

Top news

Leti experiments with 5G networks at MINATEC

Leti convinced France's telecommunications regulator ARCEP to issue a license for the institute to run a six-month trial (H1 2017) at 3.5 GHz with a bandwidth of 40 MHz.

The frequency could be the first to be released for 5G network rollout, and Leti wants to use it for multiservice transmission tests on the MINATEC campus. A base station was installed at a high point on the campus and three mobile terminals will be used to emulate smartphones.

The researchers working on the project will start by tackling how to enhance the signal waveform and decode it at the receiver. In particular, they will test a post-OFDM multicarrier waveform to make sure that it is compatible with the three types of service 5G networks will primarily provide: very-high-speed internet, optimized transmission for IoT, and high-reliability low-latency communications.

The researchers will also experiment with innovative multiple-access control systems to demonstrate that information can be transmitted and received by multiple users simultaneously. Finally, they will test some of the more advanced features of tomorrow's 5G networks, like in-band full-duplex, which can double capacity by allowing data to be transmitted and received at the same time on the same frequency band.

Contact: dimitri.ktenas@cea.fr

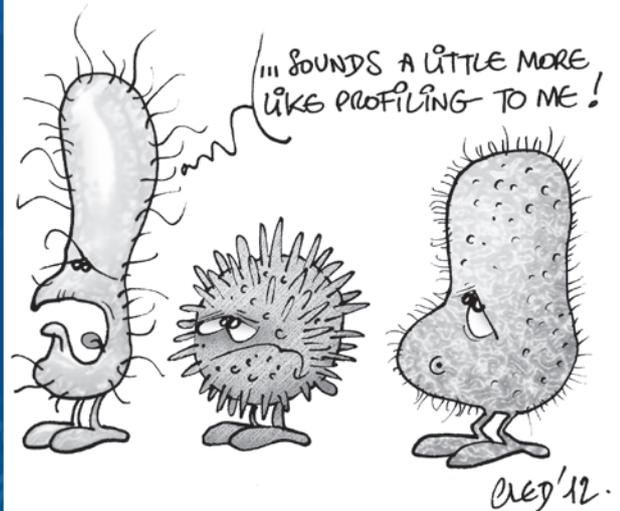
Innovation

New bacterial identification tool

Researchers at INAC, Leti, and LTM recently developed a novel single-cell bacterial identification method that uses a SOI nanophotonic optical structure that concentrates light to produce a very intense electromagnetic field that can attract and trap a single bacterial cell. Fluctuations in the intensity of the light transmitted by the optical structure due to interactions between the bacteria and "trap" are analyzed to identify the bacteria.

The system, which is still in development, has already been used successfully to identify three types of bacteria in just a few seconds. If it is as successful with other bacteria, it could pave the way to new biological analysis solutions.

Contact: manon.tardif@cea.fr



Nanometric electrical wires will soon be here

Molecular-size electrical wires will soon be a reality. Researchers from the Institut Charles-Sadron (CNRS, Strasbourg) successfully coated polymer semiconductor P3BT, or poly(3-butylthiophene), fibers with insulating nanotubes by two-dimensional self-assembly of liquid esters using a heterogeneous germination process.

Researchers at INAC used atomic-force microscopy and transition-voltage spectroscopy to characterize the electrical wire obtained. They demonstrated that the insulating sheath completely coats the conductive fiber over a length of at least five microns.

The insulated electrical wires, with a gauge of just 10 nm, will create new possibilities in organic electronics for use on flexible materials.

Contact: jerome.faure-vincent@cea.fr

Innovation

Mapping magnetic fields: INAC innovates!

When you place little compasses in a magnetic field, they spontaneously align with the magnetic field. Researchers at INAC developed and patented a local magnetic-field mapping system that leverages this concept. Stated simply, the researchers invented a matrix of flexible micrometric beams made from a nickel-iron alloy etched directly onto a silicon or glass substrate. The beams, or cantilevers, curve when an outside magnetic field is applied. The beams' deformation can be observed and measured under a microscope to generate an accurate image.

The technique is easy to use, accurate, and sensitive. The system could be a good alternative to other mapping techniques currently used for industrial and research applications.

Contact: bernard.dieny@cea.fr

Deeper insights into electrolytes' ionic conductivity

How do solvent molecules and anions organize themselves around the lithium in the electrolyte of a lithium-ion battery? Researchers from INAC and Liten used DFT, a computational quantum mechanical modelling method, and molecular dynamics to find answers. Their results were confirmed by vibrational spectroscopy images from the United States.

The research provided crucial insights into the influence of anions on the overall structure of the cation-solvent-anion structure and a rational explanation for the loss of ionic conductivity of electrolyte solutions at high concentrations. This new information could be used to enhance electrolyte formulations for better conductivity.

Contact: stefano.mossa@cea.fr

Atomic moirés' crystallographic structure under the microscope

When it comes to atomic moirés, appearances can be deceiving. The wavy patterns are caused by the vertical movement of atoms and interference from electronic waves in the crystals. Researchers from Institut Néel, the CEA, and Grenoble-Alpes University joined forces to show that the moirés, when viewed using a scanning tunneling microscope, did not show their actual periodicity. The researchers applied a mathematical method (Fourier transform) to the images obtained and discovered much greater and more complex periodicity, one that is closer to reality. The researchers used the tool to inventory the possible moirés on graphene deposited on different substrates. The advance will help better determine the crystallographic structure—and, therefore, the electronic properties—of stacked two-dimensional materials.

Contact: claude.chapelier@cea.fr

A micro-display with incredible resolution

Leti unveiled a new micro-LED display at Photonics West in January 2017. The 873 x 500 pixel display has a pixel pitch of 10 microns and is the fruit of four years of research and development.

The technological breakthrough is based on a patented self-aligned fabrication technique that requires one lithography step to create all of the electrical contacts and the micro-LED geometry and several damascene metallization steps. By eliminating certain alignment constraints, the pixel pitch is reduced, placing a pixel pitch of 7 microns within reach.

High-resolution micro-displays can be used in mobile augmented and virtual reality systems, for example.

Contact: ludovic.dupre@cea.fr

Obstacle-detection for all with INSPEX

The EU-funded INSPEX project was set up to develop portable guidance systems for low-visibility conditions. Coordinated by Leti, the project, which kicked off in 2017, is expected to result in systems for humans as well as for light drones and robots.

The bulk of the research will focus on miniaturizing and reducing the power consumption of existing remote LiDAR (light detection and ranging) sensors, ultra-wide-band radar, and ultrasonic detection systems. When combined with environment sensors, an inertial measurement unit, and the SigmaFusion data fusion algorithm, the sensors could, for example, be integrated into white canes to give the blind and visually-impaired a 3D audio representation of their environment.

Contact: suzanne.lesecq@cea.fr

Day by day

Nanobiose strengthens ties with MINATEC

Nanobiose is headquartered in Le Bourget du Lac. But since the startup signed an R&D contract with Grenoble Institute of Technology, its staff can often be found at MINATEC using the resources at CIME Nanotech and LMGP.

Founded in July 2016, Nanobiose offers products and services to assess the potential toxicity of nanoparticles, nanodrugs, and biotherapeutics to the human immune system. The company's non-destructive three-dimensional human cell culture method delivers very accurate results that closely replicate human physiology.

Nanobiose has already applied for one patent and plans to release the first generation of its labs-on-chip on the research market in 2018.

Contact: sarahmilgram@nanobiose.com

Phelma strong in French Physics Society tournament

A team of undergraduate and graduate students from Grenoble Institute of Technology's Phelma engineering school attempted to solve a unique problem at the French Physicists' Tournament in February. Can the height of a kernel of popcorn's "jump" be determined from the sound of the "pop?" The tournament, run by the French Physics Society, pits nine teams of students against one another in a "Physics Fight" debate in English. The teams take turns presenting their results, challenging their competitors' results, and moderating the debate.

A team of eight Phelma students and two of their professors had worked on the project two half-days a week since September, preparing their arguments (from theoretical knowledge to lab experiments and numerical simulation) and brushing up on their public speaking skills in English.

Contact: aurelien.kuhn@phelma.grenoble-inp.fr

Day by day

ISKN: Results worth writing about!

ISKN, a startup founded in 2014 to develop and commercialize a Leti technology, has seen its revenue grow by 400% per year—a success by any measure.

To date, ISKN has sold more than 30,000 units of its Slate digital sketchpad. The Slate2, released in September 2016, has done equally well: the item has been out of stock at retailers since early December. The Slate3, expected in 2018, will come in a new format (A4) and will offer new 3D and interactive features.

Given the company's impressive growth, new hires will double its headcount this year. And, to house the 40-odd employees, the company will move to a new location in Grenoble. The move will also provide an opportunity to create a unique work environment for employees, whose average age is just 27.

Contact: jean-luc.vallejo@iskn.com

Startups: Two Phelma grads earn kudos

Two graduates of Grenoble Institute of Technology's Phelma engineering school have earned recognition for their business plans from the business incubator Pépite Ozer (a Grenoble-Alpes University Community initiative) where they are hosted.

Paola Ceccato, who graduated from the SICOM program in 2015, won two awards: best project by a female entrepreneur and jury's favorite. Her planned business, Symbiose, will offer natural, biostimulant-based solutions to revitalize and protect soil and crops.

Cédric Jouy, who graduated from the International Nanotech program in 2013, won the award for best project by a young entrepreneur. His project, MotorSat, involves manufacturing motors for the space industry. The motors, for small satellites, do not require fuel or particle tanks and their batteries are charged by the satellites' solar panels.

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

Leti unveils new website

Leti's new website went online in early March for the institute's 50th anniversary, which was in 2017. The new site promotes Leti's pioneering spirit and showcases the institute's research activities through a variety of multimedia content, from scientific reports to demonstrator presentations.

The site is well-organized by topic and has its own search engine. The website's graphic design also got a complete overhaul. Visitors, whether they are professionals from industry, scientific researchers, graduate students looking for PhD opportunities, or journalists, can quickly and easily find the information they are looking for.

The English version of the website, www.leti-cea.com, will help raise the institute's international profile.

<http://www.leti-cea.fr> and <http://www.leti-cea.com>

Contact: dominique.maizou-avezou@cea.fr

Horizons

Phelma Junior Consultants moving up

Phelma Junior Consultants was audited in December 2016 by France's National Federation of Student Enterprises (CNJE) and has subsequently moved up from "Junior-Création" status to "Pépinière Junior-Entreprise" (incubator) status. That leaves just one more step to the top, "Junior-Entreprise," a move Phelma Junior Consultants expects to make in December 2017 or May 2018.

The successful audit confirms Phelma Junior Consultants' popularity with the companies it is targeting with its services. Since it was founded, Phelma Junior Consultants has completed more than 30 projects that align with Phelma's areas of expertise, has organized tours of businesses, labs, and large scientific instruments for Phelma students, and has run guest lectures by professionals from industry.

Contact: jeanne.direr@juniorphelma.fr

Horizons

Atos joins Phelma Partners Circle

Grenoble Institute of Technology's Phelma engineering school recently signed an initial one-year partnership agreement with Atos, a leading international digital services provider. Phelma had been anxiously awaiting the agreement, as the school already counted Amesys Bull among its partners before it was acquired by Atos in 2014 and integrated into Atos Worldgrid, a smart energy management solutions specialist.

Atos Worldgrid is a key stakeholder in the local digital ecosystem, and specializes in several markets that align closely with Phelma programs. The partnership will facilitate student internships, guest lectures, mock job interviews for third-year students, and participation in Partners Day. Atos will allocate its apprenticeship tax to Phelma.

Contact: aurelie.dinola@phelma.grenoble-inp.fr

Five weeks of nanotechnology!

Grenoble Institute of Technology's 15th Summer School in Nanotechnologies will take place at MINATEC from June 12 to July 13. A cohort of around 20 undergraduate and graduate students from top-tier universities around the globe will attend.

All classes will be taught in English by Phelma and Grenoble-Alpes University faculty, and guest lectures will be given by faculty from foreign universities. Students will also take French classes and participate in sports and cultural activities. Summer schools have become very popular, but this one stands out for the quality of its lab classes, which are held in cleanrooms at CIME Nanotech. The 20 hours of lab classes will focus on photovoltaic cell characterization and fabrication.

Contact: summerschool@grenoble-inp.fr

Even more CEA technologies in the spotlight at this year's Forum 5i!

The 20th Forum 5i will be held on Thursday, June 1 at the World Trade Center in Grenoble. Of the twelve emerging innovations selected for this year's technology showcase, two are based on technologies developed at the CEA.

Startup Morphosense, a Leti spinoff, will present its high-precision structural monitoring system, which is used to monitor the structural health of bridges, tunnels, dams and other infrastructures by measuring deformation and vibrations in real time.

Motion Recall will show off its Action Cam, which leverages a technology developed by Leti and List. The GoPro-style camera combines virtual reality, 360° video, and interactive features. It will target consumers as well as B to B markets like theme parks, escape rooms, and other gaming and entertainment activities.

Contact: alain.briand@cea.fr

Interview

Stéphane Renard,
Founder and CTO, Tronics Microsystems

A majority stake in Tronics is a golden opportunity for Epcos

Tronics Microsystems was founded in 1997. Can you tell us how it all came about?

During the 1990s, Leti had developed innovative sensor technologies for several manufacturers looking to create products like accelerometers and pressure sensors using these technologies and penetrate new high-growth markets. At the time, I also wanted to seize the opportunity. So I founded Tronics as a Leti spinoff.

What has helped to make Tronics so successful?

The primary factor is without a doubt technology. Tronics has leveraged Leti research and patents to manufacture its MEMS. However, Tronics also managed to build a team of engineers combining manufacturing know-how and cutting-edge technological expertise. The company has had its ups and downs over the past two decades, but we have always been able to adapt to change and keep growing.

What is your take on Epcos' (a TDK Group Company) recent acquisition of Tronics?

It marks a major step forward. Our startup grew into a listed mid-cap company, and now we are part of a major international corporation.

By acquiring a majority stake in Tronics, Epcos will gain access to the growing inertial sensor—and, more broadly, MEMS—markets. The acquisition is also evidence of the company's desire to open a location in the Grenoble area. The people at Epcos are well aware of the value here in terms of know-how and innovation. The acquisition is a really positive sign for the future, both for Leti and Tronics!

Contact: stephane.renard@tronicsgroup.com

Live from MINATEC

A Chair of Excellence for MAX phases

Michel Barsoum of Drexel University's (Philadelphia) Materials Science and Engineering Department has just been appointed to the Grenoble-Alpes University-Fondation Nanosciences Chair of Excellence to pursue his research on MAX phases. Barsoum will create two-dimensional systems from a new family of composites, MXenes. MXenes, which offer some extraordinary properties, are obtained by etching a MAX phase (a nanolayered material). Because they are conductive, strong, and transparent, they could be used to make two-dimensional electronics for applications in the energy storage and biomedical markets.

Grenoble's INAC, Institut Néel, and LMGP bring together a unique combination of resources and know-how. LMGP is the only laboratory in the world that can synthesize monocrystalline MAX phase, for example.

Contact: thierry.ouisse@grenoble-inp.fr

EEA Club: A Grenoble congress with a European flavor

The 57th annual congress of the EEA Club will be held on June 8 and 9 at Phelma's MINATEC campus location. The event will bring together professors and researchers in the fields of electronics, electrotechnics, automatics, and signal and image processing. This year's theme is EU projects in research and education, and a variety of lectures and panel talks will give participants the opportunity to address new teaching methods (project-based learning and flipped classrooms) and educational technology and share best practices and learn how to put together an EU project proposal.

The EEA Club congress will be held in parallel to the European Association for Education in Electrical and Information Engineering (EAEIE) European conference, which will begin a day earlier, so that participants can attend the European conference (in English) on June 7, and then the EEA Club congress (in French).

Contact: laurent.montes@minatec.grenoble-inp.fr

Lancey Energy Storage introduces the smart radiator

This fall, Lancey Energy Storage, a startup housed at Phelma's MINATEC location, installed around a hundred of its smart radiators for field testing. The radiators are equipped with lithium batteries connected to a communicating meter to store energy during off-peak hours for use during peak demand. The technology behind the radiators is protected by three patents.

The data gathered during field testing has been very similar to what was observed in the laboratory, which is very encouraging. The radiators were installed by the local public housing authority and intermunicipal government, with excellent results in the form of lower energy consumption and savings on utility bills. Lancey Energy Storage plans to sell 2,000 of the radiators this year and 10,000 in 2018—a great start for this startup!

Contact: r.meyer@lancey.fr

Avalun begins scaling up its LabPad® for manufacturing

Avalun, which received support from the French government's *investissements d'avenir* program in 2016, is growing! The Leti spinoff, founded in 2013, recently moved into the BHT, where it will have a modular space of 175 sq. m, an 80 sq. m lab, and 70 sq. m of offices. In other words, everything it needs to start scaling up its LabPad® connected pocket-sized biological analysis device.

The company will set up a test production line for its Tsmart® microcuvettes for prothrombin ratio (PR) and international normalized ratio (INR) tests (which indicate blood clotting time) at the BHT in April. Production will be manual to start, and will be automated over the course of the year. By the end of 2017 Avalun, which will manufacture and sell the consumables, plans to reach output of 5,000 units per day.

Avalun, which currently employs 18 people, will hire six new employees (in R&D, sales, and marketing) to support this new phase in its development.

Contact: contact@avalun.com

Live from MINATEC

Activage puts digital technology to work for the elderly

The Activage project, which was selected by the European Commission for support under the H2020 program, will assess the performance of innovative secure assisted living solutions to help the elderly live in their homes longer. The €20 million project involves a consortium of 50 partners who have been working together since January 2017 at nine experimental rollout sites across Europe.

IRT Nanoelec is coordinating testing at the French site, and several Grenoble-based partners (the Isère General Council, STMicroelectronics, and Technosens) are also participating. Future users (the elderly, caregivers, and healthcare and social workers) will contribute to developing the service and devices tested. The field tests will take place in Isère, where 75 homes and 10 nursing home patient rooms will be equipped with connected technologies.

Contact: isabelle.chartier@cea.fr

Power electronics: Exagan speeds up production

Exagan recently started production of its materials in the company's own cleanrooms, marking a major step toward the launch of its first power components. The company is using an Aixtron 200 mm epitaxy machine and the G-Stack™ process, developed by Exagan with Leti's support, to make the GaN-on-silicon material.

The material will then be sent to Germany's X-Fab, Europe's leading specialty component foundry. The components will be assembled in Asia, and then tested by Hirex Engineering in partnership with CEA Tech's regional platform in Toulouse.

The first half of the year will be devoted to sampling. Production will ramp up in the second half of the year. Exagan, which already had ten employees, hired and trained an additional ten people in 2016 to prepare for the increase in activity.

Contact: frederic.dupont@exagan.com

LPSC nuclear instrumentation platform transformed

Thanks to major renovations completed several months ago, the LPSC (the Subatomic Physics and Cosmology Laboratory operated by Grenoble Institute of Technology and Grenoble-Alpes University) nuclear instrumentation platform has been completely transformed.

A 240 sq. m addition has substantially expanded the facility, and the workspace was redesigned around four classrooms, one of which is equipped with a PWR (pressurized water reactor), and an open-plan area with around 20 lab stations, also used for teaching.

The nuclear instrumentation platform is one of France's largest, and is used by 500 Grenoble Institute of Technology and Grenoble-Alpes University students each year.

Contact: christophe.sage@lpsc.in2p3.fr

Find the latest MINATEC news on your favorite social network

MINATEC has both Twitter and Facebook accounts where you will find both the latest MINATEC news and other information of interest to Grenoble's innovation community. The articles in the MINA-NEWS newsletter are also published, one per day after the newsletter comes out over a period of several weeks. In other words, there is always something new!

MINATEC's Twitter feed, with Tweets in both French and English, counts 2,500 followers. The Facebook page, in French only, has held steady at just under 1,000 subscribers. Twitter and LinkedIn remain professionals' networks of choice, so the results are not surprising!

<https://twitter.com/MINATEC>
and <https://www.facebook.com/minatec.org>
Contact: julie.spinelli@cea.fr

CEA one of the world's most innovative publicly-funded research organizations

The Reuters-Clarivate Analytics "Top 25 Global Innovators – Government" ranking was published on March 1. And the CEA is at the top of the list.

The CEA pulled ahead of Germany's Fraunhofer Society and Max Planck Society, ranking first in Europe. In terms of the global ranking, the CEA came in second, just after the US Health & Human Services Laboratories.

The rankings are based on criteria like publications in academic journals, patent citations, and patent volume and success. For 2009–2014 Reuters and Clarivate Analytics tallied up 2,480 patent applications from the CEA, with a success rate of 85.5%.

Contact: isabelle.rivat@cea.fr

Agenda

April 10, Fondation Nanosciences
Deadline to submit projects to 4 PHD PROGRAMS.

<http://fondation-nanosciences.fr/>

April 11, 6:30 p.m., CRDP Grenoble

Hiroshi Amano, winner of the Nobel Prize in Physics, "Blue LEDs and the Electronics of the Future for a Sustainable Society."

Contact: helene.deschamps@univ-grenoble-alpes.fr

April 12, 11:30 a.m.–2 p.m., Maison MINATEC

Engineering Sciences Olympics, academic finals.

Contact: giant-grenoble.org

April 13, 2D@Grenoble, Phelma Polygone 2D@Grenoble

Exploring 2D materials, including graphene and Transition metal dichalcogenide (TMDC) monolayers.

Contact: claud.chapelier@cea.fr

April 26, Maison MINATEC Minalogic Business Meetings

International business networking.

<https://goo.gl/qDoZXh>

May 10–11, Fontaine FIRST Tech Challenge 2017,

6th French edition of the FIRST Tech Challenge (FTC2017) robotics competition.

Contact: first-tech-challenge@grenoble-inp.fr

May 11, 1 p.m., Grenoble Institute of Technology Phelma Auditorium at MINATEC

Colloquium organized by Phelma students on "Teaching Science: From Higher Education down to Primary School" (ASUR project).

Contact: aurelien.kuhn@phelma.grenoble-inp.fr

May 31, CNRS, Polygone scientifique "Photovoltaics: thin layers and advanced concepts"

This day-long event is open to all (and especially PhDs and post-docs) and is organized by the LANEF laboratory of excellence; registration required.

<https://goo.gl/1Zpvbu>

June 7, 8, and 9, Phelma MINATEC 57th EEA Club congress and EAEEIE European conference.

<http://eea2017-iut1.univ-grenoble-alpes.fr/>

June 28 and 29, Maison MINATEC Leti Innovation Days, "Miniaturization technologies: innovations and roadmaps driven by Leti."

This event, for professionals from industry, coincides with Leti's 50th anniversary.

<http://www.letidays.com/2017/>

July 3–7, Maison MINATEC InMRAM Summer School

Introductory course on Magnetic Random Access Memory run by SPINTEC.

<http://www.inmram.com>

June 12–July 13, MINATEC Summer School in nanotechnologies

Contact: summerschool@grenoble-inp.fr

Contacts

MINA-NEWS >