

Annual report

Activities and outreach • Education • Policy





Annual Report April 2017

Throughout the year, the physics community in Ireland has come together through the Institute of Physics (IOP). In academic meetings, cultural activities and policy matters, our members have spread interest in areas as diverse as astronomy and Brexit to photonics and increasing women in science.

With around 100 events annually, we are very appreciative of our volunteers who have brought energy, enthusiasm and passion for physics to more than 150,000 people across the island.

Reaching out

Working with a range of organisations, the IOP supported a number of highly innovative activities such as astronomy board games, particle-physics masterclasses, SciFest, Schools Formula 1 Racing, Dublin Maker, Lab on a Chip, the Irish Science Teachers Association student quiz, physics busking at festivals across Ireland, Trinity Walton club, the Robert Boyle Summer School in Lismore and Creativityday at W5 in Belfast, to name but a few.



Physics buskers in action

The IOP Ireland (IOPI) stand at the BT Young Scientist Exhibition was a particular highlight, with thousands of visitors exploring some fun physics with our custom-made diffraction glasses. Volunteers from the Irish Association of Physicists in Medicine brought a selection of hands-on demonstrations to the stand, while laser-beam equipment developed at Dublin City University with support from the IOP Walton Fund was a great draw.

Awareness of industry links and careers in physics was a key issue, with the IOP working at events throughout Ireland distributing copies of its publication 28 Days, 28 Physicists at careers fairs in Galway, Monaghan, Roscommon and Belfast. The materials were also made available to schools and colleges across Ireland on request.

IOPI was closely involved in the third annual Northern Ireland Science Festival, with around 170 events running across 10 days in February 2017. The festival featured a highly entertaining mix of art, music, history, discussion and workshops – all infused with science. A particular physics highlight in the festival was the conversation between the discoverer of pulsars, professor dame Jocelyn Bell Burnell, and physicist and author professor Jim Al-Khalili. The latter also gave the inaugural John Bell lecture on quantum biology.

Throughout the year, the physics buskers took to the roads and brought their own blend of entertainment, engagement and education to 12 events and festivals across Ireland. The troupe of 34 buskers (made up of physicists, teachers and researchers) gave 160 days (more than 1,500 hours) of volunteering and engagement to more than 130,000 members of the public. The project, which is jointly organised by the CASTel group at DCU and the IOP, is supported by a grant from the SFI Discover Science and Engineering programme.

Educating

The five Teacher Network coordinators of IOPI have provided tremendous support to hundreds of teachers throughout Ireland, with many talks and workshops, including What Comes Next, Physics in Action, Shocked and Stunned, Virtual Lab and Lights, Camera Images, Physics@work events, and with newsletters produced and exam papers reviewed. Much of this work has been done in conjunction with the Professional Development Service for Teachers and with the Northern Ireland Department of Education.

Around 100 physics teachers gathered at the new Dublin Institute of Technology Grangegorman campus in September 2016 for the 16th annual Frontiers conference. The programme included talks from international speakers, and workshops and activities such as Science on Stage demos, transition-year resources, and using football in science teaching. Keynote speaker professor Mike Cruise, who was part of the LIGO team, spoke about the recent



observation of gravitational waves, while professor Tom Ray of the Dublin Institute for Advanced Studies brought along the recently discovered ceolostat. This instrument was used by Eddington to measure the gravitational deflection of starlight in the solar eclipse of 1919. Manufactured in Dublin by Grubb, it had been lost for almost 70 years.

The Teacher Network coordinators also contributed physics demonstrations to many other events around the country, including the Galway Science and Technology Festival. They also worked closely with the Irish Science Teachers Association and the Association for Science Education to provide support, particularly for newly qualified teachers and non-specialist physics teachers.

Irish-born 15th-century scientist Robert Boyle and his sister lady Ranelagh featured in a costumed re-enactment of his most famous experiments during the IOPI Tyndall lecture tour. Eoin Gill and Sheila Donegan of the Waterford Institute of Technology delivered the highly entertaining talk in nine venues across Ireland with around 3,000 students attending.

The IOPI academic lecture programme included speakers on laser physics, condensed matter, attosecond optical electronics, quantum information, extrasolar planets and confocal microscopy, who gave talks across Ireland. The annual Spring Meeting 2017 was planned for Dublin, with the theme of physics and life.

Awards

Excellence in physics at all levels was highlighted through the Institute's medals and awards.

The top physics award at the 2017 BT Young Scientist event, which is sponsored by the IOP, was won by Cormac Larkin, a final-year student at Coláiste An Spioraid Naomh, Cork, for his case study of data mining in observational astronomy. He was presented with the award by the 2016 winner of the IOPI Rosse Medal for physics communication, Niamh Kavanagh of the Tyndall Institute.

Domantas Jagutis, St Mary's CBS, Carlow, was awarded the prize for the top Leaving Certificate physics performance, while Thomas McIver, St Malachy's College, Belfast, won the equivalent award for Northern Ireland A-level physics.

Adam Dempsey of Dublin City University won the Earnshaw Award for best final-year undergraduate project, while Máire Duffy of Clonkeen College, Blackrock, Co. Dublin, was named Irish Physics Teacher of the Year at the IOP's annual award ceremony in London.



Niamh Kavanagh presenting the BT Young Scientist physics award to Cormac Larkin

Last year, IOPI introduced its school award for physics, in which schools may nominate up to two students to receive a special certificate for physics performance and are included on the roll of honour on the IOPI website. The award has proven popular, with around 70 students being honoured in 2016.

Influencing

The Institute contributed to consultations on a range of issues affecting physics, including the programme for government in Northern Ireland and the Department of Education Statement of Strategy 2016–2018. The IOP also organised a meeting in Belfast on the implications for physics from Brexit, as well as highlighting to members critical issues to raise with politicians standing for election in its manifesto for physics.

Early in 2017, the IOP launched two reports looking at the impact of physics on the economy in Ireland and in Northern Ireland. Physics-based industries contribute more than €38 bn annually to the Irish economy, employing more than 287,000 people, while direct GVA is worth £3.2 bn, a 9.7%

Images (left to right):

Domantus Jagutis, winner of the top Leaving Certificate physics award; A teacher workshop; Sheila Donegan as lady Ranelagh at the Tyndall Lecture; Buskers have fun with flowers at Bloom Festival; Fruity-physics demonstration.

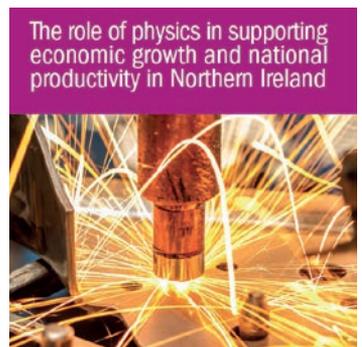
share of Northern Ireland's economy. Given such figures, it has never been more important to ensure the pipeline of well-qualified physicists.

The numbers of students taking physics at Leaving Certificate level has steadily increased in recent years – 13% of the Leaving Certificate cohort in 2016 compared with 12% in 2009 – but the numbers of girls taking the subject remains stubbornly low, at just a quarter of the group. The IOP and Dublin City University is seeking to redress this through a pilot project funded by Science Foundation Ireland. The Improving Gender Balance project will work with six schools using a whole-school approach, which is also being trialed in Scotland and England.

The IOP continued to work closely with organisations such as the Royal Irish Academy, Engineers Ireland, the Institution of Engineering and Technology, Royal Dublin Society and the Royal Society of Chemistry to highlight many issues of common interest, particularly in relation to the uptake of science at school level and the funding of research. IOPI has had a number of meetings with politicians, ministers and senior civil servants on both sides of the Irish border, to both raise concerns and to offer help in implementing possible solutions.

In the upcoming year, IOPI will continue to work closely with its members, teachers, academics, government and business to promote physics and support physicists.

Image top: Students at the Trinity Walton Club.
Middle (left to right): Enda McGlynn, Adam Dempsey, winner of the Earnshaw Award, and Tony Cafolla, all from DCU; professor Dame Jocelyn Bell Burnell with professor Jim Al-Khalili at the Northern Ireland Science Festival; Sheila Gilheany, IOP, with Tom McIver, winner of the top Northern Ireland A-level physics award 2016.
Bottom (left to right): Minister John Halligan speaking at the launch of the physics and the Irish economy report; Eddington's ceolostat on display at the Frontiers of Physics conference for teachers, and the NI economy report.



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