



# CERN Bulletin

## Middle East physics collaboration plans for the future



The SESAME site in Allaan, Jordan. (© SESAME)

Jordan has provided the land and an elegant building that will house the accelerator complex and associated infrastructure; a number of states, organizations and synchrotron light laboratories have donated the injector and booster, beam lines or components, support for infrastructures, and training of scientists and engineers; the SESAME members cover the laboratory operating

**The SESAME initiative, the Synchrotron-light for Experimental Science and Applications in the Middle East, is making progress. At a recent SESAME Council meeting at the end of May, Jordan, Iran and Israel confirmed their cash contributions to the project's storage ring. The Palestinian Authority and Pakistan have confirmed their in-kind support and Egypt and Turkey are taking steps to allow their participation. Technically planned to start operation in 2015, SESAME has begun to show significant potential as a science for peace initiative in the Middle East.**

cost These are but some the magic ingredients that are making the SESAME project become a reality.

Built in a region where peaceful interactions among neighbouring countries remains a

(Continued on page 2)

Nos 28 & 29 – 13 June & 20 July 2011



A word from the DG



### Half term report

This week marks the mid-point of my mandate as Director General, so what better time to take stock of the last two and a half years and look forward to the next?

On the surface, the report is good. The LHC is performing well, Council has just approved our medium term plan, and there seem to be few clouds on CERN's long-term horizon. It's precisely at times like this,

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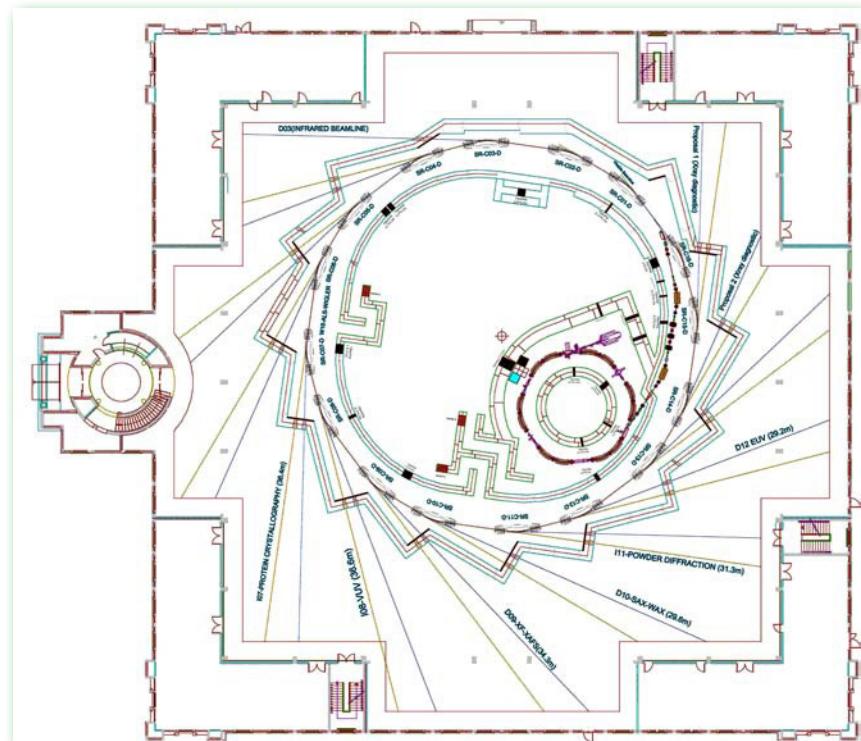


## Middle East physics collaboration plans for the future

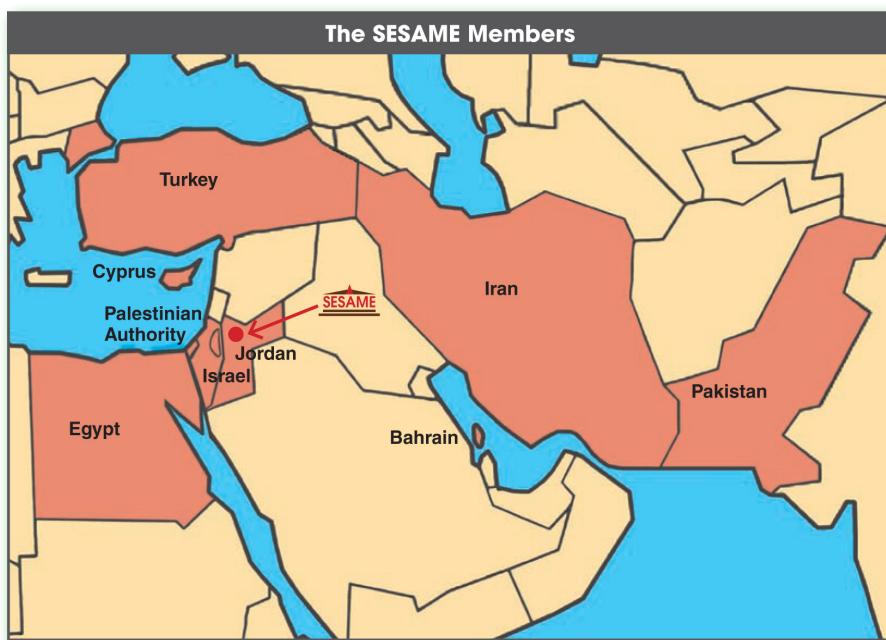
*(Continued from page 1)*

challenging goal, SESAME is a strong evidence of the will to overcome the current difficulties in the name of and for the sake of science. SESAME will be a third-generation light source that will compete with other – existing or in construction – light-source facilities around the world. “CERN is supporting this initiative by sharing its expertise in particular for the magnet system. In 2010, CERN and SESAME Directors signed a collaboration protocol. As a first step, CERN has provided a review of the SESAME magnet system of the main ring, the construction of which will hopefully start this year,” explains Jean-Pierre Koutchouk, CERN’s representative for the SESAME project. “We have suggested some possible improvements and also agreed to provide our support in other domains, such as particle physics simulations, safety and protection, instrumentation, and access to CERN IT infrastructure. CERN’s experts (active or retired) will deliver training to SESAME personnel on request.

While the necessary preliminary studies and further negotiations are taking place at different levels, the construction of SESAME is on-going: the radiation shielding wall is complete and the hall is ready for installation of the accelerators. The injector and



The SESAME site. (© SESAME)



### *Map of SESAME members. (© SESAME)*

booster synchrotron will be commissioned with a beam early next year. The 2.5 GeV electron storage ring has been designed by the SESAME team and passed a number of reviews. "As the region's first major international research centre, SESAME will contribute to regional scientific, technical and economic development at a crucial stage in the history of the Middle East. It will be a focal point for regional scientific collaboration and for cross-border networking," said Her Royal Highness Princess Sumaya Bint El Hassan, President of the El Hassan Science City in Amman (Jordan), when she welcomed the delegates of the SESAME Council.

"Following the review, a more ambitious goal will be for CERN to launch the construction of the main ring magnetic system, in close collaboration with the SESAME laboratory. To this end, CERN is seeking the political and financial support of the European Union and is preparing for this contribution," says Koutchouk. "SESAME recalls the beginnings of CERN's history, when previously conflicting countries decided to peacefully start a common scientific project. It is thus important for CERN to provide concrete support for the SESAME initiative and help make it a reality."

CFRN Bulletin

# LHC Report: here comes the summer!

At present, the spacing between the bunches in the LHC is 50 ns, with some bigger gaps here and there to allow the injection and extraction kickers to do their job. The maximum number of bunches that we can inject in the machine with a 50 ns spacing is 1380, which is indeed the target for 2011. A nominal LHC bunch contains around  $1.15 \times 10^{11}$  protons. The 1380 nominal bunches now in use gives a total of  $1.6 \times 10^{14}$  protons per beam and a combined energy of around 89 MJ at 3.5 TeV. Happily the machine protection system is working very well.

After a rocky period, the start of last week saw some excellent machine availability

**Over the last three months the LHC has been gradually stepping up the total number of bunches in the beams and, early on Tuesday 28 June, the first fill with 1380 bunches per beam went into physics.**

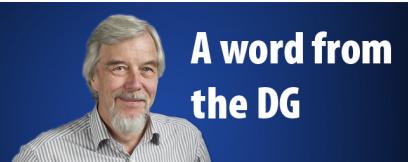
and two back-to-back fills delivered 62 and 46 inverse picobarns. Both were dumped by the operations team, which is unusual because fills normally get taken out by one of a variety of problems – for example electrical network glitches caused by thunderstorms have been recent culprits.

Wednesday 29 June saw the start of an intense five-day machine development period. Many detailed studies were performed with the aim to push the performance of the LHC in both the short and the long term. Among the highlights were: the first injection of 25 ns bunch trains; the col-

lision of bunches at 450 GeV with twice nominal intensity and smaller than nominal beam size; and another successful test of an optics designed for the future high luminosity LHC (HL-LHC).

This week, the LHC has been in a 5-day technical stop (4–8 July), which is to be followed by a sustained 6-week physics production run. The aim is to ramp quickly back up to 1380 bunches per beam and start “turning the handle”. The Booster and PS are able to offer somewhat higher bunch intensities and smaller beam sizes than those used at present, and the hope is to gently push these parameters in the search for even higher luminosities.

*Mike Lamont for the LHC team*



(Continued from page 1)

## Half term report

however, that complacency would be most dangerous. The world is still in the grip of an economic crisis, and recovery in our Member States is slow. CERN is still in debt, as are our social security systems. We are working on this, but these factors need constant and careful attention.

While we need to remain vigilant, I'd like to focus on the positives for my mid term message. Let's start with the LHC. The machine's performance this year has been fantastic. We achieved our target luminosity for the year in June, which augurs well for the summer conferences. I don't expect any major discoveries just yet, but we are on target to have covered the whole range for Higgs from the LEP limit to 600 GeV by the end of next year. If the Higgs is not there, it doesn't exist. Either way, it would be a great discovery for physics.

For the physics programme beyond

the LHC, it's the same story. CNGS is delivering good beam to the experiments at Gran Sasso, and I'm looking forward to learning of more tau-neutrinos being detected there. There's a steady stream of exciting results coming from the AD. The CLOUD experiment's first paper is soon to be published. The n-ToF facility and ISOLDE continue to deliver, and we have been privileged to witness the successful launch and first data from AMS.

These successes are thanks in large part to the CERN infrastructure supporting our research, the electrical power supplied to cryogenics and, of course, the great performance of the Worldwide LHC Computing Grid (WLCG). The WLCG now routinely handles up to 200000 concurrent analysis jobs. Without it, our physics would emerge much slower.

Looking further ahead, the redesign of the LHC high-current interconnects is now complete, so we're ready to

prepare the machine for 7 TeV per beam running in the first long shutdown in 2013–14. CLIC is progressing steadily towards a conceptual design report to be published in 2012, while CTF3 routinely achieves accelerating gradients of 100MV/m.

In the world as a whole, CERN's attractiveness continues to grow. To cite just a few figures, the number of users has increased by 60% since 2005 with most coming from non-Member States. We've had 107 VIP visits and 182 media visits since January, and the number of public visitors is approaching 40000.

Overall, things are going well. However, we have no reason for complacency. There is still a lot of ground to cover, but CERN has the necessary drive to succeed. For a more complete report, go to: <http://cdsweb.cern.ch/record/1363357> to see my talk to personnel on Monday 4 July.

*Rolf Heuer*

# Science for all and all for science

Open online resources have the potential to break through global economic, social and educational barriers; this was the scope of the discussion among visiting Shuttleworth Fellows and their

CERN colleagues. In a round table session on 20 June, they shared information about their open resource projects. From the Shuttleworth Fellows came discussion of P2PU, a peer to peer online University, Siyavula, a project that uses open educational resources in South African schools; the open educational repository, Connexions; creative commons licenses; and ways of making government data more accessible, through the Open Knowledge Foundation. Afterwards, a number of CERN projects were presented, including the Open Access publishing approach for the high-energy physics community, and the CERN-UNESCO initiative for digital libraries in Africa.

Each of these projects fulfils a unique objective, but how exactly do they come about? According to François Grey, coordinator of the Citizen Cyberscience Centre (CCC), these open source projects - and the volunteer computing projects handled by the CCC - tend to be based in western countries. "There's a lot of potential for these projects in developing regions. Instead of having to invest in an expensive computing centre, an African scientist could access a vast network of computing power through a single server," explains Grey. "At the CCC we want to make volunteer computing know-how and technology available to scientists worldwide." CERN is one of the CCC's core institutional partners, providing it with its "headquarters" in the IT building,

Fellows from the Shuttleworth Foundation visited CERN from 20 to 23 June. The Foundation supports a variety of open source, volunteer-oriented projects tackling humanitarian and scientific problems. It is also the founding sponsor of the Citizen Cyberscience Centre, a partnership between CERN, the UN Institute for Training and Research and the University of Geneva, that enables ordinary citizens to participate in scientific research on the Web.



while the Shuttleworth Foundation provides the principal sponsorship.

In order to tackle issues of particular relevance to developing worlds, the CCC runs so-called 'hackfests'. These are sessions that bring together scientists, local people involved in open source software and enthusiastic volunteers to work on a particular problem. According to Grey, "they're more than just a workshop, because instead of just leaving with an idea, scientists walk away with a prototype of a new project and a network of people who want to help with the project." These 'hackfests' have already gotten a number of projects down the pipeline, including an initiative to monitor deforestation of the Amazon rainforest.

These diverse open source and volunteer-computing projects are only a small part of a growing movement to re-engage the public with educational and research content via the web. Through 'Citizen Science' projects, audiences around the world are participating in scientific research as never before. "If you provide ordinary citizens with the means and the method, they can participate in real scientific research," concludes Grey. "The CCC projects enable volunteers to behave like scientists, asking questions and making their own useful and scientifically relevant conclusions."

Katarina Anthony



## Did you know?

### LHC++@Home

When LHC@Home was launched in 2004, it was meant to be a simple public participation project in celebration of the 50th anniversary of CERN. But after only a week online, the project had thousands of computers crunching data. This data turned out to be very useful for LHC engineers and the project continues to run, some 7 years later.

But with the progress of computers and the advent of "Virtual Machine" software – which allows computers to "imitate" different operating systems – there are new LHC questions that could be answered through volunteer computing. A new project, currently known as LHC++@ Home, will run high-energy physics simulations on ordinary computers; this is thanks to CernVM, an innovative virtual machine technology developed at CERN. Although currently in its test phase, the project will soon be a way for volunteers to help CERN scientists conduct cutting edge research from the comfort of home.

LHC++@Home will join a multitude of Citizen Science projects already gathering results, including Fold.it, a groundbreaking computer game which allows players to fold proteins, making a hands-on contribution to the field of protein design; Quake-Catcher Network, a project that links together laptops and computers from around the world to form a vast earthquake monitoring system; and the hugely successful GalaxyZoo, which gives volunteers the opportunity to classify and, occasionally, discover galaxies on their own.

More information at:

<http://www.citizencyberscience.net/>

# Open hardware for open science

Two years ago, a group of electronics designers led by Javier Serrano, a CERN engineer, working in experimental physics

laboratories created the Open Hardware Repository (OHR). This project was initiated in order to facilitate the exchange of hardware designs across the community in line with the ideals of "open science". The main objectives include avoiding duplication of effort by sharing results across different teams that might be working on the same need.

"For hardware developers, the advantages of open hardware are numerous. For example, it is a great learning tool for technologies some developers would not otherwise master, and it avoids unnecessary work if someone has already designed what one needs. Furthermore, having all work reviewed increases its quality," explains Javier Serrano, an engineer in CERN's Beams Department and the founder of the OHR. "For the users - engineers, scientists, researchers, etc. - the OH concept offers some attractive freedom. Everyone has the possibility to criticise and modify the design, as well as manufacture the hardware specified in the design files. Moreover, everyone can benefit from better hardware, better support from local hardware designers and can request or add new features easily."

It was in this regard that some members of the OHR team felt the need to regulate

**Inspired by the open source software movement, the Open Hardware Repository was created to enable hardware developers to share the results of their R&D activities. The recently published CERN Open Hardware Licence offers the legal framework to support this knowledge and technology exchange.**

the use of the designs published by CERN. The first version of the CERN OHL (Open Hardware Licence) was created with the support of the Knowledge Transfer group and was published two months ago on the OHR. And a few days ago, a second version of the OHL was presented. Although the principles behind the two versions are the same, a few changes had to be made after feedback was received from the Free Software community. "With this licence, CERN wishes to offer an additional means to maximise the dissemination of its hardware design and to foster collaboration among public research hardware designers," says Myriam Ayass, the legal advisor of the Knowledge Transfer group and the author of the CERN OHL. "Everyone is able to see the design documentation, study it, modify it and share it. In addition, if modifications are made and distributed, it must be under the same licence conditions – this is the "persistent" nature of the licence, which ensures that the whole community will continue to benefit from improvements as everyone in turn will be able to make modifications to these improvements."

The fact that the designs are "open" also means that anyone can manufacture the product based on this design – from individuals to research institutes and big com-



panies – and commercialize it. "The CERN OHL specifically states that manufacturers of products based on those designs should not imply any kind of endorsement or responsibility on the part of the designers," points out Myriam Ayass.

The OHR already hosts more than 40 projects developed by institutes including CERN, GSI (Helmholtzzentrum für Schwerionenforschung) and the University of Cape Town. "Open source software was our source of inspiration for Open Hardware, and we are starting to see that the benefits seen in the former translate well to the latter. We are proving that there need be no contradiction between commercial hardware and openness," concludes Javier Serrano.

For further information, read the recent CERN Press Release on OHL.

*CERN Bulletin*

# In conversation with Nobel Laureate Jack Steinberger

I've been at CERN for 45 years, and I've seen this organisation go through a lot. Experiments have grown significantly and so have the aspirations of particle physics. When I did my thesis 64 years ago, I could do it alone in just 6 months and I could get worldwide interesting results. Now, experiments at CERN are made up of hundreds, if not thousands of people, working for 20 years to get a result.

My thesis advisor was Enrico Fermi, and in 1953 – unless it was 1952, I'd done my thesis a few years before – he was asked to be the chairman of the APS. It was more of an honorary job, but one of his few obligations included giving a farewell address at the end of that year. He gave a speech about the physics of the day, and it was a time when particle-producing accelerators were just getting started. The first accelerator used to produce particles was the cyclotron at Berkley and it had just gone online in 1948;

**Awarded the 1988 Nobel Prize for Physics for his discovery of the muon neutrino, Jack Steinberger has been part of the CERN establishment for almost 50 years. He recently celebrated his 90th birthday and can still be found in his CERN office on an almost daily basis. If you happened to have a coffee with him... this is what he would tell you: his recollections, and thoughts about the present and future of particle physics.**



although they were much smaller then than they are now, they were the biggest experimental devices ever made at that time. And so, in his speech, Fermi imagined what the final – or rather, the biggest – accelerator would be. He drew a circle that went around the globe, representing a particle accelerator that went around the Earth. The LHC has a diameter of 9km, so it's 1000x smaller than the accelerator that Fermi imagined.

That was the dream over 50 years ago, but as for the future of particle physics – especially after the LHC – I do not know. It will depend on what we find out at the LHC and no one quite knows what that will be. But there is clearly a general interest in the kind of physics that we do here. A cultural

interest – we want to know what the world is like and this part of the unknown that we are trying to understand here. But there's also the fact that experiments are always getting bigger and more expensive; there is a limit as to what governments will be willing to invest.

Hopefully something interesting will come out of the LHC. What everyone is interested in, myself included, is something that gives us indications of new physics outside of the Standard Model. For me, any indication beyond this would be something absolutely beautiful. So far, everything that we have found can be interpreted within the Standard Model.

But now I spend most of my time trying to follow what is going on in astrophysics. With the discovery of the inhomogeneities of the cosmic microwave background in 1992, and their precise measurement since then, astrophysics and cosmology have seen a beautiful advance in the last two decades, but I am afraid that further progress, learning about dark matter and dark energy is challenging. I hope that the LHC will help us to learn what dark matter is.

*Interview by Katarina Anthony  
for the CERN Bulletin*

# New Head of the Users Office

Doris Chromek-Burckhart arrived at CERN about thirty years ago after completing a physics degree at

Mainz University in Germany, and began her career with the Organization working on data acquisition systems for the experiments. She then joined ATLAS, where she took part in the development, commissioning and operation of the experiment's own data acquisition system. Her appointment as Head of the Users Office was preceded by two years as CERN's Equal Opportunities Officer from 2009 to 2010.

**Doris Chromek-Burckhart took over as Head of the Users Office on 1 June. She succeeds Chris Onions, who held the post for more than ten years before retiring in 2010, and Jose Salicio Diez, who replaced him temporarily.**

The Users Office, which has now been in existence for over twenty years, manages administrative procedures and generally makes life easier for the 10,000 or more users from around a hundred different countries, in collaboration with CERN's various services and the Host States. "Before the LHC was commissioned at the end of 2008, there were many users working on the design and construction of the LHC experiments,"

says Doris. "Today, our guest scientists – increasingly students, doctoral students and post-docs – are here above all to analyse the huge quantity of data being produced by the experiments to discover new physics."

The users have vastly varying profiles, ranging from students to Nobel Prize winners. Some spend only a few days of their career at CERN, while others spend their whole professional lives here. "Today, 32% of users are "resident", which means that they are at CERN for more than 50% of the year," explains Doris. Their passion for science leads them to conduct their own research, give lectures and head projects in their home institutes, all the while taking part in the CERN experiments. "Guest scientists have many responsibilities, from analysing data to supervising various projects. They are so enthusiastic about the research being done at CERN that many work round the clock seven days a week when they come to the Laboratory!" adds Doris.

The Users Office team is currently preparing to receive a batch of new arrivals since, as Doris points out, "there are always a lot more people here in the summer, not only students but also scientists making the most of the end of the university teaching year to come and work at CERN. The members of our team, who are highly professional and always do their utmost to ensure that everything goes smoothly, will rise to the challenge as usual." The Users Office is well on track to fulfilling its mission and with someone at the helm who admits that her overriding concern is the well being of others, the future looks promising.



Doris Chromek-Burckhart photographed by Pierre Gildemyn.

Anaïs Schaeffer

# Doing business with CERN: a new website explains everything

When the Laboratory needs to buy goods or services, the PI group comes into play and makes sure that this happens according to the established rules and procedures. "CERN

procures supplies and services and awards orders and contracts in compliance with the principles of transparency and impartiality," explains Anders Unnervik, Head of Procurement and Industrial Services in the Finance and Procurement Department (FP). "CERN's tendering procedures are selective but they are designed to guarantee fair competition."

The invitations to tender are, in principle, limited to firms established in the Member States or in countries that are candidates for accession and Associate Member States. Contracts and orders are awarded to firms whose bids meet the technical, financial and delivery requirements and are either the lowest or represent the best value for money.

A range of stakeholders is involved in the procurement process: CERN's personnel requesting the supplies or services, existing and potential suppliers, Industrial Liaison Officers and, of course, the procurement staff. The new website was developed within the Finance and Procurement Department by its webmaster, Robin

**At CERN, procuring all supplies and services is the job of the Procurement and Industrial Services (PI) group of the Finance and Procurement Department. Managing about 30,000 new orders and contracts every year, the Group recently launched a brand-new website where CERN and its external partners can find all the useful information to effectively do business together.**

Ashford, who explains: "The foundation for the project is Drupal, an open source content management system with styling determined by the new CERN web framework and graphic charter being developed by the Communications Group, and hosting provided by IT-OIS-ODS using CERN's new Drupal infrastructure."

Among other features, the site contains graphical lifecycles to illustrate the procurement process. The figures are interactive, providing detailed information on every step of the procurement process, including questions and answers and direct links to all the necessary technical documents. "After the completion of the LHC project, it was necessary to refurbish the templates of technical documents to align them with the current activities of the Organization. These updates have been performed under the auspices of the Accelerators and Technology Sector Quality Assurance Working Group chaired by Tadeusz Kurtyka, involving some experienced Procurement Officers. This Working Group proposed that a visual approach would be the best means for promoting clear and best practices in pro-

curement," explains Pierre Bonnal from the Projects Support Office of the Accelerators and Technology Sector, who worked out a graphical framework for presenting the procurement lifecycle.

While providing CERN's personnel with all the necessary information concerning the procurement procedures, the website does not neglect to satisfy the external potential partners with dedicated sections where CERN's procedures are explained in straightforward terms, supported by details of all major upcoming procurement requests (Forthcoming Market Surveys and Calls for Tender). "Information about upcoming needs was previously published quarterly on paper and presented to the Finance Committee. Thanks to the new website, it is now immediately available along with links to all of the relevant documentation as it is published", explains Cristina Lara, Deputy Head of the Procurement and Industrial Services Group. "Potential suppliers are also encouraged to contact staff in the Procurement Service, along with Industrial Liaison Officers in our Member States, and the new website provides detailed contact information for both. This is part of an ongoing effort to improve the quality of our services," she concludes.

More information at:

<http://procurement.web.cern.ch/>

CERN Bulletin

The screenshot shows the homepage of the CERN Procurement & Industrial Services Group website. At the top, there is a navigation bar with links to European Laboratory for Particle Physics, CERN, PROCUREMENT AND INDUSTRIAL SERVICES GROUP, and a search bar. The main header is 'FP Procurement & Industrial Services Group'. Below the header, there is a 'Welcome' section featuring a collage of images related to particle physics and industrial services. To the left, there are two columns of links: 'CERN Personnel' (Procurement Guidelines, CERN Templates, Procedures Travail Temporaire) and 'Doing Business with CERN' (How to do Business with CERN, Procurement Strategy and Policy, Market Surveys and Calls for Tender, Who to contact at CERN, Who to Contact in your Country, Register for our Suppliers Database, Key Reference Documents). On the right, there are sections for 'News' (links to Best Value for Money and A new approach to the labour law applicable to contractors' personnel) and 'User Options' (Logout). At the bottom, there is a footer with links to CERN Home, Finance and Procurement, Procurement and Industrial Services, Knowledge and Technology Transfer, Recuperation and Sales, Human Resources, General Infrastructure Services, Feedback and Suggestions, and the CERN logo.

# A glimpse into the future for 12 young scientists

In early 2009, Craig Barrett, Intel's chairman of the Board at the time, visited CERN as part of Intel's partnership in CERN openlab. He and Wolfgang von Rüden, former IT Department Head, agreed to create the CERN Special Award for the Intel International Science and Engineering Fair (ISEF) – a 5-day trip to CERN for 12 students, co-funded by CERN and Intel.

The annual Intel ISEF is an aspiration for students, who participate at the local high school science fair level. Students who succeed there go on to compete at ISEF affiliated regional or state level fairs from which the winning students earn an invitation to participate in Intel ISEF, held this year in Los Angeles, California. It is the premier science competition for high school students (ages 14–18) worldwide, with some 1500 participating students now coming from as many as 60 different countries.

Winning the Intel ISEF competition does not go without recognition and the top prizes awarded to the students are quite generous. Besides the many financial prizes awarded to students who win in the Grand Awards category, there are numerous Special Awards that are granted by partnering organizations and institutions. The Special Awards vary from university scholarships to all-inclusive trips to visit laboratories and scientific organizations worldwide.

Now in the third year, the CERN special award winners who passed a multi-level selection process discovered first hand what CERN is all about and what it's like to work in such a complex environment. Von

Last week, CERN received a visit from a gifted group of high school students. The winners of CERN's Special Award at the Intel International Science and Engineering Fair (ISEF) were invited to spend a few days here and discover first hand what it's like to work in such a complex environment and how to best enjoy oneself in this part of the world.

Rüden prepared an extensive programme of lectures and visits, given by some of CERN's most experienced physicists and engineers. The students also visited Geneva, EPFL and some of Switzerland's nearby landmarks.

Sahir Raoof, a 17-year-old student from Jericho, New York, described the experience in comparison to the time he spent at RHIC, the Relativistic Heavy Ion Collider at Brookhaven National Laboratory, where he did work on the electric dipole moment of the proton that led to his ISEF prize. "Coming to CERN has opened my eyes to high-energy physics and how large the scale is here at CERN," said Raoof. "The amount of brain power and the scale of the experiments here with detectors that weigh twice as much as the Eiffel tower... it's hard to wrap your head around."

Emil Khabiboulline, 16, from Aurora Illinois explained that he has a high interest in both physics and engineering: "I would be happy to work for CERN because I find the work done here and the amount of necessary collaboration an intriguing prospect." Emil did research for his ISEF project at Fermilab, where he studied models for quench propagation in systems of interconnected superconducting coils and efficient methods of quench protection. "By the end of my research period, I produced results that will hopefully be used in the design of a future linear particle accelerator."

While some of the visiting students were lucky enough to have been exposed to a large laboratory setting already, others were thrilled by the introduction to such large-scale science. On their final day, the students were paired up with a scientist who allowed them to tag along to see what an afternoon in the life of a CERN scientist is really like, and many of the students were introduced to the prospect of a summer internship at CERN through the Summer Student Programme. Andrey Sushko in particular, a 17-year-old student from Richland Washington, who designed a new alternative to conventional electrical motors using electrowetting principles, was intrigued by the internship opportunity. "I've mainly been working alone," explained Sushko. "I did all my research at home, in my room, but I would really enjoy collaboration in principle. I have only just heard of the Summer Student Programme in the past few days and it sounds very interesting. I am definitely applying."

The final night in Geneva brought the students into the city to enjoy an evening of blues with the Blues Association of Geneva (BAG), not by accident, as the trip organiser is also a blues musician.

For more information on Intel ISEF visit the website:

<http://www.societyforscience.org/isef/>

To know more about the programme of this trip and the award winners' projects:

<https://indico.cern.ch/conferenceDisplay.py?confId=124649>

Jordan Juras



ISEF students sit with Wolfgang Von Rüden outside of the Globe.

# Globe exhibit wins international acclaim

Back in 2008, the design company Atelier Brückner was presented with a challenge: to design the layout of a new permanent exhibition for CERN, one that would epitomize both the Organization and its research. The brief was concise but complex: the exhibit had to be symbolic of the Organization, use modern technology, engage and immerse visitors, and, preferably, use touch-screen technology.

With the help of IArt, an interactive technology firm, and based on the content provided by CERN's Education Group, Atelier Brückner developed the "Universe of Particles" exhibit as it is today. Its principal concept centred on the spherical shape, symbolic of the world of fundamental particles and our concept of a spherical Universe.

"Because of the nature of the work at CERN, we understood at an early stage that the content of the exhibition would have to develop and change over time as the experiments brought new insights," says Uwe R. Brückner, creative director for Atelier Brückner. "So our challenge was to find a content-generated design language

The Globe's "Universe of Particles" exhibition has recently received four prestigious awards for its avant-garde design. This external praise is great encouragement for the CERN exhibitions currently on the drawing board.

that would also allow changes to individual stories or displays over time, while maintaining the common idea or image of the space." The spherical design has received the following awards: the DDC Award "Good Design 11" for Space/Architecture, the Annual Multimedia Award 2011, the ADC Award in Silver, and the European Design Award for Digital (Misc.) design.

While the exhibition design has received external commendation, CERN has mandated an evaluation of how well the content achieves the initial objectives. "With the Globe exhibit having just celebrated its first anniversary and the redevelopment of Microcosm currently on the drawing board, now is the ideal time to gauge public opinion on our displays," explains Rolf Landua, Head of the Education Group. "It's important to have a good understanding of visitor opinion that we might apply to future exhibitions and other forms of interpretation."

The group has mandated external expert Ben Gammon, former head of the London

Science Museum's visitor research team, to conduct a multi-pronged evaluation of both the Globe and Microcosm, combining visitor tracking, exit interviews and accompanied visits. The survey will measure several aspects of the visitors' experience, and check whether the content of the exhibitions is appropriately pitched for the audience and successfully conveys CERN's messages about particle physics and the Organization.

Data taking has already started and the final report is due this autumn. "The evaluation will identify the approaches that are successful in attracting and holding visitors' attention, and also those that are unsuccessful," explains Ben Gammon. "We will be gathering detailed information not just about the exhibitions as a whole, but on the specific elements within each space. This will give us an idea of which aspects could be changed to increase visitor enjoyment, engagement and learning."

With the upgrade of Microcosm starting later in the year, the acclaimed Universe of Particles exhibition open and the upcoming Globe Gardens project on the table, CERN is a step closer towards a comprehensive, world-class visitor centre.

Katarina Anthony



The Universe of Particles exhibition has won 4 awards for its avant-garde design.

# Claude Nicollier visits CERN

The colloquium, Hubble, the astronomer, the telescope, the results, surveyed the three themes suggested by its title: the fundamental discoveries made by Edwin Hubble in the early 20th century, servicing the telescope in orbit and the main results recently obtained relating to the structure and history of our universe. Nicollier spoke from the rare perspective of an astronaut who has had real contact with Hubble in orbit and included some of his own photography from the missions. Nicollier has an intimate relationship with the telescope that very few astrophysicists share. "I had the opportunity to service Hubble twice, both from the comfort of the Space Shuttle and in the vacuum of space," he explains. "The telescope is a wonderful discovery machine and it was my desire, as a former astrophysicist, to visit it and help in keeping it healthy."

After completing his Masters degree in astrophysics in 1975, Nicollier was selected by the European Space Agency (ESA) in 1978 along with two others astronauts, Ulf Merbold and Wubbo Ockels, to support Spacelab – the first joint project between ESA and NASA. Although Nicollier did not fly on the Spacelab missions, it allowed him time to complete full training for working on board the Shuttle – which included related aspects of astronautics, such as space walking and robotics. "I trained in Houston, Texas with American and eventually Canadian, Japanese, and other European astronauts, and it was during this time that he became good friends with Charles Bolden" explains Nicollier. "Interestingly, it was Bolden who later piloted the Space Shuttle Discovery into orbit in 1990 with Hubble in the payload bay."

What Nicollier did not anticipate was that,



*Hanging over the Space Shuttle Discovery's payload bay, Claude Nicollier and C. Michael Foale service Hubble.*

**Switzerland's first astronaut, Claude Nicollier, paid a short visit to CERN on Thursday 22 June, to lead a colloquium about the Hubble Space Telescope. With the Shuttle programme soon coming to an end. Nicollier recalled the enriching experience he had at NASA and gave us a preview of the futuristic project that he is currently involved in.**

during his visit at CERN, General Charles Bolden Jr. happened to be onsite visiting the now fully operational Payload Operation and Control Centre of the AMS collaboration. A brief meeting was arranged and both Nicollier and Bolden were overjoyed; it had been years since they last met (see article in The Bulletin issue 26-27).

Due to delays resulting from the Challenger disaster, Nicollier did not take his first spaceflight until 1992. The following year he flew again, this time on STS-61 – the first servicing mission to Hubble. Nicollier says that, "It was a very important mission because NASA was embarrassed because of the optical flaw that was present in this two billion dollar telescope. They said, 'Go and fix it, and have success.'" The primary goal of this mission was to install the Corrective Optics Space Telescope Axial Replacement (COSTAR), an optical corrector that exhibited the same error as the faulty primary mirror, only with the opposite sign, which made an exact correction. Nicollier acted as robotic arm operator and flight engineer on this flight, and the crew was successful in every task they were sent to accomplish.

It was not until 1999 that Nicollier returned to Hubble on STS-103 to perform an eight-hour spacewalk. Nicollier explains that returning to Hubble on his final spaceflight was emotional, "Approaching the orbiting observatory was a very special experience and I had a very good feeling. I felt like it was a good friend that I had not seen in six years and to see him again and functioning well at the end of the mission was a source of great satisfaction."

The spacewalk involved the complicated task of replacing the telescope's main computer, but Nicollier explains that NASA provides its astronauts with the necessary training to make such a difficult objective manageable. "We trained about ten times the planned space walking time in water with high fidelity models of the telescope so that we were really familiar with the environment. Water is an excellent simulation of the absence of gravity. During my space walk, I remember thinking, 'Wow, Claude, you can do it,' because everything was so familiar."

Nicollier's personal photography complimented an array of magnificent pictures



produced by Hubble in recent years, which have provided us with significant insight into the nature of our Universe – from protoplanetary disks to the Ultra Deep Field, which allowed us to peek 10 billion years back in time. While the LHC continues to probe for particles predicted to have existed moments after the Big Bang, the relationship between astrophysics and particle physics continues to grow, and of course, as Nicollier says, "There's obviously a relationship between anything and particle physics, because we, and everything else, are made of particles!"

Jordan Juras

## Solar Impulse: Nicollier's next challenge

Nicollier currently holds the position of full professor of Spatial Technology at the École Polytechnique Fédérale de Lausanne, but he has recently become involved in the Solar Impulse project. "I like the classroom and the lab environment, but I also like to be in the field and the Solar Impulse was an opportunity to get back into the open air," explains Nicollier. The Solar Impulse is a revolutionary aeroplane that is scheduled to complete a journey with several stops around the world in 2014, relying exclusively on solar energy. Nicollier acts as Head of Test Flight Operations and his team is likely to be involved in the testing of the final version of the solar aeroplane in 2013. "Our team is probably going to be involved again in the flight testing of the final aeroplane because we gained a lot of knowledge about its behavior and also about cockpit design," explains Nicollier. "We are involved in cockpit design as well and that is very rewarding."

Watch Nicollier's colloquium online here and follow the Solar Impulse's progress on the website:

[www.solarimpulse.com/](http://www.solarimpulse.com/)

# Science journalists learn of scientific renaissance at Doha conference

Firstly, the large number of participants shows clearly that reports of the demise of science journalism seem to have been widely exaggerated. But it's not only the number or participants

that's impressive: it's also where they came from. Thanks in part to grants from the Qatar Foundation, 90 countries were represented with around 50% of participants coming from the developing world.

One real eye-opener was the state of science in the Middle East. Originally scheduled to be hosted in Cairo, the conference moved to Doha as a result of the Arab Spring, and the changes in the Arab world played a large part in the proceedings. Among the keynote speakers was the American-Egyptian Nobel Prize winner Ahmed Zewail, who pointed out that one of the first actions of the new Egyptian government was the creation of a new science city outside Cairo – a message that resonated in Doha since the conference was held in Qatar's own education city. There was much talk of renaissance, gentle reminders to those of us from the west that while Europe was going through some dark ages, the Arab world was making huge advances in science: advances that tend

Last week, over 700 science journalists from around the world made their way to Doha, Qatar, for the World Conference of Science Journalists. This meeting takes place every two years, and is the largest gathering of science writers in the world. Established in the early 1990s, this is the first time that a Middle Eastern country has hosted the conference, and it was quite an eye opener.

to get glossed over in western text books. There was recognition too that although the Middle East has much to be proud of in its scientific heritage, the region cannot live in the scientific past.

In establishing the Qatar foundation and setting itself the goal of becoming a modern knowledge-based economy by 2030, the Qatari government has recognised the value of science and education. In turn, by enabling the WCSJ to move from Egypt to Doha under difficult circumstances, the Qatar Foundation recognised the value of good science communication. Dr. Mohammed Fathy Saoud, President of the Qatar Foundation, summed it up very nicely. "It is part of our mandate at Qatar Foundation, and as scientists the world over, to make science available and accessible to the people in our communities," he said. "Science, technology and medical research are not sustainable if we cannot make the humanitarian and social connection." The



American-Egyptian Nobel Prize winner Ahmed Zewail delivers a keynote address at the World Conference of Science Journalists.

700 journalists and science communicators assembled in Doha last week would all concur.

James Gillies

# Paving new roads for scholarly communication

At the end of June, more than 250 librarians, IT engineers and information specialists from different communities and from all five continents gathered at the University of Geneva to participate in the CERN Workshop on Innovations in Scholarly Communication. Will nano-publications and triplets replace the classic journal articles? Will Mendeley become the new Facebook for scientists? Why do fewer than 10% of scientists, across all disciplines, publish their work in Open Access while actually 90% think Open Access would be beneficial for their field? These were the kind of questions that was discussed during the three-day workshop and which in the years to come will clearly change our "modus operandi".

The workshop was aimed at those involved in the development of Open Access repositories and who can influence the direction

**Although electronic publishing has became mainstream, to a large extent the patterns of scholarly communication are still very similar to what we knew prior to the invention of the World Wide Web. Indeed, the most common method used by authors remains writing up the findings of research in an article to be published in a scholarly journal. Many communities want to make the next step, and CERN is acting as a hub in this change.**

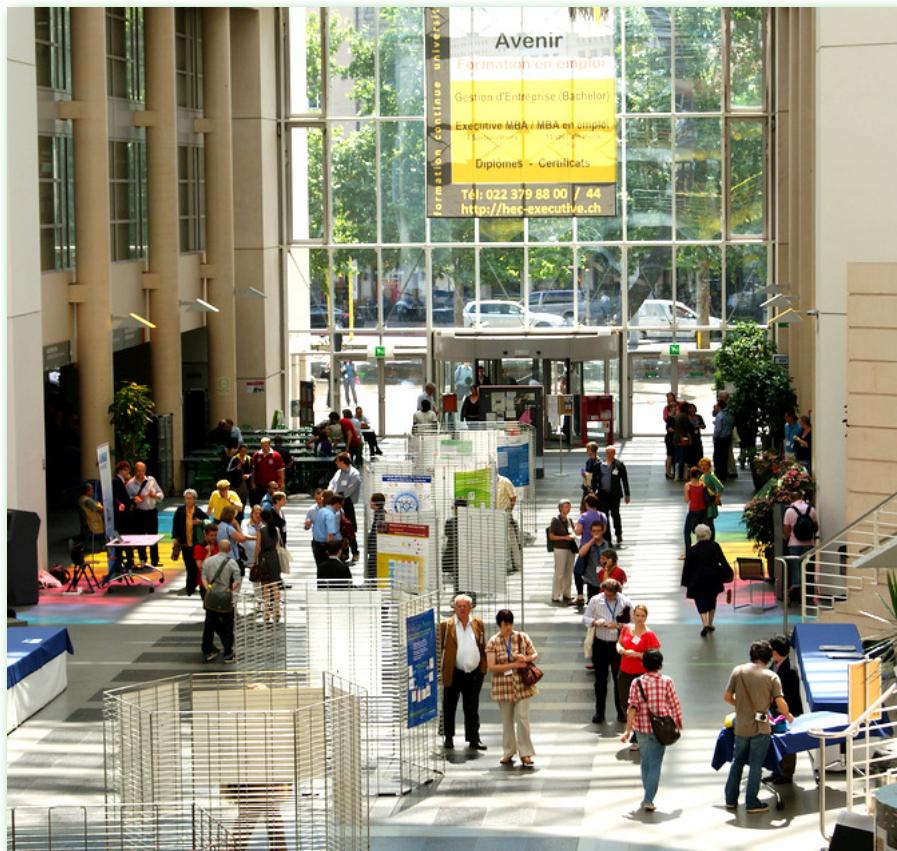
of developments either within their institution, their country or at an international level - that includes technical developers of Open Access bibliographic databases and connected services, research information policy developers at university or library level, funding bodies concerned with access to the results of their research, Open Access publishers, and influential researchers keen to lead Open Access developments in their own field.

This was the seventh workshop in a row (OAI7). Since the workshop was organized at CERN the first time in 2001, under the name

"Workshop on the Open Archives Initiative (OAI) and Peer Review journals in Europe", the meeting has become global and has grown substantially in terms of participants. At a given moment it was therefore decided to move the workshop to the University of Geneva; a collaboration that is apparently very fruitful as this was the second workshop in a row to be held at Uni Mail. The participants did however get a good flavour of CERN as they were all invited to a reception in the Globe, which included "Drole de physique", a visit to the ATLAS control room and a guided tour of the "catacombs where the web was born".

The success of the workshop is evident in the many positive "tweets" published on the Internet. The CERN Scientific Information Service has every reason to be happy with the achievement and can happily look forward to the next workshop.

CERN Bulletin





## Protecting your files on the DFS file system

**F**iles can be accessed from anywhere, via a dedicated web portal (<http://cern.ch/dfs>). Due to the ease of access to DFS with in CERN it is of utmost importance to properly protect access to sensitive data. As the use of DFS access control mechanisms is not obvious to all users, passwords, certificates or sensitive files might get exposed. At least this happened in past to the Andrews File System (AFS) - the Linux equivalent to DFS) - and led to bad publicity due to a journalist accessing supposedly "private" AFS folders (SonntagsZeitung 2009/11/08). This problem does not only affect the individual user but also has a bad impact on CERN's reputation when it comes to IT security.

Therefore, all departments and LHC experiments agreed recently to apply more stringent protections to all DFS user folders. The goal of this data protection policy is to assist users in protecting their data on DFS (folders other than \\cern.ch\dfs\Users will not be affected). It goes

### The Windows Distributed File System (DFS) hosts user directories for all NICE users plus many more data.

along with a similar effort done recently for AFS, see Bulletin 09-10/2011:

<http://cdsweb.cern.ch/journal/CERNBulletin/2011/09/Announcements/1330707?ln=en>

The access rights of these folders will be automatically and regularly reviewed and corrected in order to enforce the corresponding policy:

- For all anonymous users, the default ACLs of \\cern.ch\dfs\Users\HOME must not be more permissive than "List"/"Traverse"-rights.
- For all anonymous users, the default ACLs of \\cern.ch\dfs\Users\HOME/Public and all its sub-folders must not be more permissive than either combined "List"/"Read"/"Traverse"-rights or combined "Create"/"List"/"Traverse"/"Write"-rights.

- For all anonymous users, the default ACLs of any folder must not allow for simultaneous "Write" and "Read" access.
- The ACLs of every sub-folder of \\cern.ch\dfs\Users\HOME not covered before, and all their sub-folders, must not contain any entries for anonymous users.

(Anonymous users are defined to be any potentially very large group of people, for example the default groups "Everyone" or "Authenticated Users".)

The deployment will start first in the IT Department and will subsequently address all other departments during Summer 2011. For details on DFS access rights, please consult:

<http://cern.ch/go/DFSRightsBestPractice>

and

<http://cern.ch/go/DFSManagingACLs>

Computer Security Team

## Holidays Come - Passwords Go

**I**f you are keen to access your CERN mailbox or other computing facilities at CERN from the Internet café at your hotel, hold on and think twice. Is that local PC trustworthy? Most likely it is not. It might never have been patched, and, thus, has been infected by plenty of computer viruses long time ago. Worse, nasty people might have installed tools which aim at stealing your password once you type it. Therefore, it is better to use your own laptop or mobile phone for such activities. If you decided to connect to CERN from an untrustworthy computer and had typed in your CERN password there – please seriously consider changing your CERN password at <http://cern.ch/account> as soon as you have access to a trustworthy computer.

### The holiday season is approaching and with it, the best chance of losing your password!!

However, also take care when using your own laptop or mobile device: wireless communication can be intercepted. Many wireless access points, e.g. at airports, do not encrypt and protect network traffic by default. When you access sensitive web-pages like your CERN mailbox, your bank account, or your Facebook profile, you have to ensure that you use encrypted protocols. For example, look for a "HTTPS" in your browsers address bar (and avoid "HTTP"). If you connect directly to CERN mail servers, however, you are safe: these accept only encrypted connections.

Finally, take care on your laptop. Thousands of laptop get lost per year at international airports, not to speak about those which got

stolen. If this is not bad enough, losing a CERN laptop which holds sensitive or confidential documents can become embarrassing to the organization. Either encrypt your data or consider leaving such a laptop at home. Recall, losing a laptop with confidential CERN data might be considered to be a professional fault...

Happy holidays! Enjoy!

If you have questions, suggestions or comments, please contact Computer.Security@cern.ch or visit us at

<http://cern.ch/security>

Computer Security Team



## News from the Library

**G**o to Building 52 1st floor or simply open your laptop... The Library can answer all your questions and meet your needs!

Borrow books, read online thousands of electronic journals and e-books while on the terrace or order articles the Library doesn't have and have them sent to your email inbox within 24 hours... Don't forget that there is more than a Library at your

**After an inspiring lecture of the Summer student program, would you like to get hold of the books suggested by the speaker? The Library is there to help you.**

disposal: you can also buy books in the Bookshop located in the Library premises.

Moreover, the Library provides a calm and cool working environment. You will not be alone...Indeed, during the Summer, the CERN Library welcomes more visitors than in the rest of the year. Last year, in July and August, on average every two minutes a

visitor entered the Library during working hours. It's a busy knowledge hub, which remains nevertheless an ideal place to work, concentrate and search for the information you need.  
Welcome!

CERN Bulletin



## Official news

Members of the personnel shall be deemed to have taken note of the news under this heading. Reproduction of all or part of this information by persons or institutions external to the Organization requires the prior approval of the CERN Management.

## INFORMATION CONCERNING THE RESULTS OF THE CONCERTED WORK STOPPAGE ON 22 JUNE 2011 (FROM 8:30 TO 12:30)

Following the concerted work stoppage called by the Staff Association for 22 June 2011 concerning the measures aimed at restoring the financial equilibrium of the Pension Fund, HR Department invited staff members and fellows to declare whether or not they had participated in this action.

As indicated in the communication sent to the persons concerned, it was assumed that those who did not complete the electronic declaration form did not take part in the work stoppage.

The results are as follows:

	Staff and fellows
<b>Declarations : Yes (took part in the concerted work stoppage)</b>	<b>373</b>
<b>Declarations : No (did not take part in the concerted work stoppage)</b>	<b>386</b>
Those requisitioned	120
Those not able to participate in the concerted work stoppage (leave, absence, training...)	484
No reply (counted as no)	1474

In accordance with Article 10 of the Note DG/270-81 dated 3 September 1981, for those who participated in the concerted work stoppage, a deduction will be made from their basic salary or stipend and will be notified to them in their July 2011 pay slips.

At the request of the Staff Association, the Director-General has decided that the funds generated by these deductions will be allocated to the Pension Fund.

Human Resources Department



## Language training

### FRENCH COURSES FOR BEGINNERS

We are now offering a French course for beginners. If you are interested in following this course, please enrol through the following link:

[https://cta.cern.ch/cta2/f?p=110:9:4314988246421131:::X\\_STATUS,XS.Course\\_Name,XS.Programme,XS.SubCategory,X.Course\\_ID,XS.Language,XS.Session:D%2C1%2C4251%2CB%2C](https://cta.cern.ch/cta2/f?p=110:9:4314988246421131:::X_STATUS,XS.Course_Name,XS.Programme,XS.SubCategory,X.Course_ID,XS.Language,XS.Session:D%2C1%2C4251%2CB%2C)

or contact: Kerstin Fuhrmeister, tel. 70896.

### SUMMER ORAL EXPRESSION ENGLISH COURSE

An English Oral Expression course will take place between 15 August and 30 September 2011.

**Schedule:** to be determined (2 sessions of 2 hours per week). Please note that this course is for learners who have a good knowledge of English (CERN level 7 upwards). If you are interested in following this course, please enrol through the following link

[https://cta.cern.ch/cta2/f?p=110:9:1576796470009589:::X\\_Status,XS.Course\\_Name,XS.Programme,XS.SubCategory,X.Course\\_ID,XS.Language,XS.Session:D,,1,,4368,B](https://cta.cern.ch/cta2/f?p=110:9:1576796470009589:::X_Status,XS.Course_Name,XS.Programme,XS.SubCategory,X.Course_ID,XS.Language,XS.Session:D,,1,,4368,B)

Or contact: Kerstin FUHRMEISTER (70896), Tessa OSBORNE (72957)



Take note



Save lives  
Give your blood

**On Wednesday 27 July 2011  
From 9-00 to 17-00  
BLOOD DONATION**

Organized by the Cantonal Hospital of Geneva

**CERN - Main building  
1<sup>st</sup> floor – Room : Pas Perdus**

**Give 30 minutes of your time to save  
lives...**

**<http://dondusang.hug-ge.ch/>**





# Seminars

## MONDAY 11 JULY

SUMMER STUDENT LECTURE PROGRAMME  
Main Auditorium, Bldg. 500

**09:15 - Standard Model (Theoretical Particle Physics) (1/6)** - R. M. GODBOLE / CENTRE FOR HEP, IIS, BANGALORE, INDIA

**10:15 - Concepts in Particle Physics (Theoretical Particle Physics) (4/5)**

J.-P. DERENDINGER / A. EINSTEIN INST. F. FUND. PHYS., ITP U. OF BERN, SWITZERLAND

**11:15 - Introduction to Root (1/2)**

J. F. GROSSE-OETRINGHAUS / CERN

**12:00 - Discussion Session**

R. GODBOLE, J.-P. DERENDINGER,  
J. GROSSE-OETRINGHAUS

## TUESDAY 12 JULY

SUMMER STUDENT LECTURE PROGRAMME  
Main Auditorium, Bldg. 500

**09:15 - Standard Model (Theoretical Particle Physics) (2/6)** - R. M. GODBOLE / CENTRE FOR HEP, IIS, BANGALORE, INDIA

**10:15 - Concepts in Particle Physics (Theoretical Particle Physics) (5/5)**

J.-P. DERENDINGER / A. EINSTEIN INST. F. FUND. PHYS., ITP U. OF BERN, SWITZERLAND

**11:15 - Introduction to Root (2/2)**

J. F. GROSSE-OETRINGHAUS / CERN

**12:00 - Discussion Session** - R. GODBOLE,  
J.-P. DERENDINGER, J. GROSSE-OETRINGHAUS

TH STRING THEORY SEMINAR  
14:00 - TH Auditorium, Bldg. 4

**Constraints on a fine-grained AdS/CFT correspondence** - M. GARY / UCS

## WEDNESDAY 13 JULY

SUMMER STUDENT LECTURE PROGRAMME  
Main Auditorium, Bldg. 500

**09:15 - Standard Model (Theoretical Particle Physics) (3/6)** - R. M. GODBOLE / CENTRE FOR HEP, IIS, BANGALORE, INDIA

**10:15 - Standard Model (Theoretical Particle Physics) (4/6)** - R. M. GODBOLE / CENTRE FOR HEP, IIS, BANGALORE, INDIA

**11:15 - Accelerators (Experimental Physics) (1/5)** - B. HOLZER / CERN

**12:00 - Discussion Session**

R. GODBOLE, B. HOLZER

## WEDNESDAY 13 JULY

**ISOLDE SEMINAR**

14:30 - Bldg. 26-1-022

**R&Ds at Tokai Radioactive Accelerator Complex** - M. MAGGIORE / UNIGE

## THURSDAY 14 JULY

SUMMER STUDENT LECTURE PROGRAMME

Main Auditorium, Bldg. 500

**09:15 - Standard Model (Theoretical Particle Physics) (5/6)** - R. M. GODBOLE / CENTRE FOR HEP, IIS, BANGALORE, INDIA

**10:15 - Detectors (Experimental Physics) (1/5)** - W. RIEGLER / CERN

**11:15 - Accelerators (Experimental Physics) (2/5)** - B. HOLZER / CERN

**12:00 - Discussion Session**

R. GODBOLE, W. RIEGLER, B. HOLZER

**COLLIDER CROSS TALK**

11:00 - TH Auditorium, Bldg. 4

**TBA** - D. CURTIN / CORNELL

**CERN COLLOQUIUM**

16:30 - Main Auditorium, Bldg. 500

**Indication of Electron Neutrino Appearance in the T2K experiment and its long-term implications**

T. KOBAYASHI / IPNS/KEK, JAPAN, SPOKESMAN OF T2K

## FRIDAY 15 JULY

SUMMER STUDENT LECTURE PROGRAMME

Main Auditorium, Bldg. 500

**09:15 - Standard Model (Theoretical Particle Physics) (6/6)** - R. M. GODBOLE / CENTRE FOR HEP, IIS, BANGALORE, INDIA

**10:15 - Detectors (Experimental Physics) (2/5)** - W. RIEGLER / CERN

**11:15 - Accelerators (Experimental Physics) (3/5)** - B. HOLZER / CERN

**12:00 - Discussion Session**

R. GODBOLE, W. RIEGLER, B. HOLZER

**DETECTOR SEMINAR**

11:00 - TH Auditorium, Bldg. 4

**Novel photon detectors based on ThickGEM technology for COMPASS RICH-1** - S. DALLA TORRE / ISTITUTO NAZIONALE DI FISICA NUCLEARE (INFN)

## MONDAY 18 JULY

**TH INSTITUTES**

08:00 - TH Auditorium, Bldg. 4

**Dark Matter underground and in the heavens - DMUH11**

SUMMER STUDENT LECTURE PROGRAMME

Main Auditorium, Bldg. 500

**09:15 - Accelerators (Experimental Physics) (4/5)**

B. HOLZER / CERN

**10:15 - Detectors (Experimental Physics) (3/5)**

W. RIEGLER / CERN

**11:15 - Electronics, DAQ, Trigger (Experimental Physics) (1/3)**

N. NEUFELD / CERN

**12:00 - Discussion Session**

W. RIEGLER, N. NEUFELD, B. HOLZER

## TUESDAY 19 JULY

SUMMER STUDENT LECTURE PROGRAMME

Main Auditorium, Bldg. 500

**09:15 - Accelerators (Experimental Physics) (5/5)**

B. HOLZER / CERN

**10:15 - Detectors (Experimental Physics) (4/5)**

W. RIEGLER / CERN

**11:15 - Electronics, DAQ, Trigger (Experimental Physics) (2/3)**

N. NEUFELD / CERN

**12:00 - Discussion Session**

W. RIEGLER, N. NEUFELD, B. HOLZER

TH STRING THEORY SEMINAR

14:00 - TH Auditorium, Bldg. 4

**Interacting non-BPS black holes**

G. BOSSARD / CPHT, ECOLE POLYTECHNIQUE, PALAISEAU

