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Queen's University Belfast has invested in a state-of-the-art 3D bioprinter from GeSiM for research into the manufacture of medical devices and drug delivery systems.

Cambridge, UK, 26th February 2019: Analytik, a leading provider of cutting-edge scientific instrumentation, announce the recent installation of a state-of-the-art GeSiM 3D bioprinter at Queen's University Belfast. It will be used in the development of new processes including the manufacture of medical devices and drug delivery devices.

3D printing has the potential to revolutionise personalised medicine by creating complex devices tailored to the individual patient through precise control of device geometry, materials and internal architecture. Instrumentation such as the family of state-of-the-art 3D printers from GeSiM are being used to advance the development of new bio devices.

The GeSiM BioScaffolder 3.2 is a flexible 3D bioprinter with a unique piezoelectric micro-pipetting system for pico- and nano-litre spotting of cells and biomolecules, as well as pneumatically-actuated cartridges for precise printing of highly viscous materials (e.g. molten thermoplastic polymers) on definable coordinates within a scaffold structure or on flat surfaces. This combination of both technologies is unique and not available on competitor 3D printers. The BioScaffolder can print polymers at temperatures up to 250 °C, while cells and biomolecules (e.g. enzymes, proteins) can be maintained at 37 °C or chilled to enhance stability. This innovative approach allows struts of mechanically-stiff materials to be combined with cell-friendly materials (e.g. hydrogels) containing suspended cells in novel regenerative medicine approaches. The instrument automatically aligns print tools of different dimensions by means of a 3-axis light barrier. Struts of up to three different materials can be combined, even in a single layer. Individual cells, cell suspensions and aqueous polymer solutions can be printed onto substrates for applications in single-cell analyses, biosensing and drug delivery. Importantly, the BioScaffolder can be interfaced with existing analytical equipment, with individual cells or minute-volume solutions accurately printed directly into multi-well plates, or onto microfluidic chips or biosensor substrates. GeSiM have recently added melt electrospinning for fibre production and UV-curing capabilities, while a new core-shell tool allows precise printing of tubes, with either a hollow bore or soft internal material, further extending utility.

Professor Ryan Donnelly holds the Chair in Pharmaceutical Technology in the School of Pharmacy at Queen's University Belfast. His research is focused on the design and physicochemical characterisation of advanced polymeric drug delivery systems for transdermal and topical applications. He describes

the plans for his recently installed bioprinter which was funded by a Wellcome Trust Multi-use Equipment grant. “Our overall aim is to, for the first time, extend the utility of 3D bioprinting from applications in regenerative medicine into reproducible manufacture of micron-scale drug delivery devices, biosensor production, single cell analyses and enhancing understanding of tumour microenvironments. These novel uses of 3D bioprinting have the potential to make a significant and far-reaching impact, in improving health and therapeutic outcomes for patients. This is the first 3D bioprinter in our university and, to our knowledge, is the first instrument with the unique capabilities of the BioScaffolder exists on the island of Ireland. Together with my colleagues, we plan to follow the Wellcome Trust’s strategy on improving health for all, in that it will accelerate the application of research to improve health and drive forward development of new healthcare products, devices and technologies and promote clinical translation of research advances from bench to clinic.”

Product Specialist, Hiran Vegad, says “Working with Professor Donnelly and his group at Queen’s is already proving extremely exciting. Their broad focus will impact on the prevention of disease, antimicrobial resistance, improved diagnoses, better treatments and enhanced understanding of cancer and inflammatory diseases, to the benefit of patients worldwide. As suppliers, we at Analytik look forward to playing an active role in this program over the coming years.”

Visit the Analytik website to find out more about the GeSiM 3D bioprinters and their applications in new manufacturing methods.

Attachment:

Professor Ryan Donnelly with the GeSiM BioScaffolder 3D Bioprinter which has recently been installed in the School of Pharmacy at Queen’s University Belfast

For a high resolution copy of this image, either right click to download or contact Jezz Leckenby at Talking Science.

About… Analytik *is a leading provider of innovative analytical instrumentation to the UK and Ireland. Delivering cutting-edge solutions from global technology providers, coupled with responsive service and flexibility, has enabled Analytik to build an impressive customer base since forming in 2003. Analytik's partners include: Agilent Technologies, Malvern Panalytical, SciAps, Microfluidics, GL Optic, Avian Technologies, GeSiM, CPS Instruments, Particle/Colloid Metrix, Videometer and Headwall Photonics. Solutions include portable and handheld spectrometers (FTIR, NIR & Raman), spectral imaging systems, light measurement systems, reflectance standards and coatings, non-contact nanolitre dispensing systems, nanoparticle size/zeta potential analysers and high shear fluid processors.*

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