School of Surveying Summer Bursary Project

Mahu Whenua Biodiversity Mapping Project

Shineng Wu (Wilson) (supervisor: Dr. Tony Moore). A collaboration between the Departments of Zoology, Botany and the School of Surveying

Abstract: The Mahu Whenua covenants were established by Robert 'Mutt' Lange of Soho Property Limited in partnership with Queen Elizabeth II National Trust. They were formally opened on 7 March 2015 by the National Trust's Patron. The Mahu Whenua, which is approximately 53,000 hectares of land and lies between Wanaka and Arrowtown in central Otago, encompasses iconic high country landscapes adjacent to rapidly expanding urban populations, and thus provides an opportunity to explore and manipulate the processes of ecological restoration in this important low alpine zone ecosystem. The four open space covenants cover land on Motatapu, Mount Soho, Glencoe and Coronet Peak Stations, bordered by the Shotover River and the Cardrona Valley.

A View to Lake Wanaka *(Taken by Vegetation Team from Department of Botany, 08/01/2016)*

The Mahu Whenua biodiversity mapping project aims to undertake baseline inventory and mapping of biodiversity and landforms across Mahu Whenua. An accurate, precise, GIS-based habitat map is a prerequisite to more detailed future investigation of ecological networks and ecosystem responses to restoration measures. This project seeks to produce a habitat map for the Mahu Whenua covenant area between Lake Wanaka and Arrowtown, including compilation of selected existing geo-information on the site and production of database layers relating to floral and faunal elements, both exotic and native, as a basis for future ecological restoration research and management. The tasks in this project for School of Surveying mainly contain three aspects – they are preparation and preprocessing of existing contextual data, classification of land covers within the four farms, as well as creation and compilation of Mahu Whenua's geodatabase. Additionally, ArcGIS 10.3.1 for Desktop and ERDAS IMAGINE 2014 are two major software tools applied in this project.

Slippery Slopes to Alpine Fault: Deformation Monitoring with GNSS at Moeraki and the Cascade

Jeanette Ma (supervisor: Dr. Paul Denys and Dr. Chris Pearson)

Abstract: Land instability has been a longstanding problem for the Moeraki Township, with important implications for surveyors when defining boundaries and in terms of the design and construction of infrastructure. The School of Surveying started the Moeraki Deformation Project in the summer of 2005/06 with the aim of determining velocities of the movement. This presentation covers the methodologies employed during the 2015/16 campaign and addresses the question: what does the GNSS data collected over the last decade reveal?

Part two of the presentation is an overview of the fieldwork conducted as part of the annual Cascade Campaign near Haast, South Westland. GNSS occupations of over 150 sites located on opposite sides of the Alpine Fault provide measurements of their relative movement at the millimetre level. The Alpine Fault, a boundary between the Australian and Pacific Plates, is a geological feature of great interest to the scientific community.

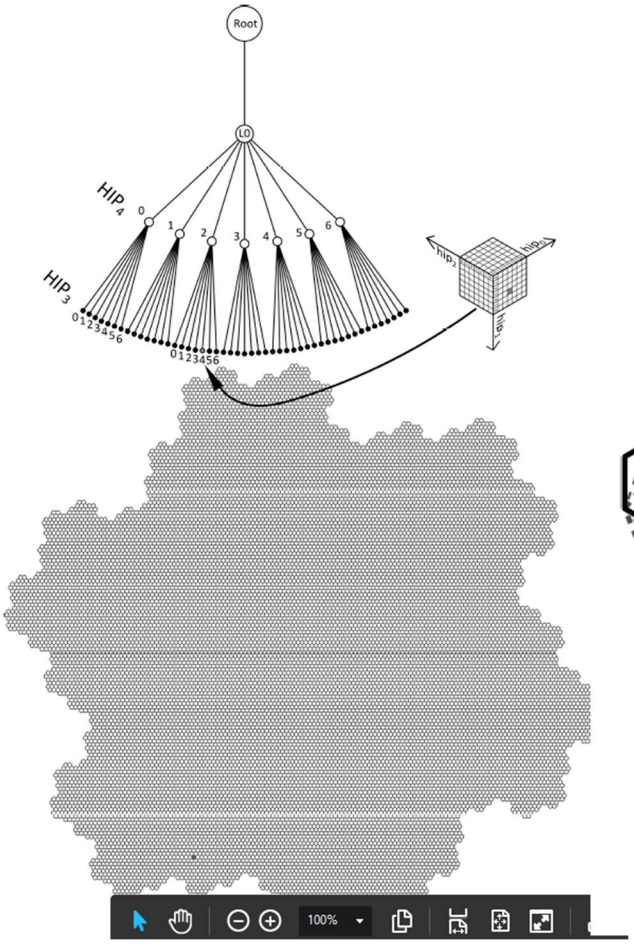
Assisting with the Arthur's Pass Deformation Research Fieldwork Campaign of 2016

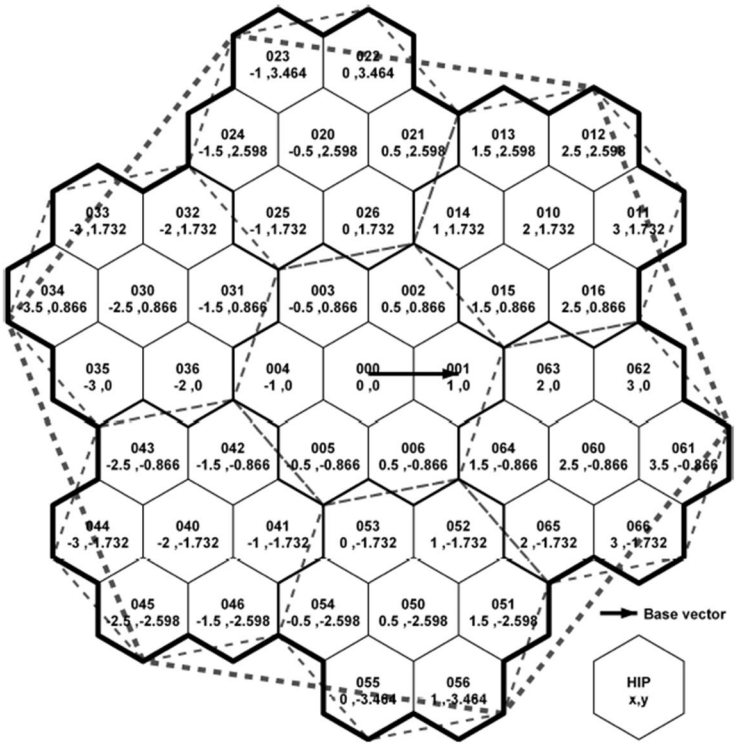
Mathew Harting (supervisor: Dr. Paul Denys and Dr. Chris Pearson)

Abstract: The 2016 summer vacation field work scholarship included assisting with the Arthur's Pass deformation research fieldwork campaign. The 2016 fieldwork campaign included a GNSS survey of over 170 control points over a three week period.

Investigating a Hierarchical Surface Modelling Tool

Andrew Bell (supervisor: Dr. Greg Leonard)





Abstract: As part of part of his doctoral thesis Jo Wright developed multi-scale surface water flow routing techniques that could potentially offer substantial performance improvement to distributed urban stormwater modelling where the built environment influences flow paths at different spatial and temporal scales. These techniques were written in the Python programming language and store and process surface data for environmental using Level of Detail data structures originally developed for computer graphics and visualisation.

This research project aimed to study and document Jo's code and the techniques he developed with the ultimate aim of applying the theoretical modelling techniques to real-world data.

Cruising across the Ross Ice Shelf

Raki Ryan (supervisor: Prof. Christina Hulbe)

Abstract: The Ross Ice Shelf is the largest of the ice shelfs (~487,000km2) and to accommodate the interdisciplinary research required an oversea traverse to a location far away was undertaken.

Investigating the performance of low-cost, single-frequency GNSS receivers using multiple constellations

Ryan Cambridge and Callum Johns
(supervisor: Dr. Robert Odolinski)

Abstract: As more and more GNSS satellites are launched, the potential for improved positioning precision becomes greater. In particular, the performance of low-cost receivers collecting single-frequency data is enhanced by greater positioning availability and satellite geometry. The summer bursary programme consisted of ensuring the data collected by a u-blox EVK-M8T receiver could be converted into a RINEX format for data processing, collecting data on the roof of the school of surveying building, and analyzing the results in comparison with high-quality geodetic receivers. In particular, datasets included 48-hour baselines between two pillars on the School of Surveying roof and between the roof and a point on the Otago Peninsula, an earth deformation monitoring experiment, and a car lane-keeping test. These preliminary datasets gave promising results that will provide an excellent starting point for further research in the years to come.

School of Surveying
Te Kura Kairūri

12:00 noon, Thursday, 24 March 2016
L1 Lecture Theatre
School of Surveying
310 Castle Street

University of Otago
Te Whare Wānanga o Otāgo
New Zealand