

Lifting Barriers to Women in Science, Technology, Engineering and Mathematics: A Strategy for Scotland

Institute of Physics response to the Royal
Society of Edinburgh consultation

A full list of the Institute's submissions to
consultations and inquiries can be viewed at
www.iop.org

Response – Women in STEM Consultation
Dr Caroline Wallace
The Royal Society of Edinburgh,
22-26 George Street,
Edinburgh
EH2 2PQ

IOP Institute of Physics

Dear Dr Wallace,

Lifting Barriers to Women in Science, Technology, Engineering and Mathematics: A Strategy for Scotland

The Institute of Physics (IOP) is a leading scientific society promoting physics and bringing physicists together for the benefit of all. It has a worldwide membership of around 40 000 comprising physicists from all sectors, as well as those with an interest in physics. It works to advance physics research, application and education; and engages with policy makers and the public to develop awareness and understanding of physics. Its publishing company, IOP Publishing, is a world leader in professional scientific communications.

The Institute welcomes the opportunity to respond to the Royal Society of Edinburgh's consultation on 'Lifting Barriers to Women in Science, Technology, Engineering and Mathematics: A Strategy for Scotland'.

The attached annex details our response to the questions listed in the general call for evidence, as well as the additional call for evidence from learned societies/professional organisations.

If you need any further information on the points raised, please do not hesitate to contact me.

Yours faithfully



Professor Peter Main, Director, Education and Science

Lifting Barriers to Women in Science, Technology, Engineering and Mathematics: A Strategy for Scotland

Introduction

As the Institute of Physics, while we recognise the overall importance of STEM, our background is in physics and our answers necessary focus on our discipline. While women struggle to fulfil their potential in many STEM careers, in physics we also face the problem of initial recruitment to the discipline.

For physics to thrive in the UK we believe that it is vital that it capitalises on the skills and talent of the widest pool of potential physicists. Currently, women, people with disabilities, people from ethnic-minority backgrounds and people from lower socio-economic backgrounds are under-represented in physics therefore physics is missing out on the knowledge and skills of people from these groups.

A key challenge for the physics community is to encourage more female students to choose to continue with physics post-16, where despite significant changes in the educational system over the last 20 years, women continue to make up around 20% of those choosing to study physics at this level. In parallel to this challenge, it is equally important that physics cultivates an environment where women who have studied physics at school and university will remain in physics or SET employment and progress to senior positions. Women in senior positions are vital to ensure that women are represented in decision-making so that issues can be addressed that may inadvertently have a detrimental impact on women, as well as senior women providing role models for people coming through the pipeline.

Section 1: Institute of Physics response to general call for evidence

1. What do you see as the opportunities and challenges facing the STEM workforce in Scotland today?

Scotland has excellent opportunities for physicists and physics based jobs. A 2007 Institute of Physics report found that more than 100,000 Scottish jobs relied on industries where the use of physics-based technologies was critical¹. These jobs represented 4.3% of the workforce but provided nearly 9.4% of the GVA (Gross Value Added) productivity measure. This is a greater percentage than the total for the UK, which is 6.4%, showing the disproportionate value of these industries to Scotland.

Physics graduates are also well paid in Scotland: an IOP 2009 survey found that many earn far in excess of the UK median wage². Indeed, because physics graduates can find lucrative employment around the world, one of the challenges for Scotland is to keep hold of them. They may leave Scotland if opportunities in the

¹ *Physics and the Scottish Economy*, IOP 2007, www.iopscotland.org/publications/iopscotland-publications/page_51307.html

² *Physics in Scotland: the brightest minds go further*, IOP 2009, www.iopscotland.org/publications/iopscotland-publications/page_51308.html

local economy become restricted or if other countries offer greater salaries or invest more heavily in physics-based industries.

Another challenge is to ensure an adequate pipeline of trained scientists coming through from school and university. In common with the rest of the UK, since the mid 90s Scotland has seen a decline in people taking physical science and mathematics at post-16 and degree level, although this decline has been partially reversed in recent years – for example the number of students taking Higher physics now stands at 9,445, the highest it has been since 2002.

Eight Scottish universities, out of fifteen, offer physics degrees. This is a higher proportion than in England, where 33 out of 89 universities offer the degree. Mirroring the pattern seen at Higher level, the number of physics undergraduates declined in the first half of the last decade before beginning to rise again. Many physics graduates of Scottish HEIs stay on to continue their studies - 58% are in further study one year after graduation, with half of these studying for a PhD. These figures are similar to the UK as a whole.

All eight universities that offer physics are part of SUPA, the Scottish Universities Physics Alliance³. This seeks to maximise the shared research strengths of the institutions by pooling and enhancing the strongest research areas and adopting a coherent approach to staffing strategy, research training, research initiatives, commercialisation and funding opportunities. SUPA funds approximately 20 chairs and lecturers, 14 research fellowships, and 8 competitive studentships per year, and a chief executive to run the enterprise. It also directs the Scottish Graduate School in Physics.

One unknown factor for universities is the effect of tuition fees and the differences for students between Scotland and England. In the last decade around a quarter to a third of undergraduate physics students came from outside Scotland. With the changes to fees, one can anticipate that more Scottish students will wish to study in Scotland. But as Scottish universities are allowed to charge the full English rate on English students, they may seek to recruit more English students.

A major concern of the IOP in securing the pipeline of trained physicists is the inadequate numbers of physics graduates teaching physics in UK schools. In this respect Scotland is better off than the UK as a whole - nearly every secondary school has a specialist physics teacher and vacancies for positions are very low⁴. This is in contrast to England where it is estimated that around 500 state schools do not have a specialist physics teacher.

Challenges and opportunities also come from changes to the nature of STEM employers in Scotland, with fewer traditional large-scale organisations but a rise in SMEs.

2. What do you see as the current barriers to the recruitment, retention and progression of women in the STEM workforce?

IOP research in Scotland has shown that female physics graduates are less likely to reach the best-paid positions than their male counterparts: the 2009 survey showed that 61% of male physics graduates who responded earned over £40k, compared to

³ SUPA, Scottish Universities Physics Alliance, www.supa.ac.uk

⁴ Physics Education Statistics for Scotland, www.iopscotland.org/policy/education

only 33% of women graduates, while only 11% of respondents in management positions were female and only 6% of consultants.

In general in the UK, women are less represented all the way through the 'pipeline' of physics education and into the STEM workforce.

Research shows that as girls go through secondary schooling, they increasingly feel that physics is not for them⁵. The teaching objectives of the curriculum align less well with their personal goals and they feel less confident about their mathematical ability, even if this is not borne out by their actual performance. Good teaching is particularly vital for girls: as they often lack familiarity with the situations and activities that are commonly used in physics teaching, they require more support to negotiate shared meanings and are therefore more sensitive to poor teaching than boys.

The percentage of females taking physics degrees at Scottish universities is around 22%, similar to that in the UK overall. Although comparable proportions of males and females go on to further study once they graduate, as the academic route progresses from PhD through to a series of postdoctoral positions, women drop out with greater frequency than men. The demands of short-term contracts and frequent need to move location are more likely to discourage women, especially as they move into their thirties. A recent survey of physics postdoctoral researchers found that men who were on their second or subsequent contracts were more likely than women to say that they were aiming for a permanent academic position (76% of males to 55% females, compared to 63% and 57% respectively for those on first contracts)⁶.

Childcare and flexible working continue to be major barriers to women's career progression. A recent childcare survey of the IOP's members found that 80% of respondents, both men and women, reported that they found it difficult to make additional childcare arrangements outside of working hours⁷. However, there was a significant difference between men and women, with women significantly more likely to find it "very difficult" or "difficult" compared to men. Almost 75% of respondents reported attending fewer conferences and events once they had caring responsibilities, although again women were significantly more likely to report this than men. As one women respondent said, "I avoid attending international meetings unless unavoidable – in a multinational company that amounts to putting your career on hold". And finally, 58% of respondents thought that their career progression might have been affected by childcare issues, although again, women were significantly more likely to report this than men, with 80% of women reporting this compared to 47% of men.

Scotland has some large industrial sectors, such as defence, oil and nuclear power, whose focus and working culture may also appeal less generally to women. Looking at industry in general, there is a real need to develop some reliable research to understand why women are under-represented. Is it because they do not apply, because they apply but fail to get jobs, or because they leave as they are unhappy with the working environment?

3. What steps are being taken within your sector to enhance the career options and progression routes for females?

⁵ *Girls in the Physics Classroom*, Murphy, P. and Whitelegg, E., IOP 2006, www.iop.org/education/teacher/support/girls_physics/review/page_41597.html

⁶ *Mapping the Future: Survey of Chemistry and Physics Postdoctoral Researchers' Experiences and Career Intentions*, IOP/RSC 2011, www.iop.org/publications/iop/2011/page_50579.html

⁷ *Survey on Childcare*, IOP 2010, www.iop.org/publications/iop/2010/page_45280.html

The Institute of Physics has a dedicated Diversity team and a wide-ranging programme of activities that seeks to combat the under-representation of women in physics. It works at the school and university level to effect culture change and supports its members in their career progression. The IOP also monitors diversity aspects in its membership, governing bodies and activities, seeking to embed its diversity philosophy among Institute staff and members as well as the wider physics community. [See *part two of the submission for more information on these activities.*]

At the school level, the Girls in Physics programme aims to encourage teachers to examine their teaching methods and shares information on successful teaching and learning strategies to engage girls with physics. The Institute has been working with the National Network of Science Learning Centres and has run a number of highly successful events in Scotland which were advertised to all teachers.

For universities, the Institute runs Project Juno, an award scheme that recognises and rewards physics departments that are working to address the under-representation of women⁸. A department moves through levels of recognition as they identify issues, develop an action plan and work through it. They start out as supporters then progress through practitioner to champion level. At each stage they receive individual guidance and feedback from an independent panel on their work. Scotland has one Juno champion (Glasgow) and one Juno practitioner (Edinburgh), with all other departments signed up to supporter level. Juno is complementary to the Athena SWAN Charter and departments or schools that already have Athena SWAN Silver can be fast-tracked through to Champion status.

For its members, the Institute provides a range of benefits that support them throughout their professional development. Although open to all, women may find some of these benefits particularly beneficial at certain stages of their careers. For example, members can take advantage of the IOP's mentoring service, which allows members to match themselves with other members who can give them advice and guidance in how to progress their careers. Members on a low income, such as those on maternity leave, pay a reduced subscription to the Institute. If members wish to attend an IOP meeting and need additional financial help as they have responsibility for caring for someone (including childcare), they can apply to the IOP Carers Fund. The IOP Benevolent Fund can also provide assistance to members on a career break.

The IOP's Women in Physics Group encourages its members to participate in all activities of the Institute. As well as organising meetings, the group has a number of interests that it works on, including: education, women in research and academia - especially those on short term contracts, career breaks, career management workshops and networking.

4. What further steps could be taken within your organisation and/or sector, including any specific policies and practices?

The Institute is currently running a number of studies either directly or indirectly related to gender. For example a longitudinal survey is examining what physics graduates do in the first five years after they graduate, while a school project is looking at the influences on girls choosing to study A-level physics. The results of studies such as these will help inform our next moves.

⁸ Project Juno, www.iop.org/policy/diversity/initiatives/juno/index.html

A key issue for us to understand is the fall off in girls studying physics at post-16 and degree level to around 20% of the total number studying. This percentage has stayed much the same over the past decades even during the fall and rise again in overall numbers, and despite work by the Institute and others. All the easy and obvious approaches to increase the percentage have been tried with little effect. The reasons appear deep seated. There is a real need to bring together social scientists and education professionals to understand the interaction between how physics is taught and learnt and the roles that girls have to play in society to be accepted.

Whilst the IOP has a good understanding of how women fare in academia, and has set up programmes such as Project Juno to help university departments, it has much less data on career progression of women in industry and the challenges that they face. The Institute could seek to do further research in this area and try to engage more employers. However, we recognise that this is more difficult than in academia as the drivers for employers are very different: those in the public sector (including HEIs) have an overarching public sector duty to eliminate discrimination and promote equality, under the Equality Act 2010. SMEs can prove particularly difficult to engage with, given their small size and their need to focus on their priority of simply continuing to exist and thrive.

5. More generally, how could the potential of women in the STEM workforce be more effectively and efficiently realised? Who would be responsible for implementation and what support would be required?

Changing the culture of employers takes time. Organisations have to be persuaded that it is worth their time and effort to enhance diversity within their workforce – a business case has to be built and communicated to them. Change needs to be led by the people who are respected by those employers – champions from within industry will provide the best role models and convincing examples.

The Scottish Government can help by taking a bold stance in the implementation of equalities legislation. It should specifically consider how recommendations such as those from the recent Davies review of *Women on Boards* can be implemented within STEM organisations within Scotland⁹. Employers need examples of good practice, highlighting how diversity can be achieved with minimal expense and resource and it must be inter-related with talent management - equality and diversity needs to be embedded within recruitment and retention processes in all sectors of employment to ensure that all employers are recruiting from the widest possible talent pool and therefore secure in the knowledge that they are getting the very best staff.

External organisations can help by providing guidance and serving to recognise and reward exemplars of change, as the IOP does with its Juno programme in academia. Various schemes exist, such as the UKRC's SET Fair Standard, which is a gender equality award for businesses and organisations. Perhaps these schemes could be given more bite by making it a government procurement condition that it will only give contracts to companies that reach a certain benchmark.

⁹ *Women on Boards*, BIS 2011, www.bis.gov.uk/news/topstories/2011/Feb/women-on-boards

6. Do you think there needs to be any changes to existing employment law? If so, in what areas?

We believe that there are robust, comprehensive pieces of legislation governing equalities, part-time working, flexible working, etc and no further changes are needed. However, guidance on implementing legislation and going beyond minimum legislative requirements is crucial to ensure that it is being implemented effectively across all STEM sectors in Scotland. This could perhaps be linked to the benchmarking scheme suggested in question 5.

7. Are you aware of any existing resource that is effective in addressing the under representation of women in STEM?

In the other part of our submission, specifically addressing professional bodies, we outline the many steps and achievements the IOP has made towards addressing under-representation of women in STEM. Other professional STEM bodies also work in this area, as do organisations such as the UKRC and schemes such as Athena Swan.

Section 2: Institute of Physics response to the additional call for evidence from learned societies/professional organisations

Inclusion of women:

a) Does your organisation feel that it would benefit from increased inclusion of women in its Fellowship? If so, in what ways would the organisations benefit?

Although the number of women Fellows at the IOP is a reasonable reflection of the pool of female physicists who qualify for that membership grade, the overall percentage is still small compared to men. Female fellows are vital to ensure that we have a properly diverse and inclusive community and to provide role models for younger female physicists.

The Institute has 40 000 members in the UK and Ireland and beyond. We welcome all people with an interest in physics and have range of membership grades to suit different circumstances and backgrounds. Overall 19% of our members are female. However, women are concentrated in the junior membership grades with around 25% female members in the student and associate categories, compared to 12% of members and only 5% of fellows. This mirrors the academic pipeline of women in physics, where around 22% of A-level and undergraduate students, 14% of academic staff and 5% of professors are female, indicating that we are successful are recruiting female members from the physics community in representative numbers.

We believe that including all members, or potential members, in our activities is fundamental to ensure that we fully represent physics and physicists and can achieve our vision to be the leading scientific society promoting physics and bringing physicists together.

b) What mechanisms, procedures or actions, if any, are in place to move towards achieving an appropriately gender-balanced membership? Examples may include positive action, gender-balanced panels, attention to the pipeline.

The Institute has established the Diversity and Inclusion Programme with three over-riding aims:

- to encourage wider participation in physics from under-represented groups;
- to mainstream and embed diversity and inclusion across all of the Institute's activities and
- to champion and provide leadership on diversity and inclusion across the physics community.

The Diversity and Inclusion Committee has strategic oversight of the programme. The Committee meets three times per year and reports to Council, the Institute's main governing body. The Institute employs dedicated staff to manage the initiatives of Diversity and Inclusion Programme.

The Diversity and Inclusion Programme is rooted in a robust evidence base of quantitative data to understand the representation of women in the physics pipeline and qualitative information to develop our understanding of the barriers to participation and how these can be overcome.

The Institute has established the Diversity Forum as an internal platform to discuss and address diversity and inclusion across all areas of Institute activity. It is chaired by the Chief Executive and has staff representatives from all parts of the Institute. Through the Forum, good practice in diversity and inclusion can be shared and embedded.

In 2008, the Institute undertook a Diversity Audit to understand our areas of good practice and set ourselves challenging targets to improve how we address diversity in all that we do. Progress on the implementation of the recommendations of the Audit are monitored by the Diversity and Inclusion Committee and annually reported to Council.

Challenges for women in physics

The Institute recognises two inter-related challenges to increasing the inclusion of women in physics: the first is the inclusion of women in the Institute's membership and activities. The second is supporting the inclusion of women in the wider physics community from which our membership is drawn.

The Institute works towards an increased inclusion of women in the physics community with initiatives to support the recruitment, retention and progression of all people in physics at all levels, from school, to university and into employment.

Initiatives of the Diversity and Inclusion Programme around gender include:

- **Girls in Physics** – a suite of publications to provide teachers with strategies to develop inclusive classroom practices to address the barriers that stop girls choosing to study physics post-16.
- **Project Juno** – recognising and rewarding university physics departments that have taken action to address the under-representation of women in physics higher education. We currently have 30 of the 46 physics departments in the UK engaged in Juno, including all eight physics departments in Scotland.
- **Mapping the future: Physics and chemistry postdoctoral researchers' experiences and career intentions** – the transition from postgraduate studies to postdoctoral researcher (PDR) is a key attrition point for women in the physics pipeline, with women constituting 17% of PDRs compared to 26% of postgraduate students. To understand this attrition the Institute, working with the Royal Society of Chemistry, undertook a survey of PDRs in UK physics and chemistry departments. This found issues around PDR representation in department decision-making and lack of access to impartial careers advice.
- **Survey on Childcare** – this survey of Institute members with childcare responsibilities found that almost three-quarters of all respondents reported attending fewer conferences and events once they had caring responsibilities for children and over half reported that they thought their career progression might have been affected by childcare issues. Both men and women were affected although women were affected to a much larger extent than men.
- **Carers Fund** – following the recommendation of the Survey on Childcare the Institute established the Carers Fund to offer grants to contribute towards the additional care costs for dependents when our members attend events, meetings or conferences.
- **Best Practice for Career Breaks** – a guide developed to provide strategies and actions to help those returning to careers in SET after a career break.

The Institute is continually examining the nature of membership in all respects, including gender, to understand how to remain relevant to physicists from all backgrounds and working in all areas. The strategic goal for membership is

specifically aimed at making the membership 'larger, boarder and more diverse'. This applies to all grades of membership and all aspects of diversity.

To achieve this goal the Institute is working to understand how to address the barriers that might stop people from applying to membership. This includes exploring the perceptions of who members are, the perceptions of the requirements for membership and reviewing the nature of membership forms. Recently, actions have included setting up focus groups with members, fostering discussions around diversity with members of selection panels and reviewing the information produced for members.

Initial specific actions to come out of the review include:

- Producing new marketing materials, using pictures and quotes from real members. These feature women relatively heavily, and in the prime locations on the materials.
- Targeting high achievers who are not currently fellows but have been identified as being eligible, particularly those who would help us achieve the goal to make the membership larger, broader and more diverse.
- Increased promotion of the nomination route for fellowship which runs in parallel to application. Here existing fellows are encouraged to nominate other people they believe meet the criteria for fellowship. This has proved particularly effective to reach women and 19 of the last 25 women elected to fellow have come from nominations.

To further understand our members, the Institute conducted a survey in April 2011 to capture, for the first time, information on the diversity profile of our membership. We have used this to benchmark ourselves against the physics community to verify that we reflect the interests of all physicists.

c) Are there any further mechanisms or actions that the organisation could initiate by which the gender balance could be improved?

The Institute recognises that there is a long way to go to reach a gender-balanced physics community and membership, but we believe that we have established robust mechanisms for monitoring, review and action to ensure that we will continue to make progress and move in the right direction. Key to this is the monitoring and expansion of our evidence base to ensure that we fully understand the issues, pipeline and attrition points, so that we are able to identify appropriate action to address the barriers.

Election of fellows

d) What criteria are used in selecting new Fellows?

Fellow is the highest grade of membership of the Institute, for people with a very high level of achievement in physics and have made an outstanding contribution to the profession.

For election to fellow, a candidate must be educated to degree level in physics or a cognate subject and able to demonstrate important achievements in areas relevant to the Institute over a sustained period.

To demonstrate achievement candidates are given the following list of benchmarking criteria used in the assessment of a fellowship application. A range of criteria is

provided to account for the diversity of the physics community and candidates are asked to provide evidence against the criteria they select as the most applicable to their experience and area of work. No candidate would be expected to have experience in all areas and some may only have experience in two or three.

A candidate may choose from:

- personal responsibility for technological innovation, providing demonstrable benefits for your business, society or other stakeholders;
- industrial collaboration, providing demonstrable benefits for business, society or other stakeholders;
- personal responsibility for significant resources (such as budget, personnel or facilities);
- project management of a senior and complex nature;
- original research, significantly contributing to the advancement of physics;
- award of patents, or other formal recognition of invention;
- successful creation of a business in a relevant sector, e.g. the technology-based, manufacturing or service sectors;
- attainment of Professor or Reader rank, or position of similar seniority;
- acknowledged expertise in developing new courses or teaching methods;
- substantial experience in an external examiner capacity;
- award of major research grants;
- established reputation as physics teacher at school or college level, regionally or nationally;
- outstanding service on national or international professional committees;
- peer-acclaimed contributions to the public understanding of science;
- setting of national or international policy, whether affecting education, research or other scientific areas;
- other contributions to the enhancement of the profession e.g. through high profile promotion of the importance of physics or demonstration of the value of a physics education.

e) Has your organisation done a gender impact analysis on the selection criteria to assess if they are equally appropriate for both genders?

The Institute routinely monitors the numbers nominated, applying and awarded fellowship. From consideration of these data by gender, the Institute finds that there are equivalent proportions of men and women being awarded fellowship as apply or are nominated, indicating that there is not an inherent bias in the election process.

The data do show, however, that while the promotion of the nomination route to fellowship has been effective in reaching women, there are stubbornly low numbers of women putting themselves forward to apply for fellowship. This requires further efforts to understand and overcome, where actions will be shaped by the outcomes of the focus groups and work with fellowship panels.

f) How transparent is the selection process? Are the criteria published and do those outside the Council and Selection Committees understand how the selection is done?

The criteria for fellowship are published on the Institute website and in hard copy. The application form includes guidance notes explaining these criteria and how the selection process operates. In addition, feedback is always given to unsuccessful candidates.

The Institute is continually reviewing the criteria and documentation in light of experience, where the aim is to strike the balance between giving enough detail so that the process is transparent and not too much detail to be complicated or off-putting.

Perception of the process for election to fellow is one aspect that is being explored through focus groups with members. The outcomes of these discussions will help to shape revisions of how information about fellowship is provided and how fellows are elected.

g) How are interdisciplinary nominations handled?

Physicists are increasingly being sought to apply their knowledge, skills and expertise in interdisciplinary environments. Interdisciplinary applications and nominations for fellowship are handled in the same way as all others. The criteria state that candidates must have reached a high level of achievement in their profession, which must be in a sphere relevant to the Institute. Therefore they are judged in the context of their particular sphere of work against the criteria they have chosen as most appropriate to them, whether that is in academia or industry.

Statistics:

In the following section we provide statistics to compare our fellowship to UK physics professors; however we note that we do not see physics professors as a robust approximation for eligibility for Institute fellowship. In particular it does not encompass the proportion of Institute's membership who are based in industry and the Institute works hard to ensure that fellowship, and the Institute as a whole, is not wrongly perceived as biased towards people working in academia.

In addition, it should be noted that the Institute's fellowship includes members in retirement, who receive a subscription remission, but equivalent people will not feature in the national figures for professors which will only include those still working in higher education institutions.

h) Is the % of females in the candidate pool the same as/lower than/higher than the % of females in the pool candidates are drawn from? (We suggest taking professors as the best approximation to the pool candidates are drawn from).

At present, the Institute has around 3800 fellows where 4.7% of them are women. This is comparable to 5.4%¹⁰ of physics professors at UK institutions who are female.

When considering recently elected fellows¹¹, 13.7% of those in the candidate pool being considered for fellowship (through application or nomination) were women. The same proportion of women (13.3%) was elected to fellow, showing that men and women are equally likely to be successful. These percentages are markedly higher than the percentage of female professors giving a positive indication that we are moving in the right direction.

¹⁰ Data drawn from IOP publication *Diversity in University Physics: Statistical Digest 2010*, based on HESA data for the academic year 2007/08, www.iop.org/publications/iop/2010/page_43857.html

¹¹ Fellowship candidates considered between January 2009 – July 2011

i) Are there trends in these percentages? Does the trend match that of the pool?

The percentage of female fellows has seen a slow, steady increase, rising to the current figure (4.7%) from 3.8% in May 2007. This mirrors the percentage of female physics professors which has increased steadily from 3.0% in 2000/01 (to 5.4%).

j) Once in the candidate pool, do women get elected more often/quickly than men?

For recently elected fellows, the percentage of women in the candidate pool (13.7%) is the same as the percentage of women who are elected (13.3%), indicating that men and women being considered for fellowship are equally likely to be successful.

Interestingly, the average age at election to fellow for men is 51 years compared to 49 years for women. This is in contrast to the average age for appointment to Professor which is 46.5 years for men and 50.5 years for women¹².

k) Is the number of women in the candidate pool growing, static, decreasing? (Are they being elected faster than they are being nominated?)

The promotion of the nomination process has proved effective to increase the number of women being considered for fellowship, although numbers are still low. We recognise that further work is needed to understand how to increase the number of women being elected to fellow through the application route.

In recent years, there has been a sharp increase in the number of female senior lecturers in UK physics departments, many of whom will be, or will soon be, eligible for Fellowship⁹. We will continue the mechanisms for monitoring and review to ensure that this increase in senior lecturers is reflected in the numbers of women being considered and elected to fellowship.

If there are several categories of Fellowship (e.g. Honorary Fellows and Ordinary Fellows) it would be useful to have figures for each category.

Honorary Fellows:

The Institute annually considers nominations for the award of honorary fellowship of the Institute. Honorary fellowship is for distinguished persons that the Institute wishes to honour for important contributions to physics, the work of the Institute or for persons whose association would be of benefit to the Institute. There is an upper limit of 100 honorary fellows at one time and following a call for nominations, the Honorary Fellows Committee selects three to four people per year to receive honorary fellowship.

There are currently five female honorary fellows out of 46 (11%), markedly higher than the proportion of female physics professors (4.7%). It is notable that despite low proportions of female nominations, of the last eight honorary fellows elected since

¹² Data drawn from IOP publication, *Survey of Academic Appointments in Physics 2004-2008*, www.iop.org/publications/iop/2010/page_38419.html

2009, three have been women, indicating that distinguished women are being recognised.

Statistics on the gender breakdown of honorary fellow nominations and recipients are annually considered by the Institute.

To encourage an increase in nominations for honorary fellow from groups that are currently under-represented, the call for nominations includes the statement:

“The Institute welcomes nominations from the business and industry communities as well as for women physicists and physicists from ethnic minorities.”

Related areas: Similar questions may be raised about the gender balance in the award of prizes and grants, in the membership of its most powerful committees and in the slates of speakers and chairs of meetings it promotes. We welcome any information you can provide us in this regard.

To understand the participation of women in the Institute’s activities wide-ranging statistics are monitored annually, these include: female representation on the Institute’s Council, boards and committees; nominations and winners of Institute awards and data on the female membership and committee representation of the Institute’s member groups, branches and divisions.

These statistics tell us that women are well-represented in the Institute’s governance structure. The Institute’s Council has 6/22 (27%) female members. All 12 boards and committees of Council have one or more female members and three have a female chair. For the Institute’s awards, the data show that the challenge for the Institute is to encourage more nominations of women.

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