



Welcome

Welcome to our first newsletter for the [2D-Health](#) project. 2D Materials for Next Generation Healthcare Technologies (2D-Health) is an EPSRC funded programme that aims to utilise graphene based materials to develop innovative solutions for specific unmet needs for an ageing population. In order to facilitate clinical translation of the research, our team of academics at the [University of Manchester](#) are partnered with industrial champions.

Project Themes

The project consists of four themes and two cores:

- [Theme I—Smart Membranes in Trauma & Wound Care](#)
- [Theme II—Wireless Neural Cell Stimulation & Sensing](#)
- [Theme III—2D Inks for Imaging Cell Therapies](#)
- [Theme IV—2D Sheets for Cancer Immunotherapy](#)
- [Chemistry core](#)
- [Pre-clinical core](#)

EVENTS

[Polymers for Advanced Technologies Conference](#), 11-13th Sept 2017, University Place, University of Manchester

EPSRC Programme Grant Joint Meeting, 12th Sept 2017, University Place, University of Manchester

NanoMed Network, [Nanotechnology in neurology and neurosciences](#), 9th Nov 2017, University of Manchester

PUBLICATIONS

[Water-based and biocompatible 2D crystal inks for all-inkjet-printed heterostructures](#). D McManus *et al.*, Nature Nanotechnology 2017, 12(4), 343-350

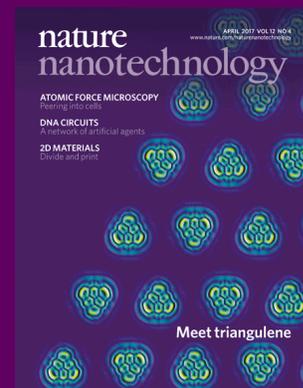
[Tunable graphene sieving of ions using graphene oxide membranes](#). J Abraham *et al.*, Nature Nanotechnology 2017, 12(6), 546-550

News

Can water-based 2D material inks be used in healthcare?

In work recently published in *Nature Nanotechnology*, a group of scientists from the Universities of Manchester and Pisa demonstrated a simple way of engineering water-based 2D material inks. Using the new strategy, multi-stack fabrication was also achievable enabling the demonstration of all-inkjet-print heterostructure-based devices. The examples provided were arrays of photosensors printed on plastic and paper as well as programmable logic memory devices. A further step was taken to confirm biocompatibility to extend the use of these inks in biomedical applications.

With these promising results, [Cinzia Casiraghi](#) and [Kostas Kostarelos](#), who have both been involved in this project, hope to transfer this technology into healthcare. Their research in [Theme III](#) of 2D-Health will be based around the design and use of Graphene-based 2D inks that can be used to track cell populations non-invasively when administered in cell therapy protocols. If successful, this would have a major impact on target delivery and diagnostics for research in many areas such as ocular and cardiovascular diseases.



Graphene sieve may have medical implications

A group of scientists at the University of Manchester made the front cover of *Nature Nanotechnology* by presenting a strategy that could potentially sieve common salt out of water rendering it safe to drink. This could have a major impact on access to clean drinking water for many globally.

Graphene-oxide membranes have already been shown to have the potential to filter small molecules. In their [letter to Nature Nanotechnology](#), this group of scientists presented their strategy to prevent swelling of a graphene-oxide membrane when exposed to water and to provide control of pore size. Such findings are likely to have a significant impact on desalination technology research.



[Rahul Nair](#) and [Irina Grigorieva](#) have both been involved in this project and hope to make use of this strategy in 2D-Health. It is hoped that such research can be transferable to health care technology to create 'smart' membranes for controlled delivery of certain ionic species of interest. These membranes also have the potential for fabricating artificial ion channels that mimic naturally occurring biological channels. This forms part of [Theme I](#) in our programme, which aims to include the promotion of antibacterial resistance as well as releasing therapeutic molecules as needed in order to accelerate wound healing.



Meet our new PostDocs....

Six new Post-Doctoral Research Associates have joined us over the last few months. From left to right: [Yuyoung Shin](#) (Theme III), [Alfredo Gravagnuolo](#) (Theme IV), [Neha Kulshrestha](#) (Theme II), [Xavier Just-Baringo](#) (Chemistry Core), [Avishek Pal](#) (Theme I), and [Balakrishna Ananthoju](#) (Chemistry Core).

Over the summer we have held two PDRA meetings, where all project members were invited to hear each PDRA present their work in progress. With four diverse themes, it provides an opportunity for each PDRA to learn about other applications.



NanoMed Network

The [Nanotechnology in Medicine \(NanoMed\) Network](#) is a cross-faculty network based at the [University of Manchester](#). It aims to facilitate the use of nanomaterials and technologies to find solutions that will meet clinical needs. [2D-Health](#) is the first biomedical project to capitalise on the interdisciplinary research community within this network.

The next NanoMed Network event is - [Nanotechnology in neurology and neurosciences](#), 9th November 2017.

New Website

Please visit our project website 2d-health.com, which provides further project information on research themes, project management and project news. You can also follow us on Twitter [@2d_health](https://twitter.com/2d_health).

Community Festival

The University of Manchester held its first Community Festival on 17th June, where local residents were invited to come and meet researchers and to take part in various activities. [Yuyoung Shin](#), one of our new PDRAs, helped members of [The Nanomedicine Lab](#) with several table-top activities to demonstrate *Using Tiny Materials to Treat Diseases*.



EPSRC

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