agenda

Te Komiti Rangahau o Unitec | Unitec Research Committee

Date:	**2019-07-18**
Scheduled Start:	1300h
Scheduled End:	1500h
Location:	**Building 115-1030**

SECTION 1 NGĀ KUPU ARATAKI | PRELIMINARIES

1. Opening Karakia
2. Welcome from the Chair
3. Membership (2019)
4. Terms of Reference (2019)

SECTION 2 STANDING ITEMS

1. Ngā Whakapāha | Attendance, Apologies & Quorate Status
2. Mahia Atu | Matters Arising
3. Pitopito Kōrero o Ngā Hui | Minutes of the Previous Meeting

SECTION 3 ITEMS TO APPROVE

1. Re-start fund to support researchers returning from maternity leave
2. Research Centre Application

SECTION 4 WHAKAWHITI KŌRERO | ITEMS TO DISCUSS

1. Research Productivity Traffic Light
2. 2019 Research Symposium
3. 2018 PBRF Report
4. 2018 Annual Research Report
5. Draft Strategies:
   - *5.1. International Strategy*
   - *5.2. Unitec Pacific Success Strategy 2018 – 2022*

SECTION 5 ĒTAHI KAUPAPA ANŌ | OTHER BUSINESS

Closing Karakia

SECTION 1 NGĀ KUPU ARATAKI | PRELIMINARIES

Item 1.1 Opening Karakia

KARAKIA TIMATANGA	**BEGINNING PRAYER**
Manawa mai te mauri nuku	*Embrace the power of the earth*
Manawa mai te mauri rangi	*Embrace the power of the sky*
Ko te mauri kai au	*The power I have*
He mauri tipua	*Is mystical*
Ka pakaru mai te pō	*And shatters all darkness*
Tau mai te mauri	*Cometh the light*
Haumi ē, Hui ē, Tāiki ē!	*Join it, gather it, it is done!*

Item 1.2 Welcome from the Chair

New member	Kristina Naden (Early Career)	Environmental & Animal Science

Item 1.3 Membership of Te Komiti Rangahau o Unitec

Associate Professor Marcus Williams	Chair - Director, Research and Enterprise
Professor Christian Probst	Director, High Technology Transdisciplinary Research
Heather Stonyer	Director Industry Partnerships or nominee
Dr Falaniko Tominiko	Director, Pacific Success or nominee
Dr Jo Mane	Director, Māori Success or nominee
Dr Helen Gremillion (Associate Professor)	Healthcare and Social Practice
Yusef Patel (New and Emerging)	Architecture
Roger Birchmore (Early Career)	Building Construction
Dr Lian Wu (Associate Professor)	Community Studies
Dr Iman Ardekani (Associate Professor)	Computing and IT
Dr Leon Tan (Associate Professor)	Creative Industries
Dr Jonathan Leaver (Associate Professor)	Engineering and Applied Technology
Kristina Naden (Early Career)	Environmental & Animal Science
Gerry Ryan (New and Emerging)	Trades and Services
Dr Maryam Mirzaei (Early Career)	Business Studies
Tui Matelau (Early Career)	Bridgepoint
Susan Eady	Library Knowledge Specialist
Myles Durrant	One member nominated by the Student Council
Arun Deo	Research Advisor
TBA	ePress Editor (non-voting members)

In attendance: Asma Munir URC Secretary

Item 1.4 Te Komiti Rangahau o Unitec Terms of Reference

The powers and functions of Te Komiti Rangahau o Unitec (URC) shall be to:

a. Foster the conduct of research, and support the achievement of Unitec's strategic research, enterprise and innovation priorities;

b. Propose and advise on strategic directions and priorities for research, enterprise and innovation;

c. Provide expert advice on institutional policy;

d. Develop protocols and guidelines and make recommendations in relation to the conduct of research, enterprise and innovation;

e. Oversee the Grants Advisory Committee and the reporting of funded projects;

f. Encourage and enhance the development of the research, enterprise and innovation culture along with student and staff research capability;

g. Oversee the monitoring of research outputs and research reporting; and,

h. Foster transdisciplinary, collaborative and externally engaged research, enterprise and innovation.

SECTION 2 STANDING ITEMS

Item 2.1 Ngā Whakapāha | Attendance, Apologies & Quorate Status

RECOMMENDATION
That the Committee accept the Apologies of today's meeting.

Item 2.2 Pitopito Kōrero o Ngā Hui | Minutes of the Previous Meeting

refer to pg1

RECOMMENDATION
That the Committee approves the Minutes of the meeting of 2019-05-23.

Item 2.3 Mahia Atu | Matters Arising

(None) *refer to pg4*

SECTION 3 ITEMS TO APPROVE

Item 3.1 Re-start fund to support researchers returning from maternity leave

refer to pg6

Item 3.2 Research Centre Application

refer to pg7

SECTION 4 WHAKAWHITI KŌRERO | ITEMS TO DISCUSS

Item 4.1 2019 Research Productivity Traffic Light (RTPL) Report

refer to pg52

Item 4.2 2019 Research Symposium

refer to pg59

Item 4.3 2018 PBRF Report

refer to pg63

Item 4.4 2018 Annual Research Report

refer to pg73

Item 4.5 Draft Strategies

item 4.5.1 International Strategy

refer to pg126
https://unitecnz-my.sharepoint.com/:w:/g/personal/tchapman_unitec_ac_nz/EeMoTPO-xI5NmSN50cJhkFgBRV9q1IXW9j2BoZKsPTkyhw?e=EI7fWG

item 4.5.2 Unitec Pacific Success Strategy 2018 – 2022

refer to pg150

(NB – The Director of Pacific Success has highlighted relevant clauses)

SECTION 5 ĒTAHI KAUPAPA ANŌ | OTHER BUSINESS

Closing Karakia

TE KARAKIA WHAKAMUTUNGA	**ENDING PRAYER**
Ka wehe atu tātou	*We are departing*
I raro i te rangimārie	*Peacefully*
Te harikoa	*Joyfully*
Me te manawanui	*And resolute*
Haumi ē, Hui ē, Tāiki ē!	*We are united, progressing forward!*

Item 2.2

Te Komiti Rangahau o Unitec (URC) Minutes

18 April 2019 at 1pm - Unitec Mt Albert Campus

Membership of Te Komiti Rangahau o Unitec (Quorum = 9)	
Associate Professor Marcus Williams	Chair - Director, Research and Enterprise
Professor Christian Probst	Director, High Technology Transdisciplinary Research
Heather Stonyer	Director Industry Partnerships or nominee
Dr Falaniko Tominiko	Director, Pacific Success or nominee
Dr Jo Mane	Director, Māori Success or nominee
Dr Helen Gremillion (Associate Professor)	Healthcare and Social Practice
Yusef Patel (New and Emerging)	Architecture
Roger Birchmore (Early Career)	Building Construction
Dr Lian Wu (Associate Professor)	Community Studies
Dr Iman Ardekani (Associate Professor)	Computing and IT
Dr Leon Tan (Associate Professor)	Creative Industries
Dr Jonathan Leaver (Associate Professor)	Engineering and Applied Technology
Dr Kristie Cameron (Early Career)	Environmental & Animal Science
Gerry Ryan (New and Emerging)	Trades and Services
Dr Maryam Mirzaei (Early Career)	Business Studies
Tui Matelau (Early Career)	Bridgepoint
Susan Eady	Library Knowledge Specialist
Myles Durrant	One member nominated by the Student Council
Arun Deo	Research Advisor
Gwynneth Porter	ePress Editor (non-voting members)
In attendance: Asma Munir	URC Secretary

Te Komiti Rangahau o Unitec Terms of Reference:

The powers and functions of Te Komiti Rangahau o Unitec (URC) shall be to:

a. Foster the conduct of research, and support the achievement of Unitec's strategic research, enterprise and innovation priorities;

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c. Provide expert advice on institutional policy;

d. Develop protocols and guidelines and make recommendations in relation to the conduct of research, enterprise and innovation;

e. Oversee the Grants Advisory Committee and the reporting of funded projects;

f. Encourage and enhance the development of the research, enterprise and innovation culture along with student and staff research capability;

g. Oversee the monitoring of research outputs and research reporting; and,

h. Foster transdisciplinary, collaborative and externally engaged research, enterprise and innovation

1. **WELCOME & APOLOGIES**

The Chair warmly welcomed committee members with a Karakia. The Chair introduced Dr Jacquie Reed, the new Operation Manager to the committee.

Present:

Assoc Prof Marcus Williams (Chair), Dr Falaniko Tominiko, Dr Helen Gremillion, Dr Jonathan Leaver, Dr Lian Wu, Dr Maryam Mirzaei, Heather Stonyer, Yusef Patel, Arun Deo, Susan Eady, Myles Durrant.

Apologies:

Prof Christian Probst, Dr Iman Ardekani, Dr Jo Mane, Dr Leon Tan, Dr Kristie Cameron, Roger Birchmore

2. **Confirmation of the minutes of the 14 March 2019 meeting**

The minutes of the 14 March 2019 meeting to be ratified by the committee.

Moved: Dr Helen Gremillion **Seconded:** Dr Maryam Mirzaei

3. **Matters arising from the previous minutes**

All matters risen from the previous minutes were completed.

4. **Consultation and co-creation process for the new research strategy – 2020 - 2025**

Marcus opened the discussion and shared with the committee the concerns he raised with Interim Chief Executive. They were that the URC work plan involves the review of two significant policies and the Unitec Research Strategy which may be significantly impacted by the outcome of the Review of Vocational Education currently being undertaken by the Ministry of Education. In order to avoid wasting institutional time the implementation of the work will be put on hold until July.

Marcus briefly explained each step of the work plan and it was agreed to add one more step to the work plan for the committee member to articulate the key point of the Unitec Diamond, NZ Tertiary Education Strategy and existing Unitec Research Strategy so that when consultation occurs, there will be some points of consideration on which staff can provide feedback.

Committee will continue working on the PBRF review as per timeline.

Action: Marcus to add one more step to the work plan for the committee to articulate the key point of the Unitec Diamond, NZ Tertiary Education Strategy and existing Unitec Research Strategy. **Action:** Marcus to adjust dates in the work plan.

5. **SPSS phase out**

Committee members were referred to the memo, which was circulated with the agenda (pg9).

The SPSS (Statistical Package for the Social Sciences) is a widely used software for statistical analyses and had been used at Unitec for over a decade now. Unitec annually pays about $44,000 (NZD) for the renewal of its license.

Investigation into the viability of an alternative was undertaken in 2017, led by Associate Professor Nigel Adams in the School of Environmental and Animal Science.

In late 2018, Tūāpapa Rangahau did a survey and the results indicated that SPSS software is under-used and the cost associated with its usage is very high.

The records held by IMS/Library also showed that the software usage is declining:

- 45 licenses issued in 2016
- 35 licenses issued in 2017
- 23 licenses issued in 2018

Arun Deo (Research Adviser) explained the rationale behind the recommendation of R Statistical software and responded to the questions raised by the committee members.

The committee members present approved the discontinuation of SPSS software to be replaced with R statistical software from 2020, subject to consultation with staff in schools. Tūāpapa Rangahau will run workshops on R statistical software for staff every year for few years.

Action: Committee Members to consult with staff on SPSS. **Action:** Asma to contact and seek feedback from those who were absent in the meeting.

6. Draft School Research Plan template

Marcus explained the relevance of the School Research Plan. Committee members provided feedback on a draft template.

Action: Marcus to add following two points to the template: 1. A list of summary of research topics or names of the most recent research paper. 2. Asking for details for student research engagement

7. General Business

There was no general business

Meeting closed @ 2.15pm with a Karakia.

Item 2.3

Matters Arising from 18 April 2019 Meeting

Agenda Item	Matter Arising	Responsible	Outcome
4	**Consultation and co-creation process for the new research strategy – 2020 – 2025:** **Action:** 1. Marcus to add one more step to the work plan for the committee to articulate the key point of the Unitec Diamond, NZ Tertiary Education Strategy and existing Unitec Research Strategy. 2. Marcus to adjust dates in the work plan.	Marcus Williams	**Completed** *(please refer to next page)*
5	**SPSS phase out** **Action:** 1. Committee Members to consult with staff on SPSS. 2. Asma to contact and seek feedback from those who were absent in the meeting.	Asma Munir	**Completed**
6	**Draft School Research Plan template** **Action:** Marcus to add following two points to the template: 1. A list of summary of research topics or names of the most recent research paper. 2. Asking for details for student research engagement	Marcus Williams	**Completed**

Unitec Research Committee (URC) Work Plan - 2019

Review of Unitec Research Strategy: 2021 - 2025	
Item	***Timeline***
1. Initial URC review referring to Unitec Diamond, NZ Tertiary Education Strategy & existing Unitec Research Strategy. URC looks to identify areas of need and opportunity. URC identifies key individuals to participate in a focus group responding to areas identified by URC	August
2. Facilitate focus group. Provide background information; the Unitec Diamond, the Tertiary Education Strategy and the current Unitec Research Strategy	September
3. Summarise recommendations of focus group and write them up. Initiate consultation hui for Mt Albert and Henderson campuses in appropriately appointed space	October
4. Draft up high level changes/improvements and bring back to URC. Members can take back to school meetings.	November
5. Feedback incorporated into a first draft and presented back to URC.	December

Research Policy Timeline:	
Item	***Timeline***
Conduct of Research Policy	
1. URC members review policy individually and bring thoughts back to the committee	August
2. Research Director drafts changes in response and presents back to the committee	October
3. Final draft is presented to Academic Board	March 2020

PBRF Revision Timeline:	
Item	***Timeline***
1. URC members review the 2015 PBRF revision framework	August
2. Research Director drafts changes in response and presents back to URC	October
3. Terms of Reference for the review are presented to schools through RLs for semester two 2020	November

Unitec Institute of Technology
TE WHARE WĀNANGA O WAIRAKA

memo

Tūāpapa Rangahau, partnering research and enterprise

To	Unitec Research Committee	Date	15 May 2019
CC	Associate Professor Dan Blanchon		
From	Marcus Williams Director of Tūāpapa Rangahau	Phone No.	021 401 965
Subject	Re-start fund to support researchers returning from maternity leave		

Rationale:

Supporting our researchers is one of our most important functions as a committee and our Early Career Researchers particularly. This latter is the most likely to go on maternity leave and Associate Professor Dan Blanchon has suggested we develop a fund to support active researchers in this position to return to the level of independence they had before they went on leave. The following is the essence of the idea.

Proposal:

1. The fund will be known as "Re-start fund to support researchers returning from maternity leave"
2. Use part of the ECR budget to create this fund
3. Up to $2k is available for those who meet the criteria; provide an evidence of past productivity and having a clear plan

The proposal must be considered and approved by Unitec Research Committee.

The re-start fund will be administered by Tūāpapa Rangahau.

Recommended:

The committee consider this idea and provide feedback.

Request to Establish a Research Centre

Proposed name of Research Centre:	Environmental Solutions Research Centre
Proposed Director:	Dr Terri-Ann Berry
Relevant Research Committee Chair supporting the proposal:	Heather Stonyer
Executive Dean supporting the proposal:	Merran Davis
Name of Unitec staff member/s associated with this project:	Dr Terri-Ann Berry Shannon Wallis German Hernandez A/P Dan Blanchon A/P Peter de Lange Graham Jones Glenn Aguilar Prof Jenny Lee-Morgan A/P David Phillips A/P Linda Kestle Prof Bin Su A/P Helen Gremillion Dr Ashveen Nand Duaa Al-Shadli Cesar Lador Kambiz Borna Roger Birchmore Guillermo Ramirez-Prado Erin Doyle Gregor Steinhorn Brenda Massey

1. Background

The proposed Environmental Solutions Research Centre (ESRC) will partner chemists, biologists, engineers, epidemiologists, geographers and building and construction experts with industry experts from various fields such as waste management and minimisation, air quality, wastewater treatment and civil engineering. By working on such complex and multigenerational challenges such as asbestos contaminated soil, the Research Centre will foster transdisciplinary research initiatives that push the boundary of current disciplinary silos.

Currently, research and development in the environmental science and engineering field suffers from a disconnect between academic research and industry application. Due to the transdisciplinary and complex nature of the challenges encountered in this field, solutions require deep scientific investigations and advanced technological solutions. This necessitates usually long development time frames and high development costs. To ensure that the research and development is meeting industry and user needs, practical implications have to be taken into account from the initial research planning stage. This is traditionally difficult as there are different ways of managing projects between industry and academia. We aim to develop a structure for the Environmental Solutions Research Centre that fosters transdisciplinary industry engaged research to tackle waste and pollution challenges.

2. Research aims

The Research Centre for Environmental Solutions will aim to investigate ideas and concepts under two main themes: Waste and Pollution. Current activity within these fields includes:

Waste: asbestos bioremediation, waste minimisation, plastic reduction in construction and the recycling/reuse of port sediments.

Pollution: air quality, indoor air pollution and the treatment of nitrate-rich runoff from farming.

3. Partnerships and Connections

3.1. Strategic Research Foci

Environmental challenges can only be understood by researching them simultaneously with the methods of different fields for example heavy metal contamination in harbour sediment can only be successfully described by integrating chemistry marine biology oceanography and toxicology with application disciplines such as civil and process engineering. To ensure good information flows between the practitioners of all the involved disciplines innovation science research suggests long term conversations and collaborations to be the most fruitful way.

Terri-Ann Berry is an active member of Applied Molecular Solutions (AMS) and has been working collaboratively with Dr Dan Blanchon (AMS Director) on a successful funding application with Ministry for the Environment and also a Smart Ideas application (which is currently under second round review) on asbestos bioremediation.

In addition, Terri-Ann has applied for HTTRN incubator funding for research into Indoor Air Quality with Unitec staff from Computer Sciences (Guillermo Ramirez-Prado), Social Practise (Helen Gremillion), Ngā Wai a te Tūī (Professor Jenny Lee-Morgan) and Construction (Roger Birchmore). This represents a continuation of a successful BRANZ funded project on IAQ on which Terri-Ann was Primary Investigator and Roger Birchmore Associate investigator.

3.2. Internal Unitec Collaborations - Unitec Research Strategy 2015-2020 - particularly related to the table of Key Actions and Deliverables on pp.7-9

The new research centre will provide a structure to attract External Research Income, collaborate with the Applied Molecular Solutions Strategic Research Focus and increase the number and level of research outputs at Unitec, thereby increasing the likelihood for Unitec academics to rate highly in PBRF. The researchers involved have already won nearly half a million $ in research grant with opportunities worth millions currently under development. Concentrating these efforts into one research centre will improve the chances to win significant ERI in the future.

Internally, researchers from the proposed research centre are already co-leading projects with Applied Molecular Solutions (AMS) (e.g asbestos bioremediation). AMS applies new molecular technologies and techniques to address problems which include biosecurity, animal welfare and human health. A key purpose of AMS is the provision of tools to investigate real world problems, however there are clear synergies between AMS and the proposed ESRC which seeks to provide solutions to those real world environmental problems. A long-term objective would be the creation of a larger centre which will further enable collaborative research (between AMS and ESRC) whilst still allowing both centres to develop independently (where research interests differ). ESRC will support the

formation of a critical mass of environmental research expertise to attract further projects, skilled academics, external partnerships and funding, thereby supporting the aims of the research focus. The current and future research projects in the proposed research centre are expected to produce a multitude of high quality research outputs for Unitec staff in several schools. This will greatly support them in building competitive PBRF portfolios for the next PBRF round. Given the likelihood that the next PBRF round will include a stronger impact focus the highly applied, impactful research of the Environmental Solutions Research Centre will be well placed to profit from these changes.

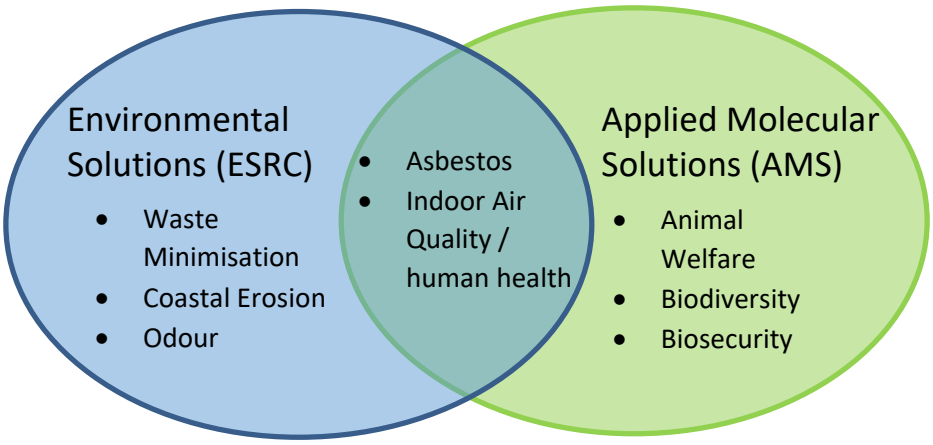

Figure 1: Proposed long-term structure AMS, ESRC and the overarching centre to promote collaborative research.

3.3. External

The ES Centre aims to encourage multi-disciplinary teams to engage in trans-disciplinary challenges alongside developing new transdisciplinary methods and know-how. Besides the necessary integration of the different academic researchers, industry practitioners hold indispensable knowledge and framing these transdisciplinary challenges without them would be futile. Therefore, this centre proposes to develop a structure that will utilise a collaborative transdisciplinary academic team with different industry collaboration groups for specific research areas.

National external collaborators from both academia and industry currently include: A/P Dr Jennifer Salmond, A/P Dr Kim Dirks & Dr Colin Whittaker (University of Auckland); Dr Julie Bennett (University of Otago); Dr Nick Talbot (Auckland Council), Dr Guy Coulson (NIWA), Dr Perry Davy (GNS), Nigel Ironside (Ports of Auckland), Andrew Schunke (Chester Consultants), Raymond Chang (Beca) & Tony Edmonds (Chemcare).

International collaboration partners include: Dr Robyn Hardy (University of Canberra), Professor Edward Emmett & Dr Brenda Casper (University of Pennsylvania), Dr Joe Testa (University of Pennsylvania & Fox Chase Cancer Center) & Dr Rachel Codd (University of Sydney).

4. Staff members involved

4.1. Proposed Research Centre Director:

Dr Terri-Ann Berry has a PhD in Water Science and Engineering from Cranfield University in the UK, and is a Chartered Environmentalist and a Fellow of the Royal Society of Chemistry. She has 10 years' experience in academia and 12 years' experience in industry as a scientist and researcher. Terri-Ann is currently a Senior Lecturer in the School of Engineering and Applied Technology, teaching and leading the development of courses at levels 5, 6 and 7 in environmental engineering, including environmental chemistry. She is the Principal Investigator on several large externally funded research projects, which involve collaborations with international and national tertiary and research institutions, industry, community and iwi. These projects have developed her expertise in contract management, budgeting, procurement, employment and risk management processes and procedures. Terri-Ann is listed on the Unitec Supervisor's Register as a Principal Supervisor for Masters and Doctoral research. Her CV is attached.

4.2. Potential key staff members (Selection of CVs attached)

External Personnel & Organisation	
A/P Jennifer Salmond	University of Auckland
A/P Kim Dirks	University of Auckland
Dr Guy Coulson	NIWA
Adj. Professor Robyn Hardy	University of Canberra, Australia
Professor Edward Emmett	University of Pennsylvania, USA
Dr Joseph Testa	Fox Chase Cancer Centre, Philadelphia, USA
Professor Peter Lockhart	Massey University
Dr Nick Waipara	Te Tira Whakamātaki Māori Biosecurity Network
Regan Burke	Civil Share
Andrew Schunke	Chester Consultants/University of Auckland
Unitec Personnel & School	
Shannon Wallis	Engineering & Applied Technology
German Hernandez	Bridgepoint/Engineering & Applied Technology
A/P Dr Dan Blanchon	Environmental & Animal Sciences
A/P Peter de Lange	Environmental & Animal Sciences
Graham Jones	Environmental & Animal Sciences
Glenn Aguilar	Environmental & Animal Sciences
Professor Jenny Lee-Morgan	Ngā Wai a te Tūī
A/P David Phillips	Engineering & Applied Technology
A/P Dr Linda Kestle	Building Construction
Professor Bin Su	Architecture
A/P Dr Helen Gremillion	Healthcare & Social Practice
Dr Ashveen Nand	Animal & Environmental Sciences
Dr Duaa Al-Shadli	Engineering & Applied Technology
Cesar Lador	Engineering & Applied Technology
Dr Kambiz Borna	Engineering & Applied Technology
Roger Birchmore	Building Construction
Dr Guillermo Prado-Ramirez	Computer Science
Erin Doyle	Environmental & Animal Sciences
Gregor Steinhorn,	Tūāpapa Rangahau
Brenda Massey	Tūāpapa Rangahau

5. Funding

The centre will receive funding primarily from grants from central and local government and from industry partners. An itemised budget, forecasting to year five, is attached. The centre will work closely with staff from Tūāpapa Rangahau to identify other funding opportunities that may include paid consultancies, student scholarships and the hosting of conferences and symposia.

6. Teaching and Students

Provide linkage between the aims of the Centre and programmes or areas of teaching provision. Outline intended opportunities for the involvement of students at postgraduate or undergraduate level.

- University of Canberra PhD student Shannon Wallis and University of Auckland MEng student Andrew Schunke will be working on some of the centre's projects. The centre's collaborations with other tertiary institutions will provide opportunities for the Centre Director to co-supervise additional postgraduate students and to develop Masters and PhD projects that can be funded through external grants.

7. Distinctiveness

Please outline how the proposed Centre is distinct from existing Centres (nationally and internationally).

The sustainability challenges in New Zealand and globally require new ways of research and innovation. The proposed Environmental Solutions Research Centre will investigate areas of great relevance to New Zealand environmentally, economically and socially. The first research area we will include in this research centre is the treatment of asbestos contaminated waste. Unitec had already significant success in this field establishing an international collaboration with the University of Canberra and University of Pennsylvania. Furthermore, the Research Group has won a $400,000 grant from the Ministry for the Environments, Waste Minimisation Fund and is currently in the second phase for $1 million MBIE Smart Ideas Application. Industry partner Chemcare has offered $30,000 cash contribution and significant in-kind contribution for this research. This time is ripe for integrating the interests of the different New Zealand waste management companies with the needs of central and local government and the capabilities of the researchers here at Unitec and with our New Zealand and international partners. By doing so we can harness know how and expertise from the industry experts and at the same time ensure timely and efficient knowledge transfer from the researchers into the industry. This will help industry manage significant environmental and public health risks posed by various wastes and pollution sources. Besides the direct benefits here in New Zealand technology transfer will have significant export potential and due to our international collaboration partners, we are well placed to capitalise on this.

In addition to the initial asbestos remediation industry collaboration group further such groups can be formed in the future. Areas currently already under development at Unitec are indoor air quality in buildings, sustainability assessment of New Zealand ports and the reduction of construction waste in residential buildings. By partnering industry collaboration groups from different industries with a core transdisciplinary academic research team, significant applied research capabilities can be built with great potential for positive spill-over effects to other related research areas. We believe this partnership opportunity with the Research Centre has the potential to impact how individual businesses can collaborate together to resolve critical, shared challenges.

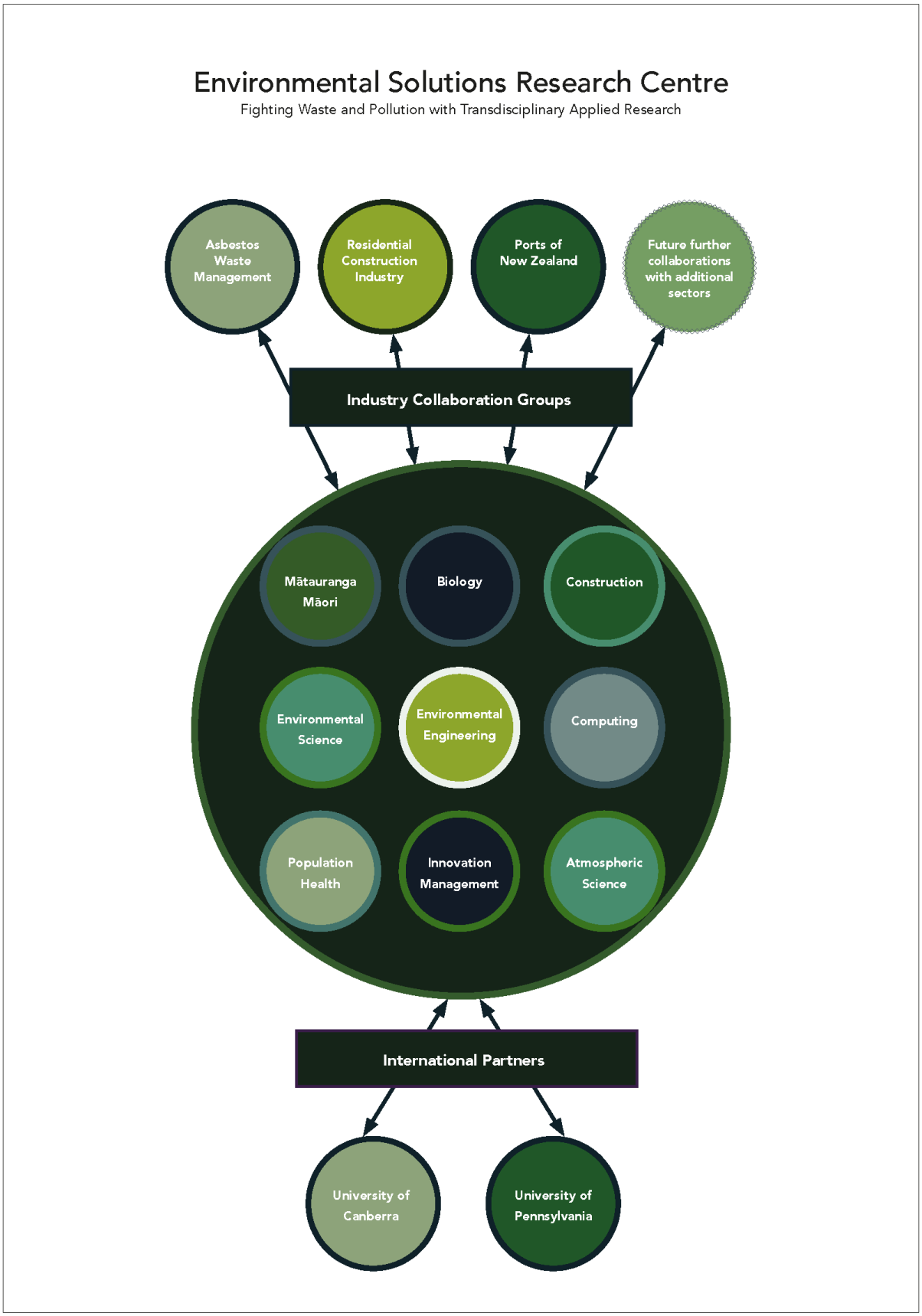

Figure 2: Proposed Environmental Solutions Research Centre, partners, collaborators and research topics

8. Management and Operation

8.1. Proposed Location – 113-2002

8.2. Proposed Advisory Board – A/P Marcus Williams, Dr Jacquie Reed, Nick Sheppard, Irene Kereama-Royal, Heather Stonyer & Nigel Ironside.

8.3. Proposed Personnel – Dr Terri-Ann Berry, Shannon Wallis, German Hernandez

8.4. Proposed Operational Financing – Please see details included in the budget

8.5. External Research Income

See budget

9. Outcomes

Please outline any expected outcomes and how you will assess these.

Please outline previous outputs of the group along with intended outputs and forecast outputs of the Centre in the template provided (*available in the Forms section on the Nest*).

9.1. Previous

In 2016, the Environmental Solutions (ES) team led a successful $94,000 bid for a research project called "the potential impact of energy-saving building design on occupant health". The grant was the result of a successful application to BRANZ (the Building Research Association of New Zealand). The project (now complete) utilised the two Unitec research houses. It was the first time, according to the Unitec Research Office, that a Unitec team had been allocated funding from BRANZ. Their funding is highly contested amongst New Zealand's Universities and Crown Research Institutes. It was also the first external grant that the Unitec research houses had attracted and was successfully conducted by an inter-disciplinary team involving staff and students from Building Technology, Electrotechnology, Construction and Plumbing & Gasfitting. One conference presentation, two publications in a high quality peer-reviewed journal and another planned journal publication have been produced from this project. An ongoing relationship with BRANZ and the opportunity to work with other experts within this field have also been key outcomes.

In 2018, the ES team won a $400,000 grant from the Ministry for the Environment (MfE) for a three-year research project called "Remediation of asbestos contaminated soil: an alternative to landfill disposal". As Principal Investigator of the project, Terri-Ann is leading a team that includes international researchers and professors from the US Ivy League University of Pennsylvania, the Fox Chase Cancer in Philadelphia and Canberra University, as well as a senior researcher and associate professor in the School of Environmental and Animal Sciences and a former Unitec student and University of Canberra PhD student.

9.2. Intended

In 2019, the ES team applied to MBIE's (the Ministry for Business, Innovation and Employment) Endeavour Fund Smart Ideas fund for a proposed research project called "Bioremediation of asbestos contaminated soil: an alternative to landfill disposal" was approved to proceed to the full proposal stage. This project involves the same researchers and professors from the University of Pennsylvania, the Fox Chase Cancer and Canberra University as are involved in the MfE project, but also a senior scientist from Crown Research Institute Plant and Food, two associate professors and an additional PhD student.

In addition, an internal seed fund from HTTRN was applied for to further research into indoor air quality issues. This transdisciplinary and trans-institutional research includes A/P Dr Jennifer Salmond and A/P Dr Kim Dirks (University of Auckland), Dr Guy Coulson (NIWA),

Dr Nick Talbot (Auckland Council), Dr Guillermo Ramirez-Prado (Computer Sciences), Dr Helen Gremillion (Social Practice), Professor Jenny Lee-Morgan (Ngā Wai a te Tūī) and Roger Birchmore (Construction). Industrial support has been offered by (including external funding) by Fisher and Paykel and we are in discussion with HRV and DVS.

9.3. Forecast

Further to the success of the IAQ project, this will form the basis of applications for funding to BRANZ (the Building Research Association of New Zealand and the Health Research Council, and could lead to the identification of long-term options for helping vulnerable communities in South Auckland who are currently living in poor IAQ environments.

The ES team is currently in conversation with Nigel Ironside at Ports of Auckland (PoA)working on a project to recycle sediment dredgings. This is a collaborative project which includes MEng student, Andrew Schunke (University of Auckland) and co-supervisor Dr Colin Whittaker (UoA). Funding has been offered by PoA for a long-term project to find environmental waste management options for Auckland. Terri-Ann has recently been invited to join a Waste Minimisation Committee led by Auckland Council and Civil Share which supports initiative to encourage a global economy within New Zealand.

10. Work Programme and Milestones

The proposed work programme is described in the attached budget. For project milestones, please see individual project descriptions.

Research Centre for Environmental Solutions: 5 - Year Budget (Income)						
Projects & Funding Sources (excludes in-kind contributions)	**Yr 1**	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Totals**
Unitec Seed Funding						
HTTRN - Indoor Air Quality (IAQ)	$ 20,000	$ 20,000				**$ 40,000**
External Funding						
INDOOR AIR QUALITY (IAQ)						
Auckland Council - IAQ		$ 10,000				**$ 10,000**
2020 University of Auckland Sub-contract (MBIE Endeavour Fund)		$ 101,600	$ 104,498	$ 107,483	$ 110,557	**$ 424,138**
Haier -IAQ		$ 10,000				**$ 10,000**
HRV - IAQ		$ 10,000				**$ 10,000**
WASTE						
2018 Ministry for the Environment (MfE) - Asbestos	$ 126,550	$ 137,317	$ 129,728			**$ 393,595**
2019 MBIE Endeavour Fund: Smart Ideas - Asbestos	$ 391,301	$ 345,610	$ 262,744			**$ 999,655**
2020 MBIE Endeavour Fund: Smart Ideas - Waste		$ 300,000	$ 500,000			**$ 800,000**
2020 MfE - Mudcrete		$ 50,000	$ 150,000			**$ 200,000**
2020 MfE - Plastic		$ 50,000	$ 150,000			**$ 200,000**
2021 MBIE Endeavour Fund: Research Programme -Waste			$ 500,000	$ 1,500,000	$ 1,800,000	**$ 3,800,000**
Chemcare - Asbestos	$ 10,000	$ 10,000	$ 10,000			**$ 30,000**
Ports of Auckland		$ 20,000				**$ 20,000**
ODOUR						
Watercare	$ 10,000					**$ 10,000**
TOTAL INCOME	**$ 557,851**	**$ 1,064,527**	**$ 1,806,970**	**$ 1,607,483**	**$ 1,910,557**	**$6,947,388**

Key

Under development
Submitted applications
Funded

Research Centre for Environmental Solutions: 5-Year Budget (Expenses)							
Budget Item	**Project**	**Yr 1**	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Totals**
Overheads							
Unitec	*2018 Ministry for the Environment (MfE) - Asbestos*	*$ 18,480*	*$ 19,034*	*$ 19,605*			***$ 57,119***
Unitec	*2019 MBIE Endeavour Fund: Smart Ideas - Asbestos*	*$ 62,475*	*$ 52,744*	*$ 39,582*			***$ 154,801***
Unitec	*2020 MBIE Endeavour Fund: Smart Ideas - Waste*		*$ 37,500*	*$ 62,500*			***$ 100,000***
Unitec	*2020 MfE - Mudcrete*		*$ 6,250*	*$ 18,750*			***$ 25,000***
Unitec	*2020 MfE - Plastics*		*$ 6,250*	*$ 18,750*			***$ 25,000***
Unitec	*2020 University of Auckland Sub-contract (MBIE Endeavour Fund)*		*$ 25,300*	*$ 26,059*	*$ 26,841*	*$ 27,646*	***$ 105,846***
Unitec	*2021 MBIE Endeavour Fund: Research Programme -Waste*			*$ 62,500*	*$ 187,500*	*$ 225,000*	***$ 475,000***
School	*2018 Ministry for the Environment (MfE) - Asbestos*	*$ -*	*$ -*	*$ -*			
School	*2019 MBIE Endeavour Fund: Smart Ideas - Asbestos*	*$ 49,980*	*$ 42,195*	*$ 31,666*			***$ 123,840***
School	*2020 MBIE Endeavour Fund: Smart Ideas - Waste*		*$ 30,000*	*$ 50,000*			***$ 80,000***
School	*2020 MfE - Mudcrete*		*$ 5,000*	*$ 15,000*			***$ 20,000***
School	*2020 MfE - Plastics*		*$ 5,000*	*$ 15,000*			***$ 20,000***
School	*2020 University of Auckland Sub-contract (MBIE Endeavour Fund)*		*$ 20,240*	*$ 20,847*	*$ 21,473*	*$ 22,117*	***$ 84,677***
School	*2021 MBIE Endeavour Fund: Research Programme -Waste*			*$ 50,000*	*$ 150,000*	*$ 180,000*	***$ 380,000***
Staff Costs							
Unitec personnel	*2018 Ministry for the Environment (MfE) - Asbestos*	*$ 86,051*	*$ 88,633*	*$ 91,292*			***$ 265,976***
Unitec personnel	*2019 MBIE Endeavour Fund: Smart Ideas - Asbestos*	*$ 127,500*	*$ 107,640*	*$ 80,780*			***$ 315,920***
Unitec personnel	*2020 MBIE Endeavour Fund: Smart Ideas - Waste*		*$ 75,000*	*$ 125,000*			***$ 200,000***
Unitec personnel	*2020 MfE - Mudcrete*		*$ 12,500*	*$ 37,500*			***$ 50,000***
Unitec personnel	*2020 MfE - Plastics*		*$ 12,500*	*$ 37,500*			***$ 50,000***
Unitec personnel	*2020 University of Auckland Sub-contract (MBIE Endeavour Fund)*		*$ 46,000*	*$ 47,380*	*$ 48,801*	*$ 50,265*	***$ 192,446***
Unitec personnel	*2021 MBIE Endeavour Fund: Research Programme -Waste*			*$ 125,000*	*$ 375,000*	*$ 450,000*	***$ 950,000***
Sub-contracts							
External providers	*2019 MBIE Endeavour Fund: Smart Ideas - Asbestos*	*$ 76,876*	*$ 74,101*	*$ 64,761*			***$ 215,738***
External providers	*2020 MBIE Endeavour Fund: Smart Ideas - Waste*		*$ 60,000*	*$ 100,000*			***160000***
External providers	*2020 MfE - Mudcrete*		*$ 10,000*	*$ 30,000*			***40000***
External providers	*2020 MfE - Plastics*		*$ 10,000*	*$ 30,000*			***$ 40,000***
External providers	*2021 MBIE Endeavour Fund: Research Programme -Waste*			*$ 100,000*	*$ 300,000*	*$ 360,000*	***$ 760,000***
Operating Costs							
Project costs	*2018 MfE - Asbestos*	*$ 22,019*	*$ 29,650*	*$ 18,831*			***$ 70,500***
Project costs	*2019 MBIE Endeavour Fund: Smart Ideas - Asbestos*	*$ 61,975*	*$ 58,382*	*$ 38,039*			***$ 158,396***
Project costs	*2020 MBIE Endeavour Fund Smart Ideas - Waste*		*$ 60,000*	*$ 100,000*			***$ 160,000***
Project costs	*2020 MfE - Mudcrete*		*$ 10,000*	*$ 30,000*			***$ 40,000***
Project costs	*2020 MfE - Plastics*		*$ 10,000*	*$ 30,000*			***$ 40,000***
Project costs	*2020 University of Auckland Sub-contract (MBIE Endeavour Fund)*		*$ 5,000*	*$ 5,000*	*$ 5,000*	*$ 5,000*	***$ 20,000***
Project costs	*2021 MBIE Endeavour Fund: Research Programme -Waste*			*$ 100,000*	*$ 300,000*	*$ 360,000*	***$ 760,000***
Project costs	*Auckland Council - IAQ*		$ 9,000				
Project costs	*Chemcare - Asbestos*	*$ 9,000*	*$ 9,000*	*$ 9,000*			
Project costs	*Haier -IAQ*		$ 9,000				
Project costs	*HRV - IAQ*		$ 9,000				
Project costs	*HTTRN - Indoor Air Quality (IAQ)*	$ 20,000	$ 20,000				
Project costs	*Ports of Auckland*		$ 19,000				
Project costs	*Watercare - Odour*	$ 9,000					
TOTAL COSTS		***$ 543,356***	***$ 993,918***	***$ 1,630,342***	***$ 1,414,615***	***$ 1,680,028***	***$ 6,262,259***

Research Centre for Environmental Solutions: 5 - Year Budget (Profit)						
Projects & Funding Sources (excludes in-kind contributions)	**Yr 1**	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Totals**
Unitec Seed Funding						
HTTRN - Indoor Air Quality (IAQ)	*$0*	*$0*				***$0***
External Funding						
INDOOR AIR QUALITY (IAQ)						
Auckland Council - IAQ		*$1,000*				***$1,000***
2020 University of Auckland Sub-contract (MBIE Endeavour Fund)		*$5,060*	*$5,212*	*$5,368*	*$5,529*	***$21,169***
Haier -IAQ		*$1,000*				***$1,000***
HRV - IAQ		*$1,000*				***$1,000***
WASTE						
2018 Ministry for the Environment (MfE) - Asbestos	*$0*	*$0*	*$0*			***$0***
2019 MBIE Endeavour Fund: Smart Ideas - Asbestos	*$12,495*	*$10,549*	*$7,916*			***$30,960***
2020 MBIE Endeavour Fund: Smart Ideas - Waste		*$ 37,500*	*$ 62,500*			***$100,000***
2020 MfE - Mudcrete		*$ 6,250*	*$ 18,750*			***$25,000***
2020 MfE - Plastic		*$ 6,250*	*$ 18,750*			***$25,000***
2021 MBIE Endeavour Fund: Research Programme -Waste			*$ 62,500*	*$187,500*	*$225,000*	***$475,000***
Chemcare - Asbestos	*$1,000*	*$1,000*	*$1,000*			***$3,000***
Ports of Auckland		*$1,000*				***$1,000***
ODOUR						
Watercare	*$1,000*					***$1,000***
TOTAL PROFIT	***$14,495***	***$70,609***	***$176,628***	***$192,868***	***$230,529***	***$685,129***

CV
David Phillips

New Zealand RS&T Curriculum Vitae

PART 1

1a. Personal details						
Full name	*Title* Dr	*First name* David	*Second name(s)* John	*Family name* Phillips		
Present position	Associate Professor					
Organisation/Employer	School of Engineering and Applied Technology					
Contact Address	Private Bay 92025					
	Victoria Street West					
	Auckland			**Post code**	1142	
Work telephone	09 892 8445		**Mobile**	021 649 117		
Email	dphillip@unitec.ac.nz					
Personal website (if applicable)	http://www.ecoast.co.nz/about/assoc-prof-david-phillips/					

1b. Academic qualifications

- 2005, PhD, Coastal Oceanography, Waikato University.
- 2003, CALE, Certificate in Adult Learning and Education, Unitec.
- 1995, BTech(Env)(Hons), Environmental Science and Engineering, Unitec.
- 1992, CL, Certificate in Landscaping, Carrington Polytechnic.
- 1992, Diploma in Environmental Technology, Environmental Engineering, Carrington Polytechnic.
- 1989 NZCE, Civil Engineering, Christchurch Polytechnic and Carrington Polytechnic.

1c. Professional positions held

2012 – present	Associate Professor, Civil Engineering Unitec Institute of Technology, NZ.
2010 – 2018	Head of Civil Engineering, Unitec Institute of Technology, NZ.
2002 – 2009	Lecturer, Senior Lecturer (2005), Unitec Institute of Technology, NZ.
1998 - 2002	Director/Lecturer, Engineering School, Unitec Institute of Technology, NZ.
1993 - 1998	Engineering Lecturer/Senior Environmental Technologist/Dive Officer, Unitec Institute of Technology, NZ.
1992 - 1993	Civil Construction and Landscape Contractor, RTS Ltd, NZ.
1991 - 1992	Site Engineer and Construction Supervisor, London, UK.
1989 - 1991	Engineer/Surveyor, Works Consultancy Services and Works Infrastructure, NZ.
1988 - 1989	Civil Engineer, North Shore Drainage Board, NZ.

1d. Present research/professional speciality

Coastal oceanography, erosion and management, environmental assessment and low impact design including Mauri enhancement, environmental engineering – stormwater quality, quantity and system design, on-site wastewater and mitigating impacts on the receiving environment.

1e. Total years research experience	23 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

2016 – current	Fellow of the Institute of Professional Engineers NZ.
2015 – current	International Professional Engineer (IntPE).
1999 – current	Chartered Professional Engineer (CPEng - Civil, Environmental).
1999 – current	Member Institute of Professional Engineers New Zealand (MIPENZ).
2008 – current	Company Director PC Ltd (NZ).
2011 – current	Company Director ESV Ltd (Fiji) (Eco Resort).
2012 – 2015	Board Member of NZ Board of Engineering Diplomas (NZBED).
2010 – 2015	CETENZ (Council of Engineering Technology Education NZ) (Chairman elected 2012 - 2015).
2009 – 2016	Member of the Unitec Sustainability Committee that has implemented a high level sustainability policy for Unitec which has won National and International Awards.

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents
	5	1	≈45	

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

- Yardley, B., **Phillips, D.,** and Mead, S. (2012). The Suitability of Using a Flat Bottom Barge Development System for the Construction of a Multi-Purpose Reef in Kovalam, India. A Preliminary Design Case Study. *Reef Journal. 2*: 46-63.
- **Phillips, D.**, Black, K., and Healy, T. (2009). Headland issues surrounding the construction of artificial reefs by detailed examinations of a natural headland. Reef Journal. 1 (1) : 162-176.
- **Phillips, D.**, and Mead, S. (2009). Investigation of a large sandbar at Raglan, New Zealand: Project Overiview and Preliminary Results. Reef Journal. 1 (1) : 267-278. **Phillips, D.**, and Mead, S. (2008). Investigation of a large offshore sandbar at Raglan, New Zealand: Impacts on surfing amenity. Shore and Beach. 76 (2) : 53-62.
- **Phillips, D.J.,** Black, K.P. and Healy, T.R., 2004. Successive Side Scan Sonar Surveys on an Exposed Surfing Headland at Raglan, New Zealand. Survey Quarterly Journal. Published by the NZ Institute of Surveyors.

Peer reviewed books, book chapters, books edited

Phillips, D.J. (2010). Sediment Dynamics of the Headland at Raglan, New Zealand. Saarbrucken, Germany. VDM Verlag Dr. Muller.

Refereed conference proceedings (selected)

- **Phillips, D.**, Mead, S., & Emeny, M. (2017). Lyall Bay Coastal Remediation. Proceedings of the Australasian Coasts and Ports Conference 2017 an amalgamation of the 23rd Australasian Coastal and Ocean Engineering Conference and the 16th Australasian Port and Harbour Conference (pp. 1-6 [Online]).
- Mead, S. T., Atkin, E. A., & **Phillips, D. J.** (2017). The rise and fall (and rise) of Winston Island. Proceedings of the 23rd Australasian Coastal and Ocean Engineering Conference and the 16th Australasian Port and Harbour Conference. (pp. 1-6 [online]).
- Wilson, H., & **Phillips, D.** (2017). A pilot study into use of regular short quizzes in a flipped learning class. In S. Nash and L. M. Patston (Ed.), Spaces and Pedagogies: New Zealand Tertiary Learning and Teaching Conference 2017 Proceedings (pp. 121-130).
- Yu, R., Mahmood, B., DeCosta, G., & **Phillips, D.** (2016). Application of Floating Vegetative Pads (FVP) to improve storm water quality - A pilot scale study. 20th Congress of the Asia Pacific Division of the International Association for Hydro-Environment Engineering & Research (IAHRAPD) (pp. 1-12 [online]).
- Li, J., DeCosta, G., & **Phillips, D.** (2016). Simplified model forecasting changes to groundwater table and land lost due to sea level rise. 20th Congress of the Asia Pacific Division of the International Association for Hydro-Environment Engineering & Research (IAHRAPD) (pp. online).
- Greer, D., McIntosh, R., Harrison, S., & **Phillips, D.** (2015). Understanding water quality in Raglan Harbour. Australasian Coasts & Ports Conference 2015: 22nd Australasian Coastal and Ocean Engineering Conference and the 15th Australasian Port and Harbour Conference (pp. 352-357). Retrieved from https://search.informit.com.au/documentSummary;res=IELENG;dn=701330535603121
- Mead, S., Borrero, J., **Phillips, D.**, & Atkin, E. (2015). Application of climate change

adaptation, resilience, and beach management strategies on coral islands. Proceedings of the Australasian Coasts & Ports Conference 2015: 22nd Australasian Coastal and Ocean Engineering Conference and the 15th Australasian Port and Harbour Conference (pp. 556-571). Retrieved from https://search.informit.com.au/documentSummary;dn=726652743077353;res=IELENG

- Estrin, A., & **Phillips, D. J.** (2014). Wairaka stream daylighting project. *Proceedings of the Water New Zealand's Stormwater Conference* (pp. 1-9 [Online]). Retrieved from https://www.waternz.org.nz/Article?Action=View&Article_id=457
- Mead, S., **Phillips, D.**, and Prime, A. (2013). Developement of a multi-purpose breakwater reef at Maqai Eco Surf Resort, Qamea Island, Fiji. Coasts & Ports 2013 Conference: 21st Australasian Coastal and Ocean Engineering Conference and the 14th Australasian Port and Harbour Conference / National Committee for Coastal and Ocean Engineering, Engineers Australia, PIANC and IPENZ. Vol. 1 (pp. 543-548). Retrieved from http://toc.proceedings.com/27096webtoc.pdf
- Mead, S., **Phillips, D.**, and Haggitt, T. (2011). Development of a Geographic Information System (GIS) to Determine the Vulnerability of Regionally Significant Marine Receiving Environments to Land-Use Impacts. Proceedings of Coast & Ports 2011: The 20th Australasian Coastal and Ocean Engineering Conference and the 13th Australasian Port and Harbour Conference. PIANC Australia and the Institute of Professional Engineers New Zealand. CD-Rom.
- **Phillips, D.J.**, Taylor, R., Leaver, J., and McMullan, R. (2010). Perspectives on the Challenges of Delivering a Sustainable Survey Technician Training Programme in New Zealand. FIG Congress 2010 Facing the Challenges - Building the Capacity. 1 : 11p.
- Clarke, C., Preston, L., **Phillips, D.**, and Fourie, L. (2010). Getting on Track for Sustainability in Education. Observations from the Unitec Environmental Sustainability Program. Transitions to Sustainability. Proceedings of the 4th International Conference on Sustainability Engineering and Science, Auckland, NZ, Nov 30 - Dec 3. http://www.nzsses.auckland.ac.nz/conference/2010/index.htm.

Other forms of dissemination (reports for clients, technical reports, popular press, etc)

Design Outputs (Selected)

- **Phillips, D.** (2017). On-Site Wastewater Design, Dairy Flat Highway Childcare Facility. Chester Consultants Ltd: Auckland, New Zealand. www.chester.co.nz.
- **Phillips, D.** (2017). On-Site Wastewater Design, Waitoki Childcare Facility. Chester Consultants Ltd: Auckland, New Zealand. www.chester.co.nz.
- **Phillips, D.J.** (2017). David Phillips Statement of Evidence 262 Bed Taupaki Hospital and Aged Care Facility for Environment Court of the Design of the On-site Wastewater Treatment System and Irrigation for this large-scale development. [Design Output]. Auckland, New Zealand: Atkins Holm Majurey Lawyers.
- **Phillips, D.J.** (2017). Rangitahi Bridge Stormwater and Sediment Management Plan. [Design Output]. Raglan, New Zealand: eCoast for Fulton Hogan.
- **Phillips, D.** (2016). Stormwater, Wastewater and Greywater Assessment and Design for the 70 Lot Residential and 5 Star Hotel Development. [Design Output]. Vunabaka Six Senses Residences and Hotel, Malolo Island: Fiji. Retrieved from: www.vunabaka.com
- **Phillips, D.** (2015). Naisoso Beach Stormwater Erosion Assessment and Design.

Naisoso Island: Fiji. www.naisosoisland.com.

Reports (Selected)

- **Phillips, D.**J., & Mead, S.T. (2016). *Lyall Bay Coastal Remediation.* Wellington: Wellington City Council. 122p.
- **Phillips, D.**, & Hiliau, W. (2014). Infrastructure Research Assessment. (No. 9837). Auckland: Chester Consultants Ltd.
- Mead, S.T., & **Phillips, D.** (2014). Woja Causeway Project, Republic of the Marshall Islands: Coastal Processes and Feasibility. (Report No. CC/13/357). Marshall Islands: Report prepared for the Secretariat of Pacific Communities (SPC), specifically the Global Climate Change Alliance: Pacific Small Island States (GCCA:PSIS).
- Mead, S., Hiliau, W., & **Phillips, D.** (2013). Final Design of Two Coastal Erosion Options for Eastern Tongatapu, Tonga for Climate Change Resilience. (CC/13/95-3). Suva: Secretariat of Pacific Communities (SPC), specifically the Global Climate Change Alliance: Pacific Small Island States (GCCA:PSIS).
- **Phillips, D.**, & Berry, T. (2013). Pre-Construction Environmental Report, 102 Hobsonville Rd, Hobsonville. (3001). Auckland: Prepared for Hick Bros. Construction Ltd.
- **Phillips, D.**, & Berry, T. (2013). Site Contamination Assessment Report: 82B Shaw Rd, Oratia. (3002). Auckland: Prepared for: C. Westcott-Jones.
- Mead, S., Aitken, E., and **Phillips, D.** (2012). *Literature Review and a Prelimianry Investigation of Offshore Focussing Multi-Purpose Reefs.* Technical Report to CERA (Christchurch Earthquake Recovery Authority). December.
- **Phillips, D.** (2011). Orewa Beach Stormwater Request for Further Information Report in Relation to the Coastal Permits for Orewa Beach Multi-Purpose Reefs. Auckland Council, Notified Resource Consent for Public Consultation. 7 July. p. 17.
- **Phillips, D.**, and Rankin, S. (2010). Watercare Dam Vegetation Assessment and Remediation Report. Earth Dams in the Auckland Region. Report prepared for Watercare. Auckland, New Zealand, September.
- **Phillips, D.** (2008). Catchment sediment threats in the Auckland region. Report prepared for Auckland Regional Council. Auckland, New Zealand.
- **Phillips, D.** (2006). Resource consent (Retrospective) Section 92 request for resource consent.

CV
Jenny Lee-Morgan

PART 1

1a. Personal details				
Full name	*Title*	*First name*	*Second name(s)*	*Family name*
	Prof	Jenny	Bol Jun	Lee-Morgan

Present position	Professor of Māori Research, Director Ngā Wai o te Tūī Māori Research Centre, Te Wānanga o Wairaka, Unitec			
Organisation/Employer	Unitec Institute of Technology			
Contact Address	Private Bag 92025			
	Victoria Street West			
	Auckland		**Post code**	1142
Work telephone	09 815 4321	**Mobile**	021 598 225	
Email	jleemorgan@unitec.ac.nz			

1b. Academic qualifications

2008 EdD, The University of Auckland
1996 MA (Māori Education, 1st Class Honours), The University of Auckland
1992 BA, BEd, Dip. Tchg (secondary), The University of Waikato

1c. Professional positions held

2016 Current Deputy Director, Te Kotahi Research Institute, Associate Professor, The University of Waikato
2012-2015 Head of School, Te Puna Wānanga, Faculty of Education and Social Work, The University of Auckland
2010-2013 Senior Lecturer, Adjunct Faculty, Te Whare Wānanga o Awanuiārangi
2004-present Managing Director, Rautaki Ltd
2000-2005 Lecturer, Te Aratiatia, School of Education, The University of Auckland
1996-2000 HOD Māori/Dean Ngā Tumanako o Kahurangi, Auckland Girls' Grammar School
1995 Teaching Fellow, University of Canterbury
1993-1995 HOD Māori, Northcote College

1d. Present research/professional speciality

Kaupapa Māori Research; Marae; Housing; Kaupapa Māori methodology; Pūrakau as narrative inquiry, Māori education, Ako (Māori pedagogy), Māori language

2019 (PI) Poipoia te Kakano: Repositioning iwi trade training.
2017-2019 (PI) Te Manaaki o te Marae: The role of marae in the Auckland housing crisis. Building Better Homes Towns and Cities, National Science Challenge.
2018-2019 (PI) Tukua ki te ao: Te normalisation of te reo Maori in organisations. Te Taura Whiri i te Reo (Māori Language Commission)
2018 (PI) Te Matarere: The future of te reo Maori in Waikato-Tainui to 2038. Te Mātāwai
2017 (PI) Te Pū o te Rākau: The pedagogy of pūrākau. Ngā Pae o te Maramatanga.
2017 (PI) Pūrākau as methodology: An Indigenous narrative inquiry approach. The University of Waikato.
2015-2017 (AI): Te Tātua o Kahukura: AKO Aotearoa
2016: Te ahu o te Reo: 2015-2017 (PI) Taikākā: Optimising Māori academic achievement in Initial Teacher Education
2010-2012 (PI) Marae-ā-kura: School Marae. Teaching Learning and Research Initiative (TLRI)

1e. Total years research experience	18 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc.)

Executive, advisory or governance roles

2016 – 2018 BOT, Newton Central School, Auckland
2013 – 2016 Advisor, Ropu Tikanga Rangahau, Te Wāhanga, NZCER.
2013 – 2016 Member of Carnegie Project on Education Doctorate (CPED)
2012 – 2016 Academic Director, MAI ki Tamaki, Ngā Pae o te Maramatanga

Membership to professional committees/groups

2012 - 2016 New Zealand Association of Educational Research (NZARE)
2014 – 2015 Reference group of OLT project: PLD to embed inclusive and explicit teaching practices in higher education, Victoria University, Melbourne
2012 -2015 American Educational Research Association (AERA)

Significant Distinctions/Awards

2018 Te Tohu Rapuora, The Health Research Council of New Zealand
2017 Winner of Te Kōrero Pono (non-fiction category) in the Ngā Kupu Ora Aotearoa Māori Book Awards 2017 for Hutchings, J & J BJ Lee-Morgan (2016) Decolonisation in Aotearoa: Education, Research and Practice. Wellington: NZARE
2016 Te Tohu Pae Tawhiti Award, NZARE
2008 Inaugural Post-Doctoral Fellow, Te Whare Wānanga o Awanuiārangi
2007 Chinese Poll Heritage Trust Grant
2006 Waikato Raupatu Lands Trust Doctoral Scholarship
2005 Ngā Pae o te Māramatanga Doctoral Scholarship
2003 Ministry of Education Post Graduate Scholarship

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents
	10	14	3	0

2a. Research publications and dissemination

Pihama, L., **J. Lee-Morgan,** L. Smith, S. Tiakiwai & J. Seed-Pihama (forthcoming). *MAI Te Kupenga: Supporting Māori and Indigenous doctoral scholars within Higher Education* in Alternative: An International Journal of Indigenous Peoples**.**

Pihama, L., Miller, J.M., Greensill, H., Te Nana, R., Campbell, D., **Lee-Morgan, J.** (forthcoming) 'Treasuring Future Generations: Māori & Hawaiian Ancestral Knowledge & The Wellbeing of Indigenous Children' in *Journal of Indigenous Wellbeing: Te Mauri – Pimatisiwin.*

Lee-Morgan, J., Courtney, M., & Muller, M. (2018). New Zealand Māori medium teacher education: an examination of students' academic confidence and preparedness, Asia-Pacific Journal of Teacher Education, DOI: 10.1080/1359866X.2018.1539214

Lee-Morgan, J. & Muller, M. (2017). On stage Māori- medium ITE: Listening to students' voices. New Zealand Annual Review of Education, 22, 21-35.

Lee, J. BJ. **(2013)** Mehemea ka moemoea tatou, ka taea e tatou. Set: Research Information for Teachers, 2,37-40. Retrieved from http://search.informit.com.au/documentSummary;dn=057298942633841;res=IELHSS

Lee, J. BJ. **(2013)** Marae a-kura: Tracing the birth of marae in schools. Set: Research Information for Teachers, 2, 3-11. Retrieved from http://www.nzcer.org.nz/nzcerpress/set/articles/marae- kura- tracing- birthmarae-schools

Lee, J. BJ. (**2012**). Kia tangi te titi: Permission to speak - successful schooling for Maori students in the 21st century. Review in NZ Journal of Educational Studies, 47 (2), 119-121. Lee

Lee, J. BJ. (2011) Kaiako: Māori teachers as cultural workers. He Pūkenga Kōrero, Massey University, 10(2), 19-27.

Lee, J. BJ. (2009). Decolonising Māori narratives: Making methodological space for pūrākau as a narrative inquiry method. MAI Review

Lee, J. BJ. (2002). Akonga Māori: A Framework of Study on Māori Secondary School Teachers. Action in Teacher Education Journal Special Issue "Indigenous Perspectives of Teacher Education: Beyond Perceived Borders", XXIV (2, Summer), 64-74.

Pihama, L., & **Lee-Morgan, J.** (2019). Colonization, Education, and Indigenous Peoples. In Handbook of Indigenous Education. Singapore: Springer Singapore.

Lee-Morgan, J., R. Hoskins, R. Te Nana, M. Rua, W. Knox. (2018) Mahia te mahi: In service to homeless whānau. Auckland: Te Puea Memorial Marae.

Archibald, J., J **BJ Lee-Morgan** & J DeSantolo (eds) (forthcoming). Decolonizing Research: Indigenous Story work as Methodology. Zed Books: United Kingdom, London

Lee-Morgan, J (forthcoming) From the inside out: At the heart of pūrākau. in Archibald, J., J B J Lee-Morgan & J DeSantolo (eds) Decolonizing Research: Indigenous Story work as Methodology. Zed Books: United Kingdom, London

Lee-Morgan, J. (2017) Pūrākau: Hei kaupapa rangahau mana motuhake Māori! in A. McFarland & N. Mathews (Eds) He kete Whakawaitara he whakatara ā-rangahau. Wellington: NZCER.

Hutchings, **J., Lee-Morgan**, J. (eds) (2016) Decolonisation in Aotearoa: Education, research and practice, Wellington: NZCER Press.

Lee, J. (2016). Indigenising the EdD in New Zealand. In V. A. Storey (Ed.), International Perspectives on Professional Practice Doctorates: Applying a Critical Friends Approach to Educational Doctorates and Beyond. Palgrave Macmillan.

Pihama, L., **Lee, J**., Te Nana, R., Campbell, D., Greensill, H., & Tauroa, T. (2015). Te pā

harakeke: Whānau as a site of wellbeing. In R. E. Rinehart, E. Emerald, & R. Matamua (Eds.), Ethnographies in Pan Pacific Research Tensions and Positionings (pp. 251-266). Routledge.

Pihama, L., Greensill, H., Campbell, D., Te Nana, R., & **Lee, J.** (2015). Taku Kuru Pounamu. Hamilton, New Zealand: Te Kotahi Research Institute.

Santamaría, L. **J., Lee, J**., & Harker, N. (2014). Optimising Māori academic achievement (OMAA): An indigenous led, international, inter-institutional higher education initiative. In F. Cram, H. Phillips, P. Sauni, & C. Tuagalu (Eds.), Māori and Pasifika higher education horizons, diversity in higher education. H. T. Frierson (Series Ed.) (pp. 201-221). USA: Emerald Books.

Hutchings, J., Barnes, A., Taupo, K., Bright, N., Pihama, L., & **Lee, J.** (2012). Kia puāwaitia ngā tumanako: Critical issues for whānau in Māori education. Wellington, N.Z.: New Zealand Council for Educational Research.

Lee, J., Selwyn, C. (2010) Oho ake: Rehu Marae, Ngā Puna o Waiōrea. Auckland: Rautaki.

Lee, J. (2007) Jade Taniwha: Māori-Chinese Identity and Schooling. Auckland: Rautaki

Lee, J. (2003). Eating Pork Bones and Puha with Chopsticks: The Emergence of Māori-Chinese. In Ip, Manying (ed.) Unfolding History, Evolving Identity: The Chinese in New Zealand (pp. 94-112), Auckland, N.Z: Auckland University Press.

Refereed conference proceedings

Lee, J. (forthcoming). Researching with rangatiratanga: Pūrākau as 'evidence'. 2015 Kei Tua o Te Pae: Re-searching Rangatiratanga, Innovating Mātauranga, Te Wānanga o Raukawa Otaki.

Lee, J. (2005). Articulating ako: Māori pedagogy in New Zealand education. Proceedings of the Diversity Conference 2004, International Journal of Diversity, UCLA, LA, 6-9 July 2004, 563-571, 2004.

Lee, J. (2003). Ngā Tohutohu: A pūrākau approach to Māori teacher narratives. Teacher Education Forum of Aotearoa New Zealand (TEFANZ) Conference Proceedings, Massey University, 2002.

Other forms of dissemination (reports for clients, technical reports, popular press, etc)

Lee-Morgan, J. (2018) Taikākā: Learning and teaching strategies to optimise academic achievement in a Māori-medium Initial Teacher Education programme. Wellington: Ako Aotearoa

Lee-Morgan, J. & M. Hetaraka. (2018) Taikākā: Teaching strategies to improvecademic learning for Māori-medium ITE.

Pihama, L., **Lee, J**., Campbell, D., Greensill, H., Te Nana, R. (2015). Tiakina Te Pā Harakeke: Traditional views and practices of childrearing, Report to Ngā Pae o Te Maramatanga. Hamilton: University of Waikato.

Pihama, L., R. Mataamua, J. Tipene, K. Ngāpō, S. Tiakiwai, W. Edwards, **J. Lee**, M. Hohepa, TK. Maxwell, H. Skipper. (2015). Te Matataua o Te Reo: A national research agenda for the regeneration and revitalisation of Te Reo Māori, Report to He Puna Whakarauora, Te Taura Whiri i Te Reo. Hamilton: Te Kotahi Research Institute.

Hutchings, J., Barnes, A., Taupo, K., Bright, N., Pihama, L., **Lee, J**., (2012) Kia Puāwaitia Ngā Tūmanako, Wellington, NZCER

Lee, J., Pihama, L., Smith, L., (2012) Marae-ā-kura: Teaching, learning and living as Māori, Set, Wellington, NZCER.

Lee, J. (2011). Participation in early childhood education in Kaikohe: An intensive community participation project: A report for Ministry of Education. Kawakawa, New Zealand: Ngāti Hine Health Trust.

Pihama, L. & **Lee, J.** (2010). He kākano i ruia mai i Rangiātea: Māori whānau stories of neonatal intensive care units. Funded by Ngā Pae o te Māramatanga. Auckland, Māori and Indigenous Analysis and Rautaki Ltd.

Lee, J., Pihama, L., & McRoberts, H. (2009). The entry and retention of Māori student's in

the Faculty of Education, University of Auckland. Initial Teacher Education and Social Work programmes: A report for The University of Auckland. Auckland, New Zealand: Rautaki Ltd.

2b. Previous research work

Research title: Te Manaaki o te Marae: The role of marae in the Auckland Housing Crisis
Principal outcome: Provided useful baseline data and models about the Manaaki Tāngata Programme, Te Puea Memorial Marae; marae-based housing typologies and associated financing models; policy and practice directives for marae-based housing and marae-based transitional housing providers.
Principal end-user and contact: Marae, Iwi, Auckland City Council, BBHTC NSC, BRANZ, TPK, Housing NZ, Social Service providers and government agencies, policy analysts. Contact: Dr Jessica Hutchings (BBHTC, NSC)

Research title: Te Matarere: The future of te reo Maori in Waikato-Tainui to 2038.
Principal outcome: Baseline and predictive cohort modelling of Māori language speakers in Waikato-Tainui region; current and future innovations in Waikato-Tainui, education, technology and community; recommendations for future growth of te reo Maori in this region
Principal end-user and contact: Te Mātāwai, Te Taura Whiri i te Reo; iwi, hapu, whanau, education, community, government agencies and service providers. Contact: Jonathan Kilgour, Te Mātāwai.

Research title: Tukua ki te ao: Te normalisation of te reo Maori in organisations. Te Taura Whiri i te Reo Māori (Māori Language Commission)
Principal outcome: case studies of successful normalisation of te reo in corporate, local body and secondary schools, identification of success indicators
Principal end-user and contact: Te Taura Whiri i te Reo Māori, Te Mātāwai, corporate sector, central and local government agencies and service providers, education, mainstream organisations. Contact: Roimata Taura, Te Taura Whiri i te Reo Māori.

2c. Describe the commercial, social or environmental impact of your previous research work

My research contributes impacts across social, cultural, educational, wellbeing and housing domains through specifically contributing innovative thinking about Mātauranga Māori at the interface with contemporary issue that face Māori whanau and wider New Zealand society across all the sectors that we engage. An example of impact of the 'Te Manaaki o te Marae' project includes proposed marae-based training of government social service agencies at Te Puea Memorial Marae (TPMM), the proposed two storey build of accommodation for homeless whanau (for 50 people) at Te Puea Memorial Marae, the accreditation TPMM as the first marae-based Transitional Housing Provider; other marae developing long-term housing interventions based on marae-based housing typologies created in our research.

2d. Demonstration of relationships with end-users

Te Manaaki o te Marae project: engaged five key marae in the Auckland region, this included the development of strong relationships with people of the marae from Board of Trustees level to whanau members. Other endusers include Tamaki marae and wider urban marae throughout NZ, government agencies such as HNZC, TPK, MSD and Ministry of Housing and Urban Development, Te Mataphi.

CV
Roger Birchmore

Roger Birchmore Curriculum Vitae

PART 1

1a. Personal details						
Full name	*Title* Mr	*First name* Roger	*Second name(s)*	*Family name* Birchmore		
Present position	Senior Lecturer					
Organisation/Employer	Unitec Institute of Technology					
Contact Address	Private Bag 92025					
	Victoria Street West					
	Auckland			**Post code**	1142	
Work telephone	09 892 7372	**Mobile**				
Email	rbirchmore@unitec.ac.nz					

1b. Academic qualifications

2001, Master of Project Management, University of Technology Sydney, Australia.
1981, Bachelor of Technology (Hons), Loughborough, University of Technology, UK.

1c. Professional positions held

2011 – Now	Senior Lecturer, School of Building Construction, Unitec Institute of Technology
2009 – 2010	Senior Lecturer, Department of Construction, Unitec Institute of Technology
2003 – 2008	Head of School, School of the Build Environment, Unitec Institute of Technology
1999 – 2003	Head of School, School of Construction, Unitec Institute of Technology
1995 – 1998	Programme Leader for BQS and BCM Degree Programmes, School of Construction, Unitec Institute of Technology
1995 – 1998	Programme Leader for BQS and BCM Degree Programmes, School of Construction, Unitec Institute of Technology
1992 – 1994	Lecturer, Carrington Polytechnic
1990 – 1992	Contracts Manager, Celsius Air Conditioning Ltd, Auckland
1986 – 1990	Contracts Engineer, Aircool Engineering Ltd, Auckland
1982 – 1986	Design Engineer, Building Design Partnership, UK

1d. Present research/professional speciality

Innovative construction methods to improve internal environmental conditions in New Zealand houses, including air quality, heating and ventilation.

1e. Total years research experience	18 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

Current –	CEng (UK)
Current –	MNZIOB
2013 – Current	MCIBSE committee member, education portfolio, Auckland branch CIBse
2005 – Current	CIBSE professional interview panel

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents
	4	0	10	0

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

Wallis, S., Hernandez, G., Poyner, D., **Birchmore**, R., & Berry, T. (2019). Infiltration of Particulate Matter into Residential Buildings: Part I. The Dynamics of Particle Transport into Unoccupied Spaces. Atmospheric Environment, March 2019, 1-22. doi:10.1016/j.aeaoa.2019.100024

Wallis, S., Hernandez, G., Poyner, D., **Birchmore**, R., & Berry, T. (2019). Infiltration of Particulate Matter into Residential Buildings: Part II. The Impact of Mechanical Ventilation and Simulated Occupancy. Atmoshpheric Environment, March 2019, 1-20. doi:10.1016/j.aeaoa.2019.100026

Birchmore, R., Davies, K., Etherington, P., Tait, R., & Pivac, A. (2016). Overheating in Auckland homes: testing and interventions in full-scale and simulated houses. Building Research & Information, 45(1-2), pp.157-175. doi:10.1080/09613218.2017.1232857

Birchmore, R. C., Pivac, A., & Tait, R. (2015). Impacts of an innovative residential construction method on internal conditions. Buildings, 5 (2015), pp.1-17.

Peer reviewed books, book chapters, books edited

Refereed conference proceedings

Look, M., Holmes, W., & **Birchmore**, R. (2019). Reliability of wireless sensors using low cost WiFi chipsets for Structural Monitoring. The 18th International Conference on Electronics, Information, and Communication (pp. 227-230).

Birchmore, R. C., Pivac, A., & Tait, R. (2014, September). *Impacts of an Innovative Construction Method on Internal Conditions.* Building a Better New Zealand (Ed.), Building a Better New Zealand Conference (pp.85).

Davies, K., **Birchmore**, R., and Tait, R. (2013). Use of roof space ventilation to address summertime overheating in New Zealand houses. In S. Kajewski, K. Manley & K. Hampson (Eds.), Proceedings of the 19th International CIB World Building Congress (Ed.), *Brisbane: Queensland University of Technology*

Birchmore, R., Tait, R., and Davies, K. (2012). The impacts of high performance glazing on typical light timber framed houses in a New Zealand winter. In Skates, H. (Ed.) 46th Annual Conference of the Architectural Science Association (ANZAScA) 2012: Building on Knowledge: Theory and Practice. Griffith University, Gold Coast Australia (Ed.),

Andric, J., and **Birchmore**, R. (2012). *The carbon footprint of increased home*

insulation levels in New Zealand. Skates, H. (Ed.) 46th Annual Conference of the Architectural Science Association (ANZAScA) 2012: Building on Knowledge: Theory and Practice. Griffith University, Gold Coast Australia(Ed.),

Birchmore, R.C., and Kestle, L. (2011). *XYZ of the Living Curriculum.* Best, R. and Langston, C (eds.) Proceedings of the 36th Australasian University Building Educators Association Conference. Bond University, Gold Coast, Australia. 27 - 29 April 2011(Ed.),

Kestle, L., and **Birchmore**, R. (2011). *Applying the living curriculum approach to undergraduate sustainable design and construction education in NZ.* R. Best and C. Langston (Eds.). Proceedings of the 36th Conference for Australasian Building Educators Association, Bond University, Gold Coast, Australia. 27 - 29 April.(Ed.), (pp. 331-346).

Tait, R., Davies, K., and **Birchmore**, R. (2011, *The impact of changing the glazing on thermal performance of simple timber houses.* Proceedings of the World Sustainable Building Conference, Helsinki, Finland. 18 - 21 October. (Ed.),

Lai, F.P., Halvitigala, D., Boon, J., and **Birchmore**, R. (2010). *How can BIM technology assist in optimising the Life Cycle Costing of buildings.* Proceedings of the Pacific Rim Real Estate Society Conference(Ed.), Wellington, NZ. 24-27 January 2010.

Davies, K., and **Birchmore**, R. (2008). *Getting to yes - Agreeing research project marks without tears.* Proceedings of 2008 Conference of the Australasian Universities Building Education Association (AUBEA) CD Rom.

Patents

Other forms of dissemination (reports for clients, technical reports, popular press, etc)

Birchmore, R. (2018). Medium Density Dwellings in Auckland and the Building Regulations. 2. Medium Density Dwellings in Auckland and the Building Regulations. New Zealand: Unitec ePress.

Birchmore, R. (2018). *Medium Density Dwellings in Auckland and the Building Regulations.* BRANZ. (pp. 1-11). Auckland, New Zealand: Auckland's housing supply challenge: A Unitec response to the Mayoral Housing Taskforce Report. http://www.buildingbetter.nz/research/contestable.html.

Berry, T., Chiswell, J.H.D., Wallis, S.L., & **Birchmore**, R. (2017). The Effect of Airtightness on Indoor Air Quality in Timber Houses in New Zealand. Unitec ePress Occasional and Discussion Paper Series (2017:9). 2017:9. (pp. 1-13). Auckland: Unitec ePress. DOI: http://www.unitec.ac.nz/epress/index.php/the-effect-of-airtightness-on-indoor-air-quality-in-timber-houses-in-new-zealand/.

CV
Terri-Ann Berry

Curriculum Vitae

PART 1

1a. Personal details						
Full name	*Title* Dr	*First name* Terri-Ann	*Second name(s)*	*Family name* Berry (nee Clark)		
Present position	Senior Lecturer, School of Engineering and Applied Technology					
Organisation/Employer	Unitec Institute of Technology					
Contact Address	Private Bag 92025					
	Victoria Street West					
	Auckland			**Post code**	1142	
Work telephone	+64 9 892 7024	**Mobile**	+64 22 635 2670			
Email	tberry@unitec.ac.nz					

1b. Academic qualifications

1998, PhD, Water Science and Engineering, Cranfield University, UK
1995, Masters, Water Science and Engineering, Cranfield University, UK
1994, Bachelors, Marine Chemistry, Liverpool University, UK

1c. Professional positions held

2016 – Present, Senior Lecturer, Engineering, Unitec Institute of Technology, NZ
2012 – 2016, Lecturer, Engineering, Unitec Institute of Technology, NZ
2009 – 2012, Lecturer, Foundation Studies, Unitec Institute of Technology, NZ
2004 – 2006, Environmental Consultant, Thames Water, UK
1999 – 2004, Senior Research Scientist, Thames Water, UK
1998 – 1999, Environmental Scientist, Dames & Moore, UK

1d. Present research/professional speciality

Main fields of interest include:

- The impact of structural design on indoor air quality in residential buildings (externally sponsored by BRANZ)
- Long-term options for asbestos disposal (in collaboration with University of Canberra and University of Pennsylvania)
- Water quality assessment and improvement with Ports of Auckland
- The reduction of nitrates from agricultural runoff
- Waste minimisation in the Civil Engineering industry

1e. Total years research experience	14 years

Parental Leave 2001-2002, 2004-2005 and from 2006-2009
Part-time employment between 2002-2004 and 2005-2006

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

2019 - Invitation to become a review editor for Frontiers - Sustainable Cities Journal.

2018 – NZ$390,000 from the Ministry for the Environment's Waste Minimisation Fund for project 'Remediation of asbestos contaminated soil: an alternative to landfill disposal' (deed of funding pending).
2015 – Present, Editorial role for the International Conference for Environment, Chemistry and Biology
2018 – Present, Fellowship of the Royal Society of Chemistry (FRSC), UK
2017 – Present, Chartered Environmentalist (CEnv) for the Royal Society of Chemistry, UK
2017 - Dean's Award for the Contribution to the Research Environment at Unitec
2016 - NZ$94,000 grant from BRANZ to carry out research into "The potential impact of energy saving building design on occupant health".
2015 – Present, Committee member and reviewer for the International Conferences of Environment, Chemistry and Biology (ICECB).
2014 - Awarded the Unitec Environmental Sustainability Award in recognition of sustainability teaching in engineering.
2005 – Present, Chartered Chemist (CChem) for the Royal Society of Chemistry, UK

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents
	19	1	3	0

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

1. Wallis, S.L., Emmett, E., Hardy, R., Casper, B., Blanchon, D., Testa, J., Mendes, C., Gonneau, C., Jerolmack, D.J., Seiphoori, A., & **Berry, T-A.** (**2019**). Challenging global waste management and why asbestos never left the building. Frontiers-Sustainable Cities, under review. doi:xx
2. Wallis, S.L., Hernandez, G., Poyner, D., Birchmore, R., & **Berry, T-A.** (**2019**). Particulate matter in residential buildings in New Zealand: Part I. Variability of particle transport into unoccupied spaces with mechanical ventilation. Atmospheric Environment X, 2, 1-10. doi:10.1016/j.aeaoa.2019.100024
3. Wallis, S.L., Hernandez, G., Poyner, D., Holmes, W., Birchmore, R., & **Berry, T-A.** (**2019**). Particulate Matter in Residential Buildings in New Zealand: Part II. The Impact of Building Airtightness, Mechanical Ventilation using Simulated Occupancy. Atmospheric Environment X, 2, 1-11. doi:10.1016/j.aeaoa.2019.100026
4. **Berry, T-A.** (**2018**). Challenging Global Waste Management and Why Asbestos never left the building. Nature Communications. Paper submitted.
5. **Berry, T-A.,** Chiswell, J.H.D., Wallis, S.L. and Birchmore, R. (**2017**). The Effect of Airtightness on Indoor Air Quality in Timber Houses in New Zealand. Unitec ePress Occasional and Discussion Paper Series, 9, pp.1-13.
6. **Berry, T-A.** and Chiswell, J.H.D. (**2015**). The effect of vapour-control membrane technology on indoor air quality in buildings. International proceedings of chemistry, biology and environmental engineering, 2015. Paper Submitted and accepted.
7. Burgess, J.E., Mayhew, M.E, **Clark, T.** and Stephenson, T. (2002). Assessment of microbial populations in activated sludge using an organism diversity index. JIWEM. 16, 1, 40-45.
8. Jaffer, Y., **Clark, T**., Pearce, P. and Parsons, S.A. (2002). Assessing the potential of full-scale phosphorus recovery by struvite formation. Water Research, 36, 1834-1842.
9. Thistleton, J., **Clark, T**., Pearce, P. and Parsons, S.A. (2002). Mechanisms of chemical phosphorus removal II - iron (III) salts. TransIChemE. Part B, 80, 265-269.
10. Thistleton, J., **Clark, T**., Pearce, P. and Parsons, S.A. (2001). Mechanisms of chemical phosphorus removal I - iron (II) salts. TransIChemE, Part B, 79, 339-344.
11. Doyle, J.D., Parsons, S.A., Jaffer, Y., Wall, F., Oldring, K., Churchley, J. and **Clark, T**. (2001). The potential for struvite recovery from digested sludge liquor. Proceedings of the Recycling and Reuse of Sewage Sludge Conference, Dundee, March 2001.
12. **Clark, T**., Burgess, J.E., Stephenson, T. and Arnold-Smith, A-K. (2000). The influence of iron-based co-precipitants on activated sludge biomass. TransIChemE 78, Part B, 405-410.
13. **Clark, T**., Jeffery, P., Stephenson, T. and Arnold-Smith, A-K. (2000). Complex agendas for new technology adoption in the UK water industry. Technovation, 20, 247-256.
14. McAteer, J., Ndombasi, P. and **Clark, T**. (2000). Further developments of the "Amtreat" nitrification process, Proceedings of the 5th European Biosolids and Organic Residuals Conference, Wakefield, UK, 20th-22nd November, 2, Seminar 9, 1-4.
15. **Clark, T**. and Stephenson, T. (1999). Development of a jar testing protocol for

chemical phosphorus removal in activated sludge using statistical experimental design. Water Research 33, 1730-1734.

16. **Clark, T**., Stephenson, T. and Arnold-Smith, A-K. (1999). The impact of aluminium-based co-precipitants on the activated sludge process. TransIChemE 77, Part B, 31-36.
17. **Clark, T**. and Stephenson, T. (1998). Using simplex for optimisation of phosphate removal by chemical addition to activated sludge in jar tests. Proceedings of the IChemE 1998 Research Event April 7 - 9, Newcastle, UK.
18. **Clark, T**. and Stephenson, T. (1998). Effects of chemical addition on aerobic biological treatment of municipal wastewater. Environmental Technology 19, 579-590.
19. **Clark, T**., Stephenson, T., and Pearce, P. (1997). Phosphorus removal by chemical precipitation in a biological aerated filter. Water Research 31(10), 2557 – 2563.

Peer reviewed books, book chapters, books edited

Parsons, S.A and **Berry T-A.** (2003). Chemical Phosphorus Removal. In Valsami-Jones E (Ed). Phosphorus in Environmental Technology - Removal, Recovery, Applications. IWA, London.

Refereed conference proceedings

1. Hernandez, G., **Berry, T-A**., Wallis, S.L. and Poyner, D. (**2017**, November). Temperature and Humidity Effects on Particulate Matter Concentrations in a Sub-Tropical Climate During Winter. Liu Juan (Ed.), International Conference of the Environment, Chemistry and Biology (pp.41-49). 102. 10.7763/IPCBEE 2017.V102
2. **Berry, T-A.** and Wairepo, D. (**2015**, December). Asbestos remediation in the Cook Islands – a long-term solution for making schools safer. Unitec (Ed.), Building Today - Saving Tomorrow: Sustainability In Construction And Deconstruction Conference Proceedings. (pp.6-17).
3. **Berry, T-A.** and Chiswell, J.H.D. (**2015**, November). The Effect of Vapour-Control Membrane Technology on Indoor Air Quality in Buildings. Liu Juan (Ed.), International Proceedings of Chemical, Biological and Environmental Engineering (pp.87-93). 90 (14). 10.7763/IPCBEE.

Other forms of dissemination (reports for clients, technical reports, popular press, etc)

1. Bettridge, N., Beisembayeva, D., **Berry, T-A.** & Ramirez-Prado, G. (**2019**, 23 May). Healthy Air, Healthy Children @ Unitec 2019. Tech Week 2019 https://techweek.co.nz/whats-on/2019/healthy-air-healthy-children-unitec-2019-242/
2. Steinhorn, G., **Berry, T-A.**, & Wallis, S.L. (**2019**, April). Building collaborative research networks to tackle asbestos waste with a circular economy approach. Paper presented at the ITP Research Symposium, Napier.
3. Stock, R. (**2019**) 'Asbestos research in race against time', *The Sunday Star Times*, 7 April, pg 43.
4. Slade, M (**2019**) 'How asbestos 'compost heaps' could be the natural answer to a toxic problem', *The Spinoff*, 5 Feb https://thespinoff.co.nz/partner/unitecs1a/05-02-2019/how-asbestos-compost-heaps-could-be-the-natural-answer-to-a-toxic-problem/
5. Provided an expert opinion on national television (**2017**), *1 News at Six, TVNZ*.
6. Nights (**2017**) '*Breaking down asbestos with plants',* RNZ, 14 June http://www.radionz.co.nz/national/programmes/nights/audio/201847544/breaking-down-asbestos-with-plants
7. **Berry, T-A**., Wallis, S.L. and Hardy, R.M. (**2017**, September). International Bio Remediation Presentation. Presentation conducted at the Australian Government, Darwin.

8. **Berry, T-A**., Wallis, S.L. and Hardy, R.M. (**2017**, September). International Bio Remediation Presentation. Presentation to the Northern Territories Government and Yuendumu community, Yuendumu, Australia. Presentation conducted at the Northern Territories and local authority meeting, Yuendumu, Australia.
9. **Berry, T-A**. and Wallis, S.L. (**2016**, September). Asbestos remediation and the progress of the Mr Fluffy asbestos clean-up. Presentation conducted at the ACT Government & Master Builders, Iron knob Street, Fyshwick, Canberra.
10. **Berry, T-A.** and Wallis, S. L. (**2016**, August). Long-term asbestos disposal. Presentation conducted at the Sustainable Buildings and Technologies (8038), Canberra University, Australia.
11. Phillips, D. and **Berry, T.** (**2013**). Pre-Construction Environmental Report, 102 Hobsonville Rd, Hobsonville. (3001). Auckland: Prepared for Hick Bros. Construction Ltd.
12. Phillips, D. and **Berry, T.** (**2013**). Site Contamination Assessment Report: 82B Shaw Rd, Oratia. (3002). Auckland: Prepared for: C. Westcott-Jones.

2b. Previous research work

Research title: The Potential Impact of Energy-Saving Building Design on Occupant Health
Principal outcome: Provided useful baseline data for BRANZ on the indoor air quality in residential buildings which are unoccupied and also under simulated occupancy.
Principal end-user and contact: BRANZ

2c. Describe the commercial, social or environmental impact of your previous research work

The impact of my research for BRANZ is vast as we have been able to obtain baseline data as to the contribution made from a building itself and its surroundings, in terms of particulate matter and volatile organic compounds, without the variability caused by human behaviour. This was a novel experiment which has not been established or explored before. The research has the ability to inform public guidelines and regulations around the use of certain building practices and materials.

2d. Demonstration of relationships with end-users

Following the completion of the project listed in 2b and 2c above, I have become a member of the BRANZ “Warmer, Drier, Healthier Buildings Programme”, comprised of a number of advisors who will advise on current trends, activities and thinking in the building and construction sectors. As the principle end-user, the relationship with BRANZ is significant. Throughout the research we were in constant contact with BRANZ, as we were providing progress reports and updates. BRANZ invited us, and assisted us, in the process of applying for out-of-cycle funding.

I was invited to present research (via a live webinar) on indoor air quality at the Transforma event, Medellin, Colombia on Friday, June 8 at 10:30am (in NZ) (Thursday, June 7 Medellin 5:30pm (in Med)). The Transforma event was the "Second International Meeting of cultures and arts for Social Transformation Towards Good Living, Medellin 2018", which took place from May 29 to June 10 in Medellin. I was also invited to present our research at the Clean Air Society of Australia and New Zealand (CASANZ), the University of Otago Summer School on Public Health, Tuesday 27 February 2018. Through this research I now have on-going collaboration with NIWA and University of Otago.

CV
Wayne Holmes

Curriculum Vitae Template

PART 1

1a. Personal details				
Full name	*Title* Mr	*First name* Wayne	*Second name(s)* Stephen	*Family name* Holmes
Present position	Senior Lecturer / Academic Leader			
Organisation/Employer	Unitec Institute of Technology			
Contact Address				
			Post code	
Work telephone		**Mobile**		
Email	wholmes@unitec.ac.nz			
Personal website (if applicable)	http://			

1b. Academic qualifications

2013, **Masters of Engineering** (Electronics & Computer Technology) with merit, Massey University

1993, **Bachelor of Engineering** (Electrical & Electronic), University of Auckland

1988, **NZCE** (Electronics and Computer Technology), Manukau Technical Institute,

1c. Professional positions held

Unitec Institute of Technology

2016-present: Senior Lecturer, Academic Leader Level 7, Department of Engineering

2015-2016: Lecturer\Programme leader BEngTech, NZDE, Dept of Electrotechnology

2013-2015: Lecturer\Programme leader BAppTech, Dept of Electrotechnology

2010-2013: Lecturer\Curriculum leader, Dept of Electrotechnology

Windridge Technologies Limited

2006-2010: Consulting Engineer / Director

NZ Institute of Industrial Research (Callaghan Innovation)

2004-06: Senior Scientist/ Project Manager

2002-04: Senior Scientist/ Portfolio Manager Forestry, Imaging and Sensing team

1994-02: Research Engineer/Manager Microwave Engineering

1992-94: Research Engineer, Microwave Engineering Team

Department of Scientific and Industrial Research (DSIR).

1986-92: Electronics Design Engineer.

1d. Present research/professional speciality

Although I have been exposed to most areas of electronics and sensing systems, my current specialist area is into the industrial applications of electromagnetism in the non-destructive sensing of material properties. I have a strong background in microwave and radio frequency systems, transmission line theory and software engineering.

1e. Total years research experience	33 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

- Member of International Microwave Power Institute.
- Member International Society for Electromagnetic Aquametry
- Member of Institute of Electrical and Electronic Engineers (IEEE).
- Member NZ Chapter IEEE Instrumentation and Measurement Society
- Reviewer IEEE Sensors Journal
- Reviewer IEEE Transactions on Instrumentation and Measurement

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents
	8	2	32	4

.

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

- Wallis, SL., Hernandez, G., Poyner, D., **Holmes, W.S**., Birchmore, R., & Berry, T-A. (2019). Particulate Matter in Residential Buildings in New Zealand: Part II. The Impact of Building Airtightness, Mechanical Ventilation using Simulated Occupancy. Atmospheric Environment: X, 2C, pp 1-11. doi:https://doi.org/10.1016/j.aeaoa.2019.100026
- **Holmes, WS**, Bogosanovic, M., Emms, G., and Mukhopadhyay, SC. (2014). The Effects of Lumber Seasonal Growth Rings on Microwave Measurements. International Journal on Smart Sensing and Intelligent Systems.VOL7, NO.4 : pp1980-1996. ISSN 1178-5608
- K.P.Thakur and **W.S Holmes**,"Non-contact measurement of moisture in layered dielectrics from microwave reflection spectroscopy using an inverse technique", IEEE Transactions on Microwave Theory and Techniques, 2004, 52(1):76-82
- A. Raj, **W. S. Holmes,** S. R Judah, "Wide Bandwidth Measurement of Complex Permittivity of Liquids using Coplanar Lines" IEEE Trans. Instrumentation and Measurement, June 2001
- K. P. Thakur, **W S Holmes**, An inverse technique to evaluate permittivity of material in a cavity, IEEE - Microwave Theory and Techniques, 49(6),1129-1132, June 2001.
- Thakur KP, Cresswell KJ, Bogosanovich M, **Holmes WS**, "Modelling the Permittivity of Liquid Mixtures", Journal of Microwave Power and Electromagnetic Energy (JMPEE), 1999, vol34 No.4 pp161-169.
- Thakur KP, Cresswell KJ, Bogosanovich M, **Holmes WS**, "Non-interactive and distributive property of dielectrics in mixture", IEE Electronics Letters, 1999, 35: 1143 1144
- Keam, R.B. and **Holmes, W.S.,** "Spectral-domain analysis of microstrip transmission line covered with lossy dielectric". IEE Electronics Letters. Volume 31, August 1994

Peer reviewed books, book chapters, books edited

- **Holmes, W.** (2014). "Microwave Timber Moisture Measurement." Scholar's Press. ISBN 978-3-639-70499-0.
- **Holmes, W. S**, Mukhopadhyay, S. C., and Riley, S. G. (2012). Dielectric Properties of Wood for Improved Internal Imaging. S.C. Mukhopadhyay et al. (Eds.): Advancement in Sensing Technology, SSMI 1. pp. 93-104.

Refereed conference proceedings

1) **Holmes W.S.,** Ooi M., Look M., Kuang Y.C., Simpkin R., Blanchon D., & Demidenko S. (2019). Proximal Near-Infrared Spectral Reflectance Characterisation of Weed Species in New Zealand Pasture. 2019 IEEE International Instrumentation and Measurement Technology Conferemce (I2MTC 2019) (pp. 596-601).
2) Look, M., **Holmes, W.S**., & Birchmore, R. (2019). Reliability of wireless sensors using low cost WiFi chipsets for Structural Monitoring. International conference on electronics,Information and Communications (ICEIC) (pp. 227-230).
3) Ahmad, A., Anderson, T., Swain, A., Lie, T., Currie, J., & **Holmes, W**. (2016). Residential household electrical appliance management using model predictive control of a grid connected photovoltaic-battery system. Asia-Pacific Solar Research Conference, 2016 Asia-Pacific Solar Research Conference.
4) Ahmad, A., Anderson, TN., Lie, TT., & **Holmes, WS**. (2015). A Platform for Analysing Advanced Photovoltaic Energy Controllers. Asia Pacific Solar Research Conference, NSW Sydney, Australia (Ed.), 2015 Solar Research Conference (pp.97-108).
5) Lai, Anthony., Phang, Shaoning., & **Holmes, Wayne**. (2015). "Data Mining Driven Computational Analysis of Stock Markets, Methods and Strategies", ECBA-2015, International Conference on "Engineering & Technology, Computer, Basic & Applied
6) **Holmes WS**, Bogosanovic M., Emms G., and Mukhopadhyay SC. (2014). "Effects of Seasonal Growth Rings on the Microwave Measurement of Wood.", 8th International Conference on Sensing Technologies (ICST14), Liverpool, United Kingdom. pp 412-417
7) Saeed Ur Rehman, Kevin Sowerby, Colin Coghill, **Wayne Holmes**, "The Analysis of RF Fingerprinting for Low-End Wireless Receivers with application to IEEE802.11a" , proc iCOST2012,France,July2012

8) **Holmes WS**, Mukhopadhyay S, Thakur KP ,Riley SG, "Lumber Moisture Measurement using a Six-port reflectometer and waveguide aperture array", proc. IMPI's 46th Annual Microwave Power Symposium (IMPI 46),June 20-22, 2012
9) **Holmes W**, Rehman S, Riley S," Dielectric Measurement of Logs for Improved Internal Imaging", proc ICST11, Massey University, 2011.
10) S Ur Rehman, **W S Holmes**, et al, "Modelling the Impact of Deferred Transmission in CSMA/CA Algorithm of IEEE 802.15.4 for Acknowledged and Unacknowledged Traffic" proc. ACM PE-WASUN 2011.
11) **Holmes W**, Cown D, "Microwave Density Measurement of Standing Trees", proc. 9th conf on Electromagnetic Wave Interaction with Water and Moist Substances, ISEMA June 2011,pp39-41.
12) KP Thakur, **WS Holmes** and S Mukhopadhyay,"Measurement of thickness of dielectric materials from microwave reflection data", proc. IEEE Instrumentation and Measurement Society 1st international conference on sensing technologies, ICST05,2005, pp 573-577.
13) **Holmes, W.S**. Thakur, K.P. Riley, S.G. "A Microwave method for the measurement of moisture content variation in stacked lumber". Fifth International Conference an Electromagnetic Wave Interaction with Water and Moist Substances, 23-26 March, 2003, Rotorua. pp. 300-306.
14) Thakur, K.P., Chan KL **Holmes W.S**. "Thickness and Permittivity on inhomogeneous dielectricsfrom microwave reflection spectroscopy using an inverse technique". Fifth International Conference an Electromagnetic Wave Interaction with Water and Moist Substances, 23-26 March, 2003, Rotorua. pp118-128.
15) M. Bogosanovich, A. Williamson, K. P. Thakur, **W. S. Holmes** and Ken Cresswell, "A comparison of the systems for non-contact and non-destructive natural product inspection",5th International Conference on Electromagnetic Wave Interaction with Water and Moist Substances, International Society for Electromagnetic Aquametry (ISEMA), Rotorua, New Zealand, pp. 15-23, March 2003
16) Thakur KP, Chan KL, **Holmes WS**,"An inverse Technique to Evaluate Thickness and Permittivity using Reflection of Plane Wave from inhomgeneous Dielectrics", proc. 59th Automatic RF Techniques group conference, Seattle, 2002, pp 77-83
17) **Holmes W. S**. , Riley S., Microwave In-kiln Moisture Measurement. IUFRO Wood Drying Conference. July 2001. Japan.
18) K. P. Thakur and **W. S. Holmes**, Permittivity of rice grain from electromagnetic scattering, 4th International Conference on Electromagnetic Wave Interaction with water and Moist Substances, Weimar, Germany. 2001
19) K. P. Thakur and **W. S. Holmes**, "Reflection of plane wave from multi-layered dielectrics". Proc. IEEE Asia Pacific Microwave Conference,(APMC2001) Dec. 2001, vol2, pp910-913.
20) K. P. Thakur and **W. S. Holmes**, "Dielectric Constant and Loss Factor of Dielectric Material using Finite Element Method in a Cavity", Asia Pacific Microwave Conference, Dec. 2000. pp802-809.
21) A. Raj, **W. S. Holmes,** S. R Judah, "Wide Bandwidth Measurement of Complex Permittivity of Liquids using Coplanar Lines" Proc. of the 17th IEEE Instrumentation and Measurement Technology Conference, IMTC 2000. June 2000
22) **Holmes W.S**., " Microwave technologies applied to in-stand measurement systems" proc. 3rd Wood Quality Symposium, FIEA, Melbourne, Dec 1999.
23) Thakur KP, **Holmes WS**, "Dielectric constant of Lentil and dry Peas", Proc. Of 34th annual microwave power symposium, International Microwave Power Institute, July 1999, pp13-16.
24) S.R.Judah and **W.S. Holmes** "A Novel Sixport Calibration incorporating diode detector non-linearity." IEEE Instrumentation & Measurement Technology Conference, May 1998.
25) **Holmes W.S**.,Riley S.G., Green A.D.,"In-kiln Moisture Content Measurement of Timber using a Waveguide Aperture Array." Proc. IMPI Symposium, Boston,July 1996
26) Green A.D, **Holmes W.S**, "Dielectric Properties of Fresh Peas at Frequencies from 130MHz to 4GHz" Proc. IMPI Symposium, Boston,July 1996
27) **Holmes W.S**.,Riley S.G.,"Microwave Method for In-kiln Moisture Content Measurement." Proc. IUFRO Wood Drying Conference, August 1996
28) Horsfield B, Ball J.A.R, **Holmes W.S.,** Green A, Holdem JR, Keam RB,"A Technique for Measuring Cheese Curd in Real Time." Proc. Conf. on Engineering in Agriculture and Food

Processing, Gatton Australia, November 1996.

29) Horsfield B, Ball J.A.R, Holdem JR, Keam RB, **Holmes W.S**., Green A, ,"On-line Moisture measurement during Cheese Production." Proc. RMIT Symposium, Melbourne Australia, Aug.1996.
30) Ball J.A.R, Horsfield B, **Holmes W.S.,** Green A, Holdem JR, Keam RB."Cheese Curd Permittivity and Moisture Measurement using a 6-Port Reflectometer" Proc. Asia Pacific Microwave Conference, New Dheli, December 1996.
31) **Holmes, W.S**. and Keam, R.B. "Measurement of Complex Dielectric Permittivity using Microstrip Transmission Line". Proc. IEEE AP-S/URSI Symposium, June 1995.
32) Keam, R.B. and **Holmes, W.S**., "Uncertainty Analysis of Measurement of Complex Dielectric Permittivity using Microstrip Transmission Line". Proc. SBMO/IEEE MTT-S Conference, July 1995.

Patents

- Patent US6411106, "method and apparatus for moisture sensing using microwave technologies", June 25th 2002.
- Patent US20030218468 A1, "Apparatus and method for measuring characteristics of anisotropic materials", Nov 27th 2003
- Patent US6903557. "Microwave Moisture Sensing via Waveguide with Slot Array", June 7th 2005
- Patent US7089047B2. "Fat Depth Sensor", Aug 8, 2006

Other forms of dissemination (reports for clients, technical reports, popular press, etc)

1. Ooi, M., **Holmes, WS**., Look, M., & Al-Shadli, D. (2019, April). *Light Driven Precision Agriculture*. Poster presented at 2019 ITP Research Symposium, Napier, New Zealand.
2. Ahmad, A., Anderson, T., Swain, A., Lie, T., & **Holmes, W.** (2017). *Home energy management using model predictive control*. ITPNZ Applied Research Symposium, Hamilton, New Zealand
3. **Holmes, W.S**, and Riley, S.G. (2012). *Microwave Sensor for the Measurement of Stacked and Layered Dielectrics*. IEEE I & M Chapter, New Zealand Workshop on Smart Sensors Measurements and Instrumentation. Lincoln University, Christchurch, NZ, 11-12th April.
4. Ahmad, A., Hu, Z., and **Holmes, WS.** (2014). Characterization of Photonic Bandgap Transmission Lines for device miniaturization. 21st Electronics New Zealand Conference (ENZCon'14). Hamilton, November

CV
Ashveen Nand

New Zealand MSI Curriculum Vitae Template

PART 1

1a. Personal details				
Full name	*Title* Dr	*First name* *Ashveen*	*Second name(s)* *Vikash*	*Family name* Nand
Present position	Technical Manager			
Organisation/Employer	Unitec Institute of Technology			
Contact Address	27 Jaylo Place			
	Mangere			
	Auckland		**Post code**	2022
Work telephone	8154321 ext 7448	**Mobile**	0223768902	
Email	anand2@unitec.ac.nz			
Personal website (if applicable)	http://			

1b. Academic qualifications

2012, PhD, Chemistry, University of Auckland
2007, Graduate Certificate in Tertiary Teaching, Education, University of the South Pacific
2006, Master of Science, Chemistry, University of the South Pacific
2003, post Graduate Diploma in Chemistry, Chemistry, University of the South Pacific
1999, Bachelor of Science, Mathematics/ Chemistry, University of the South Pacific

1c. Professional positions held

July 2017 - , Technical Manager, Unitec Institute of Technology
July 2016 – June 2017, Senior Technician, Auckland University of Technology
Jan 2014 – June 2016, Research and Development Polymer Chemist, Hydroxsys (NZ) Ltd
Dec 2012-Dec 2013, Scientist, Technix Industries Ltd
Aug 2006 – Sept 2008, Assistant Lecturer, University of the South Pacific
Feb 2006 – July 2006, Tutor, University of the South Pacific
2004 Oct – Jan 2006, Lecturer, Fiji National University

1d. Present research/professional speciality

My research speciality is in the area of soft material science and my present research focus is on:

- *Development of active packaging materials*
- *Biomedical application of polymers (articular cartilage replacement)*
- *Drug delivery application of polymers*
- *Recycling synthetic plastics*
- *Bio-polymeric alternatives for synthetic polyolefins*

1e. Total years research experience	15 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

2009/ 2009-2012 Hybrid Polymers (PhD) Scholarship, University of Auckland.
2004/ 2004-2006 Australian Regional Development (MSc) Scholarship, Australian Government.

1997/ 1997-1999 Multi – Ethnic Affairs Board (BSc) Scholarship, Fiji Government.

1g. Total number of *peer reviewed* publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents
	19	4	1	

PART 2

2a. Research publications and dissemination

Peer-reviewed journal articles

1. J. Long, **A. V. Nand**, C. Bunt, A. Seyfoddin, Controlled release of dexamethasone from poly(vinyl alcohol) hydrogel, *Pharmaceutical Development and Technology*, 2019, 24, 839-848.
2. J. Long, A. E. Etxeberria, **A. V. Nand**, C. R. Bunt, S. Ray, A. Seyfoddin, A 3D printed chitosan-pectin hydrogel wound dressing for lidocaine hydrochloride delivery, *Materials Science and Engineering C*, 2019, 104, 109873.
3. M. Arjmandi, M. Ramezani, **A. Nand**, T. Neitzert, Tribological characterization of polyacrylamide-alginate hybrid hydrogels as a potential candidate for cartilage replacement, *Key Engineering Materials*, 2018, 775, 109-114.
4. M. Arjmandi, M. Ramezani, **A. Nand**, T. Neitzert, Experimental study on friction and wear properties of interpenetrating polymer network alginate-polyacrrylamide hydrogels for use in minimally invasive joint implants, *Wear*, 2018, 406-407, 194-204.
5. J. Long, **A. V. Nand**, S. Ray, S. Mayhew, D. White, C. R. Bunt, A. Seyfoddin, Development of customized 3D printed biodegradable projectile for administrating extended release contraceptive to wildlife, *International Journal of Pharmaceutics*, 2018, 548, 349-356.
6. P. A. Kilmartin, D. Robert, **A. Nand**, J. Travas-Sejdic, G. Waterhouse, Redox properties of nanostructured aniline oxidation products formed under different pH conditions, *International Journal of Nanotechnology*, 2014, 11, 458-465.
7. **A. V. Nand**, S. Swift, B. Uy and P. A. Kilmartin, Evaluation of extruded low density polyethylene/ polyaniline blends for active packaging applications, *Journal of Food Engineering*, 2013, 116, 422-429.
8. **A. V. Nand**, S. Ray, J. Travas-Sejdic and P. A. Kilmartin, Characterization of low density polyethylene/ polyaniline blends prepared via extrusion, *Materials Chemistry and Physics*, 2012, 135, 903-911.
9. **A. V. Nand,** S. Ray, J. Travas-Sejdic and P. A. Kilmartin, Characterization of polyethylene terephthalate/ polyaniline blends as potential antioxidant materials, *Materials Chemistry and Physics*, 2012, 134, 443-450.
10. **A. V. Nand,** S. Ray, A. J. Easteal, M. Gizdavic-Nikolaidis, R. P. Cooney, J. Travas-Sejdic and P. A. Kilmartin, Evaluation of polyaniline for antioxidant packaging applications, *Materials Science Forum*, 2012, 700, 236-239.
11. **A. V. Nand**, S. Ray, M. Gizdavic-Nikolaidis, J. Travas-Sejdic and P.A. Kilmartin, The effects of thermal treatment on the antioxidant activity of polyaniline, *Polymer Degradation and Stability*, 2011, 96,2159-2166.
12. **A. V. Nand**, S. Ray, A. J. Easteal, G.I.N. Waterhouse, M. Gizdavic-Nikolaidis, R.P. Cooney, J. Travas-Sejdic and P.A. Kilmartin, Factors affecting the radical scavenging activity of polyaniline, *Synthetic Metals* 2011, 161, 1232-1237.
13. **A. V. Nand**, J. R. Khurma, D. R. Rohindra and R. Charan, Isolation and properties of starch from some local cultivars of cassava and dalo in Fiji, *South Pacific Journal of Natural Science*, 2008, 26, 45-48.
14. **A. V. Nand** and J. R. Khurma, Temperature and pH sensitive hydrogels composed of chitosan and poly(ethylene glycol), *Polymer Bulletin*, 2008, 59 (6), 805-812.
15. **A. V. Nand**, J. R. Khurma, D. R. Rohindra, Characterization of genipin crosslinked hydrogels composed of chitosan and partially hydrolyzed poly (vinyl alcohol), *e-polymers*, 2007, No. 033.
16. D. R. Rohindra, J. R. Khurma and **A. V. Nand**, Synthesis and properties of hydrogels based on chitosan and poly (vinyl alcohol) corsslinked by genipin, *Journal of Macromolecular Science, Part A: Pure and Applied Chemistry*, 2006, 43 (4/5), 749-758.
17. D. R. Rohindra, J. R. Khurma and **A. V. Nand**, Swelling and thermal characteristics of genipin cross-linked chitosan and poly (vinyl pyrrolidone) hydrogels, *Polymer Bulletin*, 2005, 54(3), 195-204.
18. J. R. Khurma, D. R. Rohindra and **A. V. Nand**, Preparation and swelling of crosslikned and non-crosslinked chitosan hydrogels, *South Pacific Journal of Natural Sciences*, 2004, 22, 31-34.
19. P. N. Kumar, V. Singh, **A. V. Nand** and J. R. Khurma, Chitosan Applications in Medicine, *Fiji Medical Journal*, 2004, 23 (1), 17-23.

Peer reviewed books, book chapters, books edited
1. S. Ray, **A. Nand** and P. A. Kilmartin, Polyethylene based conducting polymer blends and composites, In *Polyethylene based blends, composites and nanocomposites*, P. M. Visakh and M. J. M. Morlanes (eds), Scrivener Publishing, USA, 2015, 93-112. ISBN: 978-1-118-83128-1. 2. **A. V. Nand** and P. A. Kilmartin, Synthetic polymers with antioxidant properties, In *Antioxidant Polymers: Synthesis, Properties and Applications*, G. Cirillo and F. Iemma (eds), Scrivener Publishing, USA, 2012, 333-354. ISBN: 978-1-118-20854-0. 3. J. R. Khurma and **A. V. Nand**, Chitosan based hydrogels for drug delivery. In R. Jayakumar and M. Prabaharan (eds), *Current Research and Developments on Chitin and Chitosan in Biomaterials*, Research Signpost, Kerala, India, 2009, vol. 2, 69-88. ISBN: 978-81-308-0299-2. 4. J. Khurma and **A. Nand** (ed.), *Form Seven Chemistry*, Chemical Society of the South Pacific, Fiji, 2007, 3rd edition.
Refereed conference proceedings
1. A. V. Nand, S. Ray, A. J. Easteal, R. P. Cooney, M. Gizdavic-Nikolaidis, G. Waterhouse, J. Travas-Sejdic and P. Kilmartin, Free-radical scavenging capacity of nanotubular and granular polyaniline, *Processing and Fabrication of Advanced Materials – XIX Proceedings*, 2011, 356-365, ISBN: 978-0-18178-9.
Patents
Other forms of dissemination (reports for clients, technical reports, popular press, etc)

To	Unitec Research Committee	**From**	Marcus Williams, Director, Research and Enterprise
Title	2019 Research Productivity Traffic Light (PRTL) Report	**Date**	2019/06/12

Recommendation/s

That the URC receive the 2019 Research Productivity Traffic Light (PRTL) Report and inform its members about the 2019 RPTL results.

Purpose

To report to the Committee about the fantastic results Unitec achieved for the 2019 Research Productivity Traffic Light (PRTL) census.

Background

In order to monitor the extent to which degree programme teaching and supervision is underpinned by research activity, a NZQA requirement, the Academic Board approved the use of the Research Productivity Traffic Light (RPTL) Report. This report was first presented to the Academic Board in 2012 and was repeated every year since then. The longitudinal nature of the RPTL productivity metric means trends and forecasting for the research activity of Unitec's degree programmes can be reported.

The Unitec Research Strategy 2015-2020 outlines Unitec's aspiration with regard to RPTL performance, stating that all programmes at degree level and above will be rated "green" by 2020.

The attached report summarises the 2019 RPTL results for Unitec's degree programmes.

RPTL Terms of Reference and Methodology

Following is an overview of the key terms of reference and methodology approved by Academic Board:

- The criteria for inclusion is permanent full time or part time staff, or staff on contracts of 12 months or more, with an FTE of at least 0.2 who significantly taught and/or supervised on degree and above level courses during Semester One 2019.
- For the purposes of the RPTL a 'research active' staff member is defined as someone who produces at least two eligible research outputs that are verified in ROMS (Unitec's Research Output Management System) within the past two years. For part-time staff the criteria are at least one research output for the two previous audited years.
- The current 2019 report is based on staff's research activity as recorded in ROMs for 2017 and 2018 period.

Next Steps

No action required. This purpose is to inform the committee about the results of the 2019 RPTL.

Attachments

Please refer to the attachment: 2019 Research Productivity Traffic Light (PRTL) Report.pdf

Contributors

Arun Deo – Research Advisor, Tūāpapa Rangahau.

Marcus Williams – Director, Research and Enterprise

Heads of Schools

Research Leaders

2019 Research Productivity Traffic Light (RPTL) Report

Background

In order to monitor the extent to which degree programme teaching and supervision is underpinned by research activity, a NZQA requirement, the Academic Board approved the use of the Research Productivity Traffic Light (RPTL) Report. This report was first presented to the Academic Board in 2012 and was repeated every year since then. The longitudinal nature of the RPTL productivity metric means trends and forecasting for the research activity of Unitec's degree programmes can be reported.

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- The current 2019 report is based on staff's research activity as recorded in ROMs for 2017 and 2018 period.

The 2019 Research Productivity Traffic Light (RPTL) Results

The RPTL analysis uses a traffic light colour system to represent levels of research activity in each degree programme:

→ **Green** is the required standard, where at least 75% of staff teaching and/or supervising on the programme are producing the required number or more outputs for the two-year period under review.

→ **Amber** is marginal, with 50-74% of staff producing the required number or more outputs.

→ **Red** is below standard with under 50% of staff achieving the required number of outputs.

In the 2019 reporting period, Unitec maintained the consistent gains made since the Traffic Light report was introduced in 2012 (see Table 1 and Figure 1 below), however the rate of progress has slowed. As shown in Table 1 below, in 2018, 27 degree programmes were green lit (68%), five programmes were amber lit (13%), and eight were red lit (20%). In 2019, 33 degree programmes are green lit (79%), seven programmes are amber lit (17%), and two are red lit (5%).

Programme Status	2012	2013	2014	2015	2016	2017	2018	2019
Count of green lit programmes	9	10	14	19	21	28	27	33
Count of amber lit programmes	7	8	9	12	16	8	5	7
Count of red lit programmes	11	9	7	4	3	5	8	2
Total	**27**	**27**	**30**	**35**	**40**	**41**	**40**	**42**

Programme Status	2012	2013	2014	2015	2016	2017	2018	2019
Percentage of green lit programmes	33%	37%	47%	54%	53%	68%	68%	79%
Percentage of amber lit programmes	26%	30%	30%	34%	40%	20%	13%	17%
Percentage of red lit programmes	41%	33%	23%	11%	8%	12%	20%	5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 1: Total number and percentage of green, amber and red lit degree programmes 2012-2019

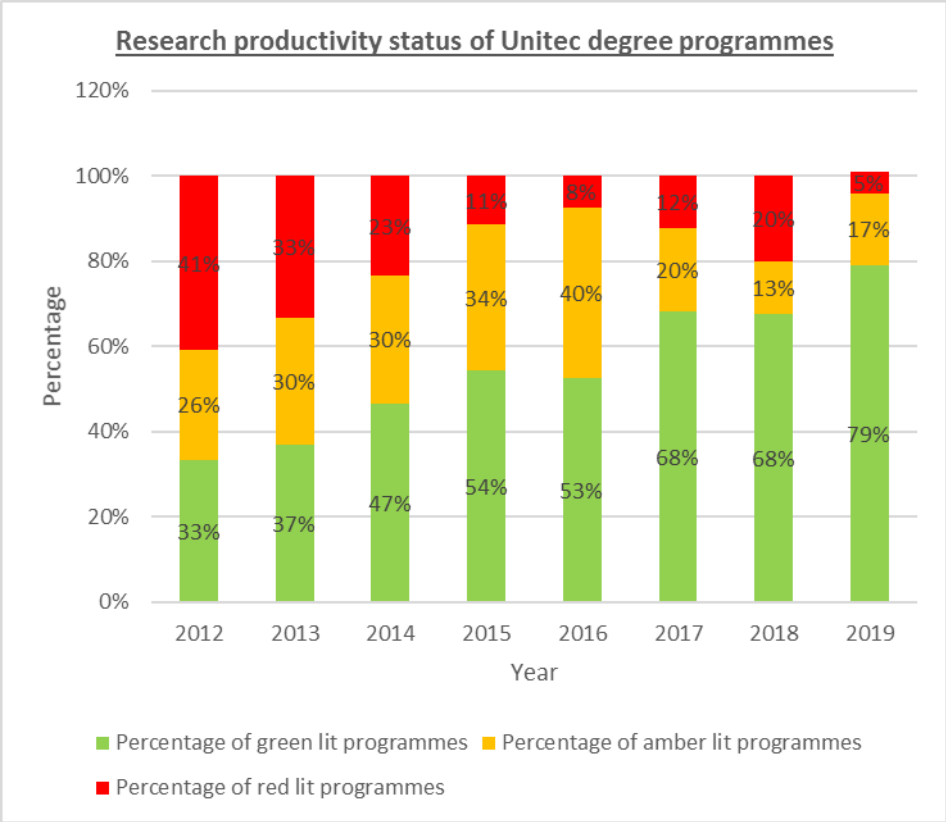

Figure 1: Total number of green, amber and red lit degree programmes 2012-2019

There was a big shift in green lit programmes, an 11 percentage point growth from 2018. The biggest achievement for the 2019 is the major shift of red lit programmes to amber lit or green lit. We now have only two programmes that are red lit compared to 8 red lit programmes in 2018. There is a 15 percentage point improvement. By looking at the positive shift from amber lit to green lit and red lit to amber lit it looks quite ambitious in achieving our 2020 target, that is, all degree programmes will be green lit. While this goal remains achievable it requires a strong focus, increased effort, and appropriate resourcing to shift the final group of amber and red programmes to green lit status. Careful planning needs to be put in place and implemented this year.

Bachelor of Teaching (ECE), Bachelor of Performing and Screen Arts, Bachelor of Applied Technology and Bachelor of Health Science (Medical Imaging) moved straight from red lit to green lit. This is a big achievement for Unitec. Master of Teaching Educational Leadership moved from red lit to amber lit. Bachelor of Nursing had its status unchanged from red lit.

Bachelor of Construction and Master of Business moved from amber lit to green lit. There were two programmes (Bachelor of Business, Bachelor of Communication (Teach Out)) which had their amber lit status unchanged.

A majority of the programmes which were green lit maintained their status in 2019. However, there were some negative shifts where four programmes moved from green lit to amber lit. These were Master of Osteopathy (Teach Out), Master of Applied Practice (Professional Accounting), Bachelor of Applied Science (Human Biology) (Teach Out) and Bachelor of Sport (Teach Out). The remaining green lit programmes are demonstrating healthy research cultures with robust research plans, suggesting that these are not at risk of losing their green lit status in 2020.

Table 2 below shows the RPTL results for the individual programmes.

School	Programme	Count of Staff Teaching in Degree Programmes in 2019	Count Green Lit Staff	Count of Amber Lit Staff	Count of Red Lit Staff	RPTL Status in 2019 (Based on 2017/2018 Research Activity)	Percentage Point Change from 2018	RPTL Status in 2018 (Based on 2016/2017 Research Activity)	RPTL Status in 2017 (Based on 2015/2016 Research Activity)	RPTL Status in 2016 (Based on 2014/2015 Research Activity)
School of Applied Business	Bachelor of Business	25	16	1	8	64%	12%	52%	75%	69%
	Bachelor of Communication (Teach Out)	2	1	1	0	50%	-10%	60%	50%	56%
	Master of Applied Practice (Professional Accounting)	7	5	1	1	71%	-9%	80%	100%	75%
	Master of Business	5	5	0	0	100%	33%	67%	100%	80%
	Master of International Communication (Teach Out)	1	1	0	0	100%	0%	100%	86%	100%
	Postgraduate Diploma in Business	4	4	0	0	100%	20%	80%	100%	83%
	Postgraduate Diploma in International Communication (Teach Out)	1	1	0	0	100%	0%	100%	80%	100%
School of Architecture	Bachelor of Architectural Studies	23	20	1	2	87%	3%	84%	79%	84%
	Bachelor of Landscape Architecture	7	6	1	0	86%	-2%	88%	75%	88%
	Master of Architecture (by Project)	5	5	0	0	100%	0%	100%		
	Master of Architecture (Professional)	25	22	1	2	88%	3%	85%	75%	90%
	Master of Landscape Architecture	7	6	1	0	86%	-2%	88%	75%	89%
School of Building Construction	Bachelor of Construction	12	9	1	2	75%	15%	60%	70%	75%
School of Community Studies	Bachelor of Applied Science (Human Biology) (Teach Out)	9	6	1	2	67%	-11%	78%	56%	22%
	Bachelor of Health and Social Development (Teach Out)	4	3	1	0	75%	-3%	78%	43%	20%
	Bachelor of Sport (Teach Out)	8	5	3	0	63%	-21%	83%	75%	70%
	Bachelor of Teaching (ECE)	10	8	0	2	80%	40%	40%	60%	64%
	Master of Osteopathy (Teach Out)	11	8	1	2	73%	-9%	82%	85%	50%
School of Computing & Information Technology	Bachelor of Computing Systems	14	13	1	0	93%	0%	93%	86%	93%
	Doctor of Computing (Teach Out)	11	11	0	0	100%	0%	100%	100%	100%
	Master of Computing	13	13	0	0	100%	0%	100%	100%	100%
	Postgraduate Diploma in Computing	9	9	0	0	100%	0%	100%	100%	100%
School of Creative Industries	Bachelor of Creative Enterprise	11	9	2	0	82%	-18%	100%	77%	60%
	Bachelor of Performing and Screen Arts	15	12	2	1	80%	33%	47%	43%	56%
	Master of Creative Practice	14	12	2	0	86%	-14%	100%	91%	100%
	Master of Design (Teach Out)	6	5	1	0	83%	-17%	100%	85%	67%
	Postgraduate Certificate in Creative Practice	13	11	2	0	85%	-15%	100%		
	Postgraduate Diploma in Creative Practice	13	11	2	0	85%	-15%	100%		
School of Engineering & Applied Technology	Bachelor of Applied Technology	10	8	1	1	80%	43%	38%	53%	55%
	Bachelor of Engineering Technology	23	11	0	12	48%	13%	35%	50%	55%
School of Environmental & Animal Sciences	Bachelor of Applied Science (Natural Sciences)	16	14	0	2	88%	4%	83%	100%	100%
School of Healthcare & Social Practice	Bachelor of Health Science (Medical Imaging)	4	4	0	0	100%	57%	43%	25%	67%
	Bachelor of Nursing	16	4	1	11	25%	4%	21%	29%	35%
	Bachelor of Social Practice	13	11	1	1	85%	-15%	100%	86%	94%
	Master of Applied Practice (Social Practice)	6	6	0	0	100%	0%	100%		
	Master of Social Practice (Teach Out)	3	3	0	0	100%	0%	100%	100%	100%
Others	Master of Applied Practice (all streams)	20	17	2	1	85%	-6%	91%	100%	91%
	Master of Educational Leadership and Management	2	2	0	0	100%	0%	100%	67%	67%
The Mindlab	Master of Applied Practice (Technological Futures)	5	5	0	0	100%	17%	83%	83%	
	Master of Contemporary Education	4	3	0	1	75%	75%			
	Master of Teaching Educational Leadership	7	4	1	2	57%	24%	33%		
	PGCert Applied Practice (Digital and Collaborative Learning)	8	8	0	0	100%	25%	75%	93%	60%

Table 2. The Traffic Light scores for all Unitec degree programmes 2012 to 2019

Conclusion

The excellent progress Unitec has made since 2012 raising research activity at degree level has been maintained in 2019. However, results indicate progress has slowed down as the final group of degrees work to lift their research activity from red and amber, to green lit status. The goal to see all Unitec degree programmes green lit by 2020 remains achievable. However, it is critical that research plans are established and the necessary actions are implemented. Tūāpapa Rangahau's Research Development Programme will focus on partnering with Schools to achieve this goal over the next two years.

2019 Research Symposium Time Line **Item 4.2**

Task	Action Date	Responsible	Action	Done	Still to do
Rooms and Date					
Date set	Thursday Oct 10th		Confirmed		
Venue Booked			Booked		
Save the Date notice to staff	25th June		Send "Save the Date" Outlook Event Invite to RC's. "Save the Date" email to AL's, HoPPs, ERC Network, DID's, PG Supervisors and the URC (and any other research networks).		
Save the Date notice to staff			Post on the Nest and ask Louise in internal comms if she can place a banner on the Nest linking to the RS website with this info. Post save the date info up on the RS website with advice that info will follow soon re: this event. Feature in Pou Tukutuku news		
Abstracts					
First call out to staff	July 25th		Banner on Nest. Email to all academic staff. Featured in Pou Tukutuku news. In Nest news and events. On Moodle, twitter, yammer, RS website etc. Abstract submission form live online. Posters up		
Banner on Nest	July 24th		As above.		
Invites to session Chairs	Week of August 6th		Via email		
Second Call/Reminder	Mon August 20th		Email to all academic staff. Featured in Pou Tukutuku news. In Nest news. On Moodle, twitter etc.		
Call for Abstracts close/submitted	Fri August 31st		Banner on Nest. Email to all academic staff. Featured in Pou Tukutuku news. In Nest news. On Moodle, twitter etc. Online submissions closed.		
Review selection criteria for Abstracts					
Review abstracts	Week of Sep 3rd		Review abstracts for acceptance/non-acceptance against selection criteria		
Abstract acceptance/non-acceptance emails sent	Week of Sep 10th		Via email		
Research with Impact Prize					
Invites to Judges	July 25th		Via email. Send as meeting requests to reserve time in staff calendars.		

Judging Panel confirmed, criteria distributed to judges	Week of August 6th		Via email		
Entries close	Fri Aug 31st		In line with abstract submission. Reminder to staff via Nest, email, Pou Tukutuku, Moodle etc.		
Abstracts reviewed – prize finalists selected and notified	Week of Sep 3rd/12th		Via email		
Reminder to judges. Judging pack and run sheet sent.	Week of Sep 17th		Via email.		
Prizes arranged	Week of Sep 3rd		To be purchased once confirmed.		
Registration					
Registrations banner on Nest	Mon Sep 3rd		To go live		
Form live on Web	Mon Sep 3rd		Registration via website live.		
Registration email to staff	Mon Sep 3rd		Banner on Nest. Email to all academic staff. Featured in Pou Tukutuku news. In Nest news. On Moodle, twitter etc.		
Registration reminder	Week of Sep 17th		As above		
Registrations close	Fri Sep 21st		As above. Remove function fom website.		
3 Minute Thesis					
Entries open	Mon Aug 6th		Banner on Nest. Email to all academic staff/PG supervisors. Featured in Pou Tukutuku news. In Nest news. On Moodle, twitter etc. Posters up on campus.		
Workshop for presenters	TBC		TBC		
Invites to Judges	July 25th		Via email		
Judging Panel confirmed, appointments in calendars, criteria distributed to judges	Week of Aug 6th		Via email		
Entries close	Fri Aug 31st		Reminder via Nest, Pou tuku tuku, Moodle etc. Online entries closed.		
Heats held (if required).	Week of Sep 3rd		Two sessions may be required. Only 13 entries can be accommodated due to time frame.		
Reminder and information to entrants	Week of Sep 17th		Via email to partcipants		
Reminder to judges and MC. Judging/MC pack and run sheet sent.	Week of Sep 17th		Via email		
Prizes arranged	Week of Sep 3rd		Purchased once confirmed.		
Undergrad Comp					

Entries open	Mon Aug 6th		Banner on Nest. Email to all academic staff/UG PL's. Featured in Pou Tukutuku news. In Nest news. On Moodle, twitter etc. Posters up on campus.		
Invites to Judges	Week of july 12th		Via email		
Judging Panel confirmed, appointments in calendars, criteria distributed to judges	Week of Aug 6th		Via email		
Entries close	Fri Aug 31st		Reminder via Nest, Pou tuku tuku, Moodle etc. Online entries closed.		
Selection of entrants (if required) acceptance/non-acceptance emails sent	Week of Sep 3rd		Notified via email.		
Reminder to (selected) entrants	Week of Sep 17th		Via email		
Reminder to judges and MC. Judging/MC pack and run sheet sent	Week of Sep 17th		Via email		
Prizes arranged	Week of Sep 3rd		Purchased once budget confirmed.		
Programme					
Draft Programme	Week of Sep 17th		First draft formatted. You can ask Brenda'a advice here/ask her to proof as she is an expert with this.		
Finalise Programme and post to website	Week of Sep 24th		Programme confirmed. Live online. Emailed to presenters, comp entrants, judges etc.		
Catering:					
Raise with Mud Pie and compass as applicable.	Week of Sep 17th		Mud Pie to cater all food (lunch and closing function). Use 2016 menu as a guide. Helene from MP knows about this event for 2017 and knows the timings for the day. Re: evening function, raise PO with bottle shop in Pt Chev for evening drinks (so you can get craft beer and cider!). Marcus will need to request permission from his manager for the booze purchase. Arrange delivery of booze to Compass at B112 for chilling (cc to Sadna for her ref). Request compass to provide wait staff etc for evening function and bring drinks, glasses etc to B23.		
Menu draft and sent	Week of Sep 24th (one week prior to Oct 3rd if poss)		Draft menu approved, confirmed with MP.		

Set up/Admin requirements					
Programmes printed	By Mon Oct 1st		As applicable depending on number of registrations. Organise with Mt Albert copy centre.		
IT support for the day – Log job with IMS	By week of Sep 3rd		Job logged with IMS. Request for temp logons and IT support on the day. Ask for someone from IMS to be there AM to ensure all AV is working prior to event start.		
Log job with FM to open building for set up Oct 2nd from 3pm and pack down on Oct 4th AM.	By week of Sep 3rd for action Oct 2nd for event set up.		Arranged with FM as required. Arrange with facilities, a time to meet to supervise packdown/ furniture to be moved back to original area and venue tidy post event.		
Dress stage/registration desk– signage etc. Facilities to help set up/pack down foyer space.	Oct 8th/9th		Arranged with FM as required. Set up from 3pm Oct 2nd, pack down Oct 3rd post event, facilities to move tables etc back to classrooms etc Oct 4th AM.		
SYMPOSIUM		**Oct 10th 2019**			

2018 Performance Based Research Fund (PBRF) - Quality Evaluation Report

1 Background

The PBRF is a funding system run by the Tertiary Education Commission (TEC) that was devised to replace a previous framework simplistically based on staff numbers. The funding tied to the PBRF is apportioned on the basis of three components: Staff assessment 'Quality Evaluation' (6 yearly frequency), Research Degree Completions (RDC) (calculated annually), and External Research Income (ERI) (calculated annually). The staff assessment makes up 55% of the PBRF fund, RDC comprises 25%, and ERI 20%. In 2019 the total size of the PBRF fund is $315 million.

For the PBRF staff quality assessment each staff member's Evidence Portfolio (EP) is assessed and then assigned a quality category (grade). These portfolios present formally verified research outputs as well as examples of more general contributions to the research environment, over the six year period. Staff are rated A, B or C, or C(NE) if they were considered 'new and emerging' at the time of the assessment or R or R(NE). These different quality categories (the TEC term for ratings) receive various levels of funding with an A being worth 5 times more than a C , B three times and an R receiving no funding. In order to mitigate the risk that PBRF might be used to influence employment related decisions, the results of the 2018 assessemnt will only publicly report on the numbers of staff (in Full Time Effective Staff - FTE) who received a funded quality category (A, B or C).

2 TEO Level Executive Summary

36 TEOs participated in 2018 compared with **27** TEOs in 2012

2 wānanga
8 universities
12 PTEs
14 ITPs

Funded Quality Categories awarded to **7,408.40** staff EPs

↑**66.2%** in researchers awarded a funded Quality Category between 2003 and 2018 → 4,461.51 to 7,408.40

Pacific Research Panel established with funded Quality Categories awarded to **54.61** EPs, **53.7%** awarded an A or B Quality Category

55.9% of researcher EPs awarded **A** or **B** Quality Categories – compared with **53.3%** in 2012

Māori Knowledge and Development awarded **85.24** EPs with A and B Quality Categories, an increase of **30.39** from 2012

↑**39.8%** in researcher EPs awarded an **A** Quality Category between 2012 and 2018

↑**17.5%** in researcher EPs awarded a **B** Quality Category between 2012 and 2018

96.7% The amount of total PBRF funding received by universities in 2019

Unitec New Zealand is the only non-university TEO to receive **greater than 1.0%** of total funding available through the PBRF

The University of Auckland and the University of Otago together receive **48.4%** of Quality Evaluation funding, **47.1%** of RDC funding and **56.2%** of ERI funding.

7.15 Average result for the **AQS(S)** for all participating TEOs. AQS(S) shows the intensity of research at each TEO relative to their staffing numbers.

3 Unitec Executive Summary

This report outlines the results of the PBRF from the perspective of Unitec. This is the 4th staff quality evaluation since the PBRF was introduced in 2003. Unitec has been the best performer of the ITPs over all that period. However, with the various re-structures at Unitec and academic staff leaving Unitec voluntarily, between 2014 to 2017, 121 PBRF 'rated' staff left, putting Unitec in the potential position of losing the 'top spot' in the ITP sector.

Despite this, we managed to maintain the highest rating factors in the ITP sector with a total of 14 institutions participating.

→ Number of PBRF eligible staff at Unitec = 281
→ Number of Evidence Portfolios submitted = 128
→ Number of Evidence Portfolios achieving funded ratings = 124
→ Percentage of eligible staff who submitted Evidence Portfolio and were awarded funded ratings = 44%
→ Success Rate (Percentage of staff who submitted an Evidence Portfolio and received a funded rating) = 97%
→ Unitec Achieved five A, twenty-six B, seventy-five C, 18 C(NE), three R and one R(NE) Quality Category rating
→ Unitec ranked 1st for Quality Categories in the Institutes of Technology and Polytechnics (ITP) sector with 115.61 rated FTE, which equates to 26.8% of the ITP sub-sector total (431.52) and 1.05% total Tertiary Education Organisations (TEO) sector. Overall Unitec ranked 9th out 36 TEOs participating in the PBRF Quality Evaluation.
→ Unitec ranked 1st for AQS(S) in the ITP sector. AQS(S) shows the intensity of research at each TEO relative to their staff numbers (successful ratings as a proportion of eligible staff).The AQS(S) score for Unitec is 5.24 and the ITP sector average score is 1.80. Overall, Unitec was rated 12th on the AQS(S) score with a score of 5.24 and average result for the AQS(S) for all participating TEOs is 7.15.
→ Unitec New Zealand is the only ITP that will receive greater than 1.0% of the total funding available through the PBRF.
→ Unitec will receive $1,826,381.05 of Quality Evaluation Funding, a drop of $314,457.3 from the 2012 round. (With our performance being better or similar in some areas than the 2012 round, one would expect our funding to be very close to that of the 2012 results. This did not happen because there were eight more participating TEOs in 2018 and the fund size remained at $315 million.

Table 1: Unitec Executive summary

4 Results

This section presents the results of the PBRF 2018 Quality Evaluation Round. The results for Unitec are mostly compared with the ITP sector and our own 2012 Quality Evaluation Round.

4.1 Participation

In the PBRF 2018 Quality Evaluation Round , 44% of the of Unitec's eligible academics were awarded with a fundable rated portfolio compared to 33% in 2012.

In the 2015 – 2020 Research Strategy, Unitec set the stretch target to grow the number of PBRF rated staff by 5% for the 2018 round – from 33% to 38% of eligible staff. However, due to redundancies and academics moving on from Unitec we lost 121 of the 2012 cohort of staff with rated (funded) portfolios, which delivered the bulk of Unitec's PBRF funding. This situation was explained to the Executive Leadership Team (ELT) in late June 2017 and it was agreed that given these developments, the PBRF related KPI needed revision. At its July meeting, the Unitec Research Committee (URC) considered Tūāpapa Rangahau's current PBRF forecasting for 2018, and in light of the aforementioned changes and the heightened uncertainty following staffing changes, it was agreed to lower the PBRF target to 30% of eligible staff. That is, Unitec was aspiring to see 30% of its eligible staff achieve a funded PBRF ranking for this 2018 Quality Evaluation Round.

Despite the challenges and in actual fact, we exceeded this target of 30% by 14 percentage points. Table 1 shows the details of the success data over the last four PBRF rounds.

Year	**2018**	**2012**	**2006**	**2003**
Number of PBRF eligible staff	281	393	419	371
Number of Evidence Portfolios submitted	128	183	113	121
Number of Evidence Portfolios achieving funded ratings	124	131	98	82
Percentage of eligible staff who submitted Evidence Portfolios	46%	47%	27%	33%
Percentage of eligible staff who submitted Evidence Portfolio and were awarded funded ratings	44%	33%	23%	22%
Success Rate (Percentage of staff who submitted an Evidence Portfolio and received a funded rating)	97%	72%	87%	68%

Table 2: PBRF success data for the last four PBRF rounds

In 2012 Quality Evaluation Round, 12% of the staff who achieved a PBRF ranking were 'New and Emerging' researchers. The PBRF defines 'New and Emerging' staff as someone who became research active for the first time within the 6 years leading up to the PBRF assessment.

In the 2018 Quality Evaluation Round Unitec was seeking to grow that figure by 5%. That is, Unitec had a new target that 17% of the staff who achieve a PBRF ranking will be 'New and Emerging'. The 2018 figure was 14% and this was 3 percentage points less than our target of 17%. Thus it could be said that new appointments of academic staff has not brought the proportion of 'New and Emerging' research active staff up to the level aimed for in 2018.

It could be concluded that these outcomes are the result of the improvement of the quality of research at Unitec, a more thorough and strategic approach to preparing for the submission process and improved recruitment protocols for degree programmes which explicitly address research capability.

4.2 Quality Categories

Quality Categories are awarded to each PBRF-eligible staffs' Evidence Portfolio. Quality Categories A, B, C and C(NE) are funded proportionally and are reported by the TEC. Quality Categories R and R(NE) are not funded and are not reported. Table 3 below shows the Quality Categories, its description and funding weight.

Quality Category	Description	Can be awarded to:	Funding Weight
A	→ expected to contain evidence of research outputs of a world-class standard → research-related activity that shows a high level of peer recognition and esteem within the relevant research subject area → indicates a significant contribution to the New Zealand and/or international research environments → may also show evidence of other significant demonstrable impact.	the EPs of all PBRF-eligible staff members including new and emerging.	5
B	→ expected to contain evidence of research outputs of a high quality → research-related activity that shows acquired recognition by peers for their research at least at a national level → indicates a contribution to the research environment beyond their institution, and/or significant contribution within their institution → may also show evidence of other significant demonstrable impact.	the EPs of all PBRF-eligible staff members including new and emerging	3

C	→ expected to contain evidence of quality-assured research outputs → research-related activity that shows some peer recognition for their research → indicates contribution to the research environment within their institution or the wider community during the assessment period.	the EPs of all PBRF-eligible staff members except new and emerging.	1
C(NE)	→ expected to contain evidence of quality-assured research outputs produced during the assessment period → may have limited or no research-related activity in the research contribution component.	the EPs of new and emerging researchers only.	2
R	→ does not demonstrate the quality standard required for a C Quality Category or higher.	the EPs of all PBRF-eligible staff members except new and emerging.	0
R(NE)	→ does not demonstrate the quality standard required for a C(NE) Quality Category or higher.	to the EPs of new and emerging researchers only.	0

Table 3: Description of quality categories

4.3 Unitec's Results by Quality Categories

Table 4 shows the Quality Categories awarded to EPs submitted by Unitec in the PBRF 2018 Quality Evaluation Round and the prior 3 rounds.

Quality Category	2018 (FTE)	2012 (FTE)	2006(FTE)	2003(FTE)
A	5	1.6	1.6	1
B	23.77	23.8	26.26	20.9
C	70.44	75.07	70.1	54.8
C(NE)	16.4	14.3	25.64	0
Total	**115.61**	**114.77**	**123.6**	**76.7**

Table 4: Unitec results by Quality Category

Over the four PBRF Quality Evaluation rounds, this is the first time Unitec was awarded such a high number of the A Quality Category. The distribution of the B rated Quality Category are very similar to the 2012 round. The distribution of the C and C(NE) grades for the 2018 and 2012 rounds are also very similar.

In the 2018 PBRF Quality Evaluation Round Unitec submitted 26% (42.33 FTE) less EPs when compared with 2012 data. This was due to the various re-structures and academics moving on from Unitec over the period 2014 to 2017. Despite this, Unitec performed very well in 2018 when compared to 2012. In 2018, 97% of Unitec's EPs received a fundable rating while in 2012 only 71% received a fundable rating. This clearly indicates that even though we were smaller in 2018 when compared to 2012, we did better. Table 5 shows the details relating to the numbers described above.

EPs and Quality Category Details	**2018 FTE**	**2012 FTE**	**2018 Percent**	**2012 Percent**
Submitted Evidence Portfolio	119.01	161.34		
Fundable Quality Categories awarded (A, B, C and C(NE))	115.61	114.77	97%	71%
Non-Fundable Quality Categories awarded (R and R(NE))	3.4	46.57	3%	29%

Table 5: EPs and Quality Category details

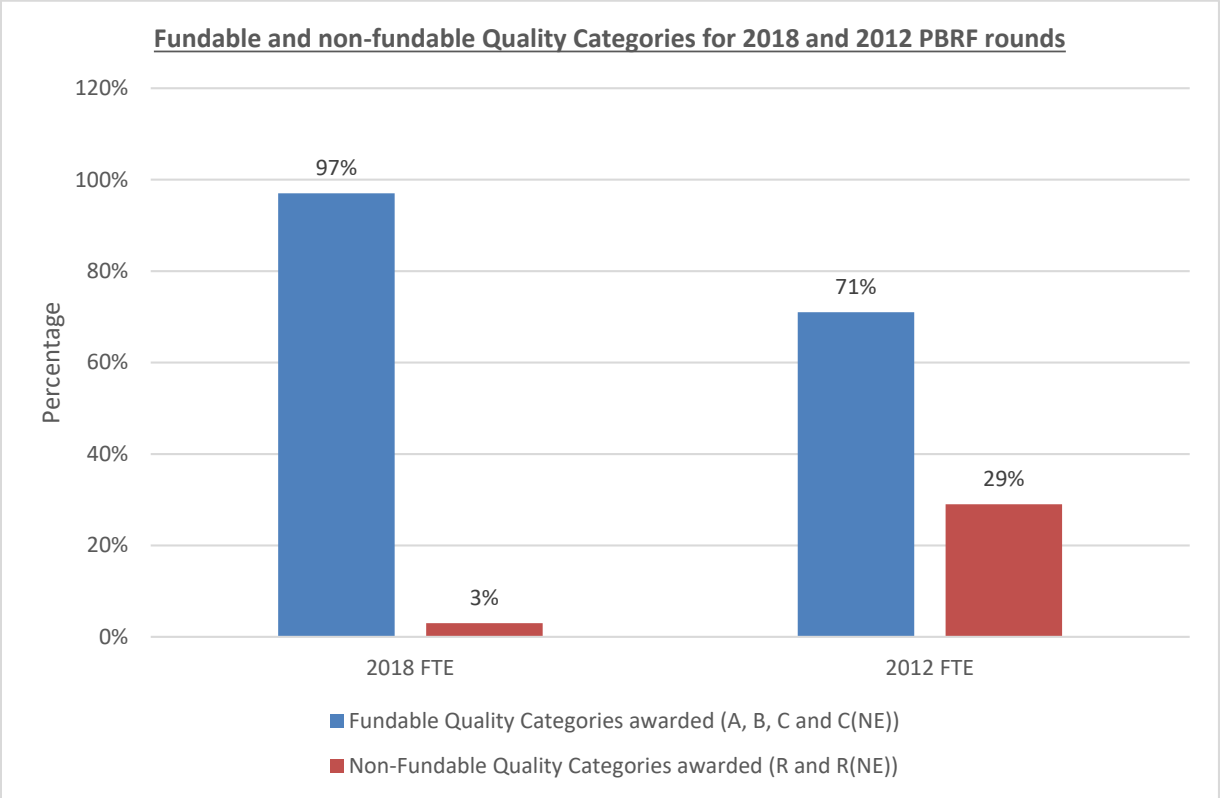

Figure 1: Fundable and non-fundable Quality Categories for 2018 and 2012 PBRF rounds

4.4 Unitec's Result by School

The Unitec's School level data is relatively arbitrary. Unitec Schools did not exist in 2018 coming into effect from the beginning of 2019. Based on the Network and Pathway the researchers belonged to, when they submitted their Evidence Portfolios, we have recoded the Pathway/Network data to School level data. Also note that some of the researchers who had submitted their Evidence Portfolio have left Unitec. They are included in the data below, because their success remains a benefit to Unitec.

Table 6 shows the 2018 PBRF results at School level for Unitec.

School	Quality Category						Total for each School
	A	B	C	C(NE)	R	R(NE)	
School of Applied Business	1	4	6	2	0	0	**13**
School of Architecture	1	4	13	3	0	0	**21**
School of Bridgepoint	1	0	4	1	0	0	**6**
School of Building Construction	0	0	6	1	1	0	**8**
School of Community Studies	0	0	5	1	0	0	**6**
School of Computing & Information Technology	0	3	8	1	0	0	**12**
School of Creative Industries	1	3	8	0	0	0	**12**
School of Engineering & Applied Technology	0	2	5	2	0	1	**10**
School of Environmental & Animal Sciences	1	4	4	3	0	0	**12**
School of Healthcare & Social Practice	0	1	8	3	2	0	**14**
School of Trades & Services	0	0	1	0	0	0	**1**
Other	0	5	7	1	0	0	**13**
Total for each Quality Category	**5**	**26**	**75**	**18**	**3**	**1**	**128**

Table 6: 2018 PBRF results by Unitec Schools (Headcounts and not FTE)

4.5 Unitec ranking compared with the other ITPs

Table 7 shows the the ranking of Unitec when compared with the 14 other ITS that participated. Unitec maintained its top position over the last four rounds with Otago Polytechnic being second over the last three rounds.

ITP	2018	2012	2006	2003
6004 - Unitec New Zealand	115.61	114.77	123.6	76.7
6013 - Otago Polytechnic	60.36	51.39	33.24	0
6019 - Waikato Institute of Technology	47.7	22.15	26.06	17.5
6006 - Ara Institute of Canterbury	40.31	32.65	26.8	0
6007 - Eastern Institute of Technology	33.8	29.71	9.8	0
6025 - Toi Ohomai Institute of Technology	26.63	0	0	0
6014 - Whitireia Community Polytechnic	26.11	12.9	5.1	0
6010 - Manukau Institute of Technology	22.94	24.35	28.5	0
6008 - Wellington Institute of Technology	14.57	7.91	0	0

6022 - Open Polytechnic	13.23	14.7	14.7	0
6011 - Nelson Marlborough Institute of Technology	11.92	0	6.74	0
6009 - Universal College of Learning	11.5	0	0	0
6012 - North Tec	4.3	6.35	2.64	0
6017 - Western Institute of Technology Taranaki	2.54	0	0	0

Table 7: 2003-2018 Quality Category ranking for the ITP Sector

4.6 Unitec's Ranking compared with the other TEOs

Unitec ranked in 9th position out of 36 TEOs that participated in the 2018. In 2012, Unitec was ranked 9th out of the 27 TEOs that participated. There are 8 universities in New Zealand and and they are generally "research led" with much more resourcing for research and large postgraduate programmes. The design of PBRF is significantly influenced by and mostly advantages, the universities. The successes achieved by the ITPs and other TEOs needs to be seen in this context.

TEO	Total quality categories (2018)	Total quality categories (2012)
7001 - University of Auckland	1,744.17	1,556.05
7007 - University of Otago	1,357.65	1,168.24
7003 - Massey University	1,014.59	919.62
7004 - Victoria University of Wellington	864.57	641.54
7008 - Auckland University of Technology	689.23	429.47
7005 - University of Canterbury	596.46	617.26
7002 - University of Waikato	428.47	440.63
7006 - Lincoln University	176.53	174.10
6004 - Unitec New Zealand	115.61	114.77
6013 - Otago Polytechnic	60.36	51.39
6019 - Waikato Institute of Technology	47.7	22.15
6006 - Ara Institute of Canterbury	40.31	32.65
6007 - Eastern Institute of Technology	33.8	29.71
6025 - Toi Ohomai Institute of Technology	26.63	0.00
6014 - Whitireia Community Polytechnic	26.11	12.90
6010 - Manukau Institute of Technology	22.94	24.35
9386 - Te Whare Wānanga O Awanuiārangi	18.33	11.00
8630 - Te Wānanga O Aotearoa	18	0.00
6008 - Wellington Institute of Technology	14.57	7.91
8509 - Whitecliffe College of Arts and Design	13.74	11.49
6022 - Open Polytechnic	13.23	14.70
6011 - Nelson Marlborough Inst of Technology	11.92	0.00
6009 - Universal College of Learning	11.5	0.00
8563 - Laidlaw College Incorporated	8.18	6.40
8530 - Auckland Institute of Studies	8	5.00
8192 - Media Design School	8	0.00
8979 - Carey Baptist College	6.8	5.50
8396 - New Zealand College of Chiropractic	6.65	2.00
8694 - Bethlehem Tertiary Institute	5	3.00

8717 - Good Shepherd College - Te Hepara Pai	5	2.00
8550 - IPU New Zealand	4.31	0.00
6012 - North Tec	4.3	6.35
6017 - Western Institute of Technology Taranaki	2.54	0.00
7548 - ICL Business School	2.2	0.00
8619 - New Zealand Tertiary College	1	3.00

Table 8: Quality Category ranking for the TEO Sector

5 Funding

The indicative 2019 funding allocations based on the PBRF 2018 Quality Evaluation Round has been calculated by TEC. The Universities sunbsector takes 95.7%, Unitec takes 1.05% and the remaining ITPs, PTEs and wananga take 3.3% out of the $315 million PBRF fund for 2019. Based on these, Unitec's 2019 indicative PBRF funding will be as follows:

PBRF Funding Component	**Ratio**	**Funding Value**
Quality Evaluation	1.05%	$1,826,381.05
External Research Income	0.18%	$111,894.20
Research Degree Completions	1.67%	$1,318,919.71
Total		**$3,257,195.00**

Table 9: Unitec's 2019 indictative funding based on 2018 PBRF results

These numbers will be finalised after the complaints process concludes later in 2019.

The funding from the Quality Evaluation is expected to decrease by $314,457.3 based on the 2019 indicative funding ($2,140,838.35) released by TEC, at the beginning of 2019, prior to the release of PBRF results. However, this is compensated overall by a very significant increase of external research funding in the evaluation period and a current peak in RDC funding. This latter will decline as the impacts of Level 9&10 programmes which are no longer taking students, kicks in.

6 Implications for Unitec

The results of this assessment show that Unitec has managed to maintain its position in the ITP sector. By virtue of size Unitec maintains a significant proportion of the non-university PBRF funding (1.05% out of 4.3%). There will however be a funding drop from the 2012 round, due to loss of rated staff, and the fact that more participating TEOs will be drawing from a resource that remains static.

Unitec Research Annual Report 2018

Prepared by

Tūāpapa Rangahau, partnering research & enterprise

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1 Preface

In 2018 Unitec arguably experienced one of the most difficult years in its history. Internal operating budgets were reduced, many research-active staff were disestablished, a number of postgraduate programmes were cut and the freeze on most travel meant research conference attendance was severely curtailed. The early External Evaluation and Review (EER) and the Government's announcement of the Review of Vocational Education (RoVE) posed further challenges, both to staff time and morale. The extraordinary achievements of Unitec's researchers and support staff in 2018 therefore need to be viewed within this context.

In this document we report against the drivers and targets in Unitec's current Research and Enterprise Strategy (2015-2020). The strategy responds to a government directive that the tertiary education sector achieves greater connectivity and responsiveness to industry. It challenges us to forge a deliberate and unique place for Unitec in applied and impactful research for the benefit of iwi, community and business.

Our three strategic drivers are:

1. To improve the quality of our research through staff **capability development** so that staff are equipped to undertake impactful research and enterprise activities.

2. To **increase external engagement** by building more and deeper research relationships with industry to improve the relevance of our research and achieve greater transfer of knowledge, ideas and expertise to industry and wider society.

3. To create **greater strategic focus** to our research, so Unitec gains a competitive reputation in specific areas of research and enterprise.

To respond to these strategic drivers, in 2018 we focused on four research targets:

- **Industry Funded Projects** (research and enterprise projects Unitec is receiving funding for, where the organisation is private sector or public sector and where the services Unitec is providing is applied contract research or consultancy).

- **External Research Income (ERI)** (income received from external sources for research purposes).

- **Research Productivity** (most staff teaching on degree level programmes at Unitec are engaged in research).

- **Quality Assured Research Outputs** (research publications and creative outputs that have been through a peer reviewed process or have been specifically commissioned).

Despite the aforementioned challenges, Unitec research performed extremely well. The continued dedication of Tūāpapa Rangahau staff, Research Leaders, Principal Investigators and committed research staff ensured it was a year of many successes for Unitec. Here are some highlights, which are reported more fully in the body of the report below:

- Unitec topped the ITP sector in the **2018 Performance Based Research Fund (PBRF) Quality Evaluation**. We were the only ITP to win over 1% of the available funds (approximately $3.3 million). We also exceeded the target (30%) to grow the number of PBRF rated staff from the 2012 round to the 2018 round by 14%.

- Unitec recruited one of New Zealand's top kaupapa Māori researchers, Professor Jenny Lee-Morgan, who established Unitec's **Ngā Wai a Te Tūī, Māori & Indigenous Research Centre**.

- The number of programmes meeting the **Research Productivity Traffic Light** (RPTL), which measures the engagement of staff teaching on degree programmes in research, increased by 11%.

- ERI has increased by 280% since 2014. Tūāpapa Rangahau is now managing 76 external grants with a combined contract value of more than **$4.1 million.**

The end of 2018 saw the Unitec Research Committee beginning the process of developing the next five-year Unitec Research Strategy (2020-2024). The new strategy will need to be cognisant of the new Tertiary Education Strategy and the RoVE, and will need to set new targets and drivers to position Unitec, in the minds of industry in particular, as New Zealand's applied research provider of choice.

Associate Professor Marcus Williams
Director Tūāpapa Rangahau, partnering research and enterprise

2 Building staff capability in research

Unitec needs 'engaged and inspired staff' who have the capability and expertise to address and respond to a wide range of social, industrial and environmental challenges. Capable staff foster the development of 'highly employable life-long learners' that will contribute to a 'highly skilled, innovative and enterprising New Zealand workforce'.

In 2018, Tūāpapa Rangahau continued to prioritise raising the capability of Unitec staff, particularly those teaching on degree-level programmes, to undertake research, disseminate their research findings and attract external research and development funding to progress their initiatives.

Unitec researchers are at various stages in their research careers, therefore capability development initiatives were tailored to Unitec staff according to whether they were new and emerging (beginner), early career (well published, intermediate) or advanced (senior leader, professoriate) researchers. The capability development initiatives were also targeted to respond to the requirement to lift Unitec's research productivity (as measured by the Research Productivity Traffic Light (RPTL)) and the quality of research evidence portfolios submitted to the 2018 Performance Based Research Fund Quality Evaluation.

2.1 Developing our staff - Research professional development series

Tūāpapa Rangahau's professional development series was founded in 2016 to improve the level of staff research capability, to encourage and assist staff to disseminate the results of their research and to link staff to industry partnered opportunities. Figure 1 shows the numbers of staff who enrolled in research workshops and writing retreats in 2018. As in the past, uptake in 2018 indicates high levels of staff engagement across the Institute.

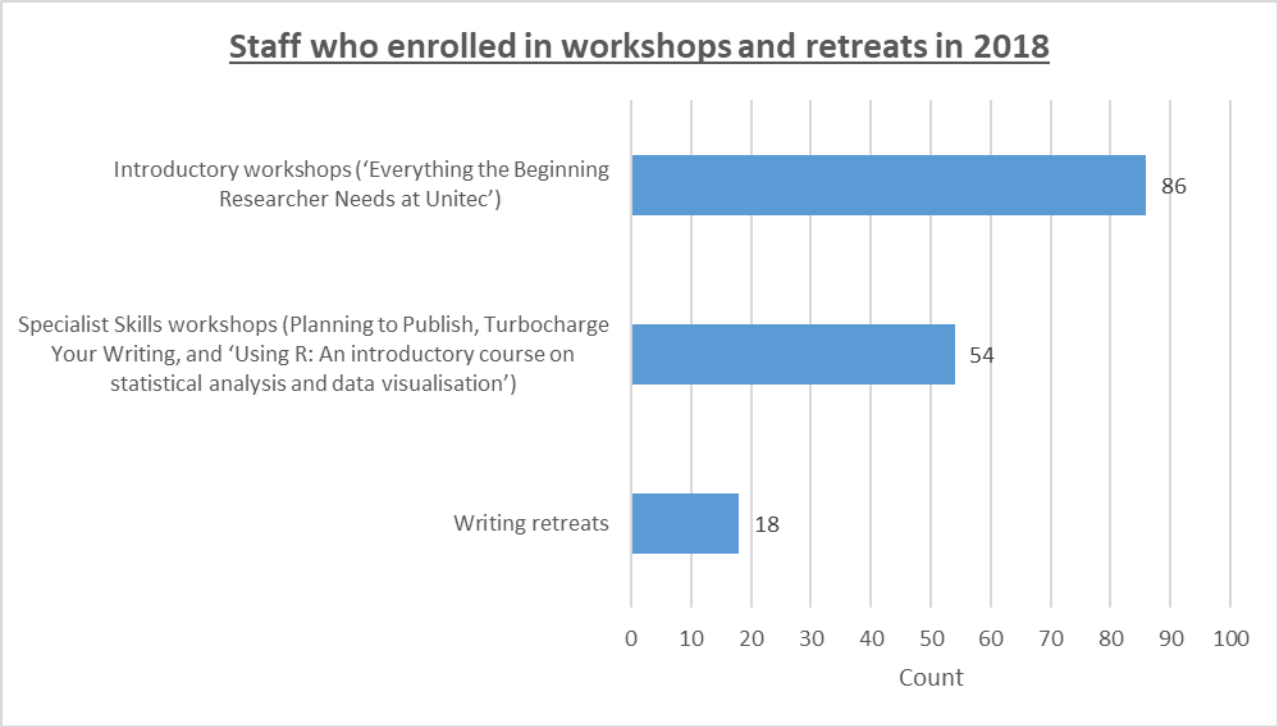


Figure 1: Staff enrolments in research professional development series in 2018

At the start of 2018, staff enthusiasm about engaging in research was apparent when the workshop 'Everything the Beginning Researcher Needs at Unitec' quickly reached maximum capacity and developed a long waitlist. Tūāpapa Rangahau responded to the demand by scheduling an additional two sessions on short notice in February. In total 86 staff enrolled in the workshop.

Writing retreats are relatively inexpensive opportunities for staff members (upon application and selection) to devote dedicated time and energy to producing research outputs in a supportive and collegial yet intensive environment. Early indications are that specialist skills workshops on writing and publishing, alongside the writing retreats and a new offering on 'Using R: An introductory course on statistical analysis and data visualisation', led to increased levels of research activity and output dissemination. These events also served to lift staff morale and inspired greater confidence that research is supported and valued at Unitec.

Figure 2 shows the number of staff who enrolled in the specialist skills workshops.

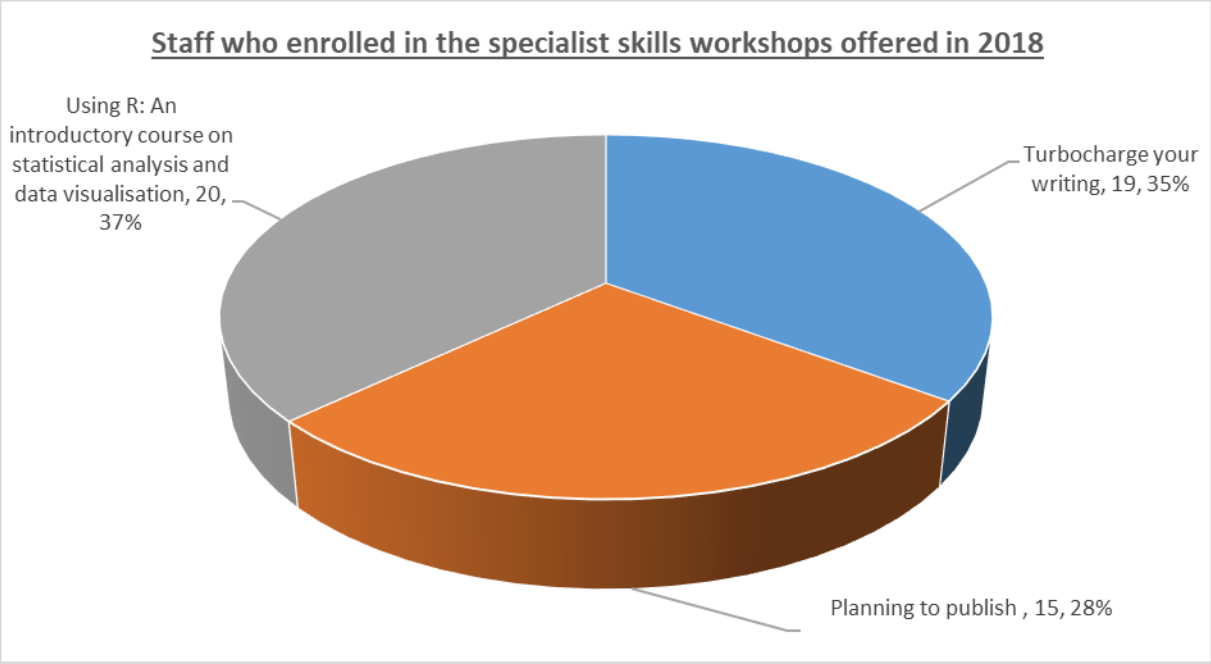


Figure 2: Staff enrolment in specialist skills workshops offered in 2018

Unitec's PhD Leaders Programme was launched in 2018. Facilitated by the Research Professional Development Liaison, this programme provided research leadership training and 0.2 FTE additional research time for staff members pursuing an industry/community-engaged PhD. In 2018 we had four staff members participating in this programme in four different disciplines. Feedback from participants showed the benefits of the programme were:

- increased confidence in research and research leadership capabilities;
- mutual learnings across disciplinary boundaries;
- research engagement extending beyond specialist fields of study; and
- supporting others' research.

Twenty-three staff members completed the Successful Postgraduate Supervision course (compared with 15 in 2017). The course is very highly regarded and serves as a permanent resource for postgraduate supervision practice.

Other courses 'Writing a Successful Grant Application' (blended course: 15 participants) and 'Managing a Research Contract' (online course: 10 participants) were also popular. In 2018, it was a requirement for recipients of grants from Unitec's Senior Researcher Fund and Early Career Researcher Project Fund to complete one or both of these courses in an effort to grow staff capability in seeking and managing grants. Notably, upon learning about these courses, research leaders within other New Zealand ITPs expressed an interest in offering them to staff members at their institutions, and subsequently the courses were shared with the Eastern Institute of Technology, Otago Polytechnic, and Nelson Marlborough Institute of Technology.

Evaluation data for the 2018 Research Professional Development series reveal very positive reception and benefits. For example, 93% of respondents rated the workshop 'Using R: An introductory course on statistical analysis and data visualisation' either four or five out of five.

The following quotes are representative of most participants' experiences of the writing retreats offered in 2018:

- *"The space was perfect for me, the ability to have my own time… as needed and a quiet focused writing room where others were working quietly helped me to stay focused. The shared meal times were great for connecting in with others and networking."*
- *"Always a great opportunity to not only progress personal or collaborative research efforts but also to meet and get alongside other Unitec staffers/researchers, without the distractions of campus meetings, corridor interrupters etc."*

2.2 Supporting our researchers – internally funded research projects

Until 2018, Unitec had two annual contestable funding rounds for staff-initiated research projects: The Senior Researcher Fund (SRF) and the Early Career Researcher Fund (ECR). Applications for ECR and SRF funding are appraised by a Grants Assessment Committee, a sub-committee of the Unitec Research Committee.

Other contestable funding rounds are offered on a case-by-case basis. These are the New Researcher Project Start-up Fund (NRPSF) and the Research Development Plan Fund. Successful applicants to these funds are required to report at least twice to Tūāpapa Rangahau on the progress, challenges and highlights of their research projects. In addition to being the 'funder', Tūāpapa Rangahau also provides project and administrative support to the Lead Researchers to ensure they are well-placed to successfully deliver their projects.

In 2018, four SRF projects were awarded contestable funding totalling $54,949 and six ECR projects were awarded contestable funding totalling $44,500.

The NRPSF provides a small budget to support new researchers to team up with an experienced researcher to undertake a research project. The fund provides a pathway for these new researchers to become research active and to contribute to their School's Research Productivity Traffic Light results. Two project teams were awarded NRPSF funding in 2018, totalling $5,337. The 2018 awardees are listed in Tables 1, 2 and 3 below, along with selected highlights from some of the funded projects.

2.2.1 Senior Researcher Fund (SRF)

Until 2018, the SRF contestable round sought to make strategic investments in Unitec's best research by providing an opportunity for senior/advanced researchers at Unitec to find support for their research. Successful SRF projects demonstrate strong academic rigor, meaningful external partnership, opportunities for external funding and the potential to impact our communities, industry and iwi.

Lead Researcher	Practice Pathway (2018 name)	Project name
Glen Aguilar	Environmental and Animal Sciences	The use of DNA barcoding to characterise marine food webs: using apex seabird predators as a sampling vehicle
Iman Ardekani	Computer Science	Active Noise Control Technology for Unmanned Aircraft Vehicles (UAVs) Used for Filming
Melanie Ooi	Engineering	Spectral-Based NIR Vision Inspection of Natural Products
Hamid Sharifzadeh	Computer Science	Predicting Wear Patterns on Footwear Outsoles

Table 1: 2018 Senior Researcher Fund projects awarded

Highlights from these SRF projects are:

- **Glen Aguilar** used a drone to acquire images to construct high resolution maps of areas in Northland that are undergoing ecological restoration due to issues including invasive plant species and kauri dieback. Results were presented at three different hui to stakeholder community groups, iwi and hapū, to the 2018 NZ ESRI User Group Conference and at the 2018 Unitec Research Symposium, where the project won the Research with Impact Award. The next phase of the project is its expansion to other areas of Northland.

- **Iman Ardekani** created a novel algorithm and engineering prototype to reduce the propeller noise that drones create when they fly. By suppressing the unwanted sound, drones can be used to film not only images but also audio from the ground. With support from Tūāpapa Rangahau industry partnering discussions are underway.

- A new imaging technique was developed by **Melanie Ooi** and her research team that can potentially improve the measurement, identification and classification of common weed species in pastures. This technique may lead to the development of a more efficient and sustainable pastoral industry in New Zealand and a strengthening of the New Zealand agricultural and agricultural technology sectors.

- Shoeprints found at crime scenes can be used to link a suspect to a crime, however, the soles of shoes wear over time. A computational approach to modelling the wear patterns of footwear, by applying machine learning models, is being developed that can help link crime scene shoe print images to shoes that have undergone wear over time. **Hamid Sharifzadeh** begun this research after partnering with ESR (the Institute of Environmental Science and Research) and is a great example of a successful industry collaboration that is helping to solve real world problems.

2.2.2 Early Career Researcher Fund (ECR)

The ECR contestable funding round supports both emerging and established early career researchers at Unitec, in order to develop their capability, capacity and career progression.

Lead Researcher	Practice Pathway (2018 Name)	Project name
Mary Yan	Health and Community	Development of a healthier commercially viable snack product in collaboration with GMP Ltd
Paul Woodruffe	Creative Industries	Piki Project
Guillermo Ramirez-Prado and Aziz Ahmad	Computer Science and Engineering	Implementation of Model Predictive Controller for solar water heating based on solar and energy consumption forecasts
Andrew Veale	Environmental & Animal Sciences	New Zealand reptile conservation genomics
Judy Nicholson	Environmental & Animal Sciences	Do these food grade, non-abrasive dental products favour protective microbiomes in oral ecosystems while preventing the establishment of pathogenic ones?
Victor Grbic	Creative Industries	Te Rua Digital Repository

Table 2: 2018 Early Career Researcher Fund projects awarded

Whilst several of these ECR projects are still underway, a few 2018 highlights to date are:

- A multi-disciplinary team that includes researchers from AUT aims to research and develop a novel, solar water heating control system. When successfully tested and implemented, the proposed controller for domestic solar water heating will significantly reduce electricity bills for the New Zealand households and

will help achieve GHG emission goals. The proposed research has the potential to generate new intellectual property.

- **Paul Woodruffe** partnered with Lifewise Trust, Datacom and Heart of the City on the Piki project, a multiyear project aiming to address the results of homelessness on individuals. The project was conceived as a way to replace "Hustling" on the streets of central Auckland by facilitating entrepreneurship for people with lived experience of homelessness. The next step will be investigating how technology can be leveraged to replace hustling with trading.

- There has been a rise in consumer demand for healthier snack food options to replace highly processed snacks. **Mary Yan** partnered with industry partner GMP Ltd to research and develop a healthier snack food product. The first phase of the project, funded in 2018, has resulted in the development of a prototype that has a lower glycaemic index and favourable satiety effects compared with two commercial snack products. This research has been disseminated at two conferences and funding this first stage of the project has enabled Dr Yan to move onto the next phase of the project which will investigate glycaemia and insulin profiles in normal human participants with external funding the next goal.

- **Judy Nicholson**'s research team, in collaboration with Dr Hisham Abdulla from the Laser LifeCARE^{TM} Institute, endeavoured to evaluate the ability of a novel system of food-grade oral care products against conventional toothpaste and mouthwash in developing a healthy oral environment composed of known protective microorganisms. This research has the potential to support the transformation of clinical approaches to oral health and infectious diseases.

2.2.3 New Researcher Project Start-up Fund (NRPSF)

The NRPSF is targeted to support research projects with strong mentor-mentee relationships and goals. The following projects were funded in 2018:

Lead Researcher	Practice Pathway (2018 Name)	Project name
Kris Descovich	Environmental & Animal Sciences	Identification of infectious canine diseases in the Pacific.
Patrick Dodd	Business Practice	Student learning experiences as they interact with authentic assessments

Table 3: 2018 New Researcher Project Start-up Fund projects awarded

New Researcher Start up Fund highlights:

- **Kris Descovich** was awarded $4,587 for research into the identification of infectious canine diseases in the Pacific which have potential impact on the local population if present. This seed funding allowed the project leader and two other new researchers to further develop their research capabilities, under the guidance of senior researchers. It also enabled them to progress towards an independent larger research project.

- **Patrick Dodd's** project aimed to investigate the efficacy of assessments in student learning and engagement. This project, that was awarded $1,750, is an example of how the fund is used to support researchers from red lit programmes to become research engaged, to support staff collaboration on research that results in outputs for multiple staff, and that provides an opportunity for staff to develop their research leadership capabilities.

2.3 Focusing on research productivity – research outputs

Research outputs have been a key measure of Unitec's research performance for some time, which enables longitudinal data to be reported. Research outputs are how researchers contribute to the store and accumulation of human knowledge. They include articles, books, conference papers, and less traditional forms of research dissemination such as patents, websites, films, exhibitions, reports for industry, government etc.

This year's annual target, as outlined in Unitec's 2018 Annual Report to the Tertiary Education Commission, was to produce 448 quality assured[1] outputs. As demonstrated in the results that follow, we did not meet our annual target for this measure. The 2018 figures are indicative only because staff have not yet fully reported their outputs. We expect the final figures to increase in 2019.

2.3.1 Total Unitec research outputs

A total of 501 research outputs were delivered in 2018. Some 386 (77%) were quality assured (QA) and the remaining 115 (23%) were not quality assured (non-QA). Figure 3 shows the overall count, which is lower than 2017. As discussed above, the 2018 numbers are indicative only. The freeze on research related travel in 2018 had some impact on outputs as many staff could not attend conferences to disseminate their research. In 2018, Unitec's focus was on building portfolios for the 2018 Performance Based Research Fund (PBRF) Quality Evaluation submission deadline. As a result of this, there was a significant increase in the 2017 and prior years' figures as staff completed and recorded outputs for this process. There is usually a drop in research output numbers in the year following the PBRF period, this being an established pattern.

Recording research outputs is a retrospective process because staff continue to add research outputs to Unitec's research output management system (ROMS) each year. As new staff publish, they also add their research activity for previous years. These retrospective additions mean that the research outputs for each year continue to rise.

There was a large effort by PBRF eligible staff to improve Unitec's entry into the 2018 PBRF assessment and this mobilised a large cohort of staff to update their outputs. The increase in outputs will be progressive throughout 2014-2017 culminating in the true figure in the 2018-2019 reports.

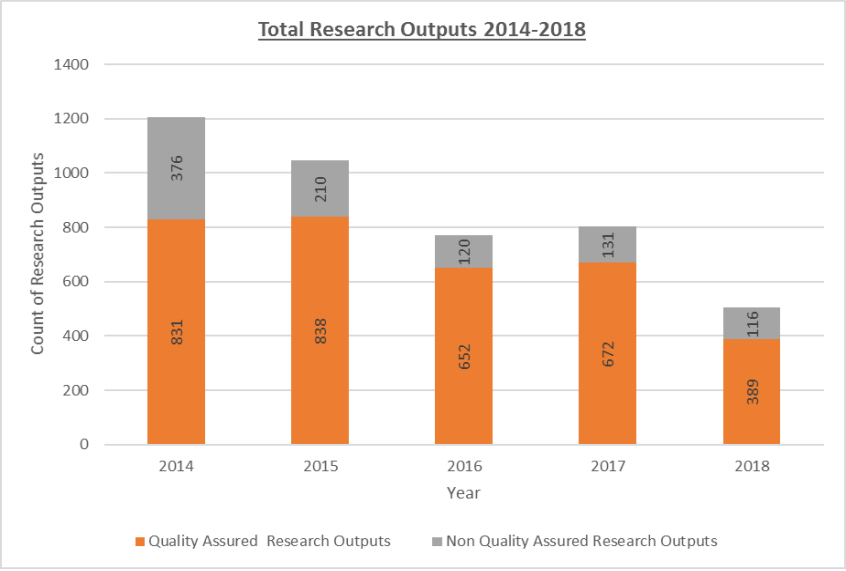


Figure 3: Quality and non-quality assured research outputs

[1] Quality assurance means that the research output has undergone a peer review process before publication and assures the consumer of the research of its veracity.

The number of QA research outputs as a percentage of total outputs produced annually has grown significantly over the last few years until 2017 and then dropped in 2018, see Figure 4. This may partly be due to an increase in research activity that tends to occur towards the end of a PBRF cycle (2017 is the last year for research publication for this PBRF round).

Figure 4: Quality assured research output growth

2.3.2 Research outputs by School

Unitec structure had Pathways until end of 2018 and from the beginning of 2019 a new School structure came into effect. We recoded to Pathway level data to School level so that the data could be looked at into the current context. Figure 5 illustrates the total QA and non-QA research outputs produced by each School in 2018. The category "other" represents research outputs from Academic Development and Te Miro.

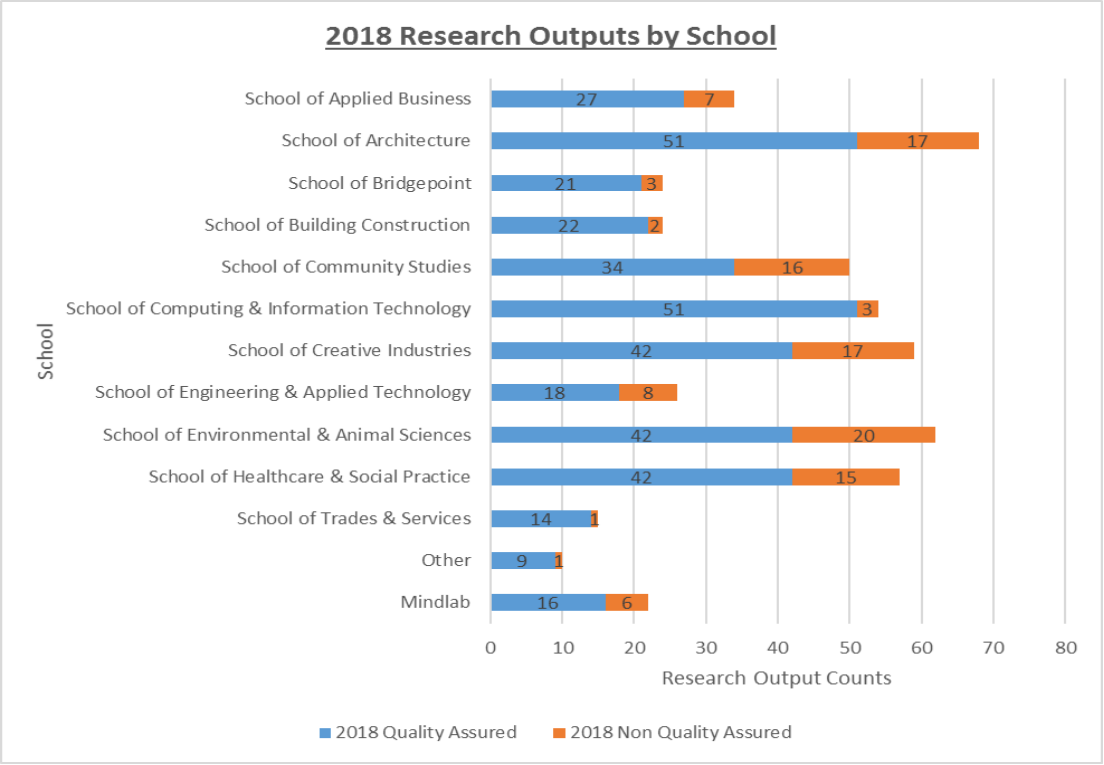


Figure 5: 2018 QA and non-QA research outputs by School

Whilst it is acknowledged that not all 2018 research outputs were included in ROMS at the time of this report, the current results show a high degree of variability in research output productivity across the Schools. However, these total counts need to also be seen in context of the total research active FTE within each School. Table 4 shows the number of QA research outputs achieved per research active FTE within each School.

School	**QA outputs per research active FTE in 2018**
School of Computing & Information Technology	3.72
School of Environmental & Animal Sciences	2.70
School of Building Construction	2.25
School of Architecture	2.04
School of Creative Industries	1.81
School of Healthcare & Social Practice	1.38
School of Community Studies	1.06
School of Applied Business	0.98
School of Engineering & Applied Technology	0.46
Other	0.57

Table 4: QA research outputs per research active FTE in 2018

In 2018 Unitec produced an institutional average of 1.7 QA research outputs per research active FTE. The target[2] for 2018 was 2.4 QA research outputs per research active FTE. The School of Computing & Information Technology and

[2] This target was set as part of the Enabling Strategies process.

the School of Environmental & Animal Sciences were the clear front runners, demonstrating high QA research output performance in 2018 by producing 3.72 and 2.7 QA outputs per FTE respectively. The School of Building Construction, the School of Architecture and the School of Creative Industries also achieved above average QA research output results relative to FTE.

2.3.3 Research dissemination support to Schools

Disseminating research through attendance and presentations at academic conferences is an important and necessary part of academic careers. This provides opportunities to generate peer reviewed research outputs (a measure of an academic's productivity), to provide staff professional development and networking opportunities, and to gain the latest knowledge and advances regarding a specific discipline. Unitec provides the Research Dissemination Fund, managed by Tūāpapa Rangahau, to support academic staff in the dissemination of new knowledge at conferences, promotion of Unitec research, and increase in external recognition.

A total of $191,000 was available across Unitec's Schools to support research dissemination but not all of this was spent due to travel restrictions. Early figures suggest that the freeze on travel in 2018 had an impact on quality assured research outputs, but due to the ingenuity of staff and the support of Research Partners, this was minimised in the short term. Submitting multiple papers with one presenter, presenting papers on skype and papers presented at conferences for publication in proceedings only, are a few examples. While retaining this economy of practice is desirable, a sustainable resourcing model for research dissemination, which ultimately builds the foundations for the 2024 PBRF submission, is essential. A sub-total of $70,000 was used to support 60 individuals to disseminate their research (averaging $1,167 per person). Some travel occurred, with 26 presenting at New Zealand conferences and 34 presenting at international conferences. The remaining monies were used to assist with writing or publishing research work.

In addition to Unitec funding, seven staff were partially or fully funded by external organisations to disseminate their research outputs, providing a strong indication of the quality and relevance of their research.

2.3.4 Professoriate

Ko te amorangi ki mua, ko te hāpai ō ki muri.

The leader is in front and the food bearers behind.

The professoriate are researchers who have gained national and international recognition and have reputations as leaders in their disciplines. The goal for the Unitec professoriate is to share their knowledge, skills, time, passion, listening ear and selves with colleagues, students, and industry stakeholders for the better of society. The professoriate advocate for their disciplines by collaborating, presenting, engaging in public and building teams across the organisation to catalyse research potential at Unitec. Supervising new and emerging researchers is a key part of the professoriate's mission.

The professoriate run the Unitec Professorial Research Mentoring Framework which involves every member mentoring an emerging researcher through to co-authorship in a recognised publication, or supporting researchers to be the lead on their own paper. This framework continues to contribute to the overall aim that every degree programme will be green lit (research engaged) by 2020.

Members of the professoriate show leadership across many aspects of the institute. Some examples are:

Deputy Chair of our Health Research Council-accredited research ethics committee	A/P Nigel Adams
Director, Ngā Wai a te Tūī, Māori & Indigenous Research Centre	Prof Jenny Lee-Morgan
Director, High Tech Transdisciplinary Network	Prof Christian Probst
Leader, Applied Molecular Solutions research focus	A/P Dan Blanchon

Executive Editor, Unitec ePress	A/P Evangelia Papoutsaki
Director Research and Enterprise	A/P Marcus Williams
Professional Development Liaison	A/P Helen Gremillion
Practice Pathway (now School) Research Leaders	A/P Linda Kestle A/P Leon Tan A/P Jonathan Leaver A/P Lian Wu A/P Christian Schnoor

In addition, members of the professoriate commonly serve as Principal Supervisors on postgraduate research degrees and as Principal Investigators on externally funded research projects.

In 2018, professoriate members Jonathan Leaver, Hayo Reinders, Christoph Schnoor and Evangelia Papoutsaki, and Senior Lecturer/Academic Leader James Prescott were invited by the Tertiary Education Commission to act as panel reviewers for the 2018 PBRF Quality Evaluation. It was the largest number of Unitec staff selected since the PBRF began in 2003 and were competitive, and prestigious appointments.

2.4 Research Productivity Traffic Light (RPTL)

In order to monitor the extent to which degree programme teaching and supervision is underpinned by research activity, a NZQA requirement, Unitec's Academic Board approved the use of the Research Productivity Traffic Light (RPTL) Report. This report was first presented to the Academic Board in 2012 and has been produced annually since then.

The traffic light applies to the research activities of permanent full time or part time staff, or staff on contracts of 12 months or more with at least 0.2 FTE, who currently teach or supervise on degree programmes. For the RPTL a research active staff member is defined as someone who reached or exceeded the threshold of two eligible research outputs (either quality assured or non-quality assured) over the previous two-year period. Part-time staff have a threshold of one output over the two-year period. A green lit degree programme is where at least 75% of staff teaching and/or supervising on it are research active.

The Unitec Research and Enterprise Strategy outlines Unitec's aspirations with regard to RPTL performance, stating that all programmes at degree level will be rated green in time for the 2020 RPTL census.

2.4.1 Research productivity status of Unitec degree programmes

In the 2019 RPTL census, which uses verified research outputs data from 2017 and 2018, hence reported in here. Unitec maintained the consistent gains made since the Traffic Light report was introduced in 2012 (see Table 5 and Figure 6 below). However, the rate of progress has slowed. As shown in Table 5 below, in the 2018 census, 27 degree programmes were green lit (68%), five programmes were amber lit (13%), and eight were red lit (20%). In the 2019 census, 33 degree programmes are green lit (79%), seven programmes are amber lit (17%), and two are red lit (5%).

Programme Status	2012	2013	2014	2015	2016	2017	2018	2019
Count of green lit programmes	9	10	14	19	21	28	27	33
Count of amber lit programmes	7	8	9	12	16	8	5	7
Count of red lit programmes	11	9	7	4	3	5	8	2
Total	27	27	30	35	40	41	40	42

Programme Status	2012	2013	2014	2015	2016	2017	2018	2019
Percentage of green lit programmes	33%	37%	47%	54%	53%	68%	68%	79%
Percentage of amber lit programmes	26%	30%	30%	34%	40%	20%	13%	17%
Percentage of red lit programmes	41%	33%	23%	11%	8%	12%	20%	5%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 5: Total Number and percentage of green, amber and red lit degree programmes 2012-2019

Figure 6 below also illustrates the research productivity results and trends for the institute over the last eight years.

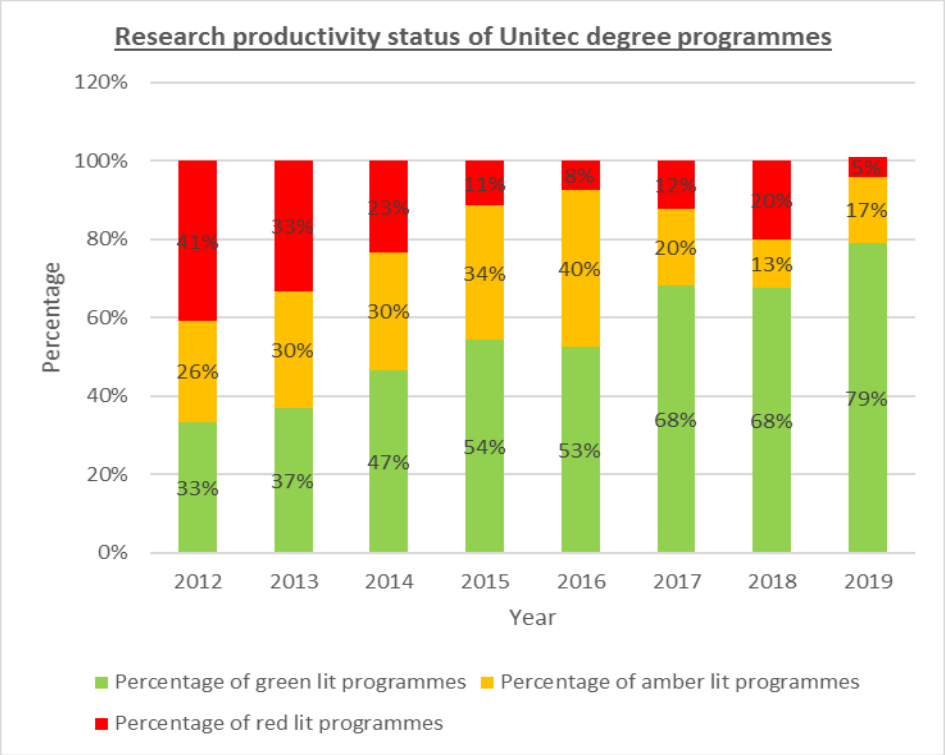


Figure 6: Total Number of Green, Amber and Red lit Degree Programmes 2012-2019

There was a big shift in green lit programmes, an 11 percentage point growth from 2018. The biggest achievement for 2019 is the major shift of red lit programmes to amber lit or green lit. We now have only two programmes that are red lit compared to 8 red lit programmes in 2018. That is a 15% improvement. While the goal that all degree programmes will be green lit by 2020 remains achievable it will require careful planning, a strong focus, increased effort, and appropriate resourcing to shift the final group of amber and red programmes to green status.

Bachelor of Teaching (ECE), Bachelor of Performing and Screen Arts, Bachelor of Applied Technology and Bachelor of Health Science (Medical Imaging) changed from red to green lit in 2019, a major achievement for Unitec. Master of Teaching Educational Leadership changed from red to amber lit. Bachelor of Nursing kept its red lit status.

Bachelor of Construction and Master of Business changed from amber to green lit. There were two programmes (Bachelor of Business, Bachelor of Communication (Teach Out)) which had their amber lit status unchanged.

Most programmes remained green lit in 2019, however four programmes changed to amber lit. These were Master of Osteopathy (Teach Out), Master of Applied Practice (Professional Accounting), Bachelor of Applied Science

(Human Biology) (Teach Out) and Bachelor of Sport (Teach Out). The remaining green lit programmes were robust, with excellent research plans.

2.4.2 Research Development Plan (RDP)

The RDP initiative was implemented in 2014 to aid programmes to improve their Research Productivity Traffic Light (RPTL) result. Resources were directed to support staff to engage in research and build a research culture. This approach resulted in a big improvement whereby 95% of programmes were green or amber lit. This figure was around 59% in 2012.

Tūāpapa Rangahau tracks individual progress by programme in order to optimise resources toward the goal of 100% green lit programmes by 2020. An example was the support provided for a new researcher to attend and present at the Ngā Pae o te Māramatanga International Indigenous Research Conference.

RDP is one of the key responsibilities of the Research Partners, who each have a suite of Practice Pathways (now Schools). There is also a dedicated Research Partner Rangahau Māori with a specific focus on looking after Māori researchers and matters pertaining to Māori research in Pathways (now Schools). Four major developments in this space were:

- The co-development with HR of a set of standard operating procedures for academic recruitment into the degree space. The lack of this in the past has meant an inconsistent awareness of the need for tertiary level research capability in candidates, which impacts on the RPTL and PBRF.

- The development, launch and implementation of the Individual Research Planners with a 100% uptake in 2018. This lays the foundation for performance based allocation of research time.

- The embedding of key research goals into degree staff ADEPs. This is critical to ensuring staff and managers mutually understand the contractual obligations around research and help individuals set a course for achieving the research goals in ways appropriate to that staff member's level and capability.

- The development and ratification of Research Competencies for research-active staff, which now sit alongside the Teaching and Leadership competencies. These competencies formalise and guide staff members' professional development trajectories in the research space, and help facilitate the informed completion of the 'Develop' quadrants within staff members' ADEPs.

The implementation of these four initiatives signals an institution-wide commitment to the embedding of research activity and research culture at Unitec and will strengthen the institute in the long term. It is also important to note that the work around RDP formed a significant part of the research narrative for the External Evaluation and Review (EER) and without a doubt contributed to the outcome for research which was GOOD for self-assessment and GOOD for quality.

2.5 Performance Based Research Fund (PBRF) performance

The primary purpose of the PBRF is to ensure that excellent research in the tertiary education sector is encouraged and rewarded. This means assessing the research performance of tertiary education organisations (TEOs) and then funding them on the basis of their performance. The PBRF comprises three funding components:

1. **Quality Evaluation (QE) measure:** the purpose of this measure is to reward and encourage the quality of research – 55% of the fund. The QE is a periodic assessment of the research performance of staff at eligible TEOs. TEOs present their staff members' research in Evidence Portfolios that are assessed for quality by

expert peer review panels. TEOs determine which of their eligible staff members' research is likely to meet the standard for a funded Quality Category and then support these staff to submit their research portfolios for assessment (discussed in Section 2.5.1).

2. **Research Degree Completions (RDC) measure**: the purpose of this measure is to reflect research degree completions – 25% of the fund. This element is a yearly measurement of the number of PBRF-eligible postgraduate research-based degrees completed at participating TEOs (discussed in Section 6.6).

3. **External Research Income (ERI) measure:** the purpose of this measure is to reflect external research income – 20% of the fund from 2016. This element is a yearly measurement of the amount and type of income received by participating TEOs from external sources for research purposes (see Section 3.3 for details of ERI earned in 2018).

The total size of the PBRF fund for 2019 is $315 million. Unitec currently receives $3.14m (2018 indicative data). Unitec's performance in the 2018 QE round secured 1.05% of the total QE fund resulting in $1.826m of funding from 2019-2024. This figure is the most stable of the three measures but can change as the size of the PBRF funding pool is determined by the Government through its annual Budget. RDC and ERI funding is calculated annually based on our annual ERI and RDC performance.

2.5.1 PBRF Evidence Portfolio (EP) submissions

Tūāpapa Rangahau has been actively preparing for the 2018 Quality Evaluation (QE) for a number of years. In June 2018, Unitec had 281 PBRF eligible staff and we submitted 128 EPs for QE. The basis of PBRF eligibility is the length of employment (at least one year), FTE (minimum of 0.2 FTE throughout the eligibility year) and whether the staff member is substantively involved in teaching at degree-level or above, and/or research. EPs were not submitted by staff, whose EP Tūāpapa Rangahau determined was not likely to meet the standard for a funded Quality Category (the TEC term for ratings).

Each submitted EP was assessed by expert peer review panels and a Quality Category was assigned. EPs present formally verified research outputs as well as examples of other contributions to the research environment. Staff were rated A, B, C or R. A rating of C(NE) of R(NE) is assigned to researchers considered 'new and emerging' at the time of the assessment. The different Quality Categories receive different levels of funding, with an A being worth five times more than a C, a B worth three times more than a C, a C(NE) worth two times more than a C and an R and R(NE) receiving no funding. In order to mitigate the risk that PBRF might be used to influence employment related decisions, only the numbers of staff who receive a funded Quality Category (A, B or C) are publicly reported.

2.5.2 2018 PBRF Quality Evaluation results

There have been three previous Quality Evaluation rounds in 2003, 2006 and 2012 and Unitec had been the highest performer of the ITPs over all that period. Despite 121 PBRF rated staff leaving Unitec between 2014 and 2017 due to transformation-related redundancies and resignations, Unitec still managed to maintain its status as the highest performing ITP in the 2018 PBRF.

Key results:

- Number of Evidence Portfolios submitted = 128.
- Number of Evidence Portfolios achieving funded ratings = 124.
- Percentage of eligible staff who submitted Evidence Portfolio and were awarded funded ratings = 44%.
- Success Rate (percentage of staff who submitted an Evidence Portfolio and received a funded rating) = 97%.
- Unitec achieved five A, 26 B, 75 C, 18 C(NE), three R and one R(NE) Quality Category ratings.
- Overall Unitec ranked ninth out 36 TEOs participating in the 2018 PBRF Quality Evaluation.

- Unitec ranked first for AQS(S) in the ITP sector (AQS(S) shows the intensity of research at each TEO relative to their staff numbers) and 12th for AQS(S) in the TEO sector overall.
- Unitec is the only ITP that will receive greater than 1% of the total funding available through the PBRF.
- Unitec will receive $1.8m of Quality Evaluation Funding, a drop of $300k from the 2012 round[3].
- The 2015–2020 Unitec Research and Enterprise Strategy set a stretch target to grow the number of PBRF rated staff by 5% from the 2012 round to the 2018 round (from 33% to 38% of eligible staff). However, as mentioned above, we lost 121 of the 2012 cohort of staff with rated (funded) portfolios between 2014 and 2017. In June 2017 the Executive Leadership Team agreed that, given these developments, the PBRF-related KPI needed revision and the Unitec Research Committee subsequently agreed to lower the PBRF target to 30% of eligible staff. That is, Unitec was aspiring to see 30% of its eligible staff achieve a funded PBRF ranking for this 2018 Quality Evaluation. Despite these challenges, we exceeded this target of 30% by 14%. Table 6 shows the details of Unitec's achievements over the last four PBRF rounds.

Year	**2003**	**2006**	**2012**	**2018**
Number of PBRF eligible staff	371	419	393	281
Number of Evidence Portfolios submitted	121	113	183	128
Number of Evidence Portfolios achieving funded ratings	82	98	131	124
Percentage of eligible staff who submitted Evidence Portfolios	33%	27%	47%	46%
Percentage of eligible staff who submitted an Evidence Portfolio and were awarded funded ratings	22%	23%	33%	44%
Success Rate (percentage of staff who submitted an Evidence Portfolio and received a funded rating)	68%	87%	72%	97%

Table 6: success data for the last four PBRF rounds

While Unitec submitted 26% less EPs to the 2018 PBRF round compared to the 2012 round, in 2018, 97% of Unitec's EPs received a fundable rating, while in 2012 only 71% received a fundable rating. This clearly indicates that even though we were smaller in 2018 when compared to 2012, the quality of our research was better. Table 6 shows the details relating to these numbers.

These positive outcomes are the result of the improvement of the quality of research being undertaken at Unitec. Being more thorough and strategic in preparing for the submission process and improved recruitment protocols for degree programmes has helped address previous challenges around building Unitec's research capability.

[3] Although Unitec's performance was better or similar in some areas compared to the 2012 round, our funding allocation was reduced as eight more TEOs participated in the 2018 round while the funding pool remained at $315 million.

2.5.3 Unitec's results by Quality Category

Table 7 shows the Quality Categories awarded to EPs submitted by Unitec in the PBRF 2018 Quality Evaluation Round and the prior 3 rounds.

Quality Category	2003(FTE)	2006(FTE)	2012 (FTE)	2018 (FTE)
A	1	2	2	5
B	21	26	24	24
C	55	70	75	70
C(NE)	0	26	14	16
Total	**77**	**124**	**115**	**116**

Table 7: Unitec results by Quality Category

In the 2012 Quality Evaluation, 12% of staff who achieved a PBRF ranking were classed as 'New and Emerging' researchers. The PBRF defines 'New and Emerging' as someone who became research active for the first time within the six years leading up to the PBRF assessment. In the 2018 Quality Evaluation Round Unitec was seeking to grow that figure by 5%. That is, Unitec had a new target that 17% of the staff who achieve a PBRF ranking will be classed as 'New and Emerging'. The 2018 figure was 14%, 3% less than our target.

Over the four PBRF Quality Evaluation rounds, this is the first time Unitec was awarded such a high number of A ratings, as an A attracts five times more funding than a C. The number of B ratings remained the same in 2018 as those received in 2012, while the numbers of portfolios rated C and C(NE) were slightly up.

2.5.4 Implications for Unitec

The results of this assessment show that Unitec has managed to maintain its position as the highest performing ITP. By virtue of size, Unitec maintains a significant proportion of the PBRF funding awarded to non-universities (1% out of 4%). Our 2018 performance will attract slightly less funding than our 2012 performance due to the loss of rated staff and because more participating TEOs will be drawing from a resource that remains static.

With over a quarter of the ITP sector's share of the PBRF funding going to Unitec, and with Unitec ranked ninth out of the 36 participating tertiary organisations in a fund that better suits the university sector, this result highlights the quality of the research programme in place at Unitec and is all the more notable. It also rewards Unitec's ongoing focus on applied research, and our support of our new and emerging researchers.

3 Increasing external engagement

Building partnerships to meet the needs of industries and to improve student success is central to achieving Unitec's vision and Research & Enterprise Strategy.

3.1 Building external relationships through research

Unitec seeks to build external partnerships through impactful research projects informed by an "outside-in" approach. To achieve this aspiration, we have promoted programmes such as the *ITP*Research and Enterprise Voucher scheme (details in Section 3.1.1). Furthermore, our largest external research projects, in areas including cybersecurity and environmental engineering, are strongly partnered with industry stakeholders and external research collaborators. These external relationships have engaged Unitec researchers in applied, impactful research projects and have generated external research income (ERI), whilst also producing secondary benefits such as access to industry expertise for course development, guest lecturing and off-campus learning experiences.

3.1.1 *ITP*Research and Enterprise Voucher scheme

The *ITP*Research and Enterprise Voucher scheme aims to seed new relationships with communities, iwi and businesses by subsidising the cost of our research services to kick-start research collaborations. In the course of delivering on a contract, we are facilitating professional development for staff in the commercial arena (outside of traditional academia) and engaging directly with end-users. This creates real world opportunities for staff and students through increased industry engagement, as well as the opportunity to foster joint projects around commercialisation and the creation of Intellectual Property.

Unitec has delivered, or was in the process of delivering, 14 research and enterprise vouchers by the end of 2018. The total external co-funding committed from the research and enterprise vouchers in 2018 was $42,300, this is in addition to external in-kind contributions to many of the projects, such as access to industry experts and specialist machinery and facilities.

The majority of research voucher projects were delivered by the School of Applied Business (5) and School of Healthcare & Social Practice (5). Within these the Social Practice and Business Practice staff were the most active.

Recent voucher projects have been more student-engaged, providing opportunities for Unitec students to undertake research and work experience with industry partners.

In 2018 there was a good mix of different types of organisations accessing the voucher scheme, although our focus was on increasing the number of private companies and public/local government organisations involved in voucher projects (see Table 8).

Organisation Type	Number of Voucher clients
Private company	4
Charitable/not-for-profit	6
Public, local government	4
Total	14

Table 8: Research Voucher clients by organisation type

Figure 7 illustrates Schools' involvement in the Research and Enterprise voucher scheme in 2018, shown as the number of active voucher projects by School.

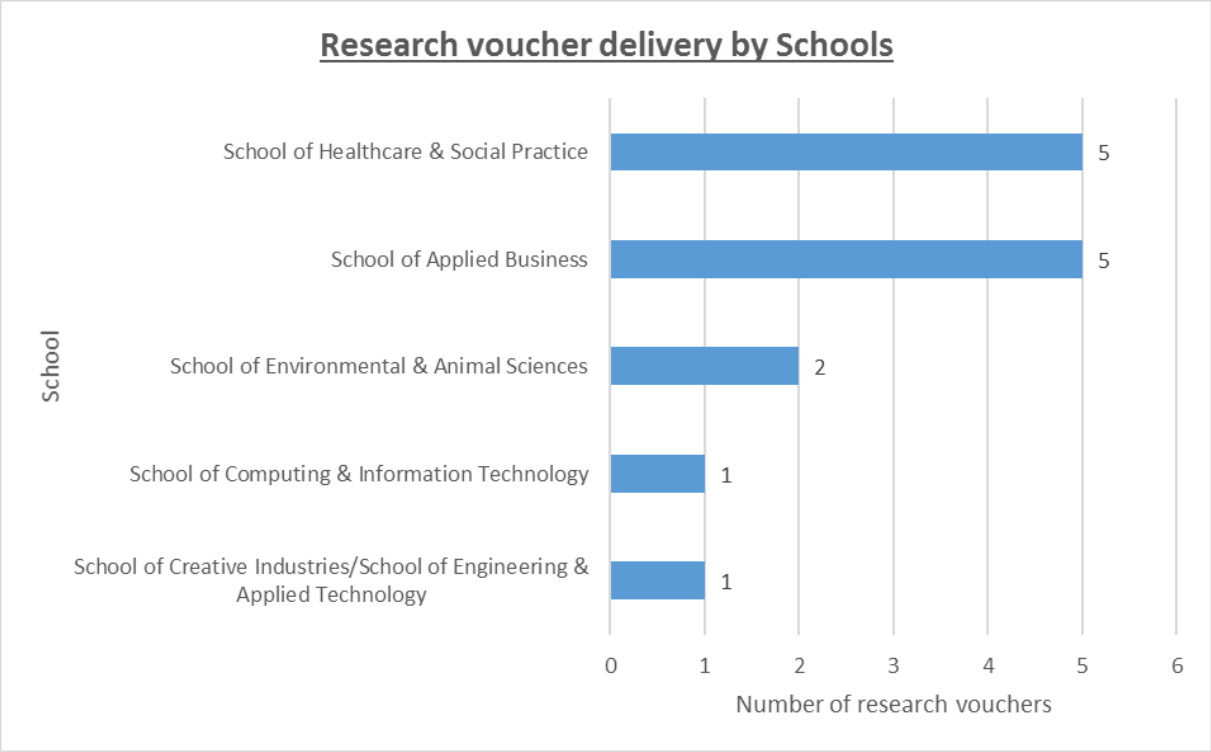


Figure 7: Schools' involvement in the research voucher scheme in 2018

3.1.2 Industry funded projects

Seventy-four research and enterprise projects in 2018[4] were at least partially industry funded. Industry funded projects are defined as active research or enterprise projects that Unitec is receiving funding for, where the organisation is private sector or public sector and where the services Unitec is providing is applied contract research or consultancy.

Figure 8 illustrates the Schools' contribution to 2018 industry funded projects.

[4] There was a slight change in the definition of industry funded projects in 2018 to include public sector and where the services Unitec is providing is applied contract research or consultancy. Prior to this only funding from private sector was included. Thus the 2018 figures reported are comparatively higher than that of 2016 and 2017.

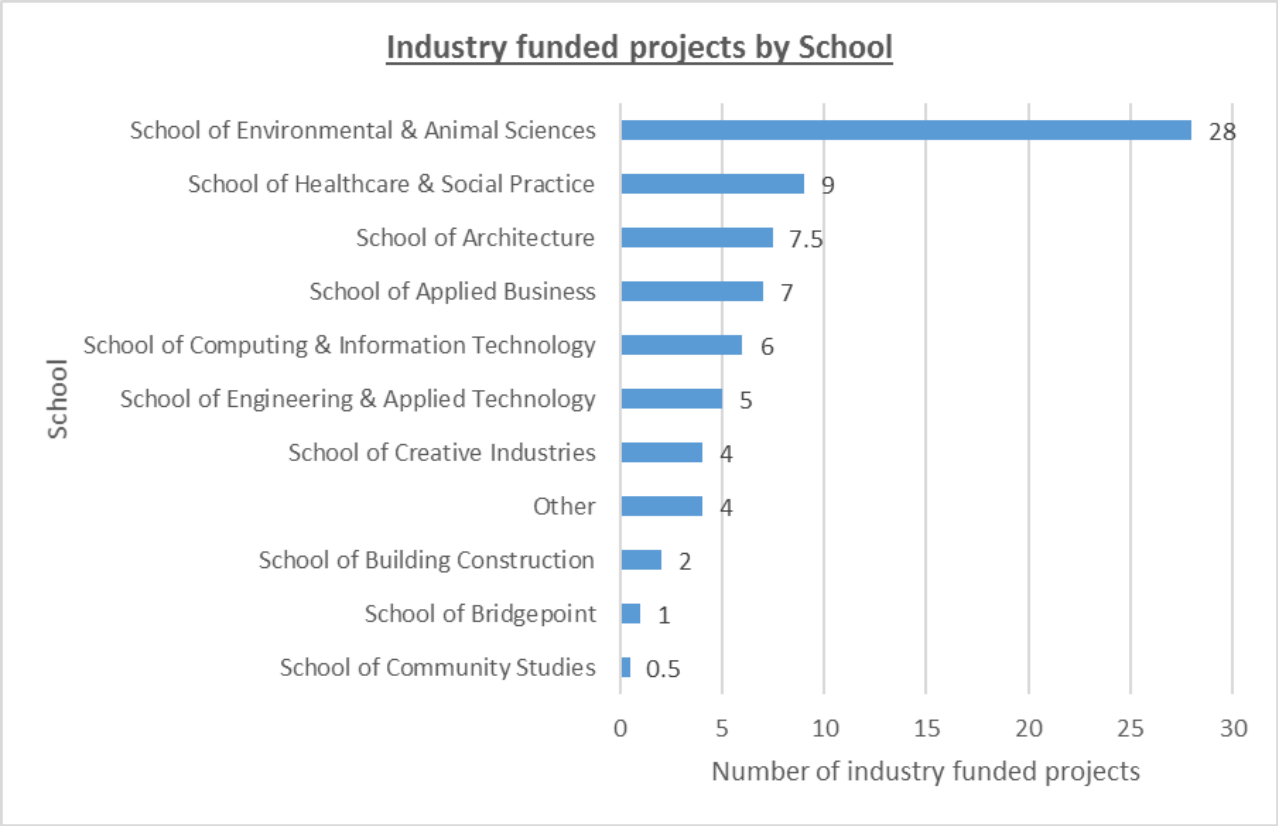


Figure 8: Schools' contribution to industry funded projects

3.1.3 Commercialisation

In 2018 Unitec has further progressed with commercialisation efforts for our cybersecurity products. STRATUS (Security Technologies Returning Accountability, Trust and User-centric Services in the Cloud), a multi partnered, six-year $1.8m project led by the University of Waikato has entered its final stage and industry engaged research is now moving on to industry partnered commercialisation. We have successfully delivered on a license agreement with Taranaki based cloud computing service provider NakiCloud. Negotiations are currently under way to open up CRaaSH, a unique disaster recovery product, to more external partners. KiwiNet and Kea are involved to help us access opportunities to commercialise CRaaSH. Cybersecurity prototype DNASec has been presented to Vodafone NZ and is currently being evaluated by their team for potential commercialisation opportunities.

Unitec's environmental engineering research on the bioremediation of asbestos has progressed well in collaboration with the Universities of Pennsylvania and Canberra and the Fox Chase Cancer Centre in Philadelphia. The Ministry for the Environment granted $393,000 to Unitec as part of the Waste Minimisation Fund. Asbestos removal specialist Chemcare has provided a $30,000 cash contribution and very valuable in-kind support. Envirowaste is also keen to explore a collaboration. The research team is working with the Director Industry Partnerships on a strategy to engage the wider hazardous waste industry. With a $1 million MBIE Endeavour Fund Smart Idea grant application currently under assessment, and strong industry interest, there is significant potential to advance this research area.

3.2 Seeking external funding

External Research Income (ERI) is a measure of the income for research purposes gained by a TEO from external sources. ERI is one of the three measures of the PBRF (see Section 2.5). Research funding provides an indicator of the contribution staff members are making to the research environment, or reflect staff members' esteem where the funding/support is competitive.

In 2018, Unitec won grants from the following sources:

- Crown Research Institutes;
- Central and local government agencies;
- Centres of Research Excellence (CoREs);
- Other NZ TEOs;
- The National Science Challenges;
- Overseas organisations;
- The private sector;
- The philanthropic and charitable sector.

Here are some details from a few of the funded projects:

- $15,000 awarded by the Oakley Mental Health Research Foundation towards completion of the "Stories of Deaf people who have had a significant experience of mental illness or addiction" project. Principal Investigator: Dr Geoff Bridgeman, School of Healthcare and Social Practice.
- $48,000 awarded by the Ministry for Primary Industries towards an assessment of quota share and ACE (annual catch entitlement) concentrations for the 2016-17 fishing year using the 15 species used in earlier studies. Principal Investigator: Dr James Stewart, School of Applied Business.
- $30,000 awarded by the MBIE Vision Mātauranga Capability Fund towards "Kaitiaki whenua: engaging kura kaupapa rangatahi in digital technologies for environmental stewardship". Principal Investigator: Dila Beisembayeva, School of Computing and Information Technology.
- $49,993 awarded by Creative New Zealand towards "Community Arts Park – Ihumaatao", a programme of cultural immersion through arts and creativity, culminating in the creation of a community arts garden. Principal Investigator (and former Unitec Bold Innovator): Tuputau Lelaulu, School of Architecture.
- $3,000 awarded by the Department of Conservation towards the collection of samples of *Pimelea eremiticia* (roimata o Tohe) and the analysis of chloroplast DNA. Principal Investigator: A/P Peter de Lange, School of Environmental and Animal Sciences.

3.2.1 Funding proposal submissions and success rates

Tūāpapa Rangahau has dedicated expertise in the identification of ERI opportunities, grant writing, contract management, intellectual property protection and commercialisation. The office supports Principal Investigators (the leaders of funded research projects) throughout the process of seeking, winning and managing ERI. Figure 9 illustrates the number of proposals submitted, the number of successful proposals and the proposal success rates in 2018[5].

[5] Success rate percentage is calculated from proposal outcomes known as at 31 Dec 2018

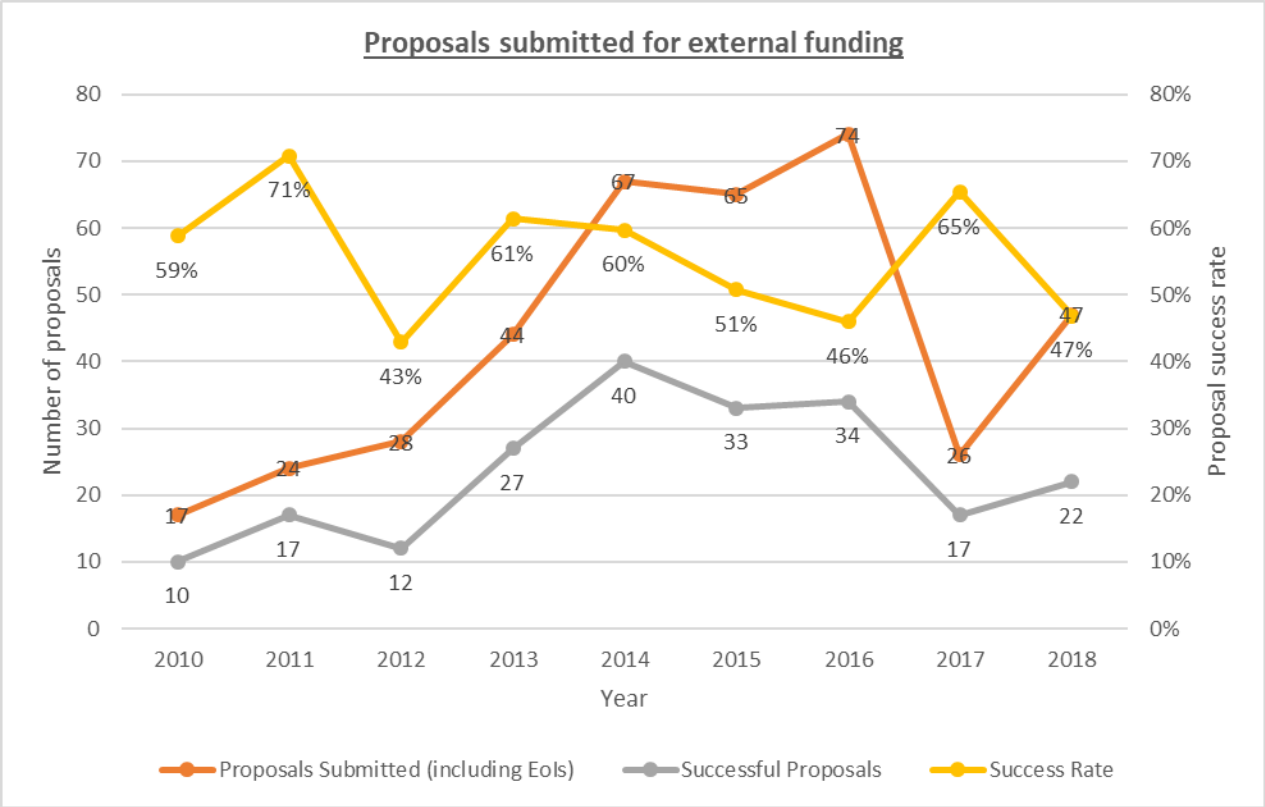


Figure 9: Proposals submitted for external funding.

External research income is an important indicator of external research engagement. It is therefore pleasing to see that the number of proposals submitted for external funding in 2018 (47) was well up on the number submitted the previous year (26) and that the number of successful proposals increased from 17 in 2017 to 22 in 2018. Despite this, a lower proportion of submitted applications were funded in 2018 (48%) than in 2017 (65%). There are a number of reasons behind this lower success rate, for instance, four of the declined applications were submitted to the Royal Society's Marsden Fund, which only funded 12% of the 1,099 nation-wide expressions of interest received in 2018. Another of the declined applications was submitted to MBIE's Endeavour Fund Research Programme which only had a 16% success rate.

Figure 10 illustrates the total grants Unitec has won since 2010, where the outlier in 2014 represents the awarding of the six year $1.8m STRATUS sub-contract (see Section 2.1.3) .

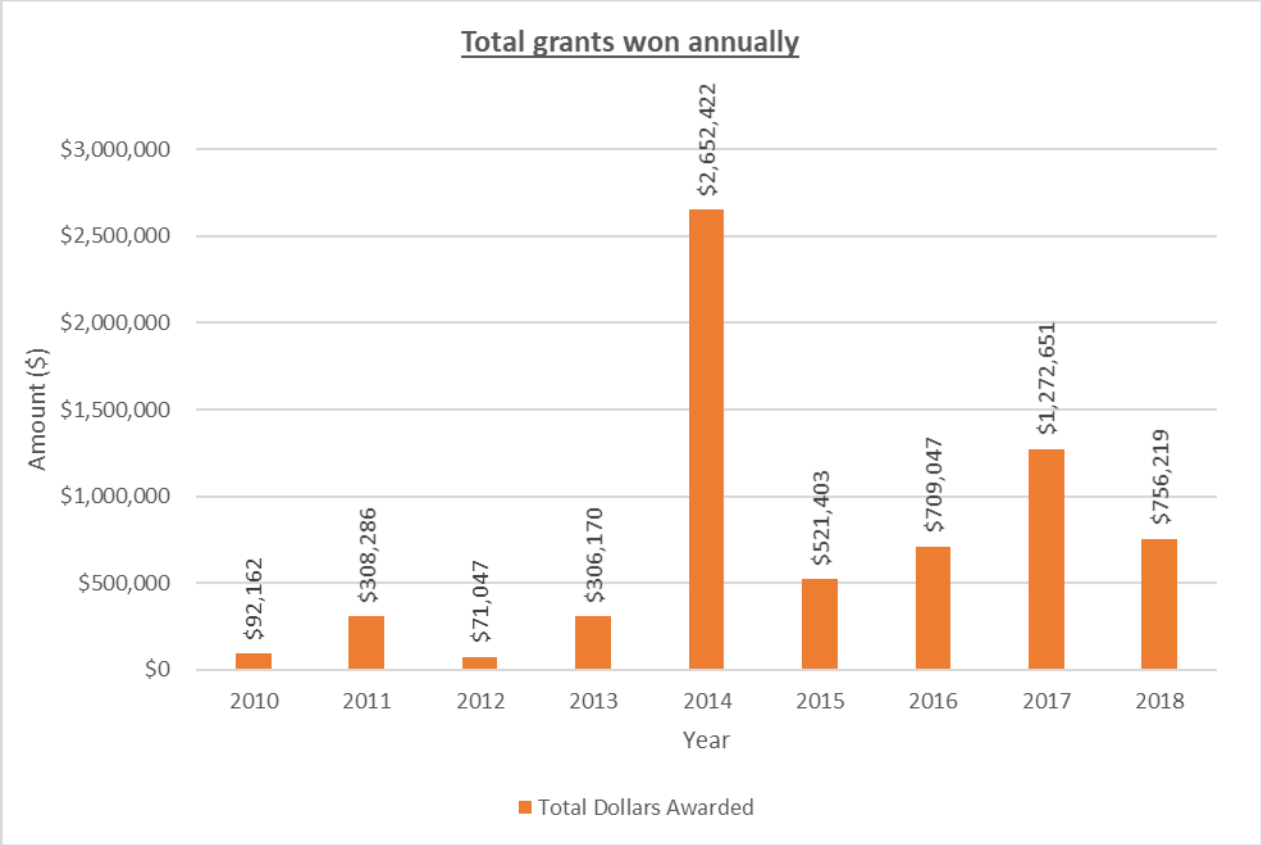


Figure 10: Total grants awarded annually

3.2.2 Organisations funding our research

The sources of Unitec's ERI provide an indicator of the value placed on Unitec research by various sectors. In 2018 Unitec received funding from 20 different sources, which was an improvement from 2017 when income was received from 12 different sources. While most of Unitec's ERI continues to come from central and local government sources (87%), income received from non-government organisations both in New Zealand and overseas remains important, as the PBRF fund rewards TEOs for seeking ERI from non-New Zealand government sources (Section 3.3.3).

The funders of Unitec's five biggest grants in 2018 are depicted in Table 9.

Top 5 funders of successful proposals in 2018	Source & Type of funding
Ministry for the Environment	Govt; contract research
BRANZ (Building Research Association of NZ)	Non-Govt; contract research
University of Waikato	Govt; subcontract
Creative New Zealand	Govt; contract research
Ministry for Primary Industries	Govt; contract research

Table 9: Funders of Unitec's five biggest grants in 2018

In 2018 more than NZ$13 million of funding was sought while just over NZ$750,000 was awarded. Table 10 shows that more than $9 million of the $13 million sought was in respect of one unsuccessful proposal to MBIE. As discussed above, the success rate for applications to the Endeavour Fund Research Programme and the Marsden

Fund are very low, so these results, while disappointing, are perhaps not surprising. One other note on this bid, is that it was an experimental attempt to rally a large number of ITPs into a singular project. While the funding was not forthcoming, the learning for the sector was significant.

Top 2 agencies that declined Unitec's applications for funding	Number of unsuccessful proposals	Total funding requested	Biggest single grant sought
Ministry of Business, Innovation and Employment (Endeavour Fund Research Programme)	1	$9,221,155	N/A
Royal Society Te Apārangi (1 x Rutherford Discovery Fellowship, 4 x Marsden Fund)	5	$1,980,000	$800,000

Table 10: Top 2 providers that declined Unitec's applications for funding

3.3 Delivery of externally funded projects

The successful delivery of an externally funded research project depends upon the Principal Investigator's ability to lead, coordinate and perform the research. It also depends on the institute's support teams including Tūāpapa Rangahau, Finance, HR and IMS to ensure Unitec maintains a strong external reputation as a quality research provider.

In 2018 Tūāpapa Rangahau provided research management and research administration support to Unitec Principal Investigators in the delivery of 76 active externally funded projects worth over $4.1 million dollars in contract value.

3.3.1 Total Unitec External Research Income (ERI)

The total external research income (ERI) for any given year is a strong indicator of the external value and magnitude of research efforts for that year. For these reasons it is one of Unitec's main KPIs within the Research and Enterprise Strategy, where Unitec seeks to increase total value of ERI by 10% per annum.

Total ERI is an annual measure of the amount of income Unitec earned delivering research services to external parties. ERI is the income we have earned during a financial year, not what we have been awarded. Unitec measures the ERI earned each year by determining the percentage of project progress made that year for each active research project. Then each project's percentage is multiplied by its respective awarded amount to provide the project ERI for that year. Total 2018 ERI is the sum of ERI calculations from all 41 active externally funded research projects.

Longitudinal data from 2010 onwards shows that Unitec has significantly increased its external research efforts in the last three years until 2017, and dropped in 2018. The major drop in 2018 was due to the change in the Accounting Principal, which is used to calculate ERI.

In 2018, the Tūāpapa Rangahau and Finance team aligned ERI project milestones with direct expenditure of the project. This change of process led to the 2018 figure being low compared with 2017 and the investment plan target. Due to this new process the ERI will be low at project start-up but will gradually increase as the percentage complete increases and is recognised. The investment plan calculation did not incorporate the complexity discussed above and requires adjustment for future years.

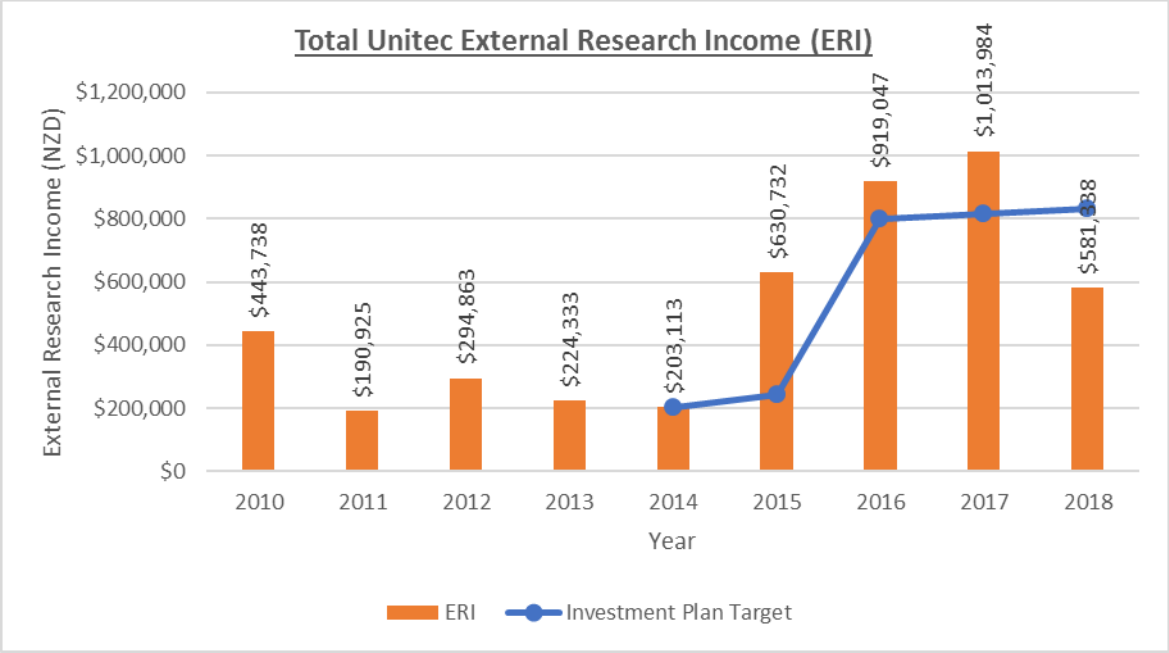


Figure 11: Unitec external research income between 2010 and 2018

As explained above, due to the change in the Accounting Principle used to calculate ERI, we claimed less ERI in 2018 but the funds are still there to claim in the upcoming years of the projects' durations. We also did not meet the investment plan target. From 2019 onwards, the investment plan target needs revision and the new percentage complete process needs to be fully implemented.

3.3.2 External Research Income by School

To promote School level engagement in externally funded research opportunities, ERI is now reported at School level.

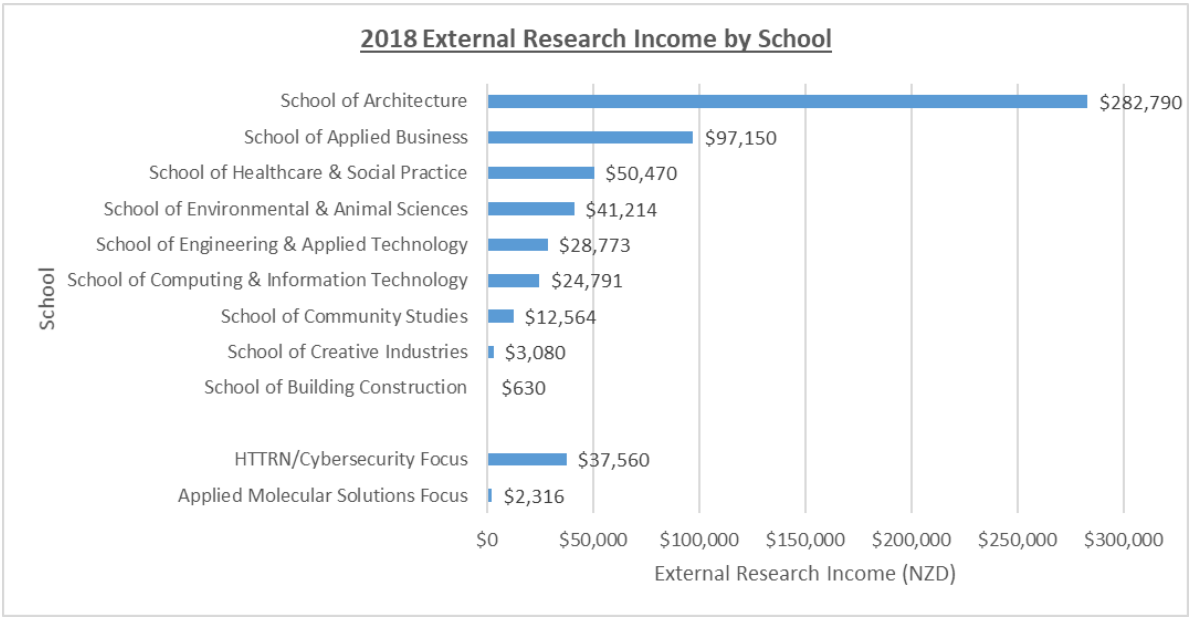


Figure 12: 2018 ERI by School (or Research Foci)

Nearly all Schools that offer degree programmes achieved some level of ERI in 2018, however there was significant variability in ERI performance between Schools, ranging from $630 to $282,790 (average of $60,162, excluding the Applied Molecular Solutions (AMS) and HTTRN/Cybersecurity foci).

School of Architecture was a clear front-runner that produced 49% of Unitec's total ERI for 2018 followed by School of Applied Business (17%). This excellent result from Architecture was due to the positive progress of several large new grants from BRANZ, Toi Ohomai Institute of Technology and University of Auckland. The School of Applied Business's excellent ERI result was due to the successful delivery of contract research for MBIE and Ministry of Primary Industries.

The contribution by the two research foci is declining however, when compared to the previous years, as projects in these foci are coming towards the completion stage. The new research strategy will address this from 2020-2024.

3.3.3 PBRF ERI

ERI is one of the three assessment elements of the PBRF's mixed performance-assessment regime. ERI is included as a measure because it is a strong proxy indicator of the quality and relevance of the research TEOs conduct. In 2016 the PBRF metric changed to increase the incentives for TEOs to win ERI, particularly from non-government sources. The Quality Evaluation (individual staff portfolio) portion reduced from 60% to 55% and the ERI portion increased from 15% to 20%. Starting in 2015, the Government also introduced requirements for ERI to be reported in four different categories, based on funding source. From 2017 onwards, the PBRF funding formula used the category weightings in Table 11 to calculate PBRF ERI funding allocations.

Funding source category	ERI Weighting
NZ government contestable funds	1.0
NZ public sector contract research	1.0
Overseas research income	1.5
NZ non-government income	2.0

Table 11: PBRF ERI weightings by funding source

Central government's changes to the PBRF, signal the growing importance of externally funded, industry and community relevant research. It also signals a continued push for TEOs to rely less on the public purse to fund research. These signals align well with Unitec's Research and Enterprise Strategy 2015-2020 which aims for greater external engagement, an applied research focus and ongoing ERI growth.

Figure 13 shows the relative split of 2018 ERI by funding source.

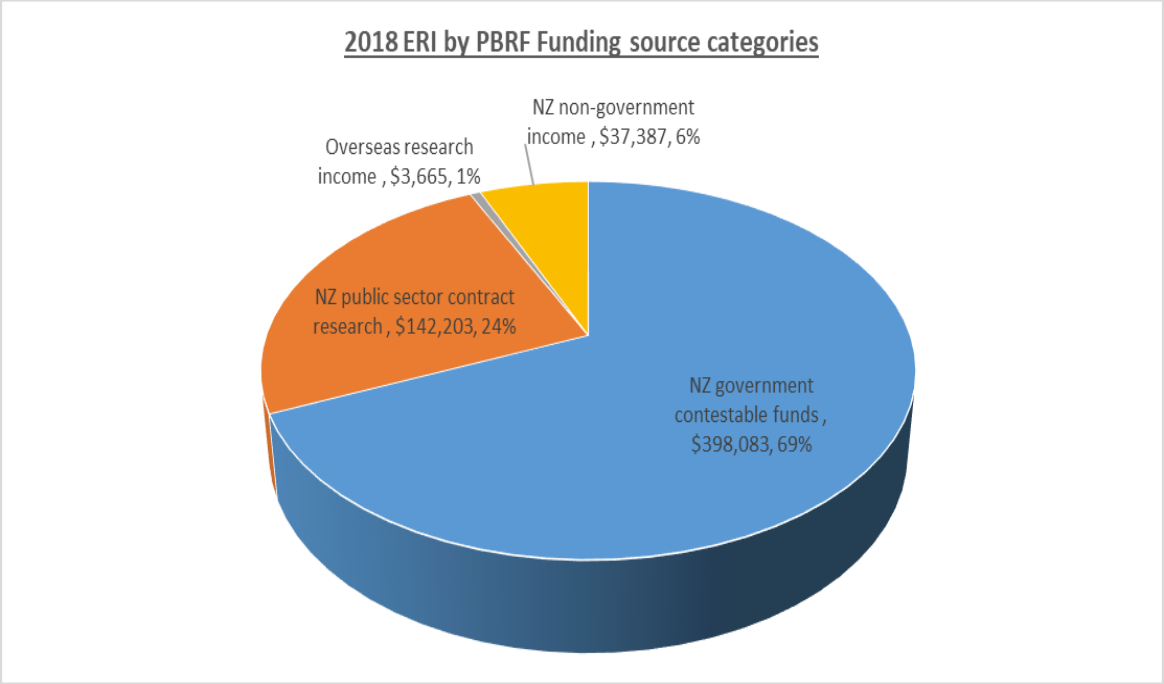


Figure 13: 2018 ERI by PBRF funding source categories

Nearly 70% of Unitec's ERI was earned from New Zealand government contestable funds and 24% was earned from New Zealand public sector contract research, indicating $540,286 (93%) of Unitec's Total ERI came from New Zealand government sources in 2018. The ERI funded from overseas sources was similar to that of 2017. The ERI from New Zealand non-government decreased significantly from 2017 ($117k) to $37k in 2018.

4 Greater research focus

Probably the most significant development proposed in the 2015-2020 Research and Enterprise Strategy was the creation of 'strategic research foci' for Unitec. A heightened degree of focus for research and enterprise activity is a national and international trend, allowing even a relatively small institution to have a high impact in a specialised zone of activity. Strategic research foci are specific areas of demonstrated research capability and leadership, aligned to credible external relationships and funding opportunities that we will invest in to accelerate their growth. The intention is that as these foci grow and are successful they can catalyse research development in related areas, and over time the accumulation of these related areas will form larger themes. Unitec has established Strategic Research Foci: Cybersecurity, Applied Molecular Solutions (AMS) and Kaupapa Māori Research.

4.1 The High Tech Transdisciplinary Network (HTTRN)

In 2018, the High Tech Transdisciplinary Network (HTTRN), Whaingia te Toi Huarewa, underwent a significant restructure and change of focus. When Professor Christian Probst joined Unitec as the new Director of the HTTRN, he initiated a review of the network's structure and goals, and of the activities started in recent years. The aim was to this revisit HTTRN's goal of initiating research projects across Unitec with a strong Computer Science component to develop applicable solutions for real-world problems across New Zealand. This review led to a revised mission for HTTRN:

> "HTTRN aims to connect Unitec's research, innovation, education, and training capabilities to business, investors, government, and the community to apply our capabilities to solve real-world problems. To enable this mission, we aim at undertaking applied research and consultancy for industry, community, iwi, and government agencies in all areas of expertise. This process is directed towards creating an eco-system of applied innovation and research commercialisation."

With the broadening of scope for HTTRN, the goal became to attract a larger number of research projects involving Unitec staff from all disciplines. While Computer Science can still be expected to contribute to many of the proposed projects, this is no longer required, and the research-active staff in HTTRN were released into their Pathways (now Schools).

Reflecting its revised mission, Unitec's Transdisciplinary Incubator was created. Proposals for incubator funding of up to $20,000 will be sought twice yearly from transdisciplinary research teams across the institution, with up to three projects being funded each round. Proposals are assessed by a selection committee consisting of external members and three Unitec members ex officio – the Executive Director Partnerships, the Director Research & Enterprise, and the Director HTTRN. External committee members in 2018 included Jörg Kistler, Venture partner BioPacific Partners; Maru Nihoniho, Metia Interactive; Shaun Hendy, University of Auckland and Director of Te Punaha Matatini - The Centre for Complex Systems and Networks; and Daniel Vidal, University of Auckland.

Six applications to the first round of funding were received, ranging from re-imagining and re-engineering small smart devices to remote measuring of medicinal cannabis plants. Decisions on these proposals will be made in early 2019.

Projects that are selected for incubation must either target the development of a research proposal to pitch to a funding agency, or propose the start of a collaboration with an external partner. Proposals for the incubator are evaluated based on their transdisciplinarity and feasibility. Another important factor is the likelihood and potential to engage students into the activities in the incubation phase and/or the project or collaboration activities after incubation, and the projects' "wow factor". Student engagement in particular is an important consideration in the selection process. The incubator is expected to become a natural space for students to contribute to interdisciplinary teams, and to experience the process of dealing with real-world problems. In the future, we plan to extend these

activities by complementing the incubator with a student innovation hub, where students will acquire innovation skills, and will work in interdisciplinary teams on case studies provided by external entities.

4.1.1 Unitec's new Innovation Policy

In 2018, Unitec's new Innovation Policy (IP) was approved by Academic Board and was rolled out across the organisation. The new policy is inspired by the University of Waterloo's policy, and states that the ownership of IP remains with the originator. The only duty of an originator is to register the invention with Tūāpapa Rangahau. If so chosen, Unitec will support originators in commercialising their invention after negotiating a commercialisation agreement, but originators are free to collaborate with partners of their choice.

The goal of the new policy is to foster innovation and inspire staff to identify innovations actively and engage in a discussion about commercialisation. Other institutions which have done this have become hubs of innovation – the University of Waterloo has been named the most innovative university in Canada for 26 consecutive years.

Since the introduction of the new innovation policy coincided with the transformation of HTTRN into Unitec's Transdisciplinary Incubator, Director of Research & Enterprise Marcus Williams and Director HTTRN Christian Probst embarked on a roadshow to Unitec's pathways to present both elements of Unitec's Innovation Framework, to discuss them with the staff, and to invite applications for incubator projects.

4.1.2 The Cybersecurity Focus

Work progressed on Unitec's largest research contract, the STRATUS project (Security Technologies Returning Accountability, Trust and User-centric Services in the Cloud). As discussed in section 3.1.3, the Unitec research team is leading the research aim focused on disaster recovery and business continuity and have to date produced several prototypes. In 2018, the beta-version of CRaaSH, a novel resiliency solution for businesses using cloud computing that ensures both internet connectivity and recovery in times of uncertainty or disaster, has been delivered to our commercial partner, NakiCloud. This has continued the close collaboration with NakiCloud's team. At the same time, we have explored other opportunities for evaluation of our techniques with service providers and IT houses like Integricity.

During 2018, further prototypes were developed in the realm of disaster recovery, most notably LogSpider, a novel distributed backup solution for infinite data streams, such as log files or CCTV footage. In the case of an attack, for example, data can be fully recovered even when multiple storage nodes experience failures. At the end of 2018 it was decided to release LogSpider as open source software in order to provide software providers with a starting point and to initiate further development in this area. The Unitec team is also working closely with the STRATUS team at Waikato University on integrating LogSpider with one of their developments. Both for CRaaSH and LogSpider, the Unitec team continued its exploration of engagement with companies and organisations in order to establish further proof-of-concept installations.

Related to the research focus is a cybersecurity whitepaper researched and written by Unitec communication studies graduate Megan Wolak during a paid internship with Delta Insurance, with whom Unitec collaborates through the STRATUS project. The internship was initiated by Unitec's Research Partner Enterprise through the ITP Research Voucher scheme. The resulting white paper covers growing cyber risks in the New Zealand workplace, the effect of the Internet of Things, blockchain and Artificial Intelligence, and suggests risk management strategies. It also explains how European Union privacy reforms affect Kiwi businesses.

In Summer 2018, cybersecurity was the theme of the Advance research magazine (see section 6.2). The issue covered the STRATUS project and its developments, but also the focus's involvement in the re-development of Unitec's cybersecurity education offerings, and the first Japan-New Zealand Summit on Smart Technologies. Hosted by Unitec in October, Japanese and New Zealand experts discussed projects and ideas across a wide range of disciplines around

the question of how smart technologies can and do change our lives, and whether we are prepared for all the ways in which they could affect society.

For 2019, several large research applications are planned, including a follow-up to the STRATUS project, and the focus will work with the School of Computing and Information Technology on redesigning their study programmes, with a special focus on cybersecurity.

4.2 Applied Molecular Solutions (AMS) Focus

The Applied Molecular Solutions Research Focus had a very active 2018. Funding from Tūāpapa Rangahau was primarily invested in further development of laboratory facilities, providing seed funding for projects, paying the salary for a research associate to work across multiple projects, and the purchase of five Bento Labs (https://www.bento.bio), which are portable DNA laboratories that allow us to do research in the field, at schools, and in hazardous or restricted areas. Research in AMS continues to focus on four main areas: biodiversity assessment; detection of pest species and pathogens and the diagnosis of disease; studying the underlying genetic causes of diseases and their spread; and the assessment of animal welfare.

AMS researchers collaborate externally with a range of national and international research consortia and organisations, including the Auckland Council, Department of Conservation, Auckland Museum, University of Auckland, Otago University, Lincoln University, Massey University, Field Museum of Natural History (Chicago, USA), Berlin Museum of Natural History (Germany) and Duke University (USA). AMS is linked to three international research consortia with a focus on lichen research: Lecanomics, PhyloRamalina, and Parsys.

In 2018, AMS researchers had external funding for the following projects:

Principle Investigator	Funder	Short Title
Dr Marie-Caroline Lefort	Hutton Fund/Auckland Zoo	Invertebrate diversity at the zoo
Dr Peter de Lange	Department of Conservation	cpDNA sequencing of *Pimelea eremitica*
Dr Nigel Adams	Birds NZ, Northern NZ Seabird Trust	Hauraki Gulf gannet diet project

Table 12: AMS externally funded projects 2018

These grants highlight the excellent collaborations AMS has developed with other research providers, local government and the community.

In addition, AMS researchers (A/P Dan Blanchon, A/P Peter de Lange and Erin Doyle) are part of a $400,000 Ministry for the Environment funded project on asbestos bioremediation (see section 3.1.3). This project aims to investigate the use of naturally occurring microorganisms to remediate asbestos.

Other key AMS projects include: An investigation of the human oral biome (Dr Judy Nicholson and Erin Doyle, part-funded by industry); plague skinks population genetics (Dr Andrew Veale and Erin Doyle, with Auckland Council); investigating the microbial diversity of invasive plant species as possible biological control agents (A/P Dan Blanchon, A/P Mark Large and Erin Doyle, with Auckland Council and Plant and Food Research); genetic, spectral, and morphological evaluation of different varieties of medicinal cannabis and hemp (A/P Dan Blanchon, A/P Mark Large, Erin Doyle, A/P Melanie Ooi, Wayne Holmes and Duaa Al-Shadii, School of Engineering and Applied Technology and external industry partners).

Research dissemination from AMS researchers in 2018 included 12 peer-reviewed journal papers, two conference presentations and two reports. Seven AMS researchers submitted PBRF portfolios.

4.3 Kaupapa Māori Research

Ki te kahore he whakakitenga ka ngaro te iwi
Without foresight or vision the people will be lost[6]

After significant successes with funded projects in the Māori housing space, Māori research and innovation was identified in 2017 as Unitec's third Strategic Research Foci. The highlight was the Building Better Homes, Towns and Cities National Science Challenge grant for the project "Te Manaaki o te Marae: The role of marae in the Tāmaki Māori housing crisis". The project is co-led by Rau Hoskins (School of Architecture) and Dr Jenny Lee-Morgan who was Deputy Director of Te Kotahi Research Institute, University of Waikato at the time the grant was won, in partnership with Te Puea Memorial Marae. The project investigates how urban marae can lead solutions in a housing crisis, such as the one afflicting Auckland at the moment.

As a result of the research relationships which developed in the course of this project, at the end of 2018 Dr Jenny Lee-Morgan was appointed as a Professor at Unitec to develop and lead a kaupapa Māori research centre. Named in early 2019, Ngā Wai a te Tui Māori Research Centre brought together a multidisciplinary team to respond and lead whānau, hapū, iwi and community research is an example of this. This team includes Irene Kereama-Royal, Ngahuia Eruera, Rihi Te Nana, Dr Tia Reihana and Rau Hoskins. Jenny is one of Aotearoa's top kaupapa Māori researchers and has a strong background in education and applied research. Her arrival marked a significant step-change for research at Te Whare Wānanga o Wairaka (Unitec) and brings considerable agency to the wider aspirations for Māori success in the institute. The arrival of Jenny and this new centre brings great promise for the realisation of the Te Noho Kotahitanga partnership at Unitec and there is no doubt there will be much to report on in 2019.

[6] Said by Kingi Tawhiao Potatau te Wherowhero, to show the urgency of unification and strong Māori leadership.

5 Ethics

The Unitec Research Ethics Committee (UREC) assesses ethics applications for research projects involving human participants. Animal ethics proposals are contracted out to AgResearch.

In 2018, 75 ethics applications were received from Unitec staff and students and 70 were approved. The majority of ethics applications were submitted by students completing Masters degrees. Since 2013, and continuing into 2018, there has been a steady decrease in the number of ethics applications submitted by staff. In 2017 staff once again began to submit ethics applications in a higher number, which was thought may continue into 2018. However, with the closure of programmes, the higher numbers in the early part of the year tapered off. The quality of applications from both staff and students continues to be an issue and UREC is investigating measures to improve this.

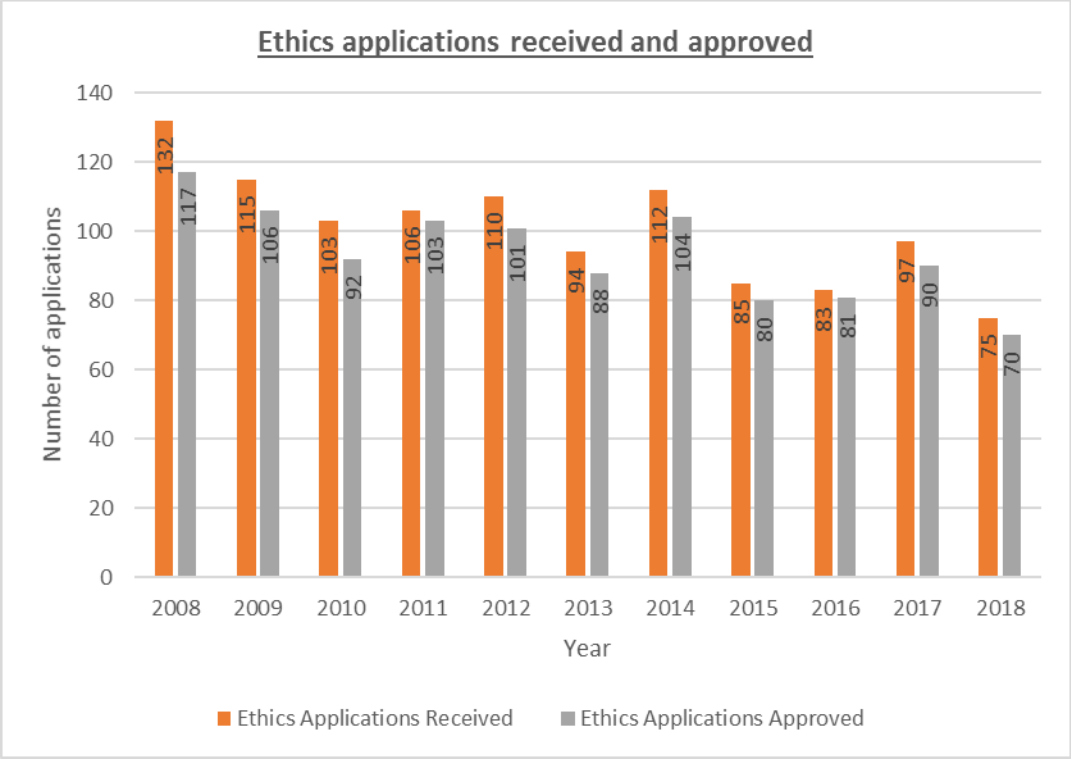


Figure 14: Staff and Student ethics applications received and approved

Dr Maria Humphries-Kil was appointed as a new external member of UREC, and was then confirmed as Chairperson in February 2018. She brings a wealth of experience from her many years at the University of Waikato. Throughout 2018, Dr Humphries-Kil has liaised with the Research Professional Development Liaison and Director Research and Enterprise to increase the quality of ethics applications. This project continues to run, and has resulted in policy changes which aim to increase the quality of research ethics applications at Unitec.

6 Postgraduate studies and student engaged research

Student success is at the centre of Unitec's vision and purpose and research plays a strong role in supporting and enhancing quality teaching and learning at degree level including postgraduate. In 2018 Tūāpapa Rangahau contributed to student success through funding postgraduate scholarships, managing postgraduate examinations, maintaining the supervisors' register, celebrating our A+ postgraduate students and promoting and enabling student-engaged research opportunities.

6.1 Postgraduate scholarships

Each year Tūāpapa Rangahau provides postgraduate scholarships to students across Unitec's postgraduate programmes, supporting our students to succeed. These scholarships are advertised, awarded and administered by Tūāpapa Rangahau in close partnership with the relevant Academic Leaders.

In 2018, $250,000 of scholarship funding was made available to 13 postgraduate programmes. The funding also supported eight Māori students with Māori-specific scholarships, seven Pasifika students with Pasifika-specific scholarships plus a Bold Innovator Scholarship.

Te Kerekere Roycroft (Ngāpuhi) who studies in the Masters of Landscape Architecture said this about her scholarship which supports her project into the relationship between her own hapū:

> *"I would like to thank you for the very generous research grant. Yours and Unitec's support will enable me to facilitate my project to a deeper level than would otherwise have been possible. A big thing, considering my project is based in Hokianga, is transport. For site visits, interviewing and wānanga. In my ethics application I allowed for two wānanga, this grant will facilitate these through marae hire, resources, kai and koha. It is also my intent to print copies of my proposal and final exegesis, to give back to my whānau who have helped me so much on my project's journey. To show that level of reciprocity of knowledge exchange."*

This year Māori postgraduate scholarship funding was partially invested in a pre-symposium wānanga as part of Ka Rewa; the Unitec Māori Innovation Symposium (see section 7.2). The wānanga (three days of knowledge sharing) was facilitated by Dr Curtis Bristowe. The students stayed at Te Noho Kotahitanga Marae, utilising Pūkenga to share and discuss their own work. This was followed by presentations from Dr Curtis Bristowe on Indigenous Knowledge and Indigenous Research and Aubrey Te Kanawa on Indigenous Knowledge in Action and Papa Kāinga Development. Having been welcomed onto the marae at Unitec already, these students joined symposium delegates at the pōwhiri of Ka Rewa and then participated fully in this two-day event.

6.2 Unitec Bold Innovators Scholarship

Tūāpapa Rangahau introduced the Unitec Bold Innovators Scholarship in 2017. Many talented Unitec students develop start-up ideas during their studies, however do not have the opportunity to progress these further once they graduate. This scholarship supports selected graduates in maturing these ventures into the early stages of commercialisation. Atarangi Anderson (Te Aitanga a Hauiti, Ngāti Porou) graduated from Unitec last year with a Bachelor of Creative Enterprise, already having set up Inky Cat, a fashion label using recycled and organic fabrics as her final year project. Winning 2018's Unitec Bold Innovators Scholarship meant she received a grant and access to an on-campus workspace and resources. Furthermore, she was able to set up a pop up store at St Kevin's Arcade to customer test her new creations. Her designs are described as a kind of nostalgic streetwear and combine high fashion with an environmental approach.

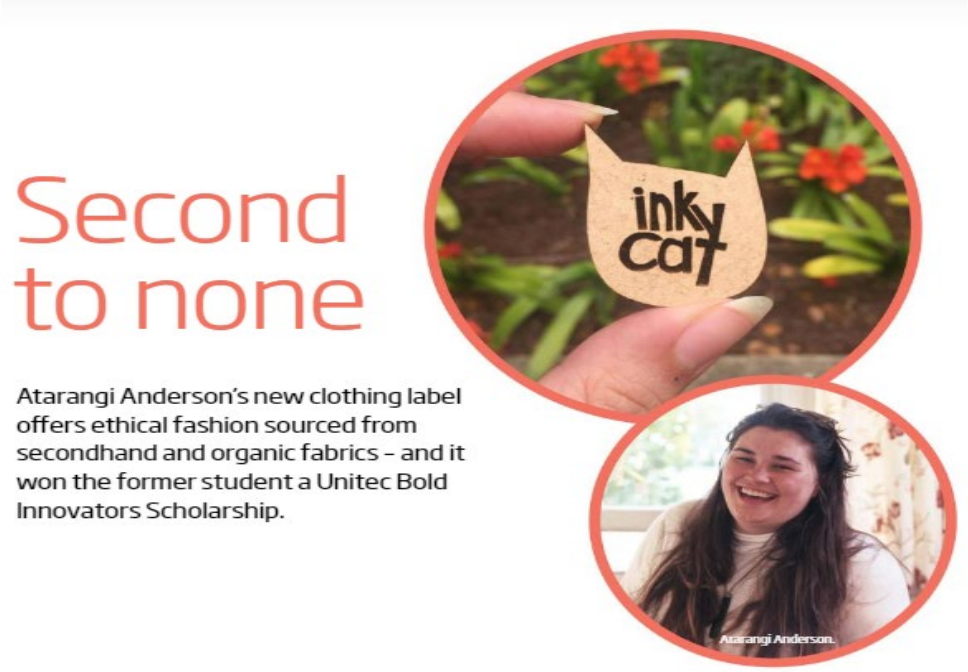


Figure 15: 2018 Bold Innovators scholarship recipient

6.3 Stories of student-engaged research

Student engagement and collaboration in staff led or initiated research is common at Unitec. This occurs through studentships, industry funded projects, externally funded grants, co-authorship with supervisors and credit bearing courses which involve industry partnered research. Such projects and partnerships provide real-life experience for students and often gets them in front of the industry they aspire to work in. Student integrated research is not a goal in the current strategy, but will almost certainly be in the next one. As a consequence, Tūāpapa Rangahau are not collecting data on this at this stage, but here are some anecdotes.

- Dr Diane Fraser, Senior Lecturer in Environmental and Animal Science, continues to provide quality stories of industry and student engaged research. Since 2011 she has supervised dozens of Bachelor of Applied Science third-year students to carry out small research projects for Auckland Council as part of their self-directed study course. This tradition continued in 2018 when two of Diane's students, Tayla Furlong and Laura de Castro, received Auckland Council summer studentships to work on the Department of Conservation's 'Kauri Dieback' campaign. Two students, Alex McKenzie and Graham Johns, received biocontrol summer studentships, providing invaluable early-career experience. They did a survey of biosecurity awareness of ferry passengers traveling to the islands of the Hauraki Gulf. One student gained a one-year Internship with Auckland Council.

- Dr Hamid Sharifzadeh, Senior Lecturer in Computer Science, is working closely with forensic analysis experts at the Institute of Environmental Science and Research (ESR) to develop new identification technology which can be used by NZ Police, NZ Customs and OCEANZ. Soheil Varastehpour, doctoral student, has been working on vein pattern analysis and was funded by ESR, Xavier Francis, masters student, has been working on shoeprint analysis and was supported by ESR who provided shoeprint datasets and forensic expertise. This was also part of Hamid's Senior Research Fund project (see section 1.2.1). Another of his projects aims to return natural speech to voice-impaired people, leveraging on recent advances in speech processing and synthesis, has involved Maryam Erfanian, doctoral student. The project received partial funding from the

NZ Health Innovation Hub in 2016 and has external collaborators from Waitematā District Health Board and University of Kent, UK.

- A/P Linda Kestle, School of Building Construction, worked closely with final year Bachelor of Construction students on their research projects. On behalf of three of these students', she presented three papers at the AUBEA 2018 Conference in Singapore, which was hosted by Curtin University and Singapore Institute of Building. These papers were:

    1. The Impacts of Fatigue on Workforce Sustainability – Tania Lipsham (student), Kathryn Davies and Linda Kestle.
    2. Learnings for Construction Project Management Personnel about Offshore Projects: a case study – Adam McKernan (student) and Linda Kestle.
    3. Last Planner System: Views of Main Contractors and Subcontractors within the New Zealand construction industry – Dorota Samorov (student), Kathryn Davies, Taija Puolitaival and Linda Kestle.

6.4 Postgraduate examinations and completions

Tūāpapa Rangahau manages and administers the examination of all 90 credit and higher theses for of Unitec's Masters and Doctoral programmes. Figure 16 shows the number of theses (90 or more credits[7]) submitted for examination. A very similar number of students submitted their thesis for examination in 2018 compared to 2017.

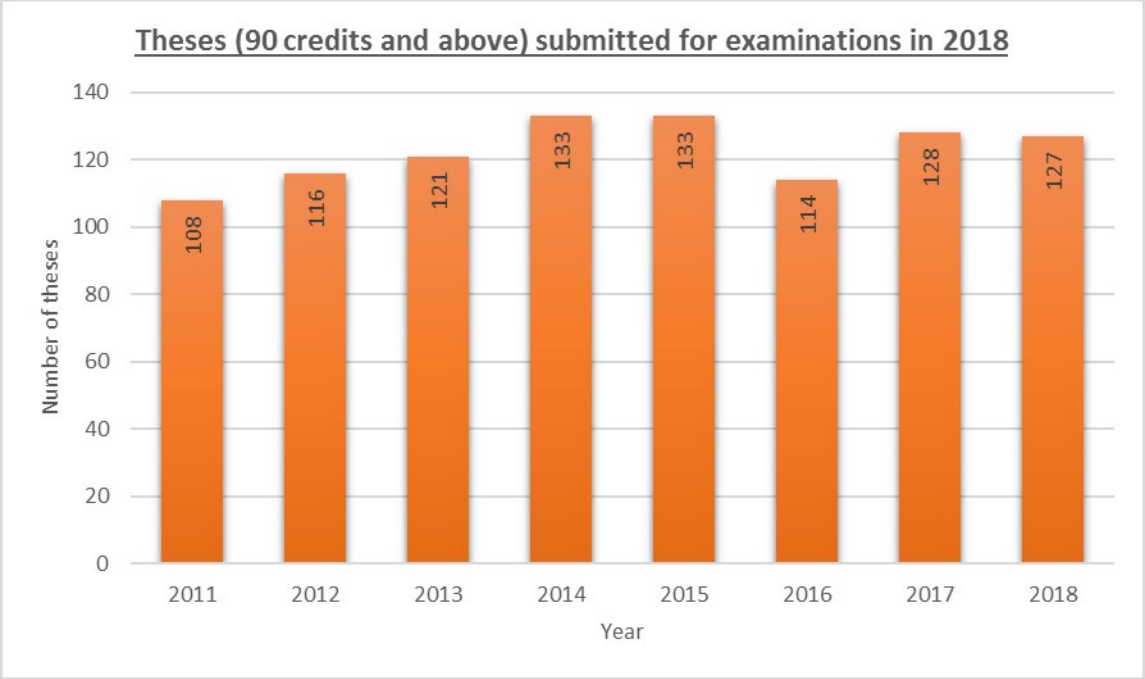


Figure 16: Theses (90+ credits) submitted for examination

[7] 90 credit plus Masters examinations involve external examiners.

Figure 17 below shows the number of graduates with a Masters or Doctoral degree along with the graduates who identify themselves as Māori or Pacific. There was an increase in the number of Māori or Pacific graduates in 2018.

The number of examinations and graduates differ because students submit theses for examination in one year and graduate in the following year. Also, there were 33 graduates in the Masters of Applied Practice programme in 2018. The credit value for these theses was less than 90 credits and the examinations were managed by the Schools and not by Tūāpapa Rangahau.

Figure 17: Masters and Doctoral graduates from 2011 to 2018

6.5 Dean's award for A+ postgraduate students

In 2018 there were a total of seven research Masters completions with an A+ grade. Figure 18 shows the distribution of the grades by the Master's degree programmes. None of these A+ grade recipients' identified themselves as Māori or Pacific.

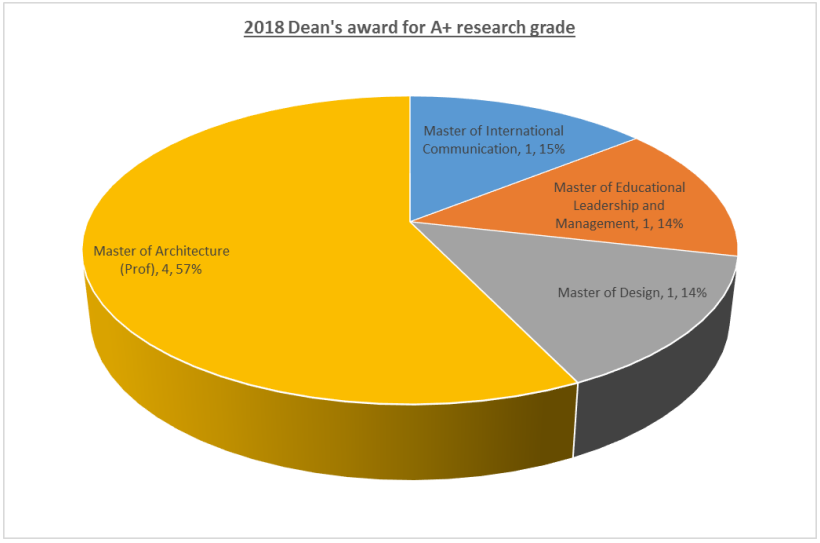


Figure 18: 2017 Deans awards for A+ research grades

6.6 Research Degree Completions (RDC)

RDC is one of the three performance measures used in PBRF to allocate PBRF funding (see section 5.5). RDC is a measurement of the number of PBRF-eligible postgraduate research-based degree completions (including Doctorates and Masters, as well as some postgraduate Diploma and Honours programmes). It is a measure of postgraduate qualification completions of greater than or equal to 90 credits that contain an externally assessed postgraduate research component. This element makes 25% of the PBRF fund and provides Unitec with approximately $1 million of funding per annum (approximately 1.46% of the total funding pool for all TEOs).

6.6.1 RDC performance calculations – quick summary

The RDC performance and funding calculations are complex, however Tūāpapa Rangahau has attempted to simplify this here.

RDC performance calculations comprise four parameters that dictate how much funding the institute will get for any particular student, course or year. Those parameters are the total credit value of the course, the course category, the student ethnicity and the completion year.

The following is a summary of the four key parameters that dictate RDC performance and how the weighting system works:

1. **Credit-value** and the level of the course:
    - Level 9 (90 credits) - weight = 0.75,
    - Level 9 (120 credits) - weight = 1
    - Level 10 (doctorate) - weight = 2

The higher the weighting value, the proportionally higher the funding allocated.

2. **Student ethnicity** - all students on enrolment can select multiple ethnicities that they identify with. Māori and Pacifica get a weighting value of 2 and all other ethnicities get 1. The higher the weighting, the proportionally higher the funding allocated.

3. **Course discipline category** - each course is classified into a discipline category and weighted by TEC (presumably to incentivise growth in some discipline areas). Unitec's RDC courses fall in the categories A, B C, I, J and L. The higher the weighting, the proportionally higher the funding allocated.

Course discipline category	RDC weighting	Classification of RDC eligible Unitec programmes
Category A	Weighting value =1	Master of Educational Leadership and Management Master of Social Practice Master of Education Master of International Communication Master of Applied Practice
Category B	Weighting value =2	Master of Design Master of Computing Master of Health Science Master of Creative Practice
Category C	Weighting value =2.5	Master of Architecture (Professional) Master of Landscape Architecture Master of Architecture Doctor of Computing

Category I	Weighting value =1	Master of Teaching and Education Leadership Master of Contemporary Education
Category J	Weighting value =1	Master of Business
Category L	Weighting value =2	Master of Osteopathy

Table 13: Classification of Unitec's RDC eligible programmes by course category and weightings

4. **Yearly weight** - students in research degree courses start and finish their course at different times, depending on whether they are full-time or part-time. Apart from being full-time or part-time, students also have the flexibility to split the dissertation course credit value in multiples of 15 credits over multiple semesters. If a particular cohort of students starts at one date, their finish date could be different for each student. Due to this complexity, the funding per completion starts two years after the actual year of completion and the funding is paid to Unitec in decreasing instalments over a three-year period. We get 50% of the total RDC funding per completion two years after a completion, and 35% three years after a completion and 15% four years after a completion. For example, the 2018 year will return 50% of funding from a 2016 completion (2-year lag), 35% from 2015 completions and 15% from 2014 completions.

Combining the weights for all the four parameters described above, gives the weighted count per student completion as follows:

Weighted count per student = Credit-value weighting x Ethnicity weighting x Course category weighting x Year weight (either 50%, 35% or 15%)

6.6.2 2018 RDC performance data

Using the above formula for calculating RDC weighting counts,

Table 14 shows Unitec's total number of RDC eligible weighted counts for the 2018 year, and illustrates how these weighted counts are earned from the completions from prior years, 2014, 2015 and 2016.

Year (Year weight)	**Total Completions** **(Total weighted count)**
2014 (15%)	105 (28)
2015 (35%)	117 (91)
2016 (50%)	107 (121)
2018 RDC weighted count total:	**(240)**

Table 14: 2018 RDC completions and total weighted counts across eligible years.

Figure 19 shows Unitec's weighted RDC counts over the last seven years. The 2018 data showed some positive growth from 2017.

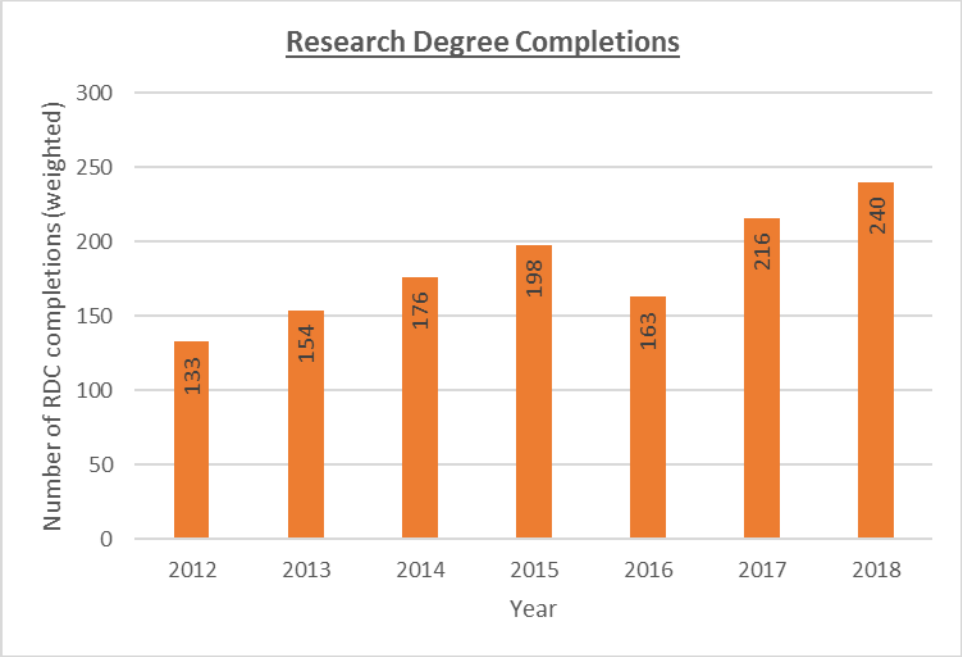


Figure 19: Unitec's RDC weighted completions from 2012 to 2018

6.6.3 RDC funding estimate

Because TEC's total PBRF funding pool is variable and so is the RDC performance of other TEOs, we are not able to definitively translate total weighted counts into RDC funding per annum. However, based on the previous years' funding allocation of approximately $5,500 per RDC weighted count, we estimate RDC funding to be around $1m again in 2018. The final RDC figure for 2018 will be released by TEC in October 2019.

Between 2014 to 2016, there were 20 actual RDC completions by Māori or Pacifica (three in 2014, 13 in 2014 and four in 2016). This resulted in a weighted count of 27 RDC completions, for 2018, for these two priority groups.

6.6.4 Credit value of RDC completions

Figure 20 indicates that a majority of Unitec's RDC completions over the past seven years have a credit value of 1, that is, 120 credit level 9 degree courses. Credit value is also referred to as volume of research factor (VRF).

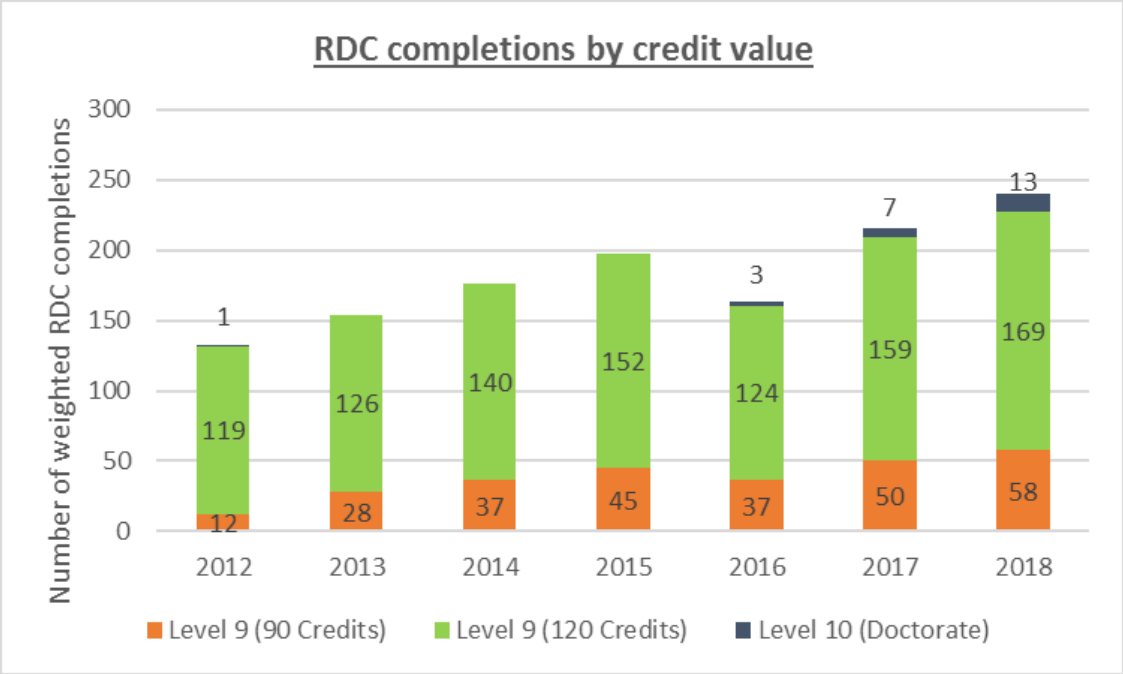


Figure 20: RDC completions by credit value

6.6.5 Course categories of RDC completions

Figure 21 indicates that a majority of Unitec's RDC comes from courses which are classified as category C. This category has a cost weighting value of 2.5 and this inflates the weighted counts significantly and positively.

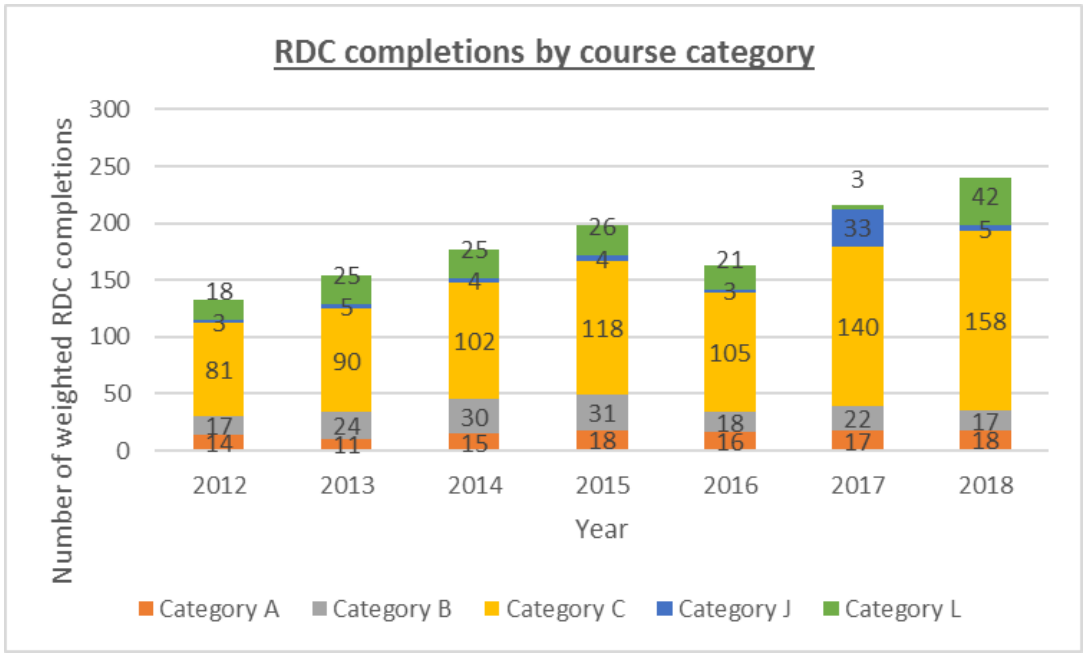


Figure 21: RDC completions by course category

Table 15 below details the full list of programmes which are included in this category, however these high category C numbers are predominantly due to large numbers of Master of Architecture completions.

Programme	Course discipline category	RDC Weighting	2018 RDC Weighted Count
Master of Educational Leadership and Management	A	1	8.4
Master of International Communication	A	1	1.4
Doctor of Philosophy	A	1	4.1
Master of Education	A	1	1.1
Master of Social Practice	A	1	3.2
Master of Computing	B	2	6.9
Master of Health Science	B	2	0.7
Master of Design	B	2	9.4
Postgraduate - Certificate of Proficiency	C	2.5	3.8
Master of Architecture	C	2.5	2.5
Master of Landscape Architecture	C	2.5	23.6
Doctor of Computing	C	2.5	9.3
Master of Architecture (Professional)	C	2.5	119.3
Master of Business	J	1	5.0
Master of Osteopathy	L	2	41.4
Total			**239.9**

Table 15: shows Unitec's RDC eligible courses by course discipline categories and the associated weighting.

7 Telling our research stories

Tūāpapa Rangahau primarily promotes its research stories via the Unitec Research Symposium, the *ITP*Research Symposium, Advance Magazine, Unitec ePress and the Unitec Research Blog.

7.1 Unitec Research Symposium

The annual Unitec Research Symposium is very important to Unitec's research community. The symposium is a conduit for staff and students to share research activity and ideas and connect across disciplines. 2018 being the year it was, the Director of Research and Enterprise came very close to shutting the symposium down (there was no Teaching and Learning Symposium in 2018). The approaching EER, cessation of programmes and staff lay-offs brought each aspect of the organisation close to the wire in terms of engagement, but somehow the numbers were "drummed-up" in time and 2018 proved to be one of the best symposiums yet.

The event was opened with an address from Unitec Acting Chief Executive Merran Davis; Forensic Research & Development Programme Manager Environmental Science & Research, Ltd (ESR), Dion Sheppard (a partner with Unitec researchers); and Building Better Homes, Towns and Cities National Science Challenge (Te Puea Memorial Marae) researcher and Unitec Masters of Architecture student Reuben Smiler.

Over 100 staff registered to be present with 50 presenting, plus undergraduate and postgraduate student researchers. The presentation of the awards was conducted by Merran Davis, and the winners were:

- Unitec Research with Impact Award – Glenn Aguilar and Hema Wihongi – Environmental & Animal Sciences*: Drone acquired imagery for characterising ecological restoration areas in Northland.*

- 3 Minute Thesis Competition joint winner – Sianne Smith (Masters in Architecture): *Architecture of Perception*. Supervisors: A/P Christoph Schnoor & Annabel Pretty.

- 3 Minute Thesis Competition joint winner – Emily Bowerman (Masters in Landscape Architecture): *Reflecting Māori relationships with water in waterscape planning and landscape architecture.* Supervisor: Daniel Irving.

- Undergraduate Research Competition winner – Kayla Rench & Phoebe Andrews, Bachelor of Applied Science: *Dissemination of biosecurity information and compliance of ferry passengers travelling to selected islands in the Hauraki Gulf.* Supervisor: Dr Diane Fraser.

- Undergraduate Research Competition runner up - Zainab Almubarak, Bachelor of Animal Management & Welfare: *Attitudes towards cats? A comparison between Saudi Arabia & New Zealand.* Supervisors: A/P Nigel Adams & Dr Kris Descovich.

Figure 22: Guests: Prof Christian Probst, Dr Hamid Sharifzadeh, Dion Sheppard, Penny Thomson, Gregor Steinhorn and Reuben Smiler.

Figure 23: Winners of the Research with Impact Award: Glenn Aguilar & Hema Wihongi, with Marcus Williams and Merran Davis

Figure 24: Winners of the Undergraduate Research Programme: Kayla Rench & Phoebe Andrews, with Marcus Williams and Merran Davis

Figure 25: Winner of the Deans Award: A/P Melanie Ooi – Head of Engineering Practice Pathway with Marcus Williams and Merran Davis

7.2 ITP Research and Innovation Symposium

Unitec bid for and won the right to host the annual ITP Research and Innovation Symposium, themed in 2018 on Māori innovation. An organising committee was formed and Chaired by TeUrikore Biddle, the symposium was called Ka Rewa.

"Ko te kāhu te whakaora o te pitomata – tukuna kia rere"
The kāhu is symbolic of our potential – so let it soar!

This was the sixth symposium convened by ITP Research, the membership of which is comprised by the ITP research directors in New Zealand; Unitec's Director Research and Enterprise was the chair in 2018. Previous hosts have been Otago Polytechnic, Weltec and Whitireia, Wintec and Manukau Institute of Technology. Unitec, Te Whare Wānanga o Wairaka, was very proud to host the first ITP Research symposium with a focus on Māori Innovation.

Ka Rewa had the objectives:

- Nurture innovation in Māori students at tertiary level.
- Demonstrate to ITP sector leadership the opportunity that the Māori innovation economy represents.
- Incorporate Māori innovation stories into ITP teaching and learning contexts.
- Demonstrate useful partners for Māori business and social innovators in the ITP sector for R&D, new talent pipeline and knowledge transfer.

The three themes of the symposium, generously sponsored by Ngā Pae o te Māramatanga (New Zealand's Māori Centre of Research Excellence) were:

- Whai Rawa: Māori Economies
- Te Tai Ao: The Natural Environment
- Mauri Ora: Human Flourishing

For the first time, senior undergraduate and postgraduate students attended a pre-symposium wānanga as well as the symposium itself (see section 6.1). These students came from WiTT, Weltec, Wintec, Whitireia, Otago Polytechnic and Unitec.

Keynote speakers were Professor Linda Nikora, Co-Director Ngā Pae o Te Māramatanga, Panapa Ehau of Hikurangi Enterprises and Keith Ikin Chief Executive Māori Television. Symposium delegates went on site visits to Te Puea Memorial Marae, Māori Television and The MindLab.

Staff from six ITPs presented in the parallel sessions along with representatives from Māori businesses and organisations. Full programme here https://itpresearch.ac.nz/2018-symposium/itpnz-symposium-programme-2018/

Significant opportunities emerged from the symposium:

- Panapa Ehau from Hikurangi Enterprises set up meetings with the commercialisation managers at Tūāpapa Rangahau and Professor Christian Probst, Director of the High-Tech Transdisciplinary Research Network, to discuss contract research projects.

- Professor Linda Nikora, Co-director of Ngā Pae o te Māramatanga, met with Hema Wihongi, Unitec's Māori Liaison in the School of Environmental and Animal Sciences, and the Māori led environmental network Reconnecting Northland, about various environmental initiatives in Te Tai Tokerau.

- Te Marino and Hemi Hoskins from Ara Institute of Canterbury met with Glenn McKay, Tumu Tauwhirowhiro Māori at Unitec, to discuss the initiative Te Tapuae, which is a Ngāi Tahu led partnership focused on Māori education and employment success. They work with whānau, communities, industries, agencies, tertiary

education providers and employers to support Māori into meaningful and successful careers. The discussion was about how Te Tapuae could be relevant in Tāmaki Makaurau.

Unitec produced an edition of its research magazine, Advance, for the symposium, featuring Māori Innovation https://issuu.com/unitecnz/docs/ds1065_advance_autumn_2018_-_single. A piece of feedback to the guest editor, Ngaire Molyneux was: "…a researcher for Business Economic and Research Limited (BERL) has been in contact with me and wants to discuss international opportunities for Māori SME's around indigenous trade and investment".

Held over the 10th and 11th of July, 2018 at Unitec's beautiful marae Te Noho Kotahitanga, Ka Rewa was another step toward the then emerging Strategic Research Focus on kaupapa Māori research, building confidence in the institute from inside and outside.

7.3 Advance magazine

Published in hard copy and as an e-magazine, Advance was established to showcase the innovative research taking place at Unitec across a wide range of disciplines in conjunction with industry, community, iwi and staff from other tertiary education organisations. Unfortunately, in 2018 the difficult decision was made to discontinue the publication of Advance due to resourcing and budgetary constraints. The final two editions of Advance were produced in Winter 2018 and Summer 2018.

The Winter issue had the theme of Māori Innovation and was edited by Ngaire Molyneux, Senior Lecturer in the School of Applied Business and champion of Māori business and innovation. The publication of this issue coincided with Ka Rewa; the Māori Innovation Symposium and followed this same theme. It showcased Unitec staff and students tackling issues, building partnerships and realising their creative projects, all while displaying a proudly Māori kaupapa. https://issuu.com/unitecnz/docs/ds1065_advance_autumn_2018_-_single

The Summer edition was edited by Professor Christian Probst, Director of the High Tech Transdisciplinary Research Network. It celebrated the seventh anniversary of Unitec's contribution to the global effort to maintain the resilience of the internet and its services via its Cybersecurity Strategic Research Focus (see Section 3.1.2).
https://issuu.com/unitecnz/docs/advance_summer_2018___cybersecurity

7.4 Unitec ePress

Unitec's ePress is an online publisher of peer-reviewed, quality-assured academic work by Unitec staff, students and associates. It publishes academic work in a range of formats on the ePress website (https://www.unitec.ac.nz/epress/) and provides a supportive publishing environment for current and emerging researchers.

Its Executive Editor and founder, Associate Professor Evangelia Papoutsaki, left Unitec towards the end of 2018 and the Editor, Gwynneth Porter, had to have her position reduced to 0.5FTE due to cutbacks. Despite this, in 2018 ePress continued to publish its two long-standing journals *Perspectives in Biosecurity* and *Whanake* along with occasional papers, thesis reviews and specialist papers. Ten publications across Unitec's schools featured 25 Unitec authors:

- Four thesis reviews.
- Two occasional papers.
- Three issues of two journals.
- One specialist paper.

A full report is not possible at this time because the Editor resigned in early 2019, however a replacement Editor will be recruited, the ePress will continue and the RoVE may well provide significant opportunity for the press.

7.5 Unitec Research Blog

After a hiatus in 2017, the Unitec research blog (https://www.unitec.ac.nz/UnitecResearchBlog/) was rebooted in 2018. The blog proudly samples our research stories, news and other information about research at Unitec, and feeds into Tūāpapa Rangahau's social media platforms via Facebook (https://www.facebook.com/UnitecResearch) and Twitter (https://twitter.com/UnitecResearch).

This year 20 stories were covered by the blog with titles including:

- Turning a tuk-tuk electric
- Celebrating students who won the Dean's Award for research excellence
- Introducing Unitec's new Research Fellow, Sue Bradford
- Keeping island communities connected
- How artificial intelligence could help predict floods
- Unitec students light up Devonport for Glow@ArtWeek 2018

The blog is an important means of telling our research stories, particularly now that *Advance* is no longer being published. Content is created by the ePress editor.

8 Priorities for 2019

Unitec has strong research capability as is evidenced by the results of the PBRF 2018 Quality Evaluation. During 2019 staff engagement with research will remain a key measure for Tūāpapa Rangahau. We aim to have all programmes at degree level rated green in time for the 2020 Research Productivity Traffic Light census. Retaining our best staff and recruiting teachers with research capability in mind are things to watch going forward.

Winning external funding will also be an important priority for 2019, particularly as many of our large externally funded research projects are coming to an end. The focus for our Research Partner Enterprise and Senior Grants Advisor will be to assist Unitec's senior researchers to pitch their projects towards the large, multi-year funding schemes run by MBIE and the Royal Society in particular. The Director of the HTTRN and the Director of Ngā Wai a te Tūī both have several large research applications planned for 2019, including follow-ups to the STRATUS and Te Manaaki o te Marae projects.

A key piece of work for Tūāpapa Rangahau in 2019 will be progressing the development of a new 2020-2024 Research and Enterprise Strategy. For example, student integrated research is not a goal in the current strategy, but will almost certainly be in the next one. Each of Tūāpapa Rangahau's three research policies are also due for review: Conduct of Research, Conduct of Student Research and Research Ethics. A plan has been put in place by the Unitec Research Committee to implement this work, although it needs to be acknowledged that this work may be affected by the Review of Vocational Edcuation.

Due to the change in the Accounting Principle used to calculate ERI, from 2019 onwards the investment plan target needs revision. We also need to develop a sustainable resourcing model for research dissemination, which ultimately builds the foundations for the next PBRF Quality Evaluation in 2024.

Ratification of the new collaborative process for allocating research time is another priority for 2019 as we aim to embed the new process and follow up on the productivity commitments which have been made by staff. This relates to the Individual Research Planners, targets from which will be again embedded into ADEPS in 2019. Both processes allow for the targeted deployment of resources to where it is most needed and will be most productive.

The development of School Research Plans is another major piece of institutional development work. The aspiration is that templates can be co-developed and then some early adopters can submit plans by the end of 2019 with full compliance in 2020.

Anticipated highlights for 2019 are as follows:

- Decisions on applications to Unitec's new Transdisciplinary Incubator fund will be made in early 2019 and at least three exciting, industry and student engaged projects will be underway.
- A replacement Editor for ePress will be recruited.
- The 2019 Unitec Research Symposium will take place, incorporating a Dean's Research Award and a Research with Impact Award. The popular 3 Minute Thesis and Undergraduate Research Competitions for students will run during the symposium.
- Ngā Wai a te Tūī will contribute significantly to the Te Noho Kotahitanga partnership and the development of Māori staff and student researchers.
- We will celebrate the achievements of our A+ postgraduate students with a Dean's Award event.
- A new office space for Tūāpapa Rangahau will bring us physically closer to many of the staff and students we work with.

9 Conclusion

Whatever the Review of Vocational Education has in store for Unitec, Unitec does now appear to share a vision that puts research at the centre of its value proposition. Applied research in particular is one of the unique selling points of the ITPs. Progressing our research targets, the improvements in our systems and processes and the facilitation of exciting new research centres chronicled in this report, suggest that this is true. The less stratified academic structure introduced through the Renewal Plan is a significant step forward. A shared vision by the executive, third tier management, staff and students, is by far the most important factor in realising the potential of Unitec research going forward.

International Success Strategy (2019 - 2022)

"Changing Lives for the Better"

OUR STRATEGY

The Unitec International Success strategy provides a framework to give effect to our International student voice and journey. It gives effect to our students' health & well-being and present and future goals. It recognises the value and contribution our students bring to our communities and the diversity and cultural tolerance this creates.

Every year we invite International students to complete their higher education at our institute. With that invitation comes expectations, responsibilities and obligations of both students and staff.

This strategy provides the context for a coordinated approach to meeting these expectations, responsibilities and obligations and is guided by the principles of Te Noho Kotahitanga and NZ Government regulatory requirements.

Fundamental to this strategy are goals that aim to

- tautoko (support),
- awhi (embrace),
- manaaki (care for) and
- whakaae (realise) our students' goals

The success of this strategy relies on an institute wide multicultural shift that puts the student at the centre of all our mahi and encourages us to make the change from compliance to excellence.

THE STRATEGY HAS FOUR OVERARCHING GOALS WITH PRIORITY ACTIONS

Led by the Principles of Te Noho Kotahitanga

	Mahi Kotahitanga (Co-operation)	***Ngakau Mahaki (Respect) Wakaritenga (Legitimacy)***	***Kaitiakitanga (Guardianship)***	***Rangatiratanga (Authority and Responsibility)***
Unitec Priorities	Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Engaged and inspired staff, equipped with the capabilities to support and deliver best learning	Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Contributing to the financial sustainability of Unitec
ISS Goals	**Goal 1** **Students feel supported and valued for their contribution to New Zealand's economy and community**	**Goal 2** **Internationalisation of Curriculum and Staff**	**Goal 3** **Students expectations of future success are delivered by the institute**	**Goal 4** **Contributing to the financial sustainability of Unitec**
ISS Priority Actions	*a) Unitec recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.* *b) Institute wide commitment to government International Educational strategies that support the wellbeing and educational achievements of our International students 1 & 2* *c) Prepare and engage all staff in bringing the Code of Practice to all aspects of the student journey and engaging in an annual self-review*	*a) Institute wide commitment to The Tertiary Education Strategy (TES) 2014–2019 4_Priority 6: Growing International Linkages* *b) Institutional Charter that commits to creating a culture of Internationalisation where all staff and students are prepared for working in a global environment that fosters international & Intercultural perspectives and initiatives.* *c) Promote a culture of internationalisation where all staff and students are prepared for working in a global environment and where International students are welcomed and supported to achieve their desired outcomes*	*a) Set Institutional EPI [6] targets 2019 – 2022 based on parity with the ITP sector and improvement target* *b) Set Institutional NPS survey score 2019 – 2022* *c) Ensure Institute wide awareness of EPI targets* *d) Educate staff on student expectations of success*	a) *Managing to budget and proactively support growth opportunities* b) *Ensuring Unitec maintains its connection to its International cultural capital and its place in the International Market.*

HOW TO ACHIEVE & MEASURE SUCCESS LINKED TO THE FOUR OVERARCHING GOALS

ISS Goals	Goal 1 Students feel supported and valued for their contribution to New Zealand's economy and community	Goal 2 Internationalisation of Curriculum and Staff	Goal 3 Students expectations of future success are delivered by the institute	Goal 4 Contributing to the financial sustainability of Unitec
Achieve by using Tools in our Kete	➢ Education (Pastoral Care of International Students) Code of Practice 2016[3] ➢ International Student Wellbeing Strategy (June 2017) [1] ➢ International Education Strategy (2018-2030) [2] ➢ Net Promoter scores by priority group	➢ The Tertiary Education Strategy (TES) 2014–2019 *sets*[4] ➢ Unitec Internationalisation Charter [5] ➢ Net Promoter scores by priority group	➢ TEC 2018 EPI International data ➢ Net Promoter scores by priority group	➢ Institute budget expectations ➢ INZ Essential Skills in Demand Lists (ESID) ➢ Net Promoter scores by priority group ➢ BI reporting tool
Influencers & Drivers of change	➢ Regulatory changes ➢ Institutional awareness ➢ Institutional values ➢ Experienced, knowledgeable, well trained staff	➢ Regulatory changes ➢ Institutional awareness ➢ Institutional values ➢ Experienced, knowledgeable, well trained staff	➢ Regulatory changes ➢ Institutional awareness ➢ Institutional values ➢ Experienced, knowledgeable, well trained staff	➢ Regulatory changes ➢ Market trends & demands ➢ Immigration skills list ➢ Future job prospects ➢ Experienced, knowledgeable, well trained staff
Measures & Indicators	1. NPS (Net Promoter Score) - International result of 20-26 by 2022 2. EER (External Evaluation and Review Report) - Highly confident for International performance and self-assessment result by 2022	1. NPS (Net Promoter Score) - International result of 20-26 by 2022 2. Establish Internationalisation benchmark and target for 2022	1. NPS (Net Promoter Score) - International result of 20-26 by 2022 2. EPI (Education Performance Indicators) – Course completion & Qualification completion at parity with ITP sector	1. Establish annual budget vs current - increased revenue/EFTs by 2022

OUR UNITEC INTERNATIONAL STORY.

Prior to 2018, Unitec International Student Service provision relating to marketing, student acquisition, application, enrolment, relationship management and student support services, historically have been co-ordinated and performed by a stand-alone operating structure that provided students with a 'One Stop Shop' service contact location.

This approach to International student support service provision resulted in a siloed impact on processing information, knowledge management and lack of accountability within our academic departments to ensure consistent engagement and Academic support to drive International Success outcomes across the institute.

In 2018 a decline in our International EFTS numbers and a change in Executive and Senior Leadership led Unitec to the realignment of the International Students Service Support provision with the domestic support provision. This resulted in the disbandment of the International Office and the relocation of key teams into three areas of the Unitec Business; Marketing, Operations & Student Success. The intention of this decision was to ensure wider accountability of our International Students to all areas of Academic and support services.

Post realignment 2 evaluations were completed – 1 internal and 1 external.

Report on Internal Evaluation - International Student Achievement and Support (June 2018) identified a number of opportunities that would support a quality student experience alongside a quality education - Undertake an evaluation of the current academic and pastoral support services and feedback mechanisms available for all Unitec students on both campuses. Within the evaluation, focus on priority areas that pertain to the needs of international students.

Arahanga Associates Limited – Tertiary Education Project specialists – Review International Function. This review identified opportunities and risk to Unitec's International business. - Review the International Strategy across Unitec to ensure that there is shared understanding of the strategy at organisational, Network, Practice Pathway and Programme level and that this is aligned to dynamic changes in the current environment.

FINDINGS

1. We should not underestimate the specific support requirements for international students and that integration does not mean an improvement in service delivery
2. That the provision of support for the well-being, achievement and rights of international students must follow a coordinated approach to ensure seamless access and service.
3. That awareness of, training and demonstration of the education (pastoral care of international students) code of practice 2016 is not evident in the institute and will take a coordinated effort to ensure the code is understood and translated into daily work across all relevant schools and service areas.
4. That self-assessment is not evident and that the lack of this information has meant the institute cannot determine strengths and areas for improvement
5. That a specific international student survey is required to understand what our students need from us to ensure their success
6. Introducing low cost activities would enhance the New Zealand experience for international students and a sense of being valued by Unitec

WHY STUDY ABROAD?

Why study abroad?
A 2019 New Horizons IV global study of youth and student travellers commissioned by ATEED (Auckland Tourism Events and Economic Development) found that when students make the decision to study abroad there are a number of key factors taken into consideration before a final decision is made.

Respondents were asked why they wanted to study abroad, 82% chose the quality of the education, 75% chose study abroad as an opportunity to enhance their career opportunities and closely followed by the academic, cultural and life experience gained.

Respondents were also asked to select the order of preference that they considered most important when deciding to study abroad more than 50% made their decision by choosing in this order

Why choose New Zealand?
The most important factors in selecting New Zealand were the English-speaking environment, safety, the international recognition of New Zealand qualifications, the quality of education and cost. Students were also heavily influenced by their peers when choosing a destination and most used agents to assist with study arrangements in New Zealand.

Which institute to choose?
Considerations when choosing an Educational Institute were: quality of the education, Institutional services and facilities (e.g., health services, accommodation services, vocational guidance, computing services, and learning support), accommodation, social & cultural connections, feelings of being welcomed and included in life in New Zealand.

OUR UNITEC STUDENTS.

Do we know our students?
Every year Unitec welcomes International students from more than 60 countries around the world. The largest markets are China and India and the key areas for study are Construction, Engineering, Computing and Business. Often these students have never left their home countries and many take an academic loan to study in New Zealand.

Our Semester 1, 2019 cohort			
Total of 1316 New and Returning students	from 63 different countries	Enrolled in 72 programmes	Key study areas: Construction, Engineering, Computing, Business
	With an average age of 2633% female 66% Male	Most students are from China and India	

Our student success is measured by using four mandatory education performance indicators (EPIs) that follow the student journey from completing the first year to graduation. Unitec is measured and benchmarked on these metrics.

Based on the 2018 EPI performance and graduate outcomes **we know** our International students have visions and goals that they want to achieve through study at Unitec. We know they are highly motivated to achieve these goals in their first year and this is reflected in the high course completion rate. Our graduate profiles tell us 78% find employment relevant to their qualification and 65% find employment, continue study or combine the 2.

2018 EPI Summary based on TEC Data		
Category		**Actual 2018**
Successful Course Completion	*Proportion of course enrolments ending in a given year that have been successfully completed*	89.4%
Cohort based first year retention	*Proportion of students in a cohort who enrol in a qualification at the same level in the year after they enter the cohort*	86.4%
Student Progression rate from Level 1-4	*Proportion of students completing a qualification (level 1-4) who then enrol within a given time period in a higher-level qualification*	69.8%
Cohort-based Qualification Completion	*Proportion of students in a cohort who go on to complete a qualification at the same level as the cohort*	62.8%
Graduates employed, studying or combining	*Proportion of students who have graduated that are either employed, studying or both*	65%
Relevance of Qualification to Employment	*Proportion of graduate students who are employed who rate their main job as highly related or moderately related to their qualification*	78%

These results provide us with information that is used to inform management decisions, define educational objectives, determine areas of focus, and measure the effectiveness of current practices.

OUR STUDENTS VOICE.

Do we listen to our students?
Our students speak out every semester and tell us how they feel. We need to start paying attention.

There are opportunities to make significant improvements to our student success with a shift in how we deliver our services of teaching and support.

Our students set their minds on studying abroad and have many factors to consider. A survey commissioned by the Ministry of Education[1] provides institutes with information that would assist with developing policies and best practice services and support for international students.

We know that International students are sensitive to teaching quality, facilities and amenities, support services and their study and living experience in NZ.

Unitec's 2018 Student NPS Semester 2 International student survey results measure these areas and the data supports the MOE survey findings in that there are opportunities for our institute to significantly improve our policies and processes and that this in turn would increase our student success rates and student experience.

The improvements could focus on keys areas identified as being important to International students. Unitec's NPS score has declined consistently over the past 4 years from a high of 26 to a low in 2018 of 8. This score is positive and remains above Unitec's overall score of -3.

The key drivers for student satisfaction are:

[1] THE EXPERIENCES OF INTERNATIONAL STUDENTS IN NEW ZEALAND REPORT ON THE RESULTS OF THE NATIONAL SURVEY Prepared for the Ministry of Education Colleen Ward & Anne-Marie Masgoret Centre for Applied Cross-cultural Research and School of Psychology Victoria University of Wellington June, 2004

- The quality of facilities and classrooms
- The range of student services
- The quality of teaching and tutoring.

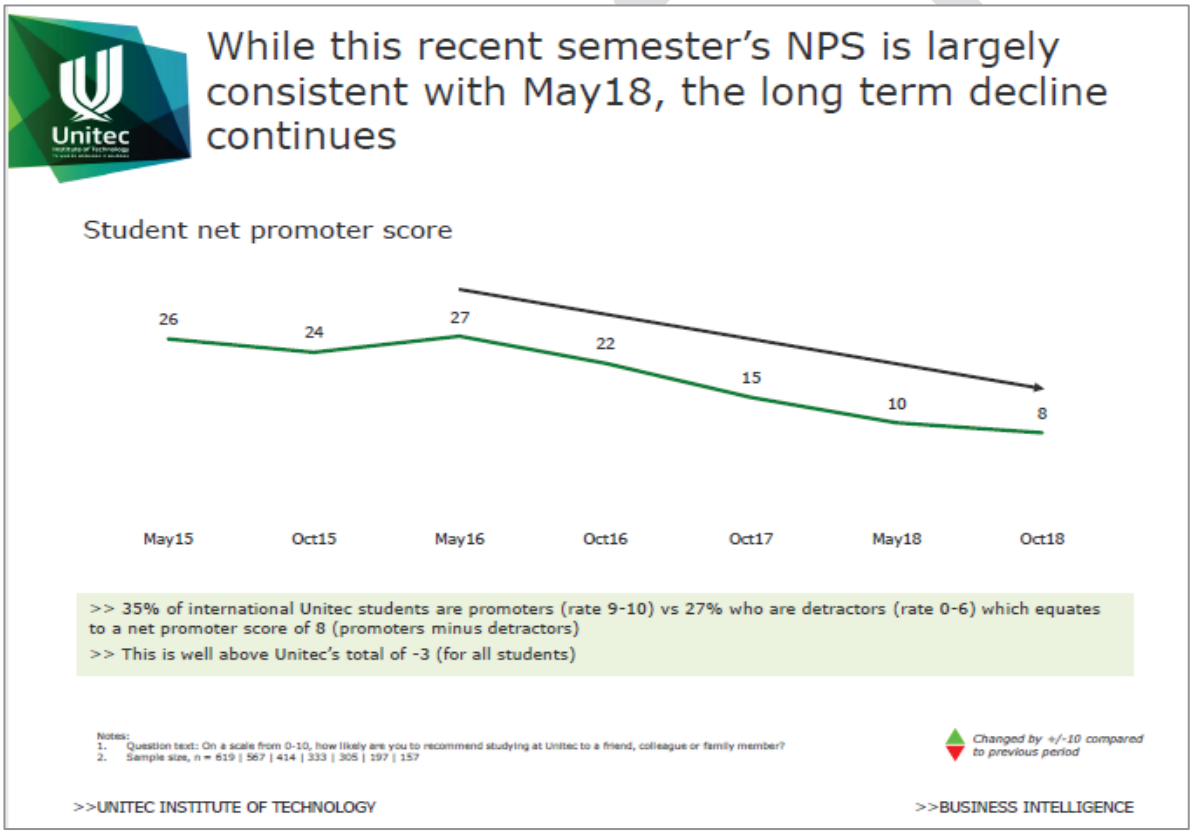
The key drivers for the decline in NPS are:

- Administration issues around enrolment
- Value for money
- Student life/culture/environment
- Teaching quality
- Student support services

We have world class facilities with engaged and inspired staff dedicated to supporting and delivering best learning and we know the goal – Work-ready graduates and lifelong learners.

There are many QUICK WIN (see Appendix 2) opportunities to improve our service to students based on the 2018 NPS results and the recent 2019 results.

We must support and encourage "kanohi ki te kanohi" (face to face) delivery of our student support.
We must be available and visible to our students.



Goal 1 STUDENTS FEEL SUPPORTED AND VALUED FOR THEIR CONTRIBUTION TO NEW ZEALAND'S ECONOMY AND COMMUNITY

The New Zealand government recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.

a) Unitec should not underestimate the specific support requirements for international students and should shape support services, learning and teaching into consistent positive touch points for our students.
We have the opportunity to improve on how our students feel supported and valued and be guided by the student voice.

Extracts from NPS 2018 survey results

- *"No support for students. Staff does not even bother to reply to emails or even help when you are dying. I am only enjoying the lectures. Sorry to score so low but I am put by in this situation cause of staff."*
- *"I have a good experience learning at Unitec. There's lot of support if needed."*
- *"Need to improve course contain of certain courses also once a student enrolled for a course it should not be cancelled."*
- *"Because they provide good service to students."*
- *"The worst part would is regarding the attendance system... There are plenty of mistakes with it, which can lead you with issues with the immigration government even if you attended every single one lectures."*
- *"The Unitec environment is green and clean, facilities are very conducive for learning, student support services are excellent and lectures are more friendly and approachable."*
- *"Some people has bad student service in student centre."*
- *"Because I love the way this institute handles issues and takes care of their students."*

Actions: (full details see Appendix 1)

b) Unitec recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.

c) Institute wide commitment to government International Educational strategies that support the wellbeing and educational achievements of our International students [1 & 2]

d) Prepare and engage all staff in bringing the Education (Pastoral Care of International Students) Code of Practice 2016 [3] *to all aspects of the student journey and engaging in an annual self-review and documentation of the Code outcomes.*

e) Provide support for International students at both campuses – Mt Albert and Waitakere

[1] **International Student Wellbeing Strategy (June 2017)**
International students are welcome, safe and well, enjoy a high quality education and are valued for their contribution to New Zealand

[2] **International Education Strategy (2018-2030)**
Aims to create an environment where international education can thrive and provide economic, social and cultural benefits for all New Zealand.

[3] **Education (Pastoral Care of International Students) Code of Practice 2016 -** *Unitec is a signatory to the Code and has an obligation to have policies and procedures in place to achieve the outcomes sought and processes required by the code. The outcomes provide standards of advice and care including all the reasonable steps necessary to protect international students and to ensure their experience is positive and supports their educational achievement. As a signatory Unitec must undertake and document self-review of our performance against the required outcomes and processes set out in the Code and will attest annually to NZQA.*

Goal 2 INTERNATIONALISATION OF CURRICULUM AND STAFF

"Internationalisation of the curriculum is the incorporation of an international and intercultural dimension into the content of the curriculum as well as the teaching and learning processes and support services of a program of study. An internationalised curriculum will engage students with internationally informed research and cultural and linguistic diversity. It will purposefully develop their international and intercultural perspectives as global professionals and citizens." 1

There are opportunities to bridge the gap with an Internationalisation goal. Unitec needs to meet the current demands of globalisation (societies, economies, labour markets) for graduates on an academic and professional level. Promoting a culture of internationalisation would emphasise the need to develop skills, knowledge, attitudes and values in students and staff to be responsive to a changing global environment.

There are many opportunities to increase the frequency and enhance the quality of intercultural contact between international and domestic students and improve relations between international students and members of the wider community. Increased cultural inclusiveness in teaching and learning will

Our Unitec priority of well-equipped work ready graduates gives us the responsibility to provide teaching and learning that supports this priority. Education can no longer be taught with a domestic view point only and graduates are looking for a well-rounded education that provides the knowledge to compete in a globalised labour market.

Actions: (full details see Appendix 1)

a) *Institute wide commitment to The Tertiary Education Strategy (TES) 2014–2019* [4] *_Priority 6: Growing International Linkages*
b) *Internationalisation Charter* [5] *that commits to creating a culture of Internationalisation where all staff and students are prepared for working in a global environment that fosters international & Intercultural perspectives and initiatives.*
c) *Promote a culture of internationalisation where all staff and students are prepared for working in a global environment and where International students are welcomed and supported to achieve their desired outcomes*
d) *Commit to including internationalisation into existing programmes and into new programme development.*

[4] **The Tertiary Education Strategy (TES) 2014–2019** *sets out the Government's long-term strategic direction for tertiary education and how a high-performing tertiary education system can contribute to improved outcomes for individuals and society as a whole.*

[5] **Internationalisation Charter** includes a set of guiding principles consistent with the **Tertiary Education Strategy 2014 – 2019** – Priority 6: Growing International Linkages and with the New Zealand International Education Strategy

Goal 3 STUDENTS EXPECTATIONS OF FUTURE SUCCESS ARE DELIVERED BY THE INSTITUTE

Establishment of EPI targets to achieve parity with the ITP sector for International students is the goal for 2019-2022. The specific targets focus on course completion and qualification completion rates which are currently below the ITP sector rates.

Considerations for targets are:

1. Government International Education strategies that set a path for a strong, equitable, high-quality education system with a vibrant international focus, globally connected students, workers and education providers.
2. International students' expectations of the receiving high-quality education in New Zealand.
3. International students' expectations of receiving an excellent overall student experience that supports their educational achievement.
4. Other priority group targets balanced against International targets
5. Overall institute targets

Actions: (full details see Appendix 1)

a) Set Institutional EPI [6] targets 2019 – 2022 based on parity with the ITP sector and improvement targets
b) Set Institutional NPS survey scores 2019 – 2022
c) Ensure Institute wide awareness of EPI targets
d) Educate staff on student expectations of success
e) Monitor and track potential student complaints, withdrawals, course changes.

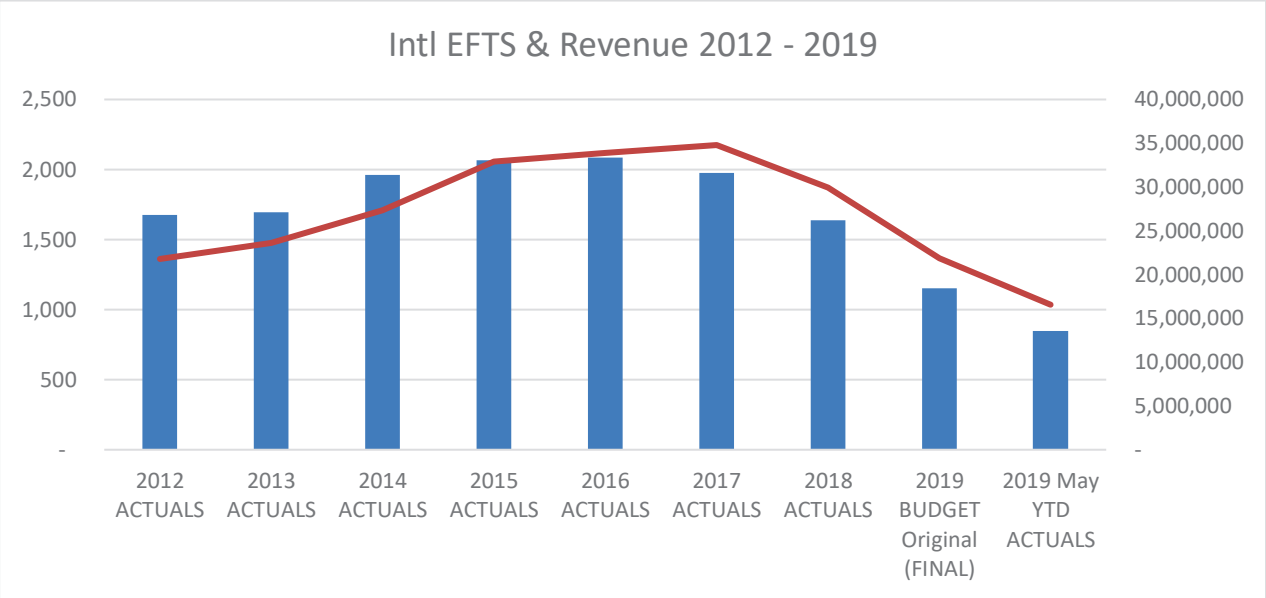
2018 EPI Summary based on TEC Data	[6] Tertiary EPIs (Education performance indicators) are used to determine and quantify how well students are succeeding at achieving the education outcomes: International Institutional EPI targets					
	ITP Sector Actual 2018 %	Unitec Actual 2018 %	Proposed 2019 %	Proposed 2020 %	Proposed 2021 %	Proposed 2022 %
Course Completion	91.1	89.4	TBC	TBC	TBC	TBC
Qualification Completion	65.2	62.8	TBC	TBC	TBC	TBC
Student Retention (1st Year)	73.5	86.4	TBC	TBC	TBC	TBC
Student Progression	67.3	69.8	TBC	TBC	TBC	TBC
Employment / Further Study		65	TBC	TBC	TBC	TBC

Goal 4 CONTRIBUTING TO THE FINANCIAL SUSTAINABILITY OF UNITEC

In 2017 125,392 international students studied in New Zealand, contributing to a thriving and globally connected New Zealand. International education is New Zealand's fourth largest export earner valued at $5.1 billion. It makes an important contribution to our national and regional economies.
This $5.1 billion was comprised of $4.8 billion from international students visiting New Zealand and $0.3 billion from education and training goods and services delivered offshore.

International revenue contributes 1/3 to total institute revenue and has been in decline since 2016. There are a number of internal and external factors that may have contributed to this decline and these should be investigated. There has however been growth identified in the international market for a small number of polytechnics and there may be opportunities for this institute.

Finally, increasing our International revenue as part of our long term financial goals matches government strategies designed to grow the NZ International Education sector.



Actions: (full details see Appendix 1)

a) *Managing to budget and proactively support growth opportunities*
b) *Opportunities for International high school students to start with domestic students on UPC programmes – leading to fulltime study when high school study completed*
c) *Actively promote APL (Assessment of prior learning) as compliance and as another revenue stream - attractive to onshore Internationals on work visas*
d) *Develop alternate semester offerings for markets out of sync with NZ semesters.*

IN SUMMARY

The ITP sector as a whole faces the same challenges to maintain International student numbers and student success rates and should continue to be guided in their decision-making by what will deliver the best possible outcomes for International students.

There are a number of regulatory changes that continue to guide our service to students. The recent amendments to the Education (Pastoral Care of International Students) Code of practice that require continuous improvement to standards of care and protection for International students and also immigration changes which strengthen the integrity of student policy and pathways to work and residence in New Zealand.

We are all aware of the pending government changes to the sector and in particular ROVE, (Proposal on a single New Zealand Institute of Skills & Technology). The consequence of this change will mean the sector working together as a single institute that provides high-quality learning that supports educational achievement.

In the meantime, Unitec needs a strong focus on activities that strengthen and improve our student success and also contributes to revenue growth. There are opportunities for QUICK WINS with immediate impact on student NPS scores, however we also need to keep in sight longer term changes, and perhaps less measurable in their immediate impact.

The implementation of this strategy relies on the institute recognising that our International students have goals and visions for themselves and are looking for opportunities to realise their potential.

We are in the business of "Changing lives for the better" and with tautoko (support), awhi (embrace) and manaaki (care for) we can support our students on the journey to their chosen "destination".

APPENDIX 1:

INTERNATIONAL SUCCESS **DETAILED** ACTION PLAN AND TIMELINE

Unitec Priorities	Team Priority & Strategy Goal	Goal description	Priority Action	Action and Timeline	Whos doing this now	Partner	Timeline
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Institute wide commitment to government International Educational strategies that support the wellbeing and educational achievements of our International students 1 & 4	Use student connectors to improve connection between students and staff	Student success	Student success	Apr-19
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Unitec recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.	Redevelop pre-departure to orientation to MIDWAY to graduation information to ensure all information is included and delivered to new students	DIS	Marketing	May-19
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Unitec recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.	Work with IMS to request work around for new applicants to complete emergency contact details through student portal as not included in application form and is a requirement of COP	DIS	IMS	Jun-19

Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Prepare and engage all staff in bringing the Education (Pastoral Care of International Students) Code of Practice 2016 3 to all aspects of the student journey and engaging in an annual self-review and documentation of the Code outcomes.	Work with marketing on an updated Pre-departure handbook and investigate translating into students first languages	DIS	Marketing	Jun-19
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Prepare and engage all staff in bringing the Education (Pastoral Care of International Students) Code of Practice 2016 3 to all aspects of the student journey and engaging in an annual self-review and documentation of the Code outcomes.	Develop "best practices that drive positive personal experiences" include all support teams and academics team (professional development) ie: customer service & experience training	DIS	Learning and development	Nov-19
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Unitec recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.	Provide an International student centre staffed Monday to Friday 9-5pm	Student success	Student success	2020
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Institute wide commitment to government International Educational strategies that support the wellbeing and educational achievements of our International students 1 & 3	Develop Academic Excellence scholarships to aid economic wellbeing and Increase student motivation for excellence	DIS	DIS	Mar-19

Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Unitec recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.	1st 6 weeks - Redevelop orientation to ensure all outcomes required as a minimum are included with improved delivery to students	DIS	Student Success	May-19
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Unitec recognises the contribution and value International students bring to our economy and communities and have established strategies to ensure that students are welcome, safe and well, enjoy a high quality education.	1st 6 weeks - Schedule CHECK IN sessions/repeat orientation sessions for students in the first 1/2 of the semester to ensure students have all they need to enable best learning practices	DIS	Student success	Mar-19
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Institute wide commitment to government International Educational strategies that support the wellbeing and educational achievements of our International students 1 & 2	1st 6 weeks - Communicate regularly using newsletter to ensure flow of information is accurate and up-to-date and Use appropriate communication platform to ensure students are getting the messages	DIS	Student success	Mar-19
Success of all students, with a focus on priority groups (Māori, Pacific, Under 25, International) and the communities we serve (West, Central & North Auckland)	Goal 1	Students feel supported and valued for their contribution to New Zealand's economy and community	Provide support for International students at both campuses – Mt Albert and Waitakere	Provide specific International support at the Waitakere campus	Not resourced	Student success	Aug-19
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Promote a culture of internationalisation where all staff and students are prepared for working in a global environment and where International students are welcomed and supported to achieve their desired outcomes	Develop "best practices that drive positive cross cultural experiences" include all support teams and academics team (professional development)	DIS	Learning and Development	Nov-19

Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Institute wide commitment to The Tertiary Education Strategy (TES) 2014–2019 4_Priority 6: Growing International Linkages	Encourage visits from partner institutions to Unitec and include staff outside of leadership and marketing	DIS	Marketing	2020
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Institute wide commitment to The Tertiary Education Strategy (TES) 2014–2019 4_Priority 6: Growing International Linkages	Look for opportunities for teachers and support staff to visit partner institutions	DIS	Marketing & Schools	2020
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Institute wide commitment to The Tertiary Education Strategy (TES) 2014–2019 4_Priority 6: Growing International Linkages	Meet with TPA to discuss how to incorporate international teaching methodologies into PD for staff	DIS	Te Puna Ako	Jul-19
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Internationalisation Charter 5 that commits to creating a culture of Internationalisation where all staff and students are prepared for working in a global environment that fosters international & Intercultural perspectives and initiatives.	Work with Learning & Development to ensure new staff inductions include cultural awareness sessions	DIS	Learning & Development	Jul-19
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Commit to including internationalisation into existing programmes and into new programme development.	Encourage domestic students to utilise the Study abroad opportunities available through our partner institutes	Marketing	Marketing	2020
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Promote a culture of internationalisation where all staff and students are prepared for working in a global environment and where International students are welcomed and supported to achieve their desired outcomes	Establish Academic progress registers for each school to track and monitor priority students	DIS	Schools/Priority Champion	Jul-19
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Internationalisation Charter 5 that commits to creating a culture of Internationalisation where all staff and students are prepared for working in a global environment that fosters international & Intercultural perspectives and initiatives.	Develop and deliver cultural awareness sessions to all staff utilising staff for this experience	DIS	DIS	Apr-19

Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Internationalisation Charter 5 that commits to creating a culture of Internationalisation where all staff and students are prepared for working in a global environment that fosters international & Intercultural perspectives and initiatives.	Develop and deliver specific culture and language training	DIS	DIS	2020
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Promote a culture of internationalisation where all staff and students are prepared for working in a global environment and where International students are welcomed and supported to achieve their desired outcomes	Collate cultural awareness session information into online resource	DIS	DIS	2020
Quality learning, teaching and applied research to develop work-ready graduates and lifelong learners	Goal 2	Internationalisation of Curriculum and Staff	Commit to including internationalisation into existing programmes and into new programme development.	Develop Internationalisation Charter –eg:	DIS	Working group	2020
Engaged and inspired staff, equipped with the capabilities to support and deliver best learning	Goal 3	Students expectations of future success are delivered by the institute	Monitor and track potential student complaints, withdrawals, course changes.	Partner with TKK, Ops, student success	DIS	TKK, Ops, Student success	2020
Engaged and inspired staff, equipped with the capabilities to support and deliver best learning	Goal 3	Students expectations of future success are delivered by the institute	Ensure Institute wide awareness of EPI targets	Partner with Learning & Development to provide teaching staff professional development opportunities to learn how to facilitate effective collaborative learning between domestic and international students.	DIS	Learning & Development	2020
Engaged and inspired staff, equipped with the capabilities to support and deliver best learning	Goal 3	Students expectations of future success are delivered by the institute	Set Institutional EPI 6 targets 2019 – 2022 based on parity with the ITP sector and improvement targets	Work with Ako Ahimura to develop courses on Western styles of teaching for international students	DIS	Committees	2020
Engaged and inspired staff, equipped with the capabilities to support and deliver best learning	Goal 3	Students expectations of future success are delivered by the institute	Set Institutional NPS survey scores 2019 – 2022	Use PAQC to reinforce and encourage collaborative work between domestic and international students	DIS	Committees	2020

Engaged and inspired staff, equipped with the capabilities to support and deliver best learning	Goal 3	Students expectations of future success are delivered by the institute	Educate staff on student expectations of success	Partner with teams to arrange a "Study & Stay" on our Unitec Marae - open to international students and international support staff	DIS	Student success & Marae team	Jun-19
A financially sustainable business to invest in the future	Goal 4	Contributing to the financial sustainability of Unitec	Managing to budget and proactively support growth opportunities	Managing to budget and proactively support growth opportunities	Finance	All teams	ongoing
A financially sustainable business to invest in the future	Goal 4	Contributing to the financial sustainability of Unitec	Managing to budget and proactively support growth opportunities	Ensuring Unitec maintains its connection to its International cultural capital and its place in the International Market.	Marketing	Marketing	ongoing
A financially sustainable business to invest in the future	Goal 4	Contributing to the financial sustainability of Unitec	Actively promote APL (Assessment of prior learning) as compliance and as another revenue stream - attractive to onshore Internationals on work visas	Actively promote APL (Assessment of learning) - refers to previous study or experience (prior achievement) relevant to the programme the student is about to enrol in or is currently studying. It enables a student to proceed with his or her study without repeating aspects of the qualification previously studied, or re-learning skills the student has already achieved through past work or other experience.	DIS	Quentin Williams	2020
A financially sustainable business to invest in the future	Goal 4	Contributing to the financial sustainability of Unitec	Opportunities for International high school students to start with domestic students on UPC programmes – leading to fulltime study when high school study completed	Partner with UPC	DIS	UPC, Business support, Finance	2020
A financially sustainable business to invest in the future	Goal 4	Contributing to the financial sustainability of Unitec	Develop alternate semester offerings for markets out of sync with NZ semesters.	Partner with HOSs and marketing to develop these alternate semester start dates for specific programmes and markets	DIS	Schools	2020

APPENDIX 2:

INTERNATIONAL SUCCESS **QUICK WINS** ACTION PLAN

Proposed "Quick Wins" could be achieved by reallocating resources and shifting focus & priorities.

Eg: Goal 1 Action a)

This action relies on increasing face to face interactive support to new students and involves delivering a "1st 6 weeks" experience that should ensure that students have a robust orientation to help them settle in well to live and study in New Zealand.
The "1st 6 weeks" experience will concentrate on the requirements and recommendations of the Education (Pastoral care of International students) Code of Practice - Outcome 5: Orientation.

Eg: Goal 1 Action b)

This action requires a dedicated International support centre based on the ground floor of Te Puna. The centre would be open for International student support based on the same opening hours of the Pacific and Maori centres.

ISS Goals	Goal 1 – Students feel supported and valued for their contribution to New Zealand's economy and community	Goal 2 – Internationalisation of Curriculum and Staff	Goal 3 – Students expectations of future success are delivered by the institute	Goal 4 – Contributing to the financial sustainability of Unitec
Quick Wins	a) Specialist International team supporting 1st 6 week requirements b) International support presence at Waitakere campus c) Provide an International student centre staffed Monday to Friday 9-5pm d) Deliver Code of Practice workshops to all frontline staff e) Support schools with academic progress registers and monitoring f) Support school International Champions	a) Engage staff in continuing with delivery of cultural awareness sessions for all staff – 2 sessions per month b) Collate session information into online resource for staff c) Engage staff in delivery of cultural awareness sessions at all new staff inductions d) Engage local international community groups in international student events	a) Work with TKK on setting EPI targets 2019-2022 including rationale b) Focus on 2019 NPS areas of high detraction c) Focus on 2019 NPS areas of high promotion d) Specialist team to be track and highlight potential risks to student retention	a) Specialist team partnering with all teams to improve year 1 and year 2 retention and to follow-up with all students at the end of each semester to check reenrolment has been completed and if not why not

Unitec Pacific Success Strategy 2018 - 2023

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Background

Unitec is committed to improving its performance to meet the aspirations of Pacific students and communities. This commitment is endorsed and supported by the **Fono Faufuatua**[1]**,** a standing committee of the Unitec Council who advise the Council, Management and the whole of Unitec in ***"promoting lifelong learning and prosperity in Pacific communities by assisting to establish Unitec as the Pacific people's tertiary institute of choice in the Auckland region (Terms of Reference)".***

This will be advanced through enhancement of Pacific student experiences, increased participation, completion and progression rates of Pacific students, and the development of innovative programmes that meet the needs of Pacific communities.

This commitment is longstanding and has to date been reflected through the establishment of the **Pacific Centre**, and the positions of:

- Director of Pacific Success
- Pacific Community Engagement Advisor
- Pacific Academic Development Lecturers
- Pacific Research Leader

Unitec's commitment to Pacific students and communities has been guided by a number of strategic documents from within the institute and nationally, primarily, the Tertiary Educational Strategy 2014 - 2019 and the Ministry of Education's Pasifika Education Plan 2013 - 2017. The responsibility for meeting Pacific student and community needs will be shared across the whole of Unitec.

National Objectives

The current Tertiary Education Strategy 2014 - 2019 outlines the government's expectations and priorities for New Zealand's tertiary education system and this contributes towards the government's prescribed six strategic priorities. Priority three of the strategy focusses on **'Boosting achievement of Maori & Pasifika'.** This indicates the importance the government is placing on increasing the achievements of Maori and Pasifika students.

The commitment to Pacific achievement is further supported by the Ministry of Education's **Pasifika Education Plan 2013 – 2017**, and the Tertiary Education Commission's **Pasifika Framework 2013 – 2017.** These two strategies collectively focus on:

[1] Fono Faufautua – The Unitec Pacific advisory committee consisting of Pacific members of the community and the tertiary sector.

- A continued and accelerated educational performance at all levels of education by Pacific students.
- Pacific students successfully transitioning into higher levels of education.
- Pacific students successful transitioning into employment as a highly skilled and highly educated workforce that will fully contribute to New Zealand's economy and society.
- The use of research and evidence effectively to achieve the goals of Pacific students in education.

Auckland Regional Context

According to the 2013 Census, two thirds of all Pacific peoples in New Zealand live in the Auckland region. Pacific people make up 14.6% of Auckland's total population. They are third behind European (59.3%) and Asian (23.1%). The Auckland Pacific population is a youthful one, having the lowest median age across all ethnic groups, 22.6 years, compared to the Auckland median age of 35.1 years.

Auckland has the largest diverse Pacific population in the world. The Pacific population of Auckland consists mostly of Samoans, Tongans, Cook Islanders, Niueans, Fijians, Tuvaluans, Tokelauans and other smaller community groups from around the Pacific. With their roots now firmly planted in Auckland, Pacific communities have thrived over the years with Pacific peoples succeeding in education, business, entertainment, sport and politics to name a few. The diversity has seen the Pacific community become a major part of the Auckland landscape, indicated by many developments such as:

- Pacific festivals – Pasifika & Polynesian Secondary Schools Festival
- Pacific churches
- Pacific language schools
- Pacific community groups
- Pacific healthcare groups
- Pacific trusts and foundations
- Pacific businesses and enterprises
- Pacific cultural and entertainment
- Pacific media networks

According to the 2013 Auckland Regional Council report, it is anticipated that the Pacific population within Auckland will continue to grow through migration and natural increase and will continue to blend with the wider New Zealand population in generations to come. This will undoubtedly result in shifts and changes to traditional ethnic and cultural identity among Pacific groups.

For Unitec, this means that it needs to see a significant increase in the number of Pacific peoples engaging in our programmes if we are to retain our relevance to Pacific communities and fulfil our regional responsibilities. Currently 15.4% of Unitec's student population identify as being of Pacific[2] heritage. As the population grows, the challenge for Unitec is ensuring that it increases the levels of participation and educational attainment of Pacific peoples in order to ensure a regional prosperity as well as increased quality education & employment opportunities for Pacific peoples. It is imperative that Unitec is responsive to the current and future needs of Pacific students and communities.

Unitec's Context

Unitec seeks to accommodate diversity and use a range of different pedagogical approaches, different teaching and learning methodologies, to better engage students. While Unitec is committed to developing a broad curriculum, it also needs to ensure that the curriculum embraces traditional and contemporary Pacific world-views and philosophies. This commitment is emphasised in the goals and objectives of the Unitec Pacific Success Strategy.

Following the success of the 2010-2015 Unitec Pacific Success Strategy which saw the Unitec Pacific course success rate grow from 64% to 72% during that period, the 2017-2023 Pacific Success Strategy will provide the leadership and direction for Unitec to further increase its Pacific success and completion rates.

The 2017-2023 Unitec Pacific Success Strategy is mandated by the government & community and has been developed in consultation with various Pacific stakeholders. The strategy provides a framework for Networks and Pathways to develop their own Pacific responsiveness initiatives.

[2] This include all Pacific groups belonging to the three areas of Polynesia, Micronesia and Melanesia.

The Unitec Pacific Success Strategy 2018 - 2023

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Vision

Unitec is the world-leading institution for Pacific Prosperity and the tertiary institution of choice for Pacific Peoples.

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To achieve this, Unitec will:

- Produce successful, skilled and work-ready Pacific graduates.
- Have highly capable staff with capacity to empower Pacific students for success.
- Embrace and promote Pacific knowledge, practice and perspectives across the curriculum.
- Actively remain connected with Pacific communities.

Goals

The Unitec Pacific Success Strategy is made up of four interrelated goals. These provide a framework for Networks and Pathways to plan their responsiveness for Pacific students and communities.

Goal 1: Increase Pacific student success, completion and participation rates.

Objectives:

(a) Increase the success and completion rates (course and programme) of Pacific students to improve year on year, with the goal of reaching an 80-84% course completion rate by the year of 2023.

Commented [FT4]: Consider changing this to "achieving parity" with mainstream. This is inline with TEC goals for Pacific students.

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(b) Increase the number of Pacific students progressing to higher and postgraduate level programmes year on year.

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(c) Ensure Networks and Pathways are supported and resourced to:

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(i) regularly track, monitor and evaluate their Pacific success and completion rates.

(ii) take the necessary actions to ensure Pacific students are supported appropriately and succeeding in their studies.

Goal 2: Grow Unitec staff capability and capacity to empower and support Pacific students

Objectives:

(a) Through the Unitec values of *'Generosity of Spirit'* and *'Accountability',* ALL staff are inspired to:

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(i) empower and support Pacific students.

(ii) increase their awareness of Pacific knowledge and culture through Pacific cultural competency workshops and experiences.

(b) Through the Unitec Partnership principles of *'Authority', 'Responsibility' and 'Guardianship'*, PACIFIC staff are inspired to:

(iii) lead, champion and promote Pacific knowledge and practice within and beyond their Networks, Pathways and Service areas.

(iv) aspire to leadership roles within Unitec.

(c) Grow Pacific staff[3] numbers to reflect the Pacific student population at Unitec as well as the growing Pacific population of the wider Auckland community.[4]

Goal 3: Grow Pacific knowledge and awareness in Learning, Teaching and Research.

Objectives:

(a) Incorporate relevant Pacific knowledge and dimensions within the current teaching and learning curriculum/programmes.

(b) Ensure Pacific cultural values and practices are embedded in the student experience.

(c) Grow Unitec's profile as a Pacific research institute through increased research training, opportunities and resourcing.

Goal 4: Develop and maintain partnerships with Pacific communities and stakeholders.

Objectives:

(a) Engage in partnerships with the Unitec Pathways College (UPC) to promote Unitec to the Pacific students of Unitec's partner secondary schools.

(b) Ensure Pacific peoples have access to Unitec for their development and to increase their participation in economic, social and wellbeing opportunities.

(c) Increase Unitec representation on Pacific industry and advisory committees.

Leadership and Monitoring

The Director of Pacific Success and the Pacific Centre leads and oversees Unitec's commitment to meet Pacific student needs, whilst at the same time providing a Pacific

[3] According to research by Anae, Anderson, Benseman & Coxon, Pacific staff at tertiary institutions provide role models and mentors and support for Pacific tertiary students (from 'Pacific Peoples and Tertiary Education: Issues of Participation' report 2002)

[4] Pacific students currently make up 15.4% of Unitec's student population, while Pacific people currently make up 14.6% of Auckland's total population. Pacific staff at Unitec only make up 8.7% of the total Unitec staff population.

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Commented [FT9]: Consider specialising in 'Pacific Community Engagement Research'.

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Commented [FT10]: Partner with:
(i) Unitec Pathway College (UPC) to promote Unitec to Pacific students from primary to secondary schools.
(ii) Marketing team to promote Unitec to the wider Pacific community.

friendly space for students to gather and study. While pastoral care is an important part of the support provided to students at Unitec, there is a large focus on academic support which signals the difficulty the current curriculum has in realising Pacific student success[5]. To ensure Pacific students realise their potential and experience academic success at Unitec, the Director of Pacific Success will:

- work across Unitec to increase knowledge, understanding and skills of their Pacific students and the Pacific community.
- ensure that all Pacific student have access to pastoral and academic support
- ensure there is a space and environment for Pacific students to engage with each other and to support each other in their studies.
- develop a Pacific Implementation Framework to advise and assist the institution's implementation of the Pacific Success Strategy.

Commented [FT11]: Change to 'Pacific Success Action Plan'.

The Director of Pacific Success will provide regular reports to the Fono Faufautua and the wider Unitec leadership team on the success of Unitec in meeting its aspirations through regular Pacific Success Reports (PacSR). The PacSR will provide up to date data on Pacific student success & completion rates, and report on internal partnerships with Networks and Pathways

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In addition, Network and Pathway leaders will:

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- report on how they have incorporated the objectives and goals of the Pacific Success Strategy into their own annual planning and implementation processes. This will be addressed in their annual PEP reports.
- respond to the PacSR report from the Director of Pacific Success via a responding document template, the Pacific Progress Report (PacPR).

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Timeframe

The Unitec Pacific Success Strategy 2018 - 2023 was endorsed by Unitec's Fono Faufautau on the 9th November 2017 and by Unitec's Executive Leadership Team on the 2nd November 2017. It will be delivered from the 1st January 2018 to the 31st December 2023.

[5] There has been a decline in course success & completion rates for Pacific students since 2015.