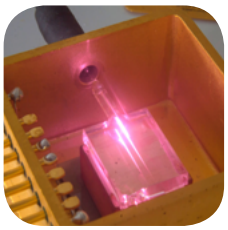
Australian National Fabrication Facility Ltd
NEWSLETTER
ANFF
SUMMER 2013



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Powerful artificial muscles made from fishing line or sewing thread

Muscles 100 times stronger than human muscles have been fabricated at the Materials Node of ANFF.

The breakthrough could open the door to the affordable use of artificial muscles in smart textiles, prosthetic limbs, robotics, or even as an alternative energy source.

In a long standing collaboration between the University of Wollongong and their international collaborators, which has led to the development of similar artificial muscles made from more exotic materials (Case Study), the team developed a very cheap and simple means to fabricate the devices.

"We attach one end of the fishing line to an electric drill and hang a weight off the other end to apply some tension. We stop the weight from rotating and we use the drill to insert twist into the fibre," said Professor Spinks from the ARC Centre of Excellence for Electromaterials Science.

"At a critical point, a loop forms in the fibre and further twisting produces more coils."

"Before too long, the whole fibre is a spring-like coil. To set this shape we apply a little bit of heat from a hair dryer and the coil contracts."

The Materials Node has developed processes for weaving the single coils to produce power-fabrics that contract in response to swelling or heat, and comfort-adjusting material with weave that can loosen or tighten according to temperature.

(Full story and video, publication in Science)

University of Wollongong researchers Dr Sina Naficy, Professor Geoffrey Spinks (front) and Dr Javad Foroughi were part of an international collaboration that showed strong artificial muscles could be made from fishing line and sewing thread. Credit: University of Wollongong.

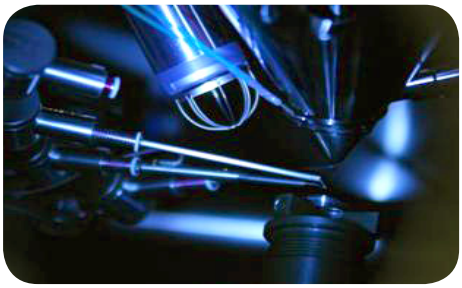
Job Opening

ANFF-SA
Microfabrication Technologist (More)

Mining technology company and ANFF client acquired for $76 million

Lithicon AS, a company started by researchers at the Australian National University and UNSW, has been sold for $76 million to the US-based FEI Company.

Working with some of the world's biggest resources companies they have developed techniques that generate critical information needed to determine the best way to extract oil and gas.



Chamber of the FIB system at the ACT node. Credit: Australian National University

ANFF has supported the long time research effort that has led to the development of Lithicon AS. In 2009, researchers at UNSW and ANU set up a company called Digitalcore, which merged with Norwegian company Numerical Rocks AS in 2013 to form Lithicon AS. Their work with ANFF developed methods of creating 3D images of minerals with nanometre scale resolution using the focussed ion beam (FIB) system at the Australian National University.

"Together with ANFF, we have been leading the application of these (FIB) systems on rock samples to produce nanoscale 3D images of tight unconventional geological systems such as shales and tight gas" said Dr Victor Pantano, General Manager of Lithicon AS.

"This work is important as these geological samples cannot be analysed using traditional means, and thus the work with the ANFF provides a means of characterising these increasingly important oil and gas bearing formations."

ANFF would like to congratulate Lithicon AS on reaching this very significant milestone, and looks forward to supporting its future R&D efforts in strengthening its position as a world leader in digital core scanning and analysis. (More)

NSW Chief Scientist Launches the OptoFab Node of ANFF

On 27 November, the OptoFab Node was officially launched by NSW Chief Scientist Prof Mary O'Kane in their new building at the Australian Hearing Hub.

Micro-machined gas jets for the Sydney and Athens Olympic torches, lasers built into a microchip, and next generation optics for telescopes were just a few of the research projects on display at the launch in their newly built headquarters, the Australian Hearing Hub at Macquarie University.

In her launch address to a community of over 100 researchers, many of whom had travelled from across Australia for the event, Prof O'Kane remarked on how Optofab's capabilities have already benefited Australian researchers, not just those in the university circles, but also Australian companies conducting their own innovative research. (More on Optofab's services)

In a big month for the Node, November also saw the launch of the one of Optofab's flagship capabilities the I-line Stepper located at the Bandwidth Foundry International by Vice Chancellor and Principal of the University of Sydney, Dr Michael Spence. (More)

Optofab Node Director Prof Michael Withford, with NSW Chief Scientist and Engineer Prof Mary O'Kane at the OptoFab launch.

Supporting Research & Innovation

Commercial prototyping, hosting industry R&D operations, and contract research are all services that the ANFF provides beyond supporting cutting edge university research.

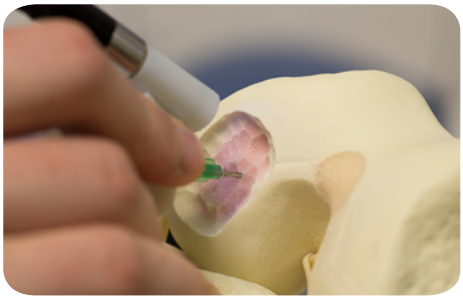
Projects can be co-ordinated across the network taking advantage of the $200 m facility portfolio with support from world leaders in the following fabrication fields:

- Micro and Nano electronics
- Microfluidics and MEMS
- Bio-nano applications
- Advanced materials
- Sensors and medical devices
- Optics and photonics

Innovative projects that have made a real difference to Australia can be found at www.anff.org.au

Around the Nodes

Materials: The 'bio pen', a handheld surgical devices that works similar to a 3D printer, which was developed at the ARC Centre of Excellence for Electromaterials Science (ACES), has been transferred to St Vincent's Hospital for clinical projects to be carried out in Melbourne. (More).



The Biopen. Credit: University of Wollongong

ACES received $25 million federal funding to continue their work on nanomaterials and functional 3D devices for applications such as batteries, solar cells and medical implants.

OptoFab: University of Adelaide has been awarded $23 million in federal funding to establish an ARC Centre of Excellence for Nanoscale BioPhotonics. (More)

A collaboration between ARC Centre of Excellence CUDOS and Technion Israel Institute of Technology was launched in December 2013 by NSW Minister for Health and Minister for Medical Research, the Hon. Jillian Skinner. The project will contribute to the development of ultra-fast chips and communications devices.

Victoria: Researchers working at the Victorian Node demonstrated that nanoparticles in sunscreen are unlikely to cause harm to beach-goers. (More)

QLD: ANFFQ installed a Nanoscribe 3D lithography system, capable of producing 3D structures with sub-micron sized features. (More)

ACT: Nano-wire lasers for ultra-fast computers that operate at room temperature have been fabricated at the ACT Node in a breakthrough critical for the development of optical circuits and high speed communication devices of the future. (Nature Photonics publication).

Upcoming Events

28 MARCH – MELBOURNE
MCN Technology Fellow Showcase
(More)

1-2 APRIL - MELBOURNE
AusMedtech
(More)

12-16 MAY - MELBOURNE
MCN's Nanofab School
(More)

13-16 MAY - SYDNEY
National Manufacturing Week
(More)

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Providing micro and nano fabrication facilities for Australia's researchers