



These Croatian students were among the many to wish CERN a happy 60th birthday by sending images via social media. (Marina Furkes/Gymnasium 'Fran Galovi' Koprivnica)

# Making an impact

## An eventful birthday

Throughout the year, CERN and its Member States celebrated 60 years of science for peace with events, exhibitions, talks and more. The 60th anniversary made the Laboratory a focal point, with events at CERN reaching a crescendo in September in the run up to the official anniversary event (see p. 6). These included a symposium on science for peace, a celebration of the anniversary of the first Council session, a concert by the United Nations Orchestra, screenings of the feature film *Particle Fever*, and the second TEDxCERN event, 'Forward — Charting the Future with Science', which addressed the essential role of science in solving global challenges, including climate, health, food, water and energy.

The many other events ranged from the CinéGlobe film festival and Famelab in March, through a special open-house event for neighbouring communities in May, to a public computing challenge in December. As part of the 60th anniversary programme, exhibitions about CERN went to 16 locations. The large 'Accelerating Science' exhibition travelled to Warsaw,

Athens, Valencia and Thessaloniki, attracting more than 300 000 visitors, while more thematic exhibitions went on show at four other venues. The 'interactive LHC tunnel' appeared at eight different locations, together with a large poster exhibition.

## Nurturing innovation

Set up in 2011, the Knowledge Transfer (KT) fund is now established as a useful tool to reduce the gap from fundamental research to applications, and to incentivize CERN researchers to bring forward their ideas. Since its inception, it has financed 25 projects, 6 of these in 2014. Other activities during the year, such as innovation days for the Beams and Engineering Departments, also helped to encourage and promote KT as part of the core activities of CERN. Further afield, the idea of a network of Business Incubation Centres (BICs) of CERN technologies in the Member States came closer to reality. Four new BICs in the Netherlands, Norway, Greece and Austria joined the existing STFC CERN BIC in the UK to assist start-up companies in bringing CERN's knowledge to market.



Researchers from CERN took part in the annual European Researchers' Night with 'Pop Science', which combined arts, poetry, theatre, music and science at multiple venues in Geneva and neighbouring France. (CERN-PHOTO-201409-198 – 64)

Young Spanish winners of a CERNland competition — launched by CERN, the Centro Nacional de Física de Partículas, Astropartículas y Nuclear (CPAN) and the Fundación Príncipe de Asturias — visit the CMS cavern. (CERN-PHOTO-201404-077 – 18)

In March, CERN signed a framework agreement with the European Space Agency (ESA) for future cooperation on research and technology in areas of mutual interest such as computing and data preservation, advanced materials, cryogenics, superconductivity and radiation resistance. In April, the two organizations shared a stand at the Hannover Messe, the world's leading trade fair for industrial technology, alongside 14 related spin-off companies.

Each year CERN welcomes many visiting school groups, but two groups who arrived in September had a particularly special experience as winners of CERN's first 'Beamline for schools' competition. The student teams from Athens in Greece and Nijmegen in the Netherlands were selected from nearly 300 entries. They spent 10 days conducting their proposed experiments in a test beam at the PS. The competition — planned to coincide with CERN's 60th anniversary — mirrored the way that researchers bid for access to the Laboratory's facilities and was made possible through the CERN & Society initiative (see p. 8).

December marked the inauguration of 'IdeaSquare', a building named after a new project designed to nurture innovation at CERN. The aim is to bring people from industry together with researchers, engineers and students to encourage new ideas to benefit society, taking inspiration from CERN's ongoing detector R&D and upgrade projects. Although the project is still in its pilot phase, two EU-funded projects have found their home there, and 46 students have participated in Challenge-Based Innovation courses. IdeaSquare also housed a 3-day problem-solving workshop, or hackathon, where interdisciplinary teams used CERN's technologies to tackle humanitarian and social issues.

For students already at university, CERN organizes or co-organizes specialist schools throughout the year, reaching hundreds of students around the world. In 2014, particle physics was addressed at the European School of High-Energy Physics and the Asia-Europe-Pacific School of High-Energy Physics; accelerator science was covered by the Joint Universities Accelerator School, as well as five CERN Accelerator Schools, one of them a joint school with the US; and computing topics featured in the International School of Trigger and Data Acquisition, the Grid and Advanced Information Systems School and the CERN School of Computing (CSC), as well as the Inverted CSC and the Thematic CSC. This year also saw some 300 students from 77 different countries take part in CERN's flagship summer-student programme.

## The scientists of tomorrow

CERN's one-week training courses for secondary-school teachers, held in 19 different national languages in 2014, had a record participation, with 1200 school teachers from 22 different countries. In addition, the international three-week High School Teachers programme in July had 54 participants from 32 different countries, including 10 teachers from the Middle East (Bahrain, Iran, Israel, Jordan, the Palestinian Authority and Turkey) as part of a collaboration with the SESAME synchrotron light-source, which is currently under construction in Jordan. To enable educators and their students to carry out hands-on experiments during visits to CERN, a new facility — S'Cool Lab — was constructed and commissioned.

## Collaborations and new horizons

The European Commission launched its Horizon 2020 (H2020) funding programme in 2014, and proposals involving CERN were submitted to a variety of H2020 sub-programmes. Of the 17 new H2020 projects selected for funding in 2014, seven are coordinated by CERN. The range of fields and activities include: a study of isotopes for medical applications (MEDICIS-PROMED), the development of innovative fibre technologies (INTELUM), international collaboration on accelerator

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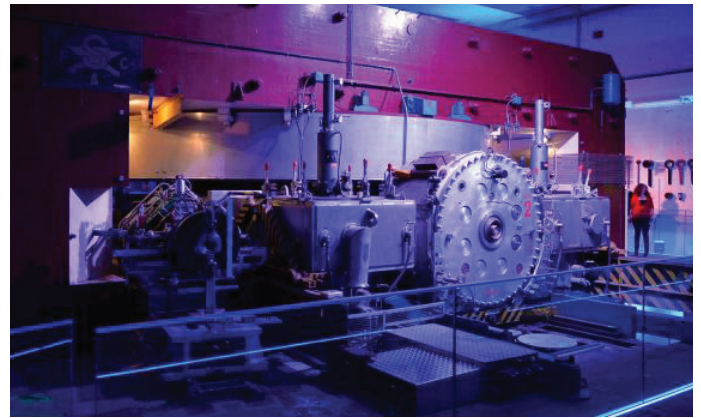
## Bringing 60 years of history to life

CERN's 60th anniversary proved the perfect opportunity to look back at the Organization's history. With this in mind, the Scientific Information Service embarked upon a digitization project to upload the Laboratory's entire picture archive onto the CERN Document Server. There are approximately a quarter of a million pictures in the archive, with older pictures existing as hard copies in a range of formats. Once the majority had been scanned, a crowd-sourcing campaign was launched for the CERN community and beyond to help in identifying the content of certain pictures. The year also saw the completion of the digital archive of all *CERN Courier* and *CERN Bulletin* issues.

When CERN's first accelerator, the Synchrocyclotron (SC), began operation in 1957, it was the highest-energy particle accelerator in Europe. During its 33 years of service it provided many important physics results. This year saw the completion of an extensive refurbishment project to turn the SC into a new exhibition point for visitors, which was inaugurated in June and named a European Physical Society Historic Site. Using 3D projectors to superimpose animations onto the machine, it allows visitors to witness how the accelerator once worked. This exhibition and other new visitor points at the Data Centre, the CERN Control Centre and the Magnet Test Facility in building SM18 provide additional options for an increasing number of visitors — about 103 000 visitors (40% of whom were school children) followed 1/2-day guided tours to dedicated visit points in 2014.



Archive photograph from 1956 of one of the coils for the Synchrocyclotron travelling through the village of Meyrin on its way to CERN. (CERN-CE-5661005)



The newly inaugurated Synchrocyclotron exhibition. (CERN-PHOTO-201406-130 – 16)

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science and technology (E-JADE), novel NMR techniques (BetaDropNMR), new mathematical structures (MathAm), the procurement of cloud services in Europe (PICSE) and science outreach (PopScience). In addition, the European Commission's Marie Skłodowska-Curie actions provided funding for more than 130 young researchers to work at CERN in 2014.

Under the umbrella of the European Network for Light Ion Hadron Therapy — ENLIGHT — several European Union (EU) projects led by or involving CERN have helped to develop the field of hadron therapy. Two such EU projects came to an end in 2014: ULICE, which strengthened the collaboration among the existing and planned hadron-therapy centres in Europe, and ENVISION, which developed state-of-the-art quality-assurance tools.

With the aim of positioning CERN as an important facilitator of medical physics in Europe, January saw the creation of the CERN Medical Applications (CMA) office to coordinate and structure activities related to medical applications within the Organization, and to catalyse collaborations with external partners. Its initial workplan includes seven key areas: large-scale computing, detectors for medical imaging, radioisotopes, a new biomedical facility, optimized design for medical accelerators, simulation and dosimetry, and applications other than cancer therapy. In addition, CERN co-organized the second International Conference on Translational Research in Radiation Oncology and Physics for Health conference in Geneva in February. The event attracted a large number of participants from fields such as physics, engineering, medicine, computer science and biology.