



leti

# 2023

## HIGHLIGHTS

### #ElectricVehicles

CEA and Renault Group develop a very high efficiency bidirectional on-board charger

[Read Press Release](#)



### #AugmentedReality

CEA-Leti's recent advances on key AR building blocks, e.g. retinal projection and holography

[Read Press Release](#)

### #Antibiotic

Choosing the right antibiotic in only two hours

[Discover](#)

### #SelfAssembly

Self-assembly of nanoscale structures

[Discover](#)



CEA-Leti  
24 250 abonnés  
7 mois

[NEWS] Testing for contaminants like gluten in food products no longer needs to be done at a lab. A device developed by CEA-Leti automates testing and turns results around in just an hour

[Voir la traduction](#)

### #Allergy

A device developed by CEA-Leti automates testing and turns results around in just an hour

[Discover](#)



CEA-Leti  
14 225 abonnés  
6 mois

[RESEARCH] The CEA-Leti transfer of technology to LYNRED provides a set of technological building blocks for coolers #Infrared detectors with record-breaking performance.

[Voir la traduction](#)

### #InfraredVision

CEA-Leti & Lynred achieve exceptionally sharp images using cooled Infrared detector

[Discover](#)



CEA-Leti  
14 225 abonnés  
6 mois

[RESEARCH] CEA-Leti and Intel Corporation are developing atomically thin, two-dimensional transition-metal dichalcogenides (2D TMDs) on 300mm wafers using layer-transfer technology with the goal to extend Moore's Law beyond 201...

[Voir la traduction](#)

### #Cybersecurity

Enhanced security for processors cache memories

[Discover](#)



CEA-Leti  
24 250 abonnés  
2 mois

[PRESS RELEASE] CEA-Leti and Intel Corporation are developing atomically thin, two-dimensional transition-metal dichalcogenides (2D TMDs) on 300mm wafers using layer-transfer technology with the goal to extend Moore's Law beyond 201...

[Voir la traduction](#)

### #Moore'sLaw

CEA-Leti & Intel to develop atomically thin 2D TMDs on 300 mm wafers for future transistor scaling

[Read Press Release](#)



CEA-Leti  
14 225 abonnés  
6 mois

[AWARD] Space is not a very hospitable environment... especially for image sensors on orbiting satellites. Space missions are exposed to radiations from solar winds and cosmic rays. Ségolène Dinand devoted her PhD to better understanding th...

[Voir la traduction](#)

### #ImagingForSpace

Congratulations to Ségolène Dinand for her William E. Spicer - Thomas N. Gasselman Best Student Paper Award during II-VI workshop

[Discover](#)



CEA-Leti  
24 250 abonnés  
3 sem.

[NEWS] Human and animal health and the environment are inextricably linked. Leti is developing enabling technologies to support an integrated approach that spans #diagnostics, therapeutics, #prevention, and monitoring

[Voir la traduction](#)

### #Health

Enabling technologies for health at all scales



CEA-Leti  
24 250 abonnés  
1 mois

[NEWS] By launching the NextGen project, the CEA-Leti aims to develop new generations of FD-SOI chips with better energy efficiency. It will ensure the capacity to engineer the most advanced components and maintain French and Eurc ...

[Voir la traduction](#)

### #NextGen

the future of silicon chips



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**PARTNERSHIP**

## The CEA and Renault Group are developing a very high efficiency bidirectional on-board charger

What if vehicles became a pillar of the electricity grid? This is the principle behind V2G, or vehicle-to-grid, a bidirectional exchange technology that will soon enable Renault vehicles to release some of the electricity stored in their batteries, to optimize grid operation and compensate for the intermittent nature of renewable energy.

**HEALTH**

## The CEA and its startups once again presented at CES 2023!

CEA-Leti showcased two startups (Injectpower and Admir) as well as the NIR demonstration for medical applications.



© CEA

**STARTUP**

## Discover the CEA-Leti startups that made the news in 2022

2022 was a prolific year for CEA-Leti. The Institute supported the creation of five startups: two in healthcare, the others in quantum computing, LIDAR, and water quality.

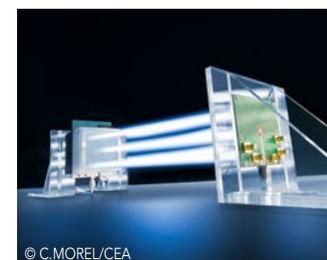


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**TELECOMMUNICATIONS**

## Innovation driving 6G wireless communications

CEA-Leti is already designing solutions to meet the needs of 6G wireless technology. By combining existing manufacturing processes and an innovative architecture, CEA-Leti teams have successfully demonstrated a solution for D-Band (140 GHz) wireless communications.



© C.MOREL/CEA

## > 2023 Leti Healthcare Workshop: Future diagnostic imaging equipment

Eminent scientists, startup CEOs, CTOs from Medical Imaging, industrial leaders, and innovative clinicians unveiled innovations in biomedical imaging technology for diagnostic tests. Click to learn more!



## > Inject Power: 2023 CES Innovations Award Honoree

Congratulations to the Injectpower team! We are pleased to announce that the ultra-miniaturized battery for medical devices is a CES Innovations Award 2023 Honoree, in the Digital Health category.

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### > New X-ray detectors for medical radiography

How can medical radiography become more efficient for everyone? Watch this video to find out!



### > How to better detect and measure gas in our environment?

CEA-Leti teams are developing a miniaturized multi-gas trace detection system that makes no concessions on performance. Watch the video!



#### HEALTH

### Allergies: A device developed by CEA-Leti automates testing and returns results in just one hour

Testing for contaminants such as gluten in food products no longer needs to be done in a lab. CEA-Leti's fully automated, fast, and versatile lab-on-a-chip is able to detect and count proteins, making it ideal for a variety of industrial use cases.



#### OPTICS & PHOTONICS

### Did you know that CEA-Leti has photonics R&D facilities?

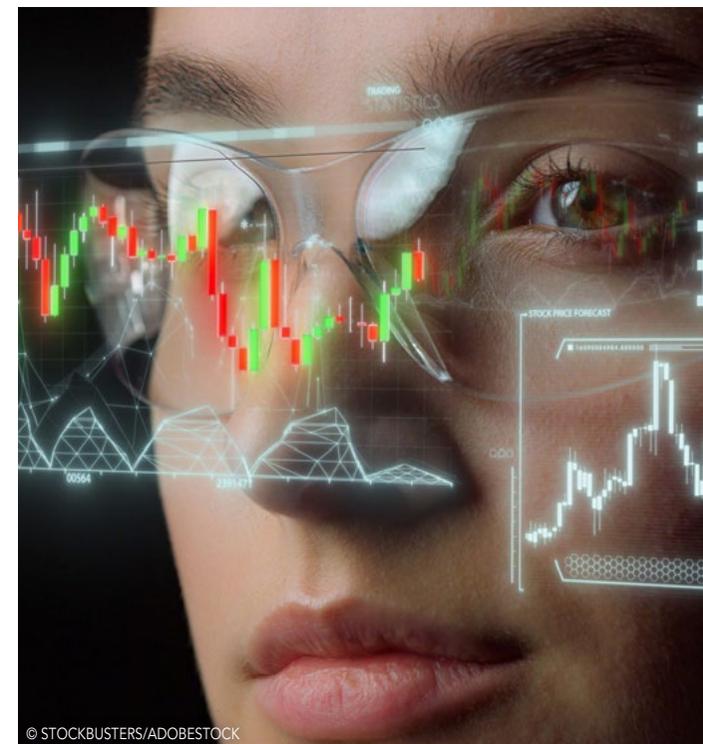
The CEA-Leti Photonics Platform, staffed by 300 scientists and engineers, generates some 700 patents a year. Learn more about how a photonics R&D partnership with CEA-Leti can help you tackle tomorrow's technological challenges.



#### SCIENTIFIC EXCELLENCE

### FDN: Ludwig Rotsen receives the Best Paper award for his work on DNA nanotech

Using a new process for depositing DNA nanostructures onto silicon dioxide, Ludwig is able to control all types of 2D network interactions. His research will enable great strides to be made in the field of quantum computing.



#### AUGMENTED REALITY

### Recent CEA-Leti advances in key AR building blocks such as retinal projection and holography

With the global market for AR glasses forecast to exceed \$74 billion by 2032, CEA-Leti scientists are investigating a variety of technologies to ensure broad use of these devices for medical, educational, and military applications.

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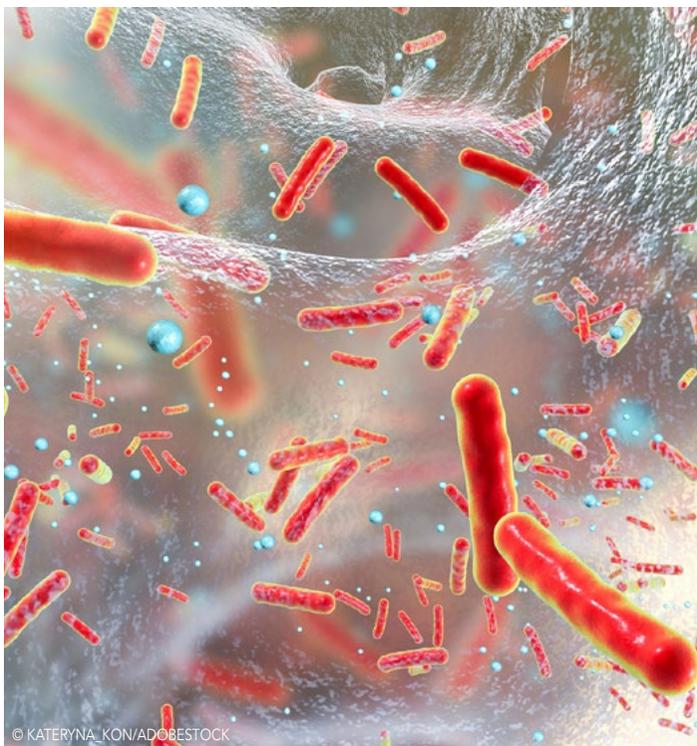
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**HEALTH****Antibiotics: Choose the right one in only two hours**

Currently, labs require at least eight hours to determine the most efficient antibiotic treatment for a particular infection.

SUPPLY, a new CEA-Leti research project, aims to revolutionize this process with the aid of a novel analytical method involving "optical tweezers."

**SPORT****Ski more efficiently thanks to a batteryless connected device**

Set up by a consortium of stakeholders from France's Auvergne-Rhône-Alpes region, the Smart Ski Experience project explores new connected ski technology that will offer snow sports enthusiasts an unprecedented skiing experience.



© DELL/ADOBESTOCK

**EDGE IA****CEA-Leti researchers published in Nature Electronics**

Collaborative efforts between CNRS, HawAI.tech, and CEA-Leti have yielded an energy-efficient computation architecture. Incorporating memristors into a Bayesian machine could provide explainable decisions while functioning on local memory with minimal data transfers.

**SPACE****II-VI Workshop: Ségolène Dinand receives the Best Student Paper Award**

Space is not a very hospitable environment... especially for image sensors on orbiting satellites. Ségolène Dinand devoted her PhD to better understanding how the radiation environment in space affects HgCdTe infrared detectors.



© ALIAKSANDR MARKO/ADOBESTOCK

**> 2023 Leti Photonics Workshop: Breakthrough photonics**

Discover cutting-edge results that will shape the future of photonics-based applications. Download the slides here!

**> A self-driving vehicle that monitors driver capacity**

Driver monitoring systems (DMS) are increasingly important as self-driving cars become more prevalent. Research carried out by CEA-Leti focuses on behavioral and physiological characterization in order to provide a global "fit-to-drive" rating that reflects a driver's current state. Watch the video to learn more!



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### > An innovative phase microscope for 3D imaging of biological samples

CEA-Leti researchers have developed a compact, robust, and easy-to-use 3D microscope.

Watch the video!



### > Women in Science

Introducing "La Cerise dans le Labo," a new CEA podcast series which looks at the careers of 13 female CEA scientists with rich and varied backgrounds. Check out the podcast!



© A. AUBERT/CEA

#### MICROELECTRONICS

### Did you know that CEA-Leti has cleanrooms dedicated to R&D projects with and for our partners?

The CEA-Leti Cleanroom Platform hosts world-class semiconductor manufacturing equipment and processes. As a CEA-Leti R&D partner, you too can access these resources to develop robust and competitive solutions.



© MONSIEUR/FOTOLIA

#### ARTIFICIAL INTELLIGENCE

### A transistor inspired by human synapses

This transistor boasts many similarities with human synapses: its operating principle, ultra-low energy consumption, and a similar level of miniaturization. It opens the door to a future with more powerful circuits able to meet our AI needs.



© CONNECT WORLD/ADOBESTOCK

#### MICROELECTRONICS

### E\PCOS: Anthony Albanese receives the Best Poster Presentation award

His research on amorphous chalcogenide materials for highly nonlinear on-chip components confirms CEA-Leti's cutting-edge expertise in More than Moore solutions.



© DIMAZEL/ADOBESTOCK

#### SPACE

### International Space Station: Battling bacteria

How can we prevent bacteria from settling and proliferating on the interior surfaces of the ISS? Since 2016, CEA-Leti has been collaborating with ENS Lyon to solve this challenge. In particular, the project aims to develop smart, bio-inspired coatings free from toxic metals or nanoparticles.

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**AUGMENTED REALITY****Retinal Projection: An innovative, integrated solution based on holographic pixels**

CEA-Leti researchers are exploring how to create transparent smart glasses that resemble normal ophthalmic lenses capable of transmitting information directly onto the wearer's retina.

**PARTNERSHIP****Discover Terradona and CEA-Leti's waste reduction solution**

Based on a unique combination of low-cost MEMS, Cliiink identifies glass and other items and calculates deposited waste volumes and quantities, all with minimal energy consumption.



© CLIINK

**MICROELECTRONICS****Introducing the Nanocharacterization platform**

If you need a deep understanding of innovative composites and other materials, our Nanocharacterization Platform—with more than 100 scientists and engineers and over 50 advanced machines and instruments—can help.



© P.JAYET/CEA

**CYBERSECURITY****Enhanced security for processor cache memories**

CEA-Leti's ScrambleCache solution is a hardware countermeasure that improves the two most commonly used security mechanisms: randomization and cache partitioning.



© LELOUCH/ADOBESTOCK

**> Innovative materials for new applications**

For several years now, the field of microelectronics has studied phase change materials, most of which are chalcogenides. At CEA-Leti, we have added a fourth element to germanium, antimony, and tellurium. Can you guess which one? Watch the video!



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### > Customized GaN power components

Need a solution that converts solar energy into a 230 V -50 Hz supply suitable for domestic power outlets? This can be achieved using silicon technologies, but gallium nitride is more efficient. Watch the video!



### > Is your job all about finding the Next Big Thing?

Then we hope you were able to join us in California for the Semiconductor Deep Tech Day at Plug and Play Tech Center. Click to learn more!



© A.AUBERT/CEA

#### CYBERSECURITY

### Did you know that CEA-Leti has its own Cybersecurity R&D facilities?

The CEA-Leti Cybersecurity Platform is home to more than 100 specialists dedicated to identifying the latest software and hardware vulnerabilities and developing robust countermeasures.



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#### SCIENTIFIC EXCELLENCE

### The CEA in the top 5 for semiconductor patents

For the 11th year in a row, the CEA features among Clarivate's Top 100 Global Innovators. This international ranking once again highlights the relevance and success of the CEA's intellectual property strategy.



© LEXARTS/FOTOLIA

#### SPACE

### ISAP: Marwan Jadid receives Best Student Paper

Marwan Jadid delivered encouraging results in a crystal-clear presentation, showing how advances in the field are expanding possibilities for applications and services once thought impossible.



© LYNRD

#### OPTICS & PHOTONICS

### CEA-Leti and Lynred achieve exceptionally sharp images using cooled infrared detectors

These new detectors can operate at 130 kelvin or more, using a novel 7.5  $\mu\text{m}$  pixel architecture to output exceptionally sharp, high-resolution images.

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**REPORT****Download CEA-Leti's 2022 Scientific report to learn about the latest R&D!**

Whether you are a technology enthusiast, business leader or researcher, the 2022 CEA-Leti Scientific report is an essential resource for staying up to date with our latest developments in the field.

**MICROELECTRONICS****PowerMEMS: Gaël Pillonnet receives the Best Poster award**

Gaël Pillonnet, an experienced energy conversion expert at CEA-Leti, has devised an ingenious solution that significantly reduces the energy consumption of traditional transistors when they operate at a slower computation speed.

**HEALTH****Empowering tomorrow's healthcare leaders**

CEA-Leti's Micro and Nanotechnology for Health platform offers cutting-edge R&D services focused on developments in the medical field.

**AUTOMOTIVE****CEA-Leti to report new integration & packaging gains for next-generation LiDAR**

CEA-Leti will present its progress in integrating advanced technologies and components for HPC/edge-AI chiplets, optical computing, displays and imagers at ECTC 2023.

**> How to maintain purified air between two cleanrooms located 250 m apart?**

Tom Scott visited us to learn about a complex and unique piece of equipment: our clean-room shuttle. Watch his video!



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### > Eclypia, the startup working on a low-cost, non-invasive blood glucose sensor

Drawing on CEA-Leti expertise in integrated photonics and microelectronics processes, CEA-Leti is mobilizing its teams to support the development of a low-cost, non-invasive blood glucose sensor, in close collaboration with Eclypia's teams.



© CEA

#### HEALTH

### Smart micro-needles: Measure biological parameters and deliver therapies

Less invasive than traditional needles, micro-needles reach the deep layers of the epidermis, where they can deliver drugs, measure physiological characteristics or emit light at specific wavelengths.



© CEA

#### FOSTERING

### Science Olympics

Microelectronics in everyday life: CEA-Leti research engineers have invested in high school students with the aim of lifting the lid on engineering sciences and stimulating vocations among young people.



© DANIEL CHETRONI/ADOBESTOCK

#### HEALTH

### A quicker, cheaper method for detecting bloodstream infections

CEA-Leti is developing an innovative blood analysis technology that does not require a mass spectrometer, reagents, or a qualified technician.



© GILLES-WEBER/CHUV

#### HEALTH

### Brain Computer Interface: Enabling thought-controlled walking after spinal cord injuries

As reported in *Nature*, neuroscientists and neurosurgeons from EPFL/CHUV/UNIL and CEA/CHUGA/UGA/FDD Clinatéc have successfully used a wireless digital bridge to re-establish communication between the brain and spinal cord, allowing a paraplegic person to walk again naturally.

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**PARTNERSHIP****Extending Moore's Law: CEA-Leti & Intel to prepare future transistor scaling**

CEA-Leti and Intel have announced a joint research project to develop layer transfer technology for two-dimensional transition-metal dichalcogenides (2D TMDs) on 300 mm wafers with the goal of extending Moore's Law beyond 2030.

**HEALTH****ICASSP'23: Congratulations to Salam Hamieh for her "Honorable Mention"**

While it is true that AI is changing the way we work, Salam Hamieh believes that the real issue is not machines replacing humans, but humans and machines working together to achieve better results.

**MICROELECTRONICS****Edge AI, in-memory computing, and neuromorphic computing for tomorrow's IoT devices**

Advances in microelectronics at CEA-Leti are enabling new computing paradigms for secure, low-latency, low-power IoT solutions.

**PARTNERSHIP****Vitesco and CEA-Leti combine their battery management expertise**

Together they have developed a "switched battery" (SWIBA) management technology that further improves the overall powertrain performance of electric vehicles by extending their range and reducing fast charge times, while optimizing charging costs and increasing battery life.

**> Wafer-to-wafer process**

Discover CEA-Leti expertise in hybrid bonding: the different stages of wafer-to-wafer process in CEA-Leti clean room, starting with chemical mechanical planarization (CMP), through wafer-to-wafer bonding, alignment measurement, characterization of bonding quality, grinding and resulting in 20,000 interconnections/mm<sup>2</sup> and a pitch of 1µm. Watch the video!



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### > PhD Generation: Stay tuned for season 4!

Season 3 offered up 11 topical episodes available online, with brilliant minds delving into the intricacies of tackling contemporary challenges and sharing captivating anecdotes of their experience at CEA-Leti. So, why not catch up on or re-watch every episode of PhD Generation S3 as you wait for the next season? Watch the video!



© A.AUBERTY/CEA

#### MICROELECTRONICS

### A CEA-Leti proof-of-concept shows that electrons move faster in Germanium-Tin than in Silicon or Germanium

CEA-Leti scientists demonstrated that electrons and other charge carriers can move through germanium-tin alloy faster than through silicon or germanium, enabling lower operation voltages and smaller footprints in vertical devices than in their planar counterparts.



© P.JAYET/CEA

#### TELECOMMUNICATIONS

### What can CEA-Leti Telecommunications R&D services do for your business?

Discover what the Telecommunications platform has to offer, where more than 100 researchers, responsible for more than 300 patents, propose state-of-the-art solutions for all types of telecommunications systems.



© ABCDSTOCK/ADOBESTOCK/CEA

#### INDUSTRY 4.0

### An innovative, connected cylindrical bushing for predictive maintenance in construction vehicles

PEI® 4.0 is an innovative sliding bushing solution that includes multilevel wear sensors, an RFID tag, and an antenna. The RFID tag enables users to track wear and facilitates predictive maintenance. This innovation is designed to withstand the harsh conditions of construction sites.



© UTOPIK PHOTOS/CEA

#### EVENT

### 2023 Leti Innovation Days: Transformational technologies for your products and our future

CEA-Leti's annual flagship event for industry leaders delved into the semiconductor industry's pivotal role in driving technological advances that transform society. The event was attended by representatives from all parts of the entire microelectronics value chain. Watch the video.

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**MICROELECTRONICS**

## NextGen: The CEA is inventing future generations of electronic chips to sustain France's competitiveness

In launching the NextGen project, CEA-Leti aims to develop new generations of FD-SOI chips with superior energy efficiency. It will secure our ability to engineer state-of-the-art components and keep French and European microelectronics competitive in tomorrow's markets.

**MICROELECTRONICS**

## Advanced Packaging: Performance, power, size, weight, cost... The choice is yours!

The CEA offers a complete chiplet and 3D integration toolkit enabling a modular "one to many" approach that speeds up the development of new solutions for automotive and high-performance computing applications, data centers, imaging, etc.

**MICROELECTRONICS**

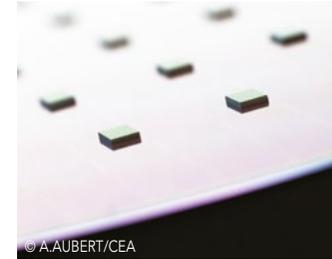
## Innovate tomorrow's devices today with the CEA-Leti 200 mm & 300 mm Microsystems platform

Home to state-of-the-art 200 mm and 300 mm process equipment and expertise, the 200 mm & 300 mm Microsystems platform develops sensors, actuators, RF microsystems (MEMS-RF) and integrated packaging solutions.

**MICROELECTRONICS**

## Electrochemical Society conference: J.-M. Hartman receives the Electronics and Photonics Division award

In launching the NextGen project, CEA-Leti aims to develop new generations of FD-SOI chips with superior energy efficiency. It will secure the ability to engineer state-of-the-art components and keep French and European microelectronics competitive in tomorrow's markets.



© A.AUBERT/CEA



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## > 2023 Leti Semicon Workshop: Paving the way for low-power, high-efficiency computing & sensing

CEA-Leti is driving deep, sustainable innovations for low-power devices and sensing technology that meet the needs of More than Moore applications. Click to learn more!



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### > Quobly raises €19 million

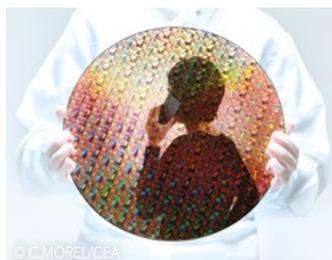
Quobly (formerly Siquance) has successfully raised €19 million—the largest amount ever raised in a seed round for a CEA-Leti startup. This funding will accelerate the development of a fault-tolerant quantum processor to power a universal quantum computer.

### > Microoled raises €21 million

This CEA-Leti startup specializes in the design, production, and marketing of OLED microdisplays for near-eye applications. In just a few years, Microoled has become a key partner to the world's top technology integrators, offering unique technology that combines high resolution, high brightness, and low energy consumption.



© PJAYET/CEA



© C. MOREL/CEA



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#### POWER ELECTRONICS

### Achieve optimal performance with the CEA-Leti Power Electronics platform

The Power Electronics platform develops innovative substrates, components, and architectures for power conversion applications, from the design stage to functional demonstrators. Featuring comprehensive pre-industrial equipment, the platform offers customized support to industrial partners.

#### TELECOMMUNICATIONS

### Radiofrequency & silicon photonics for high-performance, low-power secure data transmission

CEA-Leti's datacom solutions are built on some of the most advanced radiofrequency (RF) and silicon photonics (SiPho) technologies available anywhere, for high-performance, low-power, secure data transfer over the air or using light.

#### MICROELECTRONICS

### ECTC: Congratulations to Aurelia Plihon for her outstanding Interactive Presentation paper

Aurelia and her team achieved encouraging results and reached TMs with an unprecedented height-to-pitch ratio, with a 225  $\mu\text{m}$  height, a 50  $\mu\text{m}$  diameter, and a pitch of only 100  $\mu\text{m}$ .



© VITSTUDIO/ADOBESTOCK

#### HEALTH

### Enabling technologies for health at all stages of life

Human and animal health are inextricably linked to our environment. CEA-Leti is developing enabling technologies in support of an integrated approach that will span diagnostics, therapeutics, disease prevention, and monitoring.

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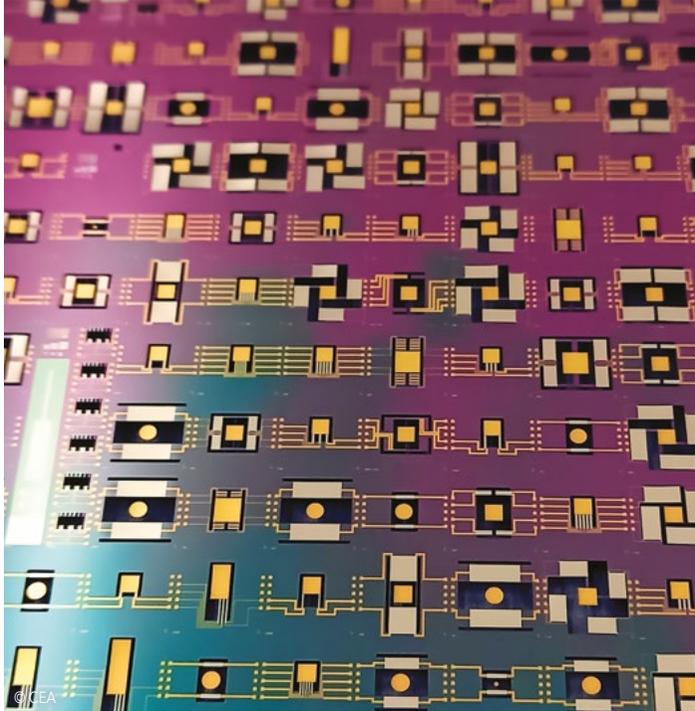
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**MICROELECTRONICS****MEMS & NEMS: Enabling technologies for small, lightweight, cost-effective devices**

MEMS and NEMS micro- and nanoelectromechanical systems are tiny devices such as sensors, actuators, and micromirror arrays. Their moving parts are sensitive to physical quantities such as speed, pressure, or direction. Converting these physical quantities into electrical signals can, in some cases, be used to operate an integrated micro-actuator.

**SIGNAL TRANSMISSION****Using ultrasound to power sensors and transmit data through metal walls**

Wallpass uses sound waves to remotely power and poll temperature, stress, strain, vibration, or any other type of sensor located inside enclosed metal environments such as pressure vessels. The system can transmit signals with a strength of a few watts through walls several centimeters thick.

**SYSTEMS****Cyberphysical systems: Where the digital & physical worlds meet**

The CEA-Leti Cyberphysical Systems platform is developing innovative interfaces between the physical and digital worlds for a wide range of use cases.

**MICROELECTRONICS****ECS: Congratulations to Justine & Marvin on their award for best student presentation**

The ever-evolving field of epitaxy research regularly yields important discoveries with a transformative impact on society. Justine and Marvin devoted their theses to this topic and received awards for their innovations.



© TOMAS/FOTOLIA



© P.JAYET/CEA



© P.JAYET/CEA

**> Dive into CEA-Leti's world-class semiconductor cleanroom**

CEA-Leti's experts support the semiconductor industry in its quest towards ever smaller high-performance devices, using the next generation materials and equipment. More importantly, the institute fast tracks innovation projects. Watch the video!



Dive into CEA-Leti's world-class semiconductor cleanroom

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## > Improving speed, density, and power consumption factors in high performance computing

CEA-Leti has been researching microLED and related display technologies for many years and is now harnessing this expertise to develop a visible light communication system using microLED arrays to emit a modulated light signal that carries information.

Watch the video!



© P.JAYET/CEA

### MICROELECTRONICS

## Learn more about CEA-Leti's Integrated Circuit Design Platform

The Integrated Circuit Design Platform at the CEA Grenoble campus hosts more than 170 engineers and other IC experts. The facility develops advanced ICs with a focus on innovative architectures, groundbreaking technologies and performance. Low-power devices are one of our specialties!

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© ISCATEL/SHUTTERSTOCK

### DISPLAY

## Imagers & displays: Technologies for the entire imaging chain

CEA-Leti's near-sensor computing strategies can help consumer component and systems manufacturers reduce the energy consumption of their smart building and other IoT products.



© ASTROCAST

### SPACE

## A low-cost solution for interconnecting devices all over the world

CEA-Leti's Astronode module is a game-changer for industries that use remote equipment such as containers, fishing beacons or oil rigs. Astronode opens up a new era of monitoring and connectivity.



© CEA

### PARTNERSHIP

## CEA-Leti, ETRI and KAIST GCC have signed a MoU

Under the 3-year agreement, they will work together on global joint R&D projects supported by the Korean and French governments, and drive innovation in semiconductors, photonics, 6G and other areas mutually agreed by the parties.

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SEPTEMBER

2023  
**OCTOBER**

NOVEMBER

DECEMBER

**AUTOMOTIVE**

## CEA-Leti launches R&D program to improve 'cooperation' between self-driving vehicles

CEA-Leti today announced a new R&D initiative to enable a higher level of vehicle automation and cooperation by expanding the latest developments in vehicular wireless communications that improve reaction times, pedestrian detection, and overall vehicle performance.

**POWER ELECTRONICS**

## SPIE: Congratulations to Raphaël Feougier for his Intel Supply Chain Best Student Paper award

How are ommatidia relevant to the energy transition? These nanostructures, visible on the surface of most insect eyes, are anti-reflective and self-cleaning, making them a source of inspiration for improving the energy efficiency of devices such as photovoltaic panels and imagers.

**SENSING**

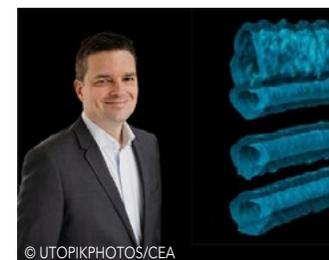
## New processes and materials driving progress

CEA-Leti has recently developed innovations in both processes and materials to overcome some of the issues plaguing PZT, one of today's most commonly used piezoelectric materials.

**SCIENTIFIC EXCELLENCE**

## Congratulations to Thomas Ernst, inducted into the Academia Europaea in 2023!

Thomas Ernst believes one of the challenges for the coming decades will involve "mobilizing future generations to tackle new issues arising from the great technological adventure."



## › 2023 Leti Innovation Days Tokyo: Breakthroughs in microelectronics—moving towards a sustainable future

CEA-Leti has invested in multidisciplinary platforms with unique facilities and expertise underpinned by innovative technologies. This strategy not only helps bridge the gap between business and research, but also addresses growing industry demand for a one-stop shop R&D partner in Europe.

Download the slides!



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### > Micro-nano technologies for health

CEA-Leti provides disruptive technologies, leveraging a continuum extending from proof-of-concept to industrial transfer. Download the booklet for a glimpse into the future of health!



### > Aledia raises €120m for microLED industrialization

Aledia has raised the necessary funding to launch industrialization of its microLED display technology. Aledia is a CEA-Leti spin-off startup. The two organizations have shared a laboratory for more than ten years.



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#### SCIENTIFIC EXCELLENCE

### IWJT: Congratulations to Nada & Philippe for their awards

Electrical junctions play an essential role in the proper functioning of integrated circuits. Their manufacturing process is energy- and material-intensive. It must therefore be optimized to reduce their impact while providing state-of-the-art performance.

#### ECOSYSTEM

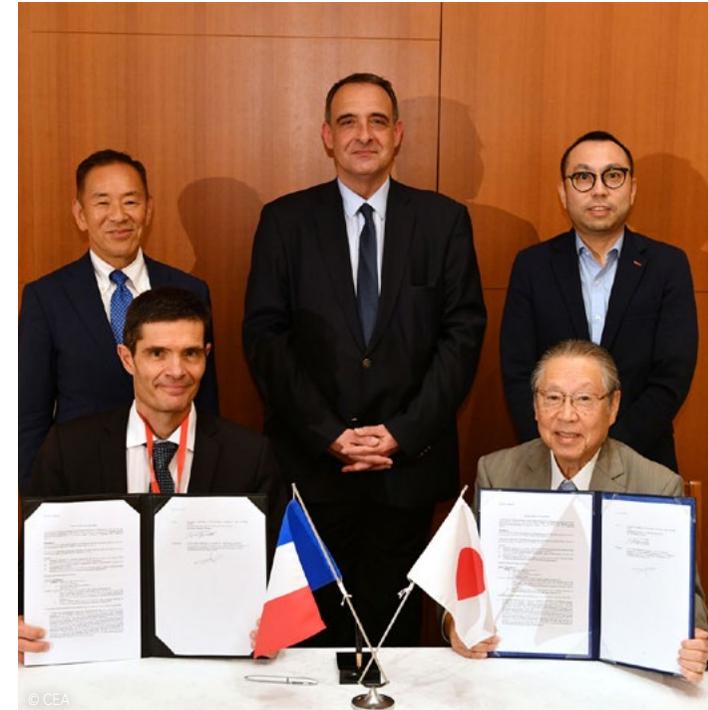
### Soitec inaugurates a new production facility for SmartSiC™ substrates

Soitec was founded as a CEA-Leti spin-off, and more than 30 years of continuous collaboration has enabled the two organizations to vastly accelerate the development of a pilot line, highlighting the value of close collaboration between industry and research.

#### INDUSTRY 4.0

### Lubsens collaboration: A compact lubricant sensor to track industrial machine wear

This innovative solution was made possible by CEA-Leti's development of a miniaturized sensor able to identify, count, and categorize particles in industrial lubricants.



© CEA

#### PARTNERSHIP

### MoU signed with LSTC at the 2023 Leti Innovation Days in Japan

CEA-Leti and LSTC (the research arm of Rapidus Corporation) wish to establish long-term and sustainable collaboration in a number of advanced semiconductor fields, including materials, devices, processes, and technology.

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**ENVIRONMENT**

## A portable, automated system for collecting and identifying bioaerosols using biomolecular amplification

How to detect pathogenic microorganisms in the air? CEA-Leti presents AirCheck, a portable, automated system that uses biomolecular amplification to collect and identify bioaerosols. It consists of a bioaerosol sampling module and a microfluidic analysis system.

**OPTICS & PHOTONICS**

## How to combine technology, architecture, and system vision for photonics—enabled next-generation computing systems?

Learn more about CEA-Leti's unique proposals for optical networks through heterogeneous integration on a photonic interposer.

**HEALTH**

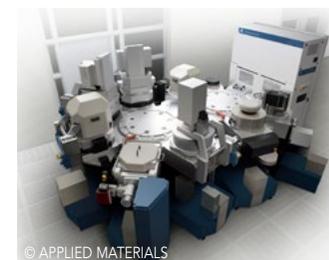
## Microfluidic devices with cellular systems that model human physiology and pathologies

World first—In 2022, the CEA successfully sustained islets of Langerhans for a month. These pancreatic cells help to regulate blood glucose levels by releasing insulin. This first may one day improve the efficacy of islet transplants in diabetic patients.

**PARTNERSHIP**

## Applied Materials and CEA-Leti unveil a joint lab for rapidly growing specialty chip markets

The joint lab, representing CEA-Leti's highest level of collaboration, aims to accelerate device innovations for Applied customers serving the IoT, communications, automotive, power, and sensors (ICAPS) markets.



## › 2023 Leti Devices Workshop: Semiconductor devices—moving towards efficiency and sustainability

This San Francisco event attracted 170 attendees from around the globe to hear key results in the field of More than Moore applications, efficient computing, and radiofrequency devices. Download the slides!

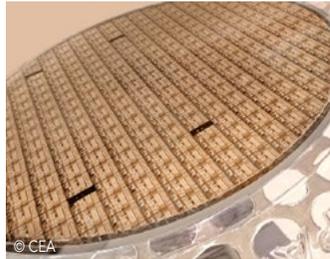


## › What kind of sensing technologies to address societal & environmental challenges?

Ultra-miniaturized, high-performance optical multi-sensors for gas & liquid detection. Watch the video!

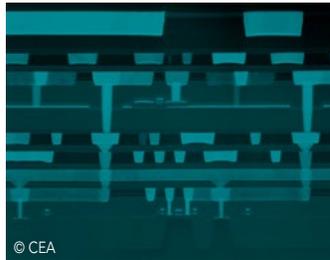


Research results presented in this document were achieved through a large number of projects, many of which were financed by local, national, and European public institutions. We therefore acknowledge and are deeply grateful for the support of the Auvergne-Rhône-Alpes region, the Grenoble-Alpes Metropole, the Department of Isère, the French State (France 2030, National Research Agency, "Plan de relance," Bpifrance), and the European Commission (Horizon Europe, KDT Joint Unit).

**POWER ELECTRONICS**

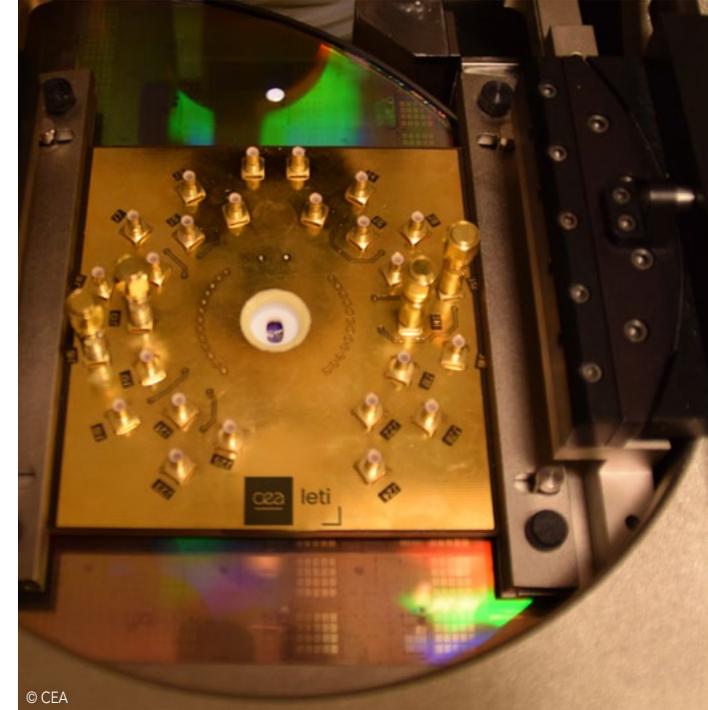
### CEA-Leti develops CMOS-compatible 200 mm process technology approaching state-of-the-art GaN/SiC performance at a lower cost

In one of nine presentations at the 2023 IEDM, the Institute said that current GaN high-electron-mobility-transistor (HEMT) technologies used in telecom or radar applications come on small GaN/SiC substrates and require processing in dedicated cleanrooms.

**MICROELECTRONICS**

### CEA-Leti reports breakthrough 3D sequential integration of CMOS over CMOS with advanced metal lines

This breakthrough stems from the demonstration of a monocrystalline CMOS stacked sequentially above an industrial CMOS platform (28 nm FDSOI) and four metal levels.

**MEMORY**

### First complete memristor-based Bayesian neural network implementation for real-world task

A team of scientists from CEA-Leti, CEA-List, and two CNRS laboratories has published a new paper in Nature Communications, presenting the first complete memristor-based Bayesian neural network implementation for a real-world task, namely classifying types of arrhythmia recordings with precise aleatoric and epistemic uncertainty.

## Stay up to date

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