

IOP Institute of Physics

The Clerk
Science and Technology Committee
House of Commons
7 Millbank
London SW1P 3JA

16 December 2011

Dear Ms Flood

Science and International Development

Please find attached a response from the Institute of Physics to the committee's consultation on science and international development.

The Institute of Physics is a scientific charity devoted to increasing the practice, understanding and application of physics. It has a worldwide membership of over 40,000 and is a leading communicator of physics-related science to all audiences, from specialists through to government and the general public. Its publishing company, IOP Publishing, is a world leader in scientific publishing and the electronic dissemination of physics.

Yours sincerely,



Prof. Stuart Palmer, Honorary Secretary



Dr Beth Taylor, Director, Communications and External relations

Science and International Development – Institute of Physics response

1. The Institute of Physics welcomes the opportunity to respond to the important issues raised in this consultation. We consider that effective support to enable developing countries to engage fully in scientific and technological issues is key to achieving many international development goals.
2. We have not sought to try to answer all the questions posed by the consultation, only those where we think learned societies have an important input to make.

Question 1: How does the UK Government support scientific capacity building in developing countries and how should it improve?

3. We have focused in this response on the activities of the Department for International Development (DfID) as the major UK agency for providing support to the developing world. DfID has made some progress in supporting scientific capacity building, but our perception is that this may be overshadowed internally by more obviously immediate issues, for example support for poverty alleviation and a more recent focus on countries where conflict resolution is a priority. It should be emphasised that support for science and technology development is an underpinning – not a competing – priority. It is one of the most important keys to effectively addressing all other development goals, and in particular to tackling the challenges of climate change.
4. We would draw the Committee's attention to comments recently made by Bill Gates at the G20 summit on the vital importance of supporting innovation for development (<http://www.scidev.net/en/science-and-innovation-policy/innovation-policy/news/gates-tells-g20-innovation-is-the-key-to-development.html>). Innovation is of course not possible without support for the development of the underpinning capacity to create and assimilate relevant research and technologies.
5. In this context, we are concerned by the lack of visibility of the importance of scientific capacity building in the summary of the recent DfID report *UK Aid: Changing Lives and Delivering Results* on the conclusions of their Bilateral and Multilateral Aid Reviews.

Recommendation 1: The Institute of Physics believes that support for scientific capacity building needs to be more overtly stated as a development objective by DfID, if it is to be treated as seriously as it deserves in decisions on the allocation of funds.

Question 2: What are the most effective models and mechanisms for supporting research capacity in developing countries?

6. UK learned societies, including the Institute of Physics, have been actively considering this issue. In 2009, a discussion meeting involving a broad spectrum of UK learned societies concluded that many international programmes in scientific capacity building, including those supported by DfID, tend to focus on building research infrastructure, providing relevant education, and supporting research projects. These activities have significant value in that developing country scientists need access to education, laboratories to work in, and research funding for their projects. Such programmes have often included some capacity building support for individuals and related research networks, but have not addressed longer term

support needs. We believe this approach is flawed in that the value of underpinning long term scientific networks, which support professional careers and drive much of the way in which science is actually done, has been relatively neglected. This threatens the sustainability of the valuable institutional and other investments made.

7. The discussion meeting also noted the view of American academic Caroline Wagner that international agencies have mistakenly tried to take the existing western model of “big science” and transplant it to the developing world – ignoring the fact that it had taken the western world 200 years to evolve such systems. The networking activities of learned societies were highlighted as having been a very important driver of the historical development process. She concluded that supporting smaller, more organic, networks of scientists in developing countries might be more productive to catalyse similar development processes.
8. Learned societies of every discipline are perhaps in a unique position to contribute to addressing this gap. They are quite different from the many other ways in which science is organised, whether through government funding agencies, universities or science based industries. In essence they are clubs of scientists, whose *raison d’être* is to provide mutual support and to build capacity in their disciplines. They are not by nature hierarchical, and are naturally organised as extended networks of scientists with strong links at grass-roots level. Many of the well-established societies, founded in the UK to serve their immediate scientific communities, have naturally extended to include an international membership, and have been quietly supporting budding scientists in the developing world before the main international aid agencies woke up to the importance of this. Such activities have not been developed by remote policy makers, but have the advantage of having been driven by the expressed needs of their memberships.
9. Learned societies can address capacity building at many levels in an integrated way, from working with scientists at grass-roots level to advising on science policy at governmental level. Learned societies and their members know how to set up and run scientific journals (many of which are still closely connected to the societies that created them), promote the highest research standards through peer review, run events on topical research issues, provide networking and career development support, train students, work with schools and universities to encourage young people to study and take up careers in science, promote the engagement of women in science and engineering, liaise with industry, and engage with the media and the general public on crucial issues of public concern.
10. We believe that there is a valuable potential opportunity to support the growth of indigenous learned societies in developing countries. The Institute already seeks to do this (see attached summary) as do other learned societies in different disciplines. DfID funding to enable UK learned societies to mentor equivalents abroad, helping them to provide much needed local support to their scientific communities and integrate them into international networks, would be especially useful to allow us to expand these activities and would help DfID meet the capacity building objectives stated in their *Research Strategy 2008-2013*: Strong and more equal north-south

partnerships; access to global research networks and expertise; practical help to ensure that research is high quality; and opportunities for personal and career development within wider organisational support.

Recommendation 2: The Institute of Physics proposes that DfID should provide support to enable UK learned societies to partner and mentor their developing country equivalents.

11. Another issue identified at the 2009 discussion meeting was the perception that DfID prefers to fund large scale initiatives and lacks the flexibility to provide support for smaller scale programmes. Although this approach may be attractive in terms of administrative economies of scale and perceived added impact of highly visible major investments, it lacks the ability to test new approaches in a low risk way and rules out promising, small-scale projects like those the Institute sponsors through our *IOP for Africa* programme, which offer excellent value for money (see attached summary).
12. Learned societies have had the flexibility to be able to support innovative small-scale initiatives, and have therefore been able to respond in a timely way to ideas being generated by scientists in developing countries. However, surveys of capacity building initiatives in learned societies, conducted by the Royal Society and the UK National Commission for UNESCO (UKNC) in 2007 and 2009, indicated that because of lack of funding many such programmes, though successful, remained small. This means that it has not been possible effectively to build on success. The best initiatives start small and are enabled to evolve to meet real local needs. Donors should have funding programmes that can cope with flexibility, diversity and small applications.

Recommendation 3: The Institute of Physics proposes that DfID's funding mechanisms should be sufficiently flexible to enable small scale pilots with successful outcomes to be scaled up where appropriate.

Question 5: How are government activities co-ordinated with the private and voluntary sectors?

13. The Institute can only comment on this question from the perspective of learned societies in the third sector. Our experience is that there is no obvious gateway to co-ordinating our efforts in international development with government activities, and indeed the many small initiatives undertaken by individual learned societies would also benefit from a co-ordinated approach.

Recommendation 4: The Institute of Physics would encourage DfID to consider how to engage the learned societies in a forum which facilitates their involvement in the international development agenda. In particular DfID's Chief Scientific Advisor should actively engage with UK learned societies on this issue.

14. The Institute has also noted the creation of an independent watchdog to scrutinise

DfID's activities (<http://www.dfid.gov.uk/News/Latest-news/2011/UK-aid-watchdog-publishes-first-reports/>). We emphasise the importance of representation of the scientific community on this body (the Independent Commission for Aid Impact), to facilitate co-ordination and provide guidance on capacity building issues.

Recommendation 5: The Institute of Physics recommends that the science and engineering community should be represented among the membership of the Independent Commission for Aid Impact.

References

E. Bell *Science, Technology and Innovation: International Capacity Building for Sustainable Growth - A Preliminary Concept Paper* (2009) http://www.ukcds.org.uk/page-Learned_Societies-144.html

E. Bell & C. White *Sharing our Experience: Report of a Discussion Meeting on International Capacity Building by UK Learned Societies on 2nd June 2009 at The Royal Astronomical Society London.* http://www.ukcds.org.uk/page-Learned_Societies-144.html

Caroline Wagner, *The New Invisible College: Science for Development* (<http://www.brookings.edu/press/Books/2008/newinvisiblecollege.aspx>)

Attachment: Physics for a better world – a summary of Institute of Physics international programmes

Physics for a better world

An introduction to IOP's
international programmes

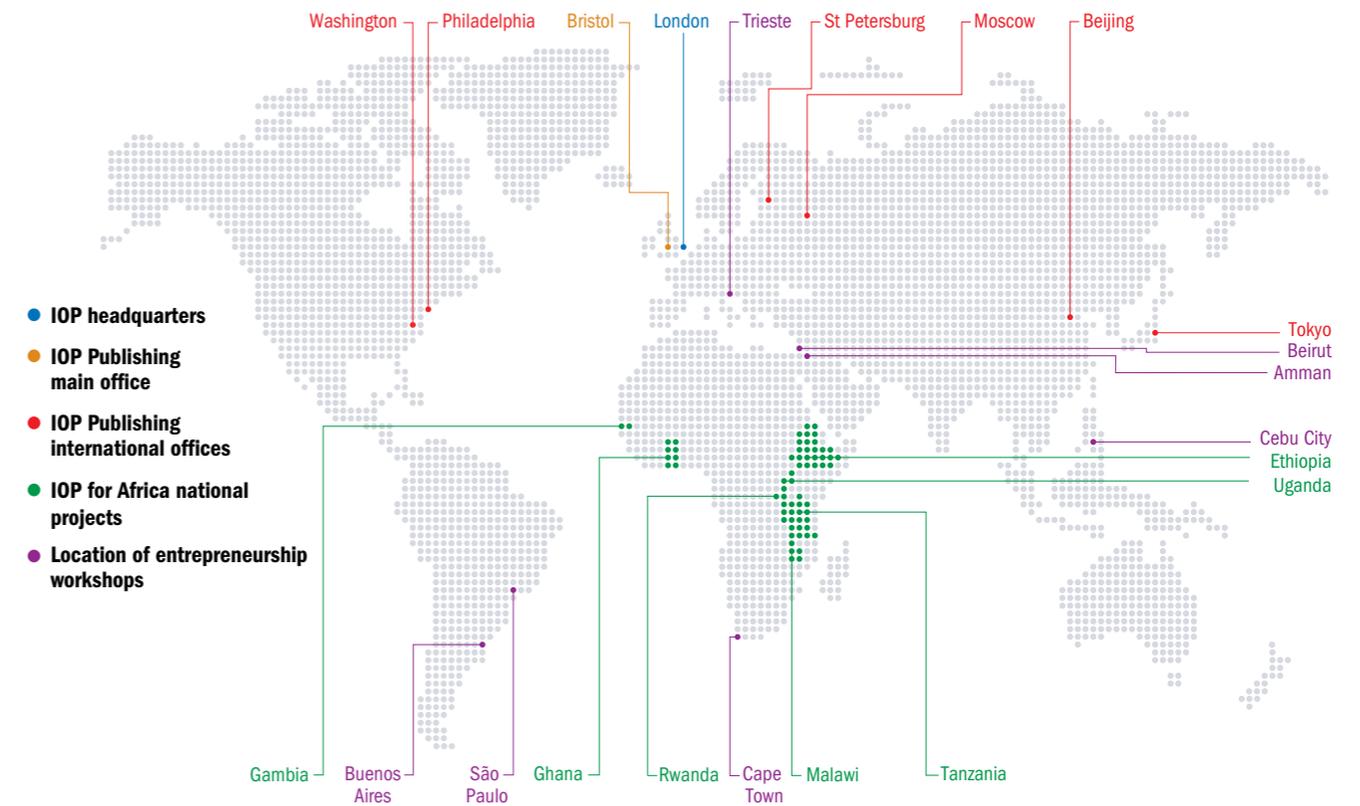


The Institute of Physics is a leading scientific society promoting physics and bringing physicists together for the benefit of all.

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 policymakers and the public to develop awareness and understanding of physics. Its publishing company, IOP Publishing, is a world leader in professional scientific communications.

IOP is an increasingly international organisation. Our membership includes people from around 100 different countries. IOP Publishing, one of the world's leading scientific publishers, has a considerable worldwide presence, with offices across Europe, the US and Asia. Our mission is to advance physics for the benefit of all.

We are committed to ensuring that the dissemination of knowledge and application of physics bring about lasting progress to countries all over the world, including those with developing economies.





Delegates at IOP's workshop on building entrepreneurial skills in Buenos Aires, Argentina.

IOP's international presence

With an overall number in excess of 40 000, IOP counts physicists from more than 100 countries around the world among its membership.

International links

IOP is an active member of the International Union of Pure and Applied Physics (IUPAP) and the European Physical Society (EPS). We also have bilateral joint agreements with a growing number of national physical societies. These provide a variety of benefits from joint membership and attendance at conferences to joint awards and exchange lecture tours.

An international scientific publisher

IOP Publishing's internationally acclaimed journals, magazines and online resources disseminate scientific research worldwide.

Through several international publishing partnerships, IOP Publishing makes its journals available for free or at a very low cost to more than 70 developing countries.

Promoting physics in the developing world

IOP's Physics for Development programme aims to:

- improve physics education at all levels and support the training and professional development of physics teachers, particularly in sub-Saharan Africa;
- equip qualified physicists in developing countries with relevant business skills to market their physics-based enterprises more effectively.

In general, the programme aims to bring about economic and social progress through the promotion and advancement of physics knowledge and application.



Secondary-school students in Ada, Ghana, building circuits at a resource centre sponsored by IOP.

Promoting entrepreneurship

IOP is committed to stimulating the application of physics in industry and business, and to see scientific innovations contributing to the economy of developing countries around the world.

In 2005, the International Union of Pure and Applied Physics (IUPAP) identified economic development as a priority to be addressed. Since then, IOP and the International Centre for Theoretical Physics (ICTP) have run a series of workshops in entrepreneurial skills, specifically designed to equip physicists and engineers from developing countries with the skills and experience to bring their research and innovations to the global marketplace.

Hundreds of participants from more than 40 countries attend these annual workshops held in Trieste, Italy, and in other, carefully chosen locations around the world, which have included Jordan and South Africa. Another, more advanced entrepreneurship workshop for high-level managers also runs yearly in countries with middle-income economies, which have included India, Argentina and Brazil.

Lack of information and skills is frequently identified as a key barrier to innovation in the developing world in feedback from international delegates. In response to this, IOP developed its entrepreneurship curriculum for scientists from developing countries in 2009, which has



Developing a business plan is an integral part of IOP's entrepreneurship training.

now been adopted in a number of African universities and in other developing countries, including the Philippines.

By stimulating entrepreneurship among physicists at all levels, IOP helps developing economies to capitalise on the skills of their brightest minds.



“The workshop was very useful to understand how to write a business plan and the concepts around intellectual property. I would love to attend the advanced workshop in a year or two.”

Delegate at El Hassan Science City, Jordan



An IOP teacher-training workshop in Tanzania: applications and experiments are at the heart of our courses.

Supporting physics education

Encouraging students to embrace physics and supporting qualified physics teachers is central to IOP's mission. This is particularly true in sub-Saharan Africa, where lack of resources often rules out practical education.

The Physics for Development programme in Africa started in 2005, with a donation of equipment to a school in Kigali, Rwanda, thanks to the efforts of David Richardson, an IOP member and physics teacher visiting the country on a volunteering scheme. Today, the Rwandan project also covers teacher training and a staffed workshop for building and maintaining experimental equipment. Similar projects are also now flourishing in Ghana, Tanzania, Ethiopia, Malawi, Uganda and Gambia.

IOP's aim in Africa is to enhance teachers' subject knowledge and give them the practical skills necessary



A rudimentary microscope made by technicians at the IOP resource centre in Tanzania: building experimental equipment is vital to the self-sustainability of all of IOP's educational projects for the long term.

to show students the myriad of applications that physics can have and the benefits that an education in physics offers.

In promoting and supporting education projects, IOP's aim is to maximise leverage of its resources and to ensure the involvement of local people for a sustainable future.



Ghanaian pupils testing solar energy: encouraging girls to engage with physics is one of IOP's key educational aims.

In 2010, IOP launched its first-ever fundraising campaign, IOP for Africa, to raise funds among IOP members and the wider public to help sustain the projects in sub-Saharan Africa. More information about the campaign can be found at www.iop.org/iopforafrica.

Joining IOP through partner societies

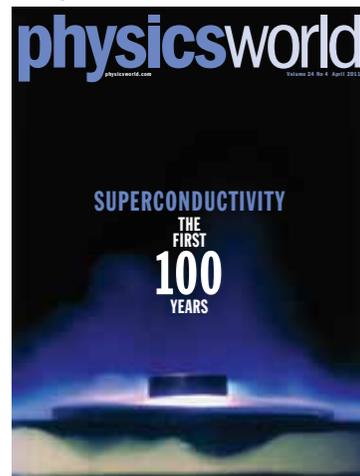
In 2011, IOP introduced a new form of membership – IOP iMember – which provides electronic access to a wide range of services delivered by IOP through its various websites and a wealth of opportunities to engage with other physicists around the world.

IOP has signed partnership agreements with many national physical societies in Asia, Africa and Latin America, offering their members the opportunity to become an **electronic affiliate** of IOP and obtain these benefits at low or no cost.

Membership benefits

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Our popular monthly magazine *Physics World*.

- Get online access to the digital version of IOP's popular monthly magazine *Physics World*, giving you all the latest news about cutting-edge physics research and developments, as well as the opportunity to access an electronic version of our members' newspaper, *Interactions*.

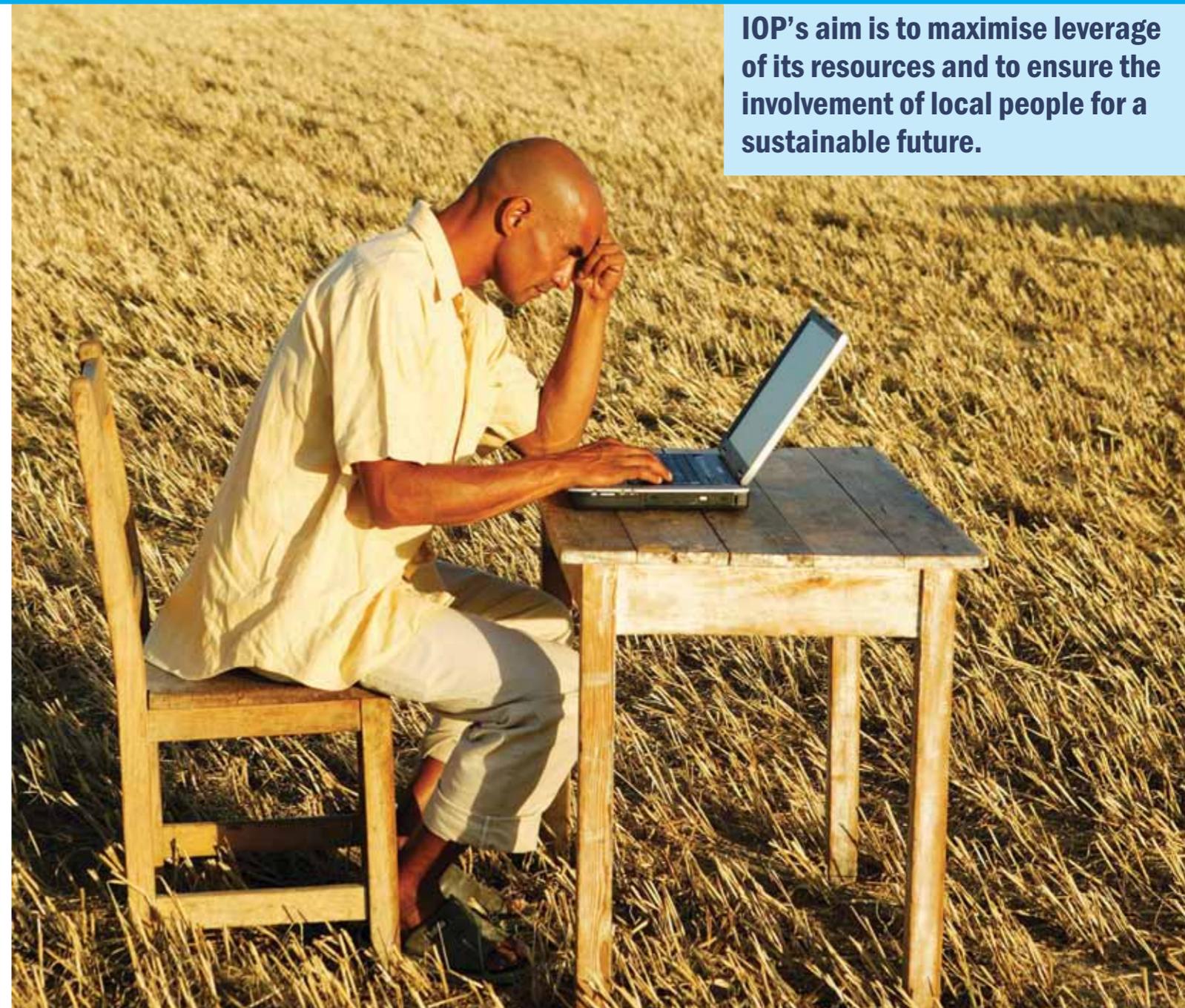
- Join any of 50 specialist groups covering many areas of physics, each with its own events and news.
- Make use of *MyIOP*, our online members network, giving you the opportunity to create your own profile page, interact with other members, blog, post photographs, join groups, read news and hear about the latest events.
- Attend conferences staged regularly throughout the UK at member rates.
- Create your own *PhysMail* address@physics.org, which also works as a forwarding service to your chosen e-mail address.

Plan your future

- Benefit from resources, such as tips for interviews and how to prepare your CV.
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- Gain access to professional helpsheets on a variety of topics, from our website or by e-mail.

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IOP's aim is to maximise leverage of its resources and to ensure the involvement of local people for a sustainable future.



To apply online for electronic affiliation, visit members.iop.org/intlmembership.asp.

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