

# UC Forest Engineering Professional Development Courses

**12<sup>th</sup> – 15<sup>th</sup> February 2024, University of Canterbury, Christchurch**

**Workshop Coordinator: Prof. Rien Visser**

Four consecutive 1-day courses are designed to provide up-to-date information in a structured learning environment for people actively engaged in the forest industry. Participants may sign up for 1, 2, 3 or all 4 courses.

Courses (more detail on each course below):

1. Mon: Introducing ML and AI for Forestry Applications
2. Tue: Working with LiDAR and Drone data in Forestry Applications
3. Wed: RoadEng for Forest Road and Landing Design
4. Thu: Building better Forest Roads – Design and Construction.

Each course starts at 8:30am and finishes approx. 4pm. The cost is \$385 (+GST) per person per day, or \$1100 (+GST) for three, or \$1300 (+GST) for all four. Cost includes all teaching materials, morning and afternoon tea, as well as lunch. Minimum course number of each day is 12 and capped at 35 for each day. Click on this link to register <https://www.eventbrite.co.nz/e/uc-forest-engineering-professional-development-courses-2024-tickets-767104639627>. Please email [rien.visser@canterbury.ac.nz](mailto:rien.visser@canterbury.ac.nz) for more information.

## **Mon 12<sup>th</sup> Feb: Introducing Machine Learning and Artificial Intelligence for Forestry Applications**

**Course Instructors: Dr. Vega Xu and Prof. Justin Morgenroth**

The use of Machine Learning (ML) and Artificial Intelligence (AI) is progressing and advancing very quickly in forestry. This course provides an overview of what ML and AI entails and gives examples of what opportunities are already being worked on in forestry.

Participants will have the opportunity to learn how to program both ML and AI using existing datasets to characterise plantation forests.

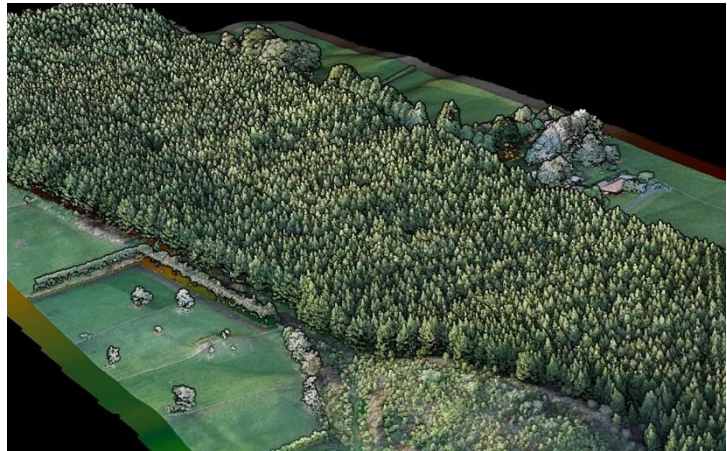
No previous experience is required, the course is designed for people looking to learn about and adopt the technology.



## Tue 13<sup>th</sup> Feb: Working with LiDAR and Drone Data

**Course Instructors: Prof. Justin Morgenroth, Dr. Vega Xu and Ning Ye**

The use of LiDAR data is now common to many forests, and drones are being used more frequently for a larger range of operational applications. This course is designed for people working with, or intending to work with, LiDAR and or drone data.



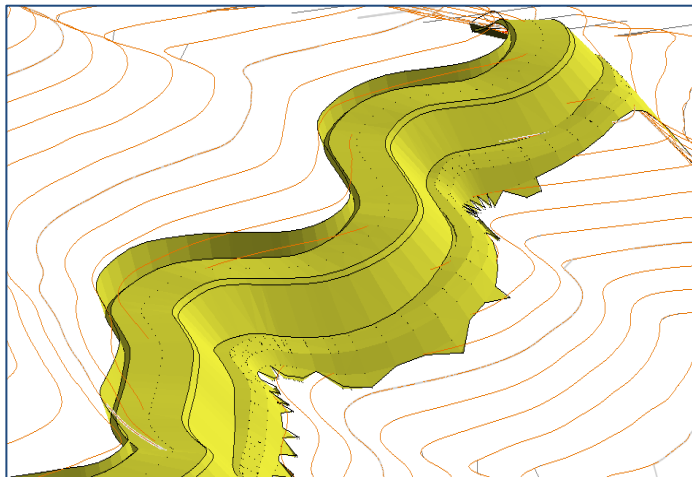
It steps through producing point clouds from drone imagery and then using either LiDAR or drone derived point clouds to yield a variety of useful terrain and canopy information.

This course combines some in-class time to learn important concepts and also some work on UC's computers working with both LiDAR and drone derived point clouds. No previous experience is required, the course is designed for people looking to learn about and advance their data processing skills.

## Tue 14<sup>th</sup> Feb: RoadEng for Road and Landing Design

**Course Instructor: Dr. Campbell Harvey and Prof. Rien Visser**

Build cost, safety, all-weather trafficability and environmental performance are all increasing expectations on forest road design. RoadEng is a robust and user-friendly software package that facilitates advanced geometric design.



This course provides an overview of geometric design principles and RoadEng capabilities, but also provides participants the opportunity to step through the design process from importing the LiDAR tile to modifying cross-section templates, right through to designing the road layout in 3D. The latest version of RoadEng facilitates the design of landings, benched roads as well as locating cross-drains. A basic overview of harvest planning for cable logging operations is also provided.

Some experience of forest road design and or basic knowledge of RoadEng will ensure the participant is able to complete the more detailed technical modules.

## Thu 15<sup>th</sup> Feb: Building better Forest Roads – Design and Construction

**Course Instructor: Prof. Rien Visser and Dr. Campbell Harvey**

Constructing new, or improving existing forest roads requires a good understanding of design and construction principles. Fit-for-purpose forest roads need to be safe and efficient to travel on, be designed and constructed to meet environmental expectations, all whilst being cost effective.



This course provides an overview of current best practice in road construction, based on the NZ Forest Road Engineering Manual. It includes principles of soil properties and will demonstrate basic lab testing practices. Construction practices such as determining the appropriate shape of the road ('template'), batter angles, compaction and drainage will be reviewed. Particular attention will be given to using benching for constructing roads in steep terrain. It will also highlight the changing expectations of our truck configurations (esp. HPMVs) with regard to aspects such as road grade, switchbacks and road standard. Working with contour maps, in terms of optimising road layout as well as linking with NES-CF requirements will also be covered. Two industry case studies will round out the day.

Note that it is advantageous to participate in the RoadEng course the day before, but not essential.