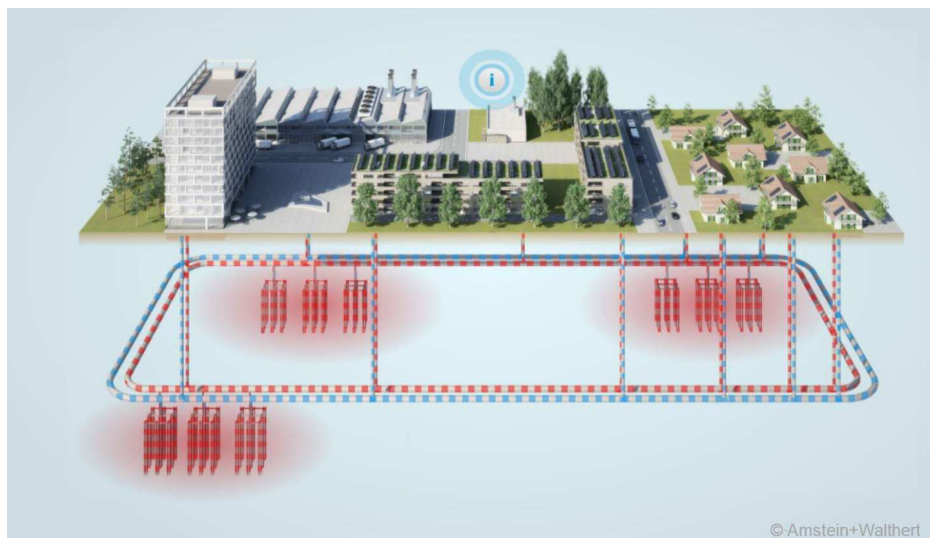


CERN: A RENEWABLE ENERGY SOURCE

Hot water from the LHC's cooling system at Point 8 will be collected to heat a new area of the neighbouring commune of Ferney-Voltaire



Geothermal probes implanted in the ground under the new area (the nine red "bunches" on the image) will store heat, compensating for temperature fluctuations in the network (Image: Territoire d'Innovation)

Can fundamental physics keep you warm in winter? Using neurons, maybe? Think bigger! Like some industrial sites, scientific facilities can be used to heat living spaces. CERN is taking the first steps in this direction.

On 26 June, the Laboratory signed an agreement with the French local authorities concerning the collection of heat from its facilities. From 2022 onwards, some of the hot water from the Large Hadron Collider's (LHC) cooling system at Point 8 will be diverted and made available to the neighbouring commune of Ferney-Voltaire.

"At CERN, many systems and installations (cryogenics, electronics, ventilation, etc.) are cooled using water: cold water is injected into the cooling circuit and the hot water produced is then collected and cooled by cooling towers, before being reinjected into the circuit," explains Serge Claudet, CERN's energy coordinator. "The hot water leaving the circuit can reach a temperature of 30°, which is very useful in the context of energy recovery."

(Continued on page 2)

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CERN: A RENEWABLE ENERGY SOURCE

With energy recovery in mind, some of the hot water collected at LHC Point 8 will be diverted to a parallel circuit that will supply the heating system of a new area currently under construction in Ferney-Voltaire (the new *zone d'aménagement concerté* (urban development zone, ZAC)). Thanks to CERN, up to 8000 people's homes will be heated at a lower cost and with reduced CO₂ emissions.

"We have performed several studies and discovered that the same could also be done at other points of the LHC," says Serge Claudet. "Notably, Points 2 and 5 could also provide heating for the neighbouring *communes*, and we are looking into the possibility of using heat collected

at Point 1 to heat the buildings on CERN's Meyrin site."

The work on the CERN side to connect Point 8 to the *commune* of Ferney-Voltaire has already begun and is scheduled to be completed by the end of the second long shutdown. "CERN is handling the construction of the heat recovery circuit up to the boundary of its site," says Serge Claudet. "Beyond that point, the *Communauté d'agglomération du Pays de Gex* will take over and will install 2 km of pipes between CERN and the new ZAC." Initial tests of the heat recovery network will be performed in 2021, with a view to coming into operation in 2022.



In blue, the new *zone d'aménagement concerté* (ZAC) currently under construction in Ferney-Voltaire. In red, the heat recovery network that will link LHC Point 8 to this new area (Image: Territoire d'Innovation)

Anaïs Schaeffer

LS2 REPORT: THE COMPLEX CASE OF VACUUMS IN THE EXPERIMENTS

New vacuum chambers are being developed for the ALICE and CMS experiments



The ALICE central beryllium chamber undergoing its final processing in the laboratory in building 181. The internal wall will be coated with a non-evaporable getter coating. The chamber can be seen fitted in a special frame and inserted vertically into the sputtering setup (Image: Samuel Hertzog/CERN)

It takes a lot more than nothing to make a vacuum. The vacuum chambers of the LHC experiments, for example, are complex components, particularly those that are nestled in the heart of the detectors, which come in a variety of shapes and are made of special material. During the second long shutdown, the teams in the vacuum group are therefore hard at work replacing the beam tubes in the ALICE and CMS experiments.

ALICE will install a new inner tracking system (ITS) closer to the beam to improve the detection of short-lived particles. As a consequence, a beam tube with a smaller diameter must be installed to replace the current chamber. "We have developed a

chamber 3.8 centimetres in diameter, compared to 5 before, and with a thickness of 0.8 millimetres, which is at the limit of what can be achieved with current technology," explains Josef Sestak of the vacuum group, who is in charge of the project.

This central vacuum chamber is made of beryllium, a metal that is very light, very resistant and transparent to particles. To put it another way, it lets particles through without intercepting them, a quality essential to ensuring that the experiment can detect all the particles. However, beryllium is a very difficult metal to work with: it comes in the form of a powder that must be compressed at very high pressure to obtain a bar of metal that is then hollowed out. Only a few companies in the world can produce such components from beryllium.

ALICE's central vacuum chamber, which is around one metre long, has just been tested and validated at CERN, following two years of development in collaboration with a company in the United States. It is now being prepared to receive a coating of non-evaporable getter (NEG), a material that is able to trap residual molecules once it is heated. "The experiments' vacuum systems rely on this coating because conventional vacuum pumps cannot be installed near to the interaction point as they

would disturb physics operations. The nearest vacuum pumps are actually placed at least 10 metres away from the interaction point," explains Josef Sestak. A similar chamber is under development for CMS, but it is six metres long.

Aside from the central chamber, the vacuum teams are replacing all the peripheral parts of the vacuum chamber in the ALICE and CMS experiments. Stainless steel components will be replaced with aluminium parts, since aluminium displays a much lower induced radioactivity than stainless steel. Eight vacuum chambers of four different types, connected by bellows and other connecting components, must be replaced in CMS. Four spare chambers are also being produced. "Some of these components are conical, with a diameter of 200 millimetres reducing down to 45 millimetres," explains Josef Sestak. The aluminium used is also special, with the finest grain possible. It must be machined with extreme precision in order to be almost perfectly aligned.

Once they have been validated and treated, the new vacuum chambers for ALICE and CMS will be installed in 2020.

Corinne Pralavorio

ARTS AT CERN: COLOURFUL HOLOGRAMS AND A MELODY OF FORGOTTEN SOUNDS

Nicole L'Huillier and Alan Bogana have presented the first fruits of their residence at CERN: a sound sculpture and a holographic work



Nicole L'Huillier and her sound sculpture (Image: Madeline Weir/CERN)

Nicole L'Huillier and Alan Bogana have just spent three weeks at CERN in the framework of *Simetría*, an artist residency split between CERN and the astronomical observatories in Chile. At the start of July, the two artists each presented their first creation inspired by their stay in the world of physics.

Nicole L'Huillier has brought forgotten sounds back to life: the Chilean artist has

devised a sound sculpture that amplifies and broadcasts the sounds that surround us but that we do not hear. Housing six colourful speakers, her sculpture was designed to be a "parasite" in the environment where it is installed.

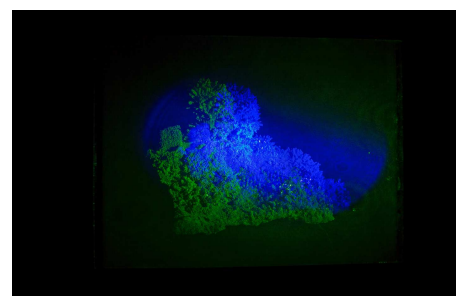
In early July, the artist placed her installation in the ALICE experiment, and then on the lawn outside Restaurant 1. Her intention is to "connect observers with their quark-gluon plasma origins, shake up their material existence and let this parasitic medium guide them through a concert of a specific moment in space and time."

Alan Bogana also exhibited his work in Restaurant 1, on 11 July: colourful holograms that caught the eye of many visitors one evening.

This Genevan artist is particularly interested in the behaviour of light and its interactions with matter. He produces art in many different media and is also interested

in research into dark matter, computer-produced visual simulations and technological architecture.

As the first winners of *Simetría*, Nicole L'Huillier and Alan Bogana will now visit the observatories in Chile to continue their artistic quest through the scientific universe.



Alan Bogana's art work (Image: Monica Bello/CERN)

Elisa Pospieszny

DUTCH ARTIST ROSA MENKMAN WINS COLLIDE INTERNATIONAL BARCELONA AWARD

Dutch artist Rosa Menkman has been selected as the winner of the first Collide International award in Barcelona alongside four Honorary Mentions



Dutch artist Rosa Menkman, winner of Collide International Barcelona Award 2019 (Image: Courtesy of the Artist)

Geneva and Barcelona. Dutch artist Rosa Menkman has been selected as the winner of the first Collide International award in Barcelona alongside four Honorary Mentions. The residency award, organised by Arts at CERN in partnership with the City of Barcelona and the Institute of Culture of Barcelona, received 228 entries from 49 countries.

"The primary objective of Arts at CERN is to create extraordinary opportunities for dialogue and exchange between artists and scientists, and to encourage significant

connections between creative minds in a fundamental research environment. I am particularly proud to announce the winners of the first Collide International prize in collaboration with the city of Barcelona," says Monica Bello, head of Arts at CERN.

"Here at CERN, we value diversity and exchange, across communities and countries. It is an inherent part of our laboratory's culture and essential to the success of our research. We appreciate the strong partnerships that now allow us to welcome new artists to connect with our community.

I am excited to see what they will achieve together with our scientists,” says Charlotte Lindberg Warakaulle, CERN’s Director for International Relations.

According to the jury, comprised of Monica Bello, Arts at CERN, Oriol Gual, director of La Capella in Barcelona, Joana Hurtado, director of Fabra i Coats and Helga Timko, CERN physicist, the winning artist demonstrated a sophistication of concept and approach. Menkman’s topic focused on the idea of resolution, which resonates with CERN’s quest to perform research from the smallest to the largest scale. They found Menkman’s argument about the significance and purpose of scientific measurement and how information is filtered in and out of an experiment inspiring. The artist will be invited to CERN in Geneva for two months to explore these topics, after

which she will work for a month on a 3D video production at Fabra i Coats.

“Barcelona City Council has the will to make the city a European capital in research and innovation through its Barcelona Science Plan. We have initiated several measures, which makes me particularly enthusiastic about the collaboration established with CERN, an alliance that will allow us to bring art and science to the citizens. I would like to congratulate all those who participated in this first edition in our city, especially Rosa Menkman, whom we will receive during her stay in Barcelona at Fabra i Coats – Art Factory and Barcelona’s Centre for Contemporary Art,” says Joan Subirats, Barcelona’s Deputy Mayor of Culture, Education and Science.

The Honorary Mentions are: Samoa Rémy from Switzerland, Addie Wagenknecht

from Austria, Nathan Witt from the UK, and Barcelona-based artist Gabriella Torres from Puerto Rico. Their work presented abstract phenomena in tangible forms while demonstrating their ability to question and analyse the deeper meaning of physical observations.

Collide International is Arts at CERN’s flagship programme and residency award, organised every three years in partnership with a city and a cultural organisation. The collaboration with Barcelona began with this first award and will continue until 2021.

Further information:

Arts at CERN website (<http://cern.ch/arts/>)

Arts at CERN Facebook site (<https://www.facebook.com/ArtsatCERN/>)

Twitter ArtsAtCern (<https://twitter.com/ArtsAtCERN>)

AFRICAN LIBRARIANS COME TO CERN TO COMPLETE THEIR TRAINING ON DIGITAL LIBRARIES

The second part of the CERN-UNESCO School on Digital Libraries took place at CERN at the end of June



From left to right: Winfreda Nalwimba (EvelynHone College, Zambia), Peter Otuoma (Karatina University, Kenya), Timothy Sukya (University of Nairobi, Kenya), Parul Pant (CERN), Jens Vigen (CERN), Deogratius Daniel (Mzumbe University, Tanzania) and Benedetta Nirta (CERN) (Image: CERN)

Following one week of general training in Nairobi, Kenya, the second part of the CERN-UNESCO School on Digital Libraries took place at CERN this year, from 17 to 28 June. This in-depth training saw the participation of four African librarians invited to CERN to complete their training after attending the Kenyan School in early October 2018.

Now on its fifth edition, the CERN-UNESCO School on Digital Libraries aims at making African research more visible, by familiarising librarians with open-access

and open-science principles, introducing them to new web technologies and services, such as Invenio, and advising them how to further develop their own digital libraries.

Throughout their two weeks in Geneva, the participants attended conferences at the United Nations, met advocates of open access and created new professional networks. “It was my first time in Europe, and we had the opportunity to meet new people, make connections with founders and delegates around the world”, says Peter Otuoma, from Kenya, who is a systems librarian at Karatina University.

Most importantly, during this follow-up training, they had the chance to work hands-on on open-access technologies with CERN experts, which helped them come up with solutions for their own professional challenges. “The solutions for open access I discovered here were quite helpful. Now I feel confident I will be able to test my knowledge back in my home institution”, says Timothy Sukya, systems librarian at the University of Nairobi.

When asked about what the future had in store, Daniel Mwashivya, from Tanzania,

had no doubts he would help spread and share the knowledge learned at CERN: “The role of librarians worldwide is constantly changing. We are no longer just sitting on shelves and this is why we need to familiarise ourselves with digital libraries.”

Winfreda Nalwimba, from Zambia, the only female participant who was able to attend the training at CERN, hopes that by sharing her experience at CERN, she can inspire more girls in her home institution to be involved in science.

The CERN-UNESCO School for Digital Libraries is an Education & Outreach project supported by the CERN & Society Foundation. The 2016 school in Ghana, the 2018 school in Kenya and their follow-up training at CERN were possible due to the kind donation received from Ms. Margarita Louis-Dreyfus.

Download (<https://cernandsocietyfoundation.cern/news/take-peek-new-annual-review>) the 2018 CERN & Society Foundation Annual Review, to learn more about the Nairobi CERN-UNESCO School on Digital Libraries.

HOW THE ISRAEL INNOVATION AUTHORITY AND CERN ARE INFUSING THE ISRAELI INNOVATION ECOSYSTEM WITH ADVANCED TECHNOLOGY

CERN technologies have proven to be beneficial in driving innovation in industries around the world. Four new contracts have been signed between CERN and Israeli companies

The Knowledge Transfer group at CERN has initiated a pilot programme in collaboration with the Israel Innovation Authority (IIA). The purpose of the programme is to explore how cutting-edge Israeli companies and institutes can embrace specific CERN technology and know-how to fuel their innovation and help drive positive impacts for society.

CERN set up a successful two-day event in June last year to meet with industrial directors from Israel and discuss possible proposals. As a result, four exciting projects have been selected by CERN and IIA within a wide range of application fields: CEVA, All-In-Image, ImmunoBrain Checkpoint and HIL Applied Medical. The four companies were awarded funds from the IIA to start a close collaboration with CERN.

The collaboration is a pilot and has shown that the Israeli ecosystem has very “fertile ground” for growing meaningful use cases out of CERN technology. The companies will have access to some of CERN's unique technological know-how and expertise. Scientific advances in accelerators, detectors and computing have historically led to positive impacts on medical and biomedical technologies. Three of the four

selected projects relate to medical applications, and will benefit from CERN's long-standing contribution to the medical field.

The collaboration has brought out the best in both CERN and IIA. “There is a lot of innovation potential in CERN technologies, and market insights and an entrepreneurial spirit are required to realise it. Thanks to the IIA, we have found the best partners for this in Israel,” says Han Dols, leader of the Business Development section at CERN. Today, experts from different departments at CERN are working closely with the Israeli companies in order to bring these ambitions to fruition. Their involvement and collaboration are vital contributions to the success of the programme.

“The cooperation with CERN has started a new age of direct industrial research benefits for the Israeli research and development community.”

Dr. Aviv Zeevi Balasiano, Vice President of the Technology Infrastructure Division (Israel Innovation Authority)

About the companies collaborating with CERN:

CEVA concentrates on the development of innovative neural networks for data com-

pression with know-how from CERN on extremely fast machine-learning hardware. CEVA's technology is used in many consumer applications like mobile phones and intelligent equipment for the home.

All-In-Image focuses on machine learning techniques for data analysis in the medical field, provided via a 'software as a service' model across the globe. This project will help hospitals and clinics search for data in order to obtain new insights into illnesses and their treatment options.

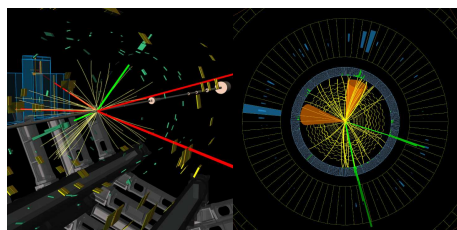
ImmunoBrain Checkpoint has established a consortium with Tel-Aviv University for the use of the technology BioDynaMo, a CERN openlab collaboration for simulation of large quantities of cells. Such simulations might help to better predict the effectiveness of immunotherapy applications for the treatment of Alzheimer's disease.

HIL Applied Medical focuses on the use of CERN expertise in the field of magnets and detectors for the development of ultra-compact, high-performance systems for proton therapy. Proton therapy is among the most advanced, focused and precise forms of radiotherapy.

Camille Monnin

LHC EXPERIMENTS PRESENT NEW HIGGS RESULTS AT 2019 EPS-HEP CONFERENCE

ATLAS and CMS have studied the Higgs boson with the largest sample of proton–proton collision data recorded so far



Candidates for a Higgs produced with a Z. ATLAS (l): both decay ultimately to leptons, leaving two electrons (green) and four muons (red). CMS (r): the Higgs decays to two charm quarks forming jets (cones); the Z decays to electrons (green) (Image: ATLAS/CMS/CERN)

Geneva and Ghent. At the 2019 European Physical Society's High-Energy Physics conference (EPS-HEP) taking place in Ghent, Belgium, the ATLAS and CMS collaborations presented a suite of new results. These include several analyses us-

ing the full dataset from the second run of CERN's Large Hadron Collider (LHC),

recorded at a collision energy of 13 TeV between 2015 and 2018. Among the highlights are the latest precision measurements involving the Higgs boson. In only seven years since its discovery, scientists have carefully studied several of the properties of this unique particle, which is increasingly becoming a powerful tool in the search for new physics.

The results include new searches for transformations (or “decays”) of the Higgs boson into pairs of muons and into pairs of charm quarks. Both ATLAS and CMS also measured previously unexplored properties of decays of the Higgs boson that involve electroweak bosons (the W, the Z and the photon) and compared these with the predictions of the Standard Model (SM) of particle physics. ATLAS and CMS will continue these studies over the course of the LHC’s Run 3 (2021 to 2023) and in the era of the High-Luminosity LHC (from 2026 onwards).

The Higgs boson is the quantum manifestation of the all-pervading Higgs field, which gives mass to elementary particles it interacts with, via the Brout-Englert-Higgs mechanism. Scientists look for such interactions between the Higgs boson and elementary particles, either by studying specific decays of the Higgs boson or by searching for instances where the Higgs boson is produced along with other particles. The Higgs boson decays almost instantly after being produced in the LHC and it is by looking through its decay products that scientists can probe its behaviour.

In the LHC’s Run 1 (2010 to 2012), decays of the Higgs boson involving pairs of electroweak bosons were observed. Now, the complete Run 2 dataset – around 140 inverse femtobarns each, the equivalent of over 10 000 trillion collisions – provides a much larger sample of Higgs bosons to study, allowing measurements of the particle’s properties to be made with unprecedented precision. ATLAS and CMS have measured the so-called “differential cross-sections” of the bosonic decay processes, which look at not just the production rate of Higgs bosons but also the distribution and orientation of the decay products relative to the colliding proton beams. These measurements provide insight into the underlying mechanism that produces the Higgs bosons. Both collaborations determined that the observed rates and distributions are compatible with those predicted by the Standard Model, at the current rate of statistical uncertainty.

Since the strength of the Higgs boson’s interaction is proportional to the mass of elementary particles, it interacts most strongly with the heaviest generation of fermions, the third. Previously, ATLAS and CMS had each observed these interactions. However, interactions with the lighter second-generation fermions – muons, charm quarks and strange quarks – are considerably rarer. At EPS-HEP, both collaborations reported on their searches for the elusive second-generation interactions.

ATLAS presented their first result from searches for Higgs bosons decaying to pairs of muons ($H \rightarrow \mu\mu$) with the full Run 2 dataset. This search is complicated by the large background of more typical SM processes that produce pairs of muons. “This result shows that we are now close to the sensitivity required to test the Standard Model’s predictions for this very rare decay of the Higgs boson,” says Karl Jakobs, the ATLAS spokesperson. “However, a definitive statement on the second generation will require the larger datasets that will be provided by the LHC in Run 3 and by the High-Luminosity LHC.”

CMS presented their first result on searches for decays of Higgs bosons to pairs of charm quarks ($H \rightarrow cc$). When a Higgs boson decays into quarks, these elementary particles immediately produce jets of particles. “Identifying jets formed by charm quarks and isolating them from other types of jets is a huge challenge,” says Roberto Carlin, spokesperson for CMS. “We’re very happy to have shown that we can tackle this difficult decay channel. We have developed novel machine-learning techniques to help with this task.”

The Higgs boson also acts as a mediator of physics processes in which electroweak bosons scatter or bounce off each other. Studies of these processes with very high statistics serve as powerful tests of the Standard Model. ATLAS presented the first-ever measurement of the scattering of two Z bosons. Observing this scattering completes the picture for the W and Z bosons as ATLAS has previously observed the WZ scattering process and both collaborations the WW process. CMS presented the first observation of electroweak-boson scattering that results in the production of a Z boson and a photon.

“The experiments are making big strides in the monumental task of understanding the

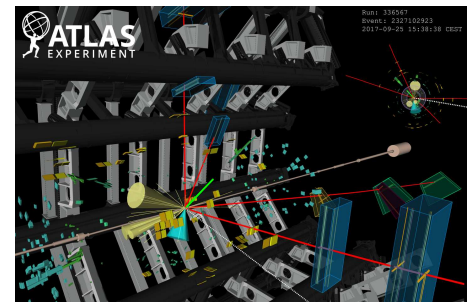
Higgs boson,” says Eckhard Elsen, CERN’s Director of Research and Computing. “After observation of its coupling to the third-generation fermions, the experiments have now shown that they have the tools at hand to address the even more challenging second generation. The LHC’s precision physics programme is in full swing.”

ATLAS:

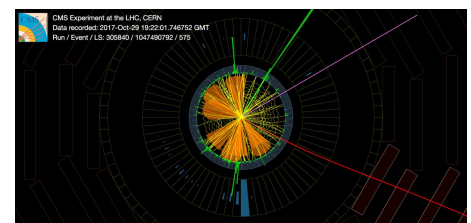
- Summary of 2019 EPS-HEP results: <https://atlas.cern/updates/atlas-news/new-results-eps-2019>
- Physics briefings on 2019 EPS-HEP results: <https://atlas.cern/tags/eps-2019>
- Physics publications: <https://twiki.cern.ch/twiki/bin/>

CMS:

- Summary of 2019 EPS-HEP results: <https://cms.cern/news/EPS-HEP2019>
- Physics briefings on 2019 EPS-HEP results: <https://cms.cern/tags/cms-physics-briefings-eps-hep-2019>
- Physics publications: <http://cern.ch/cms-results/public-results/publications/>

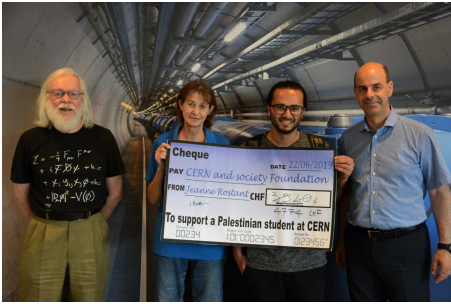


An event recorded by ATLAS showing a candidate for a Higgs boson produced in association with two top quarks. The Higgs boson decays to four muons (red tracks). There is an additional electron (green track) and four particle jets (yellow cones) (Image: ATLAS/CERN)



An event recorded by CMS showing a candidate for a Higgs boson produced in association with two top quarks. The Higgs boson and top quarks decay leading to a final state with seven jets (orange cones), an electron (green line), a muon (red line) and missing transverse energy (pink line) (Image: CMS/CERN)

A RETIREMENT PRESENT TO SUPPORT A SUMMER STUDENT



Jeanne Rostant with Osama Khlaif, the Palestinian student she helped bring to CERN, accompanied by John Ellis and Emmanuel Tsesmelis, who helped Jeanne contact the CERN & Society Foundation to organise Osama's stay at CERN (Image: Eszter Badinova/CERN)

After 39 years at CERN, including 37 working with theorists, most recently as DAO of the Theoretical Physics department, Jeanne Rostant is retiring this summer. In the 1990s, she assisted the late Sergio Fubini develop his Middle-East Scientific Collaboration, which helped prepare the way for the SESAME laboratory that has been established in Jordan with support from Iran, Israel, the Palestinian Authority and other countries in the region.

In lieu of any personal gifts to her, Jeanne asked the CERN & Society Foundation to collect money to help cover the costs of participation by a Palestinian student in the CERN Summer Student Programme for those from Non-Member States. Following

a fantastic response from donors, the student has now arrived at CERN, where he is attending lectures and working with the ATLAS collaboration.

"Out of all my CERN memories, working with Sergio on his Middle-East project was one of the most enriching, and I wanted to acknowledge this," says Jeanne.

This particular donation campaign has now closed, but the CERN & Society Foundation supports many other good causes to which you can donate. If you also would like to organise a fundraiser in support of one of the many CERN & Society projects, please contact the CERN Partnerships & Fundraising team.

COMPUTER SECURITY: WHEN YOUR MIKE SPIES ON YOU

Here are two new twists – probably still theoretical, but both pointing towards new ways to spy on you by misusing your microphone...

We have reported on sophisticated attacks via smartphones in the past (see "Your iPhone as akeylogger"). Here are two new twists – probably still theoretical, but both pointing towards new ways to spy on you by misusing your microphone...

The attack vector in both cases is the same: a local microphone to which the attacker has access. The passive attack is aimed at your desktop computer and just uses your smartphone's microphone (or any other connected microphone to which an attacker has access). Using a Skype call, Google Hangouts, or any other streaming audio chat (even via a Google Home or Amazon Echo device), the attacker listens to the sound of your screen's power supply. The way the screen renders the display, "sending signals to each pixel of each line with varying intensity levels for each sub-pixel" creates fluctuations in the power consumption, and hence in the "hum" of the power supply. Intercepted by the microphone, sophisticated machine learning techniques are subsequently employed to deduce from the hum what is being displayed on the screen... The first re-

sults show that researchers managed to determine which website out of the Alexa top-10 websites was displayed on the test screen with a 97% accuracy. On-screen keyboard strokes could be identified with an accuracy of 96% and 40% depending on the test set-up. Extended to full words, this can exceed 99% and 70% accuracy. And their results to capture paragraphs with more than 100 words displayed on screen look disturbingly accurate too.

The active attack is aimed at smartphones and uses both the local microphone and the local loudspeaker. Paired together, using the loudspeaker to emit acoustic signals inaudible to humans and recording them again with the microphone, they create a small basic sonar system: "The echo signal can be used to profile user interaction with the device", i.e. the way your finger swipes over and interacts with the screen. Interestingly, they've shown how this sonar can be employed to help identify the swipe pattern used to unlock an Android phone – reducing the number of trials to be performed by attacker by 70%. And that is only their proof-of-concept...

Admittedly, both attacks are still rudimentary and theoretical, but with more computing power at hand, better machine learning algorithms and more research, both also show what the sophisticated attackers, snoops and spies of this world might add to their exploitation arsenal in the future... By the way, if you are using an Android smartphone and swipe through the 9x9 pattern to unlock it, check out this paper (<https://www.ieee-security.org/TC/SP2017/papers/226.pdf>) listing the 20 most used swipe patterns. Using one of these is like using one of the top-10 most used passwords. If yours is listed, maybe it's time to move to another, more secure pattern?

Do you want to learn more about computer security incidents and issues at CERN? Follow our Monthly Report. For further information, questions or help, check our website or contact us at Computer.Security@cern.ch.

The Computer Security Team

Official communications

CERN PENSION FUND - INDIVIDUAL BREAKDOWN OF PENSION RIGHTS

Each year the Pension Fund Benefits Service sends an individual breakdown of pension rights to all staff members and fellows.

Please note that your individual breakdown will be sent the week commencing 15 July 2019.

fits can be found on the Fund's website: <https://pensionfund.cern.ch>.

*Benefits Service
CERN Pension Fund*

Further information about the CERN Pension Fund and your pension bene-

Announcements

NEW SERVICE FOR GAS ORDERS

Please note that a new service has been created to manage all requests concerning the supply of gases

Please note that a new service has been created to manage all requests concerning the supply of gases (supply, use, maintenance services, construction of gas distribution systems).

face allows articles to be selected in two different ways: either using search criteria (type of gas or mixture, use, format, etc.) or by entering the SCEM code for the desired article.

The progress of the order, from its creation through to the retrieval of empty packaging, will be recorded in and tracked by the Infor EAM management platform.

In this framework, a new gas ordering interface has been added to the CERN Service Portal: Gas request (<https://cern.service-now.com/service-portal/report-ticket.do?name=gas-supply-request&fe=Gas-support-and-provider>). This inter-

All information relating to the order (order accepted, planned delivery date, delivery completed, etc.), as well as any communication with users, will be included in the order ticket.

If you have any technical or administrative questions, please contact David Jaillet (EN-EA): David.Jaillet@cern.ch, tel. 75535.

LIGHTNING TALKS FROM THE CERN OPENLAB SUMMER STUDENTS

On Tuesday 13 August and Thursday 15 August, the CERN openlab summer students 2019 will present their work at a dedicated public Lightning Talk session



(Image: CERN)

On Tuesday 13 August and Thursday 15 August, the CERN openlab summer students 2019 will present their work at a dedicated public Lighting Talk sessions (Session 1, Session 2).

In a 5-minute presentation, each CERN openlab summer student will introduce the audience to their project, explain the technical challenges they have faced and describe the results of what they have been working on for the past few weeks.

It will be a great opportunity for the students to showcase the progress they have made so far and for the audience of people from the IT and other CERN departments

to be informed about various information-technology projects, the solutions that the students have come up with and the potential future challenges they have identified.

This year, the CERN openlab summer student programme hosts 40 students from 19 different nationalities for 9 weeks. Undergraduate and graduate students in computer science and physics have come from all over the world for a summer internship at CERN working on specialized advanced computing projects with applications in High Energy Physics.

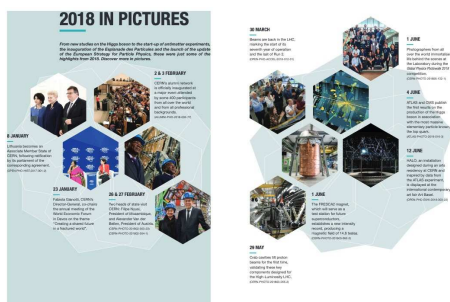
As part of the CERN openlab summer-student programme the students have

been also invited to attend a series of lectures given by IT experts on advanced CERN-related topics and had the opportunity to visit the CERN facilities and experiments as well as other research laboratories and companies such as IBM, ETH, and OpenSystems.

CERN openlab is a unique public-private partnership between CERN and leading ICT companies that has been created more than 15 years ago to tackle the LHC computing, data and infrastructure challenges. Its mission is to accelerate the development of cutting-edge solutions to be used by the worldwide LHC community.

THE 2018 CERN ANNUAL REPORT IS AVAILABLE

You can read it online or get a paper copy at the Library



(Image: CERN)

The 2018 CERN Annual Report is available.

It was presented to the CERN Council in June and highlights CERN's main achievements and activities from 2018.

You can read it online here (https://e-publishing.cern.ch/index.php/Annual_Report/issue/view/85).

Paper copies are available at the Library.

Happy reading!

CERN OPEN DAYS: FINAL CALL FOR VOLUNTEERS

All members of the personnel wishing to act as volunteers must sign-up on the platform for CERN Outreach Events Volunteers by 31 July



(Image: CERN)

On 14 and 15 September, more than 150 activities will be offered to the 80 000 visitors expected on our sites. Volunteers will be the key to the success of this exceptional event. More than 1700 volunteers have already signed-up but we still need another 1000 to fill the many roles that remain open.

Whether you are a member of CERN personnel or contractor's personnel, every-

one will have a role to play! The role assignments have now started so please **sign-up before 31 July**. Instructions and other practical information can be found on cern.ch/od2019/volunteers.

GENEVA 2050 CONSULTATION: HAVE YOUR SAY

The State of Geneva is launching a public consultation to gather opinions on the future of the canton



(Image: République et Canton de Genève)

The Geneva State Council has launched an online consultation to gather the public's opinions on the major issues of the future. This survey is being organised in the framework of the Geneva 2050 project, which is looking to the future in order to anticipate and adapt public policy.

The survey is a great opportunity to express your opinions, hopes and expectations about the future of Geneva!

The survey will take you around 15 minutes to complete. It will be available in English and French via this link (<https://survey.satiscan.com/ge2050>) until 21 July.

CERN SUMMER STUDENT WEBFEST: WEEKEND OF SCIENCE & CREATIVITY

Are you passionate about science? Then come along to the 2019 CERN Summer Student Webfest on the weekend of 26 to 28 July



(Image: CERN)

Are you passionate about science? Do you like communicating that passion to the general public? Then come along to the 2019 CERN Summer Student Webfest on the weekend of 26 to 28 July.

The event is a grassroots initiative, open to all summer students, staff and users. It aims to spark new ideas and innovation for the future of web-based education about CERN, the LHC and particle physics, as

well as in humanitarian aid, development and health.

The CERN Summer Student Webfest is a weekend of online web-based creativity, modelled on the gatherings (sometimes called hackfests or hackathons) that energise many open-source communities.

Participants in the CERN Summer Student Webfest will work in teams to design applications that encourage the public to learn more about science and, in particular, CERN's work. Projects can range from designing online games for kids to creating citizen-science projects and developing low-cost mobile-phone-based cosmic ray detectors. Examples of past projects can be found on the Webfest website. Prizes will be awarded to the best projects.

Although primarily targeted at CERN and CERN openlab summer students, the event is open to people of all ages at CERN with a passion for web-based science outreach and education. You do not have to be a software or hardware expert to contribute: many types of skill sets are needed, from writing and designing to physics and engineering.

Kick-off

Project ideas will be presented at a kick-off event on Friday, 26 July, from 4.00 p.m. to 6.00 p.m. Participants will organise them-

selves into teams to work on the most exciting pitches. The kick-off event will also introduce a range of tools for web development, creating online educational tools and contributing to science online.

Submitting your ideas

Anyone participating can pitch a project; pitches consist of short (less-than-five-minute) presentations. Participants are encouraged to submit their project ideas on the Webfest website in advance, for the best chance of forming a well-defined team.

Where will the participants work?

Teams will work primarily in CERN Restaurant 1. As the location is an open-space environment, there will be plenty of opportunity for interaction. CERN openlab will provide meal tickets for participants.

Presentations and winners

The event will wrap up on Sunday, 28 July at 4.00 p.m., with a judging panel reviewing the results (based on five-minute 'lightning talk' presentations by the teams) and awarding prizes.

The event is organised by CERN openlab. Our event partners also include Citizen Cyberscience Centre, crowdAI, Citizen Cyberlab project, the Port, CERN MediaLab, and the Quantum Future initiative.

INTEL ADVANCED-COMPUTING USER GROUP

In September, CERN will host the annual conference of the 'Intel Extreme Performance User Group'. This community event — an important discussion forum for those making use of Intel's computing technologies to support their research — will take place in the CERN Globe of Science and Innovation on 24 and 25 September. Additional hands-on training sessions will also be held in breakout rooms on 26 and 27 September.

IXPUG is an independent user group. Its mission is to provide an environment for the free exchange of information, with the goal of enhancing the usability and efficiency

of scientific and technical applications running on advanced computing systems that make use of Intel architecture.

The 2019 IXPUG annual conference will address a wide array of topics related to the adoption and deployment of state-of-the-art data-processing technologies and techniques, with a view to achieving optimal application execution. The event is an open forum, through which industry experts will share best practice and techniques for maximising software efficiency. Come along and share your experience working with these technologies, and learn from others in the field.

CERN and Intel have been collaborating closely for almost two decades through CERN openlab, a unique public-private partnership that works to accelerate the development of computing technologies for use by the research community. CERN openlab is responsible for organising the event at CERN.

Find out more about the event on the IXPUG website.

Submission of abstracts for technical sessions, lightning talks, and hands-on tutorials is open until 19 July.

TEMPORARY CLOSURE OF THE PRÉVESSIN POST OFFICE

The Préveessin post office, located in building 866, will be temporarily closed from

Friday, 12 July, to Monday, 19 August, because of refurbishment work.

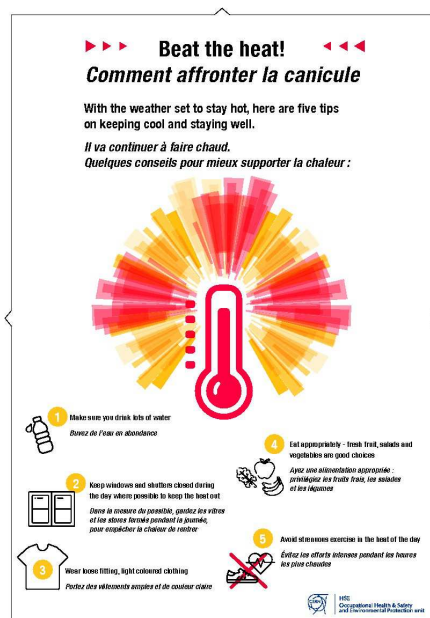
The post office will reopen on 20 August.

Thank you for your understanding.

BEAT THE HEAT!

With the weather set to stay hot, here are five tips on keeping cool and staying well

CERN Medical Service



(Image: CERN)

CLOSURE OF CAFETERIA IN BUILDING 774: 22 JULY TO 16 AUGUST

Please note that, contrary to what was announced earlier, the cafeteria located in building 774 will be closed from 22 July to

16 August. It will reopen at the usual hours on Monday, 19 August.

Thank you for your understanding.

CERN RESTAURANTS: OPENING HOURS DURING SUMMER 2019

This summer, the three CERN restaurants remain open during their usual hours. The 'Coin Brasserie' in restaurant 2 will be closed from Monday 29 July to Friday 23 August 2019 included.

The cafeterias will be open as follows:

- 6: normal hours
- 13: normal hours
- 30: normal hours
- 40: from 5 to 30 August: open from 8.30 to 16.30
- 54: from 5 to 30 August: open from 8.00 to 15.30

- 864: open from 9.30 to 10.30 and from 15.00 to 16.00 every day
- 865: open from 9.45 to 10.45 every day
- 774: normal hours (but closed from 22 July to 16 August)

Ombud's corner

HOW TO BROACH CONTENTIOUS ISSUES

Dan* is responsible for one of the robots in the workshop. You are his supervisor and you suspect that the rejection rate is much higher than usual when he is at the controls. You check the operations log and your suspicions are confirmed. You could wait for the problem to pass, but you decide to talk to him to get to the bottom of things.

It's never nice to broach difficult subjects... But you're brave enough to go through with it, so how can you prepare for this difficult conversation? By respectfully sticking to the facts, the message you want to get across and the proposed solution, your conversation can lead to positive outcomes for all concerned.

The facts.

Above all, ensure that you are basing your position on proven facts, not on suspicions or rumours. Your credibility as a supervisor is at stake. This is exactly why you checked the workshop log.

Who to talk to?

Speak directly to Dan, and only him. Don't talk to anyone else about it unless absolutely necessary at this stage. But if you do need to involve someone else, make sure you speak to Dan first.

The message.

Don't tie yourself in knots with a long-winded and complicated preamble. Put your cards on the table straight away, but don't be accusatory: *"Dan, I've asked to see you because I've noticed that the rejection rate is unusually high when you are at the controls of the robot and I wanted to talk to you about it. I want us to examine the source of the problem together."*

The solution.

Resist the temptation of a quick fix: *"Since you're obviously not capable of programming the equipment correctly, I'll take charge of it from now on."* On the contrary, give him the chance to identify the source of the problem and to find a solution. Listen to his ideas and, if necessary, put him on

the right track. That way, he won't make the same mistakes in future.

Timing.

I know that we are all very busy, but make sure you set aside enough time to discuss every aspect of the problem with a clear head. The increased rejection rate might be just the tip of the iceberg; the time to explore every aspect of the problem is now or never. Also bear in mind that Dan might need time to realise that he's made mistakes; don't count on resolving the problem straight away.

Respect.

During the discussion, separate the person from the facts. Hitting him with something like: *"I don't think you have the skills required for this job"* won't get you anywhere. Stick with the facts (statistics, periods of activity, etc.) and simply ask him to provide explanations.

If you are facing a difficult conversation and need advice and support, speak to your hi-

erarchy. Alternatively, don't hesitate to call upon the support structures put in place by CERN!

Pierre Gildemyn

about, please don't hesitate to e-mail me at Ombuds@cern.ch.

If you'd like to comment on any of my articles or suggest a topic that I could write

**Names have been changed*