CERN Bulletin

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PARTICLE DETECTORS MEET CANVAS

This year is the European year of cultural heritage, but what does particle physics have to do with art? More than you might think

Slotting a painting into the X-ray scanner, which will analyse it at a high resolution. (Image: InsightArt s.r.o.)

Technologies from particle physics continue to find applications in cultural heritage, particularly in the art. Museums, art galleries, auction houses, art restorers and other art experts may now benefit from the use of particle detectors for art authentication and restoration.

At CERN, the Medipix collaborations have been developing pixel detector readout chips since the 1990s, enabling high-resolution, high-contrast, noise-free images – making them unique for imaging applications. Medipix2, Medipix3, Timepix and Timepix3 are state-of-the-art particle imaging and detection readout chips. Now they are being used to bring about a revolutionary improvement in the field of art authentication and restoration. A new start-up company based in Prague, InsightArt s.r.o., has adopted the technology to perform spectral X-ray scans of paintings.

Bringing together scientists and art restorers, InsightArt uses these chips to perform highly detailed X-ray scans of artworks. Unlike more conventional X-ray systems used in art authentication, the InsightArt scanner produces “colour” X-rays where colours represent different materials, i.e. pigments, in a painting. Differences in materials are detected by measuring the wavelength of X-ray photons.

(Continued on page 2)

A WORD FROM MARTIN STEINACHER

THE BENEFITS OF VISIBLE BADGES

In a few weeks' time, it will become mandatory for everyone on the CERN sites to wear identification badges visibly at all times. There are many good reasons for introducing this measure, and there are reasons for doing it now.

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A WORD FROM MARTIN STEINACHER

THE BENEFITS OF VISIBLE BADGES

Our Host State authorities have been recommending that we introduce this measure for several years for reasons of security. The visible wearing of badges is becoming standard practice in public and private organisations around the world. Laboratories such as ESRF, Diamond, Soleil and GSI already require the visible wearing of badges, and the policy is also being adopted by universities. In Geneva, pretty much all the international organisations have such a policy in place already. This means that the security services have been able to measure the impact of introducing the policy, and the evidence clearly shows that organisations with badge wearing policies are less prone to issues ranging from petty theft to major security incidents.

Although wearing badges visibly may seem an additional burden, there are advantages. Badges provide a simple way of identifying people. We can all tell at a glance who's who, and that's a powerful aid to civility in the workplace. If we see a visitor looking lost, for example, we can offer help. And, unfortunate though it is to say, studies have shown that people on the whole behave in a more courteous manner when they know they can be identified.

Our badges grant us access to the places we need to be at CERN to carry out our work – they literally open doors for us. We need them to enter the site in the morning, and in future, extra functionality might be added to facilitate our working lives. If we're unfortunate enough to suffer an accident at work, a visible badge can help with identification, and in some circumstances could even prove to be a life-saver.

Wearing badges visibly is a cultural shift at CERN, and we're relying on you to make it work.

Martin Steinacher
Director for Finance and Human Resources

PARTICLE DETECTORS MEET CANVAS

Furthermore, by using a system with robotic arms, analysis can be expanded to sculptures and other antique objects.

It can take between ten minutes and two hours to scan a piece of art, depending on its type and size. The read-out chips work like cameras, recording images based on the number of photons that hit the pixels when the shutter is open. The result is an X-ray image with unprecedented contrast and information on X-ray wavelengths, permitting researchers to estimate the materials used to create the piece. This helps for instance to determine whether any modifications have been performed on it over time, and even whether or not it is an authentic piece. The InsightArt company is supported by the ESA-BIC business incubator in Prague.

The Medipix collaboration was initially established at CERN to adapt particle-tracking chips, which had been developed for the LHC, to imaging applications in other fields. Subsequently, these chips have found applications in a wide range of sectors including medicine, space research, education and art. They are one of the many CERN technologies available for knowledge transfer.

Read more about other CERN projects linked to cultural heritage, in the Knowledge Transfer annual report, page 18.

Cristina Agrigoroae

LHC REPORT: CERN ACCELERATORS BACK IN BUSINESS

Despite the tight schedules, all machines were closed in time and first beams will be injected as scheduled

With the restart of the accelerators, the CERN Control Centre (CCC) also comes back to life, with experts flocking around the consoles once again. (Image: CERN)

For the accelerator complex, 2018 started with the year-end technical stop (YETS), during which a very dense programme of maintenance and upgrade activities took place. Despite the tight schedules, all machines were closed in time and first beams will be injected as scheduled, signalling the start of an intense final straight before the second long shutdown (LS2).

Beam commissioning in the injectors started with Linac2, followed by the Proton Synchrotron Booster (PSB), which injected the first protons of 2018 on 2 March. This was followed by the injection of a beam into the Proton Synchrotron (PS) on 8 March, one day ahead of schedule. At present, protons are also circulating in the Super Proton Synchrotron (SPS), following the first injection on 16 March. Various types of beam are now being prepared and adjusted, among which is the beam required for the re-commissioning of the LHC. The first experiments in the PS East Area and n_ToF will start receiving beam on Good Friday. The other facilities in ISOLDE and the SPS North Area will follow after Easter.

In the run up to LHC beam commissioning, the operations team, in close collaboration with equipment experts, steered the LHC through an intense period of hardware re-commissioning. During that period, all electrical circuits were powered and many pre-defined tests (around 10 000) were performed and analysed in order to ensure correct functioning with the aim of identifying and solving any issues before injecting the low-intensity beam. This is expected to happen just after the Easter weekend or, if everything progresses faster than initially thought, even during the Easter weekend, but not before the so-called cold checkout is completed. During this phase, the full machine, including the experiments, should be in such a state as if it is ready to receive beam. All individual systems will then be run precisely at once, like an orchestra, as if the beam were in the machine. Only when all instruments are well tuned and play in synchronisation, music will sound and the LHC will be ready to receive beam.

Rende Steerenberg

CERN EXPERIMENT SEES HINTS OF A RARE KAON DECAY

The NA62 experiment has observed a candidate event of an ultra-rare charged kaon decay

NA62 experiment in CERN's North Area (Image: NA62/CERN)

In a seminar on 27 March at CERN, the NA62 collaboration reported a candidate event of an ultra-rare charged kaon decay found using a new "in-flight decay" approach. While this single event cannot be used to probe beyond-Standard-Model physics, it demonstrates that the approach works well and can be applied to catch more events in the next run of data-taking, which kicks off in mid-April. For more information, read this article for the public (*https://home.web.cern.ch/about/updates/2018/03/cern-experiment-sees-hints-rare-kaon-decay*).

Ana Lopes

YOUNG REFUGEES PERFORM RAPID-PROTOTYPING AT CERN

Participants enrolled in the "We Start" programme spent a day immersed in technology

The participants present their prototypes (Image: Harri Toivonen/CERN)

The IdeaSquare facility at CERN recently played host to a group of young refugees as part of the "We Start" programme run by the municipality of Anières in Geneva. The five-month-long programme involves training workshops for young people from the community to help them harness their creative and entrepreneurial talents in order to develop a new product or service and bring their ideas to fruition. The 2018 programme is the first to focus specifically on refugees and asylum seekers, with twelve participants from Afghanistan, Syria, Iraq, Guinea and El Salvador involved.

The entrepreneurial enthusiasts, aged between 12 and 26, worked under the guidance of coaches from We Start, the municipality of Anières and the *Hospice Général* as well as five mentors from CERN: Claire Adam-Bourdarios (ATLAS), Susan Cheatham (ATLAS), Romain Muller (EU Projects Office), Oday Darwich (OpenLab/UniGE) and Harri Toivonen (IdeaSquare). The purpose of the workshop at IdeaSquare was to introduce the participants to design thinking, an iterative process similar to what scientists use, but in this case applied to ideas for products and services. They were taken through the steps for framing their problem, designing and building a prototype, testing it and finally making observations and drawing conclusions.

At the end of a three-hour workshop, each group had produced their first conceptual prototypes. One of the teams worked on developing a multilingual pen capable of making instant translations in order to help with the translation of paperwork in migration services. A second group, tasked with encouraging children to safely experiment with cooking, developed a crepe-making machine with which children could draw shapes and letters onto their pancakes be-

fore frying them. The two other groups built prototype devices for tracking the recycling behaviour of individuals and for collecting plastic waste from oceans respectively.

The workshop was held at IdeaSquare on Saturday, 10 March and was the fifth of fourteen sessions being held in 2018. This year's We Start programme will continue until 22 June, when all four project outcomes will be presented at the *Foyer d'Anières*.

Achintya Rao

COMPUTER SECURITY: CERN SECURE PASSWORD COMPETITION

We will reward the "best" and "most creative" passwords used at CERN

Once more, it's time for a spring clean at the CERN Single Sign-On portal. We will take this opportunity to review all 20,000+ passwords used with CERN primary, secondary and service accounts. This campaign has three purposes: to identify password duplicates, to extend the password history rule to all CERN accounts, and to reward the "best" and "most creative" passwords used at CERN.

The first aim, identifying password duplicates, involves finding different accounts using the same or similar passwords. As of 1 April, we will prevent the use of a password if it is already in use by someone else. However, we will notify the affected users well in advance and also provide them with the email addresses of colleagues using the same or similar passwords - this feature shall allow users to form interest groups and share experiences of their password (usage).

In parallel, we will extend the password history rule to all CERN accounts. This history currently prevents you from reusing any passwords that you've used before. This will be extended to include the previous passwords of all users: once a password has been used by one of the 20,000+ CERN accounts, it can never be used again. . .

Finally, we have formed a joint jury of colleagues from the HR and IT departments who will reward the best, most secure and most complex passwords used at CERN, the longest ones, the most creative or prosaic, the funniest and the most inspiring. The basis will be the CERN password database. The winning passwords and the names of their account owners will be published in the next issue of the CERN Bulletin. If you want to make sure that your password is among those, please point us to your account name (please do NOT send us your password as your password is yours and only yours).

Here are some hints to help you choose good, secure passwords:

- Choose a line or two from your favorite song or poem, and use the first letter of each word. For example, "In Xanadu did Kubla Kahn a stately pleasure dome decree!" becomes "IXdKKaspdd!". Mathematical formulas would also do: "a**2+sqr(b)==cˆ2".
- Use a long passphrase like the sentence "InXanaduDidKublaKahnA_StatelyPleasureDomeDecree!" itself.
- Alternate between one consonant and one or two vowels with mixed upper/lower case. This provides nonsense words that are usually pronounceable, and thus easily remembered. For example: "Weze-Xupe" or "DediNida3".
- Choose two short words (or a big one that you split) and join them together with one or more punctuation marks. For example: "dogs+F18" or "comP!!UTer".

Remember that your password is like your toothbrush - you do not share it and you change it regularly. Neither your colleagues, your supervisor, the Service Desk nor the Computer Security team have any valid reason to ask for it. They should not and will never do so. The same is valid for any external company: UBS, Paypal, Amazon, Facebook or Google will never ask you for your password! Your password is yours and yours alone.

Do you want to learn more about computer security incidents and issues at CERN? Follow our Monthly Report (http://cern.ch/security/reports/en/monthly_reports.shtml). For further information, questions or help, visit our website (http://cern.ch/Computer.Security) or contact us at Computer.Security@cern.ch.

The Computer Security Team

Official communications

VISIBLE WEARING OF A BADGE: INSTRUCTIONS

As previously announced, it will be compulsory to wear your badge where it can be easily seen and at all times from 2 May 2018 onwards. This requirement will apply to all persons present on the CERN site. Why? How? Here are some questions and answers about the new rule.

Why do I have to wear a badge?
Badge-wearing was suggested by the Host States as a means of improving security within the Organization. CERN's Enlarged Directorate has approved this measure and appeals to the civic-mindedness of each and every individual to ensure compliance with it.

Which sites does the new rule apply to?
All the fenced parts of the CERN site.

Who does it apply to?
All persons present on the fenced parts of the CERN site:

- Members of the personnel
- Contractors' personnel
- Beneficiaries of the Pension Fund
- Members of the Council, committees and other subsidiary bodies of CERN, and Industrial Liaison Officers (ILOs)
- Persons with special authorisation
- Family members of members of the CERN personnel
- Regular visitors (regular individual visitors who have submitted a substantiated request, members of clubs and visitors to the Staff Association's kindergarten and school)
- Short-term visitors (visitors attending an event, guests of members of the CERN personnel or participants in an organised visit)

Can I invite someone onto the CERN site?
Yes, you can still invite your friends and acquaintances to CERN. To do this, you must follow the instructions set out below, under the bullet point “visitors invited by a member of the CERN personnel”.

How can I obtain a badge?
As in the past, all persons who regularly enter the CERN site can obtain an access card after completing the requisite formalities with the services responsible for the relevant category, in accordance with the procedure in the Admin e-guide (https://admin-eguide.web.cern.ch/en/procedure/cern-access-card).

A system has been established to generate badges for occasional visitors.

- Professional visitors or visitors invited by a member of the CERN personnel: as before, you must submit a request via the Service Desk.
- Visitors attending a conference or other event: the conference or event must have been registered in Indico in advance. The interface now has a badge generation function. You can either ask your visitors to print their badges at home, or print them at CERN and distribute them at the entrance. Badge-holders will be issued to visitors at Reception or in Building 55. A user manual for this new Indico function is available at: http://indico-user-docs.web.cern.ch/indico-user-docs/cern/cern_access/
- Visitors registered for a guided tour of the Laboratory: visitors must fill in their names and surnames on the registration form. Badges will be issued at Reception.

How should I wear my badge?
There are various ways to wear the badge: for example, on a lanyard around your neck, or attached to an item of clothing by means of a clip. Lanyards and clips are available at the Registration and Access Control Service (Building 55).

If your working conditions do not permit you to wear a lanyard around your neck, you can obtain an armband from the CERN Stores (Building 73).

What should I do if I forget my badge?
If you forget your badge, you can present your *carte de légitimation* (Swiss card), which indicates that you are a member of the CERN personnel, or request a one-day laissez-passer from the Registration and Access Control Service (Building 55).

What should I do if I my badge is lost or stolen?
If your badge is lost or stolen, you should go immediately to the third floor of Building 55 (Service Desk) to declare its loss or theft. Your old card will be deactivated and you can have a new badge made on the ground floor of the same building (Access Cards).

For more information on badge-wearing, please contact sites-security@cern.ch.

The SMB Department

Announcements

ROAD TRAFFIC: RADAR SPEED SIGNS AT CERN

In the coming weeks, mobile radar speed signs will be installed on CERN's roads, at points selected either on the basis of incidents that have been reported or for the purposes of a planned study of driving habits at CERN.

These devices measure the speed of approaching vehicles and display it on an illuminated panel, allowing the driver to adjust his or her speed if necessary. They do not record the vehicle's registration number but do record other parameters, such as the date, time and speed.

This information will allow us to improve our understanding of the driving habits of people on the CERN site and to identify potentially hazardous and frequently used areas. The data will be shared with the working group on mobility and the HSE Unit's accident group for analysis purposes.

Reminder:

- The speed limit on the CERN sites is generally **50 km/h**. It may be limited to 30 km/h in certain locations or specific situations (roadworks, etc.). Overtaking is also prohibited throughout the site.
- Since 2013, 436 accidents/near misses have been declared at CERN.

Safety behind the wheel is everyone's responsibility! Let's all try and make the CERN site safer.

Happy motoring!

You can find all this information and more by clicking on the "Security" tab of the SMB department's website.

SMB Department

CERN PERSONNEL: APPLY FOR THE CERN KNOWLEDGE TRANSFER FUND

The CERN Knowledge Transfer Fund helps CERN employees develop and market their ideas, bridging the gap between research and industry. If you are a CERN employee working on technology with potential applications that could benefit society outside of CERN, this is the time for you to apply for the CERN KT Fund.

Since 2011, the CERN KT Fund has funded 41 projects with each project receiving 15-220kCHF. The projects usually last between one to four years. The CERN KT Fund selection committee meets in June 2018 to identify the projects that will receive funding.

Projects funded during 2017 include technologies related to superconductivity, accelerators and lasers with potential applications in aerospace, cultural heritage and industrial quality control.

Read more about the CERN Knowledge Transfer Fund here: https://kt.cern/funding/kt-fund.

CERN Knowledge Transfer group

NEW: ONLINE REGISTRATION OF VEHICLES

As part of ongoing measures to improve its services, the SMB department is pleased to announce a new tool for registering the vehicles you wish to bring onto the CERN site.

Developed by the FAP-AIS group, the new tool supplements the application introduced last year, which allows you to select the vehicles you intend to use. Now, instead of having to go to Building 55, you can simply complete the online form (*https://vehicles.cern.ch/vehicles/*) and submit a copy of your grey card (this copy will be destroyed within 48 hours of validation of your request). However, the possibility to register vehicles in person, on the first floor of Building 55, will still exist.

We remind you that, in accordance with Operational Circular No. 2 (Rev. 3), vehicles must be registered before being brought onto the CERN site. You can register as many vehicles as you like, but there is a restriction on the number you can activate.

For further details, consult the Questions and Answers (*https://vehicles.cern.ch/vehicles/selection/faq*) page or visit the website of CERN's Security Service (*http://smb-dep.web.cern.ch/fr/Security*).

SMB department - FAP/AIS group

ROADWORKS AT THE CROSSROADS BY THE PRÉVESSIN SITE ENTRANCE

As we announced last spring, the crossroads by the main entrance to the Prévessin site will undergo work to widen the roads and bring the layout into compliance with the relevant standards. The work was originally scheduled to take place between 1 May and 30 October 2017, but ultimately had to be postponed and will instead take place this spring over 14 weeks, from the start of April to mid-July 2018.

Provisional schedule for the work:

- **Phase 1** : widening of the Salève side of Route Départementale 35 (RD35) – duration: 3 weeks
- **Phase 2a** : widening of the east side of Route de l'Europe – duration: 1 week

An alternating traffic system at the end of Route de l'Europe will be controlled by the traffic lights at the crossroads

- **Phase 2b** : widening of the west side of Route de l'Europe – duration: 2 weeks

An alternating traffic system at the end of Route de l'Europe will be controlled by the traffic lights at the crossroads

- **Phase 3** : installation of traffic islands on the RD35 - duration: 3 weeks
- **Phase 4** : widening of the Jura side of the RD35 and of the access road to the Prévessin site – duration: 3 weeks
- **Phase 5** : road surfacing work – duration: 1 week

This work will take place at night. A diversion will be in place to allow access to the Prévessin site via the road to the waste disposal site (*déchetterie*).

Unfortunately, traffic is likely to be disrupted throughout the duration of the work.

Thank you for your understanding.

SMB Department

CERN SCHOOL OF COMPUTING 2018 GOES TO ISRAEL: APPLY NOW!

Applications are now open for the 41stCERN School of Computing. The CSC 2018 is organized in collaboration with Tel Aviv University (TAU), and will take place from 1 to 14 October 2018 in Tel Aviv, Israel. The two-week programme consists of more than 50 hours of lectures and hands-on exercises, all in advanced, interesting and challenging computing topics. It covers three main themes: base technologies, physics computing, and data technologies.

The CSC is not a conference but a true summer university. As with every CSC, the programme is audited by the hosting university (TAU), and students that pass the final optional exam will receive a diploma from CSC and TAU. However, it's not all study; the social and sport programme is also a vital part of the School. We will have a chance to sample some of Israel's great cultural, historical and natural attractions, and profit from Tel Aviv's location by the sea.

The CSC 2018 is aimed at postgraduate engineers or scientists, working at CERN or at other research institutes, with experience in particle physics, in computing or in related fields. We welcome applications from all nationalities, and encourage all qualified persons to apply. Limited financial support may be available.

Apply now at www.cern.ch/csc . The deadline is May 6 – places are limited!

Sebastian Łopieński, CSC Director

PRESENTATIONS FROM THE CERN USER EXPERIENCE COMMUNITY

Most departments at CERN develop software but we are struggling to make interfaces user-friendly. The User Experience Community at CERN is supporting anyone who is interested in the usability of their products. We organise user testing events, brainstorming sessions and knowledge sharing meetings.

We will have a series of presentations that go deeper into how we make experiences the upcoming months.

Memory and usability
April 20th, 15:30 - 61/1-009 (Room C)
What do people remember when you ask them to sketch the EDH interface on a empty sheet of paper? Why do we only remember specific objects and what does this tell about usability?

Don't listen to users
May 28th, 16:30 - 1/1-025
We often fall into the trap of asking users what they want. But can we really trust them? Research says no. In this talk, we will learn how to find out what users really want.

The experience of music
June 22nd, 15:30 - 61/1-009 (Room C)
Music has changed a lot during the last century. Why is this? How do we experience music and how is this similar to the experience of other kinds of art, entertainment or interfaces?

All presentations are open to everyone so feel free to come. Find more information at: http://ux-community.web.cern.ch/.

Ombud's corner

DON'T FORGET EXPERIENCE!

Frans started his career at CERN as an engineer in 1992, after having worked for about 10 years in industry in his home country. He's an ordinary chap who has progressed regularly in his career and has survived several reorganisations.

He's always been loyal to his job, shouldering his responsibilities with diligence and professionalism. Now, with just a few years to go until he retires, Frans finds himself in a section of 35 people, and comes to see me to ask if it's reasonable to feel the way he does: it's not that he has any specific worries, just a vague feeling that everyone views him with indifference. He has always given his all to the Organization, has always seen it as a badge of honour to complete his projects on time and on budget, and has always shared his knowledge with his colleagues: to put it simply, he's the model of a quietly efficient worker.

Frans has never asked for any particular recognition – he has always done what he was employed to do – but he feels like over time he has become invisible. When it comes to the section's budget, no additional resources are allocated to acknowledge the achievements in which he has played a part, trips to conferences are reserved for his younger colleagues, and Frans sometimes feels overwhelmed by the digital revolution as he isn't quite as on the ball as the others. But Frans has something unique and intangible that makes him a real asset to his section: experience. He knows the history of all the installations, the reasons why particular solutions were chosen, and much more. He can help his younger colleagues to avoid repeating the mistakes of the past. His experience provides him with a much broader context when any problems arise, and he can draw on past ideas to find appropriate solutions. He is able to put things into perspective and reassure his colleagues whenever they have doubts. Young engineers faced with a dilemma have often sought him out – and he was inevitably able to shed light on the consequences of their choices.

I don't often see people like Frans – they don't want to bother me – but I know that they exist. They have an essential role to play in keeping our systems working and are an invaluable source of advice. If you have a "Frans" in your team, make sure you give him the recognition he deserves, keep asking his opinion, show him respect and value his skills. An organisation like CERN thrives on the complementarity of the sharp minds of younger personnel and the deep understanding of their venerable counterparts. Our older colleagues can be considered the safety net that allows younger people to make the technological leaps necessary for CERN's work. A team that both encourages young people and recognises the contribution of older people is a winning team!

If you'd like to comment on any of my articles or suggest a topic that I could write about, please don't hesitate to e-mail me at Ombuds@cern.ch .