



Forest
science

Scion provides the research, science and technology to help increase the value and profitability of New Zealand's commercial forests



Forest systems

Forests may be grown for timber, pulp and fibre products, and, in some countries, for chemical and industrial uses, including bioenergy. Trees also offer a natural means of protecting and restoring the environment for the benefit of society, now and in the future.

Scion helps forest growers to produce material that meets consumer needs in ways that are profitable, efficient and sustainable.

We focus on maximising forest productivity through understanding the interaction between trees and the environment, and to help the industry protect its licence to operate by demonstrating sustainable management of forests.

Our science capabilities include:

- **Resource assessment.** Developing biometrics and applying technologies such as LiDAR to assess the quantity, quality and condition of forests.
- **Resource quality.** Making it possible for forest managers to produce or select wood that matches end product requirements.

- **Tree growth and yield.** Providing forest managers with the means to forecast future volume and wood properties of forest stands for a range of species, sites and silvicultural practices.
- **Harvesting and logistics.** Creating cost effective and safer methods for harvesting trees, improving worker safety and supply chain logistics.
- **Site productivity.** Understanding and managing the factors that influence forest productivity.
- **Land use and policy.** Creating tools that enable managers and policy makers to maximise the multiple benefits from trees and forests.
- **Carbon and climate change.** Developing methods to monitor carbon stocks in forests and mitigating the risks associated with climate change.
- **Environmental and resource economics.** Quantifying the tangible and non-tangible benefits from forests.
- **Environmental impacts.** Expanding the ability of forests to protect soils, improve water quality and sequester carbon.
- **Māori forestry.** Helping grow the Māori economy and wellbeing through forestry.
- **Social research and human factors.** Quantifying and investigating the social and political risks to forestry.

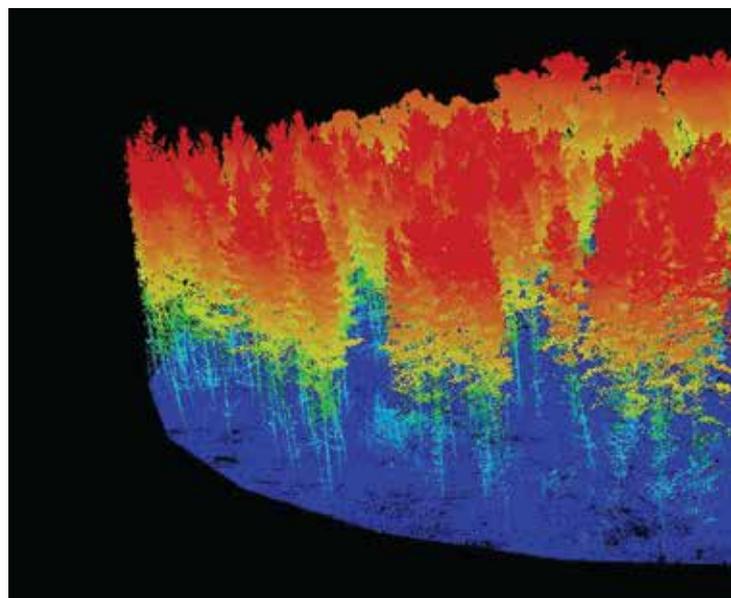
Forest protection

The benefits provided by forests can be reduced through damage caused by insect pests, diseases, weeds, wind and fire.

Scion helps growers and government agencies to manage and mitigate biological and physical risks to forests.

Our science capabilities underpinning the protection of New Zealand's forests include:

- **Entomology.** Specialising in insect pests associated with native and exotic trees in New Zealand.
- **Pathology.** Expertise in diseases and pathogens associated with trees and forests.
- **Pest management.** Developing chemical, silvicultural and biological methods for reducing the impacts of insect pests, weeds and diseases.



- **Fire research.** Advancing the knowledge and tools needed to protect life, property and forests from wildfire.
- **Diagnostics.** Expertise and resources to maintain an ISO-accredited diagnostic laboratory and nationally significant plant, insect and fungal collections.

Commercial forests offer New Zealand one of its greatest opportunities to lift economic performance, create jobs and improve environmental values. Forests are New Zealand's largest source of renewable material and biomass. They protect water quality, reduce erosion and provide valuable recreational opportunities. Forests are also our biggest storehouse of carbon and species diversity outside the oceans.



Forest genetics

The need to optimise species and varieties to boost productivity and supply a range of value-added and niche products intensifies as forestry comes more intense.

Scion is a leader in advanced breeding programmes and deployment strategies for commercial tree species. We use traditional breeding methods, along with molecular and modern breeding technologies, to develop prime germplasm for New Zealand's forest industry.

Our research programme links tree breeding science through to the nursery, ensuring that improved treestocks are rapidly available for commercial planting.

Our science capabilities include:

- **Tree breeding.** Understanding genes and their function, developing technologies for improved selection and creating improved trees.
- **Tree propagation.** Developing new technologies for the propagation of optimal germplasm.
- **Nursery.** Mass producing improved tree stocks for forest growers.

Forest industry informatics

Scion provides the specialised capabilities needed to lift the performance of the forest industry through integrated tools and systems.

Our science capabilities to enhance sustainable forest management include:

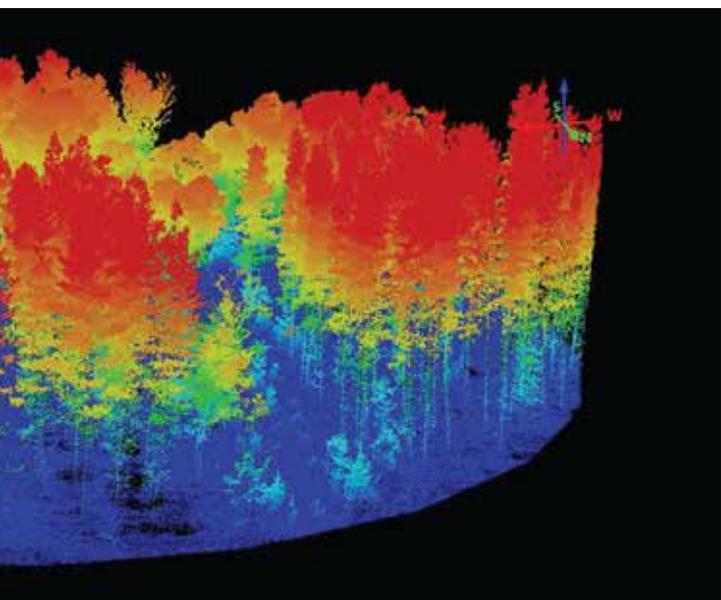
- **Software engineering.** Developing, supporting and maintaining software applications, modelling systems and decision support systems.
- **Geomatics and bioinformatics.** Using Geographic Information Systems to spatially analyse data and integrate layers of complex data relating to resources, environment and geography.

Value chain optimisation

Scion has expertise in logistics, supply chain diagnostics, value chain design and market intelligence to ensure that the value generated in the forest translates into optimal business opportunities.

Our capabilities include:

- Value chain modelling.
- Qualitative and quantitative analytical capabilities.
- Supply chain economics.
- Understanding consumer perspectives and trends.

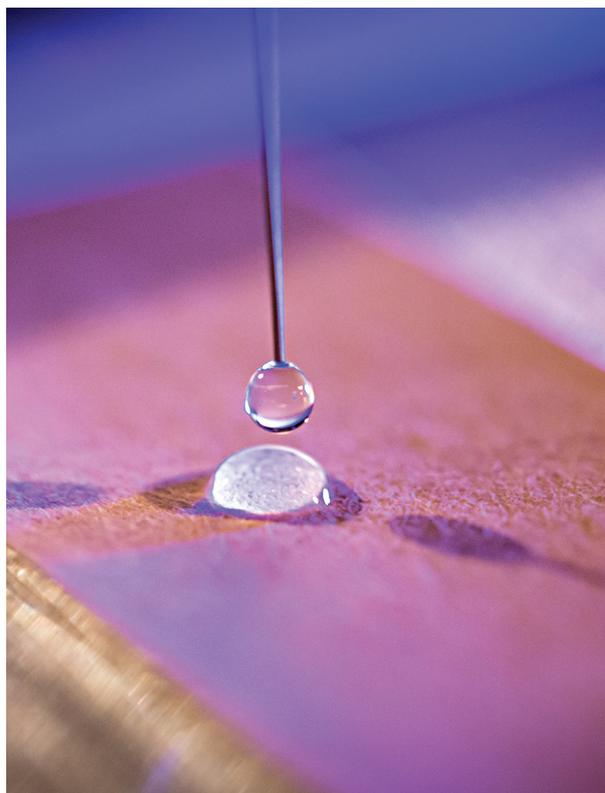


Manufacturing and bioproducts

Scion also works with New Zealand producers, manufacturers and product developers to improve processing systems and devise novel ways of using wood and plant fibre.

We provide research, science and technology to convert wood and fibre into a range of renewable and sustainable products and energy. Our research is grouped under four broad categories:

- **Biopolymers and chemicals.** Viable biopolymer and biochemical options for products derived from wood, or incorporating wood fibre, other natural fibres and biomaterials.
- **Biotransformation.** Using biological approaches to improve forest productivity and transform materials derived from forests.
- **Clean technologies.** Technologies, processes and systems that help overcome greenhouse gas emissions and waste utilisation.
- **Wood and fibre processing.** Enhancing wood processing with science and innovation to develop new systems that will extract the most value from every log.



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About Scion

Scion is the Crown research institute that specialises in research, science and technology development for forestry, wood and wood-derived materials, and other bio-material sectors.

Scion's purpose is to create economic value across the entire forestry value chain, and contribute to beneficial environmental and social outcomes for New Zealand.

We provide

- **Services.** We undertake specific projects for clients, usually involving specialised testing and problem solving.
- **One-on-one confidential research.** Projects that are targeted to maintain client competitiveness.
- **Strategic multi-party alliances.** To address sector based challenges and innovative opportunities.
- **Tailored contractual relationships.** Scion can meet the specific needs of each customer.



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Prosperity from trees *Mai i te ngahere oranga*