Public Engagement Strategy of the

School of Physics & Astronomy, University of St Andrews

This document sets out the Public Engagement[1] (PE) strategy for the School of Physics & Astronomy at the University of St Andrews. It aims to identify the motivations, priorities and best practice (the 'Why', 'What' and 'How') for our public engagement work. The strategy is not only a statement of the School's existing priorities, but should also challenge us and enable us to engage audiences who are underrepresented in physics and would most benefit from our support. The strategy will need to change over time, and this document should be updated to reflect that. It builds on the wide range of outreach carried out in the past, and aims to increase our efficiency and impact for the future.

Contents

The Purpose of Our Public Engagement

To engage everyone with our science, and support their learning and enjoyment of physics.

Public Engagement during the COVID-19 pandemic

It must be noted that PE is inevitably different during the COVID-19 pandemic. Face-to-face engagement is the gold-standard for many situations but may not be possible at this time. Much of the existing engagement work has moved online (whether synchronous as live-events, or asynchronous like videos). Online engagement does offer other advantages, e.g. a potentially greater geographic reach. Other universities have adopted a 'hyper-local' approach, focusing on engaging and supporting their target audience within a local area during this difficult time. It is also important to take the opportunity to review past engagement and plan what changes should be made, and to look ahead, so that we can expand our engagement safely and strategically, as restrictions wind down.

[1] There are many different definitions of "public engagement" and "outreach", and many other related terms. We are using the term "public engagement" here in a very general sense – not limited to engaging with the "general public" – including all types of engagement with any audience outside the School of Physics & Astronomy.

Our Key Aims

- To **improve equity** in engagement with Physics and continuing Physics education, to offer better opportunities and experiences for individuals from **underrepresented** genders, ethnic groups, socio-economic backgrounds, etc.
- To **engage everyone with our research**
- To **engage our local community** with Physics and Astronomy, both in St Andrews and across Fife and Tayside (particularly people from areas of high deprivation or underrepresented groups)
- To **support secondary teachers** with their Physics teaching, **and primary teachers** with their science teaching

Motivation: Why Public Engagement Matters

- As research pushes the boundaries of knowledge, researchers have a **responsibility to share** that knowledge
- We should aim to **encourage and increase scientific literacy** as a scientifically literate society is good for everyone (Snow & Dibner 2016), as well as the individuals
- At all levels of Physics education and work, there are groups who are under-represented. The School aims to inspire the next generation of Physicists, and work towards **fair opportunities for engaging with or continuing to study Physics**
- **Undergraduate students** who participate in Public Engagement work can benefit from a deeper understanding of the science, personal development including skills and experience that could increase employability, enjoyment of the outreach work and engaging with people outside the University, as well as opportunities for credit or pay
- **Researchers** who participate in Public Engagement work can benefit from raising their profile, contextualising their research, personal development including skills and experience that could increase employability, enjoyment of the outreach work and engaging with people outside the University, meeting funder requirements, etc.
- Public Engagement work is also important for **the School and the University** as it increases the skills of our students and staff, raises our profile in society and with funders, helps with recruitment of students and staff, etc.

How We Should Work Towards Our Aims

Aims such as improving equity in engagement with Physics are not simple, and must be considered as part of all the engagement work that we do. To successfully work towards all our aims, there are many factors at both the School, project and individual level.

- Some projects may target key audiences, but these projects cannot make the necessary changes alone and must be supported by all the other engagement work
- Best practice should be adopted (through training) across all of our programmes. (Consider that whilst a single one-off event may not be enough to challenge a lifetime of being told that ‘science is not for you’, any one event may be able to accidentally reinforce those ideas)
- All engagement work should be adapted to support the aims, for example by:
    - having the Strategy as a reference point that identifies both the aims and the methods to support them

    - maintaining a culture within the School that supports these aims
    - providing training
- Our engagement work must be reviewed to assess whether we are achieving our aims (both while designing engagements, and through effective evaluation)
- Collaborating with partners to support our aims (e.g. Institute of Physics, SSERC, etc.)
- Training – including some compulsory training and a variety of optional training

Key Audiences

The aims listed above identify some key audiences:

- Audiences from disadvantaged socio-economic backgrounds
- Historically excluded genders
- Individuals from ethnic groups that are underrepresented in physics
- Audiences from St Andrews and across Fife
- Teachers in Scotland (both secondary physics teachers and primary teachers)

The 2020 public engagement survey[2] of members of the School of Physics & Astronomy (with 34 responses) identified the three most important groups to engage with as:

- young people in schools (85%: including 100% of responding PhD students and 92% of responding academic staff)
- general public (76%: including 100% postdocs/fellows and 73% PhD students)
- school teachers (71%: including 83% academic staff and 82% PhD students)

Other audiences identified by the survey include journalists, prospective students, young people and adults from disadvantaged backgrounds, policy makers and industry. See Appendix for full list.

As this strategy is developed and updated in the future, we should continue to identify the key audiences through a process of consultation with members of the School.

Whilst it is important to focus our efforts on our key audiences, it is important to also engage with other audiences. The School supports efforts to engage with as wide a range of audiences as possible. The aim is to focus more of our efforts on the key audiences, rather than to prevent anyone doing the outreach they want. Engaging with some audiences could lead to raised professional profiles (e.g. engaging popular magazine journalists), new collaborations (e.g. engaging industry) or policy support for our research (e.g. engaging policy makers). These benefits should not dominate our choices of engagement audience but are recognised as valid motivations for engaging audiences other than our key audience groups.

[2] School of Physics & Astronomy public engagement survey, closed 10/7/2020: 34 responses, including 11 PhD students, 9 postdocs/fellows, 12 academic staff.

Key Principles

These are some important factors to consider when developing public engagement ideas:

- **One-off interactions** do not have much/any impact, beyond a few days or weeks (M. Archer et al. 2021). Repeat-engagements offer the chance for a more significant impact
- If we want to influence whether someone studies Physics (or generally feels that "science is for them"), need to **engage them at an early age**
- **Evaluation** is essential, both to improve and to understand and assess any impact
- All activities must go through a thorough **risk assessment** process, both during the planning phase and at the time of delivery. In addition to being a requirement, assessing the risks is what allows us to include higher risk activities, carry them out safely, and protect our audiences and ourselves from accidents.
- During the COVID-19 pandemic, all activities must also be **risk assessed for COVID-19**.
- Our strategy and planning should be **evidence-based** to make use of the research which exists and can help us achieve our aims
- One useful aspect of research is the concept of **science capital** (Archer Ker et al. 2013), which can help understand the influences that affect an individual's engagement with science, and the science capital-based teaching approach (Godec et al. 2017) which can help more students engage with science

What We Will Offer to Our Staff and Students

As part of the School of Physics & Astronomy's commitment to public engagement, we will offer the following to our students and staff. Much of this support is provided by the role of the School's Public Engagement Officer:

- We will provide **opportunities** for our students and staff to get involved in public engagement events and projects
- The School and University will provide **training** on different aspects of public engagement
- The Public Engagement Officer will provide **support for staff and students' PE ideas**, and where appropriate, help adapt them to align with the aims of our strategy
- The School is committed to recognising the **professional and/or academic value of public engagement work**, e.g. by recognising undergraduate projects on engagement topics, or including public engagement activities in the workload model of staff
- We will create **structured posts for students** keen to work on public engagement activities, both as volunteers doing ad-hoc engagement (supported by training, etc.) and eventually as more senior team members, taking responsibility for managing events, delivering independently, supporting other volunteers (and when possible, paid for their work)
- **Supervisors and line managers** should support their students and staff to carry out public engagement activities, for all the reasons given above (including meeting the public engagement aims of funders). The School wants to help find the right balance of time for each situation. We hope that by supporting open conversations about the research/outreach balance, we can create a culture of finding the right compromise.

Reviewing this Strategy

This strategy should be reviewed annually by the Management Committee and Public Engagement team, and input should be invited from the rest of the School if the strategy needs updating. After 3 years (2023) the strategy should be opened up for consultation.

Example Projects

Some examples of the great engagement work carried out by the School include:

- Teacher CPD carried out as part of the 'Plates for Education' programme, both to support secondary Physics teachers, but also to widen the reach of the project beyond the number of school pupils that could be directly engaged by the team
- 'Science Discovery Day' (SDD) has grown from a successful Physics event run by our School, into a University-wide event that welcomed over 3,000 visitors in 2020. A lot of effort goes into the event each year, so it should be meeting our strategic aims. To this end, in 2020 the Public Engagement with Research team ran a series of events in the run-up to SDD in regions of Fife with high deprivation to start building the engagement, and then provided buses to allow people to attend the event who otherwise would not have engaged
- The 'Shine' project has been combining astronomy, music and art for a wide range of audiences since 2015
- The University's 'Cell Block Science' has allowed a number of researchers from our School to engage with prisoners (and their families) in local prisons since 2016
- Online engagement during the 2020 coronavirus pandemic has included sessions for the Sutton Trust summer school, and 'Ask Me Anything' events for the public to virtually meet researchers
- 'Explorathon' is the Scottish universities banner for activities around 'European Researchers Night' in November. It is one of the University's biggest public engagement programmes each year, and regularly features staff from the School of Physics & Astronomy

Appendix

School of Physics & Astronomy public engagement survey data - Question 8: “Which groups or sectors outside HEI do you think it is important to engage with?”

- young people in schools (85%: including 100% of responding PhD students and 92% of responding academic staff)
- general public (76%: including 100% postdocs/fellows and 73% PhD students)
- school teachers (71%: including 83% academic staff and 82% PhD students)
- popular magazine journalists (68%) and general journalists (i.e. in press/TV/radio) including local and national (59%)
- Prospective students (65%)
- Young people from disadvantaged backgrounds (65%) and out of schools (62%)
- Adults from disadvantaged backgrounds (59%)
- Policy makers (50%)
- industry (50%)

References

Archer, M., DeWitt, J., Davenport, C. et al. (2021), “Going beyond the one-off: How can STEM engagement programmes with young people have real lasting impact?”, Research for All. Vol. 5(1):67-85. DOI: 10.14324/RFA.05.1.07

Archer Ker, L., DeWitt, J., Osborne, J. F., Dillon, J. S., Wong, B., & Willis, B. (2013), “ASPIRES Report: Young people’s science and career aspirations, age 10 –14”. King's College London.

Godec, S., King, H. & Archer, L. (2017), “The Science Capital Teaching Approach: engaging students with science, promoting social justice”, London: University College London.

Snow, C. E. & Dibner, K. A. (2016), 'Science Literacy: Concepts, Contexts, and Consequences'. Ch.2, Pg.4 and 22: “Science literacy at the level of society: There are four primary rationales for the importance of science literacy: personal, economic, democratic and cultural. Each of them makes claims about the value of science literacy for nations...". National Academies of Sciences, Engineering, and Medicine, National Academies Press, DOI 10.17226/23595