The College of Health and Science aims to bring knowledge to life through its health, science and technology research, and its educational and community programs. We believe in:

- The primacy of the student experience
- A vibrant and inclusive intellectual community
- Opportunity and excellence in our research and educational programs
- Strong local and international connections
- Valuing, rewarding, challenging and developing our staff
- Environmental and social responsibility.

Research in the College is diverse, and includes University recognised Research Centres and a range of research groups and nodes, many with external affiliations. Research in the College can be summarised under six broad themes which provide an umbrella for current and future research development.

- **Environment, Water and Energy Research**, incorporating the University Centre for Plants and the Environment, the Solar Energy Technology Research Group (also linked to Nano ++), and the recently awarded $40 million national infrastructure facility for Climate Change and Energy Research; water, ecology, wildlife and conservation research; food technology, systems agriculture, and other research in the School of Natural Sciences. The Centre for Plants and the Environment hosts the Hawkesbury Forest Experiment, and other studies examining the impact of climate change associated with elevated carbon dioxide levels on soil microbial ecology/nutrient cycling and plant physiology, and the capacity of plants to adapt.

- **Sustainable Health and Well-Being**, including the University Centre for Complementary Medicine, and a range of research groups and nodes: Family and Community Health; Health Systems and Services Management; Disaster Response and Resilience; Men’s Health, Exploring Pregnancy Outcomes etc. It also includes capacity building research to improve health services for mothers, babies and children, translating research into advanced medical and nursing practice, sleep disorders in pregnancy, eating disorders, and mental health. Research under this theme is carried out by the Schools of Biomedical and Health Science; Nursing and Midwifery; and Medicine.

- **Multi-scale Analysis and Imaging.** Civionics, the application of electronics to civil structures for structural health monitoring, will form a new Research Centre at UWS. The College has both infrastructure and staff capability in a wide range of modelling, imaging and characterisation applications which can be applied to infrastructure, health monitoring and climate change. We support a research node on Theoretical Investigations into Mathematics and Statistics (TIMS), and sense-making and visualisation of data.

- **Nanotechnology (Nano ++)** Work in medical nanotechnology, NMR, MRI, separation science, bio-remediation, and a wide range of materials science falls under this theme. The researchers in this theme have a strong chemistry and physics (including bio-physics) focus, but with interesting applications to a wide range of problems in health, environment and in materials generally. This area has close links with the Biomedical theme.
• Biomedical Research.
New appointments to the Schools of Medicine and Biomedical and Health Science have strengths in molecular medicine (genomics, proteomics, lipidomics, cell biology), sensory processing (vision, tactile sensation, proprioception, pain, hearing and vestibular), cardiovascular control in health and disease (vestibulosympathetic and somatotympanic reflexes, neurogenic hypertension, preeclampsia), neurodegeneration (peripheral neuropathies, pharmacological prevention and treatment of Alzheimer’s disease), premature labour (preeclampsia and preterm labour), HIV and infectious diseases, exercise physiology, epidemiology and population health, and drug design. The research is supported by close links with area hospitals and clinical staff, a new mass spectrometry facility at the Campbelltown campus, and a world-class imaging facility at the Hawkesbury campus.

• Urban Research
The Urban Research Centre is a national leader in research and teaching initiatives involving cities and urban management. The Centre collaborates widely across all areas of the University and with state and local government agencies in Greater Metropolitan Sydney. Its current research program features work on sustainable and affordable housing, large urban infrastructure, the design and use of public spaces, gentrification, urban dynamics, Sydney food chains, and employment strategies for lagging urban regions. The Urban Research Centre is quickly becoming Sydney’s leading urban and spatial indicators laboratory, using remote sensing and GIS modelling to map and track changes in the city as it evolves.

• Evidence-based Learning and Teaching
The College has a growing strength in scholarship and research in learning and teaching in areas of science, health, medicine, communications technology and engineering. Research projects include addressing skills and communication training in nurses, selection of medical students, visualisation in teaching science, and the first year experience. The size of the student body and programs, and the critical role played by UWS in providing opportunity and excellence to students in Sydney-West mean that all staff have an opportunity to apply scholarship and research to their learning and teaching.

Research Lectureship Positions Health, Science and Engineering

• Renewable Energy Systems
• Molecular Medicine
• Infrastructure Engineering - Civionics
• Computational Modelling and Environmental Assessment

Renewable Energy Systems Research Context
The appointee will be located in the School of Natural Sciences, and will work closely with researchers involved in the development of science underpinning renewable energy technologies. Current research activities underway within the School include:

• Development of materials for energy conversion devices including electrochemical (fuel cells, electrochemical separators, chemical gas sensors, electrocatalysts), photoelectrochemical and photovoltaic energy conversion devices.
• Development of materials and systems for the production of biodiesel and related biofuels

The candidates will undertake research in one or more topics related to the science and engineering of (i) oxide semiconductors; (ii) solid ionic conductors; (iii) electronic conductors; (iv) mixed conductors; (v) biofuel production systems; (vi) catalytic cracking of high molecular weight hydrocarbons. The appointee will work closely with the Solar Energy Technology Group (Professor Janusz Nowotny, Associate Professor Tad Bak, Dr Leigh Shepard, and Dr Maria Nowotny), Professor John Bartlett, Dr Kamali Kannangara, Dr Nguyen Tran, Dr Adriyan Milev and Emeritus Professor Mick Wilson.

Teaching Context
The College plans to develop new teaching programs in the field of energy science and technology, and the appointee will be involved in this development, and in supervising honours and PhD students. Initially teaching will be into undergraduate science programs in energy related topics, but specialist undergraduate and postgraduate courses may be developed in relevant areas

Specific Criteria
a. A PhD and strong background in one or more of the following areas:
• Solid-state science and materials engineering
• Electrochemistry, surface science, catalysis and or photocatalysis
• Development of systems for the production of biodiesel and alternative biofuels.
b. Familiarity with techniques for the characterisation of materials (including their nanostructure, chemical composition, surface properties and electrical properties).

Molecular Medicine
Research Context
The appointee will be located in either the School of Medicine or the School of Biomedical and Health Science, and will work closely with one or more molecular scientists in these schools, including Professors William Price, Jens Coorsen, Vaughan Macefield, Nikolaus Sucher, Annemarie Hennessey, Soon Lee and Associate Professors Vince Higgins, Gerald Muench, Janice Aldrich-Wright as well as other newly appointed staff in those schools. The focus of the position will be on medical applications of molecular science, and will be based at Campbelltown, but it is expected that there will be opportunities to collaborate with other molecular scientists in the Centre for Plants and the Environment at Hawkesbury in terms of equipment, techniques and methodologies.

Teaching Context
There is a wide range of basic science and medical science offered at Campbelltown, and the appointee will be expected to participate in teaching in the undergraduate and honours program, and in the supervision of PhD students in areas relevant to expertise.

Specific Criteria
- A background in molecular science (molecular biology, biochemistry, biophysics, pharmacology) with a relevant PhD, and evidence of medical applications is essential. Expertise in the use of NMR, MRI, Mass Spectrometry and other characterisation and imaging techniques would be an advantage, as would experience in any of the ‘omics’.

Infrastructure Engineering – Civionics
Research Context
The appointee will be located in the Civionics Research Centre at the Penrith campus in the School of Engineering, and will work closely with Professors Uy, Xiang, Kwok, and new academic appointees in photonics, civionics and structural engineering. Research will be in the area of infrastructure engineering (i.e. hard civil engineering infrastructure), with a focus on one or more of the following areas: Health monitoring of infrastructure; intelligent infrastructure design; and intelligent maintenance and repair of infrastructure.

Teaching Context
The School of Engineering has a strong teaching program in both electrical and civil engineering, and in construction management. The appointee will be expected to teach into one or more of these programs, and to supervise honours and PhD students in areas relevant to expertise.

Specific Criteria
- A PhD and research in the areas of electrical, structural or civil engineering related to health monitoring of infrastructure, intelligent infrastructure design and intelligent maintenance and repair of infrastructure. Significant industry experience and an understanding of the industrial and government landscape associated with civil engineering infrastructure will be highly regarded.

Computational Modelling and Environmental Assessment
Research Context
The appointee will be located in either the Centre for Plants and the Environment or the School of Computing and Mathematics, and will work closely with scientists studying climate change (Professors David Tissue, David Ellsworth, John Cairney, Bill Belotti and Associate Professor Ian Anderson) and computer scientists developing technologies for modelling and sense-making of large data sets, including data and information visualisation and interpretation (Professors Simeon Simoff and Anthony Maeder, and other recent appointees in the field). Research will involve innovations at the interface of the application of these techniques to climate change and environmental assessment.

Teaching Context
The appointee will be expected to contribute to undergraduate and postgraduate teaching and research supervision in areas relevant to expertise in either the School of Natural Science or in Computing and Mathematics.

Specific Criteria
- A PhD in a relevant area (biology/ecology) and a strong background in mathematics, statistics, engineering or computer science with a focus on computational modelling is essential as is evidence of a capacity to apply this to climate change and other environmental assessments. Evidence of innovations in statistical modelling, visualisation and sense-making of data will be an advantage.

Beryl Hesketh
Executive Dean
College of Health and Science