

VICTORIAN BIOMEDICAL IMAGING CAPABILITY

Delivering the next generation of discoveries to enhance excellence in biomedical imaging

vbic.org.au

ABOUT THE VICTORIAN BIOMEDICAL IMAGING CAPABILITY

Federal funding allocated through the National Imaging Facility, which is an initiative of the Australian Government conducted as part of the National Collaborative Research Infrastructure Strategy (NCRIS), has been earmarked for investment in Australia's research infrastructure. This funding enables VBIC to deliver its mission, increasing Victoria's global competitiveness in priority health areas.

Formed in 2010 following a \$12.5 million investment by the Victorian State Government matched by collaborating organisations, the Victorian Biomedical Imaging Capability provides the Victorian biomedical research community and industry partners with access to cutting-edge imaging equipment and expertise.

VBIC was funded by a Victorian State Government Science Agenda Grant of \$8.5 million in 2010 with \$16.3 million matched funding by the collaborating organisations. In addition \$37 million was committed to major capital investments during the period 2011-17, with competitive grant income of \$235 million including 6 major grants of \$108 million awarded to VBIC nodes.

The VSA grant led to the creation of a coordinated Victorian network of capabilities and research capacity in medical imaging to support Victorian universities and medical research institutes and industry partners.

VBIC has provided increased capability and capacity in research-dedicated imaging for: (i) cancer, brain and cardiovascular imaging, (ii) pre-clinical imaging, and (iii) cognitive and clinical neurosciences research.



VBIC INVESTMENT DELIVERS FOR VICTORIA

Over the past seven years the VBIC partners have further developed the imaging infrastructure and services and created a Victorian capability with greater depth and breadth than originally envisaged.



OBJECTIVES

- Enhance excellence in biomedical research, increasing skilled jobs and linking image resources across research institutions.
- Bring together Victorian imaging groups and enable increased collaboration and sharing of capabilities and infrastructure.
- Improve health care and global competitiveness in priority health areas through extensive imaging facilities, state-of-the-art technology and expertise, workshops and training, and interdisciplinary collaborations and networking.

VBIC's mission is to deliver the next generation of discoveries and enhance excellence in biomedical imaging.

OUTCOMES SINCE 2011

FLAGSHIP RESEARCH PROJECTS SUPPORTED BY VBIC

VBIC has co-ordinated Victorian participation in the NCRIS funded National Imaging Facility, and continued to conduct annual scientific research and networking events. The \$12.5 million investment in 2010 has secured \$235 million in grant income, delivered \$350 million of economic activity in Victoria, published 1,000 peer reviewed research papers, developed collaborations and partnerships with industry to a value of \$35 million, and has 500 active research users.

AUSTRALIAN RESEARCH COUNCIL (ARC) CENTRE OF EXCELLENCE FOR INTEGRATIVE BRAIN FUNCTION GRANT

\$20 million (2014-2020) awarded to Monash University for fundamental research into integrative brain function (Lead researcher: Prof Gary Egan, Monash University).

NHMRC ONCOLOGY PROGRAM GRANT

\$5.8 million (2016-2020) awarded to the Olivia Newton John Cancer Research Institute (Lead researcher: Prof Andrew Scott, Austin Hospital).

NHMRC PROGRAM GRANT

\$22 million (2016-2020) awarded to The Florey Institute for research into Human Epilepsy: Understanding biology to improve outcomes (Lead researcher: Prof Graeme Jackson, The Florey Institute).

AUSTRALIAN DEMENTIA NETWORK NIDR GRANT

\$18 million (2018-22) (Lead researcher: Prof Chris Rowe, The University of Melbourne).

ASPREE

An NIH funded (\$25million US) longtitudinal (10yr) study looking at aspirin in a healthy elderly patient cohort.

WHO WE WORK WITH

LL

150

STAFF EMPLOYED ACROSS THE CATEGORIES OF IMAGING RESEARCH SUPPORT SCIENTISTS (>100), SUPPORT ENGINEERS & INFORMATICIANS (10), TECHNICAL OFFICERS (~20), MANAGEMENT (10), AND ADMINISTRATIVE STAFF (20).

FIVE VBIC NODES

MONASH UNIVERSITY, THE UNIVERSITY OF MELBOURNE, THE FLOREY INSTITUTE OF NEUROSIENCE AND MENTAL HEALTH, SWINBURNE UNIVERSITY, AND THE OLIVIA NEWTON-JOHN CANCER RESEARCH INSTITUTE



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NATIONAL & INTERNATIONAL PARTNER ORGANISATIONS, INCLUDING ASTRAZENECA, NOVARTIS, PRANA BIOTECHNOLOGY, AVIPEP, IMAGINAB, PFIZER, SIEMENS HEALTHCARE, BRAINPRODUCTS, THE AUSTRALIAN FOOTBALL LEAGUE, GLAXOSMITHKLINE, BAYER, CORTICAL DYNAMICS, AND BRUKER

CRITICAL KEY RESEARCH IMAGING INVESTMENTS

VBIC has identified the investments needed to endure the future capability and competitiveness of Victorian clinical and biomedical research. NCRIS has committed funding to key areas where Victorian institutions have critical research imaging capability gaps. These criteria help frame and inform VBIC's funding requests to the Victorian State Government. Examples of NCRIS funding are given below.

MONASH UNIVERSITY

A comprehensive Medical Accelerator Facility at Monash University to provide the production capability for novel diagnostic and therapeutic radiopharmaceutical in cardiology, neurology and cancer.

FLOREY INSTITUTE

A unique MR neurointerventional imaging facility at the Florey (Austin) to trial novel therapies in dementia, brain degeneration and brain injury

UNIVERSITY OF MELBOURNE

A replacement PET-CT scanner at the University of Melbourne to enable the next generation of dementia PET imaging research.







SWINBURNE

Upgraded helium control system for the research magneto-encephalography facility at Swinburne University, for application to epilepsy and brain disorders.



AUSTIN HEALTH, UNIVERSITY OF MELBOURNE AND ONJCRI

Radiochemistry upgrades to support oncology, neuroscience and metabolism research.





VBIC SUPPORTING THE INNOVATION ECONOMY

VBIC is a fundamental platform for supporting the innovation-economy. Biomedical imaging expertise and research infrastructure is critical for basic, translational and clinical research in cancer, neuroscience, cardiovascular, respiratory and infectious diseases.

Biomedical imaging investment strengthens Victoria's \$12.7 billion Medical Technologies & Pharmaceuticals Sector. The medical technologies and pharmaceuticals sector are one of eleven industry sectors the state government has prioritised for growth.

Continued support for the biomedical imaging research infrastructure will drive outcomes, jobs, and investment in this maturing sector. Improved capabilities will have a significant economic impact, both through translation of better research into industry, and via optimally positioning VBIC to maximise the funding opportunities presented through funding from the Medical Research Future Fund, other funding agencies and industry.

VICTORIAN SCIENCE AGENDA GRANT (2010)

Formed in 2010 following a \$25 million investment by the Victorian State Government and the collaborating organisations, the Victorian Biomedical Imaging Capability (VIBC) provides the biomedical imaging research community with access to cutting-edge imaging equipment and expertise. VBIC provides a coordinated network of advanced capabilities and expertise in biomedical imaging to support the needs of universities, medical research institutes, and industry. Over the past seven years the VBIC partners have further developed the imaging infrastructure and services and created a Victorian capability with significantly greater capability that has attracted industry and international recognition.

MONASH SIEMENS SIMULTANEOUS MR-PET COLLABORATION IN BIOMEDICAL IMAGING TECHNOLOGIES

Following a competitive process the Science and Industry Endowment Fund provided over \$5 million funding to Monash University in 2015 for procurement of Australia's first research dedicated simultaneous MR-PET scanner. The scanner has the potential to bring about a paradigm shift in biomedical imaging using simultaneously acquired MRI and PET images. In 2017 a collaboration between Monash and Siemens Healthcare was awarded an Australian Research Council Linkage Grant to develop simultaneous quantitative anatomical, physiological and metabolic imaging technologies. These advances have raised more than \$10 million in financing and led to the establishment of highly innovative Victorian startup company based on artificial intelligence in biomedical imaging.

SWINBURNE – EPILEPSY IMAGING

Swinburne collaborated with St Vincent's Hospital to conduct simultaneous MEG and EEG recordings on patients with medically uncontrolled focal epilepsy. The technique pinpointed the 'electrical storms' that precede an epileptic event giving previously ineligible patients the option of surgery to remove the part of the brain triggering seizures. No other surgical epilepsy service in the world uses this combination of high density EEG and MEG. The results have been so successful that SVHM is now receiving referrals from hospitals nationally and internationally.

FLOREY MAGNETIC RESONANCE IMAGING FACILITY

A \$4m Victorian Government, Science, Technology and Innovations (STI) Grant from the Department of Innovation, Industry, and Regional Development in 2006-2008 has returned substantial ongoing benefits to Victoria. The expanded equipment and staffing of the Magnetic Resonance Imaging Facility at the Brain Research Institute (now part of The Florey Institute in the Austin LifeSciences Precinct) has facilitated over 200 research projects. It has also yielded major innovations in image analysis methodology, resulting in industry partnerships and commercialisation with leading international medical imaging technology companies.



TIMELINE OF VBIC INFRASTRUCTURE INVESTMENT



RECENT VBIC OUTCOMES

COLLABORATION

VBIC provides a network of advanced capabilities and expertise in biomedical imaging to support the needs of universities, medical research institutes and industry. Over the past ten years the VBIC partners have created a Victorian capability that has attracted collaborations with over 50 industry and 20 international partners.

SCIENCE AWARENESS

The Annual VBIC Network Meeting provides a forum for the biomedical imaging research community to gather and create awareness of the excellent biomedical imaging capabilities and projects in Victoria. The all-day event, includes presentations and panel discussions of specific findings of VBIC projects, as well as educational and policy discussion. Attendees include existing and potential new research, industry and commercial end-users. The meeting attracted over 180 participants in 2019.

SKILLS BASE

VBIC nodes have made significant investments in talent and skills development to optimize the utilization of the VBIC research instruments. This has led to substantial positive realworld outcomes. Over the past decade, more than 100 imaging research support scientists with backgrounds in physics, engineering, mathematics, data science and informatics have been recruited and trained in advanced biomedical imaging research techniques. This has supported a wide range of productive research activities, resulting in over 1,000 peerreviewed scientific publications documenting knowledge gain.

COMMERCIAL

The VBIC partner organisations have established commercial collaborations and partnerships valued over \$35 million in 2018. For example, Avipep Pty Ltd is a Victorian company, poised to capture a share of the US\$40b p.a. market for cancer therapeutics with its patented, best-in-class engineered antibodies (Avibodies[™]) for cancer imaging and therapy. The success of cancer imaging with Avibodies[™] was based on preclinical imaging studies using tumour xenograft PET and the world's first clinical trial of an engineered antibody (PET imaging) in prostate and ovarian cancer, conducted at Austin Health, and the Peter MacCallum Cancer Centre. Financial support from the Australian Government Commercial Ready and Accelerating Commercialisation grants, and a Victorian State VSA consortium award, were pivotal to the imaging studies.

SCIENTIFIC RESEARCH Victorian biomedical imaging researchers are ranked first in Australia and recognised globally as thought leaders. Since 2012 VBIC node members have been awarded more than 60 national and international awards.

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