

6th International Forest Engineering Conference

“Quenching our thirst for new Knowledge”



Holiday Inn, Rotorua, NZ, April 16th to 19th

A truly international forest engineering conference event and forum for researchers and practitioners. Featuring workshops, technical sessions, a field-trip, and time to enjoy some camaraderie. The conference will also showcase the local forest and equipment manufacturing industry that have implemented some world-leading developments. We look forward to seeing you here!

For up to date information and registration please visit: www.foresteng.canterbury.ac.nz/FEC2018.shtml

Conference Overview

Monday - Workshops (optional) and Ice-breaker

Tuesday – Main Conference day: Keynote Speakers, Technical Sessions and FEC Dinner

Wednesday – Field Trip

Thursday – Research / Technical Presentations

Agenda: Monday 16th April - Workshops (optional) and Ice-breaker

9:30 am	Buses leave for those that have registered to attend a pre-conference workshop:
	<ol style="list-style-type: none"> Waratah - pilgrimage to the best known name in NZ forest machinery! See the production process from start to finish at the Tokoroa factory. Trimble Forestry Logistics – learn what it takes to optimise a large scale trucking industry, from software development, real-time on-line truck tracking through to dispatch operations. EMS / Winch Assist – NZ is leading the world in producing larger winch-assist machines and EMS is one of the main manufactures of such equipment. Learn from their engineers and see their manufacturing. Interpine - meet the team of experts that provide technology and quality control services to the NZ industry, including LiDAR mapping services and production tracking. Includes drone demo. PF Olsen Eng. Team – find out how a leading forest engineering team uses modern technology for advanced forest roads and stream crossing design and installation. Includes field visit. Timberlands KPP – visit the largest automated stems processing plant in NZ; includes visit to Kaingaroa forest estate. Scion / Research – NZ’s largest forest research provider with a long successful history that has helped define the NZ forest industry: experience latest developments with lunch in the famous “Redwood” forest. Hancock Ltd – first NZ company to strive for full mechanisation of all their steep terrain harvesting operations; hear from their foresters and visit some of their leading operations. Natures Flame/ Bioenergy – Visit Taupo, an area renowned for wood processing facilities; but also has the nation’s largest geothermal power plants and produces wood heating pellets.
4:00 pm	Return from workshop / tour
5:00 pm	Ice-breaker at Hotel
6:30 pm	Dinner downtown Rotorua (own choice @ 'Eat Street')

We thank our conference sponsors!



Tuesday 17th – Main Conference Day



Keynote Speakers, Technical Sessions and FEC Dinner

8:30	Welcome to FEC2018 - <i>Rien Visser, UC and J-F Gingras, FPIinnovations</i>
Plenary Session	
8:45am	Commercial forestry in NZ: a modern company perspective – <i>Brendan Slui, Rayonier, NZ</i>
9:15	Forestry developments in the PNW – <i>Court Stanley, PortBlakely, Oregon, USA</i>
9:45	Dynamic risk management - what we can learn from NZ port operations – <i>Pat Kirk, Port of Tauranga, NZ</i>
10:15	Coffee Break
10:45	From the forest to innovative products: the IKEA success story – <i>Christoph Leibing, IKEA, Slovakia</i>
11:15	Highlights of Forest Eng Developments in NZ – <i>Keith Raymond, FGR, NZ</i>
11:35	Leading Forestry Innovation and Applied Research in Australia – <i>Mark Brown, USC, Australia</i>
11:55	Implementing precision forestry: high-tech tools working today – <i>David Herries, Interpine, NZ</i>
12:15	Lunch

1A Main FEC Session - moderator <i>Mark Brown</i> -		1B Technology in the foreground - moderator <i>Natascia Magagnotti</i>
1:30pm	<ol style="list-style-type: none"> 1. Forest operations in Brazil: Overview and highlights - <i>Angelo Moura, Fibria, Brazil</i> 2. Using advanced technology for improved forest road and landing construction - <i>Abby Ayson, UC Student, NZ</i> 3. Modern steep terrain harvesting in central Europe - <i>Karl Stampfer, BOKU, Austria</i> 4. The forest technology programme of the FAO Forestry Department: Examples of recent work - <i>Jonas Cedergren, FAO, Europe</i> 5. When taking your time is the best approach to improve logistic performance - <i>Luc Lebel, FORAC/U. Laval, Canada</i> 	<ol style="list-style-type: none"> 1. Harwarder performance in two logging methods in final felling - <i>Rikard Jonsson, Skogforsk, Sweden</i> 2. Determining long-term machine utilisation using GPS tracking: A Pan Pac Case Study - <i>Ben Reriti, University of Canterbury, NZ</i> 3. Production and Costs for a Processing Head on a Southeastern U.S. Harvesting Operation - <i>Jo Daniel, Auburn University, USA</i> 4. Accuracy of timber volume measurements using a harvester and a photo-optical system in post-windthrow stands - <i>Piotr Mederski, Poznan University of Life Sciences, Poland</i> 5. The Potential of Small Scale Sawmills, milling Radiata Pine: A Case study of North Otago Sawmilling Ltd - <i>Caleb Bergstrom, University of Canterbury, NZ</i>

3pm	<i>Coffee Break</i>
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3:25pm	2A Steep terrain harvesting developments including cable-assist and advanced yarder applications. <i>- moderator Keith Raymond</i>	2B Logistics, tractability, supply chain operations and international trade. <i>- moderator Tom Gallagher</i>
	<ol style="list-style-type: none"> 1. A robust productivity benchmark for grapple yarding in fast-growing tree plantations <i>- Raffaele Spinelli, CNR IVALSA, Italy</i> 2. Cable Yarders and Rigging Configurations in New Zealand: A 2018 Update <i>- Hunter Harrill, University of Canterbury, New Zealand</i> 3. Cable yarding in France and in Swiss Romandie: status quo and adapted measures within the two different organisations <i>- Paul Magaud, Institut Technologique FCBA, France</i> 4. Effects of Cable-Assistance on Reducing Soil Disturbance during Mechanized Timber Harvesting <i>- Woodam Chung, Oregon State University, USA</i> 5. Governance of risk and the use of quad bike ROPS <i>- Bjorn Edlund, Swedish University of Agricultural Sciences (SLU), Sweden</i> 6. Drivers of advances in mechanized timber harvesting: a selective review of technological innovation <i>- Ola Lindroos, SLU, Sweden</i> 	<ol style="list-style-type: none"> 1. Tracing timber logs from the forest to the sawmill: a specific French case? <i>- Maryse Bigot, OFFICE NATIONAL DES FORETS, France</i> 2. Designing of RFID tag for timber industry traceability <i>- Nopparat Kaakkurivaara, Kasetsart University, Thailand</i> 3. Evaluating the availability of forest biomass resources in Queensland using a GIS-based tool <i>- Sam Van Holsbeeck, University of the Sunshine Coast, Australia</i> 4. Supply chain operations in teak plantation <i>- Laddawan Rianthakool, Kasetsart University, Thailand</i> 5. Analysing the Effects of Re-designing the Pulpwood Log-Yard on Storage Capacity and Handling Cost by Using DES <i>- Kalvis Kons, Swedish University of Agricultural Sciences, Sweden</i> 6. Modelling the Economics of Segregation Based on Internal Wood Properties: Preliminary Results from Four New Zealand Case Studies <i>- Glen Murphy, GE Murphy & Associates Ltd, New Zealand</i>
5pm	<i>Finish and drinks at bar / swim in the pool</i>	
6:45pm	FEC Conference Dinner (at Hotel venue) <i>- Including entertainment</i>	

Wednesday 18th - Field Trip	
8:00	Bus departs Hotel - Second bus to departs 8:30
8:45	Kawerau – Kajavala central processing operation
9:30	Ground-based logging operation (Rayonier - near Kawerau)
11:15	Port of Tauranga visit
12:30	<i>Lunch at Mt Maunganui Beach - includes time for swim / walk</i>
	Steep terrain logging operation (PF Olsen – via Pyes Pa)
1:30	
5pm	Return at Hotel
	<i>Evening free</i>

Thursday 19th – FEC Technical Sessions

8:30	3A Forest Engineering in the new bio-economy. <i>- moderator Ralf Bjorheden</i>	3B Integration of new technologies for safer, lower impact and more productive systems. <i>- moderator Woodam Chung</i>
	<ol style="list-style-type: none"> 1. Design of a future supply-chain for wood fuel over the Baltic sea - Johanna Enstrom, Skogforsk, Sweden 2. Changing Times: Technique and Technology Advancements to Promote Woody Biomass Harvesting in the USA - Tom Gallagher, Auburn University, USA 3. Dry matter losses and their economic significance in forest energy procurement - Johanna Routa, Natural Resources Institute Finland, Luke, Finland 4. Optimal biomass truck load size and work models for loading of loose biomasses - Heikki Ovaskainen, Metsäteho, Finland 5. Cost and productivity of CTL and fuel-adapted harvesting in a P.radiata clearfell operation in Western Australia - Martin Strandgard, University of the Sunshine Coast, Australia 6. Production of quality feedstock from forest residues: sorting, comminution, and screening - Han-Sup Han, Northern Arizona University, USA 	<ol style="list-style-type: none"> 1. A Study of Mobile Vehicle Loading with Laser Scanner Using in Forest Resource Survey - Lihai Wang, Northeastern University Harbin, China 2. Using Data Envelopment Analysis to Measure Logging Contractor Performance - Okey Francis Obi, Uni Canterbury, NZ 3. Root Cause Analysis of Suppliers' Performance Problems: Case of Harvesting and Timber Transportation Service Providers - Janis Gercans, JSC Latvia's state forests, Latvia 4. Creation of homogeneous management units with Hot Spot Analysis (Gi-Ord) in a degraded cloud forest assessed with UAV imagery - Fernando C. Rossi, Chair of forest utilization, Germany 5. Estimation of the need for pre-harvest clearing by remote sensing and GIS-based methodologies - Blanca Sanz, University of Eastern Finland, Finland 6. Assessment of a semi-automated computer vision system for counting, measuring and tracking of logs destined for export markets. - Glen Murphy, GE Murphy & Assoc Ltd, NZ
10:10	Tea / Coffee Break	
10:40	4A Safety and Ergonomics: putting systems in place that work. <i>- moderator Karl Stampfer</i>	4B Visions and trends. <i>- moderator Maryse Bigot</i>
	<ol style="list-style-type: none"> 1. The use of analytical method to evaluate safety and ergonomics in service of forestry machines - Lars-Ola Bligard, Chalmers University of Technology, Sweden 2. Analysis of forestry work accidents in five Australian forest companies for the period 2004 to 2014 - Mohammad Ghaffariyan, University of the Sunshine Coast, Australia 3. Trainee's satisfaction with logger training: results from 8 years of training courses in Italy - Natascia Magagnotti, CNR IVALSIA, Italy 4. The assessment of musculoskeletal workload of a harvester operator depending on the control unit type - Witold Grzywinski, Poznan University of Life Sciences, Poland 	<ol style="list-style-type: none"> 1. A historical view and state-of-the-art: What will it take to transform forestry machines into smart systems? - Pedro La Hera, Swedish University of Agricultural Sciences, Sweden 2. USDA Forest Service Research to Assist the National Forest System - Dana Mitchell, US Forest Service, USA 3. Managerial approaches for achieving continuously improved harvesting operation performance in Swedish forestry: a lit review - Malin Johansson, Swedish University of Agricultural Sciences, Sweden 4. Forestry value chains for a sustainable Swedish bioeconomy - Effective and characterized process flows - Magnus Thor, Skogforsk, Sweden

	<p>5. The important role of psychosocial factors in workplace safety - Shaun Cawood, University of Canterbury, New Zealand</p> <p>6. Validation of forest machine operator competence - Carola Haggstrom, Swedish University of Agricultural Sciences, Sweden</p>	<p>5. Opportunities and challenges of a forest-based bio-economy: environmental and socio-economic impacts of biomass harvesting at the EU level? - Diana Tuomasjukka, European Forest Institute (EFI)</p> <p>6. Worldwide trends in the methods and systems for harvesting, extraction and transportation of Roundwood - Mikael Lundback, Swedish University of Agricultural Sciences, Sweden</p>
12:30	Lunch	
1:30	<p>5A Cutting-edge technologies for tomorrow...starting today. - moderator <i>Ola Lindroos</i></p>	<p>5B Protecting environmental and social values. - moderator <i>Mohammed Ghaffariyan</i></p>
	<p>1. Forestry 4.0 - Big data and new technologies to move forest operations into a new era - Ken Byrne, FPInnovations, Canada</p> <p>2. Vision for harvesting machines: Real-time individual tree detection and measurement - Lucas Wells, Oregon State University, USA</p> <p>3. Optimal design of a four bar mechanism for forestry robotic applications - Omar Mendoza-Trejo, Swedish University of Agricultural Sciences, Sweden</p> <p>4. Machine simulator study on the effects of a semi-automatic forwarder crane on operator workload and performance. - Martin Englund, Skogforsk, Sweden</p> <p>5. Optimization of multiple biomass feedstock supply chains in the Northeastern United States - Jingxin Wang, West Virginia University, USA</p>	<p>1. Leaving no impression: technological developments for reduced soil damage by forest machines - Rolf Bjorheden, Skogforsk, Sweden</p> <p>2. Drift decks: the answer to temporary stream crossings during logging operations - David Saathof, Rayonier, New Zealand</p> <p>3. Economic, social, and environmental sustainability impacts of wood product production systems in varying regional circumstances - Janni Kunttu, European Forest Institute</p> <p>4. Harvesting woodlots in New Zealand: What do small-scale landowners and loggers think? - Kris Brown, University of Canterbury, New Zealand</p> <p>5. Productive forest technology with a soft footprint: a joint effort by Swedish forestry - rationale, modes of work and results from a 3-year program - Magnus Thor, Skogforsk, Sweden</p>
3:00	Tea / Coffee Break	
3:20	<p>6A Harvest systems of the future. - moderator <i>Mark Brown</i></p>	<p>6B Forestry Economics. - moderator <i>Luc Lebel</i></p>
	<p>1. Drivers of advances in mechanized timber harvesting: a selective review of technological innovation - Ola Lindroos, SLU, Sweden</p> <p>2. Applying teleoperation and vision systems to facilitate a safer and more productive workplace - Paul Milliken, Cutover Systems, New Zealand</p> <p>3. Use of balloons for forest monitoring and machine data transmission - Angelo Moura, Fibria Pulp, Brazil</p>	<p>1. Productivity and economic impacts of harvesting with spatial and size constraints - Mauricio Acuna, University of the Sunshine Coast, Australia</p> <p>2. Cost calculation for fly ash structure on forest road - Tomi Kaakkurivaara, Luke, Finland</p> <p>3. Feasibility of an automatic quality bucking application based on image analyses - Jori Uusitalo, Luke, Finland</p>
4:10	<p>Closing session</p> <p>1. FEC 2018 Synopsis – <i>Mark Brown, University of the Sunshine Coast</i></p> <p>2. FEC 2021 Florence, Italy – <i>Raffaele Spinelli, CNR IVALS</i></p>	
4:30pm	Conference Finishes!	

FEC Posters – these will be displayed for the duration of the conference

Title	Presenter
Agent-based simulation of forest chip supply chain management with intermediate terminal and continuous quality measurements	<i>Mika Aalto, Finland</i>
Maximising the volumetric capacity of truckloads to reduce the transport costs of logs, woodchips and biomass	<i>Mauricio Acuna, Australia</i>
Performance of a mid-sized harvester-forwarder system in integrated harvesting of sawmill, pulpwood and firewood	<i>Andrei Apăfăian, Romania</i>
Automated time studies based on machine generated data: a complementary and complimentary technique?	<i>Rolf Bjorheden, Sweden</i>
Governance of risk and the use of quad bike ROPS	<i>Bjorn Edlund, Sweden</i>
Stream simulation: An ecosystem-based approach for designing road-stream crossings	<i>Clayton Gillies, Canada</i>
Mechanical soil scarification in steep and rough terrain: a comparative study of a two-armed disc trencher, conventional excavator and a harvester with a crane mounted attachment	<i>Malin Johansson, Sweden</i>
Changes in bark thickness on pine logs harvested using a Ponsse Beaver harvester over four seasons	<i>Zbigniew Karaszewski, Poland</i>
Central tyre inflation systems: Experiences from Finnish timber transportation entrepreneurs	<i>Jukka Malinen, Finland</i>
The development of heart rot fungi in pine trees and harvest strategies in manufacturing wood poles for power lines	<i>Ziedonis Miklašēvičs, Latvia</i>
Assessment of a semi-automated computer vision system for counting, measuring and tracking of logs destined for export markets.	<i>Glen Murphy, NZ</i>
Chemical composition modification of <i>Pinus massoniana</i> wood using silicone oil heat treatment	<i>Kufre Okon, China/Nigeria</i>
Tree locomotion robot	<i>Richard Parker, NZ</i>
Efficient wood supply vision 2025 - Metsäteho Ltd	<i>Heikki Ovaskainen, Finland</i>
Dendromass4Europe (D4E) - short rotation plantations for the bio-economy	<i>Raffaele Spinelli, Italy</i>
Tech4Effect (T4E) - Profitable and sustainable European forest management	<i>Raffaele Spinelli, Italy</i>
Predicting forest machine induced rutting of fine-grained mineral soils	<i>Jori Uusitalo, Finland</i>
Using forestry residues in bio-energy: value chain optimization through a mobile decision support system in Tasmania	<i>Heesung Woo, Australia</i>
Problems in forestry supply chain at the strategic level and development of machinery in Japan	<i>Mika Yoshida, Japan</i>
UC Student Posters	
The effect of landing size on operational delays for New Zealand harvesting operations	<i>Blake Jones, NZ</i>
Supply chain efficiencies - What is the optimal number of log sorts	<i>Alex Tolan, NZ</i>
Working hours in the New Zealand forestry sector	<i>Adrian Loo, NZ</i>
Waratah 625C processing head: Assessing the measurement accuracy & productivity	<i>David Saathof, NZ</i>
Balancing productivity within harvesting systems: Three case studies	<i>Kurt Malietoa, NZ</i>

From Rien, Mark and Raffaele – the Conference Organising Team!

