Regional relationships

Last year, STFC’s travelling LHC exhibition captured the imagination of people around the UK. When it visited the regional assemblies and Scottish Parliament, Members were invited to visit CERN and see the real thing. On 20 January, nine elected representatives from Northern Ireland, Scotland and Wales arrived for a visit with a distinctly regional flavour.

Expectations were high on all sides, with Patrick Harvie MSP tweeting “My inner geek is fidgety with excitement!”

VIP visits follow a tried and tested format which starts with a welcome from the Director General and an introduction to CERN focussing on the contribution made by the visitors’ country. The presentation provoked lots of question varying from queries about teacher programmes to a request for an explanation of how the Higgs boson gives matter mass.

Throughout the tours of ATLAS, the Antiproton Decelerator, LHCb and the LHC tunnel, the visitors were accompanied by members of the collaborations from either their own regions or regional universities.

The programme concluded with an informal opportunity to meet early career researchers from the regional universities.

Iain Gray MSP commented afterwards, “The science we saw and heard about is simply awe inspiring, but the impact of the visit was so much greater because of the care in its planning. To meet such senior members of the CERN staff and also so many Scots and students from Scottish institutions as well gave the day a whole different dimension.”
Eluned Parrott AM tweeted about CERN: “Scale of project unimaginable. Amazing what partnerships in science can achieve” and commented that “it was a real pleasure to meet Welsh scientists engaged in research onsite.”

The visit to CERN was part of STFC’s ongoing stakeholder engagement activities, raising the profile of the UK at CERN, the opportunities that membership offers and the benefits that it delivers. The visit has already prompted two Members of the Welsh Assembly to table questions to the First Minister about science strategy, the continuous professional development of science teachers and promotion of CERN in Wales.

**Started local, gone global**

This article is abridged from the January edition of the [CERN Courier](https://www.cern.ch/cern-courier).

Today, the annual Particle Physics Masterclasses for A’ Level students are so well established that they seem always to have been there. As many as 10,000 school students in 37 countries participate each year at an international level. But there was a time when there were no such things as masterclasses in particle physics and they had to be invented.

The original discussion took place at an Institute of Physics (IOP) meeting in 1996 between Ken Long (Imperial) and Roger Barlow (Huddersfield and LHCb).

“We were frustrated at difficulties with outreach – or the public understanding of science, as it was then called – to schools,” says Roger. “Particle physics had a great story to tell, with fine pictures and enthusiastic speakers, but schools were slow to respond to our offers to visit and give talks. Our words and pictures could not compete with the colour and noise of chemists and the experiments they included in their lectures.”

“Over the following weeks a plan developed; rather than go to schools and talk to a dozen pupils, we would invite them to come to us, in university lecture theatres that could accommodate hundreds of people; a full-day event would make the trip worth their while and allow time for a range of topics and activities; we would run the event from local universities but consider it a national event and organize publicity centrally using the IOP; and most important, we would use the new computer clusters that were being installed for undergraduates but not used much outside of university term time.

“...computer clusters could run serious software experiments directly related to real particle physics – participants could learn through doing. The World Wide Web, which was new at that time, could be used for distributing the programs and data. Today, we just point and click, but in the early days we had to be concerned with network speed, so the programs were painstakingly pre-loaded to each PC before the sessions.”

Back at the IOP in January 1997, Ken and Roger presented their plans. The university response was extremely positive.
Unable to provide a big name speaker for each masterclass, Ken and Roger decided to video talks by Stephen Hawking and Frank Close delivered at the IOP High Energy Particle Physics Conference in 1997. The videos would be shown at each masterclass.

Meanwhile, Terry Wyatt (Manchester and ATLAS) was developing the web-based software ‘Identifying interesting events at LEP’. The package was revolutionary in that it gave school students real particle physics data and real tools, and asked them to make decisions. Presented with simple Z decays from the OPAL experiment at CERN’s Large Electron–Positron (LEP) collider, the students had to classify them as electron, muon, tau or quark decays, according to the patterns in the detector. The only difference from actual analysis was that such a classification would not be done by a physicist, but by a program using criteria devised by a physicist.

“The basis for the masterclasses was ‘Think globally, act locally’,“ explains Roger. “It was a national campaign – we always specifically referred to it as the National Particle Physics Masterclass – with central publicity and preparation of materials. However, the shows were run by local groups, in their own way and with local variations.”

The pilot events went well and the idea snowballed - in 1998 nearly every university particle physics group in the UK ran a masterclass, and have done ever since. The STFC Rutherford Appleton and Daresbury Laboratories joined a year or so later.

Now organised by the International Particle Physics Outreach Group, the masterclasses have adapted with time; the LEP events were replaced by ones from the Tevatron and then the LHC; they have spread to continental Europe and across the Atlantic, and technology has evolved. What remains the same is the enthusiasm of the physicists who run the events. Roger estimates that tens of thousands of students have participated - student demand consistently outstrips the availability of places.

Applications to study physics in UK universities are rising and undoubtedly the particle physics masterclass programme can take some of the credit.

Check out the following links for more information on either the **UK** or **international** particle physics masterclass programmes.

**Spicing up ISOLDE**

UK users of CERN’s ISOLDE nuclear physics facility have just returned from an extremely successful trip to India.

India recently joined the ISOLDE facility and the visit was made possible through funding from the Royal Society and India’s Department of Science and Technology specifically aimed at fostering scientific collaboration between the UK and India. The objective was to look at how researchers in the two countries can work together on topics related to the physics programme at ISOLDE.

The three-day seminar provided an opportunity to exchange information about the latest research at ISOLDE and in India, and involved 20 physicists from facilities across India together with Peter Butler (Liverpool), Phil Woods (Edinburgh), Andrei Andreyev and David Jenkins (York), and Thomas Cocolios (Manchester).

![A brief break from discussions: (L to R) Phil Woods, Bivash R. Behera, David Jenkins, Thomas Cocolios, and Peter Butler © T E Cocolios](image)

Discussions were focussed on synergies between ISOLDE and the Indian research institutes. One area for collaboration is laser
spectroscopy, used on ISOLDE’s CRIS beamline. The CRIS team has limited beam time and therefore needs to be very efficient in scheduling technology development around the experiments. The Bhabha Atomic Research Centre in Mumbai has a suite of atomic physics labs where the team could work with Indian scientists to develop their laser spectroscopy techniques off-line, before using it at CERN.

Another area for immediate collaboration is fission. Andrei Andreyev’s area of research looks at fission in exotic systems. There is no facility anywhere in the world that can provide every isotope that is of interest to him together with a full suite of detector arrays, and Andrei has almost exhausted the range of isotopes at CERN. The Indian institutes can provide the isotopes, and Andrei’s research will, in turn, broaden the physics programme in India.

There are also opportunities to collaborate on the development of ISOLDE as it becomes HIE-ISOLDE and opens a storage ring for radioactive ions.

There is no doubt that the visit was mutually beneficial – the UK has been able to use its strong leadership role in ISOLDE to showcase the facilities and expertise that the newest member of the facility can offer. Specific work packages are already being put together and collaborations are getting underway.

Charm your quarks!

February is the month of love, so why not tell the world why you love science!

Check out Twitter @STFC_Matters and #lovescience or get passionate with the love-themed posts on the STFC Facebook page.

Beamline for schools – update

The deadline for schools to register for the competition to come to CERN and run their own experiment has passed (see UKNFC issue 35).

455 schools in 60 countries have registered - UK schools represent 10% of the total.

The schools now have until the end of March to submit a detailed proposal for their experiment, and the winner will be announced in May.

***Stop Press***

New Collider for Manchester

The Science Museum has just announced that the Collider exhibition will move to Manchester’s Museum of Science and Industry (MOSI) when it closes in London on 6 May.

Collider © Science Museum, London

The exhibition at the London Science Museum has attracted more than 25,000 visitors in two months.

Collider will be at MOSI from 23 May – 28 September.

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Diary dates

CERN Council – 17-20 March
Collider exhibition in London until 6 May
Collider in Manchester 23 May – 28 September