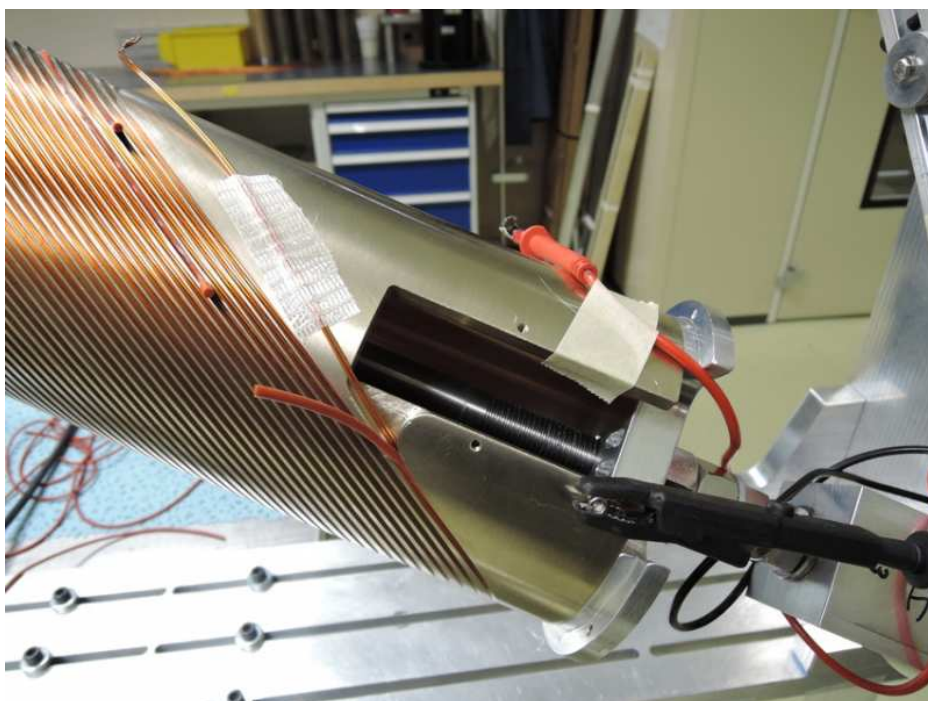


## NEW LIFE FOR AN OLD TECHNOLOGY: CANTED COSINE THETA MAGNETS

CERN is developing a corrector magnet for the High-Luminosity project that has a peculiar design (to say nothing of its name...)



A 0.5-m-long short model was tested in August at CERN. It was an essential step to demonstrate the validity of the design and of the technological solutions.. (Image: Glyn Kirby/CERN)

Among the 11 new types of magnet that are currently under development for the High-Luminosity upgrade of the LHC (HL-LHC), one has several bizarre names and a particular story behind it. These types of magnets are called, interchangeably, “canted cosine theta”, “double helix” or “tilted solenoid” magnets. They are based on a simple configuration where the conductor cable is wound around the beam tube as two oppositely tilted solenoids (see picture) – yes, solenoids just like those today installed in CMS, but approximately seventy times smaller and with much more compact winding. Two tilted solenoids provide a pure dipolar field.

“This is the first time a magnet like this will be used in a high-energy physics particle accelerator,” says Gijs De Rijk, who is in charge of the magnet laboratory building the corrector. “Its design was proposed at the end of the 1960s and later industrialised in the US. A prototype for proton therapy is currently being built at Lawrence Berkeley National Laboratory, but this is the first time it will actually be used for the high-energy application initially foreseen by the original article of the 1960s,” he explains.

(Continued on page 2)

### A WORD FROM FRÉDÉRICK BORDRY

#### A DOUBLE ANNIVERSARY FOR KNOWLEDGE TRANSFER AT CERN

Twenty years ago, CERN established a dedicated policy and structure for knowledge and technology transfer. Until then, the Organization had essentially followed the letter of the CERN Convention, which stipulates that: “the results of [the Laboratory's] experimental and theoretical work shall be published or otherwise made generally available”.

(Continued on page 2)

### In this issue

<b>News</b>	<b>1</b>
New life for an old technology: canted cosine theta magnets	1
A word from Frédérick Bordry	2
LHC Report: 100 inverse femtobarns and counting...	3
CERN meets the public	4
How can superconductors contribute for a greener future?	5
Servers to SESAME	6
Key milestones reached for the new campus-wide Wi-Fi service	6
Computer Security: Virtual Misconduct – Real Consequences	7
CERN and the HUG team up for a rescue exercise	8
<b>Announcements</b>	<b>8</b>
<b>Ombud's corner</b>	<b>11</b>



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# A WORD FROM FRÉDÉRIC BORDRY

## A DOUBLE ANNIVERSARY FOR KNOWLEDGE TRANSFER AT CERN

This was an approach that bore much fruit, with innovations like the World Wide Web, and contributions to developments in medical imaging going back to the 1970s. An emerging field in those days, CERN brought its particle detection expertise to the table, producing its first PET scan, of a mouse, forty years ago.

CERN's open approach to knowledge transfer worked well, but by 1997 the world had changed and a new approach was needed. While still following the spirit of openness embodied in the Convention, a more strategic approach was adopted and, for the first time in its history, CERN had a group dedicated to knowledge and technology transfer. Since then, some 18 start-up companies have been established based on CERN technology and continue to thrive today, and a network of Business Incubation Centres, known as BICs, has been established across nine CERN Member States.

The most significant development of this anniversary year is a new strategy for medical applications, which was presented to the CERN Council and approved in June. The new strategy describes how knowledge transfer related to medical applications fits in with CERN's mission, taking into account the pertinence of particle physics technologies to the medical domain. It describes funding mechanisms and the technologies' relevance to the demands of Member State industries, as well as outlining decision-making processes.

Under the new strategy, projects earmarked for attention include CERN-MEDICIS, which will produce innovative radioisotopes for medical research. In another initiative, a CERN-coordinated design study would contribute to the development of a new generation of compact and cost-effective light-ion medical accelerators, leveraging existing and upcoming CERN technologies and expertise to go beyond the Proton-Ion Medical Machine Study of the 1990s,

which has been deployed at two hadron therapy centres, to produce a new concept for a more compact and cheaper machine for carbon and light ions. Computing and simulation for health applications is also on the menu, as are dosimetry and techniques in medical imaging, a constant thread in CERN's knowledge transfer activities since that first PET scan in 1977. Last but not least, medical applications for high-field superconducting magnets are also under study.

All of these have something in common: they are intricately linked with CERN's core business, and they all have potentially transformative applications in the medical domain. This is at the core of CERN's strategy for knowledge and technology transfer, ensuring that developments made for particle physics find applications that bring benefits to society at large. It will be fascinating to see where the next 20 years of structured CERN knowledge transfer takes us.

*Frédéric Bordry  
Director for Accelerators and Technology*

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## NEW LIFE FOR AN OLD TECHNOLOGY: CANTED COSINE THETA MAGNETS

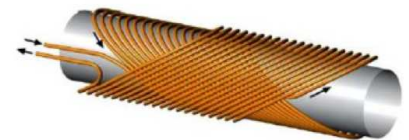
Even though this design requires about 50% more conductor than normal sector coils, this should be compensated for by the simplicity of the construction. "This magnet has 10 drawings instead of 100, so fewer components and less tooling to assemble – in the end, we believe that it will be a less expensive and more reliable magnet," explains Glyn Kirby, the engineer in charge of the magnet's development.

In the HL-LHC, two 2-metre-long canted cosine theta magnets will be positioned near the insertion region of the ATLAS and CMS experiments and will be used as corrector magnets. Indeed, in addition to the dipole and quadrupole magnets that guide

and focus the charged particles, corrector magnets are used to cure imperfections in the magnets and compensate for alignment errors. These magnets, made of niobium-titanium, will also be used to open the crossing angle between the two beams after the collision to avoid parasitic collisions in the detectors.

Scientists at the Lawrence Berkley National Laboratory in the US are also exploring the applicability of this concept for higher-field magnets based on niobium-tin ( $\text{Nb}_3\text{Sn}$ ), approaching the 10 T barrier. Recently, the Paul Scherrer Institut in Villigen, Switzerland also joined this effort. The coming years will see signifi-

cant R&D efforts on the tilted solenoid design.

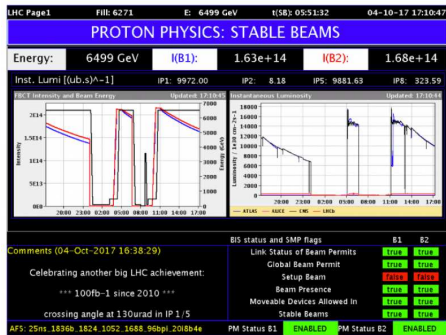


*Canted Cosine Theta magnet scheme: the conductor cable is wound around the beam tube as two oppositely tilted solenoids.*

*Stefania Pandolfi*

# LHC REPORT: 100 INVERSE FEMTOBARNS AND COUNTING...

Since it began operation in 2010, the LHC has delivered over 100 fb<sup>-1</sup> (inverse femtobarns) of integrated luminosity to each of ATLAS and CMS



10 000 000 000 000 000, or ten million billion. This is the cumulative number of potential collisions brought at the centre of ATLAS and CMS since the LHC started its operation in 2010. In jargon, the LHC operators say that the LHC has delivered over 100 fb<sup>-1</sup> (inverse femtobarn) of integrated luminosity to each ATLAS and CMS, where one inverse femtobarn corresponds to around 100 million million (potential) collisions.

This milestone was reached on 28 September and only takes into account the data taking with proton bunches spaced by 25 nanoseconds.

Over the years, the integrated luminosity figures have varied greatly. In 2010, the LHC started with beam late in the year, while in 2011 the LHC teams were still learning how to run the new and complex LHC. The year 2012 was clearly a luminosity production year, which was rewarded with impressive physics results, notably the discovery of the Higgs boson.

In 2013 and 2014, there was virtually no physics at the LHC due to the first long shutdown (LS1), except for short periods in early 2013 with ion physics and a proton-proton reference run.

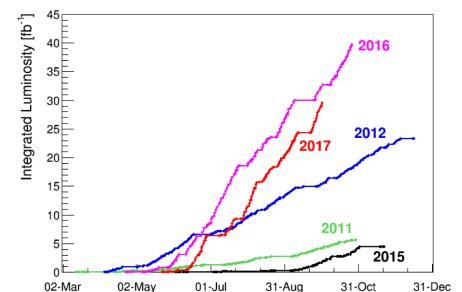
Following the massive amount of work done on the machine during LS1, the LHC was restarted in 2015, requiring substantial time for the validation of all systems and re-commissioning of the machine with beam, followed by a relatively short physics run. Last year, 2016, was again a production year, and the integrated luminosity surpassed expectations. Following this success, the target for 2017 and 2018 was raised to 90 fb<sup>-1</sup> for the two years combined. On 28 September, this endeavour resulted in the 100 fb<sup>-1</sup> mark being surpassed, a memorable moment in the history of the LHC so far.

The LHC is now well on course to deliver the expected luminosity, despite the challenges encountered in 16L2. The peak luminosity had been decreased to 'just' its design value ( $1 \times 10^{34} \text{cm}^{-2} \text{s}^{-1}$ ) but much progress has since been made with the understanding of the "16L2" issue. An important collaborative effort by people from different groups allowed elaborating methods to increase the beam performance again without interrupting the run for work on 16L2.

On 5 September, the switch to a "8b4e" beam scheme was made, with 1916 bunches, the maximum possible with this beam scheme. In a second stage, the intensity per bunch was increased from  $1.1 \times 10^{11}$  protons per bunch to close to  $1.3 \times 10^{11}$  protons per bunch. These

two actions, together with the decrease of the beta star from 40 cm to 30 cm, brought the peak luminosity back up to  $1.5 \times 10^{34} \text{cm}^{-2} \text{s}^{-1}$ . In the meantime, the LHC injectors prepared for a high brightness version of the 8b4e beam that provides  $1.2 \times 10^{11}$  protons per bunch in a beam size that is about 40% smaller. This beam was taken into the LHC for the first time on 2 October and the next day it nearly equalled the record peak luminosity of  $1.75 \times 10^{34} \text{cm}^{-2} \text{s}^{-1}$ , which had been obtained on 9 August with the standard 25 ns BCMS beam (Bunch Compression Merging and Splitting).

With these beam conditions and good machine availability, the initial goal of 45 fb<sup>-1</sup> for 2017 is again within reach. Luminosity production for proton physics will continue until Monday, 20 November. After that, there will be a period of machine development and some special physics runs recently added following approval by the research board, before the winter maintenance break.



*Rende Steerenberg for the Operations group*



# CERN MEETS THE PUBLIC

Many visitors (re)discovered CERN at Researchers' Night and the United Nations Office in Geneva Open Day



Both children and adults had the opportunity to programme a robot. (Image: Sophia Elizabeth Bennett/CERN)

## European Researchers' Night 2017 at CERN: a resounding success with over 1400 visitors

On Friday, 29 September, the Globe of Science and Innovation hosted a crowd of science fans for European Researchers' Night. Between 5.00 and 11.00 p.m., 1400 visitors were given an enthusiastic welcome by a fantastic team of volunteers, who introduced them to the mysteries of bioluminescence, gave them a tour of the antimatter factory, showed them how to programme a robot and transported them to outer space in a debate with astronaut Matthias Maurer.

By happy coincidence, the event coincided with CERN's birthday, so the first 400 visitors were lucky enough to receive a delicious cake.

## CERN at the United Nations Office at Geneva Open Day

On Saturday, 7 October, CERN took part in the Open Day of the United Nations Office at Geneva, which was an opportunity to present the Laboratory's research and discoveries to the 14000 visitors in attendance. Visitors old and young had the chance to talk to the enthusiastic volunteers, take virtual reality tours of the experiments and learn about how CERN contributes to the UN's sustainable devel-

opment goals. You can read more about this subject here (<https://home.cern/cern-people/opinion/2017/08/cern-fully-engaged-sustainable-development-goals>). CERN's participation was highly appreciated by everyone involved and it was an ideal opportunity to demonstrate once again the importance of fundamental science and education for the whole planet. A great illustration of CERN's position at the heart of International Geneva.

## The Automnales fair

The next event for the general public will be the Automnales fair, at which CERN will be this year's guest of honour. We're still looking for volunteers for this event, so why not take part as a CERN ambassador?

For more information, visit this website. (<https://cern.ch/go/volontaires>)



A game of skill with an articulated arm. (Image: François Briard/CERN)



The "space" session with ESA astronaut Matthias Maurer prompted many questions from the audience. (Image: Clara Nellist/CERN)



Virtual reality transported young and old alike to the CERN experiments. Pictured is Mr Valentin Zellweger, Ambassador and Permanent Representative of Switzerland to the United Nations Office and Other International Organisations in Geneva. (Image: Ana Godinho/CERN)



The CERN stand was a big hit. (Image: François Briard/CERN)

# HOW CAN SUPERCONDUCTORS CONTRIBUTE FOR A GREENER FUTURE?

**An international group of students found new applications of superconductors during the Superconductor Hackathon at CERN**



*Participants in the intense three-day long Superconductor Hackathon sketching out their ideas of novel applications of superconductors. (Image: Athina Papageorgiou-Koufidou)*

In September 2017, a three-day Superconductor Hackathon hosted by CERN's IdeaSquare brought together an international group of students from technical and business backgrounds with the purpose of conceiving novel applications of superconductors. The hackathon was organised in the framework of the EUCAS 2017 conference, where engineers, economists and creatives united their forces to breed new ideas.

In the past decades, superconducting magnets developed for particle accelerators allowed physicists to take a close look in the heart of matter. Superconducting materials may well have a great impact on the way we produce energy, manufacture goods, transport commodities and medical applications. However today, besides their use in the medical imaging for Magnetic resonance imaging (MRI) and Nuclear magnetic resonance (NMR) systems, the commercial success of superconductors remains largely limited to research applications.

Energy and environmental challenges create opportunities for this alluring technology. "If we can work together to turn our

research efforts into products, businesses and services, then we really can change the world for the better," says Peter Keinz, Professor in WU Vienna.

During the hackathon, the students spent an intense three days of lectures, lively discussions and hands-on prototyping at IdeaSquare. The teams sketched out ideas of novel applications for a global fruit industry, uninterruptible power supplies for data centres, decentralized electrical power plants to stabilize the electrical grid and for a visionary rocket launch system that would allow humanity to explore the solar system at costs far lower than any new conventional rocket launch system.

The concepts were presented in a ceremony, with the teams competing for the audience award given to the most motivated group and the jury prize for the most promising project.

The jury prize went to the team who developed a fruit sorting method that will determine the fruits' maturity and thus help the suppliers determine where they should be shipped and how. Today, 30 percent of the avocados shipped from South America to Europe need to be thrown away, because there exists no way to determine the fruits maturity.

The method is based on an intriguing simplification of a spectroscopic technique called Nuclear Magnetic Resonance, widely used in chemistry. The device relies on a superconductive coil that generates an intense magnetic field to twist the water molecules in the fruits passing through the magnet.

The audience award was given for the concept of a novel space transport method.

The concept aims at mining the moon for natural resources using a superconducting magnetic launch system. The system also relies on superconducting magnetic energy storage (SMES) to supply the power to the superconducting magnets, catapulting the payload towards the Earth.

"Curiosity, creativity and collaboration - we saw CERN's core qualities impressively demonstrated during the three days of the hackathon," said Johannes Gutleber from the Future Circular Collider (FCC) study office.

Experts from CERN and the Universities of Genova, Vienna and Geneva participated in the Hackathon and helped the students tackle the technical challenges. A number of presentations during the first day demonstrated how superconductivity can contribute to a greener future. How it can be used in UPS systems based on flywheels, how the use of superconducting scanners can ensure high food quality and how concepts like Hyperloop and levitating transport could transform the future of travelling were some of the topics covered in the presentations.

A major aspect of the Superconductor Hackathon is how it encouraged participants to turn to each other for help and support. Markus Nordberg, head of IdeaSquare, mentioned in his speech during the award ceremony: "You are all winners and the biggest prize of this activity is sharing, the fact that you met and shared your experiences and ideas". The time is right for superconductivity to emerge as the next great transformational technology — with far-reaching impact. Jump on EASITrain and power our future!

*Panagiotis Charitos*

# SERVICES TO SESAME

## Donation of servers to SESAME marks the thirteenth donation of CERN computing equipment



Left to right: CERN's Head of IT, Frédéric Hemmer, and Director for International Relations, Charlotte Warakaulle, with President of the SESAME Council, Rolf Heuer, and the servers donated by CERN to SESAME packed and ready to go. (Image: Max Brice/CERN)

On 12 September, 56 servers left CERN bound for the SESAME laboratory in Jordan. SESAME, like CERN is an inter-governmental research organisation, and the two laboratories have a long-standing

relationship. SESAME is based on the CERN model, though its area of research is very different. A third generation light source currently in its start-up phase, SESAME will explore disciplines ranging from medicine and biology, through materials science, physics and chemistry to healthcare, the environment, agriculture and archaeology. SESAME's eight members are Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority, and Turkey.

Once at SESAME, the servers donated by CERN will be installed in the laboratory's data centre, where they will handle data from experiments soon to be coming on line. "These servers are a very valuable addition to the SESAME data centre," said Salman Matalgah, Head of IT at SESAME. "They will help ensure that we're able to provide first-class comput-

ing support to our users." Speaking for CERN, Charlotte Warakaulle, Director for International Relations said: "This donation continues the long-standing CERN support for SESAME. After many other successful donations, it's great that we can extend the list of beneficiaries to include SESAME: a truly inspiring project showcasing and building on scientific capacity in the Middle East and neighbouring regions." CERN contributed to the construction of the SESAME main ring through the EU-funded CESSAMag project, and is currently involved in another EU-supported project, Open SESAME, which is providing valuable training experience to SESAME personnel. Previous donations of IT equipment from CERN in 2017 were made to Algeria in February and to Bulgaria in August.

James Gillies

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## KEY MILESTONES REACHED FOR THE NEW CAMPUS-WIDE WI-FI SERVICE

State-of-the-art Wi-Fi coverage is now available in key buildings including – finally – a simple "visitor" Wi-Fi service



The renewal of the Wi-Fi infrastructure in Building 40 took place at the end of July. (Image: Anna Pantelia)

Almost a year ago, the CERN Bulletin featured an article on plans for a campus-wide Wi-Fi service for CERN. Several months have passed since then, and this new service has now been deployed in many buildings, including Restaurant 1, the Main Auditorium and the technically challenging Building 40.

More than 5000 Wi-Fi users in more than 20 buildings already benefit from the new Wi-Fi infrastructure. "The new Wi-Fi service is live now. Cabling works were the main activity last year but since April it's been full steam ahead with deployment of the new access points," explains Maria Alandes, leader of the Wi-Fi Service Enhancement Project. "We aim to deliver a full Wi-Fi service in all office buildings by autumn 2018."

### Advantages of the new Wi-Fi service

The new access points are centrally managed, which allows users to move around without losing their network connection — a feature much appreciated by users with access to the new service. "This new infrastructure also supports the latest Wi-Fi standard, 802.11ac, which can provide high throughput for compatible clients," explains Vincent Ducret, the Network Engineer re-

sponsible for the Wi-Fi service. "One happy user reported symmetric speeds of 370 Mbps, more than double what was possible before the upgrade."

### Where is the new Wi-Fi available?

Many office buildings in Prévessin and Meyrin are now benefitting from the new Wi-Fi service – see the *Further Information* section for more details. A key milestone for the project was the activation of the new service in Building 40 in July. The design of Building 40, with its reinforced concrete walls and circular open space, meant that it was very difficult to provide good Wi-Fi coverage via the previous independent access points. Too few access points meant that some areas weren't covered, but adding more created interference problems. "We now have 260 access points compared to 60 before and the central controllers ensure optimal Wi-Fi coverage throughout the



building,” explains Quentin Barrand, a fellow working on Wi-Fi service configuration and support. “Our pre-deployment surveys highlighted problems for the closed offices with metallic walls in the circular part of the building” adds Adam Sosnowski, a Wi-Fi expert who worked on the layout plan for the access points. “We’ve installed one access point per office in these locations in order to provide a high-quality service.” As for public areas, the new service has been available in Restaurant 2, Building 33 and the Microcosm for some time and has just been activated in Restaurant 1 and the main building areas.

#### Visitor Wi-Fi service

The new Wi-Fi service means we can also now support a Wi-Fi service allowing people to identify themselves by a code sent to a mobile phone (rather than needing to be authorised by someone at CERN) and with their devices kept isolated from CERN’s internal network. This new Visitor service has been available in Building 33 and to Microcosm visitors since July 2017 and in Restaurant 2 since early September. Now that the new Wi-Fi service has been enabled in Restaurant 1, the new Visitor network will automatically be available wherever the new Wi-Fi service is present. (If you want to try the service out though, you can’t use a laptop or smartphone already registered for access to the CERN network; only unregistered devices can use this ser-

vice — and remember, you won’t be able to access many internal network services, only those you can access freely from outside CERN.)

#### Further information

- List of already buildings where the service is already deployed here (<http://cern.ch/wifi-wise#DeployedBuildings>)
- Deployment status of each building in GIS here ([https://gis.cern.ch/gisportal/IT\\_equipment.htm](https://gis.cern.ch/gisportal/IT_equipment.htm)) (Wi-Fi deployment by building)

*Maria Alandes Pradillo and Vincent Ducret*

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## COMPUTER SECURITY: VIRTUAL MISCONDUCT – REAL CONSEQUENCES

### “Academic” and “freedom” do not imply “devoid of rules”

In the academic environment of CERN, given the freedom it provides to undertake research and development, it is sometimes forgotten that “academic” and “freedom” do not imply “devoid of rules”, and also do not mean that there are no consequences for inappropriate or illegal behaviour.

The CERN Computing Rules – as set out in Operational Circular No. 5 (OC5) – are based on common sense and apply to everyone using CERN’s computing facilities: staff, users, students, sub-contractors, visitors... In terms of content, it is easy. Anything you would not normally do outside the privacy of your own home, or anything that obviously violates the law or is offensive, inappropriate or immoral, should not be done at CERN. The browsing of pornographic material is one such example. Whether in your office or on a dedicated public screen, it is simply not appropriate in a workplace context such as CERN and has led to the termination of contracts or persons no longer being welcome on the site. (See also our Bulletin article “Offensive Public Browsing”.

Equally inappropriate is the dissemination of material which sheds a negative light on the Organization (or, as the Staff Rules say, creates moral or material prejudice for CERN). An example is the uploading to social media of inappropriate content to do

with CERN or filmed on site, which can create a negative reaction in the media and thus impact CERN’s reputation adversely. On one occasion, for example, such activity required the mobilisation of significant resources by the Organization to address the media consequences, as well as for the internal follow-up procedures that were necessary. In that case, disciplinary action was taken in collaboration with the home institutions of the individuals concerned.

Copyright violation and licence infringements are also taken seriously : one university student found herself in a very tricky situation after she downloaded software from a dubious web portal, ran the software without a valid licence key, filed a support request using her university professor’s CERN account, and was caught by the company in question. The bill for licence infringement, which was initially sent to CERN, was passed on to her university.

As far as the use of CERN’s computing resources is concerned, common sense prevails once more. The CERN computing facilities are intended for professional use exclusively. While some personal activity is tolerated (like privately browsing the web, hosting personal webpages, or use for the benefit of CERN’s clubs), extensive misuse is not. An obvious CERN exit strategy? Bitcoin mining! While it might be tempt-

ing for a user to run Bitcoin mining on the Worldwide LHC Computing Grid, there are strict rules and extensive security monitoring in place. All violations are systematically escalated and followed up...! At least one person once tried to benefit from these resources to generate Bitcoins – to print virtual money for free, while the community paid the costs. The consequence for that person: a formal investigation.

Perhaps most serious of all, and something nobody can pretend to have thought was permissible, is sabotage. Hacking into the computer of a colleague, manipulating his analysis and deleting data is definitely outside common sense and is morally unacceptable. Planting back doors into CERN computing services for usage following your departure from CERN is too. In these cases, the perpetrators were dismissed by CERN or their new employer, respectively...

These examples are not intended to scare you. We just want to remind you that your work at CERN is subject to a set of rules: primarily, the Staff Rules and Regulations and the Organization’s Administrative and Operational Circulars, as well as the CERN Code of Conduct. They are there to protect you and ensure a respectful workplace. In particular, your use of CERN’s computing facilities is governed by OC5, which is in-

tended to protect the Organization, and therefore you, your data and your work, from any reputational or operational difficulties. So, please familiarise yourself with these rules if you have not already done so, and respect them!

*Do you want to learn more about computer security incidents and issues at CERN? Follow our Monthly Report ([http://cern.ch/security/reports/en/monthly\\_reports](http://cern.ch/security/reports/en/monthly_reports)).*

*For further information, questions or help, visit our website (<http://cern.ch/Computer.Security>) or contact us at [Computer.Security@cern.ch](mailto:Computer.Security@cern.ch).*

*The Computer Security Team*

## CERN AND THE HUG TEAM UP FOR A RESCUE EXERCISE

### CERN and the HUG combined their efforts in an accident simulation



(Image: Ordan, Julien Marius/CERN) - For more photos of the simulation, go to: <https://cds.cern.ch/record/2286001?ln=en>.

On 19 September, around 2 p.m., a mock major road accident involving five “victims” was staged on the Prévessin site. The simulation, which was part of a large-scale rescue exercise, was organised by CERN in the framework of its collaboration with the University Hospitals of Geneva (HUG).

Overall, no fewer than 18 members of the CERN Fire and Rescue Service (FRS) (including seven trainee ALS (Advanced Life Support) paramedics), four HUG doctors and four HUG nurses took part in the ex-

ercise. Several FRS and HUG rescue vehicles as well as a helicopter from the HUG REGA base were also involved in the simulation.

The exercise lasted approximately 1 hour and 30 minutes and enabled the teams from CERN and the HUG to fine-tune their coordination and spot areas for improvement. Please rest assured that all the “victims” came home safe and sound.

*Anaïs Schaeffer*

## Announcements

### THE OTHER SIDE OF INNOVATION | 25 OCTOBER | IDEASQUARE

Professor of Technology and Innovation at ETH Zürich, Stefano Brusoni, will give a talk on the divergent process of innovation while Bruno Herbelin, Deputy Director of the Center for Neuroprosthetics at EPFL, will immerse us in the power of embodiment of virtual reality and how researchers can best use this new technology.

Projects developed at IdeaSquare's rapid prototyping facilities will be showcased throughout the day. Among them, discover prototypes addressing societal challenges, developed by multidisciplinary student teams in collaboration with researchers at CERN, through the Challenge Based Innovation programme.

You can take a tour of the space or sign up for introductory workshops in 3D printing,

robotics programming, and human-centred design.

The event will take place at IdeaSquare, located in Building 3179 at Point 1, next to the Globe of Science and Innovation from 10.00 a.m. to 7.00 p.m. Access is open to anyone with a CERN badge. The full agenda is available on the Indico page of the event.



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## INNOVATE AND INSPIRE: JOIN THE LHCREATE HACKATHON



Building on the success of *CMS Create*, this year's *LHCreate* hackathon is brought

to you by the CMS and ATLAS experiments. Four teams of contestants will have two days to design and build an interactive exhibit intended for the public. The exhibits should introduce the world of particle physics and address the “why?” of CERN's research.

CERN people (staff, students, users, etc.) are encouraged to join the *LHCreate* hackathon for two days of productive fun! Participants will have a chance to collaborate with external actors, as teams will mix four CERN-affiliated people with two student designers from the Geneva IPAC design school. The hackathon will take place at IdeaSquare, where labs, workshops and a large supply of components and material will be made available for the construction of the exhibits.

Teams will be also advised by professionals in the fields of physics, product design, communication and tourism. The winning

team will be selected by a panel of four judges with criteria weighted as:

- Scientific content: 30%
- Suitability for visits: 30%
- Product design: 30%
- Reproducibility: 10%

After two days of fun, work and pizza, the teams will present their prototypes at the Globe in front of the panel of judges and members of the public. Prizes include ski passes, restaurant vouchers, spa treatments and tickets for the Automnales. The winning exhibit will also be re-engineered and turned into a permanent exhibit to be displayed at CERN and in the tourist information offices of the Pays de Gex region.

If you have a creative mind, a taste for teamwork and challenges, join us! Register at: <http://lhcreate.web.cern.ch/>.

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## “COMPLEXE SPORTIF DE MAISONNEX”: REDUCTIONS FOR CERN MEMBERS

In 2015, an agreement was established between CERN and the “*Complexe sportif de Maisonnex*” so that holders of the Blue (C) CERN card can enjoy a 15% reduction on

subscriptions for sport and leisure activities organised by the Maisonnex sports centre, such as tennis and squash, access to an open air swimming pool and also a sauna.

For more information, please check their website ([http://www.meyrin.ch/jahia/Jahia/administration/sports/complex\\_sportif\\_de\\_maisonnex](http://www.meyrin.ch/jahia/Jahia/administration/sports/complex_sportif_de_maisonnex)).

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## BADGE-WEARING TO BECOME COMPULSORY FOR ALL AT CERN

Last year, CERN's Enlarged Directorate approved the Host States' suggestion concerning the permanent and visible wearing of badges (CERN access card or visitor badge). As a result, all persons present on CERN's fenced site will soon be required to wear a badge visibly. This measure made sense only if all persons accessing the CERN site could be identified, regardless of their status. A working group made up of representatives of IR-ECO, FAP-AIS, BE-ICS, IT-CDA and SMB-DI was therefore created to discuss its implementation.

We are nearing our goal and should be able to implement the project gradually over the next few months. You will be informed of the various implementation dates in due course.

Please note that for visitors attending lectures and seminars, access management and badge creation will be handled via Indico.

The introduction of this measure will have several consequences:

- The concept of a “guarantor” accompanying unidentified persons will no longer exist.
- Your visitors must be registered in advance.
- “Pirate” visits organised without the approval of the Visits Service will be prohibited. All visits must now be declared, along with their participants if they are not CERN access card holders.
- Only access badges approved by CERN will be accepted.

There are two types of visitor badge:

- An A6 card ("portrait" format) made of tear-resistant paper, with a lanyard, for professional visitors and guided tours.

- An A4 print-at-home sheet that can be folded into four, for visitors attending lectures and seminars. A soft badge holder will be supplied by CERN.

More information on the procedural changes will be provided in due course.

Thank you for your understanding.

*The working group on the wearing of badges*

## CALL FOR ABSTRACTS FOR THE 4TH DEVELOPERS@CERN FORUM



Hundreds of developers work on many different projects at CERN – from data analysis to beam operations and administrative applications. As of this October, they will have an opportunity to meet each other at the 4<sup>th</sup> Developers@CERN Forum.

The 4th Developers @ CERN Forum will be held on 23 and 24 October in IdeaSquare. The event is being organised by developers from different CERN departments.

The topic for this fourth event will be 'Application Deployment', with a focus on continuous integration techniques. This is a topic of interest for all the developers, regardless of their specific fields of activity. The whole idea is to exchange best practices and solutions to ensure that our applications are highly reliable.

Anyone interested in submitting a presentation or a topic for a

workshop should follow this link: <https://indico.cern.ch/event/655194/abstracts/>.

With this initiative, the organisers hope to involve a large proportion of CERN's developers. If you are interested in contributing or just participating as a member of the audience, please visit the dedicated website (<http://cern.ch/dev-forum>) or e-mail the organisers. (<http://developers-forum-organizers@cern.ch>)

*The Developers@CERN Forum organisers*

## APPLY NOW FOR THE 2018 JUAS SCHOOL



Registration for the 2018 session of the Joint Universities Accelerator School (JUAS) is now open.

Applications are welcome from staff, fellows and post-graduate students wishing to further their knowledge in the field.

The deadline for submission of the full application form is **15 October 2017**.

For more information please visit [www.juas.eu](http://www.juas.eu).

# Ombud's corner

## THINGS DO INDEED CHANGE...

"Nothing will change" is one of the complaints often heard in the Ombud's Office. However, four years after taking on the role of the CERN Ombud and a few days before retiring, I would like to assert that things do change, albeit sometimes very slowly, and that, by addressing issues constructively, we can all influence each other to ultimately bring about the changes that we seek in our environment.

Although the Ombud function was established only in 2011 at CERN, it had first been proposed seven years prior to that in a 2003 presentation to the Management on equal opportunities, as well as in subsequent reports, signalling interpersonal communication issues that would benefit from an informal conflict resolution process such as this. That did indeed take some time, but it was time well spent understanding what such a function could provide and defining the specific role and terms of reference that would correspond to CERN's needs.

The creation of the Ombud function represents a commitment by CERN, and its Management, to the well-being of all its contributors and to the promotion of a respectful workplace environment. In everyday terms, this implies the willingness to support an environment in which interper-

sonal conflicts are allowed to surface with a view to managing them constructively, and thereby, over time, fostering a workplace culture of ongoing dialogue and trust.

Things have indeed changed in the seven years since it was established, as more and more people begin to have recourse to the Ombud's Office. Since I took on the role in 2014, there have been on average around 100 visitors a year, showing a need on the part of our colleagues to deal with the difficulties they encounter and a willingness to engage in bringing about change. Not all outcomes can be to the full satisfaction of the people concerned, but most visitors express their appreciation of a safe place in which they can talk openly, and for the insights and support they obtain, helping them to manage the situations they face and move on.

No organisation can be without conflict – it is how we look at conflict that counts.

As the work of the Ombud's Office gets to be better known, whether through direct interventions, Ombud's Corner articles in the bulletin, or Ombud Reports and presentations, our attitude towards conflict will also evolve towards a different mindset where both the Management and other staff are

more ready to address issues early, constructively and as a means to achieve even greater collaboration and trust.

Indeed, bringing problems to the surface and facing them together will sow the seeds for a conflict-competent culture that is open to questioning old habits and ensuring that, when necessary, things do indeed change.

Facing issues and engaging in a change process is particularly pertinent to me today as I find myself on the brink of retirement. I am going to miss CERN and everything it represents. I would like to thank all of you, readers of my articles, visitors to the Ombud's Office, the Management, colleagues and friends for having entrusted me with so many culture-change projects over the years, culminating in this role of Ombud, all of which I hope to have accomplished with care, concern and competence. Khalil Gibran's *Prophet* says that "work is love made visible" – indeed I am grateful for so many opportunities over the last 41 years to express my love for CERN and the wonderful CERN community, and I wish you continued success and well-being in the years to come.

*Sudeshna Datta Cockerill*