

Implant Systems - Electrode

The future of medical implants

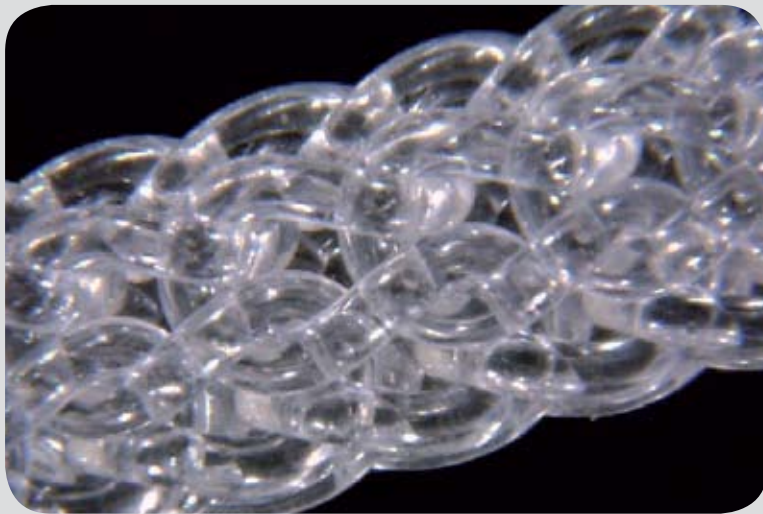


At a Glance

Neuro-stimulation is a rapidly advancing class of therapies for neural-based disorders. However there are significant limitations on device architectures, efficacy, safety and uptake due to the restrictions imposed by current lead and electrode technology.

Existing technologies are expensive and time consuming to manufacture, and presently a major cause of implant revision rates.

The NICTA Implant Systems team is developing a new micro-fabrication method for making tissue interface technologies that increase performance and reduce the cost of interfacing with nerves and muscles.



The NICTA Approach

The NICTA Implant Systems team is developing a series of technologies that will:

- Provide an automated and customisable platform for device component manufacture, enabling whole new architectures
- Be made of existing biocompatible materials, utilising elements of well understood textile fabrication
- Produce new micro-technology methods for tissue interface technologies that increase performance and allow for new planar and 3D structures.

Performance Features

Surface Area – The structure has a greater surface area than existing smooth electrode structures which will deliver power efficiency gains.

Manufacturability – The entire electrode/lead structure can be made quickly and automatically as a single unit.

Robustness – our fabrication technology allows for long, continuous structures to be formed, incorporating lead and electrode to remove joins that are a significant cause of implant failure.

Size – A new generation of micro-fabrication technology will be used to construct electrodes smaller than previously possible.

Safety – All materials used are biocompatible and have US FDA Master Files. The structure poses greater fatigue resistance and a more biocompatible in vivo behaviour.

Multiplicity – The technology can produce many shapes. Strip, grid, and even 3D electrodes are all possible and can be heat fixed for solid, 'moulded' finishes.

The Future

The medical implant of the future will be a long life, increasingly autonomous device that can emulate complex electrical, mechanical and chemical behaviours of biological systems.

From imagination to impact



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NICTA

NICTA is Australia's Information and Communications Technology (ICT) Research Centre of Excellence and the largest organisation in Australia dedicated to ICT research. NICTA drives innovation through high-quality research, research training and technology transfer.





Our researchers are located in five laboratories located in four cities around Australia: Melbourne, Sydney, Canberra and Brisbane. Working in specialised teams, they are focused on a series of specific research themes and business areas.

Our work as a world-class research institute and Centre of Excellence in science and innovation brings together many of Australia's and the world's top ICT researchers. NICTA provides them with the facilities and support they require, making our vision a reality.

NICTA's unique approach fosters and develops ICT research. We work closely with both industry and other research institutions to solve problems and make breakthroughs in ICT with real impact.

NICTA's focus on use-inspired research means our projects have direct relevance to the challenges faced by business, government and individuals around the world. The result is breakthrough technologies that provide commercial opportunities and have a positive impact on Australia's export earnings.

Our Research Themes:

-  Embedded Systems
-  Networked Systems
-  Making Sense of Data
-  Managing Complexity

Our Business Areas:

-  Biomedical and Life Sciences
-  Environmental Management
-  Intelligent Transport Systems
-  Mobile Systems and Services
-  Safety and Security
-  Software Infrastructure



For more information about Implant Systems

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Australian Government
 Department of Broadband, Communications and the Digital Economy
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