

# MINA-NEWS

MINATEC  
NEWSLETTER  
OCTOBER '19

## TOP NEWS

## BHT2: MINATEC Entreprises exceeds targets

Construction on the BHT2 building was completed last spring, and startup Prophesee moved its R&D department into a 154 sq. m space at the end of September.

Prophesee's R&D team will be working on the integration of its neuromorphic vision technology into autonomous vehicles in partnership with Leti.

### eLICHENS AND DIABELOOP TO MOVE IN SOON

Work is underway inside BHT2 to prepare spaces for two more companies expected to move in by year's end. Startup elichens (a Leti partner) designs patented gas sensors and air quality testing and forecasting systems. The company will occupy a 320 sq. m space that is currently being outfitted with office and lab equipment for the 25 elichens employees that will be moving in at the end of November.

Diabeloop will be the last new tenant to move in this year, bringing an additional 50 people to BHT2. The startup is developing a smart system for the management of type-1 diabetes in partnership with Leti. Diabeloop will occupy the entire second floor (900 sq. m).

BHT2 manager MINATEC Entreprises is in talks with other potential tenants. BHT2 offers all of the amenities high-tech companies need, with modular spaces, fluid supply lines, and maintenance and security. However, it does take time to complete the detailed specifications necessary to customize each space to meet its future tenant's requirements. In December, almost 40% of the building will be occupied—ahead of the initial target of 30%.

✉ [jp.boncristiano@minatec-entreprises.com](mailto:jp.boncristiano@minatec-entreprises.com)

## INNOVATION

## Graphene oxide caves give supercapacitors a boost

Could graphene sheets perform better than active charcoal in supercapacitor electrodes? Researchers from IRIG collaborated with two CNRS\* research teams to find out. And the answer they came up with is yes—but only if you use reduced graphene oxide (rGO) in which nanometric alkanes are used as interlayer spacers.

The alkanes serve as molecular pillars that prevent the rGO layers from clumping back together, a phenomenon that would drastically reduce the surface available for the adsorption of ions, as well as the material's storage properties. The researchers optimized the density of these pillars to ensure the free circulation of ions in the caves formed in between the graphene layers. The volume capacity of this modified rGO is four times that of conventional rGO.

\*Cimat (Toulouse) and IMN (Nantes)

✉ [florence.duclairoir@cea.fr](mailto:florence.duclairoir@cea.fr)

## How to read and modify a quantum bit, step by step

A team of researchers from Grenoble (IRIG, Leti, and CNRS) made headlines in 2016 with the world's first FDSOI qubit device—based on holes rather than electrons—made on a 300 nm CMOS fab line. Now they can read the state of the qubit, too. The researchers used a screen-grid reflectometry method, applying microwave signals to the grid to modify the qubit's state.

The read technique is still lacking in precision. However, it will be useful for the rapid characterization (coherence time, relaxation time, etc.) of qubits made in Grenoble. Plus, the technique will be easy to duplicate on future circuits made up of several qubits. The research was published in *Nature Communications* in an article that came shortly after another team of researchers from Grenoble published their research on gate-based high-fidelity spin readout in a CMOS qubit\*.

\*in *Nature Nanotechnology*

✉ [romain.maurand@cea.fr](mailto:romain.maurand@cea.fr)

## Antennas: Radiall and Leti lay the groundwork for 5G telecoms

Radiall and Leti have worked together on a variety of multi-partner R&D projects and contract R&D projects since 2003. Today, they are deepening their partnership through a new joint lab that will develop antennas for tomorrow's 5G telecommunications infrastructure. The fronthaul/backhaul\* links use frequencies from 50 GHz to 90 GHz, where high-gain antennas must be used to offset high transmission losses. The joint lab will also address the challenge of cost: Because IoT devices require many connection points, antennas must be affordable.

The partners previously developed a 5G antenna now sold by Radiall. The company will initially assign around ten employees to the new lab with the goal of getting new products to the market within 18 to 36 months.

\*Intermediate links between the network backbone and edge

✉ [stephanie.riche@cea.fr](mailto:stephanie.riche@cea.fr)

THESE NEW BIOMARKERS ARE GREAT.  
YOU CAN TELL RIGHT AWAY IF THE BLOOD IS ANY GOOD...



## Biomarkers: Portable microfluidics lab breaks records

Currently it takes two days to prepare a blood sample for biomarker testing using mass spectrometry. Leti recently unveiled a new portable microfluidics lab that can process blood samples in just two hours. The system automates and integrates all steps in the blood sample preparation process, from extracting the plasma to purifying the peptides used to detect biomarkers that indicate heart, brain, liver, and other diseases.

The PEP's—for PEPtides Saver—demonstrator system was developed by Leti, Cinatec, and IRIG with funding from the Carnot Network. The system is also flexible: The duration, temperature, and sample volumes can be adjusted as needed. Leti has filed two patents to protect the innovation and is now seeking an industrial partner to scale up and manufacture the system.

✉ [marie-line.cosnier@cea.fr](mailto:marie-line.cosnier@cea.fr)

## Unbroken layers of MoSe<sub>2</sub> over large surfaces now possible

Molybdenum diselenide (MoSe<sub>2</sub>) has good optical properties, but is resistant to deposition processes. Microelectronics researchers had all but given up on the material, but research recently conducted by three physics labs at IRIG could change that. The researchers obtained an unbroken and uniform layer of MoSe<sub>2</sub> using molecular beam epitaxy on a graphene substrate. The grains' crystalline quality is good, and their orientation is the same as the graphene grains. The material can absorb up to 15% of the light spectrum.

Applying the technique to 300 mm wafers is not yet within reach, however: The results were obtained on a surface measuring just 1 cm<sup>2</sup>. Nevertheless, the process can be implemented on a large scale and could be more effective than the exfoliation and attach processes currently used on MoSe<sub>2</sub>. The research was published in *ACS Nano*.

✉ [matthieu.jamet@cea.fr](mailto:matthieu.jamet@cea.fr)

## IRIG and Tsukuba collaborate on another PhD dissertation

IRIG and Japan's University of Tsukuba recently kicked off their second joint PhD research project on the ultra-rapid displacement of magnetic walls using the spin-transfer effect in manganese nitride (Mn<sub>2</sub>N). The conclusions of an earlier PhD dissertation were promising. Samples produced in Japan were sent to Grenoble, where they were used to reproducibly displace walls at speeds of 700 m/s to 800 m/s.

Researchers around the world investigated single spin transfer effects on walls from 2000 to 2010, when the focus shifted to spin-orbit coupling. The crystalline properties of the Mn<sub>2</sub>N obtained by epitaxial growth at Tsukuba have brought single spin transfer back. Ultimately, the research could be used to develop new magnetic memory technologies.

✉ [jean-philippe.attane@cea.fr](mailto:jean-philippe.attane@cea.fr)

## Spirit, the world's first neural-network-on-chip

Leti has achieved a world-first in embedded artificial intelligence with its Spirit neural-network-on-chip. The component is largely brain-inspired, using unary rather than binary coding, just like neurons! Each event adds "weight" to the synapse until a "firing" threshold is reached. The chip's resistive memory is also bio-inspired: Integrating the memory directly on the chip eliminates the need for energy-hungry data transmission, slashing energy consumption by a factor of five or more.

The first Spirit demonstrator chip was relatively simple. A new 28 nm version of the chip is currently on the drawing board. It is being developed to classify LiDAR point clouds. Leti is in the process of applying for three patents to protect the innovation.

✉ [alexandre.valentian@cea.fr](mailto:alexandre.valentian@cea.fr)

## Introducing Tiny, an ultra-thin, high-capacity battery

The Tiny lithium-ion microbattery is redefining the international state of the art in miniature energy storage, with a thickness of less than 100 microns, a surface area of just a few square millimeters, and a capacity three times that of competing batteries. Leti and Liten developed Tiny, which is made using a thin-layer deposition technique. A solid electrolyte makes the battery safe, robust under high temperatures, and extremely long-lasting—Tiny's lifespan is excellent, both during cycling and on the shelf.

The technology is currently being scaled up to ready it for manufacturing and is expected to hit the market in late 2021. The product will initially target medical applications and, specifically, implanted devices and integration into contact lenses.

✉ [martin.gallezot@cea.fr](mailto:martin.gallezot@cea.fr)

## Nobel laureate Gérard Mourou to visit MINATEC

**Dr.** Gérard Mourou, who is a Professor Emeritus at the prestigious École Polytechnique and winner of the Nobel Prize in Physics in 2018 (with two other scientists)\*, will come to MINATEC to meet with Grenoble Institute of Technology-Phelma students on Wednesday, October 16 during a two-day visit to Grenoble. First, he will meet with students in the Masters in Photonics and Semiconductors program, where he will very likely talk about the Nobel-worthy method he helped develop for generating high-intensity, ultra-short optical pulses. Next, he will speak to the entire first-year class and a cohort of 90 Grenoble-Alps University students.

A native of Albertville and former student at Grenoble University himself, Dr. Mourou will return to his old campus in Saint Martin d'Hères to give a talk at the Weil Auditorium from 4 p.m. to 6 p.m. on the eve of his visit to MINATEC.

\*with Arthur Ashkin (United States)

and his former PhD student Donna Strickland (Canada)

✉ [alexis.sableaux@phelma.grenoble-inp.fr](mailto:alexis.sableaux@phelma.grenoble-inp.fr)

## Grenoble Institute of Technology programs bring in even more IoT

**O**n October 10, 2019, five engineers and a PhD employed at Grenoble-area companies (Schneider Electric, Dolphin Integration, and Euromaster) will begin a new continuing education program on the Internet of Things. The ten-month, 150-hour Grenoble Institute of Technology program, taught by Phelma and Ensimag faculty, combines classroom and hands-on learning.

Participants will earn a certificate in embedded systems and connected devices after completing five modules: radio and network communications; operating systems and processor architectures; algorithms and software engineering; data management; and safety and security. The set of competencies learners are expected to acquire is also part of the Grenoble Institute of Technology engineering degree program in Technology Management.

✉ [jean-marc.dedulle@grenoble-inp.fr](mailto:jean-marc.dedulle@grenoble-inp.fr)

## Phelma student launches career in space

**J**oan Rodriguez is in his second year at Phelma and the CSUG, the Grenoble University Space Center. During the 2018-2019 academic year he had an opportunity to work on the development of AMICal SaT, the first-ever nanosatellite developed in Grenoble. Specifically, Joan contributed to the electronics and image processing systems for the satellite, which will observe aurora borealis and australis during its yearlong mission. Joan also supervised some 40 student internships and projects hosted at CSUG during his placement there.

The AMICal SaT launch, scheduled for July in Vostochny, Russia, had to be postponed. As for Joan, he is now in his third year and working on another satellite project, the Atise observation satellite, whose payload will include the AMICal SaT imager plus a spectrometer.

✉ [joan.rodriguez@grenoble-inp.org](mailto:joan.rodriguez@grenoble-inp.org)

## Phelma students experience DIY labs

**S**tudents majoring in Electrochemistry and Processes for Energy and the Environment at Grenoble Institute of Technology's Phelma engineering school are experiencing new do-it-yourself (DIY) labs this year. They are working with three pilot systems (distillation, convection, and conduction) equipped with a wide range of instruments—all hooked up to simulation software. Students must choose their own experiments, come up with and complete their own protocols, and compare the lab results with the simulated results. A faculty member supervises their experiments and makes sure that everyone is working safely.

The DIY labs were created as part of DIYChE, a project financed by IDEX Education, an instrument of the French government's economic stimulus package. Faculty from Phelma, IUT1, and the Grenoble-Alps University Chemistry Department helped develop the workshops, and versions modified to suit the different curricula will be offered to students from all three schools. For students at Phelma, a project can take up to seven four-hour lab classes to complete.

✉ [florence.druart@grenoble-inp.fr](mailto:florence.druart@grenoble-inp.fr)

## Grenoble's iGEM 2019 competitors to enter teardrop test for Parkinson's

**O**nce again this year, a group of students from Grenoble (including four from Phelma) will go to Boston in November to compete in the MIT iGEM international genetically-engineered machine competition. This year's team is currently putting the finishing touches on NeuroDrop, a system that uses a genetically-modified bacteria to detect a protein called alpha-synuclein, which is a marker for Parkinson's disease, from a sample of the patient's tears.

The concept works. The team is struggling to complete the detection chain using aptamers (strands of DNA), but this shouldn't hurt their chances of winning. NeuroDrop meets all of the requirements for iGEM, including the human practices category, which is being addressed by the team's two Political Science majors, who are investigating the topic of interdisciplinarity in research.

Also note that the NeuroDrop team will present the project at the Midi MINATEC brown bag lunch talk during the *Parvis des Sciences* on October 11.

✉ [pierre.bouvet@grenoble-inp.org](mailto:pierre.bouvet@grenoble-inp.org)

## Grenoble Institute of Technology does well in two international rankings

**T**he much-awaited Academic Ranking of World Universities (ARWU or "Shanghai Ranking") of the world's top 1,000 universities came out in June. Grenoble Institute of Technology stayed in the top 50 in three fields: electrical and electronics engineering, remote detection, and metallurgical engineering. Phelma is the only Grenoble Institute of Technology school to offer programs in metallurgy, and placed second in France and 39<sup>th</sup> worldwide in this field.

Grenoble Institute of Technology also appears in the QS World University Rankings, coming in third in France for materials science, and fourth in France for engineering and technology—two fields that concern Phelma in particular.

✉ [alexis.sableaux@phelma.grenoble-inp.fr](mailto:alexis.sableaux@phelma.grenoble-inp.fr)

**THIBAUT DAVID,**  
head of the Fostering Science program

## “Grenoble has very high ERC grant success rates”

**MINA-NEWS: The Fostering Science program helps scientists with their ERC grant applications. What kind of assistance do you provide?**

**Thibaut David:** We start by making sure that applicants understand how ERC grants work and what type of grant to apply for depending on whether they have two, five, or ten years' experience or more. They often want to know if they have to give an oral presentation, who should lead the project, and who to have on their team. We also make sure that the research topic is appropriate. ERC grants are for breakthrough concepts, not incremental innovations. Finally, we help scientists write their proposals and practice their oral presentations.

**MINA-NEWS: How many scientists have you helped over your seven years in operation?**

**TD:** We have met with more than 300 researchers—either based in Grenoble or affiliated with a team based in Grenoble—since 2012. The average overall success rate for ERC grants is 12%; our applicants' success rate is 24%. Plus, the scientists we help tend to use what they have learned to apply for other grants. So, the investment, which is ideally over a six-month period, generates returns over the long term.

**MINA-NEWS: So, Grenoble's scientific community is doing well. But how can we do better?**

**TD:** By applying more. Far too many scientists fail to apply simply because they don't have accurate information. Sometimes they underestimate the value of their work. And then there's the misconception that winning an ERC grant is somewhere between being published in *Nature* and winning a Nobel Prize. There are rules that you have to follow, but if you do, ERC grants are well within reach. And the several million euros in funding can completely change the trajectory of an exploratory research project. ■

✉ [thibaut.david@cea.fr](mailto:thibaut.david@cea.fr)  
[fostering-science@univ-grenoble-alpes.fr](mailto:fostering-science@univ-grenoble-alpes.fr)  
Website: [www.fostering-science.com](http://www.fostering-science.com)

## Turn any bike into an electric bike in just fifteen minutes

**Y**ou don't need to be a DIY expert to install the Gboost electric bike conversion kit! Developed by local startup E-Bike Lite, the ultra-lightweight (950-gram) kit can be installed on any bike with just a single screw. The innovation is an invention of Grenoble Institute of Technology-Phelma faculty member and GIPSA-Lab scientist Dominique Houzet and E-Bike Lite CEO Guenther Hirn.

What makes Gboost so innovative is its patented motor and its controller. The brushless asynchronous permanent-magnet motor (PMM) uses a roller-based transmission; the controller leverages a three-axis magnetic sensor installed on the bicycle pedal axle that analyzes the magnetic field and switches the electric motor on. The company has already sold 500 of the kits this year and plans to double sales in 2020.

<https://gboost.bike/fr/>

✉ [dominique.houzet@grenoble-inp.fr](mailto:dominique.houzet@grenoble-inp.fr)

## Catherine Picart moves from LMGP to IRIG

**C**atherine Picart has been leading a research team at LMGP for eleven years now. She was assigned to the CEA on September 1, 2019 to head the Health Department at IRIG. The department is made up of two joint research units\*, one on large-scale biology and one on the biology of cancer and infection, which will merge in 2021. The eleven LMGP staffers transferred to IRIG will bring the institute's total headcount to 120.

IRIG's Health Department conducts basic research in biology and biotechnology applied to cancer and rare diseases. The institute works closely with Leti. Dr. Picart will continue to pursue her own research and to serve as Scientific Advisor on her two tech-transfer projects, Apios and Bioactivecoating.

\*Affiliated with the CEA, INSERM, Grenoble-Alps University, and CNRS

✉ [catherine.picart@cea.fr](mailto:catherine.picart@cea.fr)

## ISKN enters video gaming market

**I**SKN, a startup founded in 2014 to develop and commercialize an augmented interaction technology hatched at Leti, made its reputation with the Slate, which transforms handwritten drawings, sketches, and notes into digital files in real time. This summer the company ramped up its international business development strategy, presenting its latest product, Tori, in New York in July. ISKN joined forces with Japanese video gaming giant Bandai Namco Entertainment to develop Tori, which combines elements of digital and physical play to create a learning and entertainment ecosystem for children. Shortly after unveiling Tori in New York, ISKN cut the ribbon on its second North American subsidiary in Montreal (the first is in Philadelphia).

The company, which employs 50 people, also plans to open an office in Asia by the end of this year. ISKN's R&D department is still based in Grenoble.

Learn more about Tori: <https://www.tori.com/>

✉ [jean-luc.vallejo@iskn.co](mailto:jean-luc.vallejo@iskn.co)

## Théano Karatsori leads the way for young women in science

**T**héano Karatsori authored nine articles and five conference papers during her PhD research alone. If that wasn't impressive enough, she also won the EEA\* Best Dissertation Award for her work. This bright young woman, now a post-doc at Leti, is certainly doing something right!

Her award-winning research on the characterization and modeling of nano-scale (28 nm and 14 nm) SOI MOSFETs—and specifically, her models and variability and reliability tests—turned out to be extremely valuable to the microelectronics industry.

After completing her PhD at IMEP-LaHC, Ms. Karatsori went on to a one-year post-doc on the characterization of a 3D integration technology. She came to Leti in August, where she is working on modelling a silicon qubit that could power tomorrow's quantum computers.

\*The Electronics, Electrotechnics, and Automatics Faculty Club

✉ [theano.karatsori@cea.fr](mailto:theano.karatsori@cea.fr)

## Leti active in Grenoble artificial intelligence institute

Leti, which kicked off a major R&D program on embedded artificial intelligence this year, is also part of Grenoble's new Multidisciplinary Institute in Artificial Intelligence (MIAI), which will receive €100 million in government and private-sector funding over four years to finance R&D partnerships with around 50 businesses and 28 research chairs. One of the main objectives of the new institute is to get different labs in Grenoble's sci-tech ecosystem working together.

Leti has been tasked with coordinating four of the chairs—on neuromorphic architectures, patient involvement in the management of medical treatment, telecommunications network optimization, and the impact of artificial intelligence on society. Work began this summer.

\*Multidisciplinary Institute in Artificial Intelligence

<https://miai.univ-grenoble-alpes.fr/fr/>

✉ [catherine.ogier-falzon@cea.fr](mailto:catherine.ogier-falzon@cea.fr)

## Startup Rosi wins two awards in one month

July 2019 was a big month for the founders of startup Rosi, which specializes in the recycling of photovoltaic-industry waste. In the space of just a few days the company won an award from French energy agency ADEME for its Redesign project and the i-Lab 2019 competition, bringing in €600,000 in grants and advances and generating promising leads, including some major international corporations.

Rosi utilizes processes developed at SIMAP\* to transform PV silicon cutting waste (40% of the material's pre-cutting volume) into polycrystalline silicon that can be used to manufacture new cells. The company is already working on a project for a customer in Norway. And, thanks to the award for Redesign, Rosi will build a demonstrator unit capable of recovering the silver and silicon contained in end-of-life solar panels.

\*A partner lab of Grenoble Institute of Technology's Phelma School of Engineering

✉ [daniel.bajonet@rosi-solar.com](mailto:daniel.bajonet@rosi-solar.com)

## Student club *Ingénieurs Citoyens* gains popularity

Student club *Ingénieurs Citoyens* was founded last year with just a dozen or so members. This year, the club's environmentally-responsible message really resonated with engineering students at all of Grenoble Institute of Technology's schools at the traditional back-to-school forums—and membership is expected to grow to more than 50 this year. More than 20 Phelma students have already expressed an interest in joining the "green engineering" group.

The expected growth in membership will position the club to roll out awareness-raising campaigns and more hands-on projects this year. A talk on climate negotiations was held on October 1, and the club plans to continue with at least one talk a month on topics like conservation, mobility, and the circular economy. This group is definitely one to watch!

✉ [anais.pasteur@grenoble-inp.org](mailto:anais.pasteur@grenoble-inp.org)

## Assystem joins Grenoble Institute of Technology-Phelma Partners Circle

International engineering firm Assystem has been very involved in activities at Phelma since the school's inception. Assystem and Phelma recently signed a partnership agreement that will deepen their cooperation.

Assystem will provide financial support and will also contribute actively to academics and career placement by offering Phelma students and graduates internships, jobs, and positions under the French government's international volunteer program. Since 2010 a total of 35 Phelma graduates have been hired by the company, which also hosts around five Phelma student interns per year, mainly from the undergraduate and graduate programs in Energy and Nuclear Engineering.

As a member of the Partners Circle, Assystem will participate in Partners Day and other Phelma events. One of the anticipated highlights is a tour of the ITER reactor in Cadarache. Assystem is prime contractor on the project and has assigned 170 employees to the site in the south of France.

✉ [aurelie.dinola@grenoble-inp.fr](mailto:aurelie.dinola@grenoble-inp.fr)

## Leti establishes leadership in Li-Fi communications technology

Li-Fi, a short-range wireless communications technology that uses visible light to transmit data, is still in its early days. However, the major stakeholders in this new technology—which include Leti—are already leading the way. In June an international consortium created the nonprofit Light Communication Alliance (LCA) to promote Li-Fi to businesses and the general public. The group will also work on standards, an area that the IEEE has already begun to address.

Leti has filed three patents on Li-Fi technologies to date and has transferred a license to a major lighting-industry stakeholder. Leti's Li-Fi research is also gaining traction, with exploratory research projects involving several of the institute's departments that aim to boost speeds to several Gbits/s.

✉ [dimitri.ktenas@cea.fr](mailto:dimitri.ktenas@cea.fr)

### LIVE FROM MINATEC

## Substrates: Soitec-Leti innovation center off to a good start

The Soitec-Leti Substrate Innovation Center opened a year ago. Today it continues to grow, with a team of around a dozen Soitec R&D engineers and substantial support from Leti staff. The Center's 200 mm and 300 mm equipment, which includes a pilot line entirely dedicated to R&D, has recently expanded to include a Kokusai furnace. In terms of results, the Center has already obtained 300 mm SOI that meets Soitec's quality standards for prototyping.

The Center's mission is to very rapidly develop innovative substrates for new applications (3D integration, RF filters, microLEDs, and more) and is available to equipment manufacturers, foundries, and microelectronics manufacturers. One of the Center's unique features is that it regularly manufactures batches to speed up the maturation of new processes.

✉ [yann.lamy@cea.fr](mailto:yann.lamy@cea.fr)

✉ [catherine.maddalon@soitec.com](mailto:catherine.maddalon@soitec.com)

## Grenoble deep tech ecosystem wins big in i-Lab national innovation competition

This summer, eight Grenoble-based projects were awarded prizes in the 21<sup>st</sup> national innovative startup competition, i-Lab. Of the eight, three of the winners were projects from CEA Grenoble labs that had previously received CEA Tech support under the Challenge First Step competition. The three CEA winners of i-Lab are: PowerUp (a battery management and optimization solution developed with Liten), Worms (thin-layer piezoelectric touch sensors developed with Leti), and Wise-Integration (GaN/Si integrated circuits for USB-C power components developed with Leti).

Several other winning projects incubated at Grenoble-Alps tech-transfer company Linksum also have ties to MINATEC stakeholders, like Hymag'In (founded by two Grenoble Institute of Technology-Phelma graduates) and Rosi (see article in this issue).

✉ [sylvain.colomb@cea.fr](mailto:sylvain.colomb@cea.fr)

## Leti's 300 mm cleanroom to get 13 new machines in 2019

Leti continues to install and commission new equipment for its 300 mm cleanroom at a steady clip. In 2018 the facility received an immersion lithography system that alone represents 40% of the total budget for the 300 mm equipment purchase plan. In 2019 another thirteen pieces of equipment will be installed—some are already in service. The new equipment includes deposition machines for imagers and memory, as well as thermal treatment, bonding, and mechanical-chemical planing machines.

The equipment purchase plan has enabled Leti to double the volume of its 300 mm R&D in just two years. Ultimately, 300 mm will account for half of the institute's activities. Staff members currently assigned to 200 mm R&D are switching over to 300 mm and new employees are being hired. Overall, the program concerns several hundred people.

✉ [laurent.clavelier@cea.fr](mailto:laurent.clavelier@cea.fr)

## What's new at the Parvis des Sciences science fair this year?

The twelfth annual *Parvis des Sciences* science fair will be held at MINATEC on October 10, 11, and 12, 2019. And the 3,000 visitors expected to attend are in for a few surprises this year, with a slate of new activities that includes an up-close look at 3D printing, workshops on the periodic table, and an exhibit booth showcasing the NeuroDrop project that a team from Grenoble is entering into the iGEM competition.

But that's not all! This year's event will also dive deep into gender equality in the sciences with activities on this topical issue over the entire three days. Visitors can explore a portrait gallery of women scientists at Maison MINATEC and, outdoors, an exhibit designed by CERN on "The Code of the Universe."

The general public is welcome on Saturday; Thursday and Friday are reserved for the impressive 63 school groups expected this year.

✉ [lea.pelosi@cea.fr](mailto:lea.pelosi@cea.fr)

## Nano@school goes low-tech

The 2018-2019 school year was a success for the Nano@school educational outreach program, which brought 800 high-school students, including 80 international students (from Turkey, Luxembourg, and Italy), to CIME Nanotech. The low-tech workshop introduced last year was a big hit. Students use parts from everyday electronics like DVD players, for example, to learn the fundamentals of electronics and signal processing and build a functioning circuit.

This year, a workshop on lensless microscopes will be introduced. Leti spinoff and project partner Iprasense will provide CIME Nanotech with several lensless microscopes. A more in-depth version of the workshop developed by Nano@school will be offered to engineering students at Phelma.

✉ [ahmad.bsiesy@cea.fr](mailto:ahmad.bsiesy@cea.fr)

### AGENDA

**October 8 [Maison MINATEC]**  
RESEARCH LECTURE: THE GENOMICS OF ALZHEIMER'S DISEASE  
✉ [lisa.carvello@clinattec.fr](mailto:lisa.carvello@clinattec.fr)

**October 10 and 11 [MINATEC]**  
PARVIS DES SCIENCES 2019 SCIENCE FAIR  
✉ [lea.pelosi@cea.fr](mailto:lea.pelosi@cea.fr)

**October 13 to 16 [Lund (Sweden)]**  
HIGH LEVEL FORUM, ORGANIZED BY GIANT  
<http://hlf-giant-grenoble.org/>

**October 16 [Grenoble Institute of Technology Auditorium]**  
GÉRARD MOUROU, WINNER OF THE 2018 NOBEL PRIZE IN PHYSICS, MEETS WITH STUDENTS  
[alexis.sableaux@phelma.grenoble-inp.fr](mailto:alexis.sableaux@phelma.grenoble-inp.fr)

**October 20 [Europole]**  
EKIDEN 2019 RELAY MARATHON  
<https://www.grenoble-ekiden.fr/ekiden/>

**October 28 to November 1 [Marrakech (Morocco)]**  
CARAC 2019 SCHOOL ON PHYSICAL AND CHEMICAL CHARACTERIZATION  
Organizer: la Puya Internationale  
✉ [amal.chabli@cea.fr](mailto:amal.chabli@cea.fr)

**November 4 to 9 [Ho Chi Minh City (Vietnam)]**  
MINATEC IWNA SCHOOL organized by the Institute for Nanotechnology  
✉ [valerie1.nguyen@cea.fr](mailto:valerie1.nguyen@cea.fr)

**November 9 [Grenoble Institute of Technology Auditorium]**  
SYMPOSIUM: "SCIENCE: EVERY GIRL'S AND BOY'S DREAM"  
<https://figas.sciencesconf.org/>

**November 14 [CEA Grenoble Nanosafety Platform]**  
NANOSAFETY WORKSHOPS  
<https://ateliers2019.insight-outside.fr/>

### CONTACTS



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: Camille Giroud, Leti, [camille.giroud@cea.fr](mailto:camille.giroud@cea.fr)

Nathalie Mathieu, Phelma, FMNT, [nathalie.mathieu@phelma.grenoble-inp.fr](mailto:nathalie.mathieu@phelma.grenoble-inp.fr)

Patrick Warin, INAC [patrick.warin@cea.fr](mailto:patrick.warin@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: Benoît Playoust and Bénédicte Magne | Graphic design: studio kolza [Lyon] | English translation: SFM Traduction