



UNSW
SYDNEY



Between Brain and Machine

The development of the optrode array chip: a stepping stone towards the next generation of high-density, implantable brain/machine interface.

Competitive advantage

- Passively transducing the neural signals into the optical domain bypasses the problem of signal degradation and provides a scalable solution that could disrupt the way science thinks about brain/machine interfaces
- Unprecedented resolution, coverage and throughput
- Step-change in both clinical and research environments

Impact

- The best approach to brain/machine interfaces suffers from serious limitations, in that their signal/noise degrades as the density of electrodes increases. An embeddable, conformal optics chip will provide a step-change in both clinical and research environments and enable the control of machines through the brain or the enhancement of human abilities.

Successful outcomes

- Short-term: multi-optrode arrays (250 connections)
- Mid-term: prosthesis control (5000-10,000 connections)
- Long-term: machine control (1 million connections)

Capabilities and facilities

- Access to exhaustive nano-fabrication facilities at the Australian National Fabrication Facility (ANFF)
- Full 3D finite-elements model of all opto-electronics aspects completed
- Research team comprising 5 senior academics and a number of doctoral students

Our partners

- Zedelef Pty Ltd
- Preclinical testing facilities

More Information

Professor François Ladouceur

School of Electrical Engineering and Telecommunications

T: +61 (0) 408 476 460
E: f.ladouceur@unsw.edu.au

Dr Leonardo Silvestri

School of Electrical Engineering and Telecommunications

T: +61 2 9385 6573
E: l.silvestri@unsw.edu.au

Scientia Professor Nigel Lovell

Graduate School of Biomedical Engineering

T: +61 2 9385 3922
E: n.lovell@unsw.edu.au

UNSW Knowledge Exchange

knowledge.exchange@unsw.edu.au

www.capabilities.unsw.edu.au

+61(2) 9385 5008