

SYDNEY & NEW SOUTH WALES

Scientific Research





A STATE OF CONSTANT DISCOVERY

A quick look at science & medical research in Sydney and New South Wales.

Great advancements in technology. Cures for diseases. Cleaner energies. Breakthroughs across every spectrum of life.

They all start with a single discovery. It's why New South Wales (NSW) is so committed to science and medical research, and dedicated to making our State a world leader.

It's something we've been working at for a long time. And today we can boast outstanding research capacities, across a variety of areas – from food safety and security, to environmental management, climate systems, communications technology, agriculture, health and more. In fact, NSW has the largest research sector in Australia¹ – a country ranked 1st in the Asia Pacific region for the quality of its research institutions, and 10th worldwide by the World Economic Forum survey².

Over \$6.2 billion is spent here³ on research, and you can see that commitment in our research institutions, universities and leading-edge high-tech companies, as well as the major international firms that call NSW home.

As a leader in health and medical research, we're home to many medical research institutes. These include, but are not limited to:

- ANZAC Research Institute
- Black Dog Institute
- Centenary Institute
- Children's Cancer Institute Australia
- Children's Medical Research Institute
- Garvan Institute of Medical Research
- George Institute for Global Health
- Heart Research Institute
- Hunter Medical Research Institute
- Ingham Health Research Institute
- Kolling Institute of Medical Research
- Neuroscience Research Australia
- Victor Chang Cardiac Research Institute
- Westmead Millennium Institute
- Woolcock Institute for Medical Research

NSW, UNDER THE MICROSCOPE

A closer look at our science and medical research facilities.

NSW is home to a number of world class science and medical research institutions – from universities, to medical schools and scientific research centres.

UNIVERSITIES

We have 11 universities headquartered in NSW, across a multitude of campuses, including five in regional areas.

Two universities – the University of Sydney and the University of New South Wales – are among the world's top 50 universities in biomedicine.⁴

COOPERATIVE RESEARCH CENTRES

Cooperative Research Centres (CRCs) are a significant contributor to education, skills, training, research and commercialisation. CRCs are consortia of local and international, public and private organisations brought together to coordinate research, education and training in discrete discipline areas, and have a clear focus translating research into practice and products.

MEDICAL RESEARCH

Along with seven dedicated medical schools at universities across the State, we also hold 14 of Australia's major teaching hospitals, and eight medical research hubs: Darlinghurst; Westmead; Central Sydney; Randwick; Hunter; Illawarra; Liverpool; and Northern Sydney.

NSW also has Centres of Clinical Research Excellence funded through the Federal Government's National Health and Medical Research Council including:

- the Centre for Clinical Research Excellence in Anxiety and Neuroscience
- the Centre for Clinical Research Excellence in Respiratory and Sleep Medicine
- the Centre for Clinical Research Excellence in Aboriginal Health: Sexually transmitted and blood-borne viral infections.

STATE RESEARCH ACTIVITY

The NSW Government makes a significant contribution to science and research, including through the Australian Museum, Cancer Institute NSW, the Department of Environment, Climate Change and Water, Industry & Investment NSW, the NSW Institute of Sport, the Powerhouse Museum, the Royal Sydney Botanic Gardens, Taronga Zoo and the State's public hospitals.

With all this going on in NSW, you can see why our State is now recognised around the world for our knowledge, creation and innovation capabilities. And we're making new discoveries every day.



A WORLD LEADER IN RESEARCH

The organisations at the forefront of science and medical research in NSW.

Science organisations

AUSTRALIAN MICROSCOPY AND MICROANALYSIS RESEARCH FACILITY (AMMRF)

AMMRF is Australia's leading facility for characterisation of matter on a fine scale. Specialising in metrology, instrumentation, and applications of materials characterisation using ion and electron beams, scanned probes, x-rays as well as light and laser optics.

AUSTRALIAN NATIONAL FABRICATION FACILITY (ANFF) – NSW, MATERIALS AND OPTOFAB NODES

ANFF provides researchers and industry with access to state-of-the-art fabrication facilities to process metals, composites, ceramics, polymers and polymer-biological moieties, with applications in sensors, medical devices, advanced materials, nanophotonics and nanoelectronics.

CSIRO RESEARCH CENTRES

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has a strong research presence in NSW, including:

- CSIRO Energy Transformed National Research Flagship
- CSIRO Riverside Life Sciences Centre
- CSIRO ICT Centre
- The Australia Telescope National Facility (ATNF).

CENTRE OF EXCELLENCE FOR ADVANCED SILICON PHOTOVOLTAICS AND PHOTONICS

The Centre is a world leader in silicon photovoltaic research on four separate fronts, including high efficiency and affordable wafer cells, thin film cells, third generation photovoltaics concepts and characterisation. It is at the forefront of research on first, second and third generation solar cells.

CENTRE OF EXCELLENCE FOR ALL-SKY ASTROPHYSICS (CAASTRO)

CAASTRO will solve fundamental processing problems in astronomy with potential application to communications, medical imaging and remote sensing. CAASTRO activities will have a focus on training the next generation of scientists, to lead discoveries on future facilities such as the Square Kilometre Array.

CENTRE OF EXCELLENCE FOR AUTONOMOUS SYSTEMS

Through the work of the Centre, Australia has come to lead the world in the development and application of robotics in large-scale field applications. The Centre's research has applications for aerospace, construction, transport, health and hazardous activities.

CENTRE OF EXCELLENCE FOR CLIMATE SYSTEM SCIENCE

The Centre will resolve uncertainties in regional climate, through research into impacts and adaptation, with direct economic, social and environmental benefits.

CENTRE OF EXCELLENCE FOR COMPLEX DYNAMIC SYSTEMS AND CONTROL

The Centre aims to be a world leader in analysis, design and optimisation of complex dynamic systems. Such systems include energy, ecosystems, health delivery, security systems, telecommunications, transportation, manufacturing processes, the economy, and minerals exploration.

CENTRE OF EXCELLENCE FOR CORE TO CRUST FLUID SYSTEMS

The Centre's research will develop new frameworks for mineral and energy exploration based on fundamental advances in geodynamics and a new understanding of fluid transport at lithosphere scales.

CENTRE OF EXCELLENCE FOR ELECTROMATERIALS SCIENCE

The Centre works to develop nanoscience and nanotechnology related to the movement of electric charge within and between materials, particularly polymers. The developments can be applied in biomedicine, industrial processes, energy harvesting and energy storage.

CENTRE OF EXCELLENCE FOR GEOTECHNICAL SCIENCE AND ENGINEERING

This Centre will provide engineers with new science-based tools for predicting the safety of offshore and onshore geostructures such as oil and gas platforms, roads, railways, tunnels, dams, and port facilities, enabling design and construction of infrastructure as cheaply and safely as possible.

CENTRE OF EXCELLENCE FOR QUANTUM COMPUTATION AND COMMUNICATION TECHNOLOGY

The Centre is developing strategic information technologies based on the laws of quantum physics. The technologies will establish access to unprecedented communications security and computing capability.

CENTRE OF EXCELLENCE FOR ULTRAHIGH BANDWIDTH DEVICES FOR OPTICAL SYSTEMS (CUDOS)

CUDOS is developing photonics and optical device technology aimed at revolutionising information systems. The outcomes will harness links between fundamental research and commercial applications.

INSTITUTE FOR TRANSDISCIPLINARY eRESEARCH SERVICES AND TECHNOLOGY (INTERSECT)

Intersect Australia provides eResearch services to the NSW research sector, working with members, partners and other organisations to identify, develop and deliver ICT enabled platforms to drive the next generation of research and innovation.

NATIONAL ICT AUSTRALIA (NICTA) CENTRE OF EXCELLENCE

NICTA is the largest organisation in Australia dedicated to Information and Communications Technology (ICT) research and innovation, undertaking research, development, commercialisation, education and industry collaboration. Research themes include embedded systems, networked systems, making sense of data and managing complexity.



Health and medical research

CANCER INSTITUTE NSW

The Cancer Institute NSW was established to decrease the devastating impact of cancer on our society. The NSW Government has made significant investments in cancer research, treatment and prevention through the Cancer Institute NSW.

CENTRE OF EXCELLENCE IN BIOTECHNOLOGY AND DEVELOPMENT

The Centre's mission is to dissect the complex developmental networks underlying the genome to phenome transition in male germ cells. This information is then used to address issues of relevance to industry, the environment and healthcare.

AUSTRALIAN NUCLEAR SCIENCE AND TECHNOLOGY ORGANISATION (ANSTO)

ANSTO is home to the 20-megawatt Open Pool Australian Lightwater (OPAL) nuclear research reactor used for applications including environmental, fabrication and medical imaging research. The Radiopharmaceutical Research Institute at ANSTO is engaged in the research and development of radiopharmaceutical technology and isotopes for biomedical imaging and treatment of disease.

CENTRE OF EXCELLENCE FOR POPULATION AGEING RESEARCH

The Centre will address social challenges of ageing, bringing together economics, psychology, sociology, epidemiology, actuarial science, and demography, drawing on strong international networks of researchers, governments and industry will yield outcomes that improve the well-being of the aged and their social and economic environment.

GOOD MANUFACTURING PRACTICE (GMP) FACILITIES

The NSW Government supports research and development in the field of cellular and molecular therapy including establishment of GMP compliant research facilities within Royal Prince Alfred and Westmead hospitals.

CENTRE OF EXCELLENCE FOR STUDY OF COGNITION AND ITS DISORDERS

The Centre's programs will have application in healthcare, education and social welfare informing the diagnosis and treatment of a range of cognitive disorders, including dyslexia, language impairment, autism, dementia and schizophrenia.

CLINICAL RESEARCH NETWORKS

Clinical research networks bring together researchers, clinicians and key stakeholders to increase the impact of research and to facilitate its translation into practice. Networks include: Spinal Cord Injury Network; Cardiovascular Research Network; Cancer Cytoskeleton Network; Multiple Sclerosis Clinical Trials and Research Network; and Paediatric Clinical Trials Network.



THE STATE OF THINGS TO COME

Building a brighter future in NSW.

We've put in place initiatives to ensure we remain at the forefront of research, and that guarantee our entire sector goes from strength to strength.

Take a look at some of the things we've put in place to ensure NSW will remain a State of discovery:

- Appointed the NSW Chief Scientist and Scientific Engineer to provide leadership that stimulates innovation, and links the State's knowledge capacity to the needs of government, business and industry. (www.chiefscientist.nsw.gov.au)
- Introduced TechVouchers, a system that promotes small businesses and public sector collaborations. TechVouchers helps companies to access research services, technology and knowledge of research organisations and universities. (www.business.nsw.gov.au/techvouchers)
- Directing funding and leveraging opportunities towards priority areas for the State, driving investment and growing research excellence and concentration.
- Leading discussions on medical research with researchers, hospitals, the health services sector and education providers – with a view to integrating research, health and education for the best possible outcomes.

1) ABS, Cat. No. 8112.0 – Research and Experimental Development, All Sector Summary, Australia, 2006–07 2) Global Competitiveness Report 2009–10
3) ABS, Cat. No. 8112.0 – Research and Experimental Development, All Sector Summary, Australia, 2006–07 4) 2010 QS World University Rankings

Images courtesy of Garvin Institute, Cochlear, the University of Sydney, CSIRO

**INDUSTRY & INVESTMENT NSW,
A DEPARTMENT OF THE
NEW SOUTH WALES GOVERNMENT**

Level 47, MLC Centre, 19 Martin Place, Sydney, NSW 2000
GPO Box 5477, Sydney NSW 2001, Australia
Phone: +61 2 9338 6600 Fax: +61 2 9338 6950
Email: info@osmr.nsw.gov.au
www.business.nsw.gov.au

**FOR FURTHER INFORMATION AND
INTERNATIONAL OFFICE LOCATIONS
VISIT WWW.SYDNEYAUSTRALIA.COM**



**Industry &
Investment**