

October 2018

ACES set to impress at Sibos

At ACES ([ARC Centre of Excellence for Electromaterials Science](http://www.aces.edu.au)), we turn our fundamental knowledge of cutting-edge materials into practical, game-changing devices to create the next generation of 'smart devices' for the benefit of the community.

We see a 'smart device' as one that uses the advanced materials we make in our laboratories to create new health and energy solutions that improve people's lives.

We have a proven track record of translating our fundamental research into strategic applications, some of which will be on show at Sibos:

The Biopen – in partnership with Prof Peter Choong from St Vincent's Hospital Melbourne, we have developed a customised bioink and hand-held printing device that can be used in surgery to repair damaged cartilage:

- The Biopen is a cutting-edge handheld 3D printer pen that is filled with stem cell ink to 'draw' new cartilage into damaged joints, and will give surgeons greater control over joint repairs and reduce the time a patient is in surgery;
- This collaboration has drawn upon the diverse skills of scientists, engineers and clinicians to bring about real, tangible advances in science to tackle a significant medical challenge;
- This partnership has brought together the science of stem cells, polymer chemistry and 3D bioprinting to help surgeons design and personalise a solution for osteoarthritis that will have a significant impact on those suffering from the debilitating and painful condition;
- This technology is a game-changer, and presents an opportunity to prevent the onset of osteoarthritis in patients by using 3D technology to print live cells to repair damaged cartilage;
- The team is continuing its work to refine the technology for eventual commercialisation including the refinement of hardware for manufacturing, large animal trials, and the processing of stem cell inks.

The iFix Pen – a collaboration with the Professor Gerard Sutton from the Lions NSW Eye Bank and Sydney University to develop a 3D printer that is set to revolutionise corneal health:

- The iFix system is a novel medical treatment technology that incorporates 3D printing to repair corneal ulcerations;
- The iFix system distributes a 3D-printed structure directly onto the eye, utilising the iFix Pen developed by ACES researchers at the University of Wollongong;
- The iFix Pen is a handheld 3D-printing device that delivers a specialised bioink formulation to the eye defect with high accuracy;

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- The advancement of this technology can have a significant impact on reducing corneal blindness in Australia and around the world. Corneal disease is the third most common cause of blindness worldwide.

3D Alek – we are working with Prof Payal Mukherjee, Ear, Nose and Throat (ENT) Surgeon from Royal Prince Alfred Hospital to build a customised 3D bioprinter to treat microtia:

- This technology seeks to regenerate cartilage for use in reconstructive ear surgery to treat microtia, a congenital deformity where the external ear is underdeveloped;
- We have built the multi-materials customised biofabrication 3D printer and inks to support this project;
- We are also working to adapt the technology so it can be translated on a global stage with a focus on developing countries.

Bioinks – revolutionising cell engineering and printing:

- Each of our novel hardware applications utilises customised bioink formulations to deliver viable cells in an appropriate manner, where they can proliferate and differentiate according to the specific requirements of the treatment;
- Our facilities and expertise allow for the synthesis of materials of bioinks to enable the supply of small to medium scale quantities of bioinks, including:
 - **Gelatin methacrylamide (GelMA) based inks** for adipose stem cells for cartilage regenerations
 - **Alginate based inks** for muscle cells
 - **Collagen based inks** for nerve cells
 - **Multi-material inks** for human neural stem cells and induced pluripotent stem cells
 - **Alginate/GelMA based inks** for pancreatic islet cells

Visit our stand at the Sibos Discovery Zone to get a first-hand look at these projects and speak with some of the researchers behind this game-changing work.

Media opportunity:

Please contact ACES Communication and Media Coordinator Lauren Hood on 02 4221 5306 or lhood@uow.edu.au to arrange any interviews.

The ARC Centre of Excellence for Electromaterials Science (ACES)

ACES is headquartered at the University of Wollongong's Innovation Campus, and incorporates eight Australian collaborating organisations and five international partner institutions known for their expertise in materials and device fabrication.

ACES is a multidisciplinary research group with a focus on developing functional devices for applications including batteries, solar cells and systems that interact with living tissue.

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