

## Top news

# Parvis des sciences fair turns ten!

The tenth annual *Parvis des sciences* science fair will be held on October 19 – 21, 2017 at MINATEC.

And, with ample opportunities to look, touch, experiment, and ask questions, there is sure to be something for each of the 3,000 visitors expected this year. Thursday and Friday—for school groups only—are already fully booked. A total of 26 grade four and five classes will visit this year (up from nineteen last year). However, the organizers at GIANT had to turn away 62 other classes. The high school slots were equally popular: a total of fifteen classes registered this year, up from five last year. GIANT is looking into adding a third schools-only day in 2018 to respond to the explosion in demand! The general public is welcome on Saturday and entry is free of charge.

What's new at this year's *Parvis des sciences*? First of all, two companies, STMicroelectronics and Poma, will be exhibiting. There will also be an introductory-level workshop on bibliographic research, which should appeal to high-school juniors in particular, as bibliographic research is a skill they need for their individual student projects. The number of lab tours is also on the rise this year, with CIME Nanotech and LMGP opening their doors. Finally, visitors who need to give their feet a rest can have a seat in the Auditorium, where science videos will be playing non-stop throughout the event.

GIANT focused massively on online communication to get the word out about the tenth annual *Parvis des sciences*, rolling out a dedicated website and Facebook page. The website contains all the practical information visitors will need to get ready for the event, with descriptions of the exhibit booths and tours, plus an interactive map of the venue so that people can find their way on the day of the event!

[www.parvis-des-sciences.com](http://www.parvis-des-sciences.com)  
Contact: [marion.levy@grenoble-inp.fr](mailto:marion.levy@grenoble-inp.fr)

## Innovation

## More reliable, compact LED lamps

LED lamps offer a theoretical lifespan of around 50,000 hours of operation. In actual practice, however, LED lifespans are much shorter. This is due to the LEDs' electronic driver and—in particular—the electrochemical condenser driver that transforms the high-voltage alternating current that comes off the grid into the low-voltage direct current that powers the LED.

Researchers at Leti did away with the chemical condenser—the least-reliable component of a LED—by tweaking the circuit's architecture. They also used GaN power components to boost the switching frequency, thereby reducing the size of the passive components. Ultimately, this new breed of driver could find its way into very compact and reliable lighting solutions for especially demanding applications.

Contact: [othman.ladhari@cea.fr](mailto:othman.ladhari@cea.fr)

## The quest for the qubit continues

Sensitive, compact systems capable of reading quantum states will be crucial to industry's transition to quantum computing. Researchers from INAC and Leti have already demonstrated the world's first FDSOI qubit (quantum bit) device made on a 300 nm CMOS fab line. Now, they have also shown that low-temperature reflectometry can be used to read a qubit.

Using reflectometry to read a qubit's quantum state is not new. However, the technique had never been implemented in an integrated circuit—until now! Screen-grid field-effect transistors were used as radiofrequency resonators integrated into the qubit architecture. Using RF reflectometry to measure the resonance frequencies turned out to be a way to read a qubit fast with an integrated silicon-based system.

Contact: [xavier.jehl@cea.fr](mailto:xavier.jehl@cea.fr)

## Unidirectional spin waves

The limits of conventional electronic systems will soon be reached, and scientists are on the lookout for new solutions, one of which would entail using spin waves to create logic architectures that are more efficient than today's CMOS systems. But to work, the spin waves have to be unidirectional, which is a challenge!

Researchers at INAC used simulation to demonstrate that the Dzyaloshinskii-Moriya interaction, an antisymmetric phenomenon that occurs at the metallic multilayer interfaces of thin films, affects spin wave sources by modifying their emission frequency according to their direction. In other words, an excitation source with spatial periodicity can emit unidirectional spin waves. The model used by the researchers can also help determine source frequency and wavelength.

Contact: [gilles.gaudin@cea.fr](mailto:gilles.gaudin@cea.fr)

Innovation

## SigmaFusion™ meets automotive-industry reliability standards

**S**igmaFusion™, Leti's data fusion system, was successfully embedded into Infineon's Aurix microcontrollers, the first time Sigma Fusion has been executed on hardware designed for automotive applications. In general, the fusion of data from the environmental sensors in driverless cars requires huge processing power, something that is totally incompatible with automotive safety standards—which call for simple, reliable, and robust equipment with redundant processors.

The successful execution of SigmaFusion™ on a hardware platform that meets the highest standards for reliability was made possible by a new arithmetic protected by several patents. It enables the Bayesian fusion of data using the processor only for entire operations without introducing additional numerical errors.

Contact: [julien.mottin@cea.fr](mailto:julien.mottin@cea.fr)

## Very-high-density optically reconfigurable gate arrays

**L**ike electrical networks, optical telecommunications networks must be reconfigurable so that the signal can be routed to meet the needs of subscribers. Researchers at Leti developed an optical signal routing node with an unrivalled level of integration.

The prototype developed counts 800 active optical components fabricated on a SOI substrate to form an array of 400 switches (up from the former state of the art of around 100). This photonic array is then assembled by 3D integration with an electronic chip that controls the array. The electrical contact between the array and chip is made up of more than 2,000 microspheres. The prototype can control the addition or subtraction of eight wavelengths and will soon be tested in a real-world environment by an industrial partner.

Contact: [christophe.kopp@cea.fr](mailto:christophe.kopp@cea.fr)

## Graphene and spintronics come together

**G**raphene offers some pretty amazing properties that could really enhance spintronic devices. But how do you inject a spin-polarized current into a two-dimensional, non-magnetic material like graphene?

Researchers at INAC tackled the issue, using *ab initio* calculations to demonstrate the feasibility of injecting a robust spin-polarized current into graphene by placing it near magnetic insulators. The researchers found that yttrium iron garnet (YIG) and europium chalcogenides give the material magnetic properties even at ambient temperature. The research, conducted under the EU-backed Graphene Flagship program, will pave the way toward the development of spintronic logic gates leveraging proximity-induced phenomena in graphene.

Contact: [mair.chshiev@cea.fr](mailto:mair.chshiev@cea.fr)

## Remote-controlled nanotweezer arrays

**R**esearchers at INAC developed micromanipulators to form an array of submicrometric tweezers that can be remote-controlled simultaneously. The researchers took advantage of standard microelectronics-industry processes to make millions of nanotweezers—each composed of two magnetic particles fabricated layer by layer using lithography and attached with a gold nanohinge—at the same time. The tweezers open when a magnetic field is applied and close when the field is removed.

The nanotweezers were successfully tested while still attached to their silicon substrate. However, they could be dispersed in a solution for use in biomedicine, where they could be used to grip nano-sized biological materials.

Contact: [helene.joisten@cea.fr](mailto:helene.joisten@cea.fr)

## INAC develops first-ever quantum-dot nanotubes

**W**hat do you get when you take a GaN nanowire, add a very thin layer of InAlN, and then heat the GaN to make it disappear? An InAlN nanotube! And if you use a nanowire covered with multiple layers of InAlN/GaN, you get a nanotube whose walls are made up of quantum dots! The quantum-dot nanotubes were developed by researchers from INAC in conjunction with EFPL in Lausanne. Quantum dots are heterostructure semiconductors just several nanometers thick that are very efficient light emitters.

When used in LEDs and lasers, for example, quantum dots are often made on flat surfaces. These first-ever quantum-dot nanotubes will pave the way to new flexible optical devices ranging from UV emitters to biological sensors.

Contact: [christophe.durand@cea.fr](mailto:christophe.durand@cea.fr)



## Iprasense introduces high-throughput cell culture monitoring

**T**he high-throughput Cytonote Cell counter, released in July 2017 by Iprasense, lets labs monitor up to 96 cell cultures in parallel and in real time. Like the company's previous-generation cell counter, the new product delivers statistics on cell viability and requires no specific sample preparation. The product is the third in Iprasense's lineup to leverage a lensless imaging technology developed at Leti that increases the visual field tenfold as compared to a traditional microscope.

Samples are placed on a 96-well plate, allowing labs to test the effects of up to 96 substances on the same cell culture, making the product ideal for antibiotic sensitivity tests, high-throughput cellular screening for drug discovery, or to monitor a therapy's efficacy.

Contact: [sandra.barbier@cea.fr](mailto:sandra.barbier@cea.fr)

## Day by day

## Growing numbers of Phelma students opt for work-study programs

**W**ork-study programs are increasingly popular at Grenoble Institute of Technology's Phelma engineering school. This year, 21 students were admitted into the work-study program, up from 14 the previous year, exceeding the school's target. While the program mainly focuses on integrated systems design, its name was recently changed to Electronics, Microelectronics, and Telecommunications (EMT). Graduates of vocational and technical college programs and traditional undergraduate programs are eligible to apply directly to the program without completing an engineering preparatory program. This year 60 of the 364 incoming freshman were admitted through this special process designed to increase student diversity.

Other than the sharp increase in work-study students, this year's admissions figures are in line with previous years. Also worth noting is that two incoming freshman were admitted from agriculture/veterinary preparatory programs, another initiative—currently in the experimental phase—designed to increase diversity.

Contact: alexis.sableaux@phelma.grenoble-inp.fr

## Women in Science competition: Now is the time to enter

**T**o promote the "Women in Science" collection recently created at the Phelma library, APMST, a French non-profit group promoting gender equality in the sciences, is running an original competition to get people reading! Both women and men are eligible to enter. Participants must read one of the 49 books in the collection and do a book report, which can be in any format—text, images, audio, video—as long as it gets people interested in the book! The deadline has been extended to October 16, so please enter!

The awards ceremony will be held at the Grenoble Institute of Technology Auditorium on Saturday, October 21 at 3:30 p.m. during the *Parvis des sciences* fair. There's a total of €1,600 in prizes to be won!

Rules and regulations

Contact: celine.ternon@grenoble-inp.fr

## Three up-and-coming CNRS researchers hired by FMNT

**I**n the space of just a year the FMNT (Federation for Micro and Nanotechnology) has hired three up-and-coming CNRS researchers, all of whom passed very selective competitive exams at the national level—proof of the quality of FMNT's research and the attractiveness of its labs.

Two research scientists joined FMNT's LMGP lab in February: Monica Burriel is investigating the potential of perovskites and their derivatives, especially for use in resistive memory, and Élisabeth Migliorini is developing biomimetic platforms to analyze cell regeneration mechanisms. Christoforos Theodorou will join IMEP-LaHC in October. He will be assigned to one of the lab's flagship topics: low-frequency noise and dynamic variability.

Contact: mouis@minatec.grenoble-inp.fr

## Nano@school 2016–2017 served 610 high-school students

**T**he 2016–2017 academic year was a good one for the Nano@school educational outreach program, which served 610 science-track high-school students—including around 80 from international schools in Turkey, Japan, and Italy—at CIME Nanotech labs.

The year was a good one in terms of quality, as well, with updates to two of the six workshops. The microsystems workshop now includes hands-on work with sensors and switches and opportunities for students to test accelerometers. The telecommunications workshop offers fun new transmission/receival experiments that let students encode and send signals to classmates to receive and decode.

Contact: sebastien.berger@cea.fr

## OPE)N(RA, the FMNT's new characterization platform

**T**he FMNT (Federation for Micro and Nanotechnology) has brought its functional characterization equipment together at the OPE)N(RA platform. The open-access, multidisciplinary facility is home to a comprehensive set of measurement equipment that can be used to study the functional properties of materials, components, sensors, circuits, and systems for applications ranging from electronics, spintronics, photovoltaics, integrated sensors, and energy harvesting to integrated photonics and telecommunications.

The platform offers access to its instruments, of course. But users can also benefit from support with collaborative research/R&D projects, both academic and industrial. The FMNT website has a list of the equipment available at the platform.

www.fmnt.fr

Contact: mouis@minatec.grenoble-inp.fr

## BHT-2: Construction to begin in November

**R**eal estate development company Léon Grosse signed a construction lease with the CEA on June 21, 2017 for the new High-Tech Building (BHT-2). The real estate development contract was signed on July 4, and construction is slated to begin in mid-November for delivery of the new building in the spring of 2019.

Like the first High-Tech Building (BHT-1), built in 2005, BHT-2 will also be home to startups and other businesses with formal research agreements with MINATEC partners. Unlike BHT-1, however, all of BHT-2's 4,600 sq. m on five levels will be mixed-use, housing both offices and labs. The space will also be compatible with clean rooms with controlled environments up to P2.

Contact: annick.merle@isere.fr

## Industrial partners host CEA Tech travelling showroom

**T**he CEA Tech Grenoble showroom and regional centers have been around for six years already! Beginning this year, CEA Tech industrial partners will be able to host their own showrooms. Several customers—like cable manufacturer Nexans—have already taken advantage of the new service. Others, like the Nord-Isère Chamber of Commerce and Industry, will soon follow suit.

The temporary showrooms can be tailored to meet each customer's needs and facilities. A variety of topics can be presented with the associated prototypes or demonstrator systems. The total exhibit space is 200 sq. m maximum and can be set up for self-guided tours or for group tours run by CEA staff. The showrooms are a great way for companies to raise their employees' awareness of innovation by giving them an up-close and personal experience with new technology.

Contact: celine.soubeyrat@cea.fr

## Interview

Marie-Noëlle Semeria  
Director, Leti

# Micro-electronics is Leti's home playing field

**Leti just turned 50. What are the institute's priorities today?**

Leti's goal is to leverage the 300 mm platform and advances in FDSOI to remain a leader in miniaturization technologies. Microelectronics is Leti's home playing field. It is a diverse topic that offers many opportunities to integrate, transfer, and transpose new technology. True to Leti's pioneering spirit, the institute intends to explore these opportunities to drive advances in technology. Innovation is a global race, one that must be won at home and at the frontiers.

**What can you tell us about Leti's partners?**

Leti's partners include global leaders like Intel, Stanford, Global Foundries, TSMC, and Oculus (a Facebook company). Leti has doubled the number of international industrial partnerships we run and strengthened relationships with traditional partners like STMicroelectronics, Soitec, and ULIS (a subsidiary of Sofradir). The institute has also broadened its partnerships in France to encompass component and systems integrators like Safran, or—earlier on in the integration value chain—with companies like Renault, Horiba, and Bureau Veritas.

**What frontiers are you hoping to push back today?**

Leti's goal is to remain true to its identity—hardware to support miniaturization, low-power components and systems, and systems integration—while addressing the intelligence technologies that will revolutionize medicine, nutrition, transportation, and education.

Leti's future challenges concern cyber-physical systems, which combine sensors, computing, and communications capabilities, as well as innovative medical systems. As for new materials like GaN, Leti feels that they will create some exciting opportunities.

Contact: catherine.ogier-falzon@cea.fr

## Day by day

### Grenoble Institute of Technology Foundation new programs

The Grenoble Institute of Technology Foundation has introduced two new programs for businesses. The first, called *MyFoundation*, supports students involved in international social or sustainable development activities, as well as student artists and elite athletes. The second, *Fast Track*, lets donors allocate their gifts to short (maximum two-year) research programs with budgets of €500,000 or less. The program rounds out the Foundation's Scientific Chairs.

On December 5, 2017, the Foundation will present these new programs to community stakeholders at its annual gala, which will feature a talk by astronaut Claudie Haigneré on the lunar village.

Contact: murielle.brachotte@fondation.grenoble-inp.fr

### Ribbon cut on Predictive Simulation Center

Leti, Liten, and INAC cut the ribbon on the new Predictive Simulation Center on September 25, 2017. The cross-disciplinary center, staffed by around 60 simulation experts, does not yet have its own facility, a situation that is expected to change within a year. What the center does have is the combined simulation know-how of three top-tier research institutes operating under a single name and a capacity to offer comprehensive services—placing it in an excellent position to win EU projects.

By the end of 2017, the center will also have a 1,500-core machine worth €400,000 to round out its intensive computation resources. The computer, housed in Building T on the CEA Grenoble campus, will also foster expanded cooperation with PFNC, whose electron microscopes and other equipment require major computing resources.

Contact: thierry.deutsch@cea.fr

## Horizons

### NanoMada: MINATEC exports its know-how to Madagascar

The MINATEC Nanolab consortium (which includes the CEA, MINATEC, CIME Nanotech, and 40-30), created to support developing countries, is helping to set up a micro and nanotechnology lab in Madagascar.

The project includes the 2017 NanoMada school to be held in Antananarivo from November 9–14. Some 50 Master's and PhD students will attend lecture and lab classes on renewable energy and nanomaterials taught by research scientists from Leti, Liten, and INAC with the support of Grenoble-Alpes University via the IDEX instrument of the French government's economic stimulus package. The curriculum covers everything from solar cells and batteries to nanoparticle synthesis. The session will wrap up with a two-day conference on healthcare, photovoltaics, and materials—the research topics the future lab in Madagascar will address.

Contact: robert.baptist@cea.fr

### Rotary Club finances 3D bioprinter

The Rotary Club wrote Grenoble-Alpes University a check for €37,000 to support research on 3D bioprinting of engineered skin conducted in partnership with the CEA and Grenoble University Medical Center. INAC and BIG, also involved in the research, helped select the bio printer, a latest-generation Cellink BIO X.

The research aims to engineer human skin models using a 3D printer and bio-ink made up of living skin cells. In the short term, the engineered skin could replace animal testing in the cosmetics industry. In the longer term, the technology could lead to human skin reconstruction right in the operating room. Finally, diseased skin could be printed and used for drug discovery screening assays.

Contact: walid.rachidi@cea.fr

## Horizons

## EU Convergence project banking on autonomous portable testing devices

**T**he EU R&D project Convergence, coordinated by EPFL in Lausanne, brings together a consortium of seventeen partners, including Grenoble Institute of Technology (and the school's LMGP and IMEP-LaHC labs) and Leti. The project supports the development of new autonomous portable environmental and health testing devices. The research will cover everything from data transmission and storage to sensors and energy harvesting.

MINATEC labs will develop nanowire-based biological and gas sensors, investigate piezoelectric electromagnetic and mechanical energy recovery systems, and integrate the sensors onto flexible materials. The potential target applications include bracelets or patches for non-invasive medical monitoring.

Contact: francis.balestra@grenoble-inp.fr

## New introductory-level book on electronic measurement systems

**D**avide Bucci is a lecturer at Grenoble Institute of Technology's Phelma engineering school, where he teaches several electronics, microelectronics, and guided optics courses. He also conducts research at IMEP-LaHC. And he is now author of a book published by Wiley-ISTE: *Analog Electronics for Measuring Systems*.

The 180-page book, intended for a readership with some prior knowledge of electronics and signal processing, delivers an introduction to the main features of low-frequency analog acquisition chains. Sensors, conditioning circuits, differential and instrumentation amplifiers, active filters, and analog-to-digital converters are all covered. The final chapter of the book addresses noise and electronic compatibility.

Contact: davide.bucci@phelma.grenoble-inp.fr

## Sciencetips science newsletter backed by the CEA

**T**he Artips publishing company's free art and music newsletters count an impressive 500,000 subscribers. In May, Artips introduced a science newsletter called—you guessed it—Sciencetips. Written for the general public, the twice-weekly newsletter, available in French only, brings subscribers serious science in a fun, easy-to-digest format, with offbeat anecdotes and illustrations, video, and animations.

The CEA is one of the publication's founding partners, as are the CNRS, Inserm, the CNES, ANDRA, and Air Liquide. In addition to providing financing, the CEA also supplies content on topics related to its areas of expertise and research activities.

<http://artips.fr/Sciencetips/>  
Contact: brigitte.raffray@cea.fr

## CIME to celebrate Science Week in Voiron!

**L**eti and STMicroelectronics retirees in Voiron turned to CIME Nanotech to help local volunteers bring Science Week back to Voiron after a two-year hiatus. CIME Nanotech helped with the preparations in the run-up to Science Week and trained the facilitators who will run the event from October 12–15, the week before the *Parvis des sciences* science fair in Grenoble.

CIME Nanotech will also provide equipment on loan: force-feedback joysticks that translate the physical forces at play at the nano scale into human-scale forces for two haptics (the science of touch) workshops and microscopes for a booth entitled "*Regardez le tout petit*" (A look at the very small.) CIME Nanotech Director Ahmad Bsiesy will tell the story of electronic chips from 1960 to the present at a lecture on Sunday at 4 p.m.

Voiron Science Fair website  
Contact: ahmad.bsiesy@cea.fr

## Fraunhofer and Leti sign novel microelectronics partnership

**B**erlin-based Fraunhofer Group for Microelectronics and Leti signed a new partnership agreement at Leti Innovation Days in June.

The agreement will build on existing collaboration between the partners and will cover R&D projects on FDSOI and More than Moore to enable the use of next-generation components in automotive and aeronautics systems, IoT, augmented reality, and healthcare.

The two institutes will join forces on these R&D projects to help ensure that France and Germany maintain their positions of leadership on the global microelectronics market.

Contact: carlo.reita@cea.fr

## Grenoble strengthens ties with Latin America

**T**he NanoAndes school has been held every year since 2010. This November, a new school, MEMS-AL, will kick off in Bogota. Research scientists from Leti and Grenoble-Alpes University will teach students the basics of MEMS, IoT, and Big Data over the five days of the session. NanoAndes, held in Buenos Aires, will cover nanomaterials and nanostructures for energy and healthcare.

Both schools, set up to disseminate Grenoble's scientific know-how and strengthen the city's ties with Latin America, have earned the backing of big-name partners: MEMS-AL is funded in part through the IDEX instrument of the French government's economic stimulus package, while NanoAndes is backed by the CNRS, the CEA, and Fondation Nanoscience. It is hoped that these schools will fuel student and faculty exchange programs and research partnerships.

Contacts: ardilarg@minatec.inpg.fr (MEMS-AL)  
alain.ibanez@neel.cnrs.fr (NanoAndes)

## Nexio boosts Pheline testing lab's capacities

**E**lectromagnetic compatibility expert Nexio, Grenoble-Alpes University labs IMEP-LaHC and G2Elab, and construction-industry R&D center CTSB in Grenoble have joined forces to boost the Pheline electromagnetic testing lab's capacities. A vocational degree program in electromagnetic compatibility testing was set up at CTSB in 2016, followed by an electronics design workshop specializing in electromagnetic fields in 2017.

The Pheline testing lab will now benefit from Nexio's innovative testing equipment and resources (including a near-field scanner) and will be able to support businesses on all EMC and RF issues at all stages of their electronic equipment and systems development processes. Pheline's objective is to improve product quality and reduce certification times and costs.

Contact: fabien.ndagijimana@univ-grenoble-alpes.fr

Live from MINATEC

## WTC and Maison MINATEC join forces to boost event capacity

**T**he World Trade Center (of the Grenoble Chamber of Commerce) and Maison MINATEC are just 750 meters away from each other. A new partnership will now bring them even closer! The two event venues signed an agreement on September 15 to combine their resources and boost their event capacity. By pooling their facilities, the WTC and Maison MINATEC will increase their meeting capacity to 900 seats and will be able to offer more than 2,000 sq. m of exhibit space.

The partnership will bring event organizers a host of additional benefits: a single point of contact, appropriate event signage, and connected solutions (live event streams, dedicated mobile apps and more). The partnership will help to attract major national and international scientific and industrial conferences to Grenoble.

Contacts: [emma.beilleau@cea.fr](mailto:emma.beilleau@cea.fr)  
[julie.satin@wtc-grenoble.com](mailto:julie.satin@wtc-grenoble.com)

## The sixth Challenge First Step in six projects

**I**n June the Challenge First Step jury selected six potential startups from Leti and Liten. The project leaders received support with the business creation process this fall and will update the jury on their progress in late November. The jury will then decide whether or not to fund any of the projects.

The projects address a variety of fields: three in information and communication technologies (InP optical transceivers, touch sensors made from piezoelectric materials, and an instrumented bicycle outfitted with sensors to measure structural integrity), two in energy (ultra-thin, conformable, flexible low-cost batteries and GaN-based miniature power supplies for domestic electrical distribution networks), and one focusing on the design and fabrication of complex microfluidic systems.

Contact: [stephane.fontanell@cea.fr](mailto:stephane.fontanell@cea.fr)

## LXRepair brings in €1.1 million

**S**tartup LXRepair, a CEA spinoff founded in 2013, has just raised €1.1 million in capital from investors Kreaxi, CEA-Investissement, XPAND Investissement Ltd., Grenoble Angels, Savoie Mont-Blanc Angels, Gentiane participations, and private individuals. LXRepair will use the funds to complete clinical proof-of-concept studies in oncology, obtain the CE mark for its innovative DNA repair measurement systems, and boost its international development strategy.

The company's enzyme assay kit, which leverages research patented by INAC, identifies markers that help predict a patient's response—whether it is toxicity or resistance—to cancer therapies. The company's first kit, Glyco-SPOT, already on the market, is used for research only.

Contact: [sylvie.sauvaigo@lxrepair.com](mailto:sylvie.sauvaigo@lxrepair.com)

## Morphosense earns kudos at i-LAB 2017 competition

**M**orphosense, a company specializing in the structural monitoring of infrastructures like bridges, dams, and tunnels, earned kudos at the national i-LAB 2017 competition, winning in the creation and development category.

i-LAB supports innovative technologies and startups through grants from the French Ministry of Research and Bpifrance. Morphosense, a Leti spinoff created in 2016, will use the prize money to speed up progress on its R&D roadmap and focus on extracting value out of data with new machine-learning-type algorithms to be able to utilize weak signals—a capability that would be totally unique on Morphosense's market.

Contact: [alexandre.paleologue@morphosense.com](mailto:alexandre.paleologue@morphosense.com)

## Diabeloop raises €13.5 million to develop artificial pancreas

**G**renoble-based startup Diabeloop, founded in partnership with Leti and diabetes research center CERITD to develop an artificial pancreas for insulin-dependent diabetics, raised €13.5 million in July 2017. Aliad (an Air Liquide company), Supernova Invest funds, Sofimac Partners, Kreaxi, and two Crédit Agricole regional investment funds injected €7.5 million in fresh capital into the company. The remaining €6 million in financing came from banks Bpifrance, CASRA, and Banque Populaire ARA.

The influx of funds and new investors will position Diabeloop to speed up the development of its artificial pancreas with additional clinical trials, obtain the CE mark, and complete studies to obtain healthcare insurance approval for reimbursement. The artificial pancreas is expected to be released in 2018.

Contact: [investors@diabeloop.fr](mailto:investors@diabeloop.fr)

## 5,200 runners expected at 2017 Grenoble Ekiden marathon

**T**he Grenoble Ekiden relay marathon has reached record levels of popularity this year, with nearly 5,200 runners expected—that's 60 six-runner teams more than last year! Participants are gearing up for the Sunday 22 October event with the traditional lunchtime training (Tuesdays at Parc Paul-Mistral and Thursday in the Presqu'île neighborhood right up until the week of the marathon) plus a new challenge created by Hardis Group and Sébastien Chabal using the Watthealth connected sports and health app for GIANT teams to see who can run the most steps from September 25 to October 9!

GIANT teams can pick up their bibs on Friday 20 October between 11:30 a.m. and 2 p.m. at the tent in front of the MINATEC campus on Parvis Louis-Néel.

Adults can register until October 9 at noon at <http://www.grenoble-ekiden.fr> and children can register on site the day of the race.  
Contact: [g-gre-grenoble-inf@cea.fr](mailto:g-gre-grenoble-inf@cea.fr)

## MagIA Diagnostics revolutionizes ELISA immunological test

**M**agIA Diagnostics, a startup spun off from G2Elab, LMPG, Institut Néel, and IAB in 2017, develops fast, easy-to-use immunological tests that will enable tests currently completed in laboratory settings to be completed anywhere.

Unlike the traditional ELISA (enzyme-linked immunosorbent assay) test, MagIA's technology does not require wash steps. An antigen associated with a given pathology is detected using antibodies marked with magnetic nanoparticles and others with fluorescent particles. If the antigen is present in the sample, in less than fifteen minutes it bonds to the antibodies, forming magnetically-marked compounds that are captured locally using micromagnets.

The unique signal is distinguished from the supernatant using a differential imaging system.

Contact: [franz.bruckert@grenoble-inp.fr](mailto:franz.bruckert@grenoble-inp.fr)

## Agenda

### October 9–10 & 16–17, Grenoble Institute of Technology Auditorium

#### Training course on scientific communication

in English (four half-day sessions); anyone can attend, but you must register. Organized by ARC Énergies; ECTS credits possible for PhD candidates.  
registration required - [arc.energies@grenoble-inp.fr](mailto:arc.energies@grenoble-inp.fr)

### October 13, Maison MINATEC and Grenoble Institute of Technology Auditorium

#### A&M Alumni Convention

<http://congres.arts-et-metiers.fr/>

### October 19–21, MINATEC Parvis des sciences science fair: Open to the general public

on Saturday, Oct. 21 with a lecture by physicist Delphine Six on Alpine glaciers as indicators of climate change at 2 p.m. at the Grenoble Institute of Technology Auditorium.

[www.parvis-des-sciences.com](http://www.parvis-des-sciences.com)

### October 22, GIANT 10<sup>th</sup> Grenoble Ekiden relay marathon

[www.grenoble-ekiden.fr](http://www.grenoble-ekiden.fr)

### November 16, CEA 1<sup>st</sup> Nanosafety Workshop

[www.nanosafety-platform.com](http://www.nanosafety-platform.com)

### November 16, MINALOGIC Day-long meeting on modelling cyber-physical systems

<https://goo.gl/4vnomo>

### November 21, Grenoble Open Innovation Day

with Michelin. Organized by Minalogic

For information and to register :  
<https://goo.gl/uJmDmIo>

### December 4–5, Annecy SYNOHE Workshop

(Synchrotron and Neutron techniques for Organic and Hybrid Electronics)

[jerome.faure-vincent@cea.fr](mailto:jerome.faure-vincent@cea.fr) — <https://synohe.sciencesconf.org/>

### December 5, Minalogic Annual Minalogic Digital Technology Cluster Day

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

### December 5, 6 p.m., World Trade Center Grenoble Grenoble Institute of Technology Foundation annual gala and lecture by astronaut Claudie Haigneré on the lunar village

Registration by email required  
[fondation@grenoble-inp.fr](mailto:fondation@grenoble-inp.fr)

## Contacts

# MINA-NEWS >

MINA-NEWS is published by MINATEC, 3 parvis Louis-Néel, 38054 Grenoble Cedex 9 France  
Head of Publication: Jean-Charles Guibert; Editor-in-Chief: Julie Spinelli  
Contributors: Catherine Ogier-Falzon, Leti, [catherine.ogier-falzon@cea.fr](mailto:catherine.ogier-falzon@cea.fr) -  
Nathalie Mathieu, Phelma, FMNT, [Nathalie.Mathieu@phelma.grenoble-inp.fr](mailto:Nathalie.Mathieu@phelma.grenoble-inp.fr) -  
Jérôme Planes, INAC, [jerome.planes@cea.fr](mailto:jerome.planes@cea.fr) - Julie Spinelli, MINATEC, [julie.spinelli@cea.fr](mailto:julie.spinelli@cea.fr) -  
Alexis Sableaux, Phelma, [alexis.sableaux@phelma.grenoble-inp.fr](mailto:alexis.sableaux@phelma.grenoble-inp.fr)  
Editing: Bénédicte Magne; layout and printing: Philippe Tur  
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