UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha

Te Kaupeka Pūhanga Rautaki 2030

Faculty of Engineering Strategy 2030

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Message from Vice Chancellor

The University of Canterbury is proud to be the institutional home of New Zealand's first engineering school, established over 130 years ago. A strong sense of resilience and responsiveness has enabled the Faculty's growth and development over the years. I am pleased to introduce our Faculty of Engineering Strategy 2030, which continues the visionary principles set forth by our first Chancellor, Henry John Tancred, and upheld by Te Whare Wānanga o Waitaha | University of Canterbury for over 150 years.

This strategy aligns with the University's Strategic Vision 2020 to 2030, Tangata Tū, Tangata Ora, in its commitment to producing graduates who are not only proficient in their technological disciplines but also deeply engaged with societal challenges and committed to making a positive impact. The Faculty of Engineering Strategy embodies our pledge to the pursuit of purpose-driven knowledge that contributes positively to both society and the environment. Leading through innovation, and interdisciplinary approaches with a commitment to inclusivity, positions the UC Faculty of Engineering well to meet its objectives to enhance its excellence, relevance and impact.

I wish to acknowledge the foresight and commitment of the Executive Dean and colleagues in developing the Faculty of Engineering Strategy 2030.

Professor Cheryl de la Rey

Tumu Whakarae | Vice-Chancellor
BA, BA (Hons), MA (Natal), PhD (Cape Town)

Message from Upoko o Ngāi Tūāhuriri

Nāia te mihi ki a koutou katoa.

The Office of Treaty Partnership acknowledges the opportunity to partner with Te Kaupeka Pūhanga | Faculty of Engineering to develop Rautaki 2030. We are pleased to endorse this strategy that clearly aligns with the aspirations of Ngāi Tahu and acknowledges the importance of Indigenous knowledge and wisdom.

This strategy embraces an ever-changing platform that brings constant disruption through fast moving technological advancements and acknowledges the importance of infrastructure development and the role engineering will play.

Mā tōtōpū, ko momoho - with change comes tremendous opportunity, exciting innovations and new thinking that can propel our people and our country forward. Some opportunities and innovations are yet to come, so this future focused strategy enables the Faculty of Engineering to be ready to meet those challenges.

Professor Te Maire Tau

Upoko (Ngāi Tūāhuriri), Pou Whakarae

Office of Treaty Partnership
B.A., M.A. and Ph.D. (Cant)

Ngā Uara | Our values

The UC Values of manaakitanga, whanaungatanga and tiakitanga underpin our behaviours and decision-making. These values inspire and challenge us to do the right thing and to demonstrate integrity and empathy in our work, our studies, and our interactions with each other.

He mana tō te tangata
We value people and their differences

He kaitiaki tātou katoa
We will enhance and nurture our resources

Kia aroha ki te tangata
We extend care and empower others

Faculty at a glance

At Te Kaupeka Pūhanga | Faculty of Engineering, Aotearoa New Zealand's first engineering school, established over 130 years ago, we stand on the brink of a transformative era. Inaugurated in 1887, when electricity was still a novel concept, our Faculty has continuously pioneered technological advancements through education and research that benefits society. Our Faculty's composition includes disciplines of engineering, mathematics, statistics, forestry, product design, and computer science. Notably, our forestry programme is the only one of its kind in Australasia.

Te Tiriti o Waitangi

The Office of Treaty Partnership partners with our Faculty and together we focus on strengthening our Faculty as a place where Indigenous knowledge and wisdom is valued and included in our teaching and learning and developed through research. Our partnership distinguishes the Faculty in the global environment and enhances our impact for the benefit of our communities and broader society.

Pacific peoples

Our Faculty strives to create a community which is culturally inclusive, where diversity is valued, and where Pacific staff and students realise a strong sense of belonging. The UC Pacific Strategy 2024–2030 defines how our Faculty strengthens our relationship with the Pacific community, highlighting how support that values and nurtures the richness of Pacific culture and heritage enhances outcomes.

Message from Executive Dean

At Te Kaupeka Pūhanga | Faculty of Engineering, Aotearoa New Zealand, we are at the forefront of the transformative currents propelled by the fourth and the impending fifth industrial revolutions. Originally established in 1887, in engineering and allied disciplines, our Faculty has long been a leader of education and research excellence. We are committed to including Indigenous values and wisdom of the Māori and Pacific peoples in cutting-edge engineering practices. We aim to forge solutions that are at the pinnacle of technological innovation, are sustainable and are inclusive.

In line with the University of Canterbury's strategic direction, we embarked on a consultative process to understand and further our competitive advantage and strategic distinction. Our process reached over 400 individuals through stakeholder surveys, design thinking workshops, and iterative discussions including the Faculty Leadership Team, Faculty Board and Faculty Forum. We extend our gratitude to staff, students, alumni, industry partners, representatives of accreditation bodies, and other stakeholders for their contributions.

As we look toward 2030, we will refine our curriculum to tackle local and global challenges more effectively. We will exemplify the integration of technology with tradition and will prepare our graduates to lead with integrity and innovation in an increasingly dynamic world. Additionally, we aim to lead in knowledge creation and dissemination, to facilitate technology transfer, and actively contribute to shaping technology-related policy frameworks.

This strategic alignment affirms our dedication to excellence, diversity, inclusivity, and sustainability, ensuring that Te Whare Wānanga o Waitaha | University of Canterbury remains a global leader in engineering and allied disciplines. We are excited about the journey ahead and confident that these strategic changes will empower our community to make profound impacts in their respective fields and broader society.

Professor Saurabh Sinha

Amo Matua | Executive Dean of Engineering

BEng, MEng, PhD (Pret),
AMP (Wharton),
CPEng, Pr Eng

Our changing world

The fourth industrial revolution has catalysed rapid technological advancements, with significant breakthroughs in digital technologies and artificial intelligence (AI). These developments offer immense opportunities but also introduce ethical challenges and inequalities.

The fifth industrial revolution, introduced by the European Commission, places human well-being and sustainability at the forefront of industrial activity. In Aotearoa New Zealand, a review of our higher education and science sectors is considering how these sectors can contribute more significantly to Aotearoa New Zealand's productivity and economic growth.

Our Faculty is committed to delivering a curriculum that brings together engineering and allied disciplines synergistically with humanities and the social sciences. This symbiotic approach to technological innovation aligns with the Washington Accord's graduate attributes, which incorporate the United Nations Sustainable Development Goals and Inclusion.

Our Faculty will embrace 'glocalisation' and sustainability simultaneously. In today's globalised world, the dynamic interaction between geopolitics, technoeconomics, social dynamics and earth systems underscores the need for sustainable and responsible innovation.

Faculty of Engineering Strategy

We educate highly sought-after graduates. We aspire to elevate our Faculty from great to exceptional.

Strategy 2030

The 2030 UC Strategic Vision, Tangata Tū, Tangata Ora | Engaged, Empowered, Making a Difference, was developed in 2019 and is the guiding strategic document for the University of Canterbury and our Faculty. Tangata Tū, Tangata Ora honours the spirit and nature of the University's founding vision of:

- accessible higher education
- service to community
- encouragement of talent without barriers of distance, wealth, class, gender or ethnicity.

Faculty mission

To deliver on this vision, the Faculty of Engineering will foster knowledge creation and learning in engineering and allied disciplines, empowering graduates to address local and global challenges sustainably while embedding Indigenous values and wisdom.

Strategic goals

Three strategic goals have been developed to support momentum towards achieving the vision and Faculty mission. Each goal has a set of catalytic initiatives that will inform our operational planning and ensure our financial sustainability and income diversity.

Goal 1. Amplify research-led education to create a collaborative, interdisciplinary, inclusive eco-system of learning.

Goal 2. Intentionally impact select societal challenges, having authentically embedded Indigenous knowledge for greater community benefit.

Goal 3. Nourish highly engaged and sustainable partnerships across our networks.

Our future state

Our Faculty aims to be an exemplar of Indigenous values and wisdom being included with engineering, allied disciplines, knowledge creation and learning. This prepares our graduates to lead in a rapidly evolving global landscape. We are bolstered by the support of our industry, alumni, sponsors, research entities and partners, who enhance our capacity to innovate and commercialise research breakthroughs. At the heart of our approach is an enabling and caring culture for our staff, students and community-at-large. Our ecosystem will reflect diversity and embody inclusion.

Hybrid, online and personalised learning

Where appropriate, we are enhancing our education to include a hybrid model of immersive online and in-person learning experiences, thereby making our programmes more accessible to an increasingly diverse student cohort. The "learning by doing" paradigm, with support from our industry advisory boards, will continue to deliver and adapt to global best practices.

Indigenous knowledge

Māori and Pacific Indigenous knowledge will be further embedded to enrich our pedagogy, curricula, and research initiatives.

Interdisciplinary education

We will promote an interdisciplinary approach within the Faculty and across broader disciplines, to address complex global issues holistically.

Excellence in research | Transformative impact

With plurality of knowledge epistemologies, we will enhance our global reputation to attract, retain, and recognise top-tier academics and students. We will further the University's strategic research themes of Sustainable Futures, Resilient Communities, Technology for Humanity and Living Well. We will retain a sound base of international-level curiosity-driven fundamental research in underpinning disciplines.

Community-centric projects and programmes

We will motivate our staff and students to undertake complex projects related to climate change and sustainable development, leveraging their engineering and allied skills in impactful ways.

Transnational education and multiculturalism

We are furthering our transnational education programmes, embracing global best practices and shifting global and population dynamics, including in Asia (South, East and Southeast) and the USA.

Robust industry partnerships

We will strengthen our connections with local, regional, and international industry. We will continue to align our educational and research initiatives with industry demands and employability, spanning sectors such as aerospace, agritech, bioengineering, climate technology, food, forestry, infrastructure, manufacturing, and more.

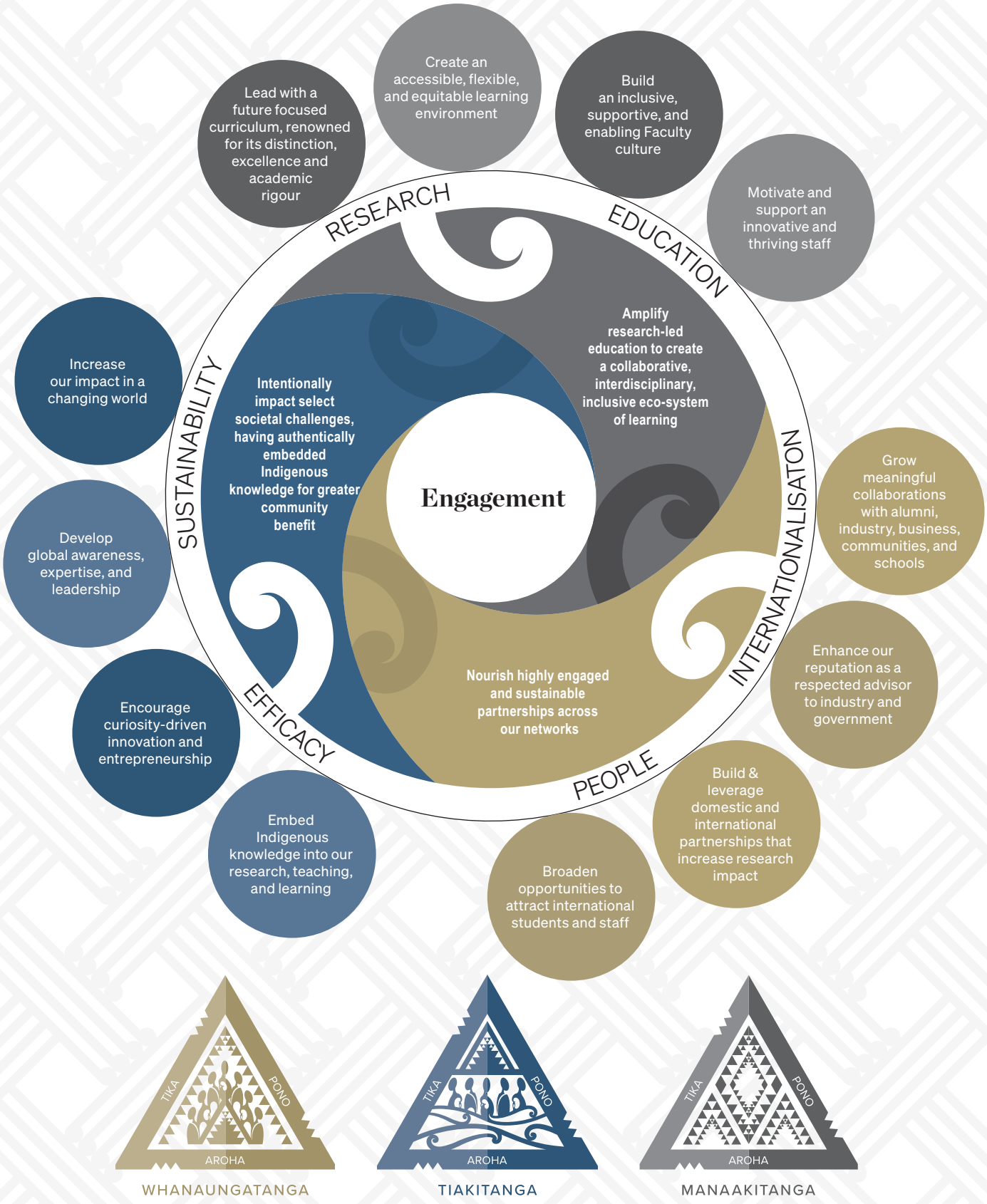
Focus on emerging technologies

Our Faculty will remain at the forefront of technologies such as machine learning and artificial general intelligence, preparing our students for pivotal roles in future industrial revolutions.

As the Faculty of Engineering progresses, support from Government, alumni, sponsors, and donors will be instrumental in preparing our graduates to face future challenges effectively.

Tangata Tū, Tangata Ora
Engaged, Empowered, Making a Difference

The Faculty of Engineering fosters knowledge creation and learning in engineering and allied disciplines, empowering graduates to address local and global challenges sustainably while embedding Indigenous values and wisdom.



Goal 1. Amplify research-led education to create a collaborative, interdisciplinary, inclusive eco-system of learning

We will refresh and improve our curriculum to remain relevant, research-informed and inspiring. We will champion programmes and pedagogies that offer competitive advantage. We will strengthen our qualification structures by developing interdisciplinary programmes including conjoint and postgraduate programmes. We will support our students and staff to succeed and will define and elevate inclusion and diversity for all.

Lead with a future focused curriculum, renowned for its distinction, excellence, and academic rigour

- Champion and advance:
  - » our core programmes in Engineering and allied disciplines (Mathematical Sciences, Forestry, Product Design, and Computer Science)
  - » our internationally acclaimed, research-informed courses and learning experiences.
- Continue to build our curricula with courses and qualifications which are shown to be relevant to the needs of employers, industry and community.
- Strengthen our degree structures by growing distinction in interdisciplinary thematic areas*.
- Lead the development of interdisciplinary qualifications with Business, Law, Health, Science, Arts and Education.
- Equip our graduates to tackle societal challenges including those aligned with the UN Sustainable Development Goals.

Create an accessible, flexible, and equitable learning environment

- Accelerate the development of alternative modes of teaching and learning delivery and pedagogy to improve accessibility and enhance student experience including hybrid, blended, augmented, virtual and online learning.
- Optimise the use of our teaching, learning, and research spaces by enhancing their flexibility.

Build an inclusive, supportive, and enabling Faculty culture

- Implement initiatives to improve the success and retention of all our students.
- Broaden our targeted outreach, recruitment and engagement to enhance student diversity and multi-culturalism.
- Develop our formal and informal learning spaces to support priority learners and address equity gaps.
- Promote, prioritise, and support diverse learners, especially differently-abled and neurodiverse learners.

Motivate and support an innovative and thriving staff

- Elevate professional development and communities of practice to advance a motivated and fulfilled workforce.
- Recognise, celebrate, and appropriately reward excellence in teaching, learning and research.
- Enable and support academic staff to develop their international reputation, furthering scholarship of learning and teaching.
- Intentionally embrace and enhance diversity of staff.
- Advocate for strong, meaningful wellbeing support for all staff.

*Interdisciplinary Thematic Areas

Artificial intelligence, machine learning, data science, augmented reality, quantum technology, digital screen and wireless communications.

Environmental engineering including nature research intelligence, sustainability, climate change, energy, food, agritech and transition engineering.

Humanistic and humanitarian engineering including bio- and biomechanical engineering, human interface technologies, mobility, robotics and synthetic biology.

Manufacturing, energy and water infrastructure, disaster management and resilience, and supply chain management.

Space technology, aerospace, astronomy and astrophysics.

Goal 2. Intentionally impact select societal challenges, having authentically embedded Indigenous knowledge for greater community benefit

We will lead research that focuses on environmental and societal challenges. We will intensify our research activity and grow sustained research capacity and capability across multiple disciplines, in partnership with mana whenua and Pacific Peoples. We will contribute expertise in areas of both national and global significance and support the University's reputation as an innovative, impactful, and Indigenously aligned institution.

Increase our impact in a changing world

- Improve our Faculty rankings, to be recognised as a leader amongst Australasian universities.
- Become a leader in engineering technology and research that contributes to resolving local, Pacific, and global sustainability challenges.
- Advance our Faculty's profile through publishing and communicating stories that evidence our impact and strong research links.

Develop global awareness, expertise, and leadership

- Elevate our research activity in line with UC's Priority Research Themes*.
- Create internationally networked knowledge that contributes and responds to emerging global technologies and general megatrends.
- Invest in interdisciplinary and cross-Faculty opportunities to create study and research pathways for students from undergraduate through to PhD.

Encourage curiosity-driven innovation and entrepreneurship

- Celebrate excellence in innovation and provide practical support for students and staff to facilitate innovation at speed and scale.
- Collaborate with stakeholders to accelerate a seamless translation of research into commercial development.
- Maximise, with other universities, the practical learning opportunities offered by our high-quality facilities and strong engagement with industry.

Embed Indigenous knowledge into our research, teaching, and learning

- Intentionally foster growth of academic excellence and leadership in Indigenous knowledge.
- Be living proof of bicultural attributes, preparing our graduates to live and work in a te Tiriti partnership-based society.
- Develop and sustain our partnerships with Ngāi Tahu Research Centre and the Macmillan Brown Centre for Pacific Studies to strengthen opportunities for impact in areas including the environment, infrastructure, aerospace, water, and climate change.

*Priority Research Themes

Sustainable Futures: Science and policies for climate change mitigation and adaptation.

Technology for Humanity: Ethically-aligned innovations for the economy, society or the environment.

Resilient Communities: Communities and institutions reducing the consequences of disruptions.

Living Well: Physical, mental, and social wellbeing strategies for public health and wellbeing.

Goal 3. Nourish highly engaged and sustainable partnerships across our networks

We will strengthen our institutional partnerships to access expertise and opportunities for the benefit of our students and staff. We will capitalise on our domestic and international connections to advance transnational relationships and diversify income opportunities. We will respond to the international trajectory of expanding internationally recognised, multidisciplinary research that addresses critical issues facing humanity. We will work together as broad integrated teams, often as part of collaborative international programmes. We will further the research, innovation, and commercialisation nexus.

Grow meaningful collaborations with alumni, industry, business, communities, and schools

- Investigate options to enhance our programme entry pathways and accessibility utilising UC Online and Transnational Education (TNE).
- Amplify opportunities for vertical integration of students and staff with industry, alumni, and professional societies to share expertise, support industry research, and enhance work-integrated learning.
- Invest in and establish professional development courses and qualifications for industry, in response to industry needs.
- Undertake effective consultation and co-design with industry, community and government stakeholders to ensure our research advances local needs.

Enhance our reputation as a respected advisor to industry and government

- Position the Faculty as thought-leaders that influence, inspire, question, and lead through academic fora and broader media platforms.
- Actively contribute to shaping policy frameworks in relevant areas of local and national government, and industry.

Build and leverage domestic and international partnerships that increase research impact

- Invest in and leverage new multi-institutional, national, and international research collaborations.
- Scale up existing cross sectoral collaborative research to maximise their scope and impact.
- Enhance cross sectoral partnerships that enable research, innovation, and commercialisation.
- Broaden and diversify funding sources for research institutes, centres, and clusters.

Broaden opportunities to attract international students and staff

- Deliver market oriented and industry engaged programmes to attract high quality international students in line with the UC International Growth Strategy.
- Maximise our international outreach to attract student interest and international enrolments.
- Host international consortia and symposia with leading institutions in engineering and allied disciplines, to improve our positioning with global research networks and platforms.
- Advance programmes that support reciprocal international staff secondments and placements.

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