Welcome

Engineers are interested in inventing, innovating, designing, building, improving, and researching structures, machines, tools, systems, components, materials, and processes. This can include adapting to climate change, turning waste into higher-value products, improving treatments for diseases, developing technologies for the next generation and developing new machines.

New Zealand and the world needs people with curious minds who are willing to ask the hard questions and who will work towards creating a bright future. The grand challenges facing society demand research and developments that transcend disciplinary boundaries, requiring an increase in flexibility in the way we seek to understand the world and the ways we prepare students to meet society’s future needs.

Our academics have national and international reputations in their subjects and place an emphasis on maintaining a productive balance between the growth areas of engineering and applying that knowledge to give practical solutions. Along with having very well equipped laboratories and workshops, our academics are well placed to address many of the challenges outlined in New Zealand’s National Science Challenges and the UN’s Millennium Development Goals.

The Faculty of Science & Engineering is a cohesive cross-disciplinary unit, providing wider opportunities in teaching, research and innovation. We offer flexible programmes that produce multi-skilled, adaptable graduates who are ready for the challenges of today and have the skills to tackle the obstacles of tomorrow.

Our students’ career prospects are limited only by their interests and their imagination. Our graduates find themselves employed throughout New Zealand and overseas in a wide range of well-paid, interesting and stimulating occupations.
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Get advice
Free advice is available at any time. Call us if you’d like help to:
• Find the best degree for you
• Choose your papers
• Plan your timetable
• Complete your application to enrol

Apply to enrol
Apply to enrol online at waikato.ac.nz/enrol
If you thrive in a team environment where problem-solving is key and you're strong in science and mathematics, a career in engineering may be for you.

Engineering professionals lead the way in innovation by improving infrastructure, building smarter technologies and working to discover alternative and renewable energy sources and environmentally friendly materials and practices.

New Zealand needs more professional engineers. Currently, less than 1,000 professional engineers graduate each year; countries with similar populations to New Zealand have more than double that number of engineering graduates.

Increasing the number of trained engineers is seen as essential for New Zealand’s growth in technology-related enterprises.

Engineers also enjoy competitive salaries. A recent Institution of Professional Engineers New Zealand (IPENZ) survey found that in 2016 the median base salary for graduates with less than 5 years’ experience is $60,000. For full-time salaried employees, the median base salary this year was $92,500, with median total remuneration $98,000.

Career options

- Agricultural engineer
- Automation engineer
- Biochemical engineer
- Chemical process engineer
- Civil engineer
- Electronic engineer
- Environmental engineer
- Food technology engineer
- Materials engineer
- Mechanical engineer
- Mechatronic designer
- Product design engineer
- Software engineer
- Systems manager
The University of Waikato offers future-proofed, project-based learning that will put you at the top of your game for a career in engineering. By the end of your degree you will have worked in teams, managed your own projects, worked with budgets and spent significant time working within the industry.

At Waikato all of our eligible engineering programmes are fully accredited by the Institution of Professional Engineers New Zealand (IPENZ), which means your degree is internationally recognised.

Our researchers lead the way in biomedical innovation, sustainable industry, agriculture, 3D imaging and titanium alloys.

Having smaller class sizes than many other universities means our undergraduate students have more direct engagement with our academics in lectures, labs and workshops.

As a Waikato engineering student you will also complete 800 hours of work experience with a company or organisation that suits your interests, and you’ll make valuable industry contacts which in many cases lead to part- or full-time work.

### Extracurricular opportunities
- Formula SAE team – WESMO
- Waikato University Young Engineers Society (YES) – hosts barbecues, speed interviewing, networking and ‘MacGyver’ nights
- Student Engineers New Zealand (SENZ) – the University of Waikato has a SENZ student representative
- During summer breaks a range of Waikato Summer Research Scholarships are available, giving students the opportunity to experience research at an undergraduate level.

### Facilities
The University of Waikato has a Large Scale Lab that features a suite of equipment dedicated to engineering teaching and research, including 3D printers, a mechanical workshop, and computer labs with engineering design software.

### Waikato Formula SAE team
Formula SAE is an international competition where university students design and build their own cars. Competitions are held across the world, with more than 500 universities taking part. The Waikato Formula SAE team was formed in 2006. Each year the team, which includes students from all year levels, builds an open-wheeled single-seat race car to compete in the Formula SAE competition. This car must comply with the rules of the competition, including a maximum 600cc engine, 20mm air inlet restrictor, with limited track width and wheel base.
Bachelor of Engineering (Honours)

If you want to lead the way in innovation, improve infrastructure, build smarter technologies and find alternative energy sources, our Bachelor of Engineering (Honours) (BE(Hons)) will help you achieve just that.

New Zealand needs more professional engineers. Currently, fewer than 1,000 professional engineers graduate each year. Countries with similar populations to New Zealand have more than double that number of engineering graduates. Increasing the number of trained engineers is seen as essential for New Zealand’s growth in technology-related enterprises.

Our Engineering School evolved directly out of the School of Science which gives us a unique character. After studying with us, you’ll be able to not only apply engineering skills, but scientific expertise. This combination generates smart ideas which will help you stand out.

Waikato’s BE(Hons) focuses on how problems can be solved using design and engineering processes. If you’re good at mathematics and physics but are also a highly creative thinker, the BE(Hons) will appeal to you. At every stage of your degree, you’ll be deeply involved in creating, designing and realising sophisticated engineering products.

Studying engineering at Waikato offers you future-proofed, project-based learning that will put you at the top of your game for a career in engineering. By the end of your degree you will have worked in teams, managed your own projects, worked with budgets and spent significant time working within the industry.

Our eligible BE(Hons) programmes are accredited by the Institute of Professional Engineers New Zealand (IPENZ), meaning they are professionally recognised in 18 countries and regions, including Australia, the UK and the USA.

Practical experience
Work placements are a major feature of the BE(Hons). You will complete 800 hours of relevant work experience during your degree. Our experienced Cooperative Education Unit will work with you to identify and obtain suitable placement opportunities.

Facilities
The Large Scale Lab complex features a suite of workshops and laboratories dedicated to engineering teaching and research, including 3D printing, a mechanical workshop, and computer labs with engineering design software.

Entry requirements
To enrol in the BE(Hons), you need University Entrance or equivalent. You must also meet specific requirements for each programme of the BE(Hons). For guaranteed entry you are expected to have studied the subjects below at NCEA Level 3 or equivalent. The requirements for each subject are:

- Civil, Mechanical, and Electronic Engineering: a minimum of 16 credits in NCEA Calculus, and at least 14 credits in NCEA Physics

- Materials and Process, Environmental, Chemical, and Biological Engineering: a minimum of 16 credits in NCEA Calculus, 16 credits in NCEA Chemistry, and at least 14 credits in NCEA Physics

- Software Engineering: 16 credits in NCEA Calculus.

If you do not meet the prerequisites, contact recruitment@waikato.ac.nz as there may be other pathways that you can take. The catalogue of papers can be found at papers.waikato.ac.nz

Career options
Here are some of the careers you could pursue:

- Agricultural engineer
- Automation engineer
- Biochemical engineer
- Civil engineer
- Environmental engineer
- Food technology engineer
- Mechatronic designer
- Software developer

And there are many more. Chat to a Future Student Adviser if you’d like to know more about where this degree could lead. Email recruitment@waikato.ac.nz
Chemical and Biological Engineering focuses on solutions that assist humanity to sustain good health, have sufficient food and clean water and have sustainable energy and materials to maintain a developed society.

Chemical and Biological Engineering focuses on solutions that assist humanity to sustain good health, have sufficient food and clean water and have sustainable energy and materials to maintain a developed society.

Chemical and biological engineers are ‘think big’ professionals who work to translate the benefits of advances in chemistry, biotechnology, materials and environmental sustainability to the real world.

The programme combines the traditional discipline of chemical engineering with new and emerging specialisations in engineering to produce graduates who are better equipped to solve the world’s sustainability challenges.

Students carry out a minimum of two internships in engineering companies where they get hands on experience on what it is like to work as an engineer, as well as learning practical skills.

Project Based Learning is widely used in the programme, ensuring students learn key Chemical and Biological Engineering skills through ‘learning by doing’.

In the future, contributions from chemical and biological engineers will be vital for creating and producing new medicines, nutritious foods, novel materials, new energy sources, better waste treatment methods and a sustainable global future.

This programme has full Institution of Professional Engineers New Zealand (IPENZ) accreditation, meaning it is nationally and internationally recognised. This offers great and growing employment opportunities, with a high salary and excellent prospects of progress into management. Waikato’s engineering degrees are uniquely practical, producing graduates with the skills required by industry and society. The skills you acquire in this programme are sought after globally, and will be immediately recognised in every country in the world.

Career options
- Process engineering design
- Food production
- Energy and fuels production
- Materials and polymer processing
- Pharmaceutical manufacturing
- Chemical products
- Agricultural engineering
- Project management
- Product development
- Consultancy
- Biomedical engineering
- Quality engineer

Potential employers
- Biotechnology industries
- Food and dairy industries
- Forestry sector
- Pharmaceutical industry

GRACE WATERS
BEng(Hons), Chemical and Biological Engineering
Process Engineer, PDV Consultants

A typical day for Bachelor of Engineering (Honours) graduate, Grace Waters, can be anything but typical. One day she will be in the office and the next out on site seeing the project through to completion.

Working with a variety of different companies in her role at PDV Consultants means a variety of different challenges every day. Grace is involved with process engineering design, catering to the food and dairy industry. She works closely with clients such as Fonterra, Tatua and Dairy Goat, following a project through from its conceptual design stage to the commissioning on site.

Studying Chemical and Biological Engineering at the University of Waikato helped to develop Grace’s passion for process design. A summer internship at PDV Consultants further developed her enthusiasm and led to gaining a graduate position with the company on the completion of her degree.

Grace’s highlight of studying at the University of Waikato was the culture within the School of Engineering. “You felt like you were part of a community. The lecturers knew your name and wanted to help grow you.” The student culture within the School of Engineering was also particularly strong and supportive with the students experiencing the same challenges and milestones together.
Civil Engineering

New Zealand faces increasing civil engineering and infrastructure challenges.

We need competent and trained professionals in engineering practices that can address those challenges in urban and rural infrastructure. This includes construction, earthquake proofing, energy recovery, water and waste management, power generation, road networks, transport management, agriculture and forestry development.

Civil engineers design, plan, oversee, construct and operate infrastructure and services that help shape natural and man-made environments. They work in many fields, including structures, dams, bridges, gas and water supply systems, sewerage systems, transportation systems and roads. These facilities provide people with a reliable, safe, sustainable and modern environment to live in.

Civil engineers have responsibility for designing and developing systems for managing people, equipment, time, resources and money, and for delivering complex information, meaning communication skills are vital. Civil engineers usually become specialised experts in one area of civil engineering such as structures, fluids, transportation, or the environment.

Great civil engineers are so much more than just their technical skills. That’s why our civil engineering degree program aims to produce highly skilled engineers who are problem solvers, ready for life, ready for work, and ready for the world. To do this, we offer a range of papers from engineering mechanics to social science to help our students become well-rounded engineers with hands-on experience of building solutions in the lab and gaining industrial experience.

Graduates gain the knowledge and expertise to work in a broad range of areas, including:
- Civil engineering research
- Construction engineering
- Engineering mechanics
- Engineering of foundations
- Environmental technology
- Fluids and hydrology
- Geology and geomechanics
- Materials engineering
- Mathematics, computing and modelling
- Project management
- Reinforced concrete, steel and timber design
- Structural dynamics and earthquake design
- Structures and mechanics of materials

Career options
- Civil engineer
- Geotechnical engineer
- Structural engineer
- Transport engineer
- Coastal engineer

Potential employers
- Private engineering consultancies
- Regional and local government
- Government agencies, such as Land Transport Authority
- Construction firms
- Property developers
- Infrastructure & utility companies

PROFESSOR MARK DYER
Dean of Engineering

Mark Dyer spent the first nineteen years of his professional career working on construction projects in Europe, USA, Asia and Africa.

Prior to his appointment as Dean of Engineering, he was appointed to chair professorships at Strathclyde University in Glasgow and Trinity College, Dublin. His research interests cover flood risk management and stability of flood levees as well as the biologically mediated processes in the soil for remediation of organic pollutants and deposition of calcite cement for ground improvement. Most recently his professional experience in the design of urban infrastructures as seen his academic work focus on the role of citizen participation for the adoption of new technologies and decision making for transformation of cities to healthier, more inclusive and energy efficient places.
Electronic Engineering

Electronic engineering focuses on the design, development, manufacture and application of electronic devices, circuits and systems.

The work of electronic engineers is essential to our social, business and industrial lives. New Zealand’s electronics manufacturing industry is one of the fastest-growing industries in the country.

Our companies are targeting niche markets, such as telecommunications, and exporting their products all over the world.

Students in this programme learn how to analyse, design and build electronic circuits; program embedded microcontrollers and build devices to sense and control factory machines, fluid flows, vehicles, etc.

They design drones, radars, medical diagnostic equipment (CAT, MRI, ultrasound), sonars, navigation aids for aircraft, audio equipment, recording studios, satellite launch systems, oncology treatment systems, wireless broadband equipment, emergency radios, radio telescopes, surgical tools, electron microscopes, robots, power stations, human implants (heart, cochlear, brain), electronic toys and games.

Electronic engineering graduates work in factories, aerospace, livestock management, renewable energy (wind, solar, geo), electronic mapping, data communications, vehicle companies, the military, hospitals, and many other fields.

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Career options
- Electronic engineer
- Manufacturing manager
- Mechatronic engineer
- Product designer
- Product design engineer
- Programmer
- Research and development

Potential employers
- Agricultural sector
- Health and biomedical industries
- Information technology industry
- Manufacturing sector
- Power generation and distribution sector
- Aerospace manufacturer
- Military communications

Kirsten Nel
BE(Hons), Electronic Engineering
Fraser High School, Hamilton
Electronic Engineer, Gallagher, Hamilton

For graduate Kirsten Nel, a work placement at Gallagher has led to a full-time job as an electronic engineer. In fact she was offered the position before she had even finished her engineering degree.

“I completed both of my work placements at Gallagher, which was my first choice of company for a work placement, and where I aimed to work ever since I was a Year 10 electronics student at high school.”

Kirsten works in the Research and Development Department, in the animal management area and focuses specifically on electric fence energizers. “I carry out experiments and run simulations on electronic circuits to verify their operation and to classify the operating limits.”

Kirsten finds the opportunity to work with a team of highly skilled engineers inspiring and is enjoying collaborating with the team to produce new products and upgrade existing products. “Since I started working here I have learnt a lot about how energizers work and it’s very interesting to see how new ideas progress into new products and how much these differ from those already found on the market.”
Environmental Engineering

Awareness of environmental issues is growing. These challenges put pressure on infrastructure for water supply, roading, transport and waste management.

Environmental engineering is a fast-growing area where well-educated graduates with strong technical and communication skills are in demand. If you enjoy science and have a passion for the environment, environmental engineering is a career to consider.

Environmental engineers make a major contribution to mitigating environmental harm. As the world’s demand for materials, food and energy grows it is environmental engineers who ensure that practices are developed to meet this demand, and contribute to protecting and enhancing our natural and man-made environments.

Environmental engineers evaluate and assess options, design equipment and systems, and develop regulations and controls, to solve issues of water quality, water supply, waste reduction and disposal, soil and air quality management, and noise.

During your degree you will learn how to identify, monitor and contribute to solving a variety of problems associated with the environment, the use and allocation of resources, and sustainability.

Environmental engineering graduates learn to understand the environment using input from a wide range of disciplines. The Environmental Engineering programme at Waikato combines the fundamentals of engineering, science, mathematics, and computing with the study of water resources, water quality, earth and ocean environments, environmental planning, modelling and sustainability, process energy and management.

Graduates gain practical knowledge in:
- Environmental and engineering design
- Environmental resource planning and law
- Environmental modelling
- Water resources and water quality
- Environmental chemistry and biology
- Sustainability
- Geology and geographical information systems
- Environmental research
- Project management

Career options
- Environmental engineer
- Water and sanitary engineer
- Public/environmental health engineer
- Infrastructure engineer
- Sustainability engineer
- Restoration engineer
- Resource/waste management/engineer

Potential employers
- Private engineering consultancies
- Regional and local government
- Government agencies, such as Ministry for the Environment
- Infrastructure and utility companies

DR GRAEME GLASGOW
Senior Lecturer, Environmental Engineering
BEng MSc PhD CEng CEnv MCiWEM

Graeme has over 20 years of academic and industrial experience in the water industry, both in the UK and New Zealand. His area of expertise is in water and wastewater treatment plant design and operation.

He joined the University of Waikato in October 2014 after working as a consultant engineer for water companies and consultancies for 12 years designing treatment plants.

Previously, Graeme worked as a lecturer and research assistant in the UK. Graeme is a chartered engineer, chartered environmentalist and is a member of the Chartered Institute of Water and Environmental Management.
Materials and Process Engineering

Materials and Processing focuses on the processes and activities of converting raw materials into valuable products needed by manufacturers and the end consumer.

Materials engineers make critical decisions in selecting and developing the best materials for a particular function, while process engineers make critical decisions in the processes and utilities required to manufacture the product.

Examples include converting trees into paper and fibre board, iron sand into steel, effluent into drinkable water and producing solar panels for electricity generation.

Materials Science can be taken as a major within a Bachelor of Science or Bachelor of Science (Technology). Materials and Process Engineering can be taken as a second major or supporting subject within most other degrees.

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Career options

- Energy efficiency engineer
- Environmental engineer
- Materials engineer (plastics, composites, metallurgy)
- Process design engineer
- Products/process development engineer

Potential employers

- Crown research institutes
- Environmental industries
- Food and dairy industries
- Iron and steel manufacturing
- Oil and gas industries
- Petrochemical and plastics industry
- Pulp, paper and wood industries

RENE ENGELBRECHT
BE(Hons), Materials and Process Engineering
Sacred Heart Girls’ College, Hamilton
Graduate Process Engineer, Genesis Oil and Gas Consultants, Perth

Engineering graduate Rene Engelbrecht’s first year out of university has been busy and exciting.

While completing her BE(Hons) she was offered a role as a graduate process engineer at Technip Oceania in New Plymouth. She spent time on-site experiencing well site commissioning and also visited Australia for a three-month secondment on one of Australasia’s largest liquefied natural gas LNG projects. “I worked on a project looking at subsea chemical injection and how it influences the onshore production station and was lucky enough to be offered a permanent position here in Australia.”

“I am now working in the process, flow assurance and technical safety areas. These three areas make up the foundations of chemical and process engineering and I love every minute of it.”

Rene says that Waikato provided the perfect environment to study engineering. “My study gave me a solid foundation in process engineering fundamentals that I can now build on and apply in the industry.”
Mechanical Engineering

Mechanical Engineering is a diverse and innovative field which uses mechanics and energy principles to design, research, develop and manufacture tools, engines, motors and other devices.

Mechanical engineers design the tools and processes necessary to create all man-made products, and are often involved from idea conception right through to seeing the finished product ready for its commercial application.

Our undergraduate programme combines a broad-based education in the engineering sciences with a strong grounding in quantitative, problem-solving, design, and communications skills. It develops the relevant engineering fundamentals, provides experience in their application, and introduces the important methods and techniques of engineering practice.

Mechanical Engineering at Waikato uses Project Based Learning, where students learn how to design, build and test mechanical and mechatronic machinery in response to real-world problems to meet a design specification. They learn the use of computer aided engineering software for designing and analysing components and machinery. Students understand how to apply advanced manufacturing processes, including laser cutting, CNC machining and 3D printing. As a result graduates are equipped with the skills required by New Zealand industry and are transferable all over the world.

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Career options
- Mechanical engineer
- Automation engineer
- Medical engineer
- Test engineer
- Quality engineer
- Agricultural engineer
- Robotics engineer
- Aeronautical engineer
- Project manager
- Safety engineer
- Computer aided engineering specialist

Potential employers
- Agricultural sector
- Automotive industries
- Equipment design and manufacturing
- Health and biomedical industries
- Iron and steel manufacturing
- Pulp and paper industry
- Energy and power generation sector

FLETCHER JACKSON
Engineering Engineer, Vickers Aircraft Company, Hamilton

“My BE(Hons) from Waikato led me to a job that I am passionate about. I love flying, so building and designing aircrafts is a perfect fit!

My job varies from programming and operating machinery, developing different components of the plane, designing production machinery and helping to set up the company workflow for our expansion.

It was the practical projects, summer placements and culture of success at Waikato that helped me prepare for the industry and land my dream job.”
Software Engineers specify, design and build the software that society relies on.

Software engineering is the scientific approach to designing, developing, operating and maintaining complex software systems. These software systems include operating systems, networks, real-time and embedded systems, distributed and parallel systems, as well as engineering, scientific and business application software.

The Software Engineering programme at Waikato emphasises the software engineering process, formal methods for software engineering, and human computer interaction.

Our students graduate with the skills to develop and use processes that are reliable, use systematic techniques to test software systems, and prove that safety-critical systems operate correctly under all possible operating conditions.

Strong emphasis is also put on the vitally important interface between critical, complex systems and the people who use them or are affected by them.

Once you graduate you will be well suited for all areas of employment that require development of high quality software that is safety or mission-critical.

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Career options
- Product development engineer
- Programmer
- Software consultant
- Software developer
- Systems analyst

Potential employers
- Communication industries
- Computer systems
- Consultancies
- Design industry
- Electronic equipment
- Government agencies
- Manufacturers
- Software publishers

ALENA CHOONG
BE(Hons), Software Engineering
Software Developer, Smartrak

“I grew up playing computer games and when I decided to pursue software engineering I came in to it thinking that I was only going to make computer games once I graduated. What I really liked about the software engineering programme at Waikato University was the breadth of computer science topics taught. Whilst I was studying, I thought it was a shame that you couldn’t pick any electives until fourth year – but after my first work placement at the Bay of Plenty Regional Council, I realised that the degree structure at Waikato prepares you to become an engineer fit for any industry.

I am currently working at Smartrak where I help create and maintain software used in tracking and aiding over 23,000 assets across Australasia each day. I go to work every day excited to work with intelligent and creative people on various projects to help customers make smart business decisions remotely. I absolutely love my job and am happy that I chose to study at the University of Waikato.”
Work placements

Work placements are a major feature of the BE(Hons) and you will complete 800 hours of relevant work experience during your degree.

Co-operative education is the combination of study and work. The Co-operative Education Unit at the University of Waikato is the leader in New Zealand for co-operative education programmes, with an average 250 students placed in industry every year.

Our Co-operative Education Unit actively seeks and oversees your industrial work placement, ensuring a good fit for your area of study and career goals.

Waikato University students have a great track record of receiving job offers from the company in which they completed a work placement and in many cases our students will have secured a job before they graduate.

Work placements help you

- Apply what you have learnt at university in the real world
- Get relevant work experience before you graduate
- Earn extra money while you study – most placements are paid and many students will earn between $5000 and $6500 during each summer placement
- Receive possible job offers – students are often offered full-time positions at the end of their placements
- Learn to work in a professional environment and become familiar with workplace-specific terminologies, teamwork skills, communication and workplace norms
- Learn workplace methods, procedures and skills that aren’t taught at university
- Try a career before you finish your degree. It will refine your study direction and focus your career goals, plus give you a better understanding of what careers are available
- Gain skills in report writing, CV preparation, and interview skills
- Gain exposure to employer contacts – the people you work alongside are valuable contacts and could even be your future employers
- Be graded on your contribution to research or on an industry project – placements are assessed, so to prospective employers your grade will serve as a valuable indication of how well you can work
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NICOLE VERSTRATEN
BE(Hons), Electronic Engineering
Fraser High School, Hamilton
Placement: Rezare Systems, Hamilton

A work placement with agricultural software development specialists, Rezare Systems, motivated Nicole Verstraten to reach her full potential.

She spent her placement working alongside a University of Waikato Software Engineering student to design a proof of a concept for a prospective customer, using an embedded Linux system and other hardware components.

“I designed the circuits that run off the system, and did some programming in C and C#, completing testing to ensure it was working as I wanted it to and then helping to integrate it with the software that has been developed.”

Nicole says the positive and encouraging Rezare Systems’ workplace environment has been a strong motivator for her to strive to be the best. “Now that the project is coming to an end it’s great to see how happy the company was with what we achieved, which is above and beyond what was expected.”

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And Mahonri is answering that call by developing a brain-controlled electro-mechanical robotic hand, which could prove invaluable for trauma patients in coming years.

Amputees often have difficulty performing simple day to day tasks, which means his work in developing robotic prosthetics has exciting potential for improving patient quality of life.

Find out more about Mahonri’s story and how our practical, real-world research projects will set you up for a successful career in engineering at waikato.ac.nz/study
WHERE THE WORLD IS GOING

TE AHUNGA O TE AO