

## 2019 NZDE/ BENGTECH TEACHING & RESEARCH FORUM

Ara Institute of Canterbury  
Kahukura Building, Moorhouse Ave  
Christchurch

**Wifi network: TeachingForum**  
**Password: teaching19**

11 & 12 February 2019  
[contact@nzbed.org.nz](mailto:contact@nzbed.org.nz)



# Welcome

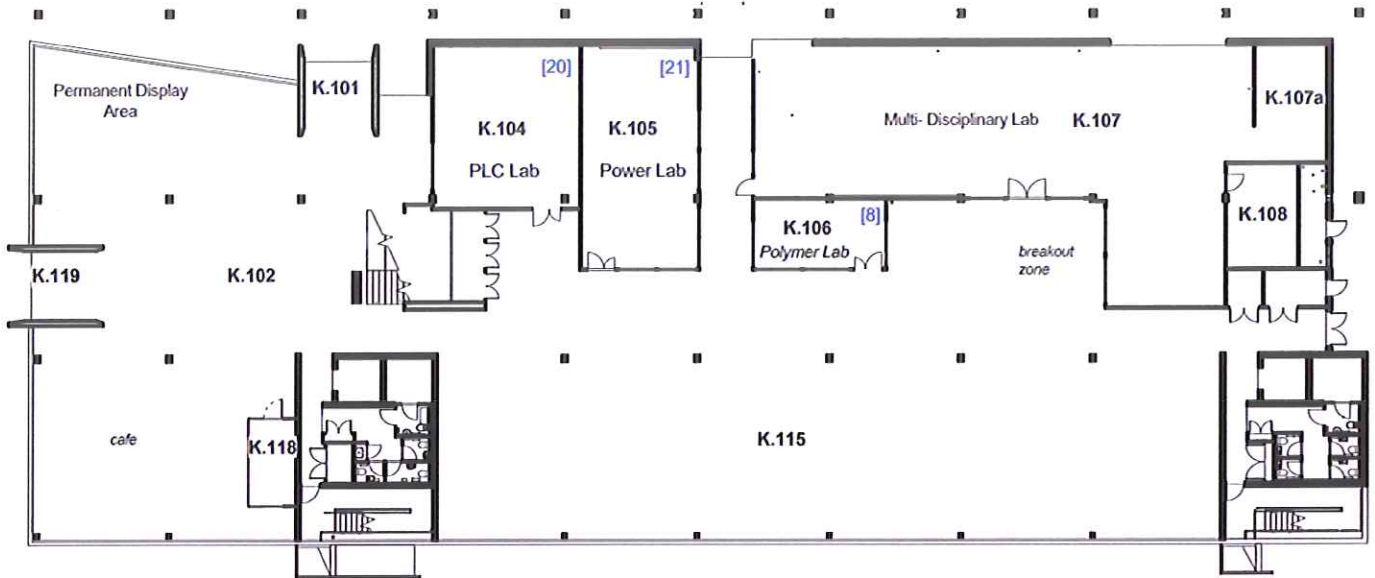
The NZBED and BEngTech Management Group extend a warm welcome to all attendees at this year's forum.

We appreciate your interest and enthusiasm in attending and taking part in this annual event and we hope that this year's focus on innovative learning provides you with some inspiration and best practice ideas that you can take back to your institutions.

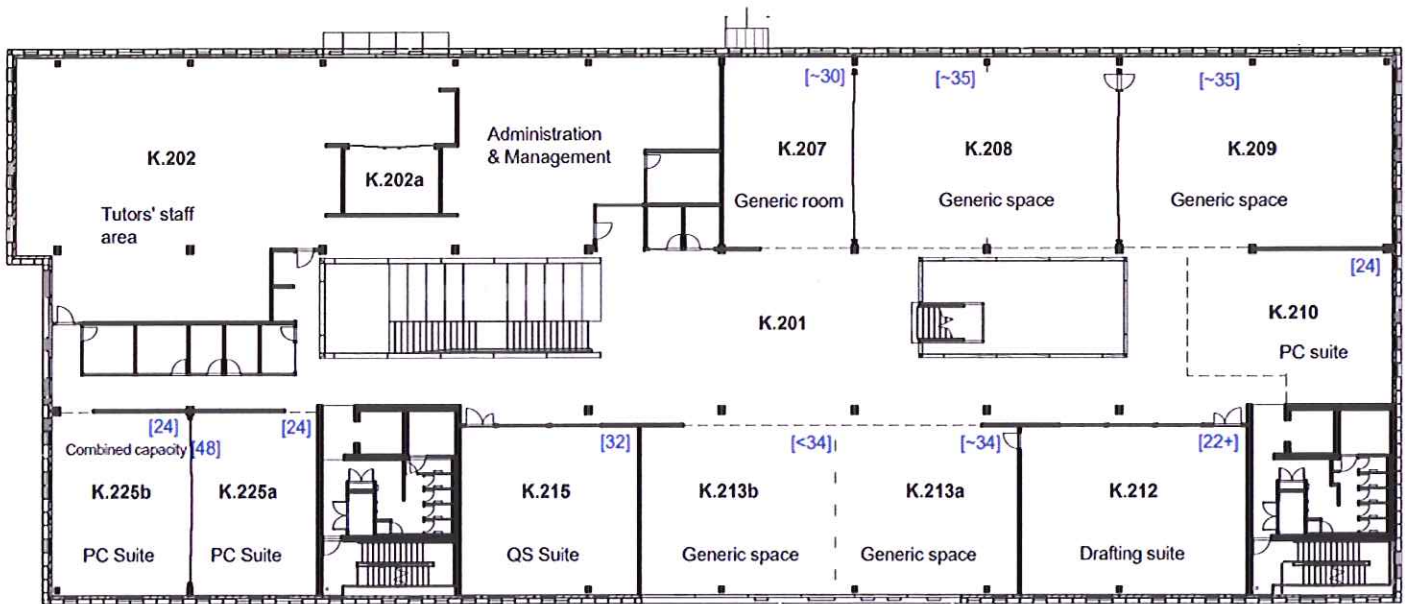
We look forward to the sharing of ideas and developing those important connections with our colleagues across the country which makes this event so successful.

This booklet includes the programme for each day and brief outline of each presentation. If you need any assistance during the forum please don't hesitate to ask.

We would like to acknowledge the support of the Ara Engineering administration team in arranging this event and we look forward to an interesting and informative two days in Christchurch.

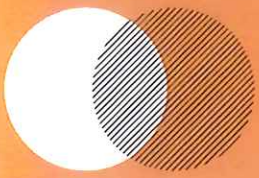


SCALE @ A4 1 : 300 DRAWING LEVEL 1 FLOOR PLAN



SCALE @ A4 1 : 300 DRAWING LEVEL 2 FLOOR PLAN





# Day one schedule

**9:00 AM** Welcome: **Tony Gray** CE Ara Institute of Canterbury

**09:15 AM** Plenary session: **Priya Patel**, Beca - Mentoring & Graduate Development Programme

**10:15 AM** Morning tea

**11:00 AM** Plenary session: **Trent Fearnley** - Fire the Silent Industry

**11:45 AM** Concurrent session

**James MacKay & Richard Nyhof**

**Pete Wilson**

**12:30 PM** Lunch

**13:30 PM** Concurrent session

**Brent Philips**

**Hugh Wilson**

**14:15 PM** Concurrent session

**Carlo Gabriel**

**Jai Khanna**

**14:45 PM** Afternoon tea

**15:30 PM** Plenary session: **Aidan Bigham**-Design Factory

**16:30 PM** Wrap up session

**18:00 PM** Conference Dinner @ The Good Habit Cafe  
319 St Asaph St, Christchurch Central

**MONDAY 11 February 2019**

0900 - 0915	Welcome reception K.208	
0915-1000	Plenary: K.208 Mentoring & Graduate Development Programme Priya Patel, Beca	
1015 - 1100	Morning tea K.213	
1100-1130	Plenary: K.208 The Silent Industry: Fire Trent Fearnley, Institution of Fire Engineers/Fire and Emergency NZ/Fire Protection Association	
1145 - 1215	Concurrent One	Concurrent Two
Room	K.207	K.209
1145-1215	Developing an industry sponsored Engineering Degree in Asset Management James Mackay & Richard Nyhof Wellington Institute of Technology/Otago Polytechnic	Secondary Tertiary Pathways project Pete Wilson, Ara Institute of Canterbury
1230-1330	Lunch K.213	
1330-1445	Concurrent One	Concurrent Two
Room	K.207	K.209
1330-1400	Embedding Māori achievement tikanga: An innovative example, Brent Phillips, Waikato Institute of Technology	What Civil Graduates actually do Hugh Wilson Unitec
1415-1445	Enhancing Students. Learning Word Problems in Thermodynamics based on Newman's Error Analysis Carlo Gabriel, Southern Institute of Technology	Education for Sustainability, Jai Khanna, Waikato Institute of Technology
1445-1515	Afternoon tea K.213	
1530-1630	Plenary: K.208 Design Factory New Zealand: A co-creation space where students work in multidisciplinary teams with industry partners to solve complex problems. Aidan Bigham, Waikato Institute of Technology.	
1645 - 1700	Conclusion to the day K.208	



# Day one content

## **Priya Patel: Mentoring & Graduate Development Programme**

At Beca we work hard to create an environment where our people excel. Two initiatives integral to how Beca grow our people are our mentoring and graduate programmes. We have a strong commitment to employ and develop graduates and our successful track record of attracting talented young professionals to a career with Beca speaks for itself. Mentoring is an important part of our culture and is strongly encouraged and supported by the organisation.

## **Trent Fearnley: The Silent Industry - Fire**

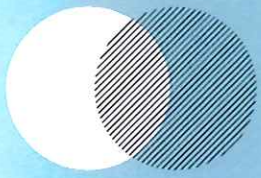
People think of the fire industry as the big red truck and firefighters. Actually it involves over 10 specialisations. Our new career pathway will start with a Pathway/Gateway/Cadet programme, includes work experience and earns a NZQA Certificate in Fire Technology. It continues to Level 2-4 Competenz courses (those interested in trades), NZDE Fire Engineering, BEngTech and to MEng (Fire). In a downturn of the economy fire systems still need to be maintained, tested, fire safety management is required by law and continuous fire safety promotion. Our industry makes the world a safer place and we are passionate about it.



# Day one content

## **James Mackay & Richard Nyhof: Developing an industry sponsored engineering degree in asset management**

This paper describes the process to date of the development of an industry sponsored engineering degree in asset management. The degree is tailor-made for the industry and designed to be delivered primarily in the workplace. It comprises a mixture of taught papers and papers that have been integrated into three large projects that culminate in a capstone end point assessment. The paper will also describe the next phase of this E2E project, when the curriculum will be piloted by both WelTec and Otago Polytechnic.



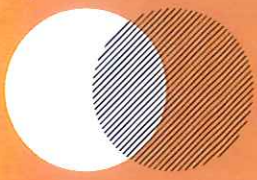
## **Pete Wilson: Lessons from the Secondary Tertiary pathway project**

Engineering E2E funded a number of STPP (Secondary Tertiary Pathway Projects.) The goal was to try new strategies to engage with high school students, leading to increasing enrolments in NZDE and BEngTech. A number of ITP's (Institutes of Technology and Polytechnics) participated, with a range of programmes undertaken across New Zealand. The programme at Ara morphed from delivering electro-technology courses to working with schools, including Maori immersion schools, delivering design engineering informally. Out of this a bold strategy, taking the message to schools, is being developed.

## **Brent Phillips: Embedding Maori achievement tikanga: An innovative example**

"Let's embed ako, tikanga and te reo in our teaching & learning", but how? We strive to increase Maori engagement & achievement, but the tikanga to reach these goals can be difficult. A novel project has engaged students & staff from across Wintec faculties as well as iwi, businesses, Council and funding agencies from the Waikato rohe to collaborate in a culturally appropriate way. The outcome will be not just a lasting public artwork for our community, but increased understanding for participants of how to embed Maori achievement into teaching & learning.





## Hugh Wilson: What civil engineering graduates actually do.

This presentation presents the results of a research project to determine exactly what NZDE and BEngTech civil engineering graduates do in practice. Graduates from the Unitec programmes were surveyed about the roles they filled in the engineering industry. From this survey and previous work, several distinct roles were identified and graduates in these roles were interviewed to provide a detailed description of the tasks they carried out and what competencies they required to do this. These interviews provided a coherent and accurate picture of the competencies that civil engineering graduates require.

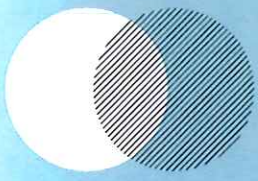
## Carlo Gabriel: An Enhancement to Learning Word Problems in Thermodynamics based from Newman's Error Analysis

① Can the Newman's Error Analysis be applied to other courses?  
What's key point to design the experiment B

This action research aims at improving the performance of eight NZDE (Mechanical) students enrolled in Thermodynamics through enhancement to learning word problems based from Newman's Error Analysis. In this study, the researcher employed the Newman's Error Analysis procedure to identify the errors of the students in dealing with mathematical word problems in Thermodynamics. From these identified errors, the researcher produced a study guide that would enhance the learning of the course. This study adopted experimental group pre-test and post-test research design. The researcher employed this analysis in developing and testing the effectiveness of the study guide.

② How to solve the problems after evaluation by Newman's error analysis

Reading / comprehension / Fran

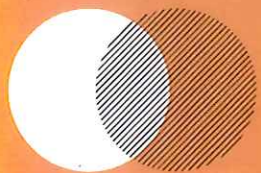


## **Jai Khanna: Education for Sustainability**

Educational development relies comprehensively on sustainable strategies, it is about learning to think and act in ways that will apply safety measures to the future wellbeing of our people. Innovative learning involves teaching practices that is delivered to students to establish the connection of education for sustainability. A range of teaching practices are explained and demonstrated in the presentation, such as blended learning (flipped classroom), inquiry based learning, active learning and collaborative learning. Reflection on these teaching practices is also performed by conducting in-class feedback surveys for qualitative teaching and to accomplish the ultimate goal of sustainable education.

## **Aidan Bigham: Design Factory NZ**

DFNZ allows students to explore new themes that challenge the usual paradigms. We encourage students to take ownership of their learning, to be open minded, and to have the freedom to respond to solutions without the shackles of a traditional design process driven by cost. By partnering with industry and exposing students to create solutions for real world problems, DFNZ has the aim of producing global citizens who have a better chance of succeeding in the workplaces of the future. This session will be very active and explore a challenge that will relate to all of us.



# Notes



# Day two schedule

**9:00 AM** Welcome

**09:15 AM** Plenary session: **Trudy Harris & Mark Symes**

AAEE - Transitioning from Educational Practitioners to Educational Researchers

**10:15 AM** Morning tea

**11:00 AM** Plenary session: **Bill Sole**, NZBED - NZDE

Consistency Review

**12:00 PM** Plenary session: **Lisa Drysdale & Melanie Ooi**

Engineering Project Awards

**12:30 PM** Lunch

**13:30 PM** Concurrent session

**Hong Zhou**

**Penelope De Boer**

**14:15 PM** Concurrent session

**Brett Williams**

**Debbie Hogan**

**14:45 PM** Afternoon tea

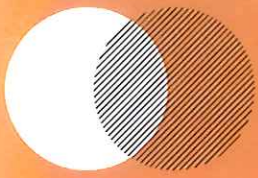
**15:30 PM** Plenary session: **Michael Edmonds** - Making

Tertiary Studies in Engineering More Relevant

**16:15 PM** Conclusion to forum

**TUESDAY 12 February 2019**

0900 - 0915	Welcome reception K.208	
0915 – 1015	Plenary: K.208 AAEE Transitioning from Educational Practitioners to Educational Researchers Trudy Harris & Mark Symes	
1015 - 1100	Morning tea K.213	
1115-1145	Plenary: K.208 NZDE Consistency Review Bill Sole, Chair, Quality Assurance Committee, NZBED	
1200-1230	Plenary: K.208 Engineering Project Awards presentation for NZDE & BEngTech students. Presented by Lisa Drysdale & Melanie Ooi	
1230-1330	Lunch K.213	
1330-1445	Concurrent One	Concurrent Two
Room	K.207	K.209
1330-1400	Reflection on the flipped teaching and student teaching practice, Hong Zhou, Waikato Institute of Technology	The Emporium method for teaching engineering maths at Weltec. A possible way forward? Penelope De Boer Wellington Institute of Technology
1415-1445	Bringing Engineering to life Brett Williams Engineering New Zealand	NMIT NZDE Engineering Project Debbie Hogan Nelson Marlborough Institute of Technology
1445-1515	Afternoon tea K.213	
1530-1600	Plenary: K.208 Making Tertiary Studies in Engineering More Relevant Michael Edmonds Ara Institute of Canterbury	
1615 - 1630	Conclusion to the forum K.208	



# Day two content

## Trudy Harris & Mark Symes: Transitioning from Educational Practitioners to Educational Researchers

In this session Trudy and Mark (representing AAEE) will discuss current thinking in the educational research area as well as give feedback on the highlights of the 2018 AAEE Conference held in Hamilton.

## Bill Sole: NZDE Consistency Review

*in terms of graduate profile. I notice there is some difference between NZDE & B EngTech.*

In this session Bill (representing the NZBED as Chair of the QA committee) will be reviewing the outcome of the recent NZQA Consistency Review of the NZDE, discussing the threshold used to determine sufficiency with the graduate profile, outlining the types of programme evidence submitted by providers, questioning the effectiveness of stakeholder surveys, presenting examples of good practice and then discussing the issues and concerns raised by the NZQA reviewers. He will then reinforce the importance of teaching with the graduate profile in mind and not just teaching to the course learning outcomes, and how every course can progressively build in students the capabilities desired by employers.

*can't remember  
↑  
for the same course  
just wonder  
why  
not your job  
hear your voice*

**Presentation of final year project award** for both NZDE and BEngTech. Awards presented to student's institution by Lisa Drysdale and Melanie Ooi.



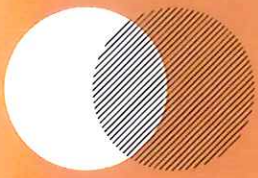
# Day two content

## **Hong Zhou: Reflection on the flipped teaching and student teaching practice**

In the presentation, the author will introduce his implementation of the flipped teaching for engineering students in Wintec. The reflection includes four parts: description, reflection, thinking and application. By comparing the pass rates in Mechanics (DE4302) from 2013 to 2017, the result shows that the application of the flipped teaching has a positive effect on students' learning. The presentation also shares some tips for the flipped teaching.

## **Penelope De Boer: The Emporium method for teaching engineering maths at Weltec: A possible way forward?**

From working with large numbers of students at WelTec and earlier at Victoria University I have learned what works and what does not work in improving student achievement in mathematics. We all know it but often forget it - students learn mathematics by doing mathematics, not by listening to someone talk about doing mathematics. The use of mymathlab combined with personalized, on-demand assistance and mandatory student participation has been a key element of improved pass rates at WelTec. Overseas this model is called the Emporium Model, though I didn't know that, and I developed my virtually identical method in ignorance.



## **Brett Williams: Bringing Engineering to life**

Brett Williams, the GM Professional Standards at Engineering New Zealand will provide an overview of key Engineering New Zealand programmes, including exciting initiatives to:

- Strengthen the pipeline into engineering and technology careers from schools
- Improve diversity in the profession
- Shape a future occupational licensing regime
- Strengthen recognition for engineering technicians

Brett will also provide a update on membership pathways for students and engineering academics and opportunities to engage and contribute.

## **Debbie Hogan: NMIT NZDE Engineering Project**

The Engineering Project is one of the Capstone courses of the NZDE programme. At NMIT, the design project entails the subdivision design for a real world project. It has been recognised as an exemplar project in the latest project moderation round. The 2017 project was completed in groups of 4 students, and was designed according to Nelson City Council Land Development Manual 2010 (NCC LDM). This presentation illustrates how graduates achieve the Graduate Profiles over the development of the project and ensures the NMIT graduates are work ready.





## **Michael Edmonds: Making Tertiary Studies in Engineering More Relevant**

This session presents the developing results of a project funded by Engineering eze to identify and promote the uptake of good practice designed to ensure that graduates are well-prepared for employment. We will share the results of surveys and focus groups with engineering educators and employers and analysis of the distribution of good practice and participation and outcomes data. A Good Practice Guide and Engineering Education Practice report will be released at the forum.



# Notes