Funded by
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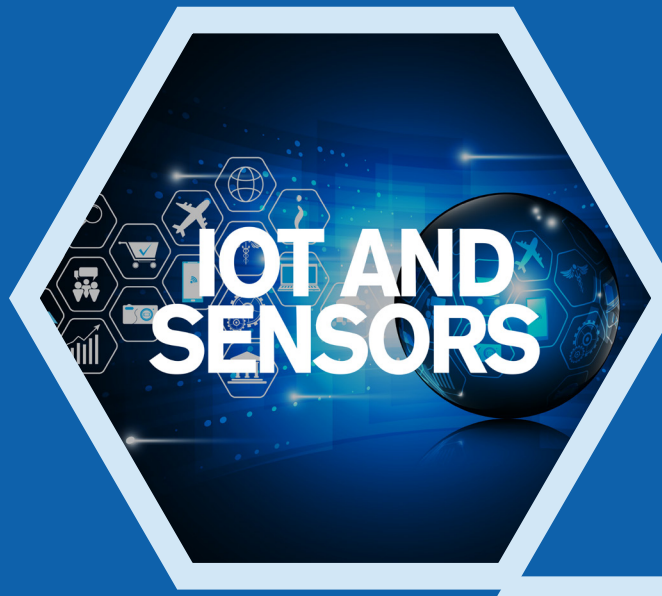
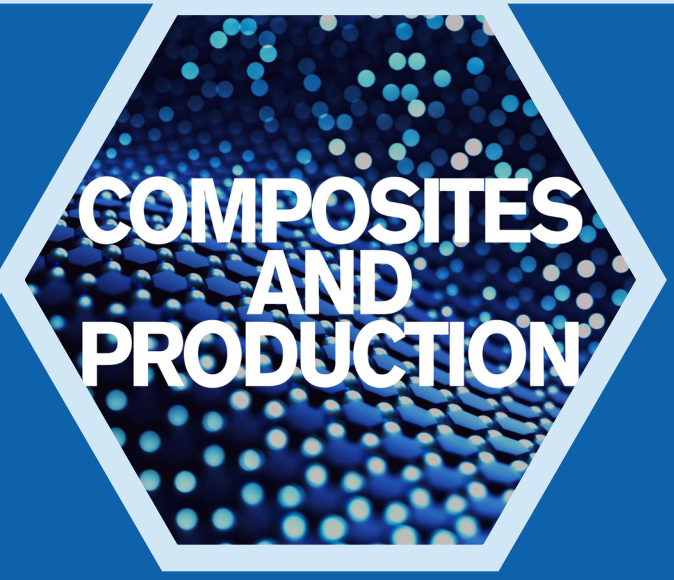
GRAPHENE FLAGSHIP

GRAPHENE EXPERIENCE ZONE





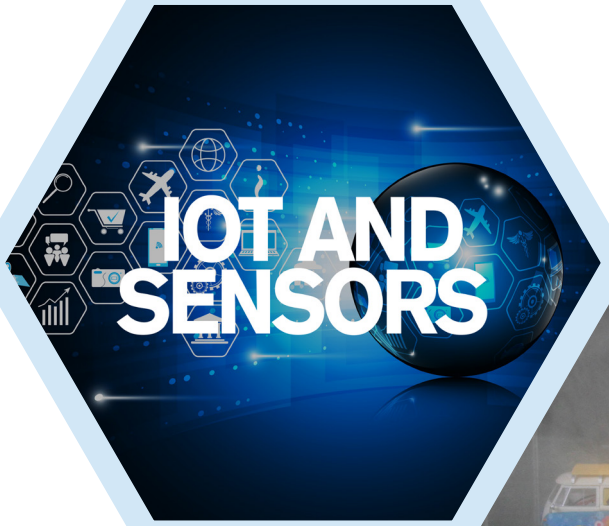
Curated by:

ICFO
The Institute of Photonic Sciences

GSMA MOBILE WORLD CONGRESS

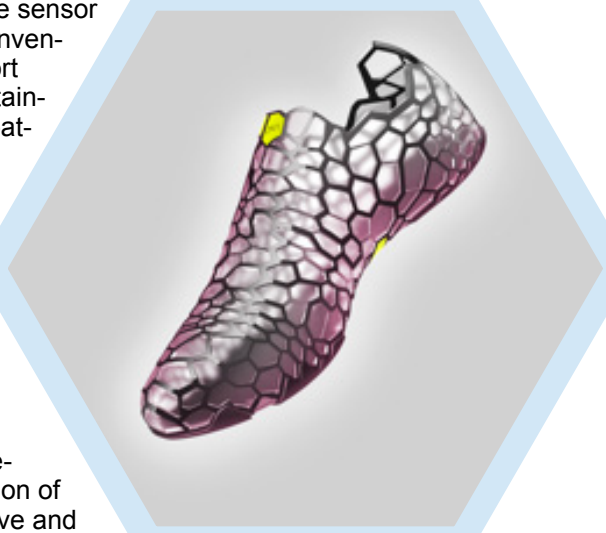
BARCELONA 27 FEB–2 MAR 2017

GRAPHENE FLAGSHIP



CAR COLLISION-AVOIDANCE SYSTEM

ICFO demonstrates technology that enables self-driving cars to navigate safely under extremely difficult weather conditions. Its graphene-based image sensor technology extends the vision of conventional digital cameras into the (short wave) infrared range while maintaining production processes compatible with CMOS technology.



GRAPHENE-BASED SENSING DEVICE

A sensing device developed by ICN2 offers a tool to detect unwanted components in a range of samples. This quick, cheap and versatile technology will enable immediate analysis using technology that is already in your pocket.

NIGHT VISION IMAGING

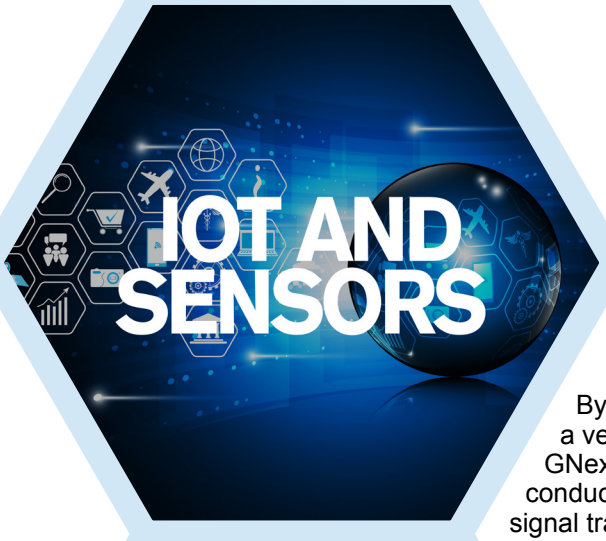
Emberion's novel visible light to shortwave infrared (vis-SWIR) detectors provide excellent combination of value and performance for automotive and surveillance night vision, spectroscopy and machine vision applications. Graphene has superior electronic properties and, integrating it with conventional CMOS, disruptive broad spectrum imaging modules can be created.

SENSING INSOLE FOR SPORTS SHOES

Modern sports require shoes to be lighter, stronger and sensory, in order to improve performance and monitoring the status of athletes. The University of Cambridge will demonstrate a 3D printed shoe with embedded graphene foam sensors to monitor the pressure applied, combining complicated structural design with accurate sensing function.

ICN2 Institut Català de Nanociència i Nanotecnologia · EXCELENCIA SEVERO OCHOA · ICFO The Institute of Photonic Sciences · EMBERION · UNIVERSITY OF CAMBRIDGE · haydale

GRAPHENE FLAGSHIP



TOUCH ME

By using a conductive ink with a very low amount of graphene, GNext paints a thin and flexible conductive trace or coating for electronic signal transmission that allows electronic equipment to be turned on and off and controlled. This provides a versatile and low-cost solution to applications in IoT where existing technology is too costly and unreliable.

GRAPHENE MECHANICAL PIXELS

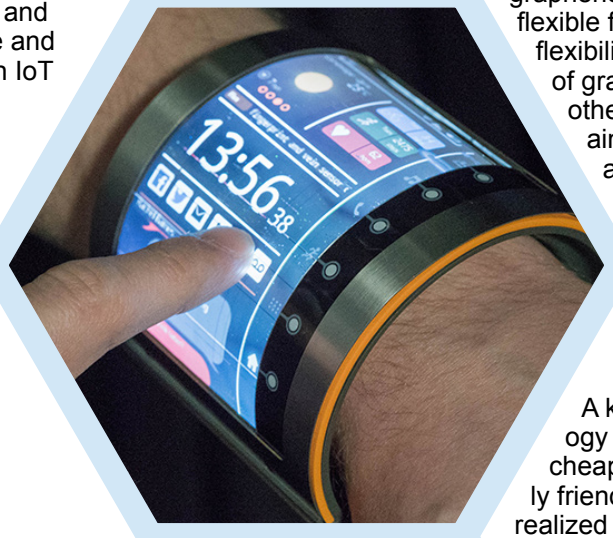
The screen prototypes of TU Delft and Graphenea change the colour of a graphical element with electricity. The visitor uses a control box to change the colours and can zoom in to find the super high resolution (the individual pixels are 5-10 times smaller than Apple's retina display) achieved by Graphene Interferometric Modulator Display (GIMOD) technology.

FLEXIBLE DISPLAYS AND SENSORS

FlexEnable will showcase a variety of demos enabled by flexible electronics including an e-paper display with graphene top pixel, an organic LCD and a flexible fingerprint sensor. By exploiting the flexibility, conductivity and transparency of graphene and the high mobility of other 2D materials, FlexEnable aims to enable active surfaces anywhere and everywhere.

FILM SENSORS

The University of Cambridge is showing a graphene gauge-sensing film printed on the underside of the cover glass of a mobile phone. These sensors detect pressure being applied to the screen. When pressed, this causes colours and lights to change on a separate display.



NFC-ANTENNAS

A key target for modern technology is to replace metals with lighter, cheaper and more environmentally friendly materials. CNR-ISOF has realized working near-field communication (NFC) devices with graphene derivatives, replacing the conventional metallic antennas. Graphene NFC devices presented work as electronic keys, flexible tags, smart cards and other typical NFC applications.

UNIVERSITY OF CAMBRIDGE · GNEXT next generation materials · TU Delft · Graphenea · FlexEnable Truly flexible electronics · National Research Council of Italy

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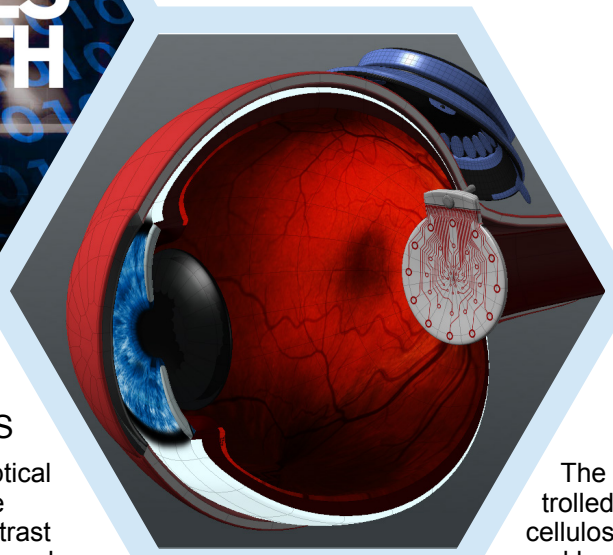
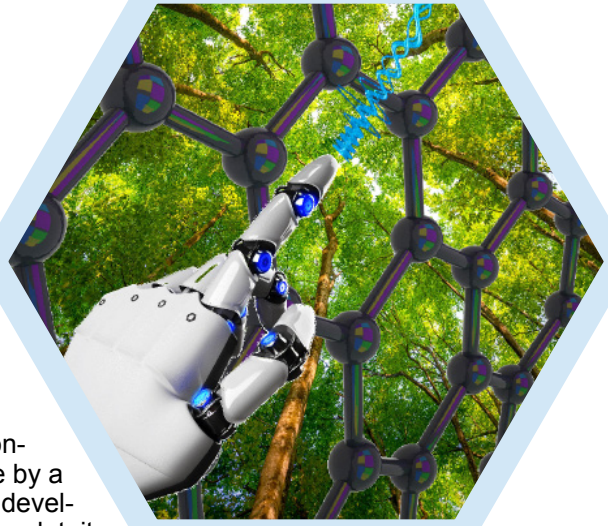


RETINAL AND NEURAL PROSTHESES

Retinal implants can serve as optical prostheses for blind people whose optical nerves are still intact. In contrast to traditionally used materials, graphene has excellent biocompatibility thanks to its great flexibility and chemical durability. With its outstanding electronic properties, graphene provides an efficient interface for communication between the retina prosthesis and nerve tissue.

ROBOTIC PROSTHETIC HAND

The robotic prosthetic hand is controlled by a wearable sensor made by a cellulosa and graphene composite, developed by IIT. Made in the form of a bracelet, it is comfortable to wear and once placed on the wrist, it transduces the movement of the hand into electrical signals that are used to move the artificial hand in a spectacular way.



FLEXIBLE WELLNESS SENSORS

Graphene and 2D materials enable devices such as optical sensors and biosensors to be flexible and transparent. ICFO is developing a transparent and flexible platform for wellness sensing and demonstrates a wearable sticker that measures heart rate as well as a concept invisible health patch for measuring respiration rate, body temperature and oxygen saturation.

ICN2 Institut Català de Nanociència i Nanotecnologia · EXCELENCIA SEVERO OCHOA · INSTITUT DE LA VISION PARIS · CNM Centro Nacional de Microelectrónica · IMB · iit ISTITUTO ITALIANO DI TECNOLOGIA GRAPHENE LABS · INAIL Centro Protesi · ICFO The Institute of Photonic Sciences

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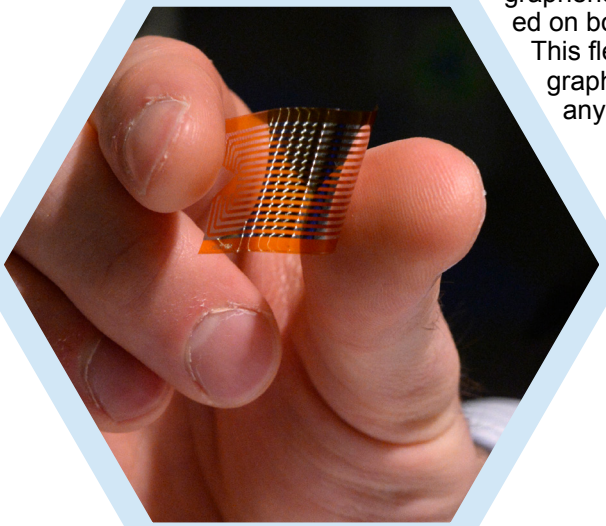
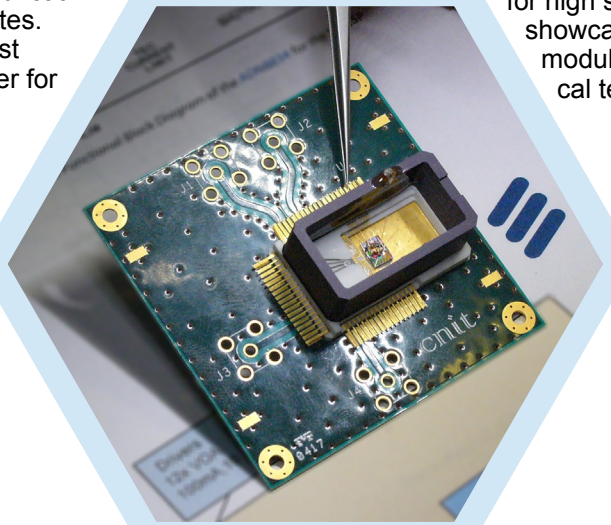
FLEXIBLE WIFI RECEIVER FRONT-END

AMO together with RWTH Aachen University are developing the first flexible WiFi receiver. The underlying graphene MMIC processor can be fabricated on both hard and flexible substrates. This flexible WiFi receiver is the first graphene-based front end receiver for any type of modulated signal.





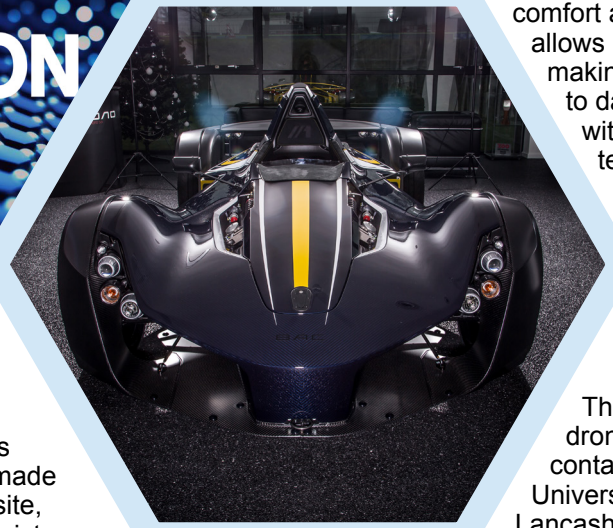
GRAPHENE PHOTONICS INTEGRATION

CNIT, Ericsson, Nokia and IMEC have developed graphene photonics integration for high speed transmission systems and are showcasing packaged graphene-based modulator operating over several optical telecommunications bands.

AMO RWTH AACHEN UNIVERSITY cnit consorzio nazionale interuniversitario per le telecomunicazioni ERICSSON NOKIA imec embracing a better life

GRAPHENE FLAGSHIP

COMPOSITES AND PRODUCTION



GRAPHENE SUPERCAR

BAC has unveiled a version of its Mono track car with body panels made from graphene carbon fibre composite, which are lighter and stronger than existing panels. The University of Manchester, Haydale and BAC have been involved in the development of graphene carbon fibre composites used in the creation of the world's first graphene car.

GRAPHENE MOTORCYCLE HELMET

By coating graphene on to the exterior shell, Momodesign and IIT have developed a helmet with improved thermal comfort and safety. The graphene coating allows better distribution of impact force, making the helmet less susceptible to damage compared to helmets without graphene, even in high temperature conditions.

GRAPHENE DRONE

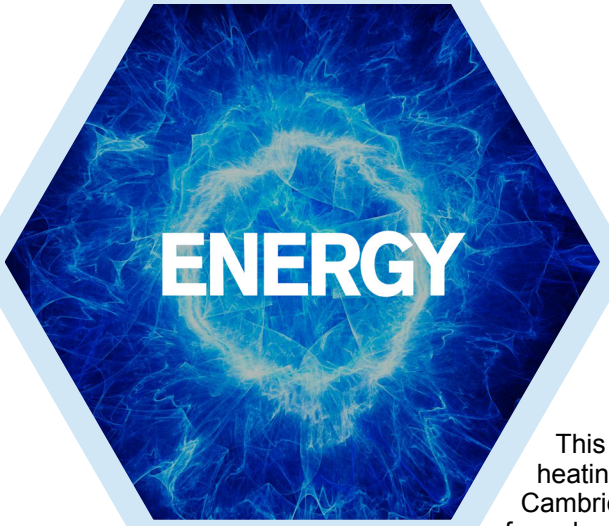
This first demonstration of a drone, whose propeller blades contain graphene is presented by the Universities of Manchester and Central Lancashire. The graphene components show benefits such as light weight, strength and stiffness, but the aim is also to investigate the potential effects of graphene in drag reduction, thermal management and ultimately the ability to achieve lightning strike protection.

GRAPHENE PRODUCTION

Graphenea aims to develop the potential of graphene for electronic systems by means of combining large-scale graphene synthesis and conventional CMOS technology into an industrial compatible process. Graphenea is scaling up graphene production for semiconductor industry, developing the quality control equipment and demonstrating the technology in real devices.

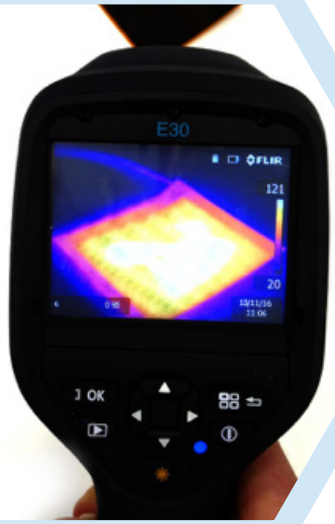
BAC BRIGGS AUTOMOTIVE COMPANY · haydale · MANCHESTER 1824 The University of Manchester National Graphene Institute · iit GRAPHENE ISTITUTO ITALIANO DI TECNOLOGIA GRAPHENE LABS · momoDESIGN · Graphenea

GRAPHENE FLAGSHIP



INTERACTIVE HEATING SYSTEM

This novel “spray on” graphene heating system developed by FGV Cambridge Nanosystems provides uniform, large-area heating. To demonstrate the versatility of the heater, it will be integrated into a piece of art, wirelessly controlled via a mobile app. The system can also double as a temperature sensor, where you can control light intensity by sensing body temperature.



GRAPHENE SUPERCAPACITOR

Graphene can really change the way of dealing with energy storage especially in terms of power. The supercapacitors presented by Thales, IIT and the University of Cambridge are fabricated using graphene and a new deposition technique. Visitors will see that they charge very quickly and deliver energy for a long time.

FGV Cambridge Nanosystems · THALES · UNIVERSITY OF CAMBRIDGE · iit ISTITUTO ITALIANO DI TECNOLOGIA GRAPHENE LABS

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GRAPHENE CONNECT WORKSHOP

FROM DATACOM TO IOT - ENABLED BY GRAPHENE

THURSDAY 2 MARCH, 9:30-16:00

HALL 8.0 NEXTECH THEATER F

GRAPHENE EXPERIENCE ZONE

NEXTech Hall 8.0 Stand M33

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