

Institute of Physics strategy 2024 – 2029

Physics for our future

Foreword from the President

It is my pleasure to introduce the Institute of Physics' 2024-2029 strategy. Physics for our Future is both a statement of shared purpose and a practical guide to how our physics community can come together to make a meaningful difference for physics, for the economy, and for society.

To be a physicist is a privilege. Ever since I first borrowed physics texts from my local library as a child, I've been hooked on how it seemed to reveal and change the world I thought I knew. In my lifetime, physics has underpinned everything from communications to treatments for cancer, from computing to our understanding of the nature of the universe.

None of us undertake the study of physics alone. Our understanding is first unlocked by teachers, themselves key members of our community, and then shared and deepened through engagement with other physicists. Some of us are seeking answers to fundamental questions, others taking these insights and applying them to products or pressing problems such as zero-carbon energy. All of us depend on our wider community - both the community of physicists of which we are currently a part, and the one to come - open to talent without prejudice wherever it may be found.

It is by working together that we will increase the impact of physics for the benefit of society.

Our motivation is to ensure a diverse, vibrant physics community that is healthy, inclusive and sustainable, so that those who choose to learn or work with physics can thrive and the UK and Ireland can capture the benefits of scientific leadership, new discoveries, and advances in technology and innovation.

If we can achieve this, we will have improved the experiences of those who choose physics and made physics a more attractive prospect for those who are yet to choose their education or career path. Moreover, physics will better play its role in society by improving health and wellbeing and increasing prosperity and opportunities for all, energising our economies and accelerating the green industrial revolution.

This strategy lays out how we plan to achieve these aims over the next five years. Its focus is simple but important: skills, science and society. But these are not only our priorities - they are also those of our members who have worked with us to identify what needs to be done and how.

Scientific publishing is central to the strategy with 100% of the profits from our publishing arm, IOP Publishing (IOPP), going towards public benefit and the scientific good. In recognition of the centrality of publishing to our mission, impact and sustainability, and vice versa, we will deepen collaboration between IOP and IOPP in the next five years.

Running through this strategy is the principle of diversity of backgrounds and inclusive environments for the physics community to thrive. Physics must not turn its back on any individual or part of society: the opportunities in physics are too great, and the solutions it offers our world too necessary, to lose any future physicist through prejudice or stereotypes. So, we will confront and break down the barriers to participation in physics and ensure our field is inclusive and welcoming to all. And so we will continue to grow our visibility and influence by championing and celebrating physics and its contribution.

We will use our expertise, our convening power and our influence to engage new and diverse audiences.

This strategy is a starting point but the measure of its success will be found beyond its pages. Each year we will review our progress and adapt as necessary so we can be the beacon of physics expertise, evidence and insight we know is needed. We are rightly passionate about

the importance of physics and want to see it thrive now and in the future. Together I am confident we can support that vital endeavour.

Professor Sir Keith Burnett CBE FRS CPhys FInstP FLSW

President of the Institute of Physics

Introduction

The IOP exists to help physics and the physics community deliver on their potential for our lives, our society, our planet.

Together with our members and leaders from the world of physics and beyond, we have identified three priorities which must shape our work over the next five years if we are to achieve this mission. We will, in partnership with members and others in the UK, Ireland and internationally, work single-mindedly towards these three priorities.

Our three priorities

Skills: Tackling the skills shortage and opening up opportunity.

Science: Strengthening physics across science, research, innovation and technology.

Society: Exploring the social and economic benefits of physics and ensuring they are understood.

To achieve this we will be guided by four fundamental principles which will run through everything we do.

Member-focused: Members are at our heart and integral to our success.

Inclusive: Physics must welcome, include and reflect all parts of our diverse society.

Sustainable: For our environment, our community and our financial foundations.

Partnership: Working with partners every step of the way helps us achieve more together and we will deepen our collaboration with IOP Publishing.

In this strategy, we set out how we will deliver these priorities over the next five years, staying true to our fundamental principles. Our vision is to improve the lives of those who research, teach, study, apply and love physics, attract more people into the wonder and opportunities of physics, and realise physics' full potential to build a brighter, healthier, more prosperous and sustainable society for us all.

Skills: Tackling the skills shortage and opening up opportunity

Our goal: The opportunities, knowledge and skills that physics can offer will be truly open to all – so we can better understand our world, shape rich and inspiring futures, and build thriving, resilient societies and economies.

Physics benefits us all. The physics community has helped to transform our societies and energise our economies. Physics offers skills, knowledge and ways of thinking and reasoning that we will depend upon ever more in years to come. Nurturing the next generation of physics professionals and scientifically literate citizens is critical for our future.

But physics skills and knowledge are not just vital for humanity's future – they also open doors and bring opportunity now. They equip people of all backgrounds to work in a wide range of sectors. Today, physics-related skills underpin jobs and industries in every region of the UK and Ireland, at all levels.

However, we face a large and growing physics skills shortage, which is putting a brake on physics-powered innovation and limiting physics' potential to improve our lives. This skills shortage is driven by various powerful factors.

The problem starts at an early age, with young people put off physics by stereotypes and prejudice, and too many young people hearing the message that physics is not for people like them. These barriers are compounded by challenges in our education system: physics faces the greatest specialist teacher gap of all subjects, and too many young people are denied educational opportunity because of where they live.

This means that the number of young people pursuing physics post-16 is low, especially among underrepresented groups. And, although more than half of the physics-based jobs in our workforce do not require a degree, young people do not get a clear picture of technical pathways that could lead them to rewarding careers in physics. Finally, for those who do pursue physics, their experience is too often limited by environments that are not equal and inclusive.

Urgent and sustained action is needed to tackle this skills shortage and ensure everyone has the opportunity to benefit from the future physics can offer.

The Institute of Physics will:

Tackle the physics teacher gap, and open up access to high quality physics education at every educational stage

We will fight for world class physics education for all young people and for measures to close the specialist physics teacher gap in schools through recruitment, retention and retraining. We will work with partners to promote the value of teaching, from primary to postgraduate education, advocate for relevant, inspiring curricula, and ensure educators have the tools and support they need to give every learner the best possible experience of physics.

Make the case for the skills that drive physics-powered sectors

We will work with physics-powered sectors to articulate current and future skills needs and champion new ways to meet them - including a focus on technical routes such as apprenticeships, action on reskilling and upskilling the existing workforce and making the case for our nations to remain open to skilled technicians, researchers and innovators.

Campaign to break down stereotypes

We will continue to campaign to break down the barriers and confront the negative stereotypes that prevent young people, including those from underrepresented groups, from doing physics after the age of 16. Individuals from underrepresented groups will each have their own unique experiences of these barriers and stereotypes. Throughout our work we will consider the protected characteristics and environmental issues that prevent people from being included and from bringing value to the physics community.

Build inclusivity and capability in the community

We will work to ensure that anyone studying or working in physics can thrive in a supportive, inclusive and welcoming environment, including by expanding our respected physics inclusion award beyond gender and academia. We will also develop capability within the physics community through a programme of support and professional development, co-created with our members.

Open up publishing opportunities

Through IOP Publishing we will ensure that all researchers have the same opportunities to become authors, reviewers or editorial board members across all our publications and design progressive, inclusive publishing processes for all.

Science: Strengthening physics across science, research, innovation, and technology

Our goal: strengthen physics across science, research, innovation and technology to enhance our understanding of the world and help current and future generations to live more prosperously and sustainably.

Physics drives discovery and innovation, transforming our understanding of the world, and almost every modern-day technology has its origins in physics. Businesses powered by physics support the livelihoods of millions, accounting for more than 10% of GDP and employment in the UK and 9% in Ireland, more than a third of private sector R&D, and offering rich and rewarding career opportunities everywhere in the UK and Ireland.

In the coming years, physics will continue to shape our world. A new wave of innovation enabled by physics is set to break, offering the potential of zero-carbon energy, new ways to diagnose and treat diseases, self-repairing infrastructure and other benefits we cannot yet predict.

However, there is great untapped potential in university departments, specialist research organisations and physics-powered business, which must be nurtured and supported if we are to realise this potential.

That means strengthening the pipeline of fundamental research from which all innovation stems, as well as supporting and advocating for the physics-powered businesses that bring those innovations to life. It means ensuring diverse and inclusive working environments for all physicists, so that we reap the rewards that diverse teams bring. We must ensure our research base and businesses are resilient to future shocks, and that international connections remain strong and vibrant.

The Institute of Physics will:

Champion diversity in research and innovation

We will champion the benefits of research and innovation communities that are open and welcoming to people from all backgrounds, identify and tackle the challenges faced by underrepresented groups, promote inclusive cultures, and demonstrate how to build and sustain them.

Advocate for and support physics innovation and R&D

We will advocate for physics research and business innovation, and for greater levels of public and private investment in research, innovation, translation and infrastructure. We will identify and act on priority areas where we can stimulate tangible change on behalf of our members and the physics community – from national technology strategies to new physics-powered industries. And through initiatives like our accelerator space we will provide direct support to growth in physics-powered businesses.

Celebrate physics and physicists

We will showcase outstanding physics and physics breakthroughs, celebrate the achievements of physicists including those of IOP members through our awards programme, and highlight the vital role physicists and physics powered businesses play in the emerging technologies that will help us address the challenges our world faces.

Offer world-class physics research, open to all

Through IOP Publishing, we will increase access to published research and showcase trusted, quality physical sciences research to a global audience through open-first publishing, progressing the discipline of physics and its applications and driving impact, recognition and value for the UK and Irish scientific community.

Build international collaboration

We will seek to unlock funding opportunities that offer mutual benefit to international partners (as we have between African and UK researchers and the UK and Canada, in the past), promote the UK and Ireland as physics partners of choice and foster strong international relationships to support collaboration, dialogue, access to facilities and the exchange of people and ideas.

Society: Exploring the social and economic benefits of physics and ensuring they are understood

Our goal: increase understanding of the ways physics benefits all our lives by amplifying physicists' voices in partnerships and conversations with wider society, and exploring the human stories of physics meeting the social challenges we face.

Engaging people in the powerful solutions physics can offer helps drive a progressive culture that is open to exploring, learning, and responding to the great challenges facing humanity.

Physics can help us solve the challenges facing current and future generations – articulated in the UN Sustainable Development Goals - and opens up opportunities for people to play an active role in understanding and shaping their world.

The population of any society is diverse, and the needs of its citizens will differ. Through conversations, we will explore and communicate different human stories about society's challenges and how the work of the physics community plays a key role in solving them. We will show people how they can pursue and be part of physics, and help them understand the role physics plays in solving challenges that matter to them. To achieve this we will make sure that conversations reflect all voices including those that are seldom heard.

The insights gained from our conversations will support the IOP's work to influence policy. We will create a body of quantitative and qualitative evidence that, along with the expertise of members and staff, will help us to influence policy and practice, promote investment in physics and support international collaboration for the benefit of our economies and everyone in society.

The Institute of Physics will:

Share the human story of physics

We will explore and showcase how the work of our members and other physicists is at the heart of the efforts to meet the challenges facing society through physics and its applications by engaging and communicating at scale with wide-ranging audiences. We will work with other disciplines to reflect society's expectations of fairness, equity of access and ethical standards in science and technology.

Promote research with social impact

Through IOP Publishing, promote the social impact of research from the international physics community, including outputs that support the UN Sustainable Development Goals.

Increase our influence through partnerships

We will gather quantitative and qualitative evidence through our conversations and partnerships to influence national and international policies, ethics, regulations and practices for the benefit of society and the economy.

Promote the global benefits of physics for all

Through our international networks in science and wider society, build understanding of the

impact physics has on the lives of diverse communities and the importance of international collaboration.

Membership

Members underpin all we do and are integral to delivering our strategy. We strive to be an exemplary membership organisation and professional body, with a growing, engaged and diverse membership. Via our member communities and networks, we represent physics across a vast range of activities.

We support our members' professional development, developing their skills and enhancing their career prospects. We also engage members in our activities, promoting the work of physics and its importance. We do this by drawing on and highlighting members' expertise, whatever their career stage, experience, or wherever they work, whether in business, academia, schools and beyond. We help to create a stimulating and inclusive environment that encourages physicists to collaborate across traditional boundaries and in which innovation can thrive.

We inspire people to develop their interest in physics, whether in the classroom, in colleges and universities, in businesses or at home. And we recognise and celebrate members of the physics community who, through their work, have made a real difference to physics and to society.

The Institute of Physics will:

- Place members' expertise at the heart of the IOP's strategy and success.
- Engage and nurture the current and future generations of physicists and wider physics community, increase opportunities for members to develop their physics

skills and knowledge, and develop member IOP networks.

- Review our current member offer to ensure it is relevant, engaging, inclusive and fit for purpose, so that the physics community values and benefits from IOP membership and actively participates in our work. In doing so, we will grow our membership, strengthening our voice and the expertise within the IOP community.
- Provide access to world class physical sciences content and information to build members' knowledge and expertise, including through the IOP's membership magazine, Physics World, to help members keep up to date with relevant research, business news and policy as it affects the physics community.
- Ensure that our professional registrations are relevant, keep pace with changing skills needs, are recognised and valued by employers, and allow for career movement between roles and sectors.
- Explore opportunities to broaden the IOP's membership to better reflect and serve the whole physics community, including future generations, with additional consideration given to groups that are underrepresented within our membership.
- Continue to strengthen and signpost member engagement channels, including the IOP's groups, nation and branch committees, conferences, our website and digital platforms. We will support our branches to work locally and regionally to bring members together and to deliver public engagement that is aligned to our strategy, particularly where it improves engagement with diverse and new audiences.

A sustainable IOP

We're here for physics, now and for the future. To ensure the IOP is sustainable for years to come, we will make strategic and financial decisions that support our work as a professional body, learned society and employer now, whilst also considering the needs of future generations.

Our commitment to sustainability includes but goes beyond reducing environmental impacts: it also encompasses financial sustainability and the sustainability of our membership and community. The IOP will endure – and remain relevant and deserve to endure – if it continues to embody society's evolving expectation of social impact and inclusivity for and on behalf of our world-changing discipline.

Through the principles set out in our Environment, Social and Governance (ESG) framework, we will make sure all our work reflects and articulates the purpose for which our organisation exists now and in the future.

To do this, we must build on the steps we have already taken and continue to develop as a sustainable organisation and employer of choice, guided by our values, empowering our workforce, and holding ourselves to the same levels of inclusive practice we promote and expect from the physics community.

The Institute of Physics will:

- **Build an enduring IOP**

We will ensure the IOP is an organisation that can endure in a fast-changing world because it is relevant, open to diverse voices and ideas, and responds to emerging challenges in a timely and equitable way. We will learn from our members, staff team and partners, listening and engaging as widely as possible, to help us continue to evolve our approach to inclusive sustainability.

- **Be an employer of choice**

We value our staff, recognising and celebrating their expertise and the essential role they play in delivering this strategy. We will motivate and engage them, ensure that they are well led and managed, have the skills and competencies they need to succeed, and invest in their development. We will provide an inclusive working environment and review our values, to ensure that they remain an expression of what we believe and how we behave as an organisation.

- **Drive financial sustainability**

We will achieve financial sustainability, be cost efficient and agile in our structures and use of technology, and drive income from our buildings and investments. We will invest in diversifying our income, opening up new income sources from partners and funders who share our ambition to harness the powerful potential of physics to create impact in society.

- **Reduce our own environmental impacts**

We will work with our staff, members, IOPP, suppliers and partners to reduce the environmental impacts arising from our work in as rapid and sustainable a way as possible. In making this commitment, we recognise that we must balance strategic, financial and environmental decisions with our obligations as a professional body, learned society and employer and must also consider the needs of current and future generations.

- **Plan for the long-term**

We will maintain appropriate reserves and balance funds for current and future expenditure, pension buy-out, income generation and longer term investments for

growth and income. We will explore the best options to minimise uncertainty within our defined benefit pension scheme. Our financial decisions will be based on the management of risk and a responsible investment strategy that aligns to our ESG principles.

- **Deepen IOP and IOPP collaboration**

All profits from IOP Publishing are spent on furthering the IOP's charitable objectives, and having publishing at our heart keeps us close to cutting edge research and global research excellence. We will develop a shared narrative to communicate our shared charitable purpose to our publishing audiences as a key reason to choose IOPP over competitors. We will work across the IOP and IOPP to increase the visibility and number of published articles in IOPP publications from the UK and Ireland, including closer working between the IOP's groups, wider networks and flagship events.

- **Champion creativity and innovation**

We will value creativity and innovation, continuing to develop new ways of working to maximise efficiency and impact, including looking at how we run ourselves as the IOP and opportunities for closer working between the IOP and IOPP. We will use our Challenge Fund or other new funding sources to innovate and pioneer new ways to deliver our strategy with partners.

- **Develop partnerships and alliances**

We will continue to build partnerships, collaborations and strong alliances within and beyond the sciences, working with organisations with complementary expertise and values to maximise our reach and impact and help us meet our strategic ambitions. We will also work with physicists who form their own networks and who may look to us for responsible and ethical collaboration.

- **Sustain an international profile**

We will be an internationally respected organisation that represents and promotes the interests of the UK and Ireland physics community in international forums. We will be a reliable, valued and supportive partner when we work with international organisations on issues of common concern and ensure that physicists play a prominent role in the international community. We will continue to invest in scientific publications as an integral part of the global science system, advancing trusted physics research worldwide.