

Event

See all Grenoble-area research events at a glance at “38 de Sciences”

Launched just before the summer holidays, a new website called “38 de Sciences” (sfp.grenoble.cnrs.fr)—set up jointly by the French Physics Society, Fondation Nanosciences, and Institut Néel’s IT department—gives Grenoble-area researchers a one-stop shop for information about upcoming seminars, conferences, thesis defenses, and other research-related events.

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For now the information is given in French only and consists mainly of physics, biology, and chemistry events; the website replaced the notices formerly sent out by the French Physics Society. However, the plan is to extend the website to all scientific fields, including the so-called “soft” sciences.

“38 de Sciences” has been highly popular since its launch, with some 250 events listed for the first six weeks of fall alone. Of course, for the website to be useful event organizers must provide information in a timely manner; the free service depends on their active cooperation.

First-time visitors to the website can immediately see how practical it is. While the graphic design could stand to be improved, the information is presented in an easy-to-read manner and the site offers a slate of helpful features like search by keyword, date, or type of event; a choice of three RSS feeds to subscribe to (Physics, Biology & Chemistry, or All Events); automatic transfer of selected events to the user’s Outlook calendar; and the ability to share events by email alert.

“38 de Sciences” reflects not only the Grenoble area’s vibrant research community, but also the large number of foreign scientists and engineers drawn to the region.

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Innovation

Phase-change memory now requires less current

Phase-change memory is a type of fast, cheap, and non-volatile memory whose only drawback is its high programming current requirement, which limits miniaturization potential and maximum density. However, Leti researchers have obtained promising results from a new “confined structure” phase-change memory architecture that allows for 50 nm chips—substantially smaller than the 300 nm currently available with standard plug architecture.

This breakthrough was achieved by combining e-beam lithography with an atomic thin film deposition process developed by ASM International N.V. and a special chemical-mechanical polishing process. The confined structure architecture uses the phase-change material GeSbTe, and will be developed further to be compatible with tomorrow’s sub-45 nm technology nodes.

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Wireless sensors poised to improve transportation safety

Wireless technology could soon replace the cumbersome cables in airplanes’ safety systems and in cars’ ABS and anti-skid systems thanks to a Leti innovation: a miniature 2-cm antenna for 868 MHz UHF frequencies. Leti researchers are now looking at how this antenna can be used for signal propagation in cars and airplanes.

The researchers developed energy loss, dispersion, and echo models using measurements taken on an Airbus and several different types of cars. The next step—to be carried out under the Linking Technologies Program at IRT Nanoelec—will be to acquire a channel propagation simulator for testing wireless systems in real-world conditions and improving the systems’ protocols, architecture, power requirements, and types of links.

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Ultra-wideband and RFID make a winning combination

Leti researchers are getting ready to transfer to industry a new wireless communication system that combines ultra-wideband and RFID technology. The new system can transfer data between a mobile phone and a RFID tag at an impressive rate of 100 Mb/s, while using just a few mW of power. Data are stored locally, so users don’t need to connect to a network requiring access to servers often located thousands of miles away.

The system was developed under a four-year R&D partnership with Nokia. It was initially designed for mobile phone applications, but applications in other fields are expected to be developed through a new start-up. Dr. Michael Pélissier, the engineer who has been spearheading this work since 2003, was awarded the 2011 Général Ferrié Radio Engineering Award at a ceremony held in June 2012.

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Innovation

3D packaging: Leti unveils a test pattern library

Leti now offers partner businesses and universities an expansive library of 3D test patterns, built from the laboratory's years of research on 3D stacking technology. The library can be used to test the performance of various interconnections and check compliance with specifications—from the very outset.

The patterns can be used to test through-silicon vias (TSVs), or vertical connections through stacked chips, as well as the interconnections between different components. The first organizations to use the library are the European Organization for Nuclear Research and EADS subsidiary Cassidian. For other research laboratories, Leti plans to offer test patterns that can be easily embedded on customers' wafers.

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Tuberculosis skin test results available in just 18 hours

Until now patients wondering whether they have tuberculosis had to wait a full 72 hours before finding out the results of a skin test. A new optical read system developed by Leti under a Lyon-Biopôle project funded by the French government has reduced the waiting time to 18 hours—and the waiting time could even be slashed to just six hours. This system can be especially beneficial in developing countries, where poor infrastructure and limited public transportation make it difficult for patients to make a second trip to a testing clinic.

The system is comprised of a fiber spectrometer probe and special software that analyzes certain characteristics of the injection area (like light absorption and diffusion, and water and melanin concentration) to determine whether the person is infected. The method has already undergone a successful first clinical trial at the Hospices Civils de Lyon.

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Electronic tongues just got simpler

Until now, electronic tongues—devices used to identify dissolved substances in liquids—have been hard to make because each of the tongues' chemical receptors (between 10 and 30) had to be synthesized independently. But scientists at the French Nanoscience and Cryogenics Institute (INAC) have found a way to sidestep this lengthy process by using the combined response of an array of different receptors, each made from mixtures of two to four molecular building blocks. Their method was inspired by the way in which heparan sulfates (naturally-occurring polysaccharides) recognize different proteins on cell surfaces.

The combination of signals from the chemically-similar receptors is used to generate a 2D or 3D profile of each substance being detected; these profiles can then be easily analyzed and incorporated into a configuration process. The scientists have filed a patent application for their work, which was published in the international chemical-industry journal *Angewandte Chemie*.

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Europe gets its first CMOS-MRAM demonstrator

Researchers from the French Nanoscience and Cryogenics Institute (INAC) and Spintec have developed a new logic circuit that combines CMOS and MRAM technology. This patented invention uses MRAM from Crocus Technology and marks Europe's first working demonstrator of its kind. MRAM offers two key benefits: it's non-volatile and it doesn't need a power supply when it's not active.

The CMOS part of the new logic circuit performs calculations while the MRAM part detects and corrects errors. This division of tasks makes the circuit radiation-resistant, opening the door to applications in the aerospace and defense industries. The research team now plans to further develop the technology in association with a corporate partner.

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Electric arcs soon to be detected acoustically

Detecting electric arcs in the high-power batteries used in electric vehicles (300 V–400 V, 50 kW–80 kW) is a real challenge, since current and voltage fluctuations tend to interfere with the fleeting signals. However, a team of researchers from Leti, Liten, and GIPSA-Lab may have found the solution in a patented acoustic detection method that they are currently testing on Liten's electric vehicles.

While characterizing the generic signature of several kinds of arcs, the researchers noted that the arcs' acoustic waves propagate through the air in a battery pack and frequently reflect off of the pack's components. Special acoustic sensors to detect these waves are currently under development at a Leti laboratory as part of an EU-funded project.

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Day by day

Grenoble Institute of Technology graduation attended by prestigious guests

The Grenoble Institute of Technology class of 2011 graduation ceremony, held on November 24, 2012, counted numerous high-profile guests among its ranks, including French Minister of Research and Higher Education Geneviève Fioraso and Gérard Matheron, Manager of the STMicroelectronics site at Crolles and class of 2011 sponsor. Representatives from the school's corporate partners were also present.

Some 500 people attended the ceremony, which was coordinated by Grenoble Institute of Technology President Brigitte Plateau. The event also included talks by representatives of each of the Institute's degree programs (including continuing and executive education) and six engineering schools, to highlight the numerous programs on offer and the vast array of career options available to graduates.

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Day by day

Movea penetrates the context detection market

High-tech start-up Movea has won a five-year contract to supply its cutting-edge context detection technology to a manufacturer of smartphone and tablet microprocessors. Movea has been trying to break into the context detection market for the past 18 months, and this new contract win, which is expected to generate substantial sales, marks a major step forward.

Movea's data fusion and motion sensing systems will be integrated into the manufacturer's mobile devices, enabling them to track a mobile phone user's physical activity, analyze his surroundings, and locate him by GPS. The data can be processed to provide the user with contextualized information like where he parked his car in an airport parking lot when he gets back from a month-long vacation, for example. Mobile phone applications like these are an extremely high-potential market for Movea.

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Dr. Yves Bréchet appointed France's High Commissioner for Atomic and Alternative Energy

Dr. Yves Bréchet, a Grenoble Institute of Technology-Phelma professor and researcher at the French Materials and Process Engineering Laboratory (SIMaP), has been appointed France's High Commissioner for Atomic and Alternative Energy by the country's Cabinet of Ministers. This appointment follows a recommendation by the French Minister of Research and Higher Education, Geneviève Fioraso.

With this appointment Dr. Bréchet becomes the official Science and Technology Advisor to the President of the French Atomic and Alternative Energy Commission and to the French government for issues covered by the Commission. Dr. Bréchet also heads the Academic Board of the French National Institute of Nuclear Science (INSTN), ensuring the scientific merit of the Institute's work. Dr. Bréchet has also been designated the 2012-2013 Chair of Technological Innovation at the prestigious Collège de France; he will give his first lecture under this Chair on January 13, 2013.

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Grenoble Institute of Technology scores high in the QS World University Rankings

London-based Quacquarelli Symonds (QS), a global provider of specialist higher education and career information, has issued its 2012 World University Rankings by Subject. And Grenoble Institute of Technology is in the top 200 in three out of five subjects. The school is ranked 94th in the world for Engineering & Technology, and France's top school for Materials Science and 35th worldwide—ahead of École Normale Supérieure de Paris, ParisTech (Ecole Polytechnique), and INSA Lyon.

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Hybrid-En brings organic materials to semiconductors

In the future, the performance of energy generation and storage systems will depend on an unprecedented alliance between semiconductors and organic materials. At least that's the goal of research to be conducted at Hybrid-En, a new 200 m² research facility being built in MINATEC's 10.05 building. Hybrid-En will bring together around 20 physicists and chemists from the French Nanoscience and Cryogenics Institute (INAC), the French National Center for Scientific Research (CNRS), and Joseph Fourier University to create new nanostructured objects for use in solar panels, batteries, and super-capacity and thermoelectric systems.

The scientists will use prototypes to demonstrate that using organic materials to create nanostructured semiconductors can offer benefits such as increased flexibility and lower costs (since organic substances are relatively cheap). The lab is scheduled to open in Q1 2013.

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Isorg wins fans with its interactive displays

Isorg's interactive displays are designed to power up and launch multimedia presentations as soon as someone walks by, thanks to a system of optical sensors on plastic developed in association with Liten. You can see these next-generation displays in action at the Minalogic offices, the CEA communications department at Saclay, and the many demonstrations given for retailers.

Isorg is currently working on a new post-touch human-machine interface that can recognize hand movements, for applications in household appliances, consumer electronics, and automobiles. The 14-person-strong start-up recently won the 2012 Rhône-Alpes Region *L'Entreprise d'Avenir* ("Promising Young Company") Award given jointly by Ernst & Young and French newspaper *L'Express*.

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First Step Challenge gets an overwhelming response

This year's inaugural First Step Challenge—designed to identify the most promising start-up ideas based on CEA Tech projects (see the October 2012 issue of *MINANEWS*)—received an overwhelming 23 applications from aspiring young entrepreneurs. 14 of these applications have been selected for the next phase of the challenge; most of the projects selected were officially launched so that they could be submitted to the Challenge. This confirms the Challenge's role in encouraging the emergence of new projects. Challenge participants have an average age of 36; the youngest person is 29.

The 14 first-round winners will undergo a two-month training program, then nine of them will present their business ideas to a jury in either December 2012 or in 2013. The jury will decide how much funding to award to individual projects to help them overcome technical and commercial hurdles. The other projects will begin CEA's incubation process in early 2013.

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MultiX raises €4 million of fresh capital

MultiX, a developer of X-ray spectrometric detectors for luggage inspection and other security applications, has just raised €4 million from six investors. This is the start-up's second round of fund raising; the first in January 2011 brought in €3 million.

MultiX's high-performance systems, developed in association with Leti, offer a fast, reliable, and low-cost method for detecting suspicious substances in luggage and parcels. The market offers strong potential. Passengers on US and European flights will again be allowed to take liquids with them on airplanes starting in 2014, and some 2,400 luggage scanners will need to be upgraded in the US alone. The company has formed major partnerships with scanner manufacturers and should be ready to produce its X-ray detectors in large volumes in 2014.

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Interview

Jean-Luc Doumont,
Co-founder of Principiaæ*:

“Scientists and engineers should strive for simplicity when presenting their research”

You train scientists and engineers around the world to communicate more effectively. Do they really need that much help?

Yes! People with scientific backgrounds often have trouble explaining things simply. They tend to be stuck in school exam mode, where they feel the need to describe concepts in complex terms to prove to their professors—who know more than they do—that they know their stuff. But if your focus is on proving yourself, then it’s not on informing your audience.

So, how do you help them?

I show them how to clearly explain the problem and the solution. In other words, what they are working on and—above all—why. And how to communicate better orally, in writing, and through visuals. Stating things simply doesn’t mean dumbing things down. Former trainees of mine have won best article and best presentation awards at conferences.

How receptive are researchers to your approach? Does it depend on the country?

Typically, after I give a talk, most of the attendees are on board. But very few go as far as to actually use my approach. For example, scientists and engineers in Asia don’t like to stand out from their peers, and those in France think they already know how to communicate effectively. The Americans are the most pragmatic and the most open to change.

You are in Grenoble to facilitate a conference held by the Nanophotonics for Energy Efficiency consortium. What exactly is your role?

I trained some of the speakers and I moderated the conference discussions so that they were both informative and productive. I also offered to write a summary of the conference highlights; often the key takeaways of these types of conferences are forgotten because they are neither written down nor acted on.

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Learn more at: www.principiae.be

*Brussels-based Principiaæ gives lectures, workshops, and training programs on effective communication for companies, research centers, NGOs, and government organizations.

Day by day

Nanosafety building slated to open in H1 2013

Construction work is on track for the new nanosafety building on the CEA campus in Grenoble. The 6,000 m², low-energy-consumption-certified building is scheduled to open in the first half of 2013. Some 150 nano-experts will work in the new building, including Liten researchers, trainers from the French National Institute of Nuclear Science (INSTN), medical testing specialists, and workstation monitoring staff.

This is the first time such a vast array of skills will be grouped at a single site devoted to nanosafety. The nanosafety team will work in conjunction with the French National Institute of Industrial Environmental Risks (INERIS), the French National Institute of Workplace Safety (INRS), and corporate partners to carry out the workstation monitoring required for R&D work. The team will also use equipment at the CEA Technology Research Division’s nanocharacterization platform.

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Horizons

Grenoble Institute of Technology brochures get a makeover

Grenoble Institute of Technology’s six engineering schools have recently issued revamped brochures with completely new content and a fresh new design. Phelma’s new brochure highlights the people that make the school great through a dozen testimonials from students, alumni, and research faculty. It also contains QR codes that point to specific sections of the school’s website. The Institute’s brochure will be ready in 2013.

With 20,000 paper copies in addition to a downloadable version online, the Phelma brochure is a key communications tool, especially for prep school students. According to a survey carried out this fall among prep school students, the brochure was just as influential in their decision to attend Phelma as the school’s website—and considerably more than social networks.

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Phelma students get an insider’s view from industry professionals

On December 3 and 10, 2012, professionals from Orange Labs and E2V, respectively, will come speak to Grenoble Institute of Technology-Phelma students as part of a corporate partnership initiative. These company lectures were initially optional, but for the past three years have been mandatory for second-year students majoring in Integrated Electronic Systems and Signals, Images, Communications & Multimedia.

Ten such company lectures are scheduled for the first semester, to give students an insider’s view of how businesses develop and leverage technology in fields related to the two majors. Most of the companies are based in the Rhône-Alpes region and range in size from budding start-ups like Isorg and Arnano to multinationals like Safran and STMicroelectronics.

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Leti Annual Review takes on a new format

The Leti Annual Review—a two-day conference where Leti researchers present their latest findings—will become the four-day Leti Innovation Days starting in 2013. This change will enable the conference to address even more technology- and innovation-related topics and delve into them in greater detail.

The first Leti Innovation Days will be held at MINATEC on June 25–28, 2013. The first two days will consist of plenary sessions and workshops—much like the former Leti Annual Review. The last two days will consist of a series of high-level workshops held in parallel to address specific technology subjects; the subjects to be covered in 2013 include 3D integration, memory, photonics, safety, imaging, and nanopackaging. A start-up session is also scheduled to illustrate how Leti supports innovation and economic development.

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Horizons

Grenoble's iGEM team wins a gold medal and safety award

In early October 2012, 49 project teams—including one from Grenoble—took part in the European round of the International Genetically Engineered Machine (iGEM) competition. While the Grenoble team did not make the cut of 18 for the final round to be held in Cambridge, MA, USA, the team did win a gold medal and the Safety Commendation for their project (called SEnsiColi) to build an ultra-sensitive pathogen detector from engineered bacteria that form part of an advanced detection-amplification-communication system. The Safety Commendation award recognizes the Grenoble team's idea to create a database of biobrick safety sheets that can be used by all competition participants and expanded with each coming year.

Learn more at: <http://2012.igem.org/Team:Grenoble>
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CEA Tech expands westward

CEA Tech, the CEA's Technology Research Division, will open sites in three cities in western France—Toulouse, Bordeaux, and Nantes—in early 2013. Initially, between six and eight people will staff each site to help local businesses enhance their existing products and services through innovation. CEA Tech's support will involve joint R&D agreements whereby the businesses can use CEA Tech's regional research and technology transfer facilities, with the back-up of the home sites in Grenoble and Saclay.

CEA Tech is expanding into western France at the impetus of the French Prime Minister, who announced that quality is one of the keys to ensuring competitiveness and turning the country's manufacturing industry around. These new sites will be used to test what could be a broader initiative to open CEA Tech offices across the country.

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Live from MINATEC

MINATEC TV keeps on growing

Two new videos have just been posted on the MINATEC TV website (www.minatec.tv): "The Titan Ultimate™ Electron Microscope" and "Wafer Bonding." The former discusses the nanotechnology characterization platform's new instrument, while the latter shows how the performance of electronic components can be enhanced by bonding silicon wafers. These two videos complete the first season of application-related videos on MINATEC TV.

The second season, slated to begin in 2013, will appeal to a broader, non-specialist audience. New videos will focus on explaining the complicated technology being developed at MINATEC in simple terms. To date, MINATEC TV offers five thematic channels with a total of 64 videos available in both French and English.

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2013 Midi MINATEC brown bag lunch series program now available

After a year of highly popular Midi MINATEC brown bag lunches in 2012, the organizers decided to take it up a notch in 2013 with no less than 37 lunches already planned. Corine Berat, a researcher at the French Subatomic Physics and Cosmology Laboratory (LPSC) will kick off the year with a talk titled "Cosmic rays: A century of scientific adventure" on Friday, January 11, 2013.

For a change of scenery, the February 8, 2013 session will take place at the Grenoble Ecole de Management campus and will address the legal issues related to gerotechnology. The speaker will be Nathalie Ferraud-Ciandet, a Grenoble Ecole de Management law professor. Apart from the location, this Midi MINATEC will have the same format as those held at Maison MINATEC.

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Live from MINATEC

2012 Science Fair and Expérimenta pack a full house

This year's Expérimenta arts, science, and design fair helped bring nearly 2,000 people to the simultaneously-held Science Fair at MINATEC on October 12–13, 2012. On the first day of the event, devoted to school groups, the organizers had to turn down 700 students and 80 teachers because there just simply was not enough room. The second day, for the general public, was just as popular, as more than 1,100 people flocked to the Science Fair to learn more about how technology influences design and the arts.

The Expérimenta fair, which was coupled with the Science Fair for the first time ever, also included a "paper" program published and distributed by the Grenoble Science Education Center (CCSTI). The organizers would like to thank the MINATEC staff as well as all of the students and other staff who helped with the event.

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Phelma beefs up its corporate partnerships

On October 1, 2012, Grenoble Institute of Technology-Phelma finalized the terms of a partnership agreement with DCNS, a global leader in naval defense with operations in civil nuclear energy and marine renewable energy. DCNS invests heavily in R&D in fields like hydrodynamics, materials, acoustic quieting, and electromagnetics. As part of the partnership, engineers working for DCNS will be invited to give talks to Phelma students on subjects related to their majors.

This brings to four the number of corporate partnerships that Phelma has entered into since June; the other three are with Amesys (a Bull company), Elsys Design, and Safran. Talks are also underway with additional companies. Phelma now boasts a 40-member-strong corporate partnership network, including long-time supporters STMicroelectronics, Areva, and EDF.

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Agenda

**Until December 7, 2012
at Maison MINATEC
International Meeting on
Molecular Electronics (Elecmol)**
www.elecmol.com

**December 8, 2012
at Grenoble Institute of
Technology-Phelma (MINATEC
auditorium M001), from 9:00 am
to 1:00 pm
Presentation by Dr. Yves Bréchet,
Member of the French Academy
of Sciences, on structural
biomimetics**
<http://goo.gl/8BPHh>

**December 21, 2012
at the MINATEC Auditorium
Christmas Midi MINATEC
with Orchestre du Polygone
Scientifique**
Sign up at: <http://www.minatec.org/midis>

**January 17, 2013
at MINATEC at 7:00 pm
GIANT scientific conference**
with 2010 CNRS Gold Medalist Dr. Gérard
Ferey, chemist and "architect of matter"
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**January 17, 2012
at Lyon
Micro and Nanotechnology
Observatory (OMNT) seminar
on the *in vivo* behavior of
nanomedication**
www.omnt.fr

**January 17-18, 2013
at Phelma
Radiofrequency, millimetrics, and
integrated optics conference**
<http://rfm-photo.sciencesconf.org/>

**January 23-25, 2013
at the Institut Laue-Langevin
Flipper 2013: Single-crystal
Diffraction with Polarized
Neutrons**
<http://www.ill.eu/flipper2013>

**February 14-15, 2013
at Phelma
Materials Science and Physical
Engineering Laboratory (LMGP)
conference**
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MINA-NEWS >

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