

From the Head of Department

Choose to do your postgraduate study in the Department of Engineering Science and you will receive excellent guidance and supervision from some of New Zealand's best and brightest academics.

Across our various subject areas, we have academic staff who are at the very top of their respective research specialties. We have a long tradition of providing world class supervision to our students, in part because our academics are readily available for meetings and research discussions.



A postgraduate degree in Engineering Science is also a valuable qualification in a wide range of future careers.

I encourage all of you that are eligible to give serious thought to postgraduate study.

A handwritten signature in blue ink, appearing to read 'M. Ehrgott'.

Professor Matthias Ehrgott

Do you...

- enjoy the challenge of problem-solving?
- enjoy learning?
- want to further hone your analytical skills?
- have an interest in a particular subject?
- want to take on more self-responsibility?
- want to take a change in direction?

Then, consider postgraduate study and research in Engineering Science.

Our postgraduate programmes

Graduate Diploma in Engineering (GradDipEng): a one year programme primarily for students without a Bachelor of Engineering

Post Graduate Diploma in Operations Research (PGDipOR): a one year programme, primarily for students who want to follow a career or postgraduate study in OR, but who may not have a strong OR background

Master of Engineering Studies (MEngSt): a one year programme of taught courses

Master of Engineering (ME): a one year programme of advanced study in Engineering Science through supervised research

Master of Operations Research (MOR): a one year programme of advanced study in Operations Research through supervised research

Master of Energy (MEnergy): a one year inter-faculty programme of advanced study in energy science and business technology, with research and taught options

Doctor of Philosophy (PhD): a three year programme of advanced study and research

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Postgraduate research and study in Engineering Science



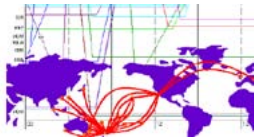
Operations Research

Operations Research (OR) is about using mathematics and computers to make better decisions. With 9 staff in this area, many of whom are leaders in their fields, the OR group in Engineering Science offer a wide range of research opportunities.

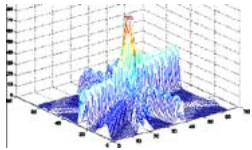
The PhD and Masters of Engineering (ME) both offer opportunities for research in OR. Other OR programs include the research based Masters in Operations Research (MOR) and the Postgraduate Diploma in Operations Research (PGDipOR), a one year programme of taught courses. These are available to students from a wide range of backgrounds.

Scheduling and Rostering

The OR group is a world leader in applying optimisation to practical rostering and scheduling problems. Our work with Air New Zealand is particularly well known.



Optimization under Uncertainty



The OR Group is world renowned for its work on optimizing problems containing uncertainty, and have a track record of success in applying these techniques to yacht design and electricity markets.

Other research areas include:

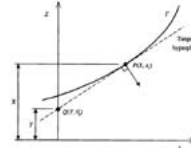
- Multicriteria optimization
- Network design & simulation
- Boat routing with uncertain weather
- Integer programming & applications
- Cancer treatment planning
- Dynamic programming
- Ambulance logistics
- Forestry



Continuum Mechanics

Continuum Mechanics (CM) is one of the fundamental applied engineering sciences used to describe, explain and predict the behaviour of the physical world around us.

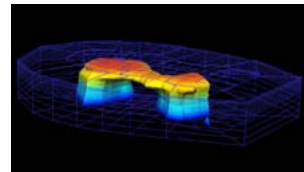
CM involves mathematical modeling, mechanics principles and computational techniques. Some projects link continuum mechanics models with optimization tools to infer unknown parameters or to maximize profit.



Specific research areas include:

- fluid flow in geothermal reservoirs
- manufacturing processes for advanced composite materials
- modelling wind flows for wind farm design
- Petroleum reservoir engineering (well testing, reservoir simulation, reservoir characterization)
- environmental fluid dynamics
- fundamental thermomechanical constitutive modelling of materials
- geotechnical problems, for example pavement design

Projects such as these equip students with problem-solving, modelling analytical and computing skills relevant to many industries in New Zealand and worldwide.



Profiles

Kavinesh Singh, BE, PhD

The Engineering Science programme appealed to me as it had a strong focus on applying mathematics to solve real engineering problems, and provided exposure to a broad range of areas - engineering and economic - in which the learnt skills could be practiced and advanced.

By the end of my bachelor's degree, I had developed a strong interest in Operations Research - the science of best possible decision making - and decided to specialise in this area by doing a doctorate in Operations Research.



The focus of my PhD was on using mathematical optimisation to develop decision-support tools for optimal capacity planning of electricity distribution networks. The work was in collaboration with Vector Limited - New Zealand's largest electricity distribution company.

Job offers were already coming in before I had finished my PhD. My first position was as an Enterprise Risk Analyst with Mighty River

Power, which covered risk strategy, insurance analysis and advice, new technology cost-benefit analysis, and investment optimization. I am now a Regional Manager at Energy Exemplar in London, managing their European and Turkey sales, marketing, consulting, training, technical support and client relationships.

Gary Nates, BE, ME, GIPENZ

Before going to University, I wanted to get into Operations Research. Engineering Science provided the perfect platform, with a structured degree and a well rounded approach to solving problems. After working with both Mighty River Power and Contact Energy over the summer breaks, I chose to do my final year project on finding the best location of wind turbines on a plot of land for a wind farm. I really enjoyed doing my final year project and decided to undergo a Masters thesis in order to expand my researching skills. Similarly, my Masters focused on the New Zealand electricity industry and how the market could be manipulated.



I've been working as a transportation engineer in Christchurch for the last two years. My degrees have given me a large number of skills and tools to adapt to the ever changing environment in light of the earthquakes, which has helped me progress my career and find more challenges. I'm now using those skills to analyse the network performance of the Auckland Motorways. My current goal is become a chartered professional engineer.