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## University of Manchester Graphene Partnership with Khalifa University Aims to Tackle Global Challenges

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An ambitious partnership between The University of Manchester and Abu Dhabi-based Khalifa University of Science and Technology has been agreed with the aim to deliver a funding boost to graphene innovation that will help tackle the planet's big challenges.

Professor Dame Nancy Rothwell, President & Vice-Chancellor of [The University of Manchester](#), and Professor Sir John O'Reilly, President, [Khalifa University](#) officially signed a contract between the two institutions during a VIP visit by a Manchester delegation to the United Arab Emirates ([UAE](#)). Senior officials from both universities were present at the signing (pictured below).

This international partnership will further accelerate Manchester and Abu Dhabi's world-leading research and innovation into graphene and other 2D materials. The Research & Innovation Center for Graphene and 2D Materials (RIC-2D), based in Khalifa University, is part of a strategic investment programme supported by the Government of Abu Dhabi, [UAE](#).

### Growing international partnership

This partnership will support expediting the development of the RIC-2D at Khalifa University as well as help building capability in graphene and 2D materials in collaboration with Graphene@Manchester, a community that includes the academic-led National Graphene Institute (NGI) and the commercially-focused Graphene Engineering Innovation Centre (GEIC), a pioneering facility already backed by the Abu Dhabi-based renewable energy company Masdar.



The historic agreement will bring together the vision of the two universities to tackle some of the globe's biggest challenges, such as providing clean drinking water for millions of people and supporting a circular 'green economy' in all parts of the world.

Graphene – originally isolated at The University of Manchester, the global 'home of graphene' – has the potential to deliver transformational technologies. The focus of the Khalifa-Manchester partnership will be on key themes, with a priority to meet the most immediate of global challenges, including climate change and the energy crisis. These flagship areas are:

- **Water filtration and desalination** – graphene and 2D materials are being applied to next generation filtration technologies to significantly boost their effectiveness and efficiency to help safeguard the world's precious supply of drinking water

- **Construction** – graphene is helping to develop building materials that are much more sustainable and when applied at scale can expect to slash global CO2 emissions

- **Energy storage** – applications are being developed across the energy storage sector to produce more efficient batteries, with greater capacity and higher performance, and other energy storage systems vital to a circular 'green economy'

- **Lightweighting of materials** – the use of graphene and 2D materials to take weight out of vehicles, as well as large structures and infrastructure, will also be a key to building a more sustainable future.

The investment is expected to be allocated towards joint projects. The full scope and budgets for projects under this new framework agreement remain to be determined in the months ahead. The proposal will see dedicated space for the Khalifa University's RIC-2D within the GEIC, which is based in the Masdar Building at The University of Manchester, to deliver rapid

R&D and breakthrough technologies. Researchers from Khalifa University will have dedicated lab space in the GEIC where they can work alongside Manchester's applications experts and access in-house facilities and equipment.

## **Knowledge exchange**

As well as the research and innovation activity, the RIC-2D programme will support the development of people, including early-career researchers who will benefit from the real-world experience of working on the joint R&D programme. Also, there will be opportunities for post-graduate students, including the exchange of PhD students and researchers (see Fact File below).

Professor Sir John O'Reilly, President, Khalifa University, said: "This Khalifa University-University of Manchester collaboration is greatly to be welcomed. It has all the hallmarks of a most successful approach to inspiring and nurturing outstanding research, innovation and enterprise in graphene to be taken forward to the benefit of the wider community."

Professor Dame Nancy Rothwell, President & Vice-Chancellor of The University of Manchester, said: "We look forward to a long and productive partnership with Khalifa University that will realise the potential of graphene to address global challenges including water and energy security and, above all, sustainability."

Dr Arif Sultan Al Hammadi, Executive Vice-President, Khalifa University, said: "We are delighted to enter into this partnership with The University of Manchester and encourage innovation in graphene through a pipeline of projects, as well as focus on transferring technology towards commercialization. Through this agreement, we will continue to not only focus our research activities on existing flagship projects in water filtration, construction, energy storage and composites but also expand to new areas. This combination of virtual and in-person collaborations will also include exchange of PhD students and sponsored labs within the Graphene Engineering Innovation Centre (GEIC) at Manchester."

Professor Luke Georghiou, Deputy President and Deputy Vice-Chancellor of The University of

Manchester, said: “Our excellent relationship with our partners in Abu Dhabi, including Khalifa University and Masdar, has been vital in the success of the world-leading graphene research and innovation activities at The University of Manchester, especially in driving forward the commercialisation of 2D materials in our facilities based in the Graphene Engineering Innovation Centre. This new investment will deliver a game-changing step change in our lab-to-market ambitions - and will accelerate the translation of graphene in an unprecedented way.”

Professor Hassan Arafat, Senior Director, RIC-2D, said: “The overarching goal of RIC-2D is to be a catalyst for economic growth in the [UAE](#), by enabling industrial and public entities within the country to utilize graphene and other 2D materials in new technologies that add economic value and solve pressing societal challenges such as water scarcity and greenhouse emissions. Therefore, the center will support a range of fundamental and translational research projects, in addition to commercialization and technology transfer activities. Graphene@Manchester has accumulated significant experience doing the same in the [UK](#) over the past decade. Hence, they were naturally identified as one of RIC-2D’s most strategic partners.”

James Baker, CEO of Graphene@Manchester, explained: “We have built a unique model of innovation for advanced materials in Greater Manchester by successfully attracting regional, national and international investment.

“The RIC-2D programme will be a significant funding boost for [UK](#)-based graphene research and commercialisation. It is set to significantly accelerate the work that is already happening in our ecosystem and help with the application and commercialisation of 2D materials at a rate much faster than you would normally expect for a revolutionary new material like graphene.

“This provides an opportunity to fast-track technologies that are urgently needed to tackle immediate challenges like climate change or the energy crisis. The University of Manchester and Khalifa University will play a key role in connecting our ambitions by synchronising new research with key industry and supply-chain companies across a range of sectors.

“Our lab-to-market model will link up fundamental research with applied research and ultimately be part of a pipeline delivering new, market-ready technologies. The programme will also provide industry-standard equipment and capabilities for the rapid scale-up and pilot production of prototypes.”

Graphene@Manchester’s world-class facilities and resources are supported by internationally renowned academics and industry-experienced engineers and innovation experts, working across a very broad range of novel technologies and applications.

James Baker added: “Together, these experts will focus on industry-led 2D material development and look to help companies design, develop, scale-up and ‘de-risk’ the next generation of innovative products and processes,”

### **Fact File - joint R&D programme**

The joint R&D programme between The University of Manchester and Khalifa University will provide a pipeline of projects from the near to long-term to ensure that RIC-2D development activities remain world-leading and are based upon a strong scientific foundation.

Part of the R&D programme will focus on Technology Readiness Levels (TRLs) 1-3 – i.e. early stage research and development - beyond which the research teams will collaborate with applications experts at the Graphene Engineering Innovation Centre (GEIC) in a bid to transfer the technology for commercialisation.

The shared R&D platforms are designed to support existing flagship projects, including those involved with water filtration, construction, energy storage and composites – but there will be an expectation to develop new streams. Finally, the R&D programme will produce high quality academic publications that will add to the prestige and international reputation of RIC-2D.

The joint programme will be a combination of virtual and in-person collaborations, through

the exchange of PhD students and researchers and having Khalifa University sponsored labs based within the GEIC.

Read the [original article](#) on University of Manchester.