



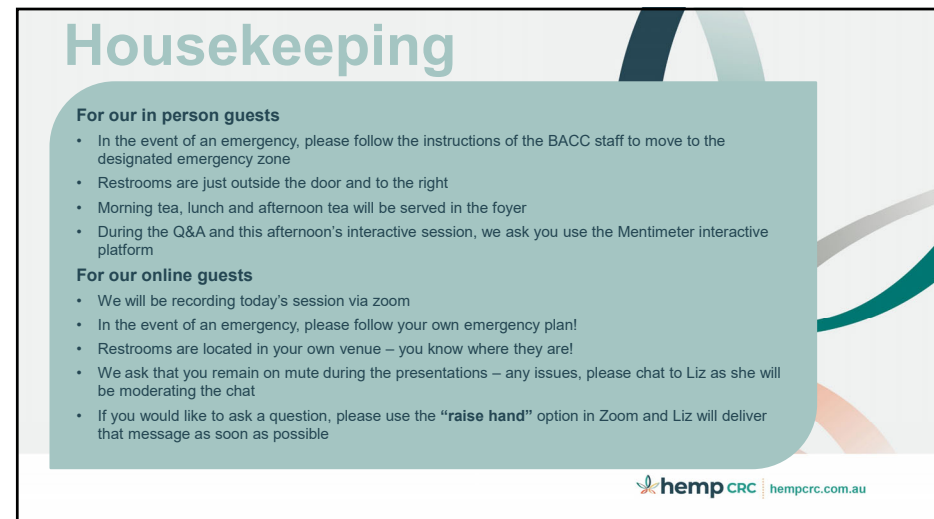
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Program Leaders



Dr Sarah Purdy
NSW DPI



Prof Dennis Chang
Western Sydney University



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Deakin University



Dr Tobias Kretzschmar
Southern Cross University



Professor Tek Maraseni
University of Southern Queensland



hemp Production



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hemp Production

The hemp production program starts with the seed and ends at the farm gate.

The systems it encompasses include broadacre, protected cropping and outdoor cultivation.

Aims to deliver

- Elite germplasm targeted to specific end uses
- The best practices in agronomy, crop protection and mechanisation



Seeds: Elite germplasm bred to produce high yields of target products



Identification of target traits

- Improved morphology for seed and medicinal varieties
- High CBD lines suitable for outdoor/broadacre cultivation
- Cell wall properties optimised for different end uses

Targeted breeding for yield and specific quality traits

- Achieved through classical breeding and advanced breeding technologies
- New varieties tested in multi-location trials to ensure consistency in performance and identify performance boundaries



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Agronomy & Crop Protection: Optimising production practices to maximise yield and minimise risk

🌾 Agronomy

- Timing and rate of fertilizer application
- Timing and rate of irrigation
- Inclusion of sensor technologies from the outset

🐛 Identify pests and disease risks through crop surveys

- Determine the best IPM strategies for different hemp crops
- Develop and apply new non-chemical technologies for plant protection
- Approaches for early detection of outbreaks

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Mechanisation: Improving efficiency and minimising labour demands

🌾 Planting systems

- Establish planting date, depth and rate for different crops
- Approaches for outdoor medicinal cultivation such as plug planting

🌾 Harvesting systems

- Minimising labour demands for medicinal crops
- GMP certification of new technologies
- Monitor changes in soil carbon with stubble management practices

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hemp for Health

AIMS

- Deliver research to support and grow the use of hemp and medicinal cannabis in humans and animals as nutritional, nutraceutical, medicinal and cosmetic products
- Assist industry partners to register cannabis products on the TGA Australian Register of Therapeutic Goods (ARTG) for S3, S4 and S8 products

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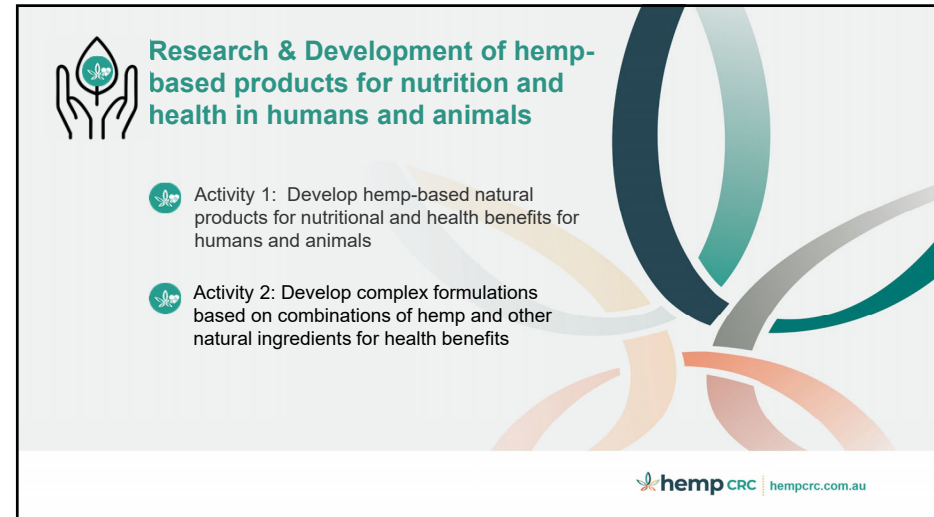


Scope

- Phytochemical analysis to standardise and optimise raw materials and products
- Pharmacological testing including mechanistic studies, pharmacokinetic profiles and toxicity
- Clinical trials to evaluate the efficacy and safety of hemp and medicinal cannabis products for specific nutritional and therapeutic applications
- Development of novel hemp and medicinal cannabis products through investigating interactions of key cannabinoids, dosage forms and routes of administration
- Development of intellectual property, commercialisation and manufacturing pathways
- Delivery of education programs on scientific evidence and safety relating to hemp and medicinal cannabis to prescribers, end-users and industry


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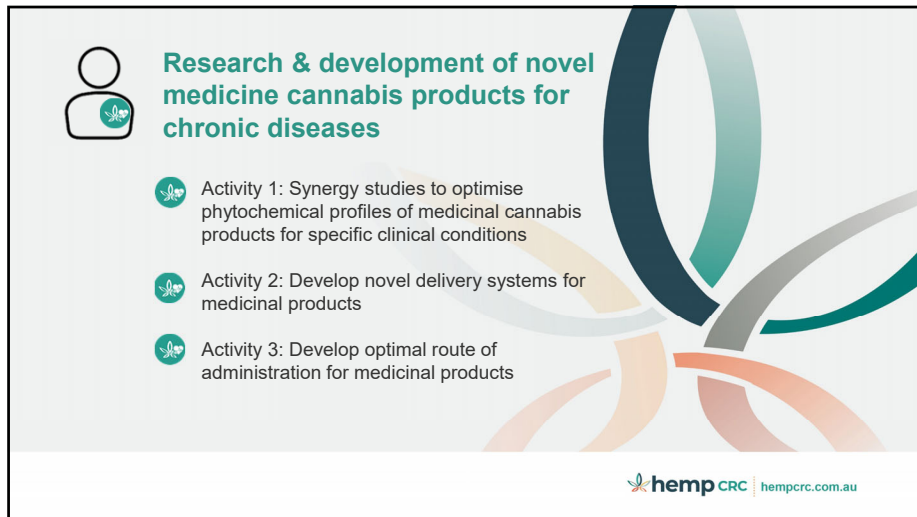


Research & Development of hemp-based products for nutrition and health in humans and animals

- Activity 1: Develop hemp-based natural products for nutritional and health benefits for humans and animals
- Activity 2: Develop complex formulations based on combinations of hemp and other natural ingredients for health benefits


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Research & development of novel medicine cannabis products for chronic diseases

- Activity 1: Synergy studies to optimise phytochemical profiles of medicinal cannabis products for specific clinical conditions
- Activity 2: Develop novel delivery systems for medicinal products
- Activity 3: Develop optimal route of administration for medicinal products


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Clinical evaluation of existing hemp/medicinal cannabis products in efficacy trials & pharmacokinetic studies

- Activity 1: Clinical trial and pharmacokinetic study of a CBD product for management of insomnia
- Activity 2: Clinical trial of a CBD product for pain management (such as chronic back pain, endometriosis)
- Activity 3: Comparison of safety and efficacy of CBD isolate and broad-spectrum/full-spectrum products for treatment of common conditions
- Activity 4: Clinical trial of a terpene-blend product for management of common conditions

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hemp Materials








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hemp Materials




Linking what growers produce & the market needs in terms of raw material. This program will investigate:


-  Post-harvest processing
-  Value-adding to new & existing hemp uses
-  Classification & metrology of grower biomass (hurd & fibre)
-  Market-driven research link to growers, manufacturers and consumers of industrial hemp products



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hemp Materials

-  Developing an end market for hemp fibre
-  Developing an end market for hemp construction materials
-  Developing an end market for hemp new materials









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Developing an end market for hemp fibre

-  Evaluate productive harvest and post-harvest processes that provide high quality and consistent feedstock materials for use in textiles, non-wovens, composites, plastics and other material processes.
-  Research & test, decortication (removing fibre from the stalk) and processing systems to optimise spinning quality and efficiency
-  Test & analyse the optimal temporary reconfiguration of cotton gin infrastructure to remove hemp fibre from the stalk
-  Research, develop and implement a uniform set of standards for hemp materials in the textiles industry with QA protocols


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Developing an end market for hemp construction materials

- Research and test different composites to find the optimal formulation that exhibits robust construction properties.
- Research, develop and implement a uniform set of standards for hemp materials in the construction industry.

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Developing an end market for hemp new materials

- Designing, developing, and producing next generation of textiles/ bioplastics that enable greater reuse, re-manufacturing, recycling, and degradation.

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hemp Futures


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hemp Futures

- will be cross-cutting & will underpin the long-term goals of the other programs
- will support a sound basis & solid framework for the sustainable future of the Australian hemp industries
- will enable hemp businesses to thrive in technologically mature & legislatively conducive environments


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hemp Futures







Future Hemp Technologies
Hemp R&D has been hindered by decades of global prohibition & over-regulation. Technological advances that are routinely deployed for the improvement of other crops & derived products need to be fast-tracked for hemp.



Future Hemp Business Models
Economical frameworks & agribusiness models along hemp supply chains have yet to mature for Australia. Hemp businesses have potential to capitalise on recent paradigm shifts towards zero-waste & net-zero carbon economies.



Future Hemp Policy
Regulatory & policy frameworks for the primary production, processing & end-use of hemp have yet to be refined for Australia. They will rely on targeted R&D to support evidence-based decision making & policy change.

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Future hemp technologies





Establish National Hemp Genebank
Open-access genetic resource for hemp R&D & industry
High value traits & markers to speed up variety development



Develop Zero-THC Hemp
Reduce risk for growers & build confidence in the hemp brand



Create novel seed systems for hemp
Seed certification to create confidence for growers
F1 hybrid seed for crop consistency & value-add for seed producers
Feminized or masculinized seed to shift female to male ratios for higher yields





Built Quality Assurance tools
Laboratory & predictive technologies for quality assurance of hemp food, fibre & medicine

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Future hemp business models







Validate potential of hemp for carbon sequestration & mitigation
Model- & trial-based data on potential & scalability of hemp to sequester carbon or prevent/offset the emission of carbon



Develop zero waste strategies for hemp
Detailed life cycle assessment for hemp products
Strategies for by-products & waste use
Reduce input inputs for cultivation, especially for medicinal cannabis





Create waste management solution for medicinal cannabis
Cost efficient and value-adding pathways to handle schedule 8 waste

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Future hemp policy






Enable new products & markets for hemp
Generate & deliver relevant data into applications with regulatory bodies for further de-regulation of hemp to create novel end-uses & value-add current by-products & waste.



Marketing & market research
Market research into consumer perception of hemp & hemp branding, including the de-regulation of the use of the iconic hemp leaf for advertising, to inform & diversify marketing strategies for hemp products.

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Education and Training

- The hemp Graduate Research School:** focussing on industry specific problems that complement all four research programs. PhD students will receive additional training & networking opportunities.
- hemp Training:** focussing on undergraduate & vocational style training. Competency based training programs will be developed in line with the Australian Qualifications Framework.
- hemp Engagement:** focussing on short courses, conferences, field days & other outreach activities based on the industry's emerging needs.




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Introducing

hemp CRC Chair Elect Professor Kerry Phelps AM



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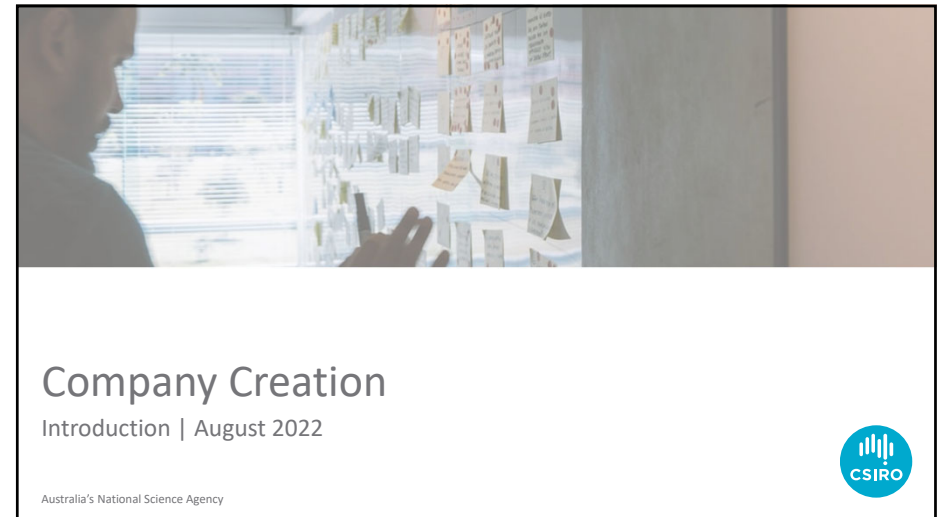


Presentation

Dean Alle
Director Company Creations

CSIRO's Company Creation team brings together founders (science, investor, entrepreneur & industry) required to build companies that can take science and technology innovation to market at pace and solve big global challenges.

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Company Creation

Introduction | August 2022

Australia's National Science Agency




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Company Creation

CSIRO's Company Creation team brings together the founders (science, investor, entrepreneur and industry) required to build companies that can take science and technology innovation to market at pace and solve big global challenges.

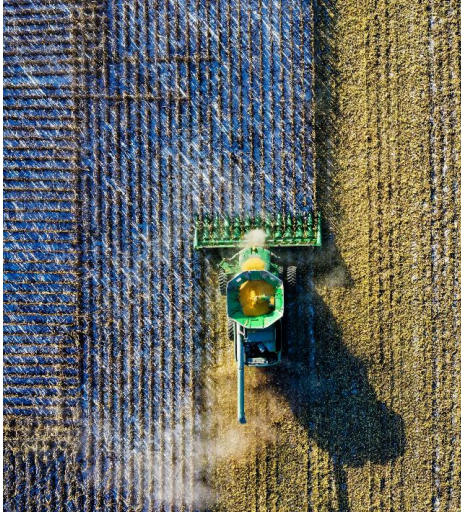
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Company Creation exists to ensure we achieve the full impact potential of CSIRO research and solutions.


We build the new ventures that put amazing science at the front, leapfrog disruption and solve wicked problems for Australia and the world.

Australia's National Science Agency




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Research organisations typically utilise one of two primary models to develop and take technologies to market



Start-up companies

Industry collaboration





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Our model

Industry collaboration, unconstrained by:

- Near-term funding cycles
- Internal people movements
- Competing priorities
- Narrow field of opportunity

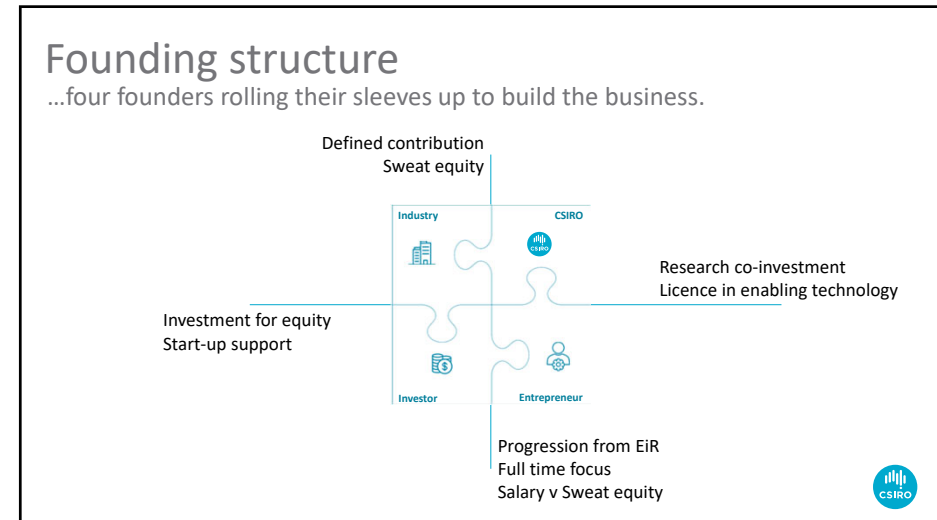
In a **new venture**, de-risked by a clear path to scale and market.



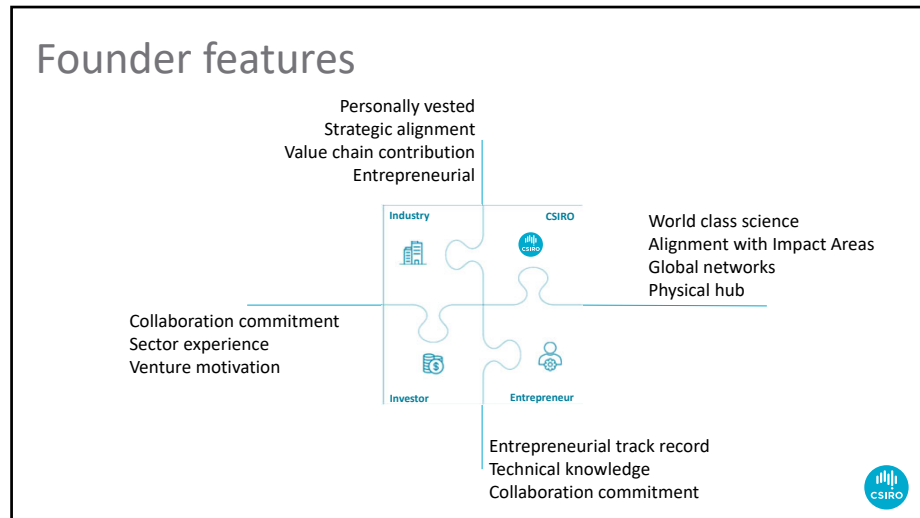
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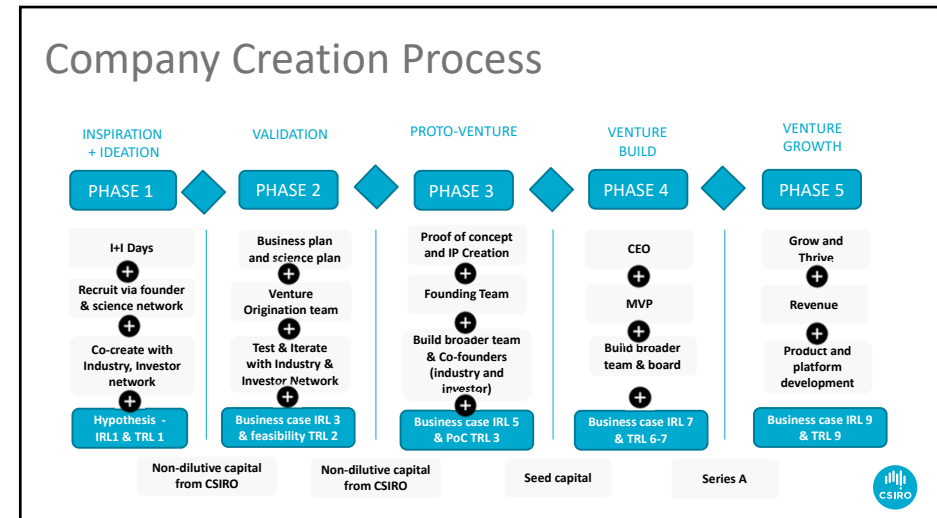
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CSIRO Australia's National Science Agency

We know it works...

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CSIRO Company Creation 2020/21

\$169m Invested across portfolio

2 New ventures established

\$12m R&D Commitment from portfolio

86 Jobs in portfolio companies

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CSIRO v2 food

v2food example

...Four founders co-develop a new venture to address a massive market opportunity

...multiple products and channels
December 2019+

Industry: HUNGRY JACK'S, Competitive Foods Australia

Investor: MAIN SEQUENCE CSIRO Innovation Fund

Entrepreneur: Nick Hazell, Founding CEO

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Contact our team to collaborate:

csiro.au/company-creation

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Industry Session

Join the Mentimeter interactive session

Go to
www.menti.com

Enter the code
7848 2046



Or use QR code



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Wrap up

Q&A

Next steps




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