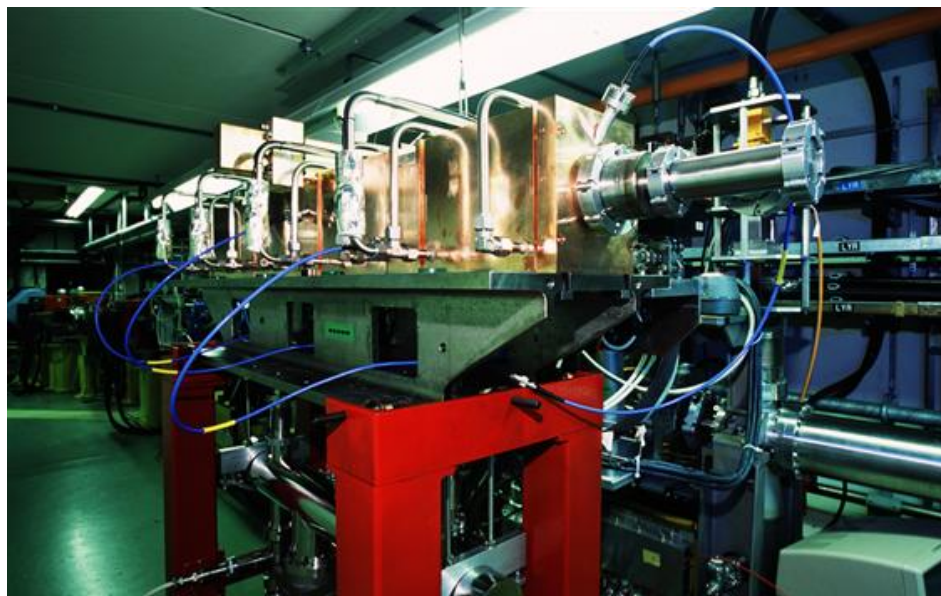


Thirty years of the TERA Foundation

On 15 September 1992, the TERA Foundation was established in Novara, Italy. Exactly 30 years later, a symposium was held at CERN to review its contributions to hadron therapy



The Linac Booster (LIBO), a prototype accelerator for medical applications built at CERN by a CERN-INFN-TERA collaboration, first demonstrated the effectiveness of linear accelerators in treating cancerous tumours with hadrons. (Image: CERN)

The Piazza Navona is home to one of Rome's most famous landmarks: the fountain of the four rivers. As well as being a beautiful work of art, Bernini's masterpiece has also served as a guiding light to me: I see science, in particular CERN science, at the centre, with the four rivers issuing from it representing the benefits that science brings to society in terms of knowledge, people, methods and technologies. Since the establishment of TERA we have endeavoured, in collaboration with CERN and INFN scientists and engineers, to keep all four streams flowing in the field of tumour radiation therapy, bringing

benefits to society as a whole. Among the guiding principles I brought to TERA, I owe one to my father. I was just beginning my physics studies in 1952 when he became Secretary-General of the Conseil Européen pour la Recherche Nucléaire, charged with steering today's CERN into being. I remember his profound conviction that the nascent laboratory should pursue two accelerator projects ...

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Ugo Amaldi

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A new step on the path towards gender equality at CERN

This summer, an additional step has been taken by the Management on the path towards gender equality and the promotion of diversity, aligning CERN with European standards.

The Enlarged Directorate has endorsed CERN's work on gender equality as constituting a Gender Equality Plan (GEP), as defined by the European Commission. A new webpage (<https://cerneu.web.cern.ch/gep>), developed by the Organization's Diversity and Inclusion (D&I) and EU Projects Offices, provides a summary of the growing catalogue of activities that CERN has put in place to promote and celebrate diversity and inclusion in the workplace. As of this year, instituting a GEP or equivalent is a requirement for an organisation to be eligible for funding under the European Union's Horizon Europe programme.

The European Commission defines a GEP as a set commitments and actions that aim to promote gender equality in an organisation through a process of structural change. It must provide for sufficient dedicated resources and

expertise in gender equality, and it must be informed by the collection and analysis of sex-disaggregated personnel data, with annual reporting. Awareness-raising and training activities on gender equality and unconscious gender biases must be included for staff and decision-makers, and it must take the form of a publicly available document endorsed by the top level of management. It is a sign of CERN's commitment to D&I that CERN had already fulfilled all of these criteria, with the exception of the final step, before they were made a formal requirement for Horizon Europe funding.

CERN appointed its first Equal Opportunities Officer in 1996, and our D&I programme was established in 2011. Since then, many actions and activities have been launched that go a long way towards fulfilling the requirements for a GEP: most recently, the 25 by '25 initiative. With the Enlarged Directorate's endorsement

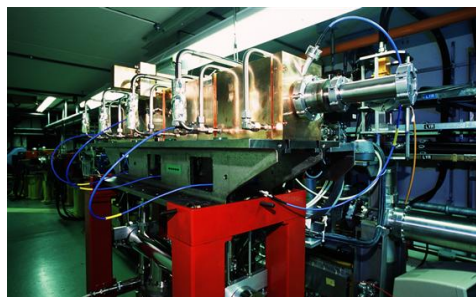
this summer, followed by publication on a dedicated webpage, CERN's gender equality actions now constitute a GEP for the purposes of Horizon Europe.

The CERN Directorate is very pleased and supportive of the fact that CERN is playing its part in this important area. Diversity is key to this organisation's success, and we encourage you all to familiarise yourselves with the work being done. You'll find a summary here (<https://cerneu.web.cern.ch/gep>) and, if you're interested in learning more about Horizon Europe's gender equality requirements, you'll find all you need to know at the European Institute for Gender Equality's webpages (<https://eige.europa.eu/gender-mainstreaming/toolkit/s/gear/what-gender-equality-plan-gep>).

Raphaël Bello

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The Linac Booster (LIBO), a prototype accelerator for medical applications built at CERN by a CERN-INFN-TERA collaboration, first demonstrated the effectiveness of linear accelerators in treating cancerous tumours with hadrons. (Image: CERN)

The Piazza Navona is home to one of Rome's most famous landmarks: the fountain of the four rivers. As well as being a beautiful work of art, Bernini's masterpiece has also served as a guiding light to me: I see science, in particular CERN science, at the centre, with the four rivers issuing from it representing the benefits that science brings to society in terms of knowledge, people, methods and technologies. Since the establishment of TERA we have endeavoured, in collaboration with CERN and INFN scientists and engineers, to keep all four streams flowing in the field of tumour radiation therapy, bringing benefits to society as a whole.

Among the guiding principles I brought to TERA, I owe one to my father. I was just

beginning my physics studies in 1952 when he became Secretary-General of the *Conseil Européen pour la Recherche Nucléaire*, charged with steering today's CERN into being. I remember his profound conviction that the nascent laboratory should pursue two accelerator projects in parallel: one conservative in order to get a research programme under way quickly, the other altogether more innovative. Those two machines became the Synchrocyclotron and the Proton Synchrotron – in terms of what had gone before, the LHC of its day.

At TERA we also adopted *conservative* and *innovative* paths. To treat radioresistant tumours with carbon ions, we chose a conventional synchrotron. Our more ambitious goal was for proton therapy using a novel 3 GHz linear accelerator. Two more guidelines we adopted from the start were *collaboration* and *documentation*, whose value I learned as spokesperson of the DELPHI collaboration for 13 years.

As well CERN and INFN, we also worked with the GSI and PSI laboratories, and with many institutes, hospitals and learned societies. Over the years we distributed more than 200 TERA Reports and four books named for the colour of their covers: green, blue, red and white. To complete the series, the contributions to this year's symposium will be published in a silver book.

The TERA story goes back to 1990, when I was invited by a young man called Gaudenzio

Vanolo, a science communicator, to give a talk in Novara. With Giampiero Tosi, a medical physicist of great renown, we went on to publish a note entitled *Per un Centro di Teleterapia con Adroni*. That was in May 1991 and, in August, I had the chance to discuss the idea with Nicola Cabibbo, President of INFN, who was attending a conference in Geneva. As a result, a new INFN group called ATER was established in Milan, but with a budget only for travel, not for people. It was a start.

Vanolo went on to play a big part in TERA. He had the idea of creating a foundation to gather funds to pay the people who would do the research, and the founding document of the foundation bears his signature alongside those of Elio Borghonovi, Giampiero Tosi and myself. Vanolo took on the role of Secretary-General, and the board was later joined by Roberto Orecchia, an internationally known radiation oncologist and one of the keynote speakers at the anniversary symposium. The others were Manuela Cirilli, Marco Durante, Fabio Sauli and Maurizio Vretenar.

The network rapidly grew, with notable members including Börje Larsson of PSI. Together we organised the first International Conference on Hadrontherapy in Como in October 1993. I am pleased to say that the proceedings – edited by Larsson and myself and published in 1994 as *Hadrontherapy in Oncology* – are still a reference in the field.

Funding was always a challenge. Vanolo and I devoted much time to finding sponsors, in

particular foundations and wealthy individuals. Our efforts were not in vain: in thirty years we have allocated some €30 million, mainly to support fellowships and salaries for over 150 young engineers and physicists. The first step came in 1992, thanks to Franco Bonnaudi and Romeo Perin, who convinced the *Associazione per lo Sviluppo del Piemonte* in Turin to give a fellowship to Gianluigi Arduini, who would go on to play a significant part – together with Marco Silari and Sandro Rossi, the first two Technical Directors – in the design of the Italian National Centre for Oncological Hadrontherapy (CNAO). A second important step came in 1995, when Meinhard Regler and I found sufficient support in the CERN Directorate, notably from Horst Wenninger and Kurt Hübner, for the Proton-Ion Medical Machine Study (PIMMS), to be launched under the direction of Phil Bryant. This proved transformative for the synchrotron part of TERA's dual ambition, forming the basis of designs for CNAO, in Pavia, and for MedAustron in Austria.

CNAO was TERA's main activity until 2000, when Umberto Veronesi, a famous oncologist from Milan, who had supported our efforts from the start, became science minister. He issued a decree establishing CNAO as a foundation, and made significant construction funds available. By 2003, TERA's CNAO design was complete, and the TERA Foundation transferred 21 people to CNAO, providing the

core of its technical construction and operations group.

The conservative part of TERA's initial mission was complete, and it was time to focus on the more challenging part: 3 GHz linacs for both proton and carbon ion therapy. What makes a linac interesting for cancer therapy is that it's possible to vary the energy of the beam every few milliseconds. This means that tumours can be rapidly scanned in depth as well as in breadth in a way that circular machines cannot do. I first had the idea of using linacs for therapy in 1993, but it was not until 2001 that a TERA-CERN-INFN collaboration, led by Mario Weiss, demonstrated the principle with the Linac Booster (LIBO) project.

Building on LIBO, a start-up company, ADAM, was established in 2007 by Alberto Colussi in Geneva, and taken over in 2013 by the UK company Advanced Oncotherapy (AVO). As for CNAO, TERA also provided people to form the core group of ADAM. Today, AVO is pursuing this technology by building the dedicated Linac for Image-Guided Hadron Therapy (LIGHT), based on a prototype tested at CERN, at the UK's Daresbury Laboratory. On 27 September, LIGHT achieved a full-energy 230 MeV beam, and the University Hospitals Birmingham NHS Foundation Trust is now preparing a treatment room to receive its first patients next year.

Further ahead, there are many developments on the horizon. The facilities we were

designing for cancer therapy can also be used for the treatment of cardiac arrhythmia. In 2010, when I thought of this idea, I discovered that I was not the first: Douglas Packer of the Mayo Clinic had been talking about it for some time. Collaboration ensued, and today in Geneva another start-up, EBAMed – partnered with the Mayo Clinic – is developing technologies to treat its first arrhythmia patients in 2024. Adriano Garonna, TERA Technical Director from 2016 to 2018, is the Chief Technical Officer of this initiative. In the meantime, CNAO is the first centre in the world to have treated an arrhythmia patient with protons. I'm convinced that in another 30 years, there will be more proton machines for arrhythmia than for cancer therapy.

A new PIMMS, called NIMMS – the N stands for New – has recently been launched under the leadership of Maurizio Vretenar. And there are plans to build a centre for hadron research and therapy, SEEIIST, in south-east Europe, based on the CERN model of international collaboration – TERA has contributed greatly to its conceptual design. All in all, I am happy with TERA's legacy so far, and I look forward to much more still to come.

Full details of the symposium can be found here: <https://indico.cern.ch/event/1184432/> (<https://indico.cern.ch/event/1184432/>).

Ugo Amaldi

Happy 25th birthday, IPPOG!

Created in 1997, the International Particle Physics Outreach Group today plays a key role in disseminating the goals and accomplishments of particle physics research to the public worldwide



"The particle physics community has a moral obligation to inform the public on its activities. To do this well, experiences must be shared among countries in view of the need to optimise the use of resources." With these words, former CERN Director-General Chris Llewellyn-Smith launched the European Particle Physics Outreach Group (EPOG) on 19 September 1997.

Little did he know at the time how much more we would accomplish. Today, the aptly renamed International Particle Physics Outreach Group (IPPOG (<https://ippog.org/>)) is a collaboration of particle physicists, communication experts and educators dedicated to disseminating the goals and accomplishments of our research to the public.

IPPOG audiences range from schoolchildren to college graduates and teachers, from the

visiting public to heads of state, and we engage them in classrooms, laboratories, festivals and government offices across the planet. The activities we use to reach these diverse audiences include public lectures, visits, games, exhibits, books, online apps and pretty much anything else that can be used to demonstrate scientific methodology and instil appreciation for fundamental research.

The first meeting, chaired by Professor Frank Close of Oxford University, was attended by representatives of the CERN Member States, the LHC experiments, CERN and DESY. Their goal was to provide a forum for the sharing of effective material and best practices in particle physics education and outreach. Twice-annual meetings were set up at CERN and EPOG reported each year to the European Committee for Future Accelerators (ECFA) and the high-energy physics branch of the European Physical Society.

In the following decades, the group's global reach expanded significantly. Key to this was the development of the International Masterclasses in Particle Physics (IMC), a programme in which students are invited to local institutions and given the chance to be scientists for a day. Lab visits and short lectures by active researchers are followed by hands-

on courses allowing the students to analyse real data from current experiments. The day concludes with videoconferences between groups of participants to share their experiences and their results.

Masterclasses are one of our most effective tools for engaging with society. – Pedro Abreu, IPPOG co-chair

Other worldwide programmes, such as International Cosmic Day, International Muon Week and Worldwide Data Day, coordinated with partners that include DESY in Germany, INFN in Italy and QuarkNet in the USA, reach a wide variety of students and are growing every year. The Global Cosmics portal on the IPPOG website provides access to projects distributing cosmic ray detectors and/or data into classrooms.

These international programmes now reach tens of thousands of students and teachers located in classrooms around the world. To ensure support for their growth, IPPOG became an official international collaboration, complete with a memorandum of understanding (MoU), in 2016. Today, the collaboration comprises 39 members (32 countries, 6 experiments and CERN) and two associate members (DESY and GSI). Each member, by signing the MoU,

commits to supporting particle physics outreach at home and worldwide.

Education and public engagement are essential tools to our field, not only because they make us better scientists, but because they are necessary to gain the public's trust, train the next generation of scientists and secure the support we will need for our field's future.

– Contributed by IPPOG co-chairs Pedro Abreu (LIP, IST) and Steven Goldfarb (U. Melbourne)

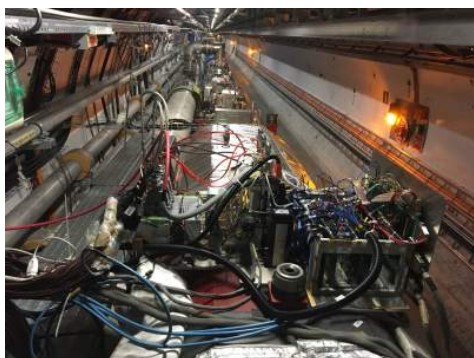
On 26 October, IPPOG, in collaboration with Women in Technology (<https://wit-hub.web.cern.ch/>) (WIT), will host a masterclass in particle physics designed for people working at CERN who have little or no scientific background. More information and registration on the Indico

page: <https://indico.cern.ch/e/ippog/Special-Particle-Physics-Masterclasses> (<https://indico.cern.ch/e/ippog/Special-Particle-Physics-Masterclasses>).

- On 29 October, IPPOG will celebrate its 25th anniversary with a symposium at CERN's Globe of Science and Innovation. More information and registration on the Indico page: <https://indico.cern.ch/e/ippog25> (<https://indico.cern.ch/e/ippog25>).

LHCf continues to investigate cosmic rays

LHCf has completed its first data-taking period during LHC Run 3, taking advantage of the record 13.6 TeV collision energy. This coincides with the machine's record fill time of 57 hours



One of the LHCf detectors (Image: CERN)

Millions of cosmic rays bombard the Earth's atmosphere every second. These are naturally-occurring particles from outer space, which are extremely difficult to detect and measure. When they collide with nuclei in the upper atmosphere, these so-called primary cosmic rays produce showers of secondary cosmic rays that go on to reach the ground. The Large Hadron Collider forward (LHCf (<https://home.cern/science/experiments/lhc-f>)) experiment, one of the smallest of the LHC (<https://home.cern/science/accelerators/large-hadron-collider>) experiments, was set up to thoroughly investigate these elusive particles when LHC operation first began. This week, it resumed its studies of the properties of cosmic rays, in a five-day data-taking run, following the

completion of upgrades to the detector during the second long shutdown of the machine.

"When page one (<https://op-webtools.web.cern.ch/vistar/vistars.php>) of the LHC showed that the LHC was being filled for the LHCf data taking, we were very excited," says Oscar Adriani, deputy spokesperson for LHCf.

This is LHCf's first data-taking run at the LHC's record collision energy of 13.6 TeV. The run also coincided with the record time that the LHC has been able to keep a fill without restarting, namely a total period of 57 hours. Running for longer means more efficient periods of data-taking for the experiments.

Primary cosmic rays can have very high energies – above 10^{17} eV – similar to those of the high-energy collisions that are produced in the LHC. Located 140 m from the ATLAS (<https://home.cern/science/experiments/atlas>) collision point of the LHC and measuring only 20cm by 40cm by 10cm, LHCf analyses neutral particles that have been thrown forward by collisions, mimicking the production of secondary cosmic rays in the Earth's atmosphere. The experiment is able to analyse neutral particles because they are not deflected by the LHC's strong magnetic field, and can measure their properties with extremely high precision.

This five-day run is likely to be the final LHCf run involving proton-proton collisions, because

in the next data-taking period of Run 3 the collaboration hopes to study proton-oxygen collisions that better emulate the interaction of primary cosmic rays with the Earth's atmosphere.

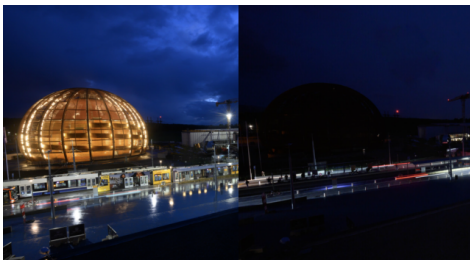
With the higher energy and higher statistics that Run 3 provides, LHCf is particularly looking out for particles (<https://home.cern/science/physics/standard-model>) called neutral kaons and neutral eta mesons. These are made up of a quark and an antiquark pair, including a strange quark. "The models that predict interaction with the atmosphere predict a certain number of secondary muons, but there is a mismatch between the expected and the detected numbers of muons," explains Adriani. "By measuring the strange component produced at the LHC, we may be able to solve this muon puzzle."

The LHC, with its high energy and controlled environment, provides the perfect place to simulate and study the hadronic interactions of cosmic rays. "High energy cosmic rays are still a mystery. They are very difficult to measure. You need huge detectors, and you cannot perform direct measurements while they are in orbit because the flux is too small," continues Adriani. "So, LHCf is really the only experiment in the world that can shed some light on these interactions at very, very high energy. This is a critical element for cosmic ray physicists."

Naomi Dinmore

CERN supports the La nuit est belle! initiative for the third year running

The clouds may have stymied the CERN astronomy club's planned stargazing event, but the switch-off of all public lighting made the night more beautiful.



La nuit est Belle 2022 - Esplanade des particules with and without public lighting (Image: CERN)

On 23 September, for the third year running, CERN joined Greater Geneva in turning off its public lighting as part of the *La nuit est belle* (<https://www.lanuitestbelle.org/>) initiative.

Friday night's cloudy skies forced the CERN astronomy club (<https://astro.web.cern.ch/>) to cancel the event it had planned to mark *La nuit est belle au CERN*. However, CERN still played its part in the initiative by switching off the lights of the Globe, the Esplanade des Particules, Gates A, B, C and E and the roads and car parks of the Meyrin, Prévessin, LHC

and SPS sites. The lights remained switched off throughout the evening and night.

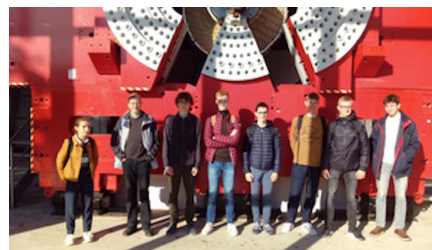
The aim of *La nuit est belle!* (<https://www.lanuitestbelle.org/>) is to educate the public about the impact of light pollution caused by excessive artificial lighting. 187 of Greater Geneva's 209 *communes* took part in this third edition of the event, which was on the theme of energy saving. Residents, shopkeepers and companies followed suit.

2022 Beamline for Schools winners at CERN and DESY

On 21 September, the winners of the 2022 Beamline for Schools competition arrived at CERN and DESY to start their experiments



The STA team from the Elsewedy Technical Academy (Egypt) on their arrival at CERN. (Image: CERN)



The Supercooling team from the École du Sacré-Coeur (France) on their arrival at DESY. (Image: CERN)



The Fermi team from the Enrico Fermi Physics Club (Spain) during a visit to Geneva. (Image: CERN)

On 21 September, the winners of the 2022 Beamline for Schools (<https://beamlineforschools.cern/>) competition arrived at CERN and DESY to start their experiments. This group of brilliant high-school students is spending two full weeks at test-beam facilities to perform the experiments that they designed for the competition.

Following the successful collaboration between CERN and DESY during the long shutdown of the CERN accelerator complex, in 2022 it has been possible to expand the competition and to invite two teams to Switzerland and one to Germany.

The teams performing their experiments at CERN come from the Elsewedy Technical Academy in Cairo, Egypt, and the Enrico Fermi Physics Club in Vigo, Spain. The team invited to DESY comes from the *École du Sacré-Coeur* in Reims, France.

Beamline for Schools is an education and outreach project funded by the CERN & Society Foundation (<https://cernandsocietyfoundation.cern/>) and supported by individual donors, foundations and companies.

Data privacy: emails = postcards

An easy way of reducing security risks with personal data is to use CERNBox, regardless of whether you're sending data to recipients inside or outside CERN

EMAILS

Emails are like postcards, be careful!

✉ Data Privacy

✉

Emails can be read by many people.

✉

Use CERNBOX to share data - within or outside CERN

✉

Remember that emails can be automatically redirected to another mailbox!

(Image: CERN)

Would you send your credit card details on a postcard? Probably not! It wouldn't be secure as the postcard would, of course, pass through a number of hands before reaching its recipient and could be read by anyone.

Transmitting personal data by email may run similar risks depending on the mail client used

by the recipient and their mail forwarding behaviours, an issue previously covered in the computer security article series ([https://security.web.cern.ch/training/en/CERN Articles On Computer Security.pdf](https://security.web.cern.ch/training/en/CERN%20Articles%20On%20Computer%20Security.pdf)) (see *Forwarding can spoil privacy* (<https://home.cern/news/news/computing/computer-security-forwarding-can-spoil-privacy>) or *Email equals letters* (<https://computing-bl.org.web.cern.ch/2022/04/computer-security-email-equals-letters/>)).

So, what's the solution?

An easy way of reducing security risks with personal data is to use CERNBox (<https://cernbox.cern.ch/index.php/apps/files/?dir=/&>), regardless of whether you're sending data to recipients inside or outside CERN. Not familiar with CERNBox? Check out the CERNBox user manual (<https://cernbox-manual.web.cern.ch/cernbox-manual/en/>) and the related training course (https://lms.cern.ch/ekp/servlet/ekp?PX=N&TEACHREVIEW=N&PTX=&CID=EKP000043820&TX=FORMAT1&LANGUAGE_TAG=en&DECORATEPAGE=N) in the CERN Learning Hub.

As a reminder, CERN takes the processing of your personal data very seriously and applies the principles of its Data Privacy Protection Policy through Operational Circular no. 11, "The Processing of Personal Data at CERN".

More information on data privacy at CERN can be found on the ODP website (<https://privacy.web.cern.ch/>) or obtained from your Departmental Data Privacy Coordinator. (<https://privacy.web.cern.ch/contacts>)

Office of Data Privacy

Download the poster of this awareness campaign on: <https://cds.cern.ch/record/2826925/files/Email-Postcard%20Campaign.pdf>.

CERN openlab trains next generation of computing experts

For the first time since the start of the COVID-19 pandemic, the CERN openlab summer students returned to CERN to work hands-on with cutting-edge computing technologies



The 2022 CERN openlab Summer Student programme involved 32 students from 19 countries. (Image: CERN)

In July and August, 32 students came to CERN to work hands-on with cutting-edge computing technologies through the CERN openlab Summer Student programme. Last week, the students presented their projects in a series of five-minute "lightning talks".

CERN openlab is a unique public-private partnership, through which CERN collaborates with leading technology companies – including Intel, Oracle, Siemens, Micron, Google and IBM – to accelerate innovation in the computing technologies needed by its research community. Today, over 30 joint R&D projects are being carried out at CERN through CERN openlab.

Education and training are important parts of CERN openlab's mission. Thus, each year, the companies participating in CERN openlab sponsor a nine-week summer-student programme. The selected students participate in a series of lectures (available free and

online here (https://www.youtube.com/playlist?list=PL6583_bOAHxYEv4SWFykqbA2kIBFUb12U)), visit different parts of the Laboratory and work on projects guided by IT experts at CERN. This year, projects addressed technologies such as quantum computing, supercomputing, machine learning and open data.

"During their stay at CERN, the students are immersed in an environment of cutting-edge technology and innovative thinking," says Enrica Porcari, head of the CERN IT department. "They also bring fresh ideas and approaches to the teams they work with at CERN."

32 students from 19 countries were selected for the 2022 CERN openlab Summer Student programme, from 1770 applications. Their five-minute "lightning talks" summarising their projects can be accessed here: <http://cern.ch/go/n9Mr> (<http://cern.ch/go/n9Mr>) and <http://cern.ch/go/t6fX> (<http://cern.ch/go/t6fX>). A panel of judges scored the talks, with the top three students receiving prizes from CERN. The top three were as follows:

1st place: Kane Bruce (USA), 'EOS continuous integration improvements (ARM64, Ubuntu, OpenSUSE)'.

2nd place: Jay Patel (India), 'Generative models using Continuous Variable Quantum Computing'.

3rd place: Leyla Naz Candogan (Turkey), 'Boosting online recalibration of physics objects for the 40 MHz scouting demonstrator system at CMS' (<https://indico.cern.ch/event/1191489/contributions/5011706/attachments/2507>

831/4309634/Leyla Naz Candogan - Lightning Talk.pdf').

This year's summer students were also joined by the winners of two recent competitions. Jay Patel, a computer-engineering student from India, was awarded a place in the programme as a prize for having won the QHACK quantum machine-learning hackathon in February. Three other prize winners from the QHACK also came to CERN for a special week-long visit in July. "I was amazed by the work environment at CERN," says Patel. "I really felt welcomed and, after doing a master's in quantum computing, I would love to go back and work at CERN."

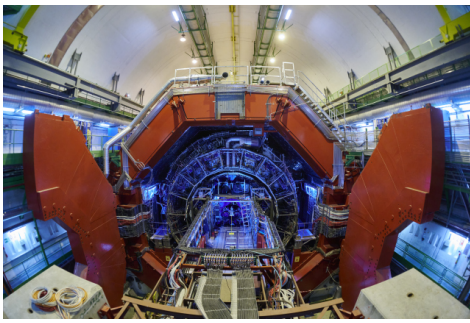
Eugenio Marinelli came to CERN after winning the oneAPI Great Cross-Architecture Challenge (<https://techdecoded.intel.io/resources/winners-announced-for-the-oneapi-great-cross-architecture-challenge/#gs.cfxn7a>), organised by Intel with support from CERN and Argonne National Laboratory in the US. He used the set of cross-architecture libraries found in the oneAPI toolkit to develop a new application for quickly and accurately decoding digital data stored in synthetic DNA. "My experience at CERN was very good," says Marinelli, who is now studying for a PhD at EURECOM in France. "I particularly enjoyed being exposed to the international environment at the Laboratory."

Applications for the 2023 CERN openlab Summer Student programme will open in November.

Andrew Purcell

ALICE pins down hypermatter properties

The collaboration's latest study of a "strange", unstable nucleus known as the hypertriton offers new insight into the particle interactions that may take place at the hearts of neutron stars



The ALICE detector (Image: CERN)

The international ALICE (<https://home.cern/science/experiments/alice>) collaboration at the Large Hadron Collider (<https://home.cern/science/accelerators/large-hadron-collider>) (LHC) has just released (<https://arxiv.org/abs/2209.07360>) the most precise measurements to date of two properties of a hypernucleus that can provide valuable insight into what the cores of neutron stars could be like.

Atomic nuclei and their antimatter (<https://www.google.com/search?client=safari&rls=en&q=ce rn+antimatter&ie=UTF-8&oe=UTF-8>) counterparts, known as antinuclei, are frequently produced at the LHC in high-energy collisions between heavy ions or protons. On a less frequent but still regular basis, unstable nuclei called hypernuclei are also formed. In contrast to normal nuclei, which comprise just protons and neutrons (that is, nucleons), hypernuclei are also made up of hyperons – unstable particles containing quarks of the strange type.

Almost 70 years since they were first observed in cosmic rays (<https://home.cern/science/physics/cosmic-rays-particles-outer-space>),

hypernuclei continue to fascinate physicists because they are rarely produced in the natural world and, although they are traditionally made and studied in low-energy nuclear-physics experiments, it's extremely challenging to measure their properties.

At the LHC, hypernuclei are created in significant quantities in heavy-ion collisions, but the only hypernucleus observed at the collider so far is the lightest hypernucleus, the hypertriton, which is composed of a proton, a neutron and a Lambda – a hyperon containing one strange quark.

In their new study, the ALICE team examined a sample of about one thousand hypertritons produced in lead–lead collisions that occurred in the LHC during its second run. Once formed in these collisions, the hypertritons fly for a few centimetres inside the ALICE experiment before decaying into two particles, a helium-3 nucleus and a charged pion, which the ALICE detectors can catch and identify. The ALICE team investigated these daughter particles and the tracks they leave in the detectors.

By analysing this sample of hypertritons, one of the largest available for these “strange” nuclei, the ALICE researchers were able to obtain the most precise measurements yet of two of the hypertriton's properties: its lifetime (how long it takes to decay) and the energy required to separate its hyperon, the Lambda, from the remaining constituents.

These two properties are fundamental to understanding the internal structure of this hypernucleus and, as a consequence, the nature of the strong force that binds nucleons and hyperons together. The study of this force is not only interesting in its own right but can also offer valuable insight into the particle

interactions that may take place in the inner cores of neutron stars. These cores, which are very dense, are predicted to favour the creation of hyperons over purely nucleonic matter.

Measurements of the hypertriton's lifetime performed with different techniques over time, including ALICE's new measurement (red). The horizontal lines and boxes denote the statistical and systematic uncertainties, respectively. The dashed-dotted lines represent different theoretical predictions. (Image: ALICE collaboration)

The new ALICE measurements indicate that the interaction between the hypertriton's hyperon and its two nucleons is extremely weak: the Lambda separation energy is just a few tens of kiloelectronvolts, similar to the energy of X-rays used in medical imaging, and the hypertriton's lifetime is compatible with that of the free Lambda.

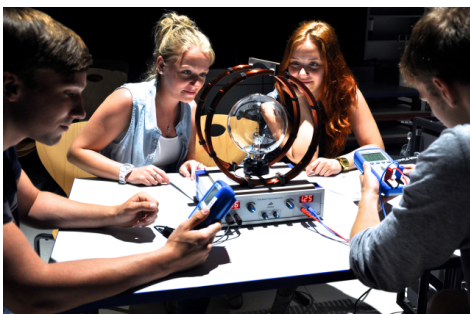
In addition, since matter and antimatter are produced in nearly equal amounts at the LHC, the ALICE collaboration was also able to study antihypertritons and determine their lifetime. The team found that, within the experimental uncertainty of the measurements, antihypertriton and hypertriton have the same lifetime. Finding even a slight difference between the two lifetimes could signal the breaking of a fundamental symmetry of nature, CPT symmetry.

With data from the third run of the LHC, which started in earnest this July, ALICE will not only further investigate the properties of the hypertriton but will also extend its studies to include heavier hypernuclei.

ALICE collaboration

CERN and Solvay launch STEM education programme for high school students

The three-year programme combines online learning and a residential camp at CERN, aimed at fostering interest in STEM across the world



The three-year programme combines online learning and a residential camp at CERN (Image: CERN)

CERN and Solvay, a Belgian science company, today announced the launch of the CERN-Solvay education programme. The three-year partnership, developed by these two leading scientific organisations, aims to inspire young

people around the world to get involved in science, technology, engineering and mathematics (STEM) subjects and aspire to related careers. It will form part of the education portfolio of Science Gateway, (<https://sciencegateway.cern/discover>) CERN's new flagship project for science education and outreach due to open in summer 2023.

The (<https://corporate-citizenship.solvay.com/corporate-citizenship/fostering-education/cern>) programme (<https://solvay-education-programme.web.cern.ch/>) combines remote and onsite learning, allowing students to engage with the field of particle physics and explore its link to understanding the universe. Operating under the slogan “Discover your inner scientist: there are no limits to what you can explore,” the programme includes hands-on online experiments intended to demonstrate that science is accessible to anyone, no matter their age or academic experience. Students

will also have the opportunity to explore scientific topics connected with CERN's research and to work on a research project in an authentic STEM workplace at one of the world's leading centres for scientific research.

“As a centre of scientific excellence and a cradle of technology and innovation, CERN is a source of inspiration for physicists and aspiring-physicists around the world, no matter their age, gender or culture,” said Fabiola Gianotti, Director-General of CERN. “This partnership with Solvay will encourage young people to pursue careers in STEM, by giving them the chance to engage more deeply with the work we are doing at CERN and enjoy a unique learning experience that could profoundly shape their future careers.”

“At Solvay, we believe that STEM education has a crucial role to play in reinventing progress. It is by encouraging students’

enthusiasm for science and technology today that we can create the great researchers of the future”, said Solvay CEO Ilham Kadri. “Through working with a leading science organisation like CERN, which shares our passion for STEM education, we aim to inspire the next generation of scientists by giving them knowledge, confidence and hands-on experience in the exciting field of particle physics.”

For CERN, as the largest accelerator-based particle physics laboratory in the world, the programme is a means to inspire and train future generations of scientists and engineers. Similarly, for Solvay, the partnership (<https://corporate-citizenship.solvay.com/corporate-citizenship/fostering-education/cern>) is another new venture in the company's extensive Corporate Citizenship programme, a key pillar of which focuses on fostering education.

CERN social media channels

Facebook (<https://www.facebook.com/cern>)

Instagram (<https://www.instagram.com/cern/>)

Linkedin (<https://www.linkedin.com/company/cern/>)

Tik Tok (https://www.tiktok.com/@cern_ontiktok)

Twitter (<https://twitter.com/CERN>)

YouTube (<https://www.youtube.com/channel/UCrHXK2A9JtiexqwHuWGeSMg>)

Solvay social media channels

Facebook (<https://www.facebook.com/solvaygroup/>)

Instagram (<https://www.instagram.com/solvaygroup/>)

Linkedin (<https://www.linkedin.com/company/solvay/>)

Twitter (<https://twitter.com/SolvayGroup>)

Youtube (<https://www.youtube.com/user/solvaygroup>)

About CERN

CERN, the European Organization for Nuclear Research, is one of the world's leading laboratories for particle physics. The Organization is located on the French-Swiss border, with its headquarters in Geneva. Its Member States are: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. Cyprus, Estonia and Slovenia are Associate Member States in the pre-stage to Membership. Croatia,

India, Latvia, Lithuania, Pakistan, Türkiye and Ukraine are Associate Member States. Japan and the United States of America currently have Observer status, as do the European Union and UNESCO. The Observer status of the Russian Federation and of JINR is suspended in accordance with the CERN Council Resolutions of 8 March 2022 and 25 March 2022, respectively.

www.home.cern (<https://home.cern/>)

About Solvay

Solvay is a science company whose technologies bring benefits to many aspects of daily life. With more than 21 000 employees in 63 countries, Solvay bonds people, ideas and elements to reinvent progress. The Group seeks to create sustainable shared values for all, notably through its Solvay One Planet roadmap crafted around three pillars: protecting the climate, preserving resources and fostering a better life. The Group's innovative solutions contribute to safer, cleaner, and more sustainable products found in homes, food and consumer goods, planes, cars, batteries, smart devices, health care applications, water and air purification systems. Founded in 1863, Solvay today ranks among the world's top three companies for the vast majority of its activities and delivered net sales of 10.1 billion euros in 2021. Solvay is listed on the Euronext Brussels and Paris (SOLB) stock markets.

Learn more at www.solvay.com (<http://www.solvay.com/>)

Computer security

Computer Security: Push & pain

With the demise and tighter regulation of cookies as a result of the EU's General Data Protection Regulation (GDPR), more and more websites are moving to alternative methods to get at your data

With the demise and tighter regulation of cookies as a result of the EU's General Data Protection Regulation (GDPR), more and more websites are moving to alternative methods to get at your data. For curiosity, for spamming, for selling, for promoting – based on the principle of “if it's for free, you pay in data”. Browser notification spam (<https://www.bleepingcomputer.com/news/security/sites-trick-users-into-subscribing-to-browser-notification-spam/>) is increasingly becoming the new method to promote unwanted extensions, fake software, adware bundles, adult sites and scam sites. Don't fall for it! Tame your curiosity. And follow the general mantra of “STOP – THINK – DON'T CLICK”.

Browser notifications are becoming the new spam of the web, presenting you with a kind of paywall before you can access a webpage, video or web functionality. But you don't pay with money, you pay with your data – location data, activity tracking – or by installing unwanted extensions. For example, the French bank Crédit Agricole asks for location data

when it is not even clear what the purpose of such a request is. Ideally, you should just decline unless you see a benefit for your usage of that webpage (e.g. finding an ATM in your vicinity).

Similarly, we have seen an increased number of devices running Omnatuor – mainly unsolicited, unwantedly and maliciously. Omnatuor.com is part of an advertising service that website publishers can use to generate revenue on their sites. Unfortunately, there are malicious programs that are redirecting users to these Omnatuor.com ads without the permission of the publisher in order to generate revenue (https://www.trendmicro.com/en_us/research/21/g/browser-notification-spam-tricks-clicks-for-ad-revenue.html). Your data, your clicks, their money.

It goes without saying that installing additional extensions, programs or software from untrusted third-party websites must be avoided. Just. Don't. Do. It. You never know what you'll get. Adware? A hidden VPN gateway (see our

Bulletin article on “Tunnel Madness (<https://home.cern/news/news/computing/computer-security-tunnel-madness>)”? Malware (<https://home.cern/news/news/computing/blackmailing-enterprises-you-are-patient-zero>)? With any installation, you put your device, your digital life and, probably, also the operation and reputation of the Organization at risk (<https://home.cern/news/news/computing/computer-security-blackmailing-academia-back-pen-and-paper>). Avoid that pain. Avoid push notifications via your browser. Once again: “STOP – THINK – DON'T CLICK”.

So, if a webpage acts in weird ways, doesn't display properly, hosts ads in places where they shouldn't be, triggers pop-ups of other webpages, asks to install additional software or redirects you to websites you didn't expect, the time has come to be vigilant and check your device (<https://malwaretips.com/blogs/remove-omnatuor-com/>). Consider installing an ad-blocker from your favourite browser's app store (like Privacy Badger, uBlock or Ghostery, to name just a few). And feel free to contact us at

Official news

Revision of administrative circulars

The following administrative circulars have been revised and will enter into force on 1 October 2022:

- Administrative Circular No. 3 (Rev. 3)
- Administrative Circular No. 11 (Rev. 8)
- Administrative Circular No. 12B (Rev. 4)
- Administrative Circular No. 14 (Rev. 5)
- Administrative Circular No. 20 (Rev. 3)
- Administrative Circular No. 21 (I) (Rev. 3)
- Administrative Circular No. 21 (II) (Rev. 3)
- Administrative Circular No. 23 (Rev. 5)
- Administrative Circular No. 27 (Rev. 2)
- Administrative Circular No. 30 (Rev. 4)

The amendments concern the introduction of the graduate programme (1) and Administrative circular n°20 "Use of private vehicles for journeys on official duty" (2):

1. Introduction of the graduate programme

The amendments are intended to finalise the introduction of the new category of employed members of the personnel, the graduates, into the Organization's legal framework, further to the amendments of the Staff Rules and Regulations approved by the Council on 16 June 2022.

Substantive changes have therefore been introduced in order to reflect, where applicable, the different employment conditions relating to this new category of employed members of the personnel.

It should be noted that provisions governing the employment conditions of fellows recruited under the former fellowship programme will be maintained during the transition period (until the last fellow leaves the Organization).

Furthermore, a number of editorial improvements have been made (including gender-inclusive language).

1. Administrative Circular No. 3 (Rev. 3), "Home leave, travel to the home station and travel for family reasons" (new title)

The structure of the circular has been changed as the provisions relating to leave for family reasons were made redundant by the provisions of AC 21 (I) on special leave. To avoid any confusion, it was decided to remove the provisions of Section 3-A-1 on leave for family reasons from the circular, thereby reducing its scope to home leave, travel to the home station and travel for family reasons. The title of AC 3 has been amended accordingly.

Regarding the benefits applicable to graduates, the circular reflects their non-eligibility for home leave and associated benefits. Graduates are, however, eligible for travel for family reasons, but with some differences compared to staff members and fellows.

Linguistic and editorial amendments have also been introduced throughout the circular.

2. Administrative Circular No. 11 (Rev. 8), "Categories of members of the personnel"

The new "graduates" category has been introduced under section II. B. Specifically, paragraph 8 describes the purpose of graduate positions, paragraph 9 introduces the graduates subcategories, paragraph 10 refers to the financial and social benefits offered to graduates, paragraph 11 refers to the priority given to the selection of Member and Associate Member State nationals, paragraph 12 describes the selection process and paragraph 13 refers to the duration of contracts.

Linguistic and editorial amendments have also been introduced.

3. Administrative Circular No. 12B (Rev. 4), "Education and language course fees"

The introduction of the new "graduates" category in AC 12B is limited to mentioning graduates together with current fellows, as the two categories enjoy the same conditions.

Linguistic and editorial amendments have also been introduced.

4. Administrative Circular No. 14 (Rev. 5), "Protection of members of the personnel against the financial consequences of illness, accident and incapacity for work"

As all categories of employed members of the personnel benefit from the same protection, it was decided to refer to "employed members of the personnel" instead of referring to staff members, fellows and graduates separately. As an in-depth revision of AC 14 is planned for next year, no linguistic or editorial amendments have been introduced at this stage.

5. Administrative Circular No. 21 (I) (Rev. 3), "Leave for family reasons and special leave" (new title)

In addition to widening the scope of the circular's provisions to encompass graduates, a complete update has been made, as it contained several outdated provisions that sometimes contradicted the Staff Rules and Regulations.

The opportunity was therefore taken to entirely revise the circular, updating the relevant provisions and reducing its scope to leave for family reasons and the various types of special leave (except leave for professional reasons and personal convenience, which are covered by AC 21 (II)).

Linguistic and editorial amendments have also been introduced.

6. Administrative Circular No. 21 (II) (Rev. 3), "Special leave for professional reasons and personal convenience"

The introduction of the new "graduates" category has been reflected in footnote 1.

Linguistic and editorial amendments have also been introduced.

7. Administrative Circular No. 23 (Rev. 5) – "Special working hours"

The introduction of the new "graduates" category into AC 23 is limited to mentioning graduates together with current fellows, as the two categories enjoy the same conditions.

Linguistic and editorial amendments have also been introduced.

8. Administrative Circular No. 27 (Rev. 2), "Authorisation for distraint / direct payment of education fees" (new title)

As all categories of employed members of the personnel enjoy the same conditions, it was decided to refer to "employed members of the personnel" instead of referring to staff members, fellows and graduates separately.

The revision also includes updated references to other legal provisions as well as editorial and gender-inclusive language improvements.

9. Administrative Circular No. 30 (Rev. 4), "Financial benefits on taking up appointment and on termination of contract"

The circular has been revised to include graduates as a new category of employed members of the personnel, with a different financial package concerning:

- travel expenses on termination of contract (paragraphs 11–12)
- payment of benefits (paragraphs 20–21)
- installation indemnity (paragraph 33 c))

Linguistic and editorial amendments have also been introduced.

2. Administrative Circular No. 20 (Rev. 3), "Use of private vehicles for journeys on official duty"

The circular required an update to bring it in line with the revised legal framework on duty travel as set out in Administrative Circular No. 33, entitled "Duty travel". Specifically, in paragraphs 10, 11 and 12, the reference to a distance of 50 km to distinguish between different categories of journeys on official duty has been replaced by a reference to their definitions in paragraphs 5 a), b) and c) respectively.

Paragraph 16 has also been adapted in a similar manner, with subparagraphs a), b) and c) referring to the definitions of journeys on official duty given in paragraphs 5 a), b) and c) respectively. The calculation of the lump sum for duty travel has been introduced in paragraph 16 b) in accordance with the current practice of calculating the lump sum for duty travel in accordance with paragraph 45 of Administrative Circular No. 33.

Announcements

Screening of « François Englert, Rebel and Nobel » at CERN – 12 October

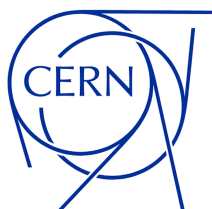
Join the audience on 12 October at 4.30 p.m. for the screening of the one-hour long Belgian film "François Englert, Rebel and Nobel" in CERN's main auditorium. The film addresses the life of Englert, the Belgian theoretical

physicist and Nobel prize laureate who, along with Robert Brout and, independently, Peter Higgs, theorised the Brout-Englert-Higgs mechanism in 1964.

The screening of the film (in French with English subtitles) will be followed by a discussion about the man and his work with the filmmakers and CERN physicists.

Meet the CERN & Society Foundation in CERN restaurants

From October, the CERN & Society Foundation will have a stand in all three CERN restaurants every Tuesday and Thursday from 12 noon to 1 p.m. Come and visit us



*CERN & Society
Foundation*

Find out how you can join the CERN & Society Foundation (<https://cernandsocietyfoundation.cern/>) and contribute to its mission: promoting the public engagement and understanding of science, and empowering young people from all over the world to pursue an education in a STEM*-related field.

* *STEM stands for science, technology, engineering and mathematics.*

CERN & Society

From October, the CERN & Society Foundation will have a stand in all three CERN restaurants every Tuesday and Thursday from 12 noon to 1 p.m.

Come and visit us to meet the team and find out about initiatives to spread the spirit of scientific curiosity. Don't miss this opportunity to get involved and make a difference!

Unconventional music concert at CERN to celebrate 100 years of Albert Einstein's Nobel Prize

The event, which was due to be held in 2021 but was postponed due to COVID-19, will take place on 19 October 2022 at the Globe of Science and Innovation.



(Image: CERN)

In December 1921, Albert Einstein was awarded a Nobel Prize in honour of his contributions to theoretical physics and his discovery of the law of the photoelectric effect. He received it in 1922. A hundred years on, Einstein is considered as the father of modern physics, but he was also an accomplished violinist who loved music.

"If I were not a physicist, I would probably be a musician. I often think in music. I live my daydreams in music. I see my life in terms of music... I get most joy in life out of music."
- Albert Einstein

At the time Einstein received the Nobel Prize, a Russian engineer, Lev Termen, was laying the foundations of modern electronic music with his invention, the theremin. Curious to find out more about this instrument, Einstein attended various concerts and even tried to play it.

To celebrate the anniversary of Albert Einstein's Nobel Prize, CERN, in collaboration with the Swedish Embassy in Switzerland, will host an unconventional music concert at the Globe of Science and Innovation at 8.00 p.m. on Wednesday 19 October 2022.

The event will comprise an unconventional music concert in which a Swiss artist (Roland Bucher (<https://www.rolandbucher.ch/>))

featuring a noise table, and a Swedish artist (Henrik Rylander (<https://www.henrikrylander.com/>)), featuring a theremin, will enter in musical conversations with CERN scientists and musicians Paula Collins, Angela Ricci, Anne Marie Magnan, Patrick Robbe and Chiara Mariotti.

Music performances will be preceded by lectures on Einstein by Professor Brian Foster (<https://www.physics.ox.ac.uk/our-people/fosterb>) (Oxford University) and on the sonification of LHC data by Professor Domenico Vicinanza (<https://aru.ac.uk/people/domenico-vicinanza>) (GEANT and Anglia Ruskin University).

Come and celebrate Einstein's life, music and science in a unique and unconventional event!

Programme and registration on the Indico page (<https://indico.cern.ch/event/1199556/>) of the event.

IPPOG event: Symposium and celebration of IPPOG's 25th anniversary

A symposium and celebration of the founding of the International Particle Physics Outreach Group will take place on 29 October



A symposium and celebration of the founding, in 1997, of the International Particle Physics Outreach Group (<https://ippog.org/>) (IPPOG) will take place **on 29 October, from 9.00 a.m. to 1.00 p.m.**, at the Globe of Science and Innovation.

More information and registration on Indico: <https://indico.cern.ch/event/1173726/> (<https://indico.cern.ch/event/1173726/>).

ECFA public talk on 6 October – “Does the World need another particle collider – and why?”

ECFA, the European Committee for Future Accelerators, will be holding a public talk on the need for a new particle collider on 6 October at DESY, in Hamburg (Germany). Follow the conference online, either on DESY's Youtube channel (<https://www.youtube.com/channel/UCcTXBDaa0J8JLxI9-voMRg>) (on which

the event will be live streamed (<https://www.youtube.com/watch?v=TUV5e1OqnGo>)) or via Zoom.

During this conference, entitled “Does the World need another particle collider – and why?”, Japanese-American scientist Hitoshi Murayama will explore the fascinating scientific

opportunities that such a collider could offer. The talk will be followed by a round-table discussion with renowned panelists, including CERN Director-General Fabiola Gianotti.

The Zoom link for the conference will be made available on the Indico page (<https://indico.desy.de/event/33640/>) of the event.

Want to learn more about Open Access@CERN?

Don't miss CERN's first ever Open Access Week from 24 to 28 October 2022!

Since 2014 CERN has had an established policy that requires that all peer-reviewed primary research articles from CERN authors

be published open access (OA), making them freely accessible to readers from across the globe. In order to make it as seamless as possible for CERN authors to comply with our policy, the CERN Scientific Information Service (SIS) has established a number of enabling mechanisms and tools to support authors in publishing their work OA.

SIS has decided to hold an online event for the CERN community during International Open Access Week 2022 (24 to 28 October). The event will feature talks from a range of experts on a range of diverse topics, from the historical perspective of OA at CERN to practical sessions to support CERN authors in publishing their work OA. The event will also

feature talks from representatives of publishers of journals relevant to the CERN community, who will showcase their latest initiatives for HEP-relevant disciplines and their agreements with SIS in support of open access for the CERN community.

The event will run throughout the week of 24–28 October 2022, with one 90-minute session per day. Sessions are free of charge and open to all, and all participants are welcome to join one or several sessions. You will have an opportunity to ask questions, and if you are not available to attend all the sessions, no worries! The event will be recorded, so you can catch up afterwards.

The full agenda is available here (<https://indico.cern.ch/event/1179488/>).

It is already possible to register for this event. Please note that registration is not mandatory, but registered people will receive reminders about the sessions and will be alerted when the recordings are ready.

If you have any questions regarding the event, please don't hesitate to contact open-access-questions@cern.ch (<mailto:open-access-questions@cern.ch>).

CERN Scientific Information Service (<https://scientific-info.cern>)

The flu season is upon us: the CERN vaccination campaign begins

Help protect yourself and others and limit transmission of the virus



(Image: CERN)

Influenza, more commonly known as “flu”, is a highly contagious viral disease. The influenza virus attacks with more intensity during the winter months. Symptoms can be mild, but the virus can also cause severe illness and even death, particularly for those in the high-risk groups (the very young, people over 55, those with an underlying health condition, those who are pregnant, overweight or who have a weakened immune system). Symptoms usually last between three and seven days, although in some instances they can persist for several weeks.

The virus spreads through water droplets, especially when an infected person coughs or

sneezes, or via contaminated hands and surfaces.

Hygiene measures adopted during the COVID-19 pandemic, such as washing your hands, coughing into your elbow and keeping your distance, are good habits to keep up, as they are effective in helping to reduce the chance of contracting and/or spreading the flu virus.

The vaccine remains the best way to protect yourself against flu, to prevent the spread of the disease and to reduce its severity, in particular if you're part of a high-risk group.

An international panel of experts carefully reviews the strain composition of the vaccine annually based on data from epidemiological centres and then makes recommendations to countries accordingly as to what strains they might wish to include in their national flu vaccine programme.

It takes about two weeks for an adequate immune response and protection to develop, and immunity tends to decline over the course of a few months. It is thus important to get a flu vaccine every year.

The flu vaccine will be available free of charge to anyone working on the CERN site, including

contractors. Practical details of this year's flu vaccination campaign, which will run from 17 October until 11 November, can be found at <https://hse.cern/flu vaccination> (<https://hse.cern/flu vaccination>).

Further information:

General information on Influenza | WHO (<https://www.who.int/europe/health-topics/influenza-seasonal>)

General information on Influenza in Switzerland | OFSP (<https://www.bag.admin.ch/bag/fr/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/saisonale-grippe---lagebericht-schweiz.html>) (available in French only)

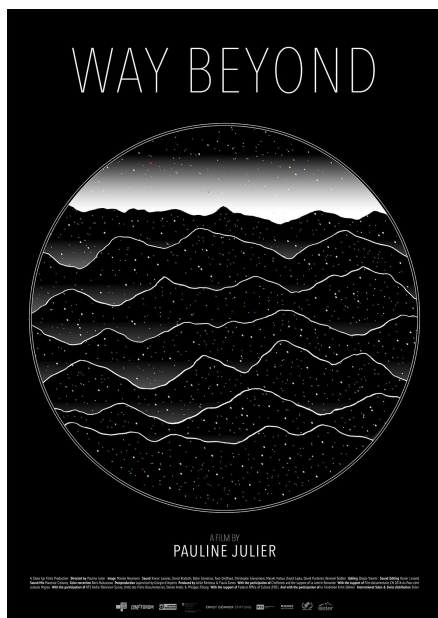
Vaccination in France | Ameli (<https://www.ameli.fr/medecin/sante-prevention/vaccination-grippe-saisonniere>) (available in French only)

Vaccination in Switzerland | HUG (<https://www.hug.ch/centre-vaccinologie/grippe>) (available in French only)

Medical Service

IPPOG event: Special particle physics masterclass for CERN personnel

The International Particle Physics Outreach Group, in collaboration with Women in Technology, will host a masterclass in particle physics on 26 October



(Image: CERN)

Way Beyond, a film directed by Swiss artist Pauline Julier and inspired by the endeavours of the FCC study, will premiere at Les Cinémas du Grütli in Geneva at 7.00 p.m. on 4 October, with the film's director in attendance. Invitations are required to attend the premiere – you may request one by e-mail at club@sister-distribution.ch (mailto:club@sister-distribution.ch).

The 60-minute documentary draws on CERN's archived documentation, mixed with more recent footage of meetings between scientists and engineers actively involved in shaping the design of the next generation of particle colliders currently being explored by the international FCC collaboration.

Julier thought up the idea of a film about humanity's quest to uncover the origins of the universe at a workshop organised by the "Arts@CERN" programme. Filming then took

place between January 2017 and June 2019 at CERN and other locations, including at the annual FCC collaboration meeting in Berlin back in 2018, and the project came about thanks to the generous support of Loterie Romande, Migros centre culturel, the Swiss *Office fédéral de la culture* and the Fondation Ernst Gohner.

Following the premiere at Cinémas du Grütli, *Way Beyond* will be screened from 5 to 11 October at the Cinélux in Geneva and at the Bellevaux cinema in Lausanne. In parallel, several special screenings, attended by the director, along with notable scientists and artists, are planned around Switzerland.

The film has also been screened at several prestigious film festivals around Europe, including the Visions du Réel festival (Burning Lights competition) in 2021, the 2021 Photo Days in Paris, the Solothurner Filmtage in 2022 and the Thessaloniki Documentary Festival, also in 2022.

CERN to host International Conference on Quantum Technology for High-Energy Physics (QT4HEP22)



(Image: CERN)

We are pleased to announce that registration will open this week for the International Conference on Quantum Technology for High-Energy Physics, which will be hosted at CERN on 1–4 November 2022. The event will take place in the CERN Main Auditorium, with featured sessions being broadcast live.

The conference will serve as a forum to discuss both the potential of and the challenges surrounding the nascent quantum technology and what overall impact this new frontier of science might have on high-energy physics (HEP). Bringing the whole community together, we will discuss recent developments in the field and keep looking for those activities within

HEP and beyond that can most benefit from the application of quantum technologies.

Spread across four days, the event will cover a number of topics ranging from four quantum technology areas (theory, sensing, computing and communication) to collaboration with academia and industry, entrepreneurship, training and education activities. There will also be a series of tutorials and hands-on sessions co-developed with companies and providers, to explore the fascinating field of quantum science to its fullest extent.

Following a successful workshop on quantum computing in 2018 (<https://home.web.cern.ch/news/news/computing/exploring-quantum-computing-high-energy-physics>) that marked the beginning of a range of new investigations into quantum computing at CERN, this is the first edition of the QT4HEP conference and a great opportunity to share knowledge and ideas, advance quantum expertise and skills and foster common activities with academia and industry on national and international levels.

Join us as we unlock the full potential of innovative quantum technology and its great

promise to support scientific research: <https://indico.cern.ch/e/QT4HEP22> (<https://indico.cern.ch/e/QT4HEP22>).

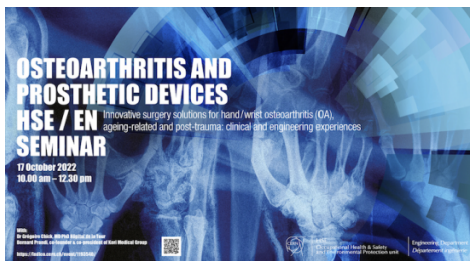
About CERN QTI

The CERN Quantum Technology Initiative (CERN QTI) is a comprehensive R&D and knowledge-sharing initiative to investigate applications of quantum technologies for high-energy physics and beyond. Given CERN's increasing information and communications technology and computing demands, as well as the significant national and international interest in quantum-technology activities, CERN QTI aims to provide dedicated mechanisms for the exchange of both knowledge and innovation.

Find out more at quantum.cern (<https://quantum.cern/>) and on Twitter (https://twitter.com/CERN_quantum) and LinkedIn (<https://www.linkedin.com/showcase/cern-quantum-technology-initiative-cern-qtii/?viewAsMember=true>).

Link to the roadmap: <https://doi.org/10.5281/zenodo.5553774> (<https://doi.org/10.5281/zenodo.5553774>).

Seminar on 17 October with Dr Grégoire Chick: Osteoarthritis and Prostheses



Osteoarthritis (OA) is the most common form of arthritis which can affect any joint, typically the hands, knees, hips, lower back and neck. Historically, OA was known as a “wear and tear” condition, generally associated with older individuals but the disease can also affect much younger people depending on

personal and professional risk factors. OA is considered a chronic disease and other than joint replacement surgery there is presently no cure. There are, however, treatments (<https://oa.rsi.org/patients>) that can reduce pain, improve function, and in some instances delay the progression of the disease.

Symptoms vary in severity, and in its more severe forms OA is a painful condition that restricts mobility, interrupts sleep, and interferes with all aspects of life, including in the workplace. In terms of occupational medicine the challenge is to ensure careful monitoring and follow up, in line with the treatment type and prosthesis chosen and the functions and conditions of one's profession.

In this seminar, Dr Grégoire Chick of the Hôpital de la Tour and Bernard Prandi, co-founder and co-president of Keri Medical

Group will present the various clinical and engineering solutions associated with OA. It will further explore the potential of CERN's Mechanical and Materials Engineering portfolio such as design, simulations and measurements, high-precision fabrication, additive manufacturing, material science and non-destructive testing (including X-ray computed tomography and failure analysis), and possible future collaboration opportunities.

This seminar is co-organised by the Health, Safety and Environmental protection (HSE) Unit, in collaboration with the Engineering (EN) Department.

We look forward to seeing many of you on this occasion!

Full details can be found on the Indico page of the event (<https://indico.cern.ch/event/1193540/>).

CERN & the Environment workshop: 12 October (morning) and 13 October



We invite you to join us for the CERN & the Environment workshop in the Council

Chamber (or via Zoom) to find out more about the many environmental initiatives completed or under way at CERN. Presentations will be given across various sessions, covering topics including: energy, the status of research on environmentally-friendly coolants and detector gases, water, our local environment, mobility, travel, food and more. The highlight of the programme will be two keynote presentations, delivered by renowned speakers, which will address the recent Intergovernmental Panel on Climate Change (IPCC (<https://www.ipcc.ch/>)) report and the barriers preventing behavioural changes that would favourably impact climate transition.

We look forward to gathering feedback from the CERN community on matters that affect us all, and will equally encourage the discussion of future objectives.

Seating in the Council Chamber will be limited, and you will need to register to attend. Full details and the event's timetable can be found here (<https://indico.cern.ch/event/1193771/>).

We hope many of you will be able to join us for this event!

Benoît Delille, Mar Capeans Garrido, Manfred Krammer, Chris Hartley, Sonja Kleiner, Roberto Losito and Serge Claudet

Obituaries

Fabrizio Murtas (1962 – 2022)



The end of the summer bereaved us of our loyal colleague and dear friend Fabrizio, who passed away unexpectedly and far too soon on 25 August, while on holiday in his beloved Sardinia.

Fabrizio started his career as a research physicist in the ALEPH collaboration at LEP, while working for the INFN National Laboratory in Frascati. He then participated in the construction of the calorimeter for the KLOE detector at Frascati's newly built accelerator, DAFNE. Fascinated by particle detectors, he devoted most of his career to the development of new tracking devices, paying special attention to their applications in industry and society. He was firmly convinced that one of the

key roles of fundamental science is to foster the development of technologies that can improve human life. In 2010, the UA9 experiment at CERN's SPS was entering the mature phase of advanced beam steering investigations. Novel detectors were required to boost the discovery potential and imaginative experts with a wide span of competences were sorely needed. Fabrizio responded enthusiastically to the call and moved to Geneva on a permanent basis. His competence and imagination in proposing more powerful detectors, based on his deep understanding of particle interactions with bent crystals, were matched only by his tenacity in pursuing demanding goals. His ability to create profound friendships and to handle conflictual situations were most appreciated by the

collaboration. Fabrizio then joined the newly created Special Project section of CERN's Radiation Protection group, where he worked on many different projects and supervised many students and fellows. His main contribution was GEMPix, which he built by combining two CERN technologies, a triple-GEM and the Timepix ASIC. The seed of the idea dates back to a workshop held at CNAO (the Italian Centre for Oncological Hadrontherapy in Pavia) in October 2012, where quality assurance (QA) instrumentation for particle therapy was thoroughly discussed. The idea to merge these two technologies and combine their advantages to build a gaseous detector with a highly pixelated readout in order to achieve superior spatial resolution unfolded rapidly, leading Fabrizio to design and build the first GEMPix prototypes in March 2013; they were then tested at the CNAO beamline. The detector proved very successful and has found many applications, such as measuring traces of Fe-55 in weakly radioactive waste at CERN. Later, Fabrizio contributed to developing a larger area version of the device by replacing the Timepix ASIC with a TFT (thin film transistor) backplane, and a version called GEMTEQ for microdosimetry. He was about to start working on GEMPix4, a version using the new Timepix4 ASIC, when he left us. He also contributed to RaDoM (radon dose monitor), a radon detector able to determine the dose to the lung rather than its concentration in air, which has been licensed to a CERN spin-off company. His firm belief in the importance of the societal applications of detector technologies led him to invest a lot of time in a variety of such projects, such as W-

MON (waste monitoring), a distributed network of small radiation sensors developed to monitor potentially weakly radioactive items in waste containers, and a GEM- and Timepix-based beam monitor for beam alignment at the CERF (CERN-EU radiation facility) in the North Area, where radiation detectors and dosimeters for aircrew monitoring are tested. He was one of the pioneers of the use of the Internet of Things (IoT) at CERN and collaborated closely with the IT department to deploy such technology. The GEM-based fast and thermal neutron detectors that he developed with the Università di Milano-Bicocca and CNR for the n_TOF collaboration have been employed at the SPIDER facility, a fundamental step towards the heating system of ITER's tokamak, as well as at ISIS and ESS (international spallation neutron sources). One of Fabrizio's fundamental contributions was the idea of developing a custom ASIC for GEM detectors, the GEMINI, which is now widely used. Fabrizio's novel ideas, such as the Multi-Boron GEM detector, will also be used in future experiments at ISIS. Fabrizio brought to n_TOF a great deal of experience in detection systems, which was especially useful for the experiment's neutron beam characterisation (energy, profile, resolution) work. Timepix Quads, Diamondpix, SiC and MBGEM were his toys of choice and greatly helped the collaboration during the commissioning of the new (third-generation) spallation target, when the accelerator complex restarted after LS2. Furthermore, Fabrizio took a leading role as co-spokesperson of a new detection system for the measurements of neutron-induced reactions leading to charged particle emission,

within a recently approved collaboration between CERN and INFN Catania.

Fabrizio's interests spanned the entire spectrum of the scientific endeavour, from its most fundamental aspects to the technological spin-offs to society and its dissemination to the public. We will sorely miss the sailing outings on Lac Léman and the skiing holidays, the genuine Italian dinners and music concerts, the discussions on climate change and how to disseminate science better; we will never forget his gentlemanly manners, and his sweet smile will always shine in our memories. A special thought goes to his three beloved daughters, Safiria, Micol and Greta, and to the rest of his family.

Fair winds, Fabrizio!

His colleagues and friends

Fabrizio's funeral took place on 29 August in Cagliari. Since he was a passionate and experienced sailor and a devoted father, we have decided to make a donation in his memory to the Peepul sailing school (<https://www.peepul.it/> (<https://www.peepul.it/>)), a charity (Onlus) that organises free sailing courses for disabled and marginalised children. The money collected will be used to buy a rescue vessel, which will be named in Fabrizio's memory. Those who wish to make a donation can do so here: <https://gofund.me/a3306414> (<https://gofund.me/a3306414>)

Ombud's corner

Need to step in to defuse a conflict?

The core of the Ombud's mandate (<https://ombuds.web.cern.ch/sites/default/files/reports/CERN%20Ombudsman's%20mandate.pdf>) is to help resolve interpersonal disputes in a consensual and impartial manner. To this end, the Ombud offers mediation services, which can take the form of a facilitated conversation, shuttle mediations (good offices) or more in-depth, structured mediation (<https://ombuds.web.cern.ch/mediation>).

Mediation may seem to be a well-defined process, to be conducted within a pre-agreed framework and requiring specific skills and qualifications. This is the case for the mediation offered by the Ombud. However, conflicts need to be caught in their very early stages and can sometimes flare up so quickly that planning mediation by the Ombud is not the most effective way to address them.

As a manager, you may find yourself in a position to step in and address a conflict between members of your team. Below are a few guidelines to help you do so, based on the same principles as the formal mediation process that is promoted by the TCM group (<https://thetcmgroup.com/>).

Trust the process – it works.

Acknowledge what is happening. Recognise that a difficult conversation is going on and ask the supervisees in conflict whether they would like you to help resolve it. They may say no, which is acceptable as long as it does not affect others in the team.

Talk to them individually. Take them for coffee out of their workplaces, so that they feel safe discussing the issue. Ask them what happened and what they observed. Be an active listener; do not interrupt and offer suggestions. Summarise what you have heard to check that you have understood. Remember that the superpower of the mediator resides in listening and never taking sides!

Organise a joint meeting. Bring them together in a neutral place. Get them to agree to basic rules such as confidentiality, respect and no interruption while the other party is speaking. Let both have their say in an open and honest exchange. Encourage the parties to describe what has happened, what impact it has had on them and what they need to recover a good

work relationship. Reflect what is said to make sure that you and the parties have a common understanding of what is exchanged.

Focus on the future. Once the two parties have expressed their views and the way they feel about the situation, you will probably feel that the tensions are released and the parties progressively open up to dialogue. It is time to focus on what they would need to happen next in order to be able to move on and beyond the conflict. The solutions have to come from them, not from you.

Handle heated exchanges. They are normal and to be expected, so keep calm. Acknowledge the strong emotions, affirm it is OK to feel angry/worried/upset, and find out more about why those emotions are erupting at this point in the conversation, as the heart of the problem might lie right there.

Follow up how the situation evolves. Once the two parties have reached an agreement on how to move forward, make sure you follow up in the next days or weeks. If you see problems reappearing, it may be worth having another round of mediation.

As a manager, you have an important role to play in the informal resolution of conflict and may find yourself in the position of accidental mediator. As a supervisee, you may see the need for help in conflict resolution and ask your manager to step in.

The few steps outlined above will help maximise the chances of successfully resolving the conflict. You are welcome in

the Ombud's Office to discuss your experience of conflict resolution and what has worked or not worked for you, and to seek guidance on how to prepare for such mediation meetings.

Laure Esteveny

I want to hear from you – feel free to email ombud@cern.ch with any feedback or

suggestions for topics you'd like me to address.

NB: *If you would like to be notified about posts, news and other communications from the CERN Ombud, please register to receive the CERN Ombud news (<https://e-groups.cern.ch/e-groups/EgroupsSubscription.do?egroupName=cern-ombud-news>).*