Established in 1897, Te Herenga Waka–Victoria University of Wellington is a globally recognised civic university. We are experts in sustainability, creativity and leadership, and our research quality is ranked number 1 in New Zealand.
OUR MARAE AT OUR HEART

Te Herenga Waka means the mooring place of canoes. It is our Māori name and the name of our marae that has been at the heart of the university’s community for more than three decades. Like the University, it is a place where people from around the world can ‘hitch their canoes’ and find shelter. When people are ready to leave the University, they can unhitch and sail off to new horizons, while still maintaining a deep connection to the University’s community and whānau, or family.
CITY WIDE CAMPUS

Kelburn Campus
The Kelburn Campus is the heart of the first-year experience at Victoria University of Wellington. Kelburn provides the full range of student support and administration offices, the Central Library and the Faculties of Humanities and Social Sciences, Science, Engineering, Education and Health.

Te Aro Campus
The School of Architecture and Design Innovation is housed at the Te Aro Campus, comprising two buildings. Reception is located in the University’s striking red building at 139 Vivian Street, and a purpose-built space, Wigan Building, is directly behind so the whole Faculty can sit in one location.

Pipitea Campus
With the iconic Beehive at its backdoor the Pipitea Campus is home of the Wellington School of Business and Government and the Faculty of Law. The Wellington School of Business and Government also offers courses at our Auckland premises, which are located in Auckland’s central business district.
Our nine faculties are committed to providing a high-quality research-led learning environment and to rewarding and celebrating excellence in all its forms.

**Te Wāhanga Pūtaiao**
Science

**Te Wāhanga Tātai Hauora**
Health

**Te Wāhanga Ahunui Pūkaha**
Engineering

**Te Wāhanga Waihanga-Hoahoa**
Architecture and Design Innovation

**Te Here Tāura Rangahau**
Graduate Research

**Te Wāhanga Aronui**
Humanities and Social Sciences

**Te Whānau o Ako Pai**
Education

**Ōrauariki**
Business and Government

**Te Kauhanganui Tātai Ture**
Law
A COMMUNITY OF PROBLEM SOLVERS

Our students have access to outstanding facilities and services and a globally recognised faculty along with 140 student exchange partnerships, 180 different clubs, and a robust leadership programme.

- More than 22,000 students
- Over 3,000 staff and faculty
- 800 PhD students
- An alumni network of over 120,000 in over 100 countries
Since 2012, Victoria University of Wellington has been New Zealand’s top-ranked university for intensity of high-quality research, based on the Performance-Based Research Funding exercise, the country’s main measure of research excellence.

- #1 in NZ for intensity of high-quality research (NZ government PBRF 2019)
- Ranked 215 out of the world’s 18,000 universities (QS World Ranking 2020)
- Top 1% of universities in 19 subject areas (QS World Ranking 2021)
- Ranked in the top 100 universities in the world for 11 subjects (QS World Ranking 2021)
GLOBALLY CONNECTED

We build networks around the world to ensure inter-cultural and global perspectives are integrated into all aspects of university life, so that staff and students are well-equipped to thrive in an international environment.

• 2000 international students from over 100 countries
• Over 100 active global partnerships
• Approximately half of our academic staff are from overseas
• 25% of people who live in Wellington were born outside of New Zealand
UNESCO WORLD’S CREATIVE CITY

Weta Digital

VUW faculty and alumni contributed to the special effects innovations made by Weta Digital for the Oscar-winning trilogy The Lord of the Rings and The Hobbit. These films were not only entirely produced, but also partially filmed in Wellington.

The original Avatar movie was filmed in New Zealand and post production was done entirely by Weta Digital who won an Oscar for Best Visual Effects in 2010. The film went on to make over 2 billion dollars and sequels are currently in production in Wellington.

Victoria University of Wellington Miramar Creative Centre

Situated between Weta Digital and Park Road Post Production, the Miramar Creative Centre is the premier location for Entertainment Arts and Technology research and education in the Asia Pacific region.

Park Road Post

Wellington companies Park Road Post Production and Weta Workshop partnered in production and post-production of ‘Wolf Warrior II’ and ‘The Wandering Earth’ — China’s #1 and #2 highest grossing films of all time.
VICE-CHANCELLOR
Professor Nic Smith

Starts January 2023

Biomedical engineering

Currently Provost Queensland University of Technology

Previously University of Auckland, Oxford, and Kings College London
DIVISION OF SCIENCE, HEALTH, ENGINEERING, ARCHITECTURE, AND DESIGN INNOVATION (SHEADI)
4 CAMPUSES
Kelburn, Pipitea, Te Aro, and Wellington Hospital

OTHER LOCATIONS
Ferrier Research Institute (Lower Hutt), Robinson Research Institute (Petone)

8 UNDERGRADUATE DEGREES
BSc, BBmedSc, BE, BAS, BBS, BDI, BHlth, BMid

60+ POSTGRADUATE DEGREES

EXTERNAL RESEARCH REVENUE OVER PAST 3 YEARS
$186,019,660
OUR STRATEGIC CHALLENGE AREAS

Our Earth
Deepening our understanding of earth systems and better predicting future states

Thrive
Harnessing innovation to significantly improve human health and well-being

Net-Zero Carbon
Rapidly transitioning our energy and materials systems in a way that ensures sustainability and supports prosperity

Build Better
Using frontier technological and design innovation to enhance our built and material environment and how we live within this

Staying Safe
Intelligent and ethical systems for keeping people safe

A Quantum Leap
Flourishing in a world of big data and advancing our digital and computational capabilities to address the big questions
Harnessing innovation to significantly improve human health and well-being

**Thrive**

- Digital Health: harnessing data analytics and AI for world-leading healthcare
- Health Systems Innovation: the NZ health system is in flux and this is the moment to draw on leading-edge thinking in health systems design, apply our deep understanding of the NZ context as well as develop the health workforce of tomorrow

**Priority themes and actions:**

- Biodesign Innovation Hub - by bringing together frontier science, modern facilities, transdisciplinary approaches and open innovation, Wellington can rapidly advance as a centre for bioinnovation leading to better health outcomes and high-value economic opportunities
- Brain Health: cross-disciplinary approaches are needed to develop scale interventions to improve NZers’ mental resilience
Quantum Leap

Flourishing in a world of big data and advancing our digital and computational capabilities in order to address the big questions

Priority themes and actions that drive contribution

- **INSIGHT**: Data Science and AI Research and Innovation Centre (contributions from maths, stats and computer science) – growing largest AI research hub in Australasia

- **REAL↔VIRTUAL**: Evolution of Computational Media Innovation Centre from entertainment focus to ‘metaverse’ platforms as these become engines of international commerce, innovation and social engagement

- **AXIOM**: Computational Sciences and Engineering – focused on mathematical modelling and advanced computing to understand and solve complex problems - developing models and simulations to understand physical/natural systems

- **SMARTS**: Smart systems - IoT, edge AI, security in distributed systems (application to vertical themes such as building systems, digital health, aerospace)
Dr Binh Nguyen and Professor Colin Simpson used data from 10,000 patients, combined with a state-of-the-art machine-learning algorithm, to better predict onset of the diabetes.
MONITORING VACCINE ROLL-OUT USING BIG DATA

Professor Colin Simpson was part of a study of 5.4 million people in Scotland, of whom 2.5m had received their first vaccine dose, with colleagues at the University of Edinburgh.
A NEW REALITY FOR CURING CANCER

Dr Brian Robinson of the School of Nursing, Midwifery, and Health Practice and Dr Craig Anslow of the School of Engineering and Computer Science are developing an immersive virtual simulation for training in radiation therapy.
Associate Professor Edgar Rodríguez from the School of Design Innovation and Ben Parkinson of the Robinson Research Institute are using high-temperature superconducting magnets to develop a different MRI concept that is easier to install and allows the patient to sit upright, which will hopefully reduce patient anxiety.
PhD student Qurrat Ul Ain is developing a computer-aided diagnostic system for skin cancer using Genetic Programming.
ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, AND DATA SCIENCE
Capabilities and Applications
• Largest AI/ML team in NZ

• Largest Research Group in evolutionary learning in Southern Hemisphere

STAFF MEMBERS (20)

POST-DOCTORAL (7)

BIG AI/ML/DS PEOPLE (8)
Te Herenga Waka—Victoria University of Wellington will establish a Centre for Data Science and Artificial Intelligence (CDSAI) in later 2022
CAPABILITIES AND APPLICATIONS
MAJOR TECHNOLOGY THEMES

- Have international leadership and reputation
- Potentially serve key applications
- Lead to substantial impact to economy, social, environmental and health outcomes
Professor Mengjie Zhang
• Professor of Computer Science
• Listed as one of the top five world genetic programming researchers
• Leads Interdisciplinary Research in Data Science, Artificial Intelligence, Machine Learning, and Evolutionary Computation, with research areas including genetic programming, learning classifier systems, particles swarm optimisation, GP for feature manipulation

Professor Bing Xue
• Programme Director Computer Science,
• Co-leads Interdisciplinary Research in Data Science, Artificial Intelligence, Machine Learning, and Evolutionary Computation
• Research areas include Artificial Intelligence, Machine Learning, and Big Data / Database with connections with Biology, Statistics, Engineering and Mathematics
PEOPLE & RESEARCH AREAS

Professor Richard Arnold
- Programme Director Data Science, Professor of Statistics and Data Science
- Research projects in Reliability Theory, Directional Statistics, Statistics in Geophysics, and Cluster Analysis, Fisheries
- Working on data science for aquaculture and the blue economy

Dr Binh Nguyen
- Senior Lecturer in Data Science
- Research projects in Reliability Theory, Directional Statistics, Statistics in Geophysics, and Cluster Analysis, Fisheries
- Working on data science for aquaculture and the blue economy, Informatics for social services and wellbeing data New Zealand (novel machine learning methods for the analysis of large datasets)
- Previously worked in Institute of High Performance Computing in the Agency for Science, Technology and Research (A*STAR), Singapore; the National University of Singapore (NUS), and the Centre for Computational Biology, Duke-NUS Medical School, Singapore
INDUSTRY GRANTS AND CONNECTIONS

- **Huayin Medical** (Guangzhou), Academician Workstation
- **Northland Waste** (Wellington City Council)
- **Cucumber** (Software, Rotorua)
- **BRANZ** (NZ)
- **Lynker** (USA, Wellington)
- **IBM**
- **Google**
- **Huawei** (NZ, HK, Shenzhen)
- **Googol** (Shenzhen)
Seven Crown Research Institutes (CRIs):

- Plant and Food Research, currently have two large grants with them (a SSIF Fund and an Endeavor RP grant).
- Landcare, currently have a SSIF on NZ-Singapore DS platform/Catalyst Fund project.
- Scion, currently on a NZ-Singapore Data Science Project
- GNS, has connections with their DS team, and plans to make an MBIE Endeavor Research Program with them and SGEES
- NIWA, has connections with their AI/DS team
- ESR, has connections with their text mining/NLP team; they used to give two projects (sub-contracts) to us on medical data NLP
- AgResearch, has great potential via Lincoln in AIML/Data for agriculture.

National “Independent” Research Institutes:

- Cawthron (close to CRI), currently have two large grants by SfTI/MBIE.
- Callaghan Innovation: has good connections with their DS/AI team.
- MetService/MetOcean: co-supervised a PhD student, strategic connection with SHEADI
RECENT COMPETITIVE FUNDING

**Marsden Fund:** 11 successful grants (~2/3 NZ AIML/Data field)
- $707,000 NZD (Symbolic regression) [2021-2024]
- $707,000 NZD (Evolutionary deep learning) [2021-2024]
- $300,000 NZD (Interpretable GP) [2021-2024]
- $360,000 NZD (Image Classification) [2022-2025]

**MBIE SSIF Fund**
- 2019: $13 million NZD (Evo and Stat learning for Aquaculture) [2020-2027]
- 2020: $3 million NZD (Evo learning for forest) [2020-2023]

**MBIE Endeavour Fund**
- 2020: $16.2 million NZD (evo learning for cyber-marine, seafood) [2020-2025]
- 2021: $9.84 million NZD (AI for Drones to use tools) [2021-2026]

**SfTI and SfTI Spearhead**
- $3 million NZD (AI for Aquaculture) [2019-2022]
- $1.2 million NZD (Reinforcement learning and Robotics) [2019]

**ARC DP (Australia):** $480,000 AUD
**NSFC (China):** ¥1.3 million [2020-2024]
**Dutch Research Council (NWO)(Netherland):** €1.1 million [2020-2023]

**Industry Grants:** Huawei, Ereuna Systems, Huayin Medical, …
AI TEACHING PROGRAMMES

- BSc in AI (Major), 3 years, 360pt (from 2023)
- Master of AI (MAI): 180pt (Can be completed in a single calendar year)
- BSc (Hons) in Artificial Intelligence (AIML), 1 year, 120pt
- PGCertSc in Artificial Intelligence, 120pt coursework
- PGDipSc in Artificial Intelligence, 120pt coursework
- MSc in Artificial Intelligence
  - Part 1: 120pt courses
  - Part 2: 120pt, research thesis
- PhD in Artificial Intelligence, 3-4 years
DATA SCIENCE TEACHING PROGRAMMES

- Master of Data Science (2 years, 240 points)
- BSc (Hons) Data Science (1 year, 120 points)
- PGCert Science Data Science (1 trimester, 60 points)
- PGDip Science Data Science (1 year, 120 points)
- MSc Data Science (1.5 years, 240 points)
PARTNERSHIP BETWEEN ZHAW-SoE and SHEADI

• “Siblingship” between both universities’ AI units
  - faculty exchange and joint appointments
  - based on research strengths / strategic areas

• Joint PhD programme
  - industrial involvement / sponsoring

• Joint educational initiatives
  - student exchange
  - Double Degree MSc in Data Science / AI
VISION OF STRATEGIC COLLABORATION

• High priority partnership and trust model in which SoE is a strategic partner for SHEADI in CH / SHEADI is strategic partner for SoE in NZ

• Critical mass of research capability across areas both universities are good at -> opportunities for joint research / education programmes

• Virtual joint research / education hub as beacon for Data Science and AI across CH and NZ, reaching out to education providers in Australasia, North America, and Europe

• Pathways to investment, e.g. government programme funding support from NZ Ministry of Foreign Affairs and Trade, with potential to develop strategic intergovernmental agreement
SHEADI ASSETS

- Wealth of knowledge in collaboration with SMEs with significant contribution to NZ economy
- World leading facilities for 3D printing and building design
- Strong government funding schemes in Data Science / AI (‘Towards a Digital Strategy for Aotearoa’)
- Close proximity to decision makers / funding agencies in Wellington
- No. 1 university in Wellington region by capability, staff, student numbers
- Top-ranked university in NZ in Engineering
- VUW is NZ’s top ranked Research University
BENEFITS OF COLLABORATION FOR SoE

• SHEADI as NZ hub in Australasia, a high priority international region for SoE

• SHEADI provides access to joint industrial PhD Programme in Data Science / AI

• SHEADI provides access to industry funding, for students and faculty in a highly sought-after location (Wellington, NZ, Australasia)
BRIDGE PROFESSORSHIPS

• 3 Bridge Professorships btw SHEADI and SoE
  - paid by home university
  - promote collaboration btw SHEADI and SoE
  - SoE: appoint SHEADI faculty member as Joint Professor at SoE
  - SHEADI: appoint 2 SoE lecturers as Adjunct Professors at SHEADI
JOINT INDUSTRIAL PHD PROGRAMME
“AI for Global Challenges”

• Yearly changing themes that allow synergetic collaboration among scholarship holders

• Potential initial themes:
  - “AI in Health and Biomedical Applications”
  - “AI for Clean and Renewable Energy”

• 3 scholarships per institution and year
  - first cohort: seed funding
  - subsequent cohorts: industry matching funds
COLLABORATION IN EDUCATION

• **Student exchange**
  - Parity of incoming and outgoing students
  - Students pay tuition at home universities
  - SoE: scholarships for incoming students (up to 3’000 CHF per semester) to cover housing, travel, living expenses

• **BSc in Computer Science / Data Science**

• **MSc in Engineering / Health, Majors e.g. in Computer Science / Data Science / Public Health**

• **Double Degree MSc in Data Science / AI -> feeder for PhD programmes**
AN INSPIRING ENVIRONMENT

Wellington, our vibrant capital, provides a bustling food scene, key political decision-making, and a cultural hub for the arts. It also offers some of the most pristine nature in the world, including direct access to wildlife, endless hikes, and clean and safe coastlines.

• New Zealand has 2nd lowest corruption in the world (Transparency International)
• Top destination to visit in New Zealand (Lonely Planet)
• Safest city in New Zealand (Economist)
ACCREDITATIONS

Business School – Triple Crown
- EQUIS
- AACSB (Business)
- AMBA

Accounting
- Chartered Accountants Australia and New Zealand (CAANZ)
- CPA Australia
- Chartered Institute of Management Accountants (CIMA)
- Association of Certified Chartered Accountants (ACCA)

Tourism Management
Tourism Education Quality (TedQual) Certification by the United Nations World Tourism Organisation

Government
Network of Schools of Public Policy, Affairs, and Administration (NASPAA)

Engineering
Engineering New Zealand under the Washington Accord

Software Engineering
Engineering New Zealand and IT Professionals under the Seoul Accord
PhD / Doctoral Programmes
• Usually completed within 3-4 years
• PhDs in NZ are research only
• Three application rounds per year
  (students must apply before 1 March, 1 July or 1 November)

Why PhD in NZ?
• International PhD students only pay domestic fees
• PhD students usually get full-time work rights, partner gets open work visa and children get enrolled as domestic students in NZ state schools

Why PhD at Victoria University of Wellington?
• Easy online application system
• No need to identify supervisor (supervisor will be matched with applicant)
• Expression of Research Interest for initial application (full research proposal is written with supervisor in first year)
• Scholarship opportunity (up to NZ$23,500 per annum stipend plus domestic tuition fees for up to three years)
STUDENT SERVICES & SUPPORT

Health / Wellbeing / Counselling
• Medical centre and pharmacy (Kelburn campus)
• Wellbeing awareness teams and wellbeing workshops
• Counsellors available to discuss personal and academic issues

Recreation
• Recreation centres (Kelburn and Pipitea campus) cater to students’ fitness, wellbeing, recreation, and sporting needs
• Staff available for high-performing athletes who require additional assistance

Course Advice
Advice on course selection, degrees, career options, academic structures, etc

Academic Support + Academic Monitoring
Workshops or one-to-one appointments to enhance writing, reading, research, maths, and general study skills

Libraries / Language Support
• Wide range of resources to help students learn their chosen language (Language Learning Centre)

Interest, Conflict and Dispute Resolution
Advice, assistance and guidance around students’ safety, studies and interests
Halls of Residence
• 9 catered + 5 self-catered halls
• Can cater for almost all dietary requirements
• Alcohol free floors and female only floors (selected halls only)
• Walking distance from campus and the city

Homestay
• Students who wish to live in a family environment in New Zealand can stay with a homestay family
• U18 students can choose between homestay and selected halls

Living Expenses (estimated expenses for one academic year)
• Realistic for a university student for 40 weeks is NZ$17,000-20,000 (depending on lifestyle)
STUDENT EXPERIENCE

Over 130+ Student Clubs & Societies
- Sports, cultures, nationalities, languages, music, arts…

Inclusion, Diversity and Sustainability
- Commitment to diversity and inclusion. Appointed staff provide services to students from various backgrounds, minorities and religions
- Ambitious plan to become carbon neutral

Wellington International Leadership Programme
- Focuses on global competency, advances critical thinking and leadership challenges in world affairs
- Tailored version for short-term students – students receive a certificate and letter of completion

Wellington Plus Programme
- Community volunteering which develops leadership skills & social responsibility
- Tailored version for short-term students – students receive a certificate and letter of completion
The Division of Science, Health, Engineering, Architecture and Design Innovation is made up of highly committed researchers and educators across the STEM disciplines.

Our hub is in Kelburn but we are present throughout the city: Te Aro, Pipitea, Miramar and Gracefield.

- Mathematical Sciences
- Biological Sciences
- Chemical and Physical Sciences
- Geography, Environment and Earth Sciences
- Psychology
- Computer Science
- Engineering
- Architecture and Building Science
- Health Systems and Sciences
- Design Innovation – Industrial, Digital/Interactive…
Our driving question is not “What are we good at?’ but is instead “What are we good for?”

We believe science, technology, engineering and design innovation can change the world for the better – improving people’s lives and the health of the environment.
Postdoctoral research fellow Soheil Mohseni’s work into the use of Artificial Intelligence to help provide affordable, reliable, sustainable power to remote communities won a Talent Green Award from the German Federal Ministry of Education and Research.
Aspects:

- Symbolic regression and mathematical modelling
- Classification: class imbalance, missing data
- Unsupervised Learning/Clustering
- Categorical and ordinal data analysis
Aspects:
• Two or more potentially conflicting objectives
• Multi-objective optimization, Multi-criterion decision making
• Numeric and combinatorial optimisation
• Classification and clustering
• Feature selection and high-dimensionality reduction
Techniques
• statistical learning,
• evolutionary learning
• deep learning, transfer learning

Aspects
• Computer vision and image processing (edge detection, segmentation, object detection, motion detection, …)
• Text mining and natural language processing
• Audio and signal processing
• Skype core techniques
Main techniques and aspects

• DCNNs, DRNNs, GANs, LSTMs for
• image, speech, signal and language processing
• Automated design of DNNs
• GP for learning deep models
• Transfer learning and cross-domain learning
• Domain adaptation and generalisation
• Multi-task learning and optimisation
SCHEDULING AND COMBINATORIAL OPTIMISATION

Main techniques
- Exact methods,
- Heuristics methods
- hyper-heuristic methods

Aspects
- Job shop scheduling
- (Vehicle/ARC) Routing
- Supply Chain optimisation
- Web service composition, recourse sequencing
- grid/cloud resource planning, allocation
- Timetabling, network flows
- Static vs dynamic, uncertain environments
EXPLAINABLE / INTERPRETABLE AI / ML
FEATURE SELECTION AND BIG DIMENSIONALITY REDUCTION

Techniques
- Statistical,
- EC methods, e.g. GAs, PSO, GP, DE, EMO

Aspects
- Visualisation of learned models and results
- Feature selection/construction
- Statistics grouping
- Feature/variable interaction
- Bioinformatics, aquaculture/seafood data, chemical/material data --- tens of thousands of features, few examples
Dr Jeremy Owen
- Senior Lecturer in Biochemistry
- Research projects in biosynthesis and discovery of bacterial natural products
- Working on developing deep learning tools for a synthetic biological platform to access the chemical diversity of New Zealand microbial communities
- Previously worked in the laboratory of Sean Brady at the Rockefeller University

Professor Stephen Marsland
- Professor of Mathematics
- Led the development of AviaNZ - https://www.avianz.net/ - an innovative project which automatically classifies birds from their songs using microphones deployed in the forest.
BEST PAPER AWARDS

- Fellow of RSNZ (2), Fellow of IEEE (2), Fellow of ENZ (1)
- IEEE Congress on Evolutionary Computation “Overall Best Paper Award” (IEEE CEC 2015)
- EuroGP 2022 Best Paper Award
- EuroGP 2019 Best Paper Award
- SEAL 2017 Best Paper Award
- EvoCOP 2015 (Evo* 2015) Best Paper Award
- EvoCOP 2016 (Evo* 2016) Best Paper Award
- IES 2016 Best Paper Award
- BCCI 2016 Best Student Paper Award
- GECCO 2013 Best Paper Award (GBML Track)
- GECCO 2014 Best Paper Award (EML Track)
- AI 2009 Best Paper Award
- 10 SCI/Web of Knowledge “Hot papers” and “highly cited papers”
- “Popular paper” or “most cited paper” from major journals, TEVC, TCBY
SoE ASSETS

• Strong applied research in Data Science, AI, Cybersecurity, Computer Science

• Access to internal (SoE), local (Canton of Zurich), national, international funding programmes

• Close proximity to large global companies (Siemens, IBM)

• SoE leading Engineering University of Applied Sciences in CH

• ZHAW top ranked University in CH for advancing in SDG goals
BENEFITS OF COLLABORATION FOR SHEADI

- SoE provides access to industry funding beyond SME sector
- SoE provides access to Zurich hub with 3 leading international universities (ZHAW, University of Zurich, ETH)