WESTMEAD HEALTH AND RESEARCH PRECINCT
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Front cover image and the above image are artist’s impressions
The expansion of the Westmead Health and Medical Precinct – the Innovation Quarter – present an extraordinary opportunity to work with Western Sydney University, and alongside other leading health organisations, to address the most pressing challenges confronting our communities.

Exemplifying international best-practice, the Innovation Quarter will bring Western Sydney University together with community, healthcare, industry and government partners. This integrated, collaboratively-driven approach will help deliver outstanding health, economic and social outcomes. Together with our precinct partners, we will seek to reinvent traditional practices and make the latest innovations, technologies and treatments available to Western Sydney sooner.

The University will base three of its renowned research institutes in the Innovation Quarter: the MARCS Institute for Brain, Behaviour and Development, the NICM Health Research Institute and the Translational Health Research Institute (THRI). These institutes already work in close partnership with organisations spanning the health sector to conduct outstanding and impactful research and development; a presence at Westmead will further amplify the opportunities of partnership and the outcomes that joint-research, innovation and training provide.

The Innovation Quarter reflects the priority we give to collaboration across our teaching, research, innovation and commercial activities at Western Sydney University and is a model which we will replicate at health precincts across Western Sydney. We invite partners who share our vision for effective, efficient and equitable healthcare to partner with us in this exciting new development.

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Western Sydney University
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A VIBRANT URBAN SETTING
Westmead offers a unique opportunity for the public and private sectors to join a precinct at the forefront of Australia’s health and research future.

At Westmead, partners from across the health sector collaborate with globally-recognised researchers who are translating innovative ideas into best practice to benefit society.

Westmead has Australia’s largest concentration of hospital and health services, co-located with research and education. Situated 25 km west of Sydney’s Central Business District, the Westmead Health and Research Precinct provides more than 18,000 high value jobs and places for more than 3,400 students.

The precinct is experiencing unprecedented investment and growth. Government and private investors have committed more than $3.4 billion over the next ten years for infrastructure development, with $2.4 billion of further investment opportunities also identified in Australia’s most rapidly evolving region.

Developments at Westmead will be key to addressing pressing challenges faced by Western Sydney in relation to an ageing population, chronic disease and community health issues.

Industry, public sector and community organisations can benefit from Westmead’s expansion, predicted to lead to 50,000 jobs by 2036. Westmead will become a jobs engine for Western Sydney and contribute more than $2.8 billion annually to NSW’s economy.

Innovation district

Much of the success of Westmead’s future pivots on its evolution into a globally-competitive innovation district. Such districts are well-established in places as diverse as Boston, Barcelona, Eindhoven, Helsinki, Manchester, Toronto and Seoul. These districts’ skilled workforce and leadership enhance collaboration, by enabling a more seamless transfer of knowledge within and across businesses, workers and supporting institutions. They provide a strong foundation for commercialisation of ideas and job creation because of their close proximity to each other.

Innovation districts also promote the efficient use of infrastructure by creating an innovation ecosystem between people, businesses and the physical geography of the district. The exchange of new ideas in turn fuels even greater economic activity and growth. Westmead will leverage the same advantages to create a world class centre of excellence for health innovation.

ANCHOR INSTITUTIONS

Health

Westmead health facilities are renowned for providing critical and acute health care for adults and children. Westmead also plays a major role in measures to lessen Western Sydney’s growing burden of chronic diseases including diabetes, cardiovascular disease and obesity.

The current health facilities at Westmead include:
- The Children’s Hospital
- Westmead Private Hospital
- Westmead Hospital
- Westmead Hospital for Oral Health
- Westmead Skin Hospital
- Cumberland Hospital

The Westmead Redevelopment is the largest health redevelopment investment in NSW and the government has already committed $900 million to its expansion and refurbishment.

Research and Education

Westmead is home to four major research institutes and many other research groups and networks, employing more than 1,100 full-time staff, including research, clinical scientists and support staff.

The research institutes include:
- Westmead Institute for Medical Research
- Children’s Medical Research Institute
- Kids Research Institute
- Institute of Clinical Pathology and Medical Research

Universities are particularly important catalysts for growing innovation districts. Currently Westmead caters for 3,400 students from two of Australia’s major universities.

Current facilities at Western Sydney University include:
- The MARCS Institute for Brain, Behaviour and Development
- NICM Health Research Institute
- Translational Health Research Institute (THRI)
- Westmead Lifespan Labs
- BioMed Rapid Translation Lab
- Western Sydney Integrative Health Clinic
- Pharmacology and Analytical Chemistry Labs
- Clinical Trials Facilities
- Health Living Labs

University of Sydney has various clinical schools and faculties located at the precinct.

The MARCS Institute for Brain, Behaviour and Development, PhD Student Researcher Irena Lovcevic, performing psychophysiological assessment with continuous measurements using an electroencephalography (EEG) cap in the Westmead BabyLab.
WESTERN SYDNEY UNIVERSITY
INNOVATION QUARTER
Western Sydney University is co-developing a $350 million ‘Innovation Quarter’ with Charter Hall as part of the Westmead campus redevelopment.

The new Innovation Quarter will be a pioneering health and medical precinct, showcasing the University’s world-class research and creating new partnerships with industry, government and healthcare providers. This precinct will generate significant scientific, economic and social benefits for Western Sydney, Australia and globally.

The distinctive quarter is an opportunity for researchers and industry to come together and generate ideas to translate solutions to achieve positive impacts to tackle clinical and community health challenges.

Covering four hectares, Western Sydney University’s Westmead precinct will be the gateway to a mixed-use development. The development co-locates attractive commercial, community and residential spaces with the University education and research facilities. This creates amenity and a valuable sense of place for those engaged in and around the precinct.

Institutes that will locate at the Westmead precinct include Western Sydney University’s MARCS Institute for Brain, Behaviour and Development, the Translational Health Research Institute (THRI) and the NICM Health Research Institute. These institutes play an important role in addressing some of the most persistent healthcare challenges.

After redevelopment, the site will evolve into a hub for 2,500 students, 2,000 residents and 1,900 workers. Westmead railway station, the Parramatta Light Rail, Sydney Metro West and the rapid bus Transitway (T-way) service will connect the precinct to the region.

This Innovation Quarter is a unique opportunity for collaboration between businesses, researchers, government sector workers and health clinicians to share the latest ideas, evidence and technology.
Western Sydney University’s world-class health and medical research addresses the most pressing social challenges, finds better treatments for chronic diseases, improves public health services, supports industry and enhances economic development.

While new scientific discoveries are very important, it is a critical priority of the University’s health and medical research to translate science into real-world impact in the local community, as well as nationally and worldwide.

The University’s research aims to improve people’s quality of life with more effective treatment and therapies, while also advancing health policy.

The University is renowned for its particular expertise in the areas of diabetes, healthy ageing, memory-related illness, complementary medicine, early language development and communication, the cancer journey, mental illness, Indigenous health, and women’s health.

Researchers work with an extensive network of partners in the public sector. These include:

- Local Health Districts across NSW
- Primary Healthcare Networks
- Tharawal Aboriginal Medical Services
- Early Learning Centres
- Schools
- Health Services
- Local Councils

Forging health innovation partnerships with health startups and also large corporates is also vitally important. Corporate collaborators include:

- GE Health
- KPMG
- Google Australia
- Blackmores, among many others.

Across NSW, the University also has joined forces with:

- Digital Health CRC
- Maridulu Budyari Gumal (The Sydney Partnership for Health, Education, Research and Enterprise)
- Ingham Institute

The MARCS Institute for Brain, Behaviour and Development’s PhD student researcher Simone Simonetti researching emotion recognition in older adults.
MANY OF OUR RESEARCHERS ARE ACKNOWLEDGED NATIONAL LEADERS AND

85 PER CENT
OF OUR RESEARCH HAS BEEN INDEPENDENTLY ASSESSED AS AT, OR ABOVE WORLD STANDARD.

MORE THAN
50 PER CENT
OF THE UNIVERSITY’S RESEARCH IS IN HEALTH AND MEDICINE.

IN THE 10 YEARS FROM 2008–2018, OUR RESEARCHERS IN HEALTH, MEDICINE AND WELLBEING HAVE RECEIVED MORE THAN

$172 MILLION
IN RESEARCH FUNDING.

THE UNIVERSITY AND ITS PARTNERS WILL ATTRACT MORE THAN

$1.2 BILLION
IN COMMERCIAL AND INDUSTRY-PARTNERED INVESTMENT IN ADVANCED HEALTH AND EDUCATION INFRASTRUCTURE OVER THE NEXT DECADE.

IN 2017 ALONE, THE UNIVERSITY GENERATED MORE THAN

$500 MILLION
IN DIRECT TEACHING AND RESEARCH INFRASTRUCTURE INVESTMENT INTO THE REGION.

RESEARCHERS HAVE WORKED ON

3,200
HEALTH AND WELLBEING PROJECTS, AND

12,500
OF OUR STUDENTS ARE AT CLINICAL OR RELATED PLACEMENTS IN HOSPITALS ACROSS THE REGION.
Artist’s impression

Dr Susan Grant dispensing herbal medicine at NICM Health Research Institute.

The MARCS Institute for Brain, Behaviour and Development’s Dr Gaetano Gargiulo and Associate Professor Paul Breen with their ‘VitalCore’ wearable technology. Photo: Michael Amendolia
The THRI cancer and fertility research team review patient experience data for a community health guide published by the Cancer Council.

Alice Salib is a Master of Research in Molecular genetics student.

The MARCS Institute for Brain, Behaviour and Development studies both the auditory and visual aspects of spoken language using Optotrak.

Nao robot used in studies of human-machine interaction and factors influencing trust.
“The aim of our research is to optimise people interacting with each other and with technology from infancy into the senior years,” says Professor Kate Stevens, Director of the MARCS Institute for Brain, Behaviour and Development.

The MARCS Institute builds on 20 years of research into human interaction across the lifespan. The Institute is renowned for outstanding fundamental science and impactful translational research. The Institute collaborates with universities and research partners across the world. More than 120 researchers work in 12 specialist laboratories to better understand brain function and improve wellbeing.

The MARCS Institute embraces a sweep of disciplines from software, electrical and biomedical engineering through to developmental psychology, language science, cognitive neuroscience and music science.

BABYLAB

BabyLab has facilities in Bankstown, Kingswood and Westmead, conducting research into the development of cognitive, social and emotional skills especially through speech and language.

Researchers use equipment that can record eye movements, heart rate and brain responses using electroencephalography. BabyLab has also developed new tools for assessing language development, tailored to Australia that includes the richness of cultural and linguistic diversity.

More than 1,000 infants and their caregivers visit BabyLab each year. Projects include identifying early precursors to potential communication challenges such as dyslexia, the benefits of bilingual and multilingual environments, the role of infant-directed speech, and potential associations with language development of maternal depression or hearing loss.

AGE LAB

The Institute’s Age Lab investigates changes in perception and cognition as people age. Researchers investigate associations between changes in hearing, social cognition and cognitive decline. Projects include examining how older adults recognise faces and voices, age-related changes in visual and auditory attention, and ways to optimise communication in noisy environments. Evidence-based interventions to potentially delay changes in cognition with age include learning a new language or a musical instrument.
THE IMPORTANCE OF BABY TALK

Postdoctoral Research Fellow Dr Anne Dwyer is using ‘LENA’ to take her research out of the lab and record the language environment in family homes around Sydney. ‘LENA’ is a voice recorder about the size of a pack of cards that fits in a baby-sized vest.

“We have been looking at the different factors that influence the language environment and the way speech and language develop in the early months and years,” she says.

Previous studies had shown an association between parental education and early vocabulary. Dr Dwyer’s study found the importance of interaction and ‘little conversations’ for vocabulary development. MARCS researchers are now sharing their insights through the BabyLab podcast series.

TIME TRAVEL TO REMEMBER

Professor Stevens is involved in a community-based project through the Institute’s Age Lab. Combining experimental psychology, reminiscence therapy and new technology, researchers gather information from older people and their families about the places they’ve lived, worked and visited. Together they “travel” to these meaningful locations using Google Earth and Street View displayed on immersive screens.

“Particularly with people with limited language or communication, the immersive technology offers the chance to reflect and share stories with family and care staff,” says Professor Stevens. “We sometimes uncover new stories that even the family hadn’t heard before. The images sometimes elicit stories that are new to family members and care staff.”

The intervention engages a small group in residential or respite care visually and verbally, and is designed and delivered in partnership with aged care providers.

The research will inform the design of future models of care to support the wellbeing of the elderly living at home or in facilities.

BIOMED TECH INNOVATION IN PARTNERSHIP

VitalCore is a novel wearable technology, invented by A/Prof Paul Breen and Dr Gaetano Gargiulo, to allow fine monitoring of lung volume and cardiac output. This lightweight, comfortable shirt incorporates contactless sensors developed at WSU. The device has multiple applications in monitoring cardiovascular and respiratory disease, sleep, foetal movement, peripheral vascular function and athletic performance. MARCS has partnered with Medical Monitoring Solutions to conduct clinical trials and quickly move to commercialisation of VitalCore.

Breen says “As researchers, we want to work on stuff that looks like the future. Our aim is to make wearable technology that is truly invisible to the wearer, while providing medical grade information for patients and clinicians. Working with MMS, we have been able to quickly accelerate the development of our device to bring that future forward, we’re extremely excited by the positive health impacts it promises.”

TRUSTING ARTIFICIAL INTELLIGENCE

Technology is everywhere and is becoming more autonomous. This has led MARCS researchers to investigate people’s trust in autonomous systems.

Dr Chris Stanton designs scenarios that engage adults in interacting with a robot or AI trained to convey a recommendation that maximises the users’ trust. His experiments study transparency, anthropomorphism and trust repair. They have revealed that social and psychological processes play an important role. “We see some really interesting trends in our research, for instance in the way different people respond to and trust robots that stare at them,” Dr Stanton says.

As technology becomes ever more embedded in our lives, his research will have wide implications for healthcare, security and transport.
NICM Health Research Institute (NICM) is Australia’s leader in integrative and complementary medicine research and policy.

Seed funded by the Commonwealth and NSW governments, NICM plays a national role in ensuring Australians have access to reliable evidence on complementary medicines and treatments. The Institute translates its laboratory research and human clinical trials into relevant clinical practice and government policy.

Located at the Westmead Health and Medical Precinct in a refurbished heritage-listed building with 70 researchers and staff, NICM’s facilities include state-of-the-art herbal pharmacological and analytical chemistry laboratories, and clinical trials capabilities.

NICM’s researchers are also exploring emerging areas including:
- Australian bush medicine
- Mind and body therapies, including yoga and meditation
- Medicinal cannabis.

NICM has also established Western Sydney Integrative Health (WSIH), a new integrative medicine clinical services facility. This provides clinical services and hosts clinical studies integrating selected complementary treatments, such as acupuncture and herbal medicine, with conventional healthcare.

Partnering with NICM, relevant healthcare businesses and researchers can leverage scientific capabilities and technical expertise to enhance their competitiveness.

The Institute is globally recognised for its world-class research and innovation in integrative and complementary medicine. NICM’s research has had significant academic and social impact, national and international, supported by extensive media coverage. NICM has numerous national international collaborations. NICM’s Director, Professor Alan Bensoussan is a widely acknowledged leader in the field and works closely with the Australian Government on relevant policies. For example, in 2012, Australia became the first Western country to regulate Chinese medicine practice.

The Institute’s primary research programs focus on:
- Preventing and treating cardiovascular and metabolic disorders
- Neurocognitive and mental health disorders
- Promoting sexual and reproductive health in women
- Encouraging healthy living for cancer patients.

NICM’s researchers are also exploring emerging areas including:
- Australian bush medicine
- Mind and body therapies, including yoga and meditation
- Medicinal cannabis.

Western’s Chinese Medicine Centre works closely with NICM Health Research Institute at the Westmead Health and Medical Precinct. The CMC leads the University’s Traditional Chinese Medicine education and training, and plays a critical part in related research and clinical programs. The CMC was established in partnership between Western Sydney University and Beijing University of Chinese Medicine, the world leader in the field; it is the only Centre of its kind in Australia. The CMC regularly hosts BUCM’s leading scientists and clinicians as visiting scholars and enjoys strong links to both the local and international industry.

Director of the CMC, A/Prof Xiaoshu Zhu, described the unique nature of the partnership. “BUCM scientists are heavily involved across all of our programs. We jointly train postgraduate and research students, provide student and staff exchange programs and host prominent professional programs. At the moment we’re working together on clinical research with a particular focus on integrative oncology and are very excited at the prospect of the impact that might have here in Australia and internationally.”

Nicm is one of only two university laboratories licensed by the Australian Therapeutic Goods Association (TGA) to produce certification of herbal ingredients. Nicm has partnerships with more than 30 companies, providing research, development and testing of their products and services.

Understanding Mental and Physical Health

Dr Joseph Firth is a Nicm-Blackmores Institute Senior Research Fellow focusing on novel interventions to treat mental health disorders, particularly in young people with psychotic disorders. “I research the interface between physical and mental health and examine if improving health behaviours can reduce the symptoms of mental disorder,” he says.

Collaborating with other universities internationally, Dr Firth has developed the evidence base that exercise improves mental health outcomes. This has led community leisure services throughout Sydney to introduce the ‘Take Charge!’ exercise referral program, offering young people with mental health disorders free gym and trainer sessions. Nicm’s researchers are also investigating using physical activity and dietary changes an early intervention strategy in young people to prevent the onset of mental health disorders.

Cannabis Therapy for Pain

Medicinal cannabis is generating international interest as a new therapy and has been legal in Australia since 2016. Nicm is poised to play a critical role in the industry's development, supporting the healthcare sector and improving patients’ quality of life. Nicm’s research focuses on cannabis’ plant genetics, pre-clinical pharmacology, how it can treat Post Traumatic Stress Disorder and mild cognitive impairment.

Nicm Research Fellow, Justin Sinclair, is exploring how cannabis can alleviate the crippling effects of endometriosis such as chronic pelvic pain, anxiety, depression, nausea and vomiting. “I’m conducting an international survey and using these findings to inform a clinical trial. Favourable results will potentially enable us to offer additional frontline treatments and to advocate for changed government policy.”

New Treatments for Brain Health

Dementia is the leading cause of disability in older Australians and it affects more than 44 million people worldwide. Dr Genevieve Steiner heads Nicm’s Neurocognition Laboratory and her team is discovering new ways to prevent, diagnose, and treat people with early stage Alzheimer’s disease.

“Continued scientific breakthroughs in this space are really important to mitigate the impacts of the disease, delay deterioration and improve quality of life,” she says. Her team uses neuroimaging and physiological measures such as electroencephalography (EEG) to assess how novel therapies change the brain’s structure and function.

Dr Steiner and her team are exploring new treatments including multicomponent herbal medicine formulas and medicinal cannabis for people at high risk of dementia.
Improving the process of applying research knowledge into practice through collaboration with our partners is the central focus of the Translational Health Research Institute.

The Translational Health Research Institute (THRI) is a health and medical research institute with a research node at the Westmead precinct. With a focus on translation and impact, THRI examines disease both acute and chronic. The Institute uplifts research across Western Sydney University, integrating it into policy and practice to have a real impact on people’s lives by improving health outcomes.

"THRI promotes cross-disciplinary research, outside and within the University," says Professor Janette Perz, THRI Director. "It’s a hub, a place to collaborate for all health and medical researchers and students in the University no matter what campus or discipline they come from."

More than 145 researchers across Western Sydney University schools and institutes are part of the THRI network.

THRI researchers produce world class research in public health and health services, nursing, psychology, allied health, maternal and child care, clinical medicine, pharmacology and many other healthcare areas. Researchers work alongside partner organisations to define the issues they face, explore solutions, implement changes and then continue to refine and improve them. THRI researchers produce a deep understanding of broader social and economic factors that influence health and wellbeing.

The Institute's research encompasses:
- prevention and management of acute and chronic disease
- health and wellness across the lifespan
- health, culture and society
- mental health and wellbeing
- diagnostics and therapeutics
- service delivery and new models of care

THRI is building new facilities at Westmead; a purpose-built, translational research hub with flexible spaces for health and clinical research. These facilities will enable researchers from across the University to collaborate with those from other universities, industry, community and government. They will include “living labs” with areas suitable for a broad range of health clinics and practices.
WOMEN WITH BIPOLAR DISORDER IN MENOPAUSE

About one per cent of Australian women have bipolar disorder, but little is known about how menopause exacerbates their mood swings. This has led Dr Tania Perich, in the School of Psychology, to compare the moods of more than 350 women with bipolar who are either of reproductive age, in menopause or post menopause. Her team is conducting qualitative interviews and online global surveys.

Her research will translate into more information for GPs and psychiatrists so that they know what to expect when their patients with bipolar reach menopause. Her research will also help educate women themselves so they can be prepared. Her link to the Westmead precinct through THRI will allow her to work easily with clinicians and the community to apply her research in practice.

OLDER PEOPLE AND TRUST

Associate Professor Phoebe Bailey studies the cognitive, social and emotional influences that people over the age of 65 face in their decision making. “The financial exploitation and financial abuse of older adults in our society is a really big problem,” she says.

Associate Professor Bailey has studied how older and younger adults trust each other by bringing them into her lab to play a game where they invest real money together.

“We’ve found that older adults were more trusting than younger adults,” she says. “The older adults respond to both genuine cues to trustworthiness, such as past behaviour, and superficial cues like facial appearance.”

She’s now using her research as a basis to design and apply tools to prevent financial exploitation of older adults. She will continue this work in the THRI translational research hub and living lab.

SELF-MANAGING HEART CARE

Senior Research Fellow Dr Caleb Ferguson has a background as a nurse for patients who’ve had a stroke. In a joint appointment at Western Sydney University and Western Sydney Local Health District, funded by the Heart Foundation, his research is improving care and preventing strokes for people with heart rhythm disorders, and particularly atrial fibrillation.

“These strokes are highly preventable, if people are diagnosed and take the right medication,” he says. In one project, he is working with THRI and MARCS Institute researchers trialling wearable heart monitors embedded in clothing. In another project, Dr Ferguson is collaborating with a technology company, creating an app with a gamification dimension to provide more information about heart rhythm for patients to monitor themselves from home.

Dr Ferguson’s research is translating into better clinical practice, care and outcomes for patients.