CERN Bulletin

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ATLAS delivers most precise luminosity measurement at the LHC

Precise knowledge of luminosity is crucial for both searches for new phenomena and precision measurements of known Standard Model processes

The ATLAS detector during upgrade work for Run 3 of the LHC. (Image: CERN)

When the Large Hadron Collider (LHC) is operating, it produces more than one billion proton–proton interactions every second. But exactly how many take place in the LHC experiments? Critical to every analysis of LHC data is a high-precision measurement of what is known as luminosity, that is, the total number of proton–proton interactions in a given dataset. It allows physicists to evaluate the probability of interesting proton–proton collision events occurring, as well as to predict the rates of similar-looking background processes. Isolating such events from the background processes is crucial for both searches for new phenomena and precision measurements of known Standard Model processes.

The ATLAS collaboration has recently released its most precise luminosity measurement to date. They studied data taken over the course of four years (2015–2018), covering the entire Run 2 of the LHC, to assess the total amount of luminosity delivered to the ATLAS experiment in that dataset.

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This International Day is celebrated every year on 11 February, and CERN is proud to be on board again for 2023

The International Day of Women and Girls in Science, 11 February, is a key date for CERN and for the scientific community in general. It is an opportunity to remind ourselves that further efforts are needed to ensure gender equality in science, technology, engineering and mathematics (STEM). As the United Nations underlines, the world has to recognise the role of women and girls in science, not only as beneficiaries, but also as agents of change.

Of course, it is not a question of concentrating all our efforts only on this one day. Everyone can, on a daily basis and in all areas, be agents of change. In 2021, the Diversity & Inclusion programme launched the "25 by '25" strategy, with the full support of CERN's Management, to boost gender and nationality diversity within the staff and fellows population and, in 2022, the Enlarged Directorate endorsed CERN's work on gender equality as constituting a Gender Equality Plan. At CERN, 21.9%[(1)] of the employed members of the personnel are women. Our aspirational target with the 25 by '25 strategy is 25% by the end of 2025.

Formal frameworks can only become pathways to lasting change when we honestly confront mindsets that hinder or undermine progress. We need to do everything we can to prevent stereotypes from being perpetuated and to transform the way girls and boys think about science careers. Careers in STEM are accessible to girls and to boys – this is a fundamental message we need to take into schools. This is why CERN launched the "Women and Girls in Science and Technology" programme in 2017, an initiative that we are proud to be part of for the seventh year, in partnership with other research institutions in the region.

From 30 January to 3 February, a hundred volunteers, all female scientists from CERN, Scienscope (University of Geneva), the École Polytechnique Fédérale de Lausanne (EPFL) and the Annecy Particle Physics Laboratory (LAPP), visited around 240 classes in the local area to talk to the pupils about their professions and the projects and experiments in which they are involved. These role models make a real difference through their direct interaction with students.

In addition, to celebrate this years' International Day, CERN is hosting this evening the show[(2)] "La Forza Nascosta – Scienziate nella Fisica e nella Storia" ("The Hidden Force – Women Scientists in Physics and History"), a musical highlighting the physics of the twentieth century through the eyes of four renowned women scientists. On 9 February, the CERN Diversity & Inclusion programme, in collaboration with the diversity offices of ALICE, CMS and LHCb, is hosting the interactive theatre-forum "Coffee Machine"[(3)], open to all CERN personnel. The event aims to raise awareness of how sexist behaviour can limit the full participation of women in the workplace. I look forward to both, and hope that many of you will join.

Attitudes are evolving, and we all have a responsibility to ensure that they continue doing so. The International Day is an opportunity for all of us to show that we take that responsibility seriously.

Charlotte Lindberg Warakaulle
Director for International Relations

[(1)] Latest available statistics, as at 31.12.2021.

[(2)] Today, 8 February, at 8.00 p.m. at the Globe of Science and Innovation (in Italian with English subtitles). For more information and to register go to: https://indico.cern.ch/event/1228843/.

[(3)] On 9 February from 2.00 to 4.00 p.m. at the Globe of Science and Innovation. Places are limited, so for more information and to register go to: https://indico.cern.ch/e/coffee_machine.

ATLAS delivers most precise luminosity measurement at the LHC

>>> What exactly did this measurement entail? When proton beams circulate in the LHC, they are arranged in “bunches” each containing more than 100 billion protons. As two bunches circulating in opposite directions cross, some of the protons interact. Determining how many interactions there are in each bunch crossing provides a measure of the luminosity. Its value depends on the number of protons per bunch, how tightly squeezed the protons are and the angle at which the bunches cross. The luminosity also depends on the number of colliding proton bunches in each beam.

ATLAS has several detectors that are sensitive to the number of particles produced in proton–proton interactions, and the average number of measured particles is often proportional to the average number of proton–proton interactions per bunch crossing. Researchers can therefore use this average to monitor the “instantaneous” luminosity in real time during data-taking periods, and to measure the cumulative (“integrated”) luminosity over longer periods of time.

While ATLAS’s luminosity-sensitive detectors provided relative measurements of the luminosity during data taking, measurement of the absolute luminosity required a special LHC beam configuration that allows the detector signals to be calibrated. Once a year, the LHC proton beams are displaced from their normal position in order to record the particle counts in the luminosity detectors. This method is called a van der Meer beam separation scan, named after physics Nobel Prize winner Simon van der Meer, who developed the idea in the 1960s for application at CERN’s Intersecting Storage Rings. It allows researchers to estimate the size of the beam and measure how densely the protons are packed in the bunches. With that information in hand, they can calibrate the detector signals.

Working in close collaboration with ATLAS researchers, LHC experts carried out van der Meer scans under low-luminosity conditions, with an average of about 0.5 proton–proton interactions per bunch crossing and very long gaps between the bunches. For comparison, the LHC typically operates with 20–50 interactions per bunch crossing, and with bunches closer together in a “train” structure. The researchers therefore need to extrapolate the results of the van der Meer scans to the normal data-taking regime using the measurements from the luminosity-sensitive detectors.

Using this approach, and after careful evaluation of the systematic effects that can influence a luminosity measurement, ATLAS physicists determined the integrated luminosity of the full Run 2 dataset that had been recorded by ATLAS and certified as good for physics analysis, to be 140.1 ± 1.2 fb–1. For comparison, 1 inverse femtobarn (fb–1) corresponds to about 100 trillion proton–proton collisions. With its uncertainty of 0.83%, the result represents the most precise luminosity measurement at a hadron collider to date. It improves upon previous ATLAS measurements by a factor of 2 and is comparable with results achieved at the ISR experiments (0.9%).

ATLAS Collaboration

CERN's Building 60 to be restored to its former glory

One of the original buildings of the Meyrin campus – Building 60 – is showing its age, and is about to undergo a two-and-a-half-year restoration

Building 60 in 1966. (Image: CERN)

It is frequently the case that we take the familiar for granted, and what could be more familiar to CERNois than the CERN Main Building? Designed in the 1950s by renowned Swiss architect Peter Steiger, the Main Building formed part of a coherent design for Europe's new scientific campus. Have you ever noticed the mushroom pillars in the Main Building stairwell? They were inspired by Steiger's time spent working with Frank Lloyd Wright in the United States. Or the original lampposts lighting the roads, whose elegant design is to be found nowhere else? These are features of Steiger's original vision for CERN, which contribute to making the Main Building complex a recognised architectural gem, emblematic of the best of 1950s Swiss architecture and protected under Swiss law.

Building 60 (B60), the tower block, has long been scheduled for renovation. It is no longer fire-risk compliant, structural elements need attention, the facades, windows and roof are at the end of their life, and the building contains asbestos. The constraints, risks and disruption associated with such a renovation require that the occupants of the building be re-housed for the duration of the works.

Thanks to the flexibility of the EP department, and especially of the CMS and ATLAS experiments, B60's occupants will be moving into part of B42 while the work is carried out, and current B42 occupants will be relocated to the newly refurbished SCE Swing Space (B653) and other EP offices across the site. Care has been taken to ensure that the office configuration in the areas concerned in B42 will match as closely as possible that of B60, so that existing teams remain together.

Disruption to the common areas of the Main Building complex and its surroundings will be kept to a minimum. The unusual construction of B60, built rather like a bridge supported by two pillars, means that it can be completely isolated from the structures beneath it. The ground floor, including all its services (bank, kiosk, CAGI cultural kiosk, UNIQA, Users' Office, Staff Association and restaurant), will therefore remain accessible.

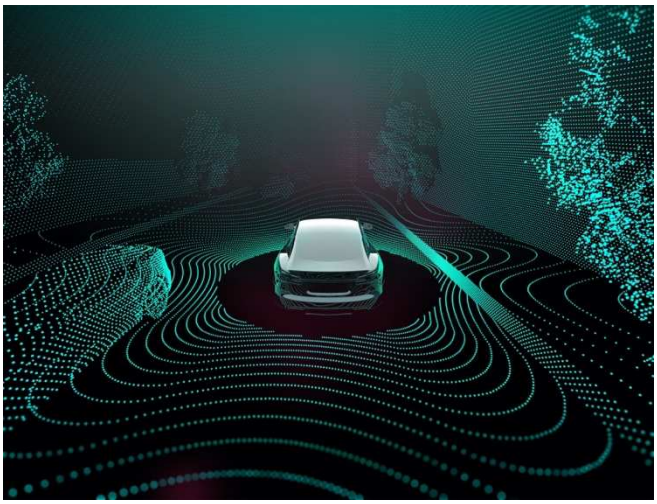
While measures are being taken to limit disruptions around B60, it should be noted that the area will be noisier than usual during the first demolition phase, that Route Scherrer will be closed for the whole duration of the works and that the CERN shuttle will not stop at Building 500 (passengers should alight at the B39 stop and then walk to the Main Building). The lifts in Buildings 3, 52 and 53 will replace those in the Main Building for rides between the ground floor and the first floor.

Working closely with the relevant Host State authorities, the renovation is scheduled to begin this year, following the relocation of the occupants of B60 to B42 in February and March. Work should be completed by the middle of 2025, when the B60 occupants will be able to return.

Once the restoration is complete, B60 will once again showcase the architectural vision of Peter Steiger, respecting the original features as far as possible, while also providing a modern, eco-friendly and modular office environment that is fit for the twenty-first century and fully compliant with standards.

Colliding particles not cars: CERN's machine learning could help self-driving cars

CERN and software company Zenseact wrap up a joint research project that could allow autonomous-driving cars to make faster decisions, thus helping avoid accidents



CERN's expertise in machine learning could help the field of autonomous driving. (Image: Zenseact)

In the future, autonomous or self-driving cars are expected to considerably reduce the number of road accident fatalities. Advancing developments on this revolutionary road, CERN and car-safety software company Zenseact have just completed a three-year project researching machine-learning models to enable self-driving cars to make better decisions faster and thus avoid collisions.

When it comes to capturing data from collisions, CERN also requires fast and efficient decision making while analysing the millions of particle collisions produced in the Large Hadron Collider (LHC) detectors. Its unique capabilities in data analysis are what brought CERN and Zenseact together to investigate how the high-energy physics organisation's machine-learning techniques could be applied to the field of autonomous driving. Focusing on "computer vision", which helps the car analyse and respond to its external environment, the goal of this collaboration was to make deep-learning techniques faster and more accurate.

"Deep learning has strongly reshaped computer vision in the last decade, and the accuracy of image-recognition applications is now at unprecedented levels. But the results of our research with CERN show that there's still room for improvement when it comes to autonomous vehicles," says Christoffer Petersson, Research Lead at Zenseact.

For processing the computer vision tasks, chips known as field-programmable gate arrays (FPGAs) were chosen as the hardware benchmark. FPGAs, which have been used at CERN for many years, are configurable integrated circuits that can execute complex decision-making algorithms in micro-seconds. The researchers found that significantly more functionality could be packed into the FPGA by optimising existing resources. The best part is that tasks could be performed with high accuracy and short latency, even on a processing unit with limited computational resources.

"Our work together elucidated compression techniques in FPGAs that could also have a significant effect on increasing processing efficiency in the LHC data centres. With machine-learning platforms setting the stage for next-generation solutions, future development of this research area could be a major contribution to multiple other domains, beyond high-energy physics," says Maurizio Pierini, Physicist at CERN.

The same techniques can also be used to improve algorithmic efficiency while maintaining accuracy in a wide range of domains, from energy efficiency gains in data centres to cell screening for medical applications.

Priyanka Dasgupta

Female science ambassadors reach out to more than 5000 local schoolchildren

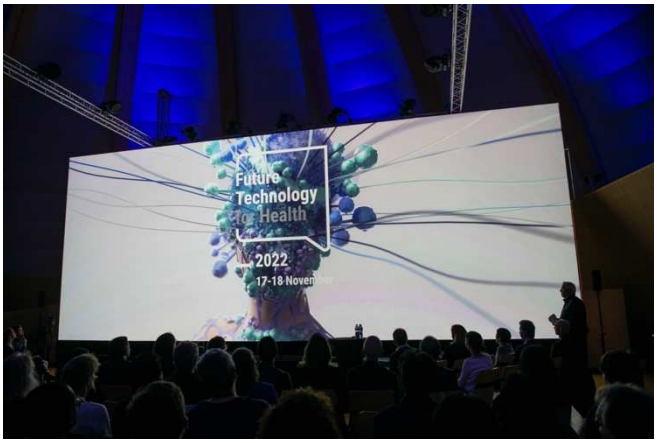
Women working in science and engineering took time out to visit local schools and talk about their jobs as part of "Women and girls in science and technology" week

Francesca Giovacchini, a physicist working on the AMS-02 space experiment at CERN, tells pupils at the Satigny-Mairie school about her work. (Image: CERN)

From 30 January to 3 February 2023, around a hundred female science "ambassadors" from CERN, Scienscope (UNIGE), the École Polytechnique Fédérale de Lausanne (EPFL) and the Laboratoire d'Annecy de Physique des Particules (LAPP), visited over two hundred classrooms in the local region to promote the sciences to 5120 schoolchildren. Since 2017, the "Women and girls in science and technology" programme has been an integral part of the International Day of Women and Girls in Science, which will be celebrated on 11 February this year. The aim is to address sexist stereotypes while children are still in their formative years and to demonstrate that careers in science are just as accessible for girls as they are for boys. By meeting female role models it's much easier for girls to picture themselves as scientists, explorers, inventors or engineers later in life.

The campaign was a great success again his year and even broke the all-time participation record. In the space of seven years, thanks to the ever expanding cohort of ambassadors eager to share their passion, more than 13 000 pupils aged between 7 and 15 from the local region have learned about jobs in science, technology, engineering and maths.

Sparks! Talks – videos available online



(Image: Carole Parodi)

Two months after our Sparks! Talks event, we are happy to announce that the videos of the individual presentations are now online on the CERN YouTube channel. We invite the community at large to dive back into the event, which was centred around future technology for health – covering aspects from the use of CERN technology for imaging, to DeepMind's breakthroughs with AI for AlphaFold, to the complexity of changing ethics in a world of quickly evolving technology.

The Sparks! Talks were held at the Globe of Science and Innovation at CERN on 17 November 2022. Bruno Giussani (TED) once again hosted our live Sparks! event, not only introducing our guests, but also interviewing some of them. In session 1 he addressed "Treating people", while in the second, the subject was "Keeping people healthy". In a now long-standing collaboration, our opening sequence was a video creation by art collective Ouchhh, who this time used data from the Human Cell Atlas to create stunning visuals on our theme of future technology for health.

Given that we will be hosting the next Sparks! Talks from Science Gateway, we look forward to continuing to develop content that speaks to as wide an audience as possible in order to maximise CERN's outreach mission. For now, we leave you with the CERN YouTube playlist where you can see all the videos from this year here.

Sparks! is part of the CERN & Society programme. CERN & Society activities are only possible thanks to the support of our partners, in particular Rolex and its long-standing association with the Organization. The 2022 Sparks! event was also supported by the Didier and Martine Primat Foundation.

Let's take a closer look at the programme

The first talk was given by WHO's Chief Scientist, Soumya Swaminathan, who addressed "Digital tools and other efforts for preventing and dealing with future global health challenges", a highly relevant subject in these times, allowing us to bring our audience into the heart of the subject and its importance for society at large. Then, Bruce Levine gave us an overview of the technology he researched and developed in a talk entitled "Treating untreatable cancers with gene therapy". Bringing matters back to CERN-centred technology, Magdalena Kowalska then presented her work in the "Future of detection and imaging", which was followed by CERN Director for International Relations Charlotte Warakaulle answering Bruno Giussani's questions about the Organization's involvement in "CERN technologies for health". Olaf Blanke, a professor at the nearby EPFL, presented his work in neuroscience and "AR/VR technology for brain research". Then, bringing the subject back to a more global dimension, Els Torreele gave a talk about "Rethinking health innovation". Finally, Bruno interviewed Andrew Hessel, who joined us via Zoom from California and answered questions about a "Genetic network".

The second session started with another remote interview conducted by Bruno, this time with Jane Metcalfe, co-founder of Wired and now the head of NEO.LIFE, who answered questions about "Biological revolution, synthetic biology". Continuing on the session's theme of "Keeping people healthy", Mark Kendall of WearOptimo presented his take on "Wearable sensors for better health". Speaking on behalf of the Snyder Lab at Stanford, Ariel Ganz followed up with "Precision health and thriving", giving us an insight into how data from sensors is useful further down the line. Coming back to the global level, Rolf Apweiler from EMBL-EBI spoke about "The bioinformatics revolution", bringing data management to the forefront. From there, Ankur Vora of DeepMind introduced us to "AI for health and the AlphaFold case", reminding returning viewers of last year's Sparks! theme: future intelligence. Giving us a successful example of a collaborative method for future science, Muzlifah Haniffa gave a talk about the "Human Cell Atlas". Concluding the event this year, author Juan Enriquez reminded us of the importance of ethics and the changes in definition we will continue to be faced with in the future with his talk "Evolving technology changes ethics".

Given that multidisciplinarity is at the heart of Sparks! mission, we included two art pieces in the programme: SciArt Work: The Beauty of Blood Flow Analysis by the Fraunhofer Institute for Digital Medicine, and an extract from a film called Bringing Bones to Life about artist Amy Karle and her artwork Regenerative Reliquary. We believe that the inclusion of artistic pieces in the Talks programme not only allows the audience to take a break from the content-intensive presentations, but also helps us remember that, when talking about visions of the future, art has its place in the conversation.

The CERN Accelerator School, a school like no other

Registration is open for the 2023 CERN Accelerator Schools, taking place in Austria, Germany and Spain – surely one is the right fit for you!

The latest Advanced Course on Accelerator Physics, which took place in Sévrier (France) last November. (Image: CERN)

The CERN Accelerator School (CAS) is organising three courses this year – don't miss your chance to attend! Two topical schools will take place: one on radiofrequency for accelerators in June in Germany, and one on magnets in November in Austria. "The topical courses are fundamental because they cover major topics in depth, with state-of-the-art presentations and hands-on courses," says Frank Tecker, CAS director.

An introductory course will also take place in Spain in September: "We offer the introductory course regularly; it allows students to acquire a broad knowledge of accelerator physics and technology in a short time. The students' feedback shows that this course is highly appreciated and relevant," continues Frank.

Last year, after a break due to the COVID-19 pandemic, CAS successfully managed to run four schools in three different countries. "We are thrilled to be back in-person. The networking opportunities during the schools are essential and can't be transposed online," says Christine Vollinger, deputy CAS director. "Indeed, although many participants are from CERN, more than half of them come from institutes and companies worldwide (26 nationalities were represented at the last school!), and they're all eager to learn and to share their experience with the other participants and lecturers."

A school like no other

Advanced and topical schools are challenging to organise. To give an example, the Advanced Course on Accelerator Physics in November 2022 required more than two tonnes of equipment to be shipped from different locations (CERN, GSI, DESY and a private company) to a hotel in Sévrier (France). Piotr Kowina (GSI), one of the most experienced CAS teachers in radiofrequency, started installing the equipment three days before the course began. The hotel was transformed into a lab: you could hear the vector network analyser humming and the spectrum analyser beeping, and see traces in all colours across the many screens. "The hands-on experiments have been designed especially for this course and we are constantly thinking about how to improve them," says Piotr.

CERN established the CERN Accelerator School (CAS) in 1983 with the mandate of "assembling and disseminating knowledge on accelerator science", and the school has indeed played a central role since in the knowledge transfer of accelerator physics and associated technologies. The school will be celebrating its 40th anniversary in 2023: "This year's anniversary is an opportunity for us to retrace CAS history and values, and to acknowledge the impact of such a unique school," says Frank Tecker.

The very first CAS organised at CERN was focused on "Antiprotons for colliding beam facilities", a topic chosen because there were very few experts in the domain. "Safeguarding and disseminating their knowledge was all the more critical," says Frank. Forty years on, CAS continues to pass on this knowledge by curating its proceedings* and building a community of engineers and physicists specialised in accelerator technologies.

Do you want to be part of that community? Registration for the 2023 schools is now open! Go to https://cas.web.cern.ch/ for more information and to register. The CAS community is looking forward to welcoming its new students.

** CAS proceedings are publicly available at: https://cas.web.cern.ch/previous-schools.*

The CERN Alumni Network's mentor programme can help you develop new skills and achieve goals

Setting the foundations of a CERN Alumni Mentorship programme in IdeaSquare. (Image: CERN)

Do you know what Steve Jobs, Michelle Obama and Christian Dior have in common? As well as worldwide fame, each of them has been a mentor at some point in their careers. Steve Jobs revealed he had mentored Mark Zuckerberg, Michelle Obama was designated as Barack's mentor at the law firm where they both worked while he was a summer associate, and Yves Saint Laurent cut his designer teeth whilst being mentored by Christian Dior.

Mentoring refers to the process of helping and guiding another person to support their personal or professional development. For a mentee, the benefits of having a mentor include access to support, feedback and resources and being given a fresh or different perspective. A good mentor can identify new skills, inspire, motivate, increase confidence or self-esteem and provide a platform of accountability. Mentoring can improve the mentee's ability to resolve challenges and achieve their goals quicker.

A brand new module has now been launched on the CERN Alumni platform enabling alumni with profiles or experience relevant to other alumni community members' professional interests to register as mentors. Potential mentees can now select a mentor from a pool of over 40 CERN Alumni Mentors.

Maybe you are considering a future career in a specific sector and would like to find out more about that area of work. Perhaps you are struggling to decide which path to take when you leave the Organization, or you would like to gain insights on transitioning from academia to industry. CERN Alumni have faced situations that younger colleagues are yet to face and they understand the value of a CERN experience and the requirements of working in a different sector. This makes them ideal candidates to support those seeking such advice. Do not simply take our word for it; find out what benefits several mentees gained from their recent mentoring experience.

A CERN Alumni mentoring relationship can be started at any time and can last as long or as briefly as required. Simply browse the full list of mentors here (https://alumni.cern/mentorships) and prepare to develop new skills, gain a better and more comprehensive understanding of a potential career path ahead and achieve your goals.

CERN Alumni programme

CERN is awarded the ISO 50001 energy certification

As part of CERN's commitment to responsible energy management, the Organization began the ISO 50001 certification process in 2022. The certification was officially awarded on 2 February 2023 for a period of three years, i.e. until 1 February 2026. ISO 50001 is the benchmark international standard for implementing systems and processes to continually improve energy performance. It entails setting up, monitoring and improving an energy management system – which is aligned with CERN's Energy Policy – and with relevant legislation. For more information about energy management at CERN, see https://hse.cern/content/energy-management.

Computer Security: How AI are you?

Artificial intelligence (AI) is on everyone's mind: autopilot for Teslas, deepfakes for fun or fake news, DALL·E 2 for the untalented artist, big data and machine learning for data analysis. And CERN is no exception. While all those AI applications come with pros and cons, with benefits and risks, AI systems deserve their own consideration when it comes to computer security. So we took the opportunity to ask a renowned expert in AI, ChatGPT, how best to secure AI systems. Here's the answer we got:

"Artificial intelligence (AI) is a rapidly advancing technology that has the potential to greatly benefit society in a variety of ways. However, it also poses new security risks that must be addressed. Here are some best practices for ensuring the security of AI systems:

Secure data inputs and outputs. AI systems rely on large amounts of data to learn and make decisions. This data must be protected from unauthorised access and tampering to ensure the integrity and accuracy of the system.

Use secure algorithms and protocols. AI systems use complex algorithms and protocols to process data and make decisions. It is important to use secure algorithms that have been thoroughly vetted and tested, and to ensure that all communication between the AI system and other systems is encrypted.

Monitor and audit AI systems. Regular monitoring and auditing of AI systems can help detect and prevent security breaches. This includes monitoring for unusual or suspicious behavior, as well as auditing the system's log files for any signs of unauthorised access or tampering.

Implement access controls. Access controls can help prevent unauthorised access to AI systems and the data they process. This includes setting up user accounts and assigning roles and permissions, as well as implementing authentication mechanisms such as biometrics or multi-factor authentication.

Stay informed and educated. As AI technology continues to evolve, it is important to stay informed about the latest security risks and best practices. This includes attending relevant conferences and workshops, reading industry publications and staying up-to-date with software updates and patches.

Be prepared for the worst. AI systems can be vulnerable to cyberattacks, and it is important to have a plan in place to respond to a security incident. This includes having a trained incident response team, and regularly testing incident response plans to ensure they are effective.

By following these best practices, organisations can help ensure the security of their AI systems and protect themselves from potential cyber threats. As AI is permeating all industries, it is crucial for everyone to be aware of the security risks and best practices to mitigate them."

Thanks a lot, ChatGPT bot. So far, nothing special here for AI – it's a matter of applying the same general security paradigms that every computer user and every service manager should apply to any well-managed computing service (like those run by CERN IT) and individual computing device (like your smartphone or laptop):

Make sure that you only input valid and trusted data, URLs, etc.

Use encryption to protect your privacy

Have intrusion detection and/or an anti-malware program running in the background

Deploy access control and opt into 2FA security

Train yourself and have auto-update enabled

Have an incident response plan.

Six simple steps to make your computing service more secure, and to protect your personal assets stored on your laptop and smartphone. Six simple steps, common sense for security-aware humans. Six simple steps, apparently also rather logical for an AI bot. So, tell us: how human is AI; how AI are you?

The Computer Security team

Official news

COVID-19 measures lifted at CERN as of 6 February

In view of the evolving epidemiological situation, and in order to align with its Host States, CERN is lifting its remaining COVID-19 measures.
Mandatory isolation and testing have been abolished in Switzerland since April 2022. As of 1 February, France has followed suit and no longer requires people to self-isolate following a positive COVID-19 test. People who are contact cases are also no longer required to take a test.
In the light of this regulatory change, CERN has taken the decision to abolish CERN-specific COVID-related measures. As of Monday, 6 February, CERN no longer requires personnel who are displaying symptoms to make a self-declaration in TRAMED. Any associated test obligation, self-isolation or site-access suspension will no longer apply. Any existing site-access suspensions will cease.
Should they test positive for COVID-19, personnel must henceforth follow the regulations applicable in their place of residence, if any, and take the appropriate measures in the light of their health condition.
Nevertheless, the coronavirus is still circulating. To continue our efforts to stem the spread of COVID-19 and other seasonal viruses, basic hygiene measures should be followed (regular handwashing, room ventilation). Moreover, people with symptoms should wear a mask, avoid close contact (in particular with vulnerable people), and get tested if appropriate.

- Link to applicable COVID-19 measures in France: https://www.ameli.fr/assure/covid-19/symptomes-gestes-barrieres-et-recommandations/covid-19-reconnaitre-la-maladie-et-ses-symptomes-adopter-les-bons-gestes#text_109936
- Link to applicable COVID-19 measures in Switzerland: https://www.bag.admin.ch/bag/en/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/novel-cov/massnahmen-des-bundes.html

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Summer work for children of members of the personnel

During the period from 5 June to 8 September 2023 inclusive, there will be a limited number of jobs for summer work at CERN (normally unskilled work of routine nature), which will be made available to children of members of the personnel (i.e. anyone holding an employment or association contract with the Organization). Candidates must be aged between 18 and 24 inclusive on the first day of the contract, and must have insurance coverage for both illness and accident. The duration of all contracts will be 4 consecutive weeks and the allowance will be CHF 1557 for this period. Candidates should apply via HR Department's electronic recruitment system, SmartRecruiters : https://smrtr.io/cVgsF
Completed application forms must be returned by 12 March 2023 at the latest. To allow as many people as possible to benefit, each child may participate in this programme only once.
The results of the selection will be available mid of May 2023.

For further information, please contact:
Virginie.Galvin@cern.ch Tel. 72855
(Geraldine.Ballet@cern.ch Tel. 74151)

Announcements

Women in Technology Mentoring 2023: Information Meeting on 21 February

The Women in Technology (WIT) network is organising a virtual mentoring information meeting on Tuesday 21 February at 12:30.
The meeting, which will be held online via Zoom, will address the benefits of mentoring, how to get involved, and what to expect as a mentee or as a mentor in the program. Come armed with your questions!
For more information, visit the Indico page of the event : https://indico.cern.ch/event/1246912/

Annual CERN openlab Technical Workshop to take place on 16-17 March

The 2023 CERN openlab Technical Workshop will be held in the CERN Council Chamber on 16-17 March. The event provides an important moment to review progress made in the 28 R&D projects currently being carried out across CERN through this unique public-private partnership. Since 2001, CERN has been working with leading technology companies through CERN openlab to accelerate the development of the cutting-edge computing technologies required by the Organization's research community.
Today, CERN openlab is working in three main areas: exascale technologies, artificial intelligence, and quantum computing. R&D carried out in this final area is closely interwoven with the work of the CERN Quantum Technology Initiative, which held a major workshop in November. CERN openlab also works closely with CERN's Knowledge Transfer Group to share computing technologies with research communities beyond particle physics.
As well as looking back over 2022, the technical workshop will provide an important opportunity to discuss upcoming plans, including the new CERN IT Innovation Roadmap.
Register for the event here (https://indico.cern.ch/e/COTW2023) until 13 March. You can also find out more about CERN openlab's work over the last year on the CERN openlab website, here (https://openlab.cern/news/23-dec-2022/highlights-it-innovation-section-2022).

6th HEP C++ Course and Hands-on Training

From 6-10 March, a training course will be held at CERN to teach C++ programming skills to particle physicists. The event is called "The 6th HEP C++ Course and Hands-on Training - The Essentials" and is organised jointly by the Software Institute for Data Intensive Sciences and the Training Working Group of the HEP Software Foundation. The goal of the course is to help members of the particle physics community to better contribute to experiments' code bases or even to write their own analysis software.
The event will run over three days: Monday, Wednesday and Friday. Each day will feature a two-hour interactive lecture in the morning,

followed by a two-hour session of related hands-on training exercises in small breakout groups of up to 10 students in the afternoons. The lectures are given by proficient C++ programmers from CERN's IT-GOV, EP-LBC and EP-SFT groups. Note: the two non-course days (Tuesday and Thursday) may also be used to complete additional exercises. The event will be held in a hybrid format: morning lectures will be given in a meeting room at CERN (593/R-010) and broadcast over Zoom, while the afternoon sessions will be held in smaller meeting rooms at CERN, as well as in dedicated Zoom breakout rooms for those participating remotely. While remote participation is possible, the organisers encourage to participants to attend the event in person to get the most out of it.

Full details of the training course, including registration, can be found here (https://indico.cern.ch/e/CppSpring23).

The team behind this event typically organises two such courses per year: an "advanced C++" course is planned for mid-late 2023. In case of interest for future events, a waiting list will be made available in parallel to the registration process for the course in March.

Alumni event on 9 February: R1 Talk with Valerio Rossetti and Snezana Nektarijevic on data science careers

Searching for a job outside of academia can be a daunting task for many PhDs, Postdocs, or engineers are CERN. In this talk, Snezana and Valerio will share their personal experience of their professional career outside of CERN. They will give an overview of the landscape of possible careers in data science, with a focus on Switzerland. They will then give practical tips on how to prepare for job applications and interviews.

9 February 2023 6 p.m. - 7 p.m. - Restaurant 1

Find out more on the CERN Alumni website : https://alumni.cern/networks/events/106047.

Alumni event on 10 February: "Virtual company showroom" with Procter & Gamble

Join representatives from Procter & Gamble, an American consumer good company, to find out more about the company, potential job opportunities and the skills and talents they are now seeking. **The event will start at 11 a.m. on 10 February** with a general presentation and will be followed by a Q&A session, come armed with your questions. Please register here (https://alumni.cern/networks/events/106309) for the event to receive the zoom link.

Alumni event on 16 February: R1 talk with Iason Rodis and James Robinson on working for a startup

Join Iason and James as they share their unique perspectives on navigating the transition from working at CERN to the world of a scaling company.

They will dive into their personal journeys and share valuable insights and takeaways for anyone considering making a similar move.
16 February 2023 10 a.m. - 11 a.m.

Restaurant 1
Find out more on the CERN Alumni website : https://alumni.cern/networks/events/102482.

Registration for DevoXX4Kids@CERN is now open

CERN will once again play host to DevoXX4Kids on Saturday, 11 March 2023, in the Globe of Science and Innovation. Throughout the day, workshops will be run (in French) for inquisitive youngsters aged 4 to 15.
The programme will feature a wide range of activities and tools designed to give children of all ages a fun introduction to disciplines such as computer programming, robotics and electronics:

- Minis (4 to 6 year-olds): 10 a.m. to 12 noon, Cubetto and Robot Turtles
- Kids (7 to 10 year-olds): 2p.m. to 5.30 p.m., Kids-lab.io and CodeCombat
- Teens (11 to 15 year-olds): 10 a.m. to 5.30 p.m., Robotics, IOT and Web

Mid-afternoon refreshments will be provided. If your child suffers from an allergy, please provide an afternoon snack yourself. The Teens will be on site all day, so please provide a packed lunch.
Registration opening dates (the number of places is strictly limited):
Monday, 6 February at 9.00 a.m. for holders of a CERN IT account. ***Booked out***
Monday, 13 February at 9.00 a.m. for the general public (including CERN personnel).
Find out more and register at https://indico.cern.ch/e/devoxx4kids-2023.

Thematic CERN School of Computing 2023 – Apply now!

The 12th Thematic CERN School of Computing (tCSC 2023) will take place on 11-17 June 2023. The programme will focus on the theme of Scientific Software for Heterogeneous Architectures, covering areas such as computer architectures, parallel and optimized software, and heterogeneous programming (CPU, GPU, HPC etc.).
This school is organised by CERN in collaboration with the University of Split. The school will take place in Split, Croatia, and be hosted at the Mediterranean Institute for Life Sciences (MEDILS) Conference Centre. The Centre is a historical renovated building situated in a wooded and landscaped park located on the Adriatic Sea coast, a few kilometres from the centre of Split.
Applications are open until Monday 13 March.
For more information, and to apply, please visit: https://indico.cern.ch/event/1244566/.

Renovation work in the library is progressing

Library services continue during the work, which are due to be completed by autumn 2023

The first floor of Building 52 has been closed since October 2022 for the renovation of the library. The aim of this work is twofold. First, the carbon footprint of the library will be substantially reduced thanks to the installation of state-of-the-art cooling and ventilation systems as well as

modern LED lights, the replacement of all windows and the renovation of the roof. In parallel, the comfort of library users will improve significantly thanks to the new optimised layout of the reading room, which will be fitted out with modern, high-quality furniture. For the moment, one needs to use their imagination when looking at an empty reading room (see below).

Library reading area as of January 2023. (Image: CERN)

The book collection remains available, and librarians are available to answer your questions from Monday to Friday, 9 a.m.–5 p.m. A selection of 1800 essential textbooks and monographs is available in a small temporary library installed in the former office room in 3/1-015 and open 24/7. More than 55 000 books are available on demand via our online catalogue, where you can choose to either pick them up in room 3/1-015 or have them delivered via internal mail directly to your office.

Future reading area, designed by Bisset Adams. (Image: CERN)

Books can also be requested for delivery at the library desk. If you cannot find what you need in our catalogue, you can order documents (books, article copies, etc.) online or email us, and we will be happy to get hold of them.
The bookshop is fully operational, too! It has been moved to the office room in 3/1-011 next to the temporary library and is open during the library desk opening hours (Monday to Friday, 9 a.m.–5 p.m.).
We look forward to opening your new library in autumn 2023 in modernised premises. In the meantime, your comments and feedback are welcome, as usual. Send them to library.desk@cern.ch.

13th International School of Trigger and Data AcQuisition – 13-22 June 2023

ISOTDAQ 2023 is the 13th of a series of international schools dedicated to introducing those with an education in physics, engineering or computing (ranging from undergraduates to postdocs) to the "arts and crafts" of triggering and acquiring data for physics experiments. The main aim of the school is to provide an overview of the basic instruments and methodologies used in high energy physics, spanning from small experiments in the lab to the very large LHC experiments.

The school will be split 50-50 between a series of lectures and hands-on laboratory exercises, in which students can use the concepts and techniques they have learned throughout the course.
The School will be held in Istanbul, Turkey, from 13 to 22 June 2023. Please apply by 1 March 2023.
For more information and registration, visit the Indico page of the event : https://indico.cern.ch/e/isotdaq2023.

CERN bike-sharing service disruption

Building on the successful results of the bike-sharing pilot launched in 2022, the Mobility service is taking advantage of the traditional winter cessation of the bike and e-bike sharing service to implement a new service contract.
This change of provider aims to offer a service that best meets the needs of the whole CERN community. The bike and e-bike sharing service will resume on 6 March 2023.
Click here (https://sce-dep.web.cern.ch/campus-life/mobility) to find out more about mobility solutions at CERN.

Obituaries

Meenakshi Narain (1964 – 2023)

Meenakshi Narain, a physicist par excellence, inspirational leader and champion of diversity, died unexpectedly on 1 January 2023 in Providence, RI, USA. A renowned experimental particle physicist, and considered by many as a "force of nature", Meenakshi's impact on the physics community has left an indelible mark.
Meenakshi grew up in Gorakhpur (India) and emigrated to the US in 1984 for graduate school at SUNY Stony Brook. Meenakshi's PhD thesis work at the CUSB-II detector at CESR utilised inclusive photon spectra from upsilon decays for both spectroscopy measurements and searches for exotic particles (including the Higgs boson).

In 1991, Meenakshi joined Fermilab as a postdoc on the D0 experiment. She was a principal player in the 1995 top discovery, leading a group searching for top anti-top pair production in the di-lepton channel. Over the next decade, as a Fermilab Wilson Fellow and a faculty member at Boston University, she made seminal contributions to measurements of top quark pair and single top production, as well as the top mass, width and couplings.
Meenakshi joined the CMS experiment in 2007 upon joining the faculty at Brown University. She pioneered a number of exotic searches for high-mass resonances, new heavy gauge bosons and top quark partners. She continued to make innovative contributions to precision top quark measurements, and her foundational work on bottom and charm quark identification paved the way for Higgs boson searches and measurements. As a leader of the CMS Upgrade Studies Group, she coordinated physics studies for several CMS technical design reports for the High-Luminosity LHC upgrade, and an impressive number of results for the CERN yellow reports. She was also an important contributor to the US CMS Outer Tracker (OT) upgrade community: her leadership of the OT Modules group was instrumental to numerous successful reviews, and was key for moving the project forward.
The tutorials and workshops Meenakshi organised as co-coordinator of the LHC Physics Center (LPC)

were pivotal in advancing the careers of many young scientists, whom she cared about deeply. As US CMS Collaboration Board Chair, Meenakshi was a passionate advocate for the research programme, and she created an inclusive, supportive community that participated in movements such as Black Lives Matter, and tackled numerous challenges imposed by the COVID-19 pandemic.

A strong voice for women and under-represented minorities in physics, Meenakshi was the founding co-chair of the CMS Diversity Office and the driving force behind the CMS Task Force on Diversity and Inclusion and the CMS Women's Forum. She mentored a large group of students, post-docs and scientists from diverse backgrounds, and strived to improve diversity and inclusion in physics, such as by creating PURSUE, an internship programme that provides summer research opportunities at CMS to students from minority-serving institutions.

Meenakshi's illustrious career has been recognised via numerous accolades and positions of responsibility. She is remembered for her recent co-leadership of the Snowmass Energy Frontier study, her service on HEPAP and her new appointment to the P5 Subpanel, in addition to her new position as the first woman Chair of Brown University's Department of Physics. She will always be remembered as a brilliant scientist, a beloved mentor and an inspiring leader who made the world a better, more equitable and inclusive place. Her legacy will live on via the generations of physicists she inspired over the years.

Our heartfelt condolences go out to Meenakshi's friends and colleagues across the world and particularly to her husband Ulrich Heintz, sons Anand and Aneesh and the rest of her family. Some colleagues have created a memorial website, where one can leave a story, light a candle or send a message: https://www.forevermissed.com/meenakshi-narain/about.

Her colleagues and friends

Ombud's corner

CERN's psychologists are here for you

Among the various support channels that CERN makes available to its community are the Medical Service's two independent psychologists, Katia Schenkel and Sébastien Tubau (https://hse.cern/content/psychologist).

I had the pleasure of meeting them to prepare this article.

Consulting a psychologist is often perceived by the colleagues who come to see me as an overly daunting step. People have preconceived ideas that are hard to shake: "I'm not crazy", "I'm not sick, the system is", "If I go and see the psychologist, it'll be recorded in my file and harm my career prospects", "There's no point, I can manage alone" – these are fears that I often hear. Today, I'd like to show you that such notions are outdated and that consulting one of CERN's psychologists could help you cope more effectively with complicated situations that might arise and affect your mental health.

To do so, let's look at two entirely fictional colleagues, Jenna and Paul.

When to contact CERN's psychologists

When Jenna, a young staff member, comes to see me and mentions that she's having trouble sleeping and coping with everyday tasks and, especially, that she feels like her difficulties are overwhelming her and she can't cope, I identify the warning signs of potential mental distress.

I remind her that she can go and see the CERN psychologists. I also try to figure out what kind of support she's getting from her family, friends and colleagues. If Jenna doesn't have any support and

seems to be facing these difficulties alone, I again mention the support available from CERN's psychologists and talk to her about how they could help.

If you find yourself in this situation, when the gap is widening between the professional or personal demands weighing on you and the resources you have to meet them, and if you start to feel like no one can help you, don't wait to contact a psychologist. The sooner you do it, the easier it will be for you to stop this downward spiral.

CERN's psychologists know the Organization, its processes and its working environment very well, and this can make a big difference when it comes to talking about work-related problems. Jenna might already be seeing a psychologist outside work, but that doesn't stop her consulting one at CERN too.

How to contact them

Paul, who has a user contract, came to see the Ombud about a particularly stressful work situation, which has come at the same time as a difficult family situation. I recommended that he contact CERN's psychologists straight away.

Paul can send an email to Psychologist-me@cern.ch. He doesn't need to explain why he's asking to see them, nor ask them to keep it confidential. CERN's psychologists, like doctors, are bound by medical secrecy. Paul can say if he'd feel more comfortable seeing a man or a woman. In addition, both psychologists are fluent in English and French.

He'll hear back from them quickly, and an appointment will be set in the coming days. The appointment can take place either at the CERN Medical Service (Building 57) or on Zoom if Paul prefers to meet online or can't come on site.

An initial appointment doesn't commit him to any subsequent sessions. Paul is in full control of the process.

What happens during the appointment

Jenna

Jenna has chosen to have a face-to-face appointment with Sébastien. He listens carefully as she describes her situation and the problems she's facing. Through active listening, he helps her express her feelings and needs.

Jenna is an extremely proficient young engineer. She always says yes to new tasks and projects and manages them brilliantly. But now she feels like she's struggling and doesn't want anyone to know. She's far from her family and, as she's a recent arrival at CERN, she hasn't yet built a solid support network of colleagues and friends. She's desperately trying to maintain a high level of performance, at the expense of her health. She meets all the criteria for a burn-out, and Sébastien warns her about the consequences in the long term. He gives her some cognitive tools and techniques to deal with anxiety and break the downward spiral in which she feels caught. These techniques are remarkably effective and quickly produce very good results.

At the end of the appointment, Sébastien decides to offer Jenna a second consultation, if she wants. He also points out that CERN's psychologists do not offer medium- or long-term psychotherapy treatment. They generally offer two or sometimes three appointments, which can already be very effective. After that, depending on Jenna's needs, he can refer her to a psychologist in the area (France or Switzerland) who can offer longer-term treatment, possibly in her mother tongue.

Paul

Paul has made an appointment with Katia. Since he's on sick leave, he prefers to meet her online. Paul doesn't feel comfortable at work; he doesn't get on with his supervisor, who micromanages his work and doesn't trust him. He hasn't been able to broach this subject with his supervisor. He's constantly dwelling on this difficult situation and his anxiety is causing him to procrastinate, which, in turn, has a detrimental effect on the quality of his work and his performance.

After listening carefully to Paul and talking through the situation with him, Katia suggests that he prepare a conversation with his supervisor specifically about the issue of micromanagement and the impact it's having on his mental health.

Over the course of two appointments, Katia helps Paul regain a sense of control over a situation in which he felt powerless. In addition, the communication techniques she teaches him will be very useful in other circumstances, too.

As you can see, CERN's psychologists are here for you. They are professionals who can offer you

some very effective tools to handle complicated situations and the negative feelings they can arouse. Why not get in touch with them? Appointments are free of charge. You have nothing to lose and everything to gain.

I'd also like to recommend Katia and Sébastien's course "Mental Health Conversations For Managers", which you can find in the CERN Learning Hub (lms.cern.ch).

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