Reflections on a year at CERN

If you get the chance to take a sabbatical, go for it! That is the clear message from Tara Shears (Liverpool) who is coming to the end of a 12-month sabbatical at CERN.

It is hard to imagine that Tara, always a passionate and enthusiastic advocate for LHCb, the LHC and physics in general, could be even more animated about her work, but she is.

Tara is one of the convenors for LHCb’s QCD, Electroweak and Exotica physics working group. The collaboration is best known as an antimatter experiment but Tara is quick to emphasise that this is just one aspect of its research programme. LHCb’s ability to look beyond the Standard Model, coupled with advances in data analysis, mean that the experiment is well placed to test theories that the other LHC experiments can’t.

“If you’re passionately interested in your research, some part of your day is always ‘at CERN’, even if you’re in the UK”, explains Tara. “But it is very special to be here in person – there is nothing like the magic of being in the middle of everything.”

Tara’s year at CERN began with the announcement of the discovery of the Higgs boson which she describes as “the most momentous day in my entire career.” Like many members of CERN collaborations not directly involved in the search for the Higgs or other scientific breakthroughs, she takes pride in the experimental achievements of her colleagues, “we all understand the challenges and the setbacks, but also admire their ingenuity. The effort required to find the Higgs boson was breath-taking - I’m proud to work with these people.”

One of the major features of CERN’s experimental collaborations is that whatever stage you are at in your career, you can make a contribution. “There is a great combination of young, enthusiastic people with good ideas, experienced researchers to guide them, and theorists to give us interesting things to look for”, says Tara. “The collective drive and enthusiasm make me even more determined to get more physics results out of our data.”

After a year away from Liverpool and from her teaching role, Tara admits to having some mixed feelings about returning. “For my research life, I would love to stay here – it’s like being a post doc again, but with more knowledge and experience, and more chance of making things happen. But I also like working with students – they’re so engaged and interested in the latest news. I’m looking
forward to teaching a new course and I will no doubt increase my own knowledge along the way."

For the University of Liverpool, having a permanent presence at CERN is very important. "It’s more than keeping in touch," explains Tara. "We are really involved and being here means that we can take leading roles in the ATLAS and LHCb experiments.” There are also benefits closer to home; having an established group supports visiting PhD students, and also allows the team to offer a limited number of summer placements for Liverpool undergraduates.

Tara’s sabbatical was supported by a CERN Scientific Associateship and she strongly encourages other academics who are considering a period of research leave to apply, “There are no drawbacks to taking a sabbatical, and the Associateship makes it possible.”

More information about CERN’s Scientific Associateship programme is available on the [CERN web site](http://cern.ch).

**Sounds like science**

The most successful outreach activities are those that take an unexpected topic to an unusual setting, and surprise a new audience. This week CERN will be hosting ‘The music of physics and the physics of music’, a seminar at the Montreux Jazz Festival.

The festival is celebrating its 47th anniversary this year and has become an established feature on the international music scene. Perhaps less-well-known is the programme of free seminars and workshops that run in parallel with concerts by some of the biggest names in music. On the bill alongside Prince (this year’s headline act) are researchers from the ATLAS and CMS collaborations.

Accompanying his talk with music played on his CMS-inspired guitar, Piotr Traczyk (CMS) will speak about the Higgs boson; what the particle is, how it appears in proton collisions at the LHC, and how it fits into the bigger picture of particle physics.

Lily Asquith (Argonne and ATLAS) will introduce the audience to the concept of sonification – the sonorisation of real LHC collisions.

Working with composer Carla Scaletti (University of Illinois) and theorist Michael Kramer (Aachen University), Lily has recently been given permission by ATLAS Spokesperson, Dave Charlton (University of Birmingham) to sonify real data collected by ATLAS, “We’ve been producing sounds such as the two gammas from a Higgs decay - one flying past each ear! At Montreux, I will explain why this is an interesting project for ATLAS data.”

The third presenter is Mark Lewney. After completing his PhD in guitar acoustics and winning the first Fame lab science communication competition, Mark now tours schools with his ‘Rock Guitar in 11 Dimensions’ lecture, explaining the physics of rock via riffs from Vivaldi to AC/DC.

Bill Fontana, American sound sculptor and winner of the second Prix Ars Electronica Collide@CERN will also be at Montreux to talk about his plans to create works of art from the sounds of the LHC.

Physics has never sounded so good!

*Lily’s original project, ‘LHC Sound – the sound of science’ was funded in 2010 by STFC.*
Young prizewinners visit CERN

The UK’s young scientist and young engineer of the year have visited CERN as part of their prizes for winning the UK National Science and Engineering Competition.

Fred Turner was named UK Young Engineer of the Year. Fascinated by the fact that both his mum and younger brother have red hair, but his is brown, Fred wanted to take a closer look at the differences in their genes. With the equipment required to carry out these investigations, a polymerase chain reaction (PCR) machine, costing around £3K, Fred decided to build his own.

At CERN, Fred had the chance to build a cloud chamber as well as going underground to see the CMS experiment and joining the summer students for several of their introductory lectures.

Emily O’Regan, the UK Young Scientist of the Year, studied the breeding habits of a flock of captive Chilean flamingos at the Washington Wetland Centre in Tyne and Wear. The flamingos had stopped breeding and Emily’s project aimed to find out why. She discovered that not only was there a correlation between temperature and breeding levels, but also that the flamingos’ mating habits changed when the local population of seagulls increased.

Emily’s visit to CERN was quite a revelation, “I’m not studying physics but I’ve learnt so much. Zoology is my main passion but I’ve realised that other areas of science are more interesting than I thought.”

She also made an interesting observation, “Physicists nurture their machines just as carefully as zoologists look after their animals!”

The highlight of Emily’s visit was an underground tour of ATLAS, “it’s enormous and I’m so glad that I got the chance to see it. When I get back I’m going to suggest to the science faculty [at Newcastle College] that they take the students over to CERN and see what’s really going on in physics!”

People News

Antonella de Santo, Head of Experimental Particle Physics at University of Sussex has just been appointed the university’s first female professor of physics. She leads the university’s group on the ATLAS experiment.

Antonella de Santo
© University of Sussex

“Working on the LHC and the discovery of the Higgs boson was a life-changing experience,” says Antonella, “and I feel very privileged to be in a generation of physicists who have witnessed this change in what we know about nature and the Universe.”

Antonella is keen to inspire the next generation of physicists and especially to encourage more girls to consider studying the subject - she cites former ATLAS spokesperson Fabiola Gianotti as her own role model.

“My advice to any young woman considering a physics degree, or a career in science would be – do not let anyone tell you that science is not for you. If that’s your dream, don’t ever let go of it.”

How to subscribe

To subscribe to (or unsubscribe from) UK News from CERN, please contact Jill Little.

Back issues of UK News from CERN are available from the archive.

Diary dates

- CERN Council – 16-20 September
- CERN public open days – 28 and 29 September
- STFC Public Engagement Symposium -25 November
- CERN Council – 9 – 13 December