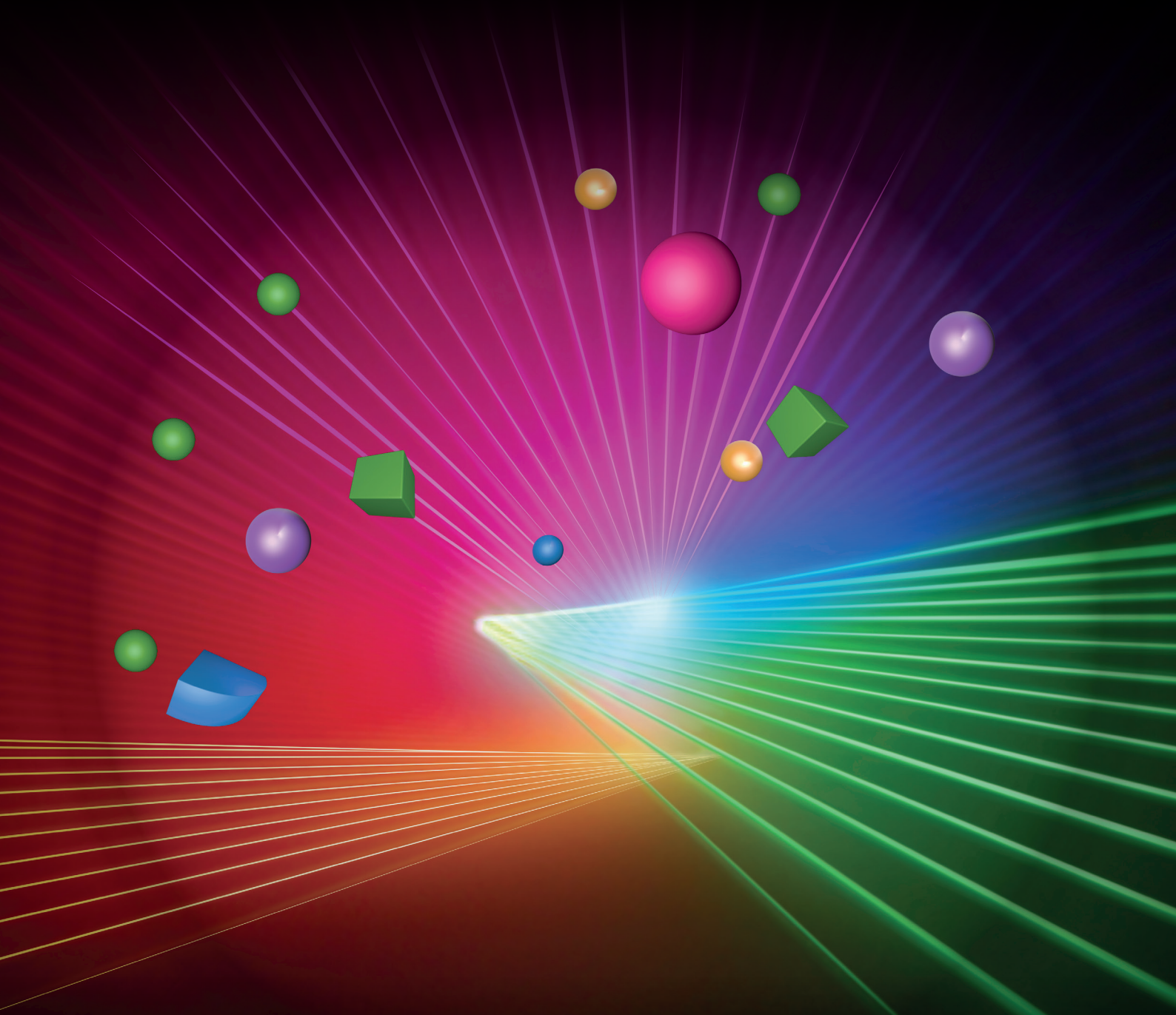


The Centre for Nanoscale BioPhotonics

The power of light to measure



Centre *for*
**Nanoscale
BioPhotonics**
ARC CENTRE OF EXCELLENCE

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At the ARC Centre of Excellence for Nanoscale BioPhotonics (CNBP) we build next-generation light-based measuring tools operating at the cellular and molecular level. We seek to understand and quantify those nanosized processes that impact both the health and condition of the living body, as well as of other dynamic biological systems.

Research Excellence

A \$40m initiative, our Centre consists of approximately 150 researchers located at four outstanding Universities — The University of Adelaide, Macquarie University, RMIT University and Griffith University — all fully equipped with world class laboratories and facilities.

We take a trans-disciplinary approach to our research, drawing from a pool of expertise in fields as diverse as biology, engineering, physics, chemistry, materials science and medicine, aiming to create the biomedical and biosensing tools of the future.

Advanced lasers, optical fibres, nanoprobe, chemical sensors and state-of-the-art imaging and microscopy techniques, these are just some of the photonic (light-based) methodologies we employ to develop our tools and to better understand the activity taking place deep within the cellular environment.

Dedicated to the delivery of outstanding scientific research we work with other academic and industry partners located around the world in pursuit of our innovative and transformational science. We are actively focused on providing solutions that positively impact society and which can also create commercial benefit and return.

Scientific Insight and Discovery

CNBP's research encompasses *Discovery*—of chemical, nanomaterial and fibre based light responsive tools—that *Sense* and that can also *Image*.

The advanced tools and techniques we develop enable living cells to be examined in unprecedented detail, deepening our understanding of the human body and of other living organisms and bio-systems.

Our research has wide-reaching implications for medical evaluations and scientific discoveries. By offering insights into the nanoscale processes that underpin all life, an opportunity to explore and extend the limits of science is being undertaken, in areas ranging from persistent pain, to vascular health, to fertility and reproductive success.

Additionally, our advanced sensing tools are able to be used across the veterinary care, food production, agricultural and manufacturing sectors. The creation of our deployable bio-devices offers real-time molecular analysis, supporting quality monitoring and assessment.

Our Research

Founded on ambition, research at CNBP is organised into three key impact areas (*Sensing*, *Imaging* and *Discovery*), with specific research targets in each.

In *Sensing* and *Imaging* the aim is to be able to quantify and/or image biological events:

- in ultra-small volumes
- in defined spatial (anatomical or cellular) compartments
- in vitro, ex vivo and in vivo, in behaving models of health and disease
- at the relevant timescale, including in real-time
- at a resolution, sensitivity and specificity level, not previously achieved and using deployable devices

We are targeting scientific *Discovery* by:

- visualising the complexity of the working immune system
- quantifying and diagnosing pain
- developing in vivo tools for cardiology
- detecting and monitoring atherosclerosis (plaque build-up in artery walls)

- assessing sperm/embryo/oocyte quality
- sensing molecular activity in the reproductive tract
- undertaking other molecular detections relevant to the biosciences, agriculture, food production and industry sectors

Impact

With our investigative and industry partners from around the world, we are pushing the very frontiers of nano-exploration and measurement. The molecular sensing tools we are devising today will underpin the diagnostic devices of the future, supporting clinicians and their patients, as well as industry and other end-users.

Already, our unique trans-disciplinary research ecosystem is pushing the boundaries of detection sensitivity and image resolution, with breakthrough discoveries in super resolution imaging, hyperspectral cellular analysis, metal ion sensing, smart needles for the brain, cancer margin detection, and the development of a new fibre optic sensor that is able to support the IVF process.

Our researchers are also actively developing exciting new sensors that are being used to objectively monitor quality and condition of foodstuffs—including to date, with milk, meat and wine. This is providing companies with the quality information and product transparency required to excel in today's exacting and competitive market-places.

At the CNBP, we're proud to say that our state-of-the-art tools are literally measuring things that have never been measured before—in the living body and in other dynamic biological systems!

Visit cnbp.org.au to find out more.