male applicant was rated as significantly more competent than the otherwise identical female applicant. One other paper discussed was “Gender Systematics in Telescope Time Allocation at ESO” (Patat 2016, *The Messenger*, 165, 2) which detailed the percentage of male and female IAU members for each country in Europe and the percentage of male to female ESO Principal Investigators in 2016. Their presentations sparked discussion between staff and students and led to in-depth conversation on the gender biases in Astronomy and why it is especially challenging in the UK. This discussion then fed into why AOP had embarked on Project Juno and stressed the importance of having equality for everyone in Physics and Astronomy.

### 3.5 International Women’s Day Event

In 2018, International Women’s Day (8 March) was marked two days earlier, on 6 March, AOP, in partnership with Armagh City, Banbridge & Craigavon Borough Council, organised and delivered a panel discussion event aimed at post-primary school pupils (aged 16+), on the scientific achievements of women and acknowledging the social and scientific challenges facing them now and in the future.



**Back Row L to R:** PhD Students Eliceth Rojas Montes, Yanina Metodieva, Holly Preece, Erin Higgins, Lauren Doyle and Education Officer Martina Glass. **Front Row L to R:** Heather Earnshaw, Improving Gender Balance Scotland, Prof. Michael Burton, Olga Murtagh, Strategic Director Armagh City, Banbridge and Craigavon Borough Council (ABC), Alderman Gareth Wilson, Lord Mayor ABC, Roger Wilson, Chief Executive ABC, Stefano Bagnulo, Project Juno Committee Chair

More than 60 pupils – importantly, balanced with girls and boys, contributed to the event. The programme, compered by television presenter and journalist Paul Clark, included: an introductory speech by the Director of AOP; a talk by an AOP female PhD student: *Significant women in Astronomy through the ages*; a pre-recorded interview with a member of the AOP MC, Professor Louise Harra (University College London); an invited talk from Dr Heather Earnshaw from Improving Gender Balance Scotland about the concept of unconscious bias; and an interview with AOP female PhD students. The day before the event, Heather Earnshaw delivered a talk about unconscious bias also at the Armagh Planetarium. This talk was attended by many AOP staff members, including most astronomers and PhD students.

### 3.6 50<sup>th</sup> Anniversary of the Planetarium

Armagh Planetarium marked its 50<sup>th</sup> anniversary in 2018 - making it the longest continuously operating Planetarium in the UK and Ireland. In celebrating the work of the Planetarium over the last fifty years, AOP was also mindful of maximising the opportunity to look to the future and challenge and change public perceptions of science, physics and astronomy. As part of the celebration plan, AOP invited Dr Leanne McCormick, Senior Lecturer in School of Arts & Humanities at Ulster University, to outline the historic reasons why and how women in Northern Ireland were historically given less access to quality education, and Dame Jocelyn Bell-Burnell to talk about her pre-eminent contribution to astronomy over the last 50 years. After these talks, Wendy Austin (one of Northern Ireland's best-known broadcasters) moderated a public discussion on "How Women are Shaping the Future of Science and Technology" with Dr McCormick, Dame Jocelyn Bell-Burnell, Prof. Adele Marshall (QUB, School of Mathematics and Physics) and Dr Diane Lees Murdock (Ulster University, School of Biomedical Sciences). This discussion provided the opportunity to engage a wider community/voluntary sector audience from across Northern Ireland on some of the themes promoted in our Project Juno activities.



*Participants in Women in Science event together with Dame Jocelyn Bell-Burnell*

### **3.7 Ensuring gender balance in exhibits and photography for use in marketing and corporate materials**

It has been noted that the history of the Observatory is such that photography representing significant contributors are dominated by male individuals. For instance, the Observatory Boardroom is decorated with portraits of the founder Archbishop Robinson and his 18 male successors as Chair of the Board as well as all former (male) Directors. It has been agreed to include additional photographs of three females considered to have made significant contributions to the Observatory. One is Mrs Theresa Hardcastle, widow of former Director Joseph Hardcastle (who died before taking up the post of Director). Mrs Hardcastle effectively ran the Observatory from 1917 to 1918 until a new Director was appointed. The contribution of Mrs Hardcastle was celebrated at an event to mark Armagh being recognised as a Centennial Weather Observing Station in December 2018. The event was attended by Mrs Hardcastle's granddaughter and her grandson.



*Education Officer Heather Alexander (who providing a living history account of Theresa Hardcastle) together with Mrs Hardcastle's Granddaughter and the framed photograph of Mrs Hardcastle now on display in the Observatory Boardroom.*

In addition, pictures of former Administrator Ms Sheelagh Grew and former Secretary Ms Margaret Cherry, who were both awarded the title of MBE, were also unveiled at a staff event in December 2018.

The Planetarium exhibition area provides an opportunity to feature significant female role models either on a permanent basis or through temporary exhibitions. Currently, for example, a previous female creative director, features prominently in a section profiling the history of the Planetarium, and a star recognising the contribution of Dame Jocelyn Bell-Burnell is also featured. A meeting room in AOP's administrative building has been named the 'pulsar room' and the building renamed the Bell Building. Following refurbishment in early 2019 photographs of Dame Jocelyn attending the 50<sup>th</sup> Anniversary of the Planetarium will be prominently displayed in the entrance foyer. AOP staff, students and invited guests to the Planetarium's 50<sup>th</sup> Anniversary events were truly inspired by Dame Jocelyn's contribution and AOP wish to ensure her connection with our institution continues to be recognised in any future developments.

AOP has ensured that a gender balance is included in the photography used in corporate and marketing material currently being produced, most particularly in its Corporate Plan 2018-2021.





*Some of AOP's Staff and Students with Dame Jocelyn Bell-Burnell at the Planetarium 50th Anniversary celebrations*

### **3.8 Girls Takeover as part of NI Science Week**

For the Annual NI Science Festival in 2019 AOP developed a unique event which had not been held onsite before, called "Girls Takeover". Held on the 18<sup>th</sup> February, this event was aimed at teenage girls with an interest in STEM. With a limit on how many people we could bring into the Observatory due to the nature of the building, we had a full quota of 20 people on the tour. Our Operations Manager, Heather Alexander, began the journey in the Planetarium with a Dome Theatre Show then moved onto a private tour of the Observatory where the girls got the opportunity to talk with astronomers and PhD students about their jobs and current research being performed.

### **3.9 Engaging Primary & Secondary School Children via Public Engagement Fellows and the Armagh Observatory and Planetarium**

The award of an STFC Public Engagement Small Award builds on recent work undertaken by AOP staff. The present award covers two of STFC's astronomy research areas which are related to research being carried out at AOP; solar physics and gravitational wave astronomy. We held workshops in October and November 2017 on 'Our Dynamic Sun' – for secondary schools (11-15 year olds); 'The Sun, space and us' for primary schools (~7-11 year olds), 'Beyond the Rainbow' presentation to 6-8 year olds, using UV beads and art. The second workshop on gravitational waves was for A-level students, these activities involved two visits by Dr Chris North. The third workshop was geared towards groups of female students (~15-18 year olds) and teachers about 'Careers in Science, Engineering and Technology'. The fourth and final workshop, in May 2018 as part of the 50<sup>th</sup> anniversary of the Planetarium celebrations, involved collaboration between AOP, the Ulster Orchestra and local school

children to create musical interpretation entitled “Music and the Planets”. All of these events included considerable contributions from AOP staff.



*Jonathan Simmance, Ulster Orchestra, directs children engaged in “Music and the Planets” programme.*

### **3.10 International Conference in Armagh, September 2018**

In September 2018 AOP hosted the fourth International Conference on Hydrogen-Deficient Stars in Armagh. 25% percent of the participants, 23% of the speakers and 50% of the session chairs were female. AOP is committed to making time and financial resources available to support successful and meaningful engagement with the Juno Principles. An example of use of resources included providing hotel accommodation for a participating female astronomer who was travelling with a child (the accommodation we originally had agreed to provide on our own site is not suitable for children). We also arranged transport with a suitable car seat and assisting with making arrangements for child care. The conference also included a public lecture by Professor Amanda Karakas.



*Professor Amanda Karakas public lecture.*

### 3.12 Use of Project Juno Logo

All staff and students have been encouraged to use the Juno logo in their public presentations and a Juno supporter logo has been incorporated in the AOP stationery. AOP launched a new corporate brand and logo in May 2018, and as part of its headed paper and other stationery, the electronic footer for all communications from its new email system will include the Juno logo. A new website ([www.armagh.ac.uk](http://www.armagh.ac.uk)) has been created, which includes the Juno logo with a link to the IOP Project Juno web page. As part of the Action Plan, we will develop a web page to describe our commitment to the principles of Project Juno.

## 4. Monitoring Gender Balance

AOP has a workforce that is 50% male and 50% female. As stated previously, there is a gender imbalance in the permanent academic staff, who are 100% male. It should, however, be noted that, while statistics at national level are slightly more positive, the overall picture is not significantly better: among about 700 UK members of the International Astronomical Union (IAU), 14% are female and 86% are male (see, e.g., Patat 2016). On the other hand, the profile of current PhD students appears better balanced: 45% are female and 55% are male over all subject areas, while, in physics and astronomy it is 28% female, 72% male; an improvement but a long way to go (Institute of Physics, 2017).

Table 1 shows the detailed gender balance for the various posts within AOP. Tables 2 and 4 give more details about recruitment exercises for PDRAs and students, respectively.



**Table 1: Gender balance among governance bodies and staff as of April 2019.**

	Female	Male	Total
Board of Governors	1	14	16 <sup>1</sup>
Management Committee	1	10	13 <sup>2</sup>
Astronomers with indefinite contract	0	7	7
PDRAs	0	2	2
PhD Students	4	5	10
Education Team <sup>3</sup>	9	1	10
Corporate <sup>4</sup>	6	5	11

**Table 2: Gender balance among PDRA applications and appointments since 2012**

Year	Applicants			Shortlisted			Appointed		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
2012	1	1	2	No data available			1	0	1
2013	1	0	1	No data available			1	0	1
2014	0	0	0	No data available			0	0	0
2015	3	4	7	No data available			0	1	1
2018	5	7	12	0	1	1	0	1	1

In Table 3, we show the past and current gender balance amongst membership of the International Astronomical Union. It is noted that the female membership amongst the 50-55 is only 19% while in the 30-35 age bracket this rises to 33%. An encouraging increase! Also, the percentage of female PhD students at AOP (45%) is significantly better than either the Institute of Physics figures (28) or the IAU.

**Table 3: Past & Current IAU Gender Balance (see**  
[https://www.iau.org/public/themes/member\\_statistics/](https://www.iau.org/public/themes/member_statistics/) for further details.)

Age Range	% Female	% Male
30-35	33	67
35-40	31	69
40-45	25	75
45-50	22	78
50-55	19	81
55-60	17	83
60-65	16	84

**Table 4: % of Female & Male PhD Students at AOP since 1985**

Year range	% Female	% Male
1985 – 1989	0	100

<sup>1</sup> Total available positions including one vacancy

<sup>2</sup> Total available positions including 2 vacancies (not counting option to co-opt additional 3 positions to identified skills gaps)

<sup>3</sup> Includes 3 part-time postholders all female and 2 female temporary posts

<sup>4</sup> Includes the AOP Director, 1 part-time male postholder and 1 male/ 1 female temporary posts

1990 – 1994	11	89
1995 – 1999	23	77
2000 – 2004	36	64
2005 – 2009	35	65
2010 – 2014	31	69
2015 – 2019	50	50

We can add that for the position of Head of Research, advertised in 2017, all ten applicants were male. We should note that accessing past data was not a simple exercise as, until 2016, the Observatory and Planetarium were under separate administration, and certain data were not collected systematically. We know for certain, however, that no female research astronomer was hired during the 200+ years of existence of the Armagh Observatory, out of a total of 25 astronomers (also including all historical Directors). We are aware of only one female PDRA in the entire history of the Observatory. In order to facilitate her when she had a young family, we introduced remote working. As a result, she was employed by AOP for over 8 years, before moving to Germany with her family.

We note also that the post of Chair of the Management Committee was filled in January 2018, and the panel assessing applications comprised two female and one male panel members. A welcome statement in the recruitment advertisement invited female applicants, however, no female candidate applied.

On the positive side, we can see that PhD student recruitment exercises in recent years have attracted a reasonably balanced proportion of male and female applicants, with more female students being appointed (Table 5). From 2012 to 2017, 60% of our recruited PhD students were female, however, for 2017/2018, from the 39 applicants only 10 were female and less than 8% of applicants were successful. This 3:1 gender split is consistent with the Institute of Physics statistics for 2015/2016 which show that 76% of UK undergraduates were male (for post-graduates, the figure is 72%). This implies a gender imbalance in those taking physics in schools. AOP's wide range of activities as outlined above can help address this regionally, but not globally. This is perhaps reflected in the 2019 PhD applicants when only 1 in 4 were female.

**Table 5: Gender balance among PhD student applications and appointments since 2012.**

Year	Applicants			Shortlisted			Appointed		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
<b>2012</b>	3	2	5	No data available			1	1	2
<b>2013a</b>	3	3	6	No data available			0	0	0
<b>2013b</b>	3	2	5	No data available			2	1	3
<b>2014</b>	2	7	9	No data available			1	1	2
<b>2015</b>	3	8	11	No data available			2	2	4
<b>2016</b>	7	5	12	4	2	6	2	0	2
<b>2017</b>	1	9	10	1	7	8	0	1	1
<b>2018</b>	9	20	29	1	6	7	0	2	2
<b>2019</b>	8	23	31	2	11	13	0	2	2

It is generally considered by most people working in the academic sector that ten to fifteen percent of astronomy PhDs are so clearly outstanding that they will have no trouble getting a job. A similar number are so unsuited to academic life that a career in further research is unlikely. The remaining seventy percent are so close in ability that their fate depends on chance, timing and other factors.

Looking at the figures world-wide, roughly one-third of astronomy PhDs will end-up in permanent jobs in the field.

Looking at AOP specifically, we know that several of our early PhD students now have senior posts; for example, one holds a professorship in a UK university while another has a senior post in the US National Science Foundation. Many others have either a tenure-track or post-doctoral post in an academic institution. Over the past 15 years, we have had 10 female students graduate with a PhD. More than half of these are currently in an academic post; some have gone into teaching, others into the business or industrial sectors. One has a senior post in Bulgaria, another with a tenure-track post in Spain, while the other four have post-doctoral positions.

As part of our action plan we have implemented a procedure to monitor the gender split of applicants for all new posts from the application stage, through to interview, offer and appointment. *This applies to all posts in the organisation* (even though we are aware that only data for the academic branch are relevant for the purpose of this application). In 2018, two positions of Education and Outreach Officer were advertised. There were 18 male applicants, and 28 female applicants. Five males and 12 females were shortlisted, and two females were finally successful for the positions. These data, although strictly speaking not relevant to the academic side of the organisation, are still very interesting. They suggest that there is a gender imbalance in favour of females in the outreach and education area, in fact there are more females than males. Our data confirm that (perhaps not surprisingly), while gender imbalance strongly affects the academic scientific world, both males and females are equally interested in science.

A discussion at the Management Committee in March 2019 members suggested AOP consider some form of summer school or visits for under-graduate students should be considered and that AOP should review its advertising policy to include UK and Ireland Universities.

AOP has awarded the honorary title of visiting astronomer to approximately 7-10 researchers with close and continued collaboration with staff members. Three of the current visiting astronomers obtained their title after a formal process that included the evaluation of their application. The recently retired Observatory Director was also awarded the title Emeritus Director. Until recently all these honorary positions were held by males as a direct result of the wider gender imbalance at a senior level. As part of its action plan, AOP has appointed 3 female visitors since 2018 (out of 4 new appointments). In addition, it will seek collaboration with external female academic researchers as mentors of its PDRAs and PhD students.

A further recruitment exercise to fill 2 STFC vacancies is currently in progress.

## **5. Staff Feedback**

In 2017 the Project Juno Committee endorsed the proposal to hold annual staff satisfaction surveys. The Committee played an active role in developing the survey. To date, annual surveys have been conducted in 2017 and 2018. It was agreed that the 2018 survey questions should closely mirror those in the 2017 survey so as to enable direct comparison.

The staff satisfaction survey, carried out in November 2017 and November 2018, included 62 questions on six themes. The questions were originally proposed by the Head of Corporate Services, and then discussed and modified by other members of the Juno Committee. Most of the questions were positive statements to which the employee had to select an answer. Points were allocated to

each possible answer, which enabled the analysis of the survey. The available responses were: Strongly disagree (1 point); Disagree (2 points); Neither agree nor disagree (3 points); Agree (4 points); Strongly agree (5 points). Respondents were also given the option to respond N/A. Ten questions asked the employee to comment or make suggestions on specific issues. The survey themes were:

- AOP Vision and Strategy (e.g., *I believe AOP Senior Management Team make clear, transparent and accountable decisions*)
- Personal value (e.g., *I feel my skills and abilities are fully utilised; I enjoy my work*)
- Career Development (e.g., *"I have a high level of Job Security in my current role"*)
- Students (e.g., *I am given opportunities to attend careers events and offered advice and guidance for finding a position after my PhD is complete*)
- Work Life Balance (e.g., *I regularly have to put in extra hours to meet my objectives and targets*)
- Health, Safety and Welfare (e.g., *I feel safe when working alone on AOP Business*)
- AOP reputation and visibility (e.g., *I feel proud to tell people I work for AOP*).

The survey was anonymous, but respondents were asked to declare their gender and whether they were student, academic or non-academic. This enabled responses to be disaggregated by gender and by role. Given the small size of the organisation, there was the risk that disaggregated answers would enable the identification of individuals. Therefore, to protect anonymity, comments and suggestions were not included when answers were disaggregated in small groups.

It was agreed by SMT that bi-annual staff engagement days should be held. The results of the full survey were used in part to guide the themes considered during staff engagement days. The purpose of these engagement days is to analyse the key issues arising under the staff survey themes, and to gain staff ideas, input and support for improvement activities designed to enhance staff satisfaction levels.

## 5.1 Staff Satisfaction Survey

High response rates were achieved for the staff survey for both 2017 and 2018. The 2017 survey showed that academic staff would highly welcome better communication between management and staff, and across the organisation. It demonstrated that staff enjoy their work, but it appeared that female students were less satisfied and took less ownership of AOP and its reputation when compared to male students.

As outlined at Table 6, the 2018 survey demonstrated significant increases in levels of staff satisfaction across all themes for the organisation as a whole. Improvements of between 8% and 19% were achieved with an overall average improvement of almost 15% across all questions and themes.

When results are broken down into male and female, it is demonstrated that the results for male staff (including students) in the 2018 survey broadly reflect the results for the organisation as a whole with some improvement in each of the six survey themes. This is outlined at Table 7.

**Table 6: Comparison of average overall staff survey responses under each theme**

Staff Survey Theme	2018 Response	2017 Response	Percentage Change
Vision & Strategy	3.7	3.2	+17%
Personal Value	4.0	3.5	+15%
Career Development	3.5	3.2	+8%
Work/Life Balance	4.1	3.6	+14%
Health & Safety and Welfare	3.9	3.3	+19%
Reputation and Visibility	3.8	3.3	+16%

**Table 7: Comparison of average male staff survey responses under each theme**

Staff Survey Theme	2018 Response	2017 Response	Percentage Change
Vision & Strategy	3.6	3.3	+9%
Personal Value	4.0	3.6	+11%
Career Development	3.5	3.4	+3%
Work/Life Balance	3.6	3.5	+3%
Health & Safety and Welfare	3.8	3.5	+7%
Reputation and Visibility	3.8	3.6	+6%

Table 8 demonstrates significant improvement in satisfaction amongst female staff (including students) in the 2018 survey compared to the previous year. Satisfaction levels amongst female staff now broadly reflects that for the organisation as a whole.

**Table 8: Comparison of average female staff survey responses under each theme**

Staff Survey Theme	2018 Response	2017 Response	Percentage Change
Vision & Strategy	3.9	3.0	+30%
Personal Value	3.9	3.3	+18%
Career Development	3.4	3.2	+6%
Work/Life Balance	4.0	3.4	+18%
Health & Safety and Welfare	4.0	3.1	+29%
Reputation and Visibility	3.8	2.8	+36%

Responses from both students and academic staff were, generally, less positive than for the organisation as a whole. Responses with a weighted average of higher than 3.0 may be considered positive as more than 50% of responses to that question were either 'Strongly Agree', 'Agree' or 'Neither Agree nor Disagree'. A very positive response is considered one which returned a weighted average of 4.0 or higher out of a possible 5.0 in the survey.

There were 10 responses from students which returned a very positive response, compared to 18 for the organisation as a whole. These are outlined at Table 9.

**Table 9: Very positive responses from students**

Question	Student Average	AOP Average
My job/project requirements are clear to me.	4.6	4.5
There are good conditions of service (e.g. leave, flexible working, etc).	4.1	4.4
I enjoy my work.	4.0	4.4
I participate in a regular annual review and am given feedback on my progression and performance.	4.3	4.1
I am able to take annual leave at times that suit me.	4.0	4.2
I am able to work flexibly to meet my personal requirements.	4.3	4.4
I am able to talk to my manager/supervisor to put arrangements in place to meet my personal commitments.	4.6	4.4
AOP proactively manages arrangements to support flexibility before, during and after breaks.	4.3	4.3
I am aware of the arrangements in place to safeguard my health and safety.	4.1	4.1
I feel safe when working alone on AOP business.	4.5	4.3

Areas of concern are those which have a weighted average of 3.0 or less as these demonstrate dissatisfaction. These responses for students are highlighted at Table 10.

**Table 10: Areas of concern for management regarding student satisfaction**

Question	Student Average	AOP Average
I believe AOP Senior Management Team makes clear, transparent and accountable decisions.	2.7	3.5
I am able to contribute my opinions and suggestions into the development of the organisation's strategy.	2.8	3.4
I believe AOP lives authentically by our organisational values.	2.6	3.7
I feel there is effective communication between management and staff and across the organisation.	2.7	3.3
I believe resources are allocated equitably and fairly across the organisation.	2.3	3.1
I feel respected and valued by the organisation and feel my contribution is recognised.	2.3	3.6
I feel my skills and abilities are fully utilised.	2.9	3.6
I have confidence in AOP's policies and procedures.	2.9	3.6
My learning and development needs are discussed with me and opportunities tailored to my individual development needs are considered.	2.4	3.3
I think AOP is widely acknowledged as an excellent organisation.	2.9	3.8
I applied for a job/studentship with AOP as I wanted to be part of it.	2.9	3.6
I would recommend AOP as a good place to work if asked by others.	2.8	3.8
I feel proud to tell people I work for AOP.	2.9	3.9

The Senior Management Team noted that, in many areas, students, who are a very important aspect of the life of AOP and a key element for our survival and future success as a research

institute, were less satisfied than the organisation as a whole. The Senior Management Team has also noted that, unlike researchers who hold regular Astronomer meetings, at the time of the survey, students had no forum at which to air common concerns or problems.

There was a total of 13 responses from academic staff which returned a very positive response, compared to 18 for the organisation as a whole. These are outlined at Table 11.

**Table 11: Very positive responses from academic staff**

Question	Academic Average	AOP Average
My job/project requirements are clear to me.	4.3	4.5
I feel there are opportunities for me to work creatively.	4.7	4.4
I have good communication and teamwork with my peers.	4.3	4.2
I feel respected and valued within my team/by my peers.	4.3	4.3
I feel comfortable engaging with my colleagues.	4.2	4.2
There are good conditions of service (e.g. leave, flexible working, etc).	4.5	4.4
I enjoy my work.	4.5	4.4
I am able to take annual leave at times that suit me.	4.7	4.2
I am able to work flexibly to meet my personal requirements.	4.6	4.4
I am able to talk to my manager/supervisor to put arrangements in place to meet my personal commitments.	4.0	4.4
AOP proactively manages arrangements to support flexibility before, during and after breaks.	4.0	4.3
I feel safe when working alone on AOP business.	4.0	4.3
I applied for a job with AOP as I wanted to be part of it.	4.0	3.6

Table 12 outlines areas of concern in relation to the satisfaction of academic staff. The Senior Management Team has noted that, in many areas, academic staff, many of whom are among the most senior staff in the organisation and key to its success, are less satisfied than the organisation as a whole.

Whilst improvements in staff satisfaction have been demonstrated in all areas and amongst all categories of staff, it is acknowledged that there remains some concern in regarding those areas where students and/or academic staff demonstrate lower levels of satisfaction than those for the organisation as a whole. Improvements since the 2017 staff survey in satisfaction levels for female staff and students have demonstrated that constructive and meaningful engagement with staff, to determine the root causes of issues and address the identified problems, can result in significant improvement in satisfaction levels.

Although levels of satisfaction remain lower than those for the organisation as a whole in some areas, it should be noted that both students and academic staff have demonstrated improved levels of satisfaction compared to the 2017 survey. The Senior Management Team is committed to continue to engage with staff through bi-annual engagement days as well as more regular staff meetings and events. In addition, SMT has engaged an external facilitator to assist it to address some of the areas highlighted for improvement in the 2018 staff survey including:

- Build trust and respect within teams and as an organisation;



- Improve decision making processes and agree appropriate mechanisms for engagement by staff in planning processes;
  - Develop an Internal Engagement format that will improve communication within teams and across the organisation and is relevant and timely;
  - Review and discuss values and actions required to ensure these are mirrored in behaviours at all levels;
- Review current appraisal and planning processes to ensure these are fit for purpose.

**Table 12: Areas of concern for management regarding academic staff satisfaction**

Question	Academic Average	AOP Average
I believe AOP Senior Management Team makes clear, transparent and accountable decisions.	2.4	3.5
I am able to contribute my opinions and suggestions into the development of the organisation's strategy.	2.8	3.4
I believe Senior Management Team contributes to a positive work culture.	2.8	3.7
I feel there is effective communication between management and staff and across the organisation.	2.2	3.3
I believe resources are allocated equitably and fairly across the organisation.	2.5	3.1
I have confidence in AOP's policies and procedures.	2.6	3.6
I have equal opportunity to access overtime or other additional payments as my peers.	2.2	3.8
I participate in a regular appraisal process and am given feedback on my performance.	3.0	3.6
I regularly have to put in extra hours to meet my objectives and targets (this was the only negatively phrased question).	4.7 (equivalent to 0.8)	3.8 (equivalent to 1.9)

## 5.2 Staff Engagement

Ongoing staff engagement, both formal and informal, is considered essential in improving teamworking, staff satisfaction and performance of the organisation as a whole. A number of engagement days have been held, and future engagement days are planned on a bi-annual basis.

Through these engagement days, management has been able to identify and address the underlying causes relating to the issues raised the staff satisfaction survey. Engagement days have also enabled staff across AOP to engage with each other, and this has led to the sharing of information and suggestions which, in turn has enabled the development of new ideas and ways of working together. The last engagement day also included the aim of involving staff and students in forward planning and objective setting at organisational level in order to include them as part of the planning and decision-making process.

The first staff engagement day was organised on 20 December 2017 to allow staff to express their opinions on which aspects of the organisation work well, and what should be done to make improvements. Communication across the organisation was a key concern among staff. It was appreciated that communication as a unified organisation is improving, but that it is of crucial importance to achieve effective staff engagement as a single organisation.

A second engagement day was held in June 2018 facilitated by an employee seconded from an external organisation. The purpose of this engagement day was to discuss and build on progress from the previous event and to assist senior management to plan future actions to improve engagement. Key areas considered included internal communication, learning & development, resource allocation, working conditions and organisational culture. It was reported that the tone and atmosphere of AOP had changed for the positive in the past six months with more opportunities to work all around the organisation including engagement days, the litter pick (which developed an appreciation for other people's jobs) and the 50th Anniversary celebrations. It was acknowledged that recent improvements such as the improved IT system including the AOP Staff & Students email group, the new phone system, online ticketing, the staff newsletter and more face to face communication have benefited the organisation. It was acknowledged that the organisational chart helped staff to understand the AOP structure and to know who they can go to with any particular issue. The SMT agreed to the following suggestions from staff:

- The establishment of an internal communications group to develop an internal communications' strategy;
- The hosting of charity fund raising events to promote teambuilding;
- More structured training for new ICT systems;
- Improved accessibility of all updated policies and procedures;
- Encouragement for staff to become actively involved in engagement and communications initiatives;
- An improved system for conference booking and expenses;
- More encouragement for students to become involved in Planetarium initiatives such as Science Week; and
- Closing the Planetarium on Monday afternoons during term time to facilitate training & development, staff meetings and work planning.

SMT is also working closely with the Department for Communities to finalise and put in place a permanent organisational structure for AOP.

The 2017 staff survey and the June 2018 Engagement Day had both identified issues which were of particular concern to students. A short focused facilitated session was held for students in October 2018 to consider these issues. Issues discussed included:

- Student offices;
- Sharing information about students through the staff newsletter and Astrobytes;
- Student focussed communication;
- Management of students;
- Providing career advice to students; and
- Induction for future new students.

As a result of this a number of actions were taken forward to include improved working environment. Further actions are planned as outlined in the action plan.

In December 2018 a further staff engagement event was held to review the 2018 survey results and to facilitate staff and student input to the 2019/2020 business plan. This also provided an opportunity for management to formally thank and recognise staff for their contribution in the past year. The main areas arising from the 2018 staff survey, and addressed during the engagement day, were: AOP values, respect and recognition; providing opportunities for people

to contribute to the organisation; communication between management and staff; and AOP reputation and visibility.



*Staff engagement session on 12 December 2018 in the Robinson Library, Armagh*

## **6. Self-Assessment of Principle 1: A Robust Organisational Framework to Deliver Equality of Opportunity and Reward**

The self-assessment checklist was discussed by the members of the Project Juno Committee during several meetings.

### **6.1 The head, or another senior leader, visibly leads and champions good practice for equality initiatives and programmes.**

The Project Juno Committee is chaired by a senior Astronomer and has representation from students, PDRAs and non-research functions of the organisation (see Section 2). The AOP Senior Management Team is represented on the Committee by the Head of Corporate Services (Section 2).

The Director (Chief Executive) has ensured that Project Juno is discussed at staff meetings and Management Committee meetings and has encouraged staff, students and the Management Committee to support the work of the Juno Committee. Short reports from the Project Juno Committee are presented at the monthly staff meetings.

Most staff participated in a 1-day Project Juno engagement session facilitated by the representative of the Institute of Physics, Angela Townsend (see Section 3.2).

The various projects presented in Section 3 have received the full support of the Director and of the Senior Management Team, both in terms of allocation of human resources and in terms of funding when needed.

Self-assessment: **B: Adopted.**

## **6.2 There are resources (time, admin support, facilities and funding) to support equality activities, initiatives and programmes.**

The Project Juno Committee meets regularly, its representatives have attended Juno network meetings and events in London and Dublin (Section 3.1), and they are planning to continue to do so. The organisation has prioritised resources for events and programmes specifically to support and engage with women in science to include:

- International Women's Day event in March 2018 showcasing our PhD students and Project Juno (see Section 3.5)
- Event in May 2018 as part of the 50th Anniversary of Armagh Planetarium (see Section 3.6)
- Commissioning of new exhibits and photography for use in marketing and corporate materials that is more gender balanced (see Section 3.7)
- Providing additional support for a conference delegate travelling with a child in September 2018
- SMT has agreed a small budget (£3k) in 2019/2020 specifically for Project Juno activities.

Self-assessment: **B: Adopted.**

## **6.3 Comprehensive staff and PDRA data (including grade, job description and working hours) are collected and analysed by gender. Data includes staff recruitment (from application to employment) and promotion.**

Clearly, it does not make sense to analyse by gender the data of staff astronomers and PDRA, since they are all male, but we can analyse the recent recruitment processes. Although data regarding the gender of job applicants were never systematically monitored in the past, the Administration was able to retrieve most information regarding the last five years. The essential data about academic recruitment are reported at Section 4, but data for the entire organisation are now systematically monitored.

AOP has a rather low turnover of staff, and the gender balance of senior astronomers is the outcome of recruitment during a period of time from 30 to 10 years ago: in particular there has not been a staff astronomer vacancy since 2007 up until the recently advertised Head of Research post (for which no applications from female candidates were received). Under these conditions, monitoring and benchmarking gender balance of senior staff is not particularly meaningful, but we can comment that the fact that only a small fraction of UK astronomers is female (see Section 4) explains, at least in part, the gender imbalance among AOP staff astronomers and PDRA. In the next few years there will be opportunities to improve gender imbalance at least among PDRA, a proposed fellowship post and visiting astronomers. We have committed to providing resources to include a female panel member with appropriate skills and experience as part of the assessment process for all new posts.

Recruitment Policies, including arrangements for recruiting PDRA and PhD placements are currently been reviewed e.g. to ensure that at least one member of each selection committee is female.

Self-assessment: **B: Adopted**

**6.4 Comprehensive student data (including foundation year where applicable) are collected and analysed by gender. Data includes application to degree outcome for all students from undergraduates to PhD.**

The gender profile of PhD students appears already well balanced, and AOP performs well in comparison to national statistics. The interview panels for PhD students have historically been composed of academic tenured staff, i.e., male astronomers. This may create a perceived or unconscious bias against female candidates, in 2019 a female panel member was included in the selection panel. For PhD students, the same gender monitoring procedure of applications and appointments as for senior academic staff is in place. In the last 20 years, nearly all PhD students of the Armagh Observatory have been successful in obtaining their degree, with no suggestion of gender discrimination during their supervision.

Self-assessment: **B: Adopted.**

**6.5 Progression pipeline data for both staff and students has been analysed and any differential representation (at all levels from undergraduate entrants to Professors) has been identified.**

An analysis of the gender balance of students and staff has been undertaken at all levels and differential representation has been identified (within the limits of a situation in which all academic staff apart from PhD students are male). See Section 4.

AOP is a small institution and there is no career pipeline internally, however, approximately 50% of female PhD students in the last 10 years have been successful in progressing a career in Astronomy.

Self-assessment: **B: Adopted**

**6.6 Qualitative data gained from staff surveys, discussions, focus groups, etc. are collected and analysed by gender.**

Both the 2017 and 2018 staff surveys provide opportunities for staff and students to submit comments on each of the six survey themes. These qualitative comments provided a basis for understanding the underlying reasons behind the quantitative responses to each question and enabled more in-depth analysis. Information gained was used to structure engagement day sessions.

Staff survey information was reviewed cumulatively for the organisation, and then specific data sets for students and academic staff by gender compared against the overall results. The results were disaggregated according to various criteria, one of which was gender (see Section 5.1). Staff-engagement sessions were conducted in December 2017, June 2018 and December 2018, during which AOP staff considered various aspects of their work, structure and environment (see Section 5.2).

Engagement days were organised into focus groups to consider specific issues raised through staff surveys and make recommendations to SMT. The outputs of each focus group were considered in plenary and provided to all staff to enable further input and comment. Final outputs were presented

to SMT for its consideration. In this way, engagement days provided substantial qualitative information to support management decision-making in relation to the key issues identified through the surveys.

The 2017 survey identified a number of issues which were of particular concern to female students. Following initial discussions with female students it became evident that they preferred all students to be included in a wider facilitated session to consider these issues and other issues of concern to all students. Identified issues were addressed throughout 2018 and a short, facilitated session for all students was held in October 2018 to monitor progress and address any outstanding issues. Students agreed to the session being facilitated by Jim McManus, seconded to AOP to assist with special projects, Jim has also assisted with leading and facilitating wider organisational engagement session and, as a result, was invited to join the Juno Committee. The quantitative and qualitative responses to the 2018 survey provided strong evidence that the key issues of concern to students had been addressed to a large extent.

AOP has committed to at least two engagement events per annum and an annual staff survey.

Self-assessment: **B: Adopted**

## **7. Self-Assessment of Principles 2 – 6**

We perform here a preliminary self-assessment against the remaining Principles and show our commitment to work to satisfy the criteria that will eventually lead us to achieve the Champion award.

### **7.1 Principle 2: Appointment and selection processes and procedures that encourage men and women to apply for academic posts at all levels**

Overall, AOP has robust recruitment and selection procedures in place. A recent recruitment exercise for a Head of Research post was managed by the Northern Ireland Civil Service HR Assist branch in compliance with all Northern Ireland Equality Legislation, and interview panels were appropriately trained. One member of the three-member interview panel was female.

Recruitment rates of PhD students have demonstrated there are no barriers for female applicants (see Section 4). The 2017 Employee Attitude Survey (Section 5.1) confirmed that 62% of employees agree or strongly agree that they are fairly and equitably treated in comparison to colleagues. This figure rose to 81% in the 2018 survey.

Recruitment Policies are currently under review.

AOP has included an equality statement and commitment to Project Juno in its 2019 PhD recruitment information (see Section 1, page 3). It is evident that the academic branch of the organisation includes numerous members from the international community, which is evidence of the organisation's commitment to diversity in its workforce.

Overall self-assessment: **B: Adopted**

### **7.2 Principle 3: Departmental structures and systems which support and encourage the career progression and promotion of all staff and enable men and women to progress and continue their careers.**

In the astronomer role, there is limited opportunity for career promotion (apart from a yearly salary increment divided into five steps) due to the small size and flat structure of the organisation. All staff astronomers are presently at the top of their salary scale. The new, recently filled post of Head of Research, was externally advertised. Although existing staff had the opportunity to apply and compete on an equal basis to external candidates, it did not provide an exclusive career progression for existing staff. Internal recruitment would not have assisted providing an opportunity to improve gender balance and would have breached Northern Ireland Fair Employment legislation.

Self-assessment is much more positive if we consider the theme of career progression for the population of PDRAs and PhD students, who are strongly encouraged and helped by senior academic staff in many different ways during their career. Supervisors continue to write recommendation letters for their PhD students well after they have obtained their degree and left the organisation.

Our overall self-assessment is very different for staff and PDRAs/PhD students, being **D: Compliant** for staff and **A: Embedded** for PDRAs and students.

### **7.3 Principle 4: Departmental organisation, structure, management arrangements and culture that are open, inclusive and transparent and encourage the participation of all staff.**

In August 2016 AOP became one organisation with a single management structure. Since then, work has been ongoing towards developing a vision, values and strategic direction, as well as a single unifying brand that staff and others can identify with. As outlined at Section 5, this has included significant formal and informal engagement with staff and students. The most recent staff survey, building on baseline data from the 2017 survey, demonstrates improvements across all survey themes and all staff disciplines.

Staff members required to sit on interview panels must attend training which includes equality and diversity. In the last two years, seven staff members and three Management Committee members have participated in this training. Following a Juno Practitioner meeting in Dublin one of the speakers, Heather Earnshaw (IOP) was invited to participate in an International Women's Day event (see Section 3.5). During her visit, a presentation was given to all staff and students on gender bias. The possibility to include more structured training will be discussed by the Juno Committee and proposals presented to SMT.

Following update of Recruitment Policies in early 2019 all staff participating in recruitment of PDRA and PhD students will require training. The training programme will be developed in-house, with advice from colleagues in other institutions such as QUB.

There is a strong commitment from senior management to promote the organisational image using material (e.g., poster exhibitions, pictures) that reflect the participation of women in science. New photographs have been included in the Observatory Board Room reflecting the contribution and influence of women and, in particular, the contribution of Theresa Hardcastle has been celebrated. The newly named 'Bell Building' will have photographs of Dame Jocelyn Bell-Burnell in the entrance foyer following refurbishment. (see Section 3.7).

To address issues arising from the staff surveys around communication, transparency and decision making AOP senior management has engaged support to deliver a Leadership and Team Development programme in early 2019.



Organisationally the association of successful female scientists with AOP has been celebrated. Professor Louise Harra, who is a member of the Management Committee, delivered the Robinson Lecture in December 2017, Louise visited the Planetarium as a child, and this was an important influence on her career. Dame Jocelyn Bell-Burnell was the keynote speaker for the Planetarium 50<sup>th</sup> Anniversary events. Dame Jocelyn's father was the resident architect for the Observatory and also designed the Planetarium. Dame Jocelyn cites her early visits to the Observatory with her father as sparking her interest in astronomy.

A transparent and open system for allocating non-research-oriented workload among senior staff is not formally in place. Some staff astronomers have started to suggest the need for it. In 2018 a Head of Research was appointed; this will be a key action for him to take forward.

Junior academic members are encouraged to take responsibilities in the activities of the organisation, for instance, students organise the weekly discussion meetings, and one PDRA is responsible for the organisation of seminars. Students are systematically and strongly encouraged to participate in conferences and to create links with the broad international community.

Erin, a PhD student and member of the Project Juno Committee (PJC), developed a research project to host two Nuffield placements in Summer 2018, supervising GCSE students (1 female, 1 male) who gained experience in Astronomy over a 6-week period which led to a presentation of results in QUB.

During two bank holidays in August 2018 and February 2019, 'Hands on Science' workshops were facilitated by PhD students and led by Lauren. These required a vast amount of organising where Lauren planned and developed the workshops while also engaging with students and planetarium staff to make the events possible.

Self-assessment: **B: Adopted**

#### **7.4 Principle 5: Flexible approaches and provisions that enable individuals at all career and life stages to optimise their contribution to their department and institution.**

AOP has flexible working arrangements in place and is extremely responsive to the needs of staff and students. In the 2018 staff survey, over 83% of staff and students responded that they were able to talk to their manager/supervisor to put arrangements in place to meet their personal commitments. No staff or students responded that they were not able to do so. When asked if there are adequate arrangements in place to meet their personal needs (e.g. reasonable adjustments for disability), over 83% of staff and students either responded positively or responded that it did not apply to them. No staff or students responded negatively.

Recent maternity leave in the Planetarium has included keep-in-touch days, phased return to work arrangements, and flexibility to accommodate caring responsibilities. In comparison to statutory entitlements, AOP has very generous maternity pay arrangements. Formal policies to demonstrate fairness and consistency across the organisation have recently been reviewed and consultation with staff was included in the process.

Self-assessment: **A: Embedded**

#### **7.5 Principle 6: An environment where professional conduct is embedded into departmental culture and behaviour.**

AOP is an Arm's Length Body of the Department for Communities of the Northern Ireland Executive. In addition to our commitments to the Department, set out in our Management Statement and Financial Memorandum and the Seven Nolan Principles of Public Life which underlie an individual's personal code of conduct, AOP has embraced values that shape our behaviour when undertaking our mission, in interacting with each other, with our customers, partners, funders and other stakeholders and in discharging our governance responsibilities. They complement the vision and reflect the characteristics of a unique establishment, set within an inspiring setting and location. A revised Code of Conduct is currently in draft format and a period of consultation has resulted in further best practice research to agree a suitable policy.

Self-assessment: **B: Adopted**

## 8. Action Plan

The action plan for the Practitioner specifically addresses the issues of gender imbalance in the organisation as well as the main issues that have been identified thanks to the staff survey. In setting up our Action Plan, we have given priority to the issues that are relevant to Principle 1: *A robust organisational framework to deliver equality of opportunity and reward*. Our action plan is summarised in the Table of Appendix 3 and the part regarding Principle 1 is described and discussed in more detail in the following. We note that some of the items of our Action Plan have been already actioned.

### 8.1 Establish Organisational Framework

The Project Juno Committee (PJC) includes senior staff astronomers and members of the SMT. The Committee is proactive in organising events that promote gender balance in science and good practice at work, publicity of our participation in Project Juno, and opportunities for staff feedback and evaluation. Staff are aware that members of the PJC may be approached to raise general themes about good practice at work. The proposed action plan will be pursued under the responsibility of the Director, Senior Management Team (SMT), and the Chair of the Project Juno Committee.

#### 8.1.1 Evidence of Senior Management Commitment

- 1) The Head of Corporate Services (HCS), who is active member of the PJC, champions Project Juno at SMT level, bringing forward recommendations from the PJC for consideration and decision-taking after each meeting. As an example, the PJC recommended a more gender balanced imagery in the Observatory Board Room, and SMT provided resources to include the photographs of three females who, in the past, played an active role in the organisation.
- 2) Following the feedback after our prevision submission, it was decided that the chair of the PJC would meet the MC to discuss future actions, in particular to improve gender balance in the governance bodies of the organisation (this meeting took place in September 2018).
- 3) The AOP Director has raised the gender profile of the BoG and MC with the MC Chair and received a commitment to improving gender balance in the filling of vacancies. Our target in the short to midterm (by May 2022) is that at least 50% of current and future vacancies will be filled by females.
- 4) Redrafted Juno application and Action Plan was considered and endorsed by the MC (this was actioned in March 2019).

- 5) Meetings of the PJC happen typically every second month or more frequently (Section 2). Attendance at PJC meetings should reflect a cross-section of staff and senior management.
- 6) SMT had decided to rename the administrative building after a significant female astronomer. The building was renamed after Jocelyn Bell-Burnell in May 2018.
- 7) SMT will consider the creation of stronger female role model imagery in the public spaces of the Planetarium (by June 2019).
- 8) SMT planned to organise a staff event to mark inclusion of stronger female role model imagery in Board room. This took place in December 2018.
- 9) SMT is actively considering proposals from staff astronomers to encourage the nomination of female visiting astronomers (VAs), and of female academic mentors for PDRAs and PhD students. Our target is, by May 2022, to have half of the VA female. This can be achieved e.g. by appointing one new female visiting astronomer per annum. We note that in 2018/2019 AOP has appointed two female VAs, and one so far in 2019/2020.

### ***8.1.2 Effective Consultation, Communication, Monitoring, Evaluation and Reporting Mechanisms***

- 1) Project Juno will be a regular agenda item at staff meetings and staff engagement sessions. There are two staff monthly meetings: one with all AOP staff, and one for astronomers; education and corporate teams also have arrangements for regular meetings. Short reports about the activity of the PJC are presented at staff meetings.
- 2) A staff survey will be undertaken annually. The first staff survey was performed in December 2017 (see Section 5.1), and results were communicated to all staff, this was repeated in 2018. As an action item, SMT is committed to repeat the survey every year, and make sure that the concerns arising from the survey are properly addressed, e.g., with a dedicated staff engagement day that will be organised within two months from the survey. Staff engagement events took place in December 2017, June 2018 and December 2018 and further events are planned in 2019 (see Section 5.2) to enable staff members to express their opinion on which aspects of the organisation work well and what should improve.
- 3) An internal communications strategy will be implemented by December 2019. The 2017 staff survey results highlighted that there are communication difficulties across the organisation in general, and between management team and staff in particular. To address this it was decided, for example, to modify the format of the staff meetings to make sure that they are used not only to communicate from top to bottom, but also to listen to and address concerns from staff members. This format may evolve if management and staff find a more effective way to address communication issues.
- 4) A Leadership and Development programme for SMT and staff will be implemented by June 2019 in order to address areas identified for improvement from the staff survey regarding leadership and decision making and student participation and communication (see section 5.1).
- 5) An issue that arose from the 2017 survey was that female students appear less satisfied and take less ownership of AOP and its reputation when compared to male students. The 2018 survey has shown demonstrable improvement, although it has been noted that satisfaction amongst Research staff and students is generally lower than the organisation as a whole. At AOP students are treated as staff members and as such are invited to all staff meetings and events. Students have communicated that they do not need to be included in all staff meetings and management workshops. Arrangements for student participation and communication will be addressed as part of a planned internal communications strategy and Leadership and Team development programme.

6) Research staff undertake some tasks not immediately related to research. The allocation of these tasks will be discussed at team meetings and during appraisal

### ***8.1.3 Clear accountability for implementation and resources allocated (time and money)***

1) The Director will guarantee funding to allow staff and students to attend and organise the PJC meetings and will allocate human resources to the various projects championed by the PJC (Section 3). Events promoted by the PJC will be funded and staff will have time allocated to participate in the activities promoted by the PJC. A budget of £3,000 to facilitate gender specific events as part of AOP Education and Engagement Programme has been allocated to the PJC for 2019/2020.

2) Mandatory equality and Diversity training will be provided to all recruitment panels (this is already being implemented).

## **8.2 Monitoring and evidence base**

### ***8.2.1 Monitor over time, quantitative data by gender: all student admissions and performance; all staff applications, shortlists, appointment and promotion, looking at the proportion of women at each stage***

As an ongoing action (i.e., already implemented), all recruitment processes at all stages are being monitored by gender: data are regularly collected and analysed. Data will be commented on during staff meetings, and always available to staff upon request (see Section 4), under the responsibility of the Head of Corporate Services. Comparative national and international data will be routinely employed to help analyse our recruitment data.

### ***8.2.2 Obtain qualitative data from staff***

1) Staff surveys will be performed every year (see Section 5.1). Results will be discussed with staff and focus groups may be set up to allow for the gathering of qualitative data to address pertinent issues identified by the survey.

2) Staff engagement sessions are organised twice per year (see Section 5.2).

### ***8.2.3 Identify any discrepancies in gender representation and/or progression and identify factors that might be causing them***

The results from the review of our recruitment exercises will be gender disaggregated to identify discrepancies and trends over time. Potential reasons for discrepancies and trends at each stage of the recruitment process and actions for addressing them, will be considered by the PJC. Actions already proposed to address discrepancies are as follows:

1) The Juno logo will be routinely used in all recruitment material to highlight AOP's commitment to gender equality to all candidates (this is already happening, see Section 3.12).

2) Recruitment panels will always include at least one female panel member. This has been already implemented at the time of PDRA and PhD student recruitment in 2018 and 2019.

3) By September 2019 all AOP recruitment and selection procedures will be reviewed to ensure gender balance and minimise bias.

4) All policies will be reviewed annually to determine their effectiveness in supporting gender balance and will be updated if required.

5) All students will be actively supported to apply for funding to attend conferences and events.

**6)** By June 2020 a policy will be developed to allow staff flexibility to take up visiting positions or internships in other institutions.

**7)** As an ongoing action item, the SMT will seek to enhance the training budget for all staff. This will enhance the chances of our PhD students getting jobs after completing their thesis training by allowing them to present their work at international conferences, attend a series of transferable skills course; and will allow our Educational Officers a wider range of skills enabling them to better communicate science to the school children, etc. Students are encouraged to apply for additional grant funding to increase their opportunities to present at conferences and increase their visibility. Some of our PhD students and research staff can avail of a range of training courses provided by Queens University. The Head of Corporate Services will work with the Head of Research to provide a programme of similar training in-house for AOP Staff and Students during 2019.

**8)** As recommended by the MC, AOP will consider undergraduate programmes to raise awareness of PhD opportunities (by August 2021).