

Transportation Programme - Research

Research in transportation engineering within the Department covers a wide range of topics, reflecting the diversity and the important socio-economic role of the transportation system in a modern society.

- **Traffic and Safety research** involves undertaking observations of traffic behaviour in the field (possibly before/after implementation of treatments) and analysing road, traffic and accident data using various computer software tools.
- **Pavements and Asset Management research** involves using highway materials and pavement testing facilities, and measurements of pavement performance in the field, as well as modelling maintenance and optimisation of assets.
- **Transportation Planning research** involves modelling travel behaviour using a variety of transportation planning software tools and predicting the effects (social, economic, environmental, etc) of policy, land use and transport network changes.

Some Current or Recent Transport Research Projects at Canterbury

Note: some of these topics may lend themselves to further research by someone else

Traffic and Safety Research

- Changes in Speed Behaviour resulting from installation of a Red Light Camera sign
- Changing NZ's left-turn Give Way Rule: Efficiency implications for intersections
- Correlation Between Travel Times on Links
- Cyclist Perceptions of Cycling Environment
- Driver Behaviour at Low-Radius, Low-Visibility Curves
- Driver Speed Behaviour during Signal Changes on major Urban Arterial roads
- Effects of colouring Cycle Spaces on road user behaviour at signalised intersections
- Effects of Traffic Calming Devices on road safety and speeds on urban local roads
- Estimation and evaluation of Capacity and Conflict of Shared Paths in NZ
- Influence on Safety of Perceptual Speed Management Treatments on NZ Rural Roads
- International comparisons using Accident Prediction Models
- Investigation into equations for determining Overtaking Demand
- Pedestrian behaviour at Road Crossings
- Suitable Roadway Widths for 2-way traffic movements of Traffic Management Devices

Pavements and Asset Mngm't Research

- Application of NZ Road Maintenance Mngm't Systems to the Philippines
- Behaviour of Pavements stabilised using Foamed Bitumen.
- A Data-sharing Framework for roading organisations' response to Disasters
- Durability & Fatigue Life of Open-graded Friction Courses
- Feasibility study of Foamed Bitumen
- Investigation of factors affecting Resilient Modulus for Hot Mix Asphalt
- Investigation of Road Base Shear Strains using in-situ instrumentation
- Mechanical properties of Foamed Bitumen Stabilised Mixes
- Modelling Nonlinear Behaviour of Unbound Materials under Axle Loads
- A Pavement Response & Performance Model for Unbound Granular Pavements
- Predicting pavement condition for Chip Sealed Unbound Granular Roads
- Recycled Glass in Asphalt pavements

Check out our website for details of more projects and how to obtain the reports

Transportation Planning Research

- Analysis of Forecasted Travel Time Benefits against those realised
- Bus service Reliability: Bunching & Arrival Time predictability
- Cognitive & Behavioural Responses to an Emerging Transport Fuel Deficit in NZ
- Congested Network Components & the Timing of Network Improvements
- Determining the Environmental Capacity of Local Residential Streets
- Effectiveness of Incident Management on Traffic Network Reliability
- Energy Risk Assessment Method for Freight Transportation Systems
- How We Got to School: A Study of Travel Choices of Chch Primary School Pupils
- Implications of Park & Ride on Urban Development Strategies in NZ
- Influences on Transport Policymakers & attitudes towards Peak Oil
- A Logistics-based Mode-change model for NZ Freight Transport
- Modelling Bus Dwell Times
- Road Pricing and Travel Demand Elasticity
- Travel Demand Estimation

(more details over page)

Some possible Future Transport Research Topics

Note: some of these are quite specific and some are more general areas of interest - contact the supervisor concerned for more information

Prof. Alan Nicholson

Expertise in accident analysis, network reliability, economic analysis

- Transportation Network Reliability and Incident Management
- Estimation and Mitigation of Travel Time Variability
- Analysis of Spatial and Temporal Distributions of Accidents
- Human Factors in Transport System Planning, Design & Management
- Development/Evaluation of Travel Demand Management strategies
- Application of Risk Management in Transport Engineering
- Public Transport Service Reliability

Dr Glen Koorey

Expertise in walking/cycling, highway design/operations, speed mngm't

- Effectiveness of Speed Limits and Traffic Management/Calming Treatments (speeds, crashes, volumes)
- Effects of Pedestrian/Cycling Facilities on Travel Behaviour (incl. surface colouring, pathway designs, bike boulevards)
- The relative Safety of different Travel Modes
- Review of Policies/guidelines for Setting Speed Limits
- Comparison of rural operations software tools (e.g. IHSDM Traffic Analysis Module, TRARR, etc)
- Development / Implementation of Campus Travel Plans (incl. introduction of Free Bus services)
- Driver understanding of Road Rules/Signs/Markings
- Adaption of US *Highway Safety Manual* & Safety Analyst Tools for NZ

Dr Mofreh Saleh

Expertise in pavement design, materials testing, asset management

- Investigation of Fatigue behaviour of different types of HMA (Hot Mix Asphalt) designs
- Development of Crack-free Structural Asphalts
- Investigation of Endurance Limit of Asphaltic Concrete
- Development of High Shear Strength Open-graded Friction Courses
- Investigation of practical solutions for Frost Heave Soils
- Best Recycling options for Old Chip Seals
- Utilisation of broken glass in Hot mix asphalts

Dr Kenneth Kuhn

Expertise in transport logistics, infrastructure mngm't, traffic flow theory

- Refining Deterioration Models used in Pavement (or other infrastructure) Management Systems
- Investigation of how Vehicle Speed, Flow, and Density change as Congestion subsides
- Applications of Multi-objective Optimisation in Transport
- Defining and characterizing Travel Time Reliability
- Traffic Flow Forecasting
- Airport Operations
- Sustainable Infrastructure Management

We also welcome enquiries about other research topics that may be of interest to you - contact one of our staff for advice

Research Course Options

Many of our qualifications involve some kind of research component. This may range from a small (0.1-0.2 EFTS) research project to a major Masters or Doctoral thesis involving a number of years' study.

Research projects can be undertaken at the following levels:

- ENCI494/95 - BE Project (1 semester)
- ENCI493 - BE Project (whole year)
- ENTR620 - Independ't Course of Study
- ENCI682 - MEngSt Special Topic
- ENTR680 - MET Research Project
- ENTR690 - MET Research Thesis
- ENTR790 - PhD Research Thesis

Talk to staff about your options.

Available Resources

The Department has a wide variety of transport facilities to help with your research, including:

- specialist traffic/transport/pavement modelling/analysis software
- traffic survey equipment to record speeds, counts and other behaviour
- pavement testing equipment for bitumen and granular materials

There is also a wide range of research resources (physical collections, electronic databases) via the Engineering Library.

Funding assistance is also available for research expenses, and attendance and presentation at research conferences.

Suitability for Research

Potential candidates should discuss with programme staff the availability of supervision, possible research topics and (if relevant) funding assistance.

We encourage you to consult staff **well before** your intended research period.

Prospective research students at any level are expected to have **good** grades in their previous qualifications and coursework.

Consult the MET website for initial entry requirements into the programme, particularly for research degrees.

See the university website for information on enrolment and current fees:

www.canterbury.ac.nz/enrol

See the MET website for more details and enrolment information

Or contact **Alan Nicholson**, Transportation Engineering Programme Director

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