



Courtesy of Aeronavics Ltd.

Aerial robotics add new dynamic to forestry

Aerial imagery, near infrared detection and aerial robotics sound like they belong in a military operation, however these advanced technologies are set to change the dynamics of forest management.

Scion and Raglan-based Aeronavics Ltd have teamed up to field test unmanned aerial vehicles (UAVs) mounted with interchangeable remote sensing technologies for use in forest management. Researchers from across Scion, led by our Forest Industry Informatics team, will be using a multi-rotor craft from which LiDAR, infrared or hyperspectral sensors and video cameras can transmit vital information on many aspects of forest management - such as resource assessment, tree health monitoring and disease and weed control. These technologies will also be a valuable addition to pest surveillance and eradication operations, and fire management.

"UAVs could seriously change the way forests are managed," says Science Leader

Bryan Graham. "They will make it possible for us to gather a larger volume of information, which combined with existing data and technologies, will add greater precision to forest management decisions.

"We spent the past year looking into the feasibility of using drones for this purpose, for both large forestry companies and smaller units, and have since received industry support to conduct field trials. By investing in UAV technology at this scale we can work with Aeronavics to further develop both the aerial platform and associated sensors, and speed up the delivery of a whole new generation of management tools for our forestry and government stakeholders."

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Smart strategies in action

This quarter, we are updating our strategy which means we are thinking hard about how Scion can further help the forest industry to generate 'prosperity from trees' more efficiently and in new ways.

Trees are enormously versatile and much of their potential is only now being tapped as the world confronts issues such as climate change and natural resource scarcity. These pose big challenges - and opportunity - for New Zealand with respect to building an international competitive biobased economy. Such environmental pressures coincide with demographic and geopolitical shifts; machines replacing jobs; heightened cyber risk; and rapid innovation through the systemisation of existing technologies. As Michael Porter and James Heppelmann from Harvard University contend, "smart, connected products" - made possible by vast improvements in processing power and device miniaturisation and by the network of ubiquitous wireless connectivity - have unleashed a new era of competition¹.

Albert Einstein's observation "We cannot solve our problems with the same thinking we used when we created them" is just as salient for the board rooms and policy agencies we work with, as it is for Scion's science teams.

This set of external factors provides a rich environment of possibilities for the forest industry and the biomaterial sectors Scion works with. It also demands from us new ways of thinking and working. Albert Einstein's observation "We cannot solve our problems with the same thinking we used when we created them" is just as salient for the board rooms and policy agencies we work with, as it is for Scion's science teams.

Collaboration - across disciplines; with firms within and between value chains; and across cultures and countries - is a growing feature of our science. That means we need better skills for working efficiently and influentially in large, multi-party programmes such as National Science Challenges and the Industrial Symbiosis project soon to get underway in the Central North Island. It also means we are giving more attention to how sectors complement each other, for example dairy and forestry, and forestry and renewable energy, in order to achieve sustainable growth and greater economic resilience.

Several years ago we identified the need to build new and additional science expertise in Value Chain



Warren Parker, Chief Executive

Want to know more?

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Optimisation, Forest Industry Informatics and effective use of 'big data', and resource economics. We have recently recruited excellent staff in all of these domains, including two science leaders. They are allowing us to address industry priorities of improving operational efficiency within the supply chains we work with, implement precision forestry and value the environmental contribution of forestry.

All three capabilities underpin our growing emphasis on the 'smart application' of existing technologies. This is well illustrated by our purchase of a UAV, high quality remote sensing equipment and large data set analytical capability in order to provide a fast, cost-effective forest management for small-medium scale foresters, as well as new services for large forest owners. At the same time we have entered a strategic collaboration with Aeronavics Ltd and partnered with some forest owners to rapidly develop the proof-of-concept.

This epitomises our strategy in action - ensuring we have excellent core capabilities (including from students and post-doctorates) and equipment; establishing early end-user and private sector partnerships with a clear focus on problem-solving and future value generation; and forming strategic collaborations with domestic and offshore leaders in fields of shared interest. You will read of several examples in this issue of *Scion Connections*. Concurrently, appropriate commercialisation pathways are being identified such as the Kiwi Innovation Network which we recently joined (see page 7). Our culture is changing to match this. We are becoming more agile in decision making and global in outlook, undertaking more multi-disciplinary research and are more reliant on our customers for market insight and co-creation of solutions to ensure their early uptake. Core funding and reinvestment of surpluses provides the essential financial resources Scion needs to execute its strategy well.

This edition of *Scion Connections* illustrates some of our recent strategic developments and progress on programmes already in place, and features some of the great new staff we have recruited. As always please feel free to contact me directly or any of the named scientists with any comments or questions you might have.

¹ Porter, M.E., Heppelmann, J.E. 2014. How smart connected products are transforming competition. *Harvard Business Review* (November): 65-88.



Kauri showing visible signs of the disease.

Kauri dieback symposium draws communities together

Over 90 participants from a cross section of the community gathered in Hokianga last month to discuss the latest efforts in the fight against kauri dieback.

Research, management, operational aspects and community engagement through the creative arts were all presented, along with a plea from the next generation to “work harder” to find a solution to the disease. Hosting the symposium in Northland, an area that contains many of the country’s remaining ‘old kauri’ forests and where signs of the disease are clearly visible, provided local communities the opportunity to take part.

Once a tree is infected, it may take years before visible signs of disease are noticeable, often in the form of leaf drop, canopy dieback and sap-bleeding lesions

“There was a real melting pot of views expressed from a broad cross section of communities facing the challenges associated with managing the disease,” says Dr Nari Williams, forest pathologist and leader of Scion’s ‘Healthy trees, healthy future’ programme (HTHF). “Overall, there was a very positive exchange of

ideas and it provided an opportunity for scientists to talk about what we are doing in the lab and field, and for us to hear how some of these findings are being applied by local communities actively involved in helping prevent the disease spreading.”

Delegates also took a field trip to nearby Waipoua Forest, home to some of the country’s iconic kauri, the four sisters and giant among giants, Tane Mahuta. The forest is one of the country’s major tourist spots, highlighting even further the significance of these magnificent forests and the economic benefits they offer nearby communities.

Kauri dieback is caused by *Phytophthora* taxon Agathis, or PTA, a pathogen which is known to affect only kauri. At present, Scion and our collaborators in the HTHF programme are focusing research on screening for PTA resistance, understanding the host-pathogen interactions, and improving diagnostic techniques. Once a tree is infected, it may take years before visible signs of disease are noticeable, often in the form of leaf drop, canopy dieback and sap-bleeding

lesions. Quick and accurate diagnosis means management strategies can be put in place that much faster. Scion pathologists are looking at portable devices that will speed up diagnosis by making it possible to confirm the presence of the pathogen in the field rather than transporting infested soil samples to the laboratory for testing; a process that is time consuming, costly and risky.

Scion geneticists are optimistic about identifying resistance in the natural population of kauri.

To understand why PTA is so devastating to kauri, research partners at Landcare Research are using electron and fluorescence microscopy to observe how the pathogens move inside the tree roots of artificially inoculated seedlings. Using these techniques they have observed how PTA grows in and around the root cells of kauri. These observations will be compared to infection by other *Phytophthora* species to compare mechanisms of infection and ensure selection is made to a wide range of species.

Scion geneticists are optimistic about identifying resistance in the natural population of kauri. Finding natural resistance would provide a glimmer of hope for possible PTA-resistant kauri being bred in the future. Encouragingly, there are early indications that response to PTA infection varies in different populations of kauri.

In the interim, however, Plant and Food Research scientist Dr Ian Horner has found that phosphite may offer some short-term relief for those trees already infected. Phosphite is an inexpensive chemical commonly used in agriculture that helps slow the progression of *Phytophthora* pathogens. Kauri injected with phosphite show some relief from visible symptoms of the disease but, as Ian stresses, it does not offer a cure.

“The Kauri Dieback Symposium was a great success this year with a lot of positives coming from having a melting pot of ideas,” says Nari. “Like all *Phytophthora* diseases, kauri dieback is a huge challenge which the HTHF team is endeavouring to tackle by determining what makes some species so virulent on specific hosts. With many key parts of the programme getting into full swing our first research objective is to determine if there is a level of resistance to PTA infection in the kauri population. This analysis will be pivotal to the long-term management of the species”.

For further information

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Improving community resilience to wildfire

This summer's spate of wildfires in the South Island is evidence that the current fire season is one of the worst in recent years.

It is over a decade since the Canterbury and Marlborough regions have experienced such severe fire danger conditions, two areas whose hot, dry and windy conditions and wide open spaces create the ideal wildfire environment. And it's likely this fusion of weather and wind will occur even more often.

Research undertaken by Scion's fire research group and NIWA into the effects of climate change on fire risk indicates we can expect more of these severe conditions in the future, doubling or even trebling the fire risk in some areas, particularly the south-east and north of both islands.

"New Zealand is a relatively small country surrounded by sea, and as such is exposed to rapidly changing atmospheric conditions and strong winds which increase the likelihood of rural fires getting out of control," says Scion fire scientist Grant Pearce.

"This season's fires have involved more cases of house loss, evacuations and threat to people than in recent decades. We're also seeing this trend in other parts of the world where fires are increasingly

encroaching upon rural and semi-rural communities that are surrounded by flammable vegetation - the rural-urban interface.

The annual cost of rural fires in New Zealand is in the vicinity of \$100 million.

"New land developments are expanding into rural areas and increasing the areas at risk. Likewise an increase in lifestyle blocks over the past decade means more trees and fuel, and often housing and other buildings being interspersed with highly flammable grass, scrub and forests."

The annual cost of rural fires in New Zealand is in the vicinity of \$100 million. While it's a common misconception that there are few rural fires in New Zealand, this season being an exception, the vast majority are controlled quickly due to the rapid response by fire fighters, improved surveillance methods and the application of research and fire behaviour tools developed by our fire research team.

One such tool is a method to map high fire risk areas at the rural-urban interface,

overlying risk factors such as vegetation flammability, fire climate severity, slope steepness and fire history, as well as proximity to rural communities, distance from fire stations and water sources. This allows rural fire authorities to focus surveillance efforts on high risk areas, and have fire management strategies and resources ready in the event of a fire breaking out.

"Nearly all of the 3,000 or so wildfires that occur every year in New Zealand are caused by humans, with less than one per cent from natural causes," says social



scientist Lisa Langer. “Escaped land clearing burns are the most common cause, accounting for 20 per cent of all fires and almost half the total area burned. Most of these could be prevented by people having a greater awareness of current fire risks, better prevention measures in place, and being prepared should a fire break out.”

“Our research has also shown that the presence or absence of community networks, such as schools and marae that are often community hubs, can have a significant effect on a community’s resilience to respond to wildfires.”

So what happens when a community is affected by wildfire as happened recently at Flock Hill in Canterbury, and Onamalutu in Marlborough?

“Apart from the damage to homes, property and animals, it’s often the intangibles that take longer to recover from,” says Lisa. “Evacuation, losing personal and often sentimental belongings, sometimes even livelihoods, is very stressful.

“Natural disasters affect entire communities. Our research has also shown that the presence or absence of community networks, such as schools and marae that are often community hubs, can have a significant effect on a community’s resilience to respond to wildfires.

“There is a real need for more effective communications around wildfire awareness, prevention and preparedness in rural

communities. These need to be targeted and tailored to various groups within a community depending on whether they are regular fire users like farmers, recreational users like campers and hikers, cultural users or those who don’t use fire at all.

“We are now helping rural fire managers to develop communication strategies for the different fire user groups, and also those people living on the outskirts of towns and visitors who need to know the fire danger in their immediate vicinity. This may involve re-developing the messaging associated with fire danger signs.

“The biggest challenge will be getting people to take notice of the fire danger signs and be aware of appropriate behaviour around lighting fires in their local area to avert a possible disaster.”

For further information

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FireSmart communities

Be proactive and manage fire risk on your property:

Reduce fire fuels. Mow grass often, plant less flammable vegetation, remove dead fuels (leaves, branches, shrubbery) and do not store firewood or other flammable materials next to your house.

Create a fire break. Maintain ‘defensible space’ around your property, open areas without dense vegetation (sparsely planted, low flammability species are okay). This can be well-maintained green lawns, paths and driveways.

Have a water source. Have an easily accessed water source such as a swimming pool or pond with a small pump, or irrigation system.

Provide access. Maintain clear access for emergency vehicles. Avoid narrow, winding driveways and remove overhanging trees. Make your address clearly visible at the entrance to your property using your rural address or RAPID number.

Know the risk. If considering using fire, know what the current fire danger and restrictions are in your area, or areas you might be visiting, by contacting the local Rural Fire Authority, council, DOC or forestry office.

Even better, work together. Work with neighbours to collectively reduce fire risks and educate other residents in the area to create a ‘FireSmart’ community.

Aerial robotics add new dynamic to forestry

(Continued from page 1)

The UAV will be able to collect data over an area of 500-1,000 hectares in a single flight. Using LiDAR, data can be collected on stand attributes, such as stocking and tree height, and the infrared camera will capture aspects of tree health. The hyperspectral camera detects a much broader spectrum of wavelengths, and can be used to identify the spectral signature, or fingerprint, of vegetation types and ultimately tree diseases such as red needlecast.

“Combining LiDAR data collected at 10 metres above the canopy with those collected from satellite or plane, with other data will give a much clearer picture of what’s happening within both native and planted forests,” says Bryan.

The team is working with several forest companies, Callaghan Innovation and the Civil Aviation Authority (CAA) to conduct

the field trials, which are due to begin in May. The trials will also be used to investigate the technical requirements for UAVs used in forestry to fly beyond the line of sight, with Callaghan Innovation and the CAA developing what may be the world’s first regulatory framework to support UAVs flown beyond line of sight. Under current regulations, UAV operators must maintain visual contact at all times to ensure it does not endanger other aircraft.

A report commissioned by Callaghan Innovation stated these new regulations could boost the farming, forestry and energy sectors by up to \$190 million a year through increased revenue and reduced costs, of which some \$72 - \$96 million will be contributed by forestry. Scion is partnered with both Callaghan Innovation and end-user group UAVNZ to ensure forestry is selected as an early

adopter of beyond line of sight regulation changes.

“Other big challenges for us will be developing the systems to process the increased volume of data and automating the system using avoidance technology to allow UAVs to manoeuvre through the forest canopy safely,” says Bryan. “Our researchers have begun developing algorithms to extract relevant information from the data collected. This will build on work we are already doing with LiDAR and link with other systems to extend Scion’s capabilities in UAVs and remote sensing technologies for precision forest management.

“Validating UAVs as a tool, not a toy, is important. And we look forward to working with forestry and other companies in this new and exciting field”.

For further information

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Meet Scion's post-doctoral research fellows



Drs Wajid Waheed (on left) and Alex Hennebry.

New breeding techniques using natural mutation

Molecular biologist Dr Alex Hennebry started at Scion in April last year to develop new breeding technologies. He aims to demonstrate that genome editing can be used to introduce specific mutations in conifer genomes. As Alex explains, these techniques can be utilised without the introduction of foreign DNA; they simply take advantage of the inherent DNA repair machinery within cells. The natural system is prone to errors, and the cell essentially mutates itself in a precise and targeted fashion.

"Genome editing has already been performed successfully in a range of organisms," says Alex. "For instance, by targeting two genes in soy beans, the healthy oil content has been increased from about 20 to 80 per cent and the unhealthy, saturated oil content reduced by about 90 per cent. If this was a commercial soy bean variety it would mean less refining costs and a much healthier end product.

"Once I have established proof-of-concept that genome editing can be used in conifers, we can look at more specific targets. For example, if we can identify a specific gene or genes that control floral development in conifers, this technology should allow these genes to be switched off through targeted mutation. This may one day allow the production of a non-flowering conifer."

Alex, who completed his PhD (University of Waikato) at AgResearch in Hamilton, has 12 years' experience in molecular biology. "I'm hoping to complete this project within the allocated two years and use my left over time to investigate other exciting options".

Terpenes on tap

Dr Wajid Waheed is hoping to fast track the production of diterpenes to use in valuable pharmaceuticals and medicines, by using the humble radiata pine. Diterpenes are a group of plant secondary metabolites with a multi-billion US\$ market as fragrances, pharmaceuticals, fuels and chemical feedstock. In nature they have a role in plant defence and are often produced in small quantities by plants that are not easily cultivated; consequently a large number of plants need to be harvested to obtain commercial quantities of terpenes.

"Radiata pine is special, it produces vast quantities of terpenes in its special compartments known as resin ducts where it stores them without affecting the tree's health," says Wajid. "And the terpenes can be extracted by tapping into the resin beneath the bark in much the same way as rubber or maple syrup.

"Our aim is to prove that this special feature of radiata pine can be used to produce larger volumes of high value terpenes. As an example, taxol is a diterpene used in cancer therapy. It's produced in tiny quantities in the bark of the slow growing Pacific yew. If taxol precursors or similar compounds can be produced and extracted from pine resin ducts then this could make cancer treatments more accessible".

Wajid, who started at Scion in October last year, completed his PhD in terpene biotechnology. "I love living in Rotorua, it's very similar to my home in Kashmir, in northern India. The landscape, rivers, lakes and plants are very much alike. This is a great experience".

Understanding radiata pine plumbing mechanisms

Dr Juan Rodriguez Gamir arrived at Scion's Christchurch campus from Spain, in May 2013. At first, he admits, it wasn't easy especially arriving in a city still licking its wounds from a devastating earthquake, but living in Christchurch has proved exciting. "Not everyone gets the chance to experience living in a post-earthquake city and feel how much people want to recover the spirit of their city."

Juan is working with forest ecophysiological Dr Jianming Xue studying the mechanisms of water transportation and regulation within radiata pine, particularly when the plants are under stress.

"The control of plant-water relations as the climate changes is important for forest tree species performance and survival in stress conditions" says Juan. "Water moves between cells through membrane channels called aquaporins. These channels control the water movement in the cells and are involved in plant adaptation and tolerance against different stresses.

"We are looking at the function and the physiological significance of aquaporin regulation under water stress in different clones of radiata pine. This new knowledge can help us develop screening tools for early evaluation, and to select clones that can perform better in specific climate and soil conditions. These will be powerful selection criteria for future breeding strategies."

Juan's two year contract has recently been extended to July of this year. "I love my work and living in New Zealand because of the beautiful landscape and way of life. And the Scion environment is great, so I am really happy with my decision to come to New Zealand and join Scion".



Dr Juan Rodriguez Gamir.

Engaging in the growing bioeconomy

New Zealand has an opportunity to be more actively engaged with European biobased technologies and networks, says General Manager Manufacturing and Bioproducts, Dr Elspeth MacRae. Elspeth was asked to represent New Zealand at the European Bioeconomy Stakeholders Conference and the OECD Present and Future Policy for Biobased Production, in Italy last year.

“We’re already operating as a bioeconomy with most of our land and exports based on the sustainable use of renewable resources, for example, food and forest products. There are still some issues to work on, like intensification and its impact on the land, food safety, infrastructure and connectedness. But there is much to be gained from us participating in biobased initiatives with Europe.

“The challenge for New Zealand is to build new industry clusters outside of the dominant primary food producers.”

“Horizon 2020, for example, is the biggest ever European research and innovation programme aimed at taking innovative ideas from the lab to the marketplace. It’s hailed as the blueprint for Europe’s smart and sustainable growth. New Zealand can be part of that.”

Elspeth said the growing bioeconomy in Europe was changing the way business operates, with greater focus on diversification, integration and the use of multiple feedstocks. A successful bioeconomy is based on ‘smart specialisation’ at a regional level, and strong collaborations within and between regions.

“The challenge for New Zealand is to build new industry clusters outside of the dominant primary food producers,” says Elspeth. “We have an abundance of renewable resources and the opportunity to use these more smartly. Greater involvement in international initiatives will allow us to expand these opportunities further and tap into innovative new ideas and technologies that support a cleaner, more sustainable environment”.

For further information

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Scion joins KiwiNet

Scion has joined Kiwi Innovation Network, or KiwiNet, a consortium of 14 other universities, Crown research institutes and entities that are working together to improve commercialisation opportunities for scientific research. The consortium encompasses around 70 per cent of New Zealand’s science capabilities with over 7,000 researchers and a collective spend of nearly \$1 billion.

Through KiwiNet, shareholders can tap into tools, contacts, investment and support to help them achieve greater commercial outcomes for their research and for New Zealand.

“Commercialisation is a growing part of what we do,” says Chief Executive Dr Warren Parker. “We work with industry and investors to improve the international competitiveness of New Zealand forestry and its related manufacturing industries. We are looking forward to working within and contributing to KiwiNet, and strengthening our commercialisation capacity and partnerships through KiwiNet’s extensive network.”

Some of Scion’s commercial success stories to date include improved tree genetics, the decision support forecasting model ‘Forecaster’ which is used to manage half of New Zealand and Australia’s softwood plantations, wood fibre products such as wood fibre reinforced plastics, and environmental technologies such as TERAX™. A number of other new products are also in the pipeline.

Over the previous calendar year, KiwiNet invested \$3,548,437 of PreSeed funding from MBIE into 108 projects. Combined, these are potentially worth \$180 million in export earnings. In total, \$11.4 million of PreSeed funding has been invested into 342 projects worth potentially \$680 million in export revenue. Scion’s General Manager Research and Investment, Dr Russell Burton, is a member of the KiwiNet investment committee.

For further information

Contact Dr Russell Burton at russell.burton@scionresearch.com

New facility helps further biosecurity research

Live insects are vital to Scion’s biosecurity research. Examples of projects include rearing populations of pests in containment, like the eucalyptus tortoise beetle and the parasitoid wasps that prey on them, and studying insect behaviour.

Other work involves studying common wood and bark eating forest insects to gain a better understanding of their biology. This knowledge can then be used to develop models that predict insect development and behaviour in the forest to help us assess the risk of export logs being infested by unwanted insects.

Until recently, our scientists had no designated facilities for this purpose. The construction of two insect-friendly facilities at our Rotorua campus will now make it easier to breed and maintain a collection of healthy insects on site for research purposes such as these.

One of the facilities is a six roomed ambient temperature insect rearing space, or insectary, which provides a dedicated, secure environment for scientists to both rear and work with multiple insect species in one location. The second facility supports our on-going research into forest insect pests by providing six additional temperature controlled rooms.

Our new insect rearing capabilities will also be used to meet the needs of other research partners and stakeholders.



For further information

Contact Dr Cecilia Romo at cecilia.romo@scionresearch.com



Dr Florian Graichen.

Welcome to our new science leader

Dr Florian Graichen brings his extensive background in developing renewable and sustainable 'green' resources to Scion, in his position as the new Biopolymers and Green Chemicals Science Leader.

Florian has joined us from the Flemish Institute for Technological Research (VITO) in Belgium where he was business development manager. The majority of his work as commercial manager, and as senior scientist and project leader at CSIRO prior to that, focused on replacing crude oil based raw materials with renewable and sustainable alternatives, combined with the development of speciality polymers and materials.

"One of my biggest achievement to date," says Florian, "is the establishment of 'Biorizon', a multinational shared research centre with a focus on technology development for the production of biobased aromatics for performance materials, chemicals and coatings. In anticipation of a growing shortage of aromatics from the petrochemical industry, the aim of Biorizon is to deliver bioderived materials as building blocks for the chemical industry.

"Establishing these multi-party, multi-disciplinary projects has led to a rapidly expanding global network in the chemical and polymer areas and also in sectors that will benefit from the materials produced".

After completing his PhD at the University of Regensburg in Germany, Florian spent two years as post-doctoral researcher at the University of Canterbury from 2003. He and his family are now looking forward to being back in New Zealand and enjoying the wonderful outdoor lifestyle Rotorua has to offer.

Upcoming events

Growing Confidence in Forestry's Future conference. 24-25 March, Hagley Oval Pavilion, Christchurch.

This second annual conference will present results on recent advances in forest productivity research in New Zealand, new contributions to the sustainability of the forest industry, and new insights into the place of forestry in the primary sector economy of New Zealand. Keynotes by national and international speakers will include: Advances in Productivity Research in the Pacific North-West, International Trends in Water and Forest Research, and Integrated Land Management.

Associated meetings and workshops: Phenotyping innovation cluster meeting. 23 March.

Swiss needle cast workshop. 26 March, University of Canterbury Dovedale Campus, Christchurch. www.gcff.co.nz

No milling around: EPDs for the NZ wood industry. 10am - 3pm, 26 March. Rimu Room Scion, Rotorua. Cost \$30 (includes morning tea and lunch).

There are growing global expectations for building products to have credible environmental product declarations

(EPDs). This workshop will look at what will be required to respond to this and outline the business case for an industry-wide approach for producing EPDs of New Zealand wood products. www.scionresearch.com/events

NZ Industrial Biotech Symposium 30-31 March, Scion Rotorua.

New Zealand is well known for an abundance of renewable feedstocks and technologies for producing bioproducts. Targeting non-pharma, non-fuel biomaterials, the symposium will focus on bioproducts derived from renewable feedstocks and bioproducts produced through a biological process. Hosted by NZBIO and Scion, the symposium features high calibre New Zealand and international speakers and thought leaders. www.scionresearch.com/events

NZ Wood: 2015 Resene Timber Design Awards

Scion is proud to be sponsoring a new category in these annual awards: Novel Application of Wood Award - for using a new wood product or system in a manner that characterises its unique features via an innovative application of design technology. This category is open to entries from any sector and will be judged on materials selected, innovation, aesthetics and environmental sustainability. Entries open from 17 March. www.nzwood.co.nz

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