



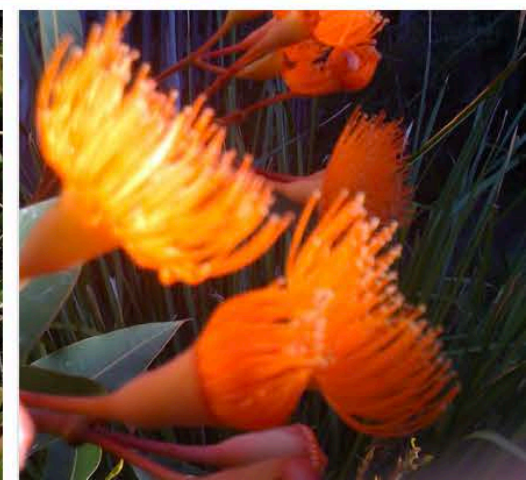
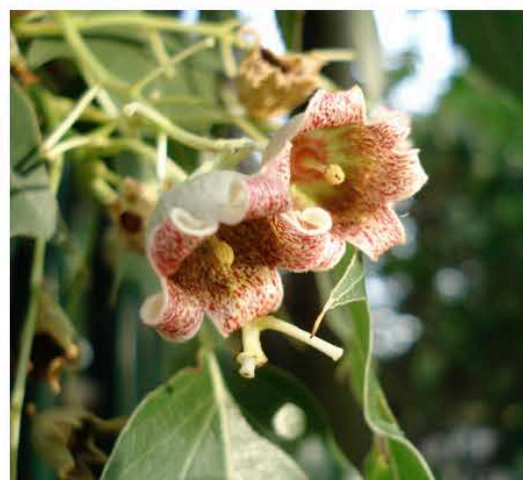
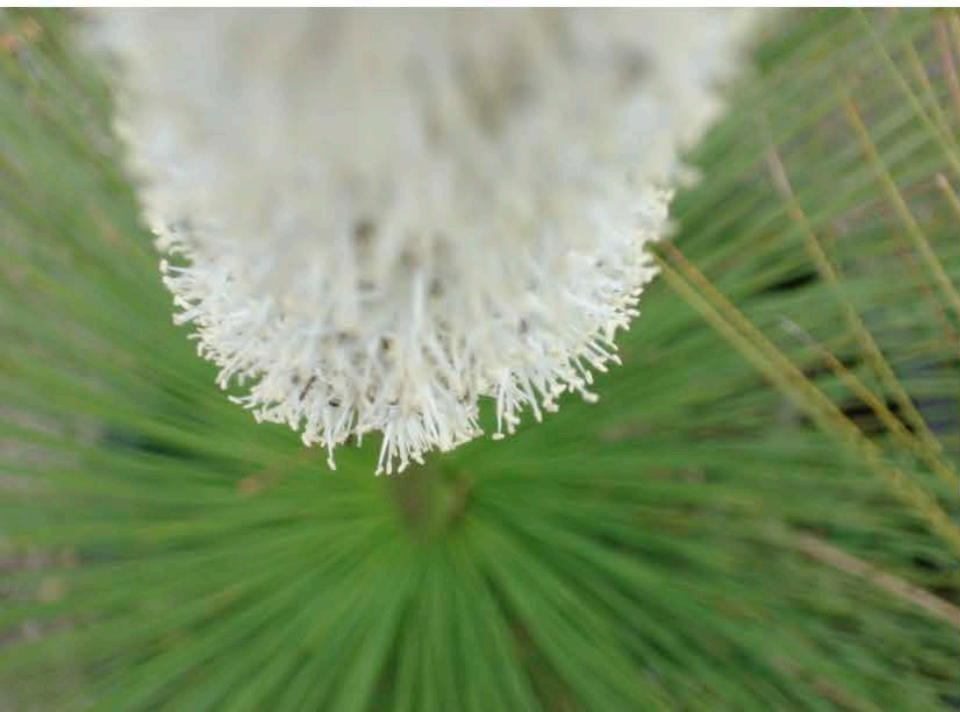
# 6<sup>th</sup> WORLD CONFERENCE ON RESEARCH INTEGRITY

HONG KONG  
2 - 5 JUNE 2019

## Focus Track (FT1) Ensuring Integrity in Innovation and Impact

Daniel Barr and Maura Hiney  
with Zoë Hammatt







Publication is not the end point in the story of research. For it to deliver a benefit, it has to be used by someone to deliver an impact. This may be by those setting policy, or developing a new drug...the impacts of research are broad and far-reaching.

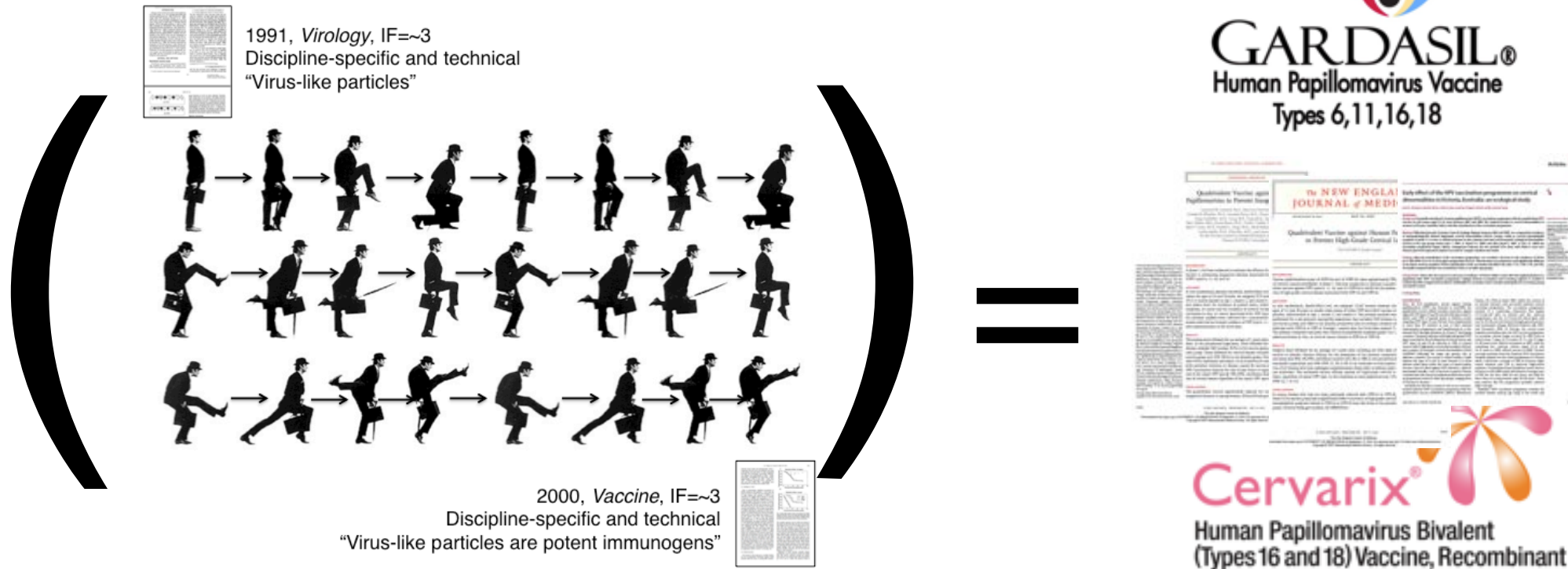
Researchers and research institutions are increasingly being asked to demonstrate the difference to the world that government funded research has made – research impact.

In many regions, government support for universities and research appears stagnant or in decline. It is argued that deeper connection with industry – a broad term used here to describe any non-academic research partner – will enable universities to become more self-sufficient, deliver a better return on investment, and deliver research that has more direct impact

## **Research Impact**

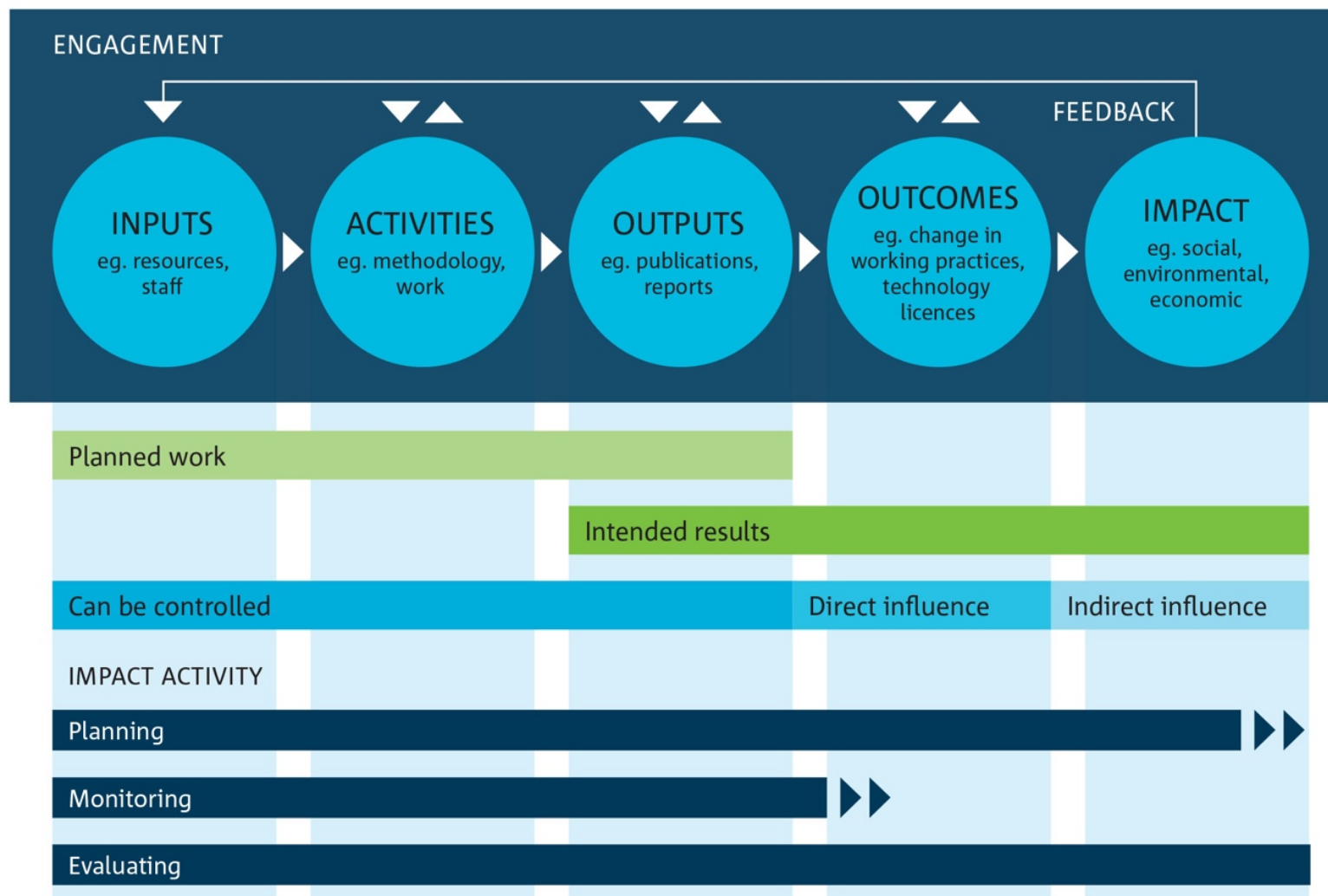
Research impact is the contribution that research makes to the economy, society, environment, culture, health and academia (although academic impacts are sometimes excluded from formal assessments of research impact).

# Research impact



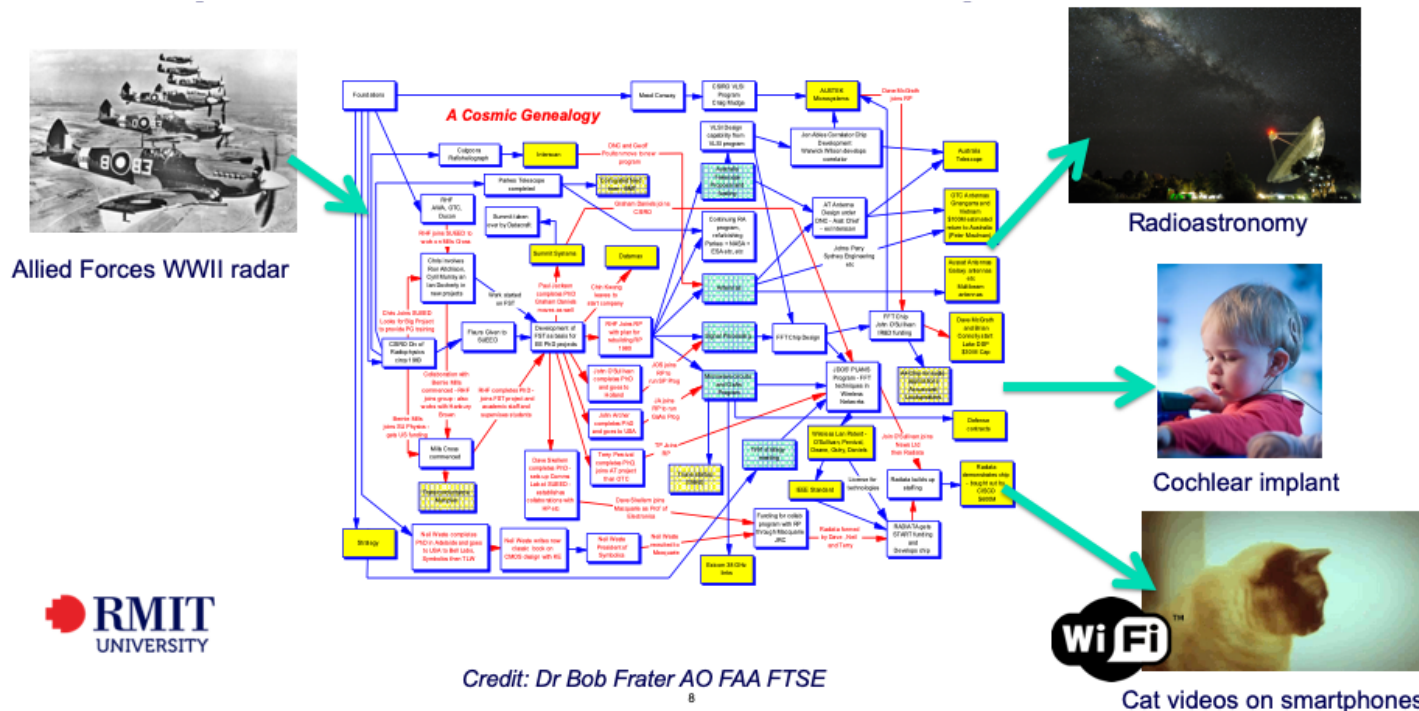
- Accumulation of non-linear steps
- A complex equation of research impact
- Safe and ~100% effective vaccines
- Reduction of precancer within 3 years of introduction

# CSIRO's Impact Framework



# Research impact and trust

- Research generates knowledge and always has impact
- The impact of research appears broad and unpredictable



***Because of this we must be able to trust research***

**Research integrity is the coherent and consistent adherence to a set of principles that underpin the trustworthiness of research.**



# Singapore Statement on Research Integrity

Preamble. The value and benefits of research are vitally dependent on the integrity of research. While there can be and are national and disciplinary differences in the way research is organized and conducted, there are also principles and professional responsibilities that are fundamental to the integrity of research wherever it is undertaken.

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## PRINCIPLES

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***Honesty*** in all aspects of research

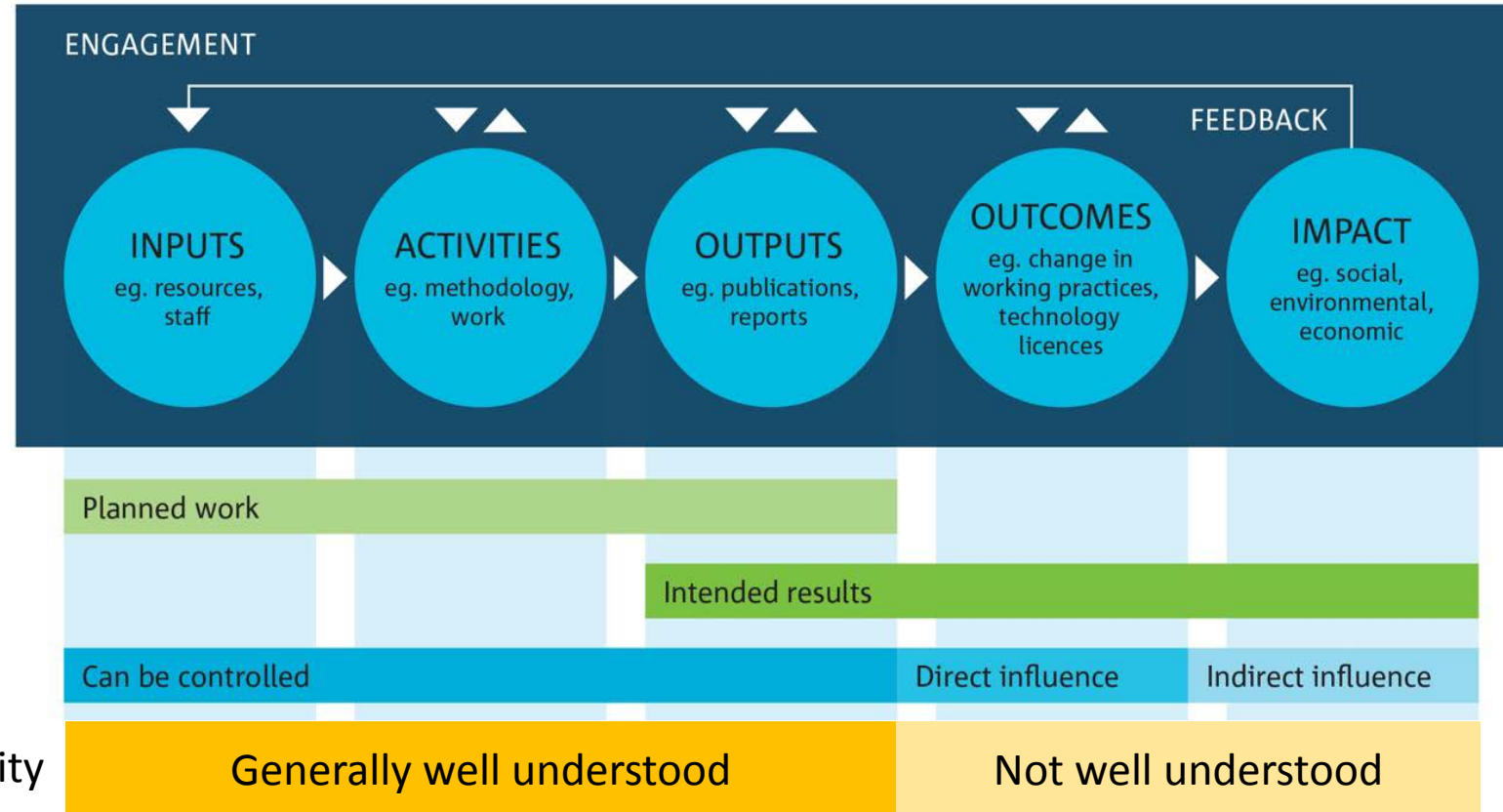
***Accountability*** in the conduct of research

***Professional courtesy and fairness*** in working with others

***Good stewardship*** of research on behalf of others

From the 2<sup>nd</sup> World Conference on Research Integrity held in Singapore, 2010.

# CSIRO's Impact Framework



The principles and responsibilities that guide research integrity, and the application of these principles and responsibilities to these phases is generally well understood

**Research Translation**  
**Research Innovation**

Principles and responsibilities of research integrity have been captured in many ways, and there is general agreement about them.

How do these apply to the task of research translation?

What additional principles or responsibilities might be required in order to ensure that the translation of research is as honest and trustworthy as the research itself?

## Research Integrity Ecosystem



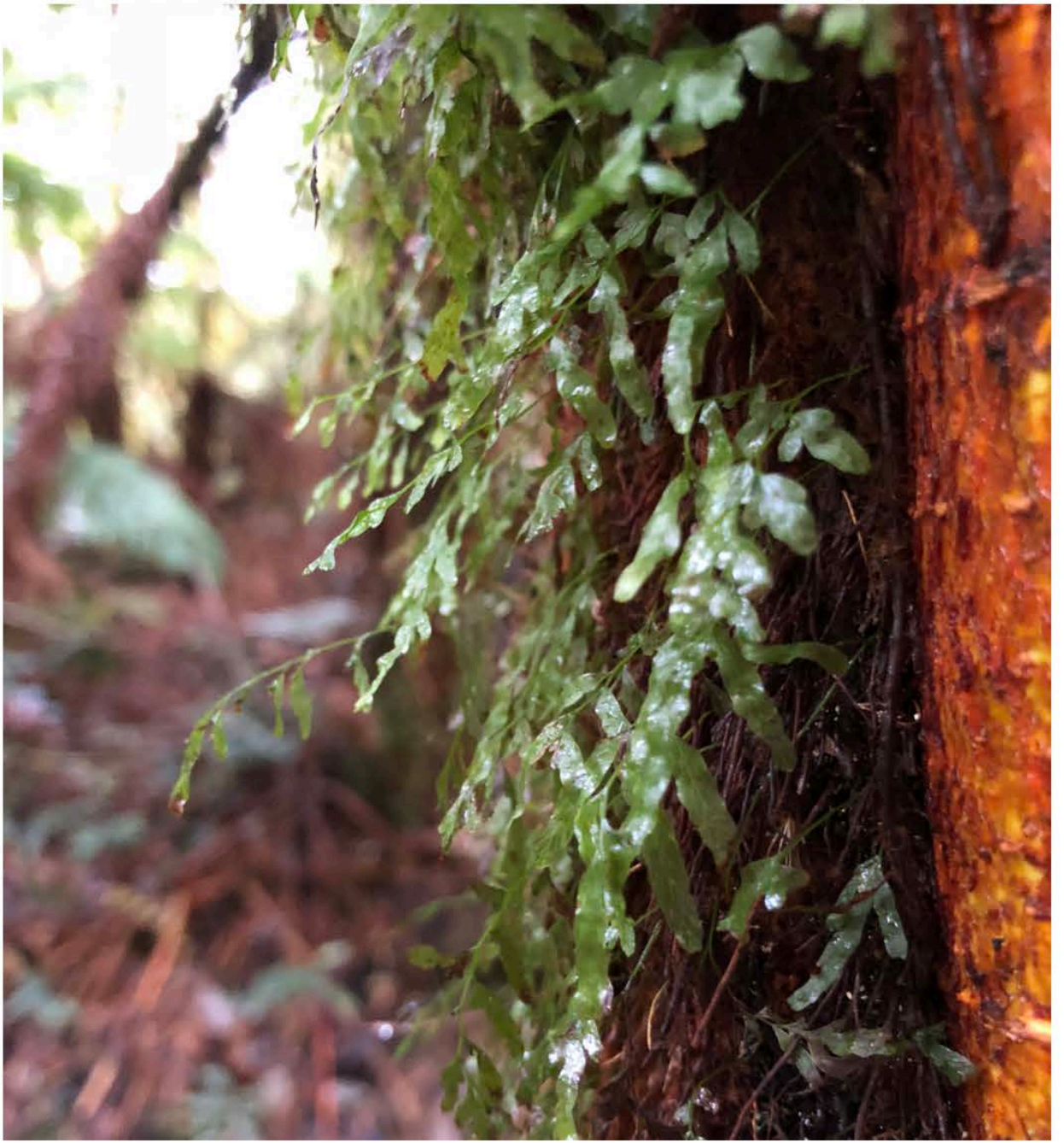
**What can we learn from the expectations of end users about research integrity?**



The overall aim is a deeper discussion about (1) the needs of end users of research with respect to integrity, and (2) the relationships between research integrity and research impact including but not limited to the integrity of impact assessments.

The discussion can progress to consideration of the interpretation of principles of research integrity as they apply to innovation and impact







## **Research end-user**

A research end-user is an individual, community or organisation external to academia that will directly use or directly benefit from the output, outcome or result of the research.

Examples of research end-users include governments, businesses, non-governmental organisations, communities and community organisations.

# What do end-users of research need?

<b>Research</b>	<b>End-users</b>	<b>Impacts</b>
	Government	Economic
	Businesses	Societal
	Non-governmental organisations	Cultural
	Communities	Environmental
	Community organisations	Health

In small groups discuss from the perspective or persona of an end user

1. What do the end users of research expect or need from research?
2. How do these needs align with the principles of research integrity?
3. What do end users need in order to be able to trust research?







# What principles apply? Do we need more?

The principles of research integrity are well captured, but what do they mean for innovation and impact?

Are certain principles or responsibilities of research integrity more important than others for research translation?

What additional principles or responsibilities might be required in order to ensure that the translation of research is as honest and trustworthy as the research itself?

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## PRINCIPLES

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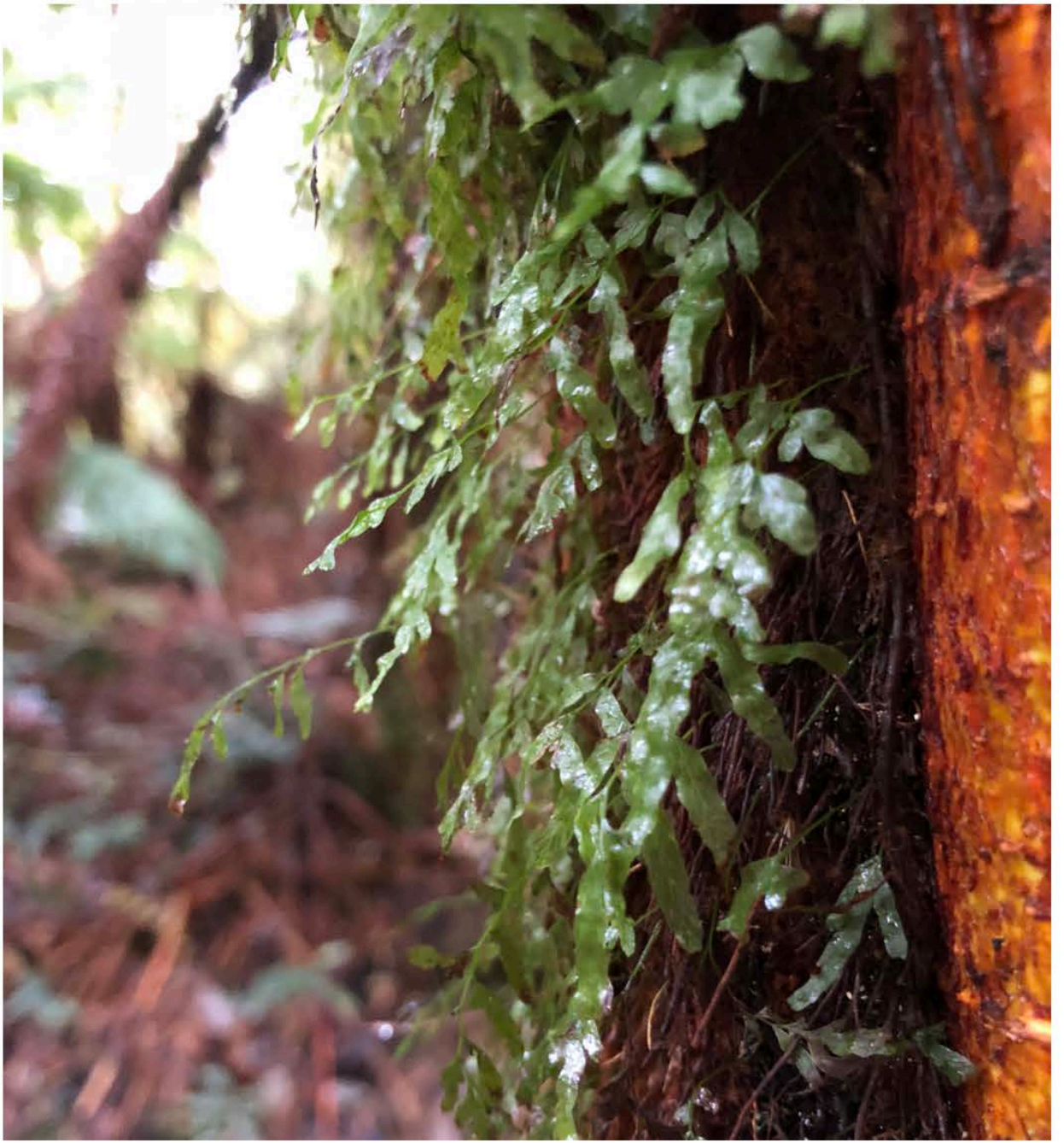
**Honesty** in all aspects of research

**Accountability** in the conduct of research

**Professional courtesy and fairness** in working with others

**Good stewardship** of research on behalf of others







How can we ensure responsible use of the outputs of research in innovation and impact?

As stakeholders, are there principles-based responsibilities for industry or end-users to ensure integrity in innovation and impact?



What are the challenges or opportunities that can arise by such an outward focus that are then placed on researchers and research institutions?

How might the outward focus on innovation and impact, and partnering with industry, positively or negatively affect the responsible conduct of research?



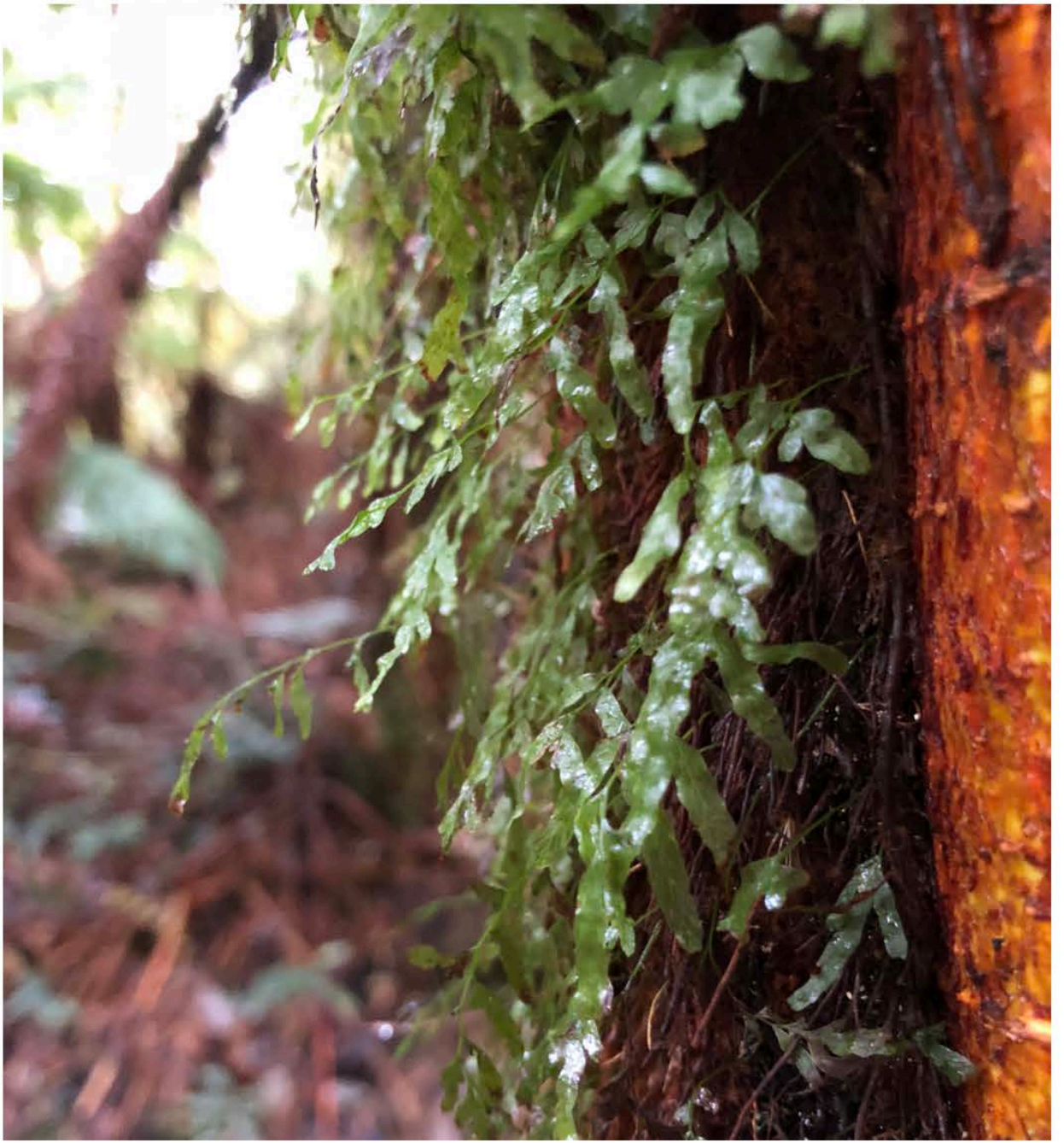






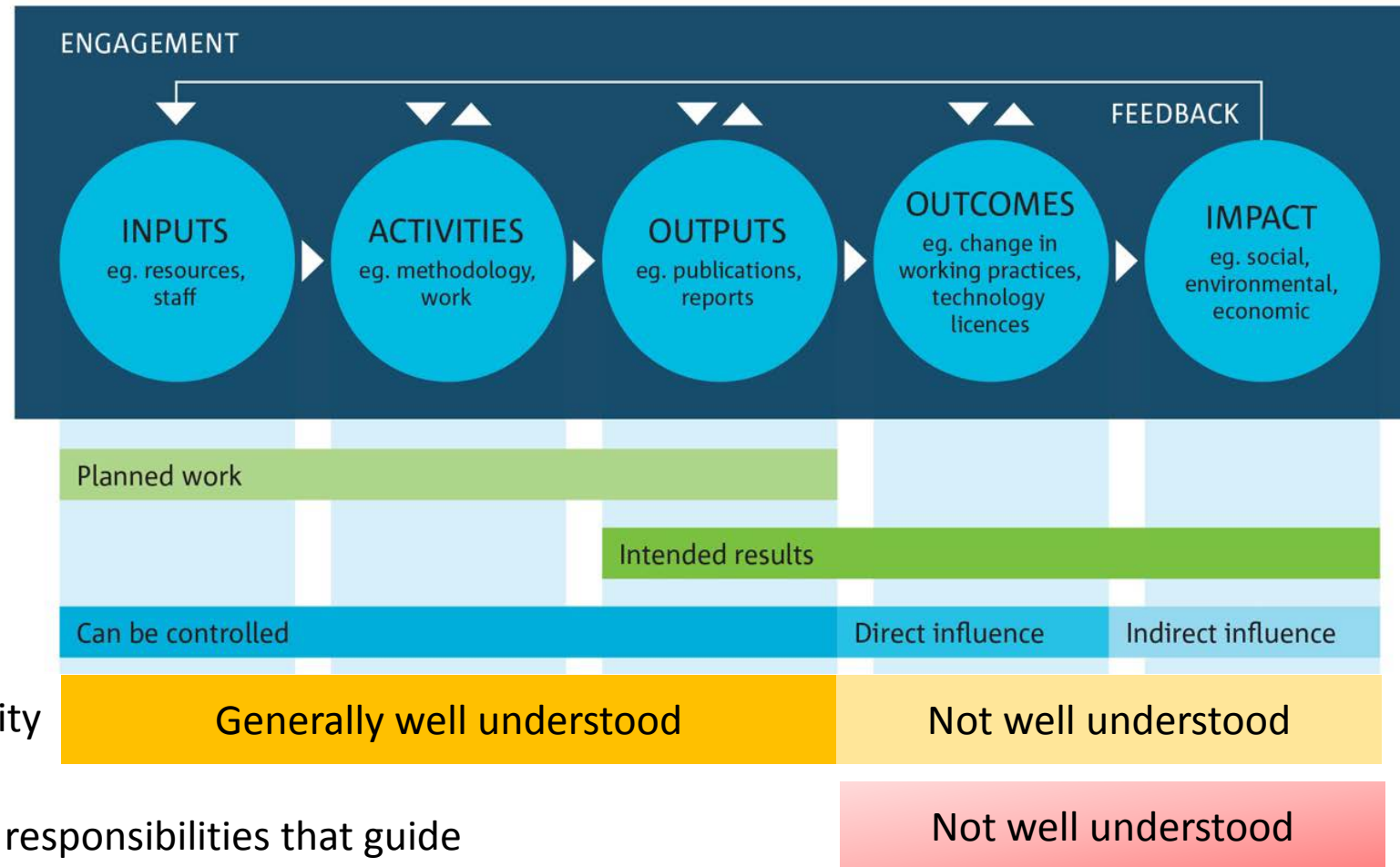








# CSIRO's Impact Framework



The principles and responsibilities that guide research integrity, and the application of these principles and responsibilities to these phases is generally well understood

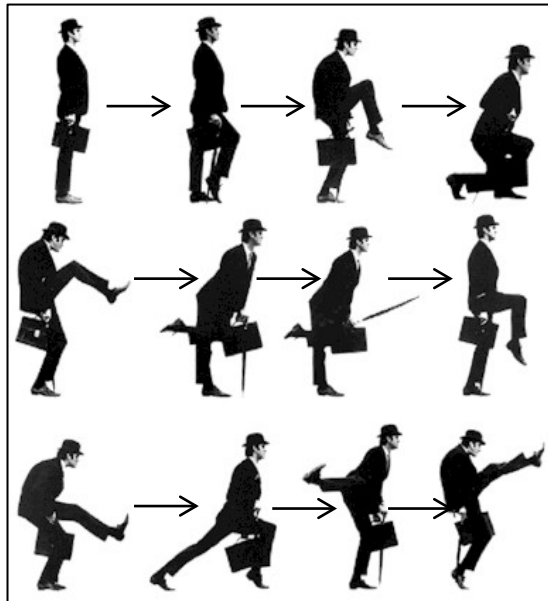
**Research Translation**



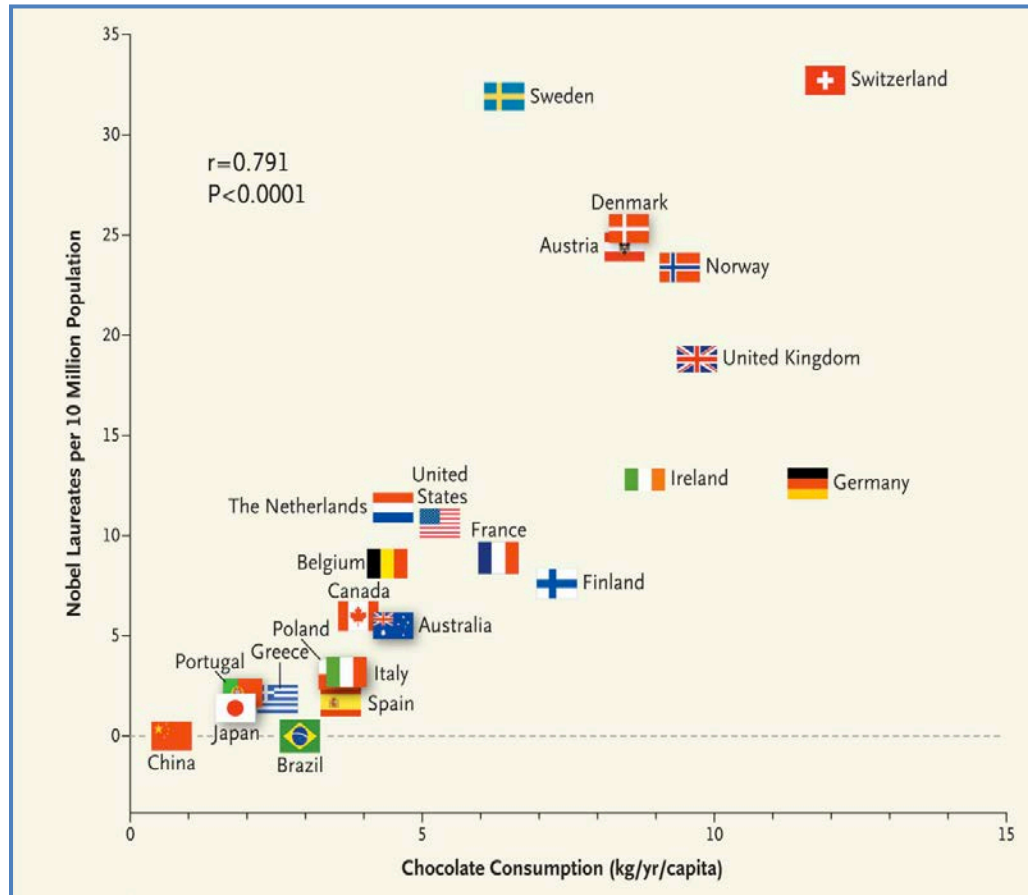
# Research

*Research is the systematic investigation into and study of materials and sources in order to establish facts and arguments, and reach new conclusions*

- Adapted from the Online Oxford English Dictionary

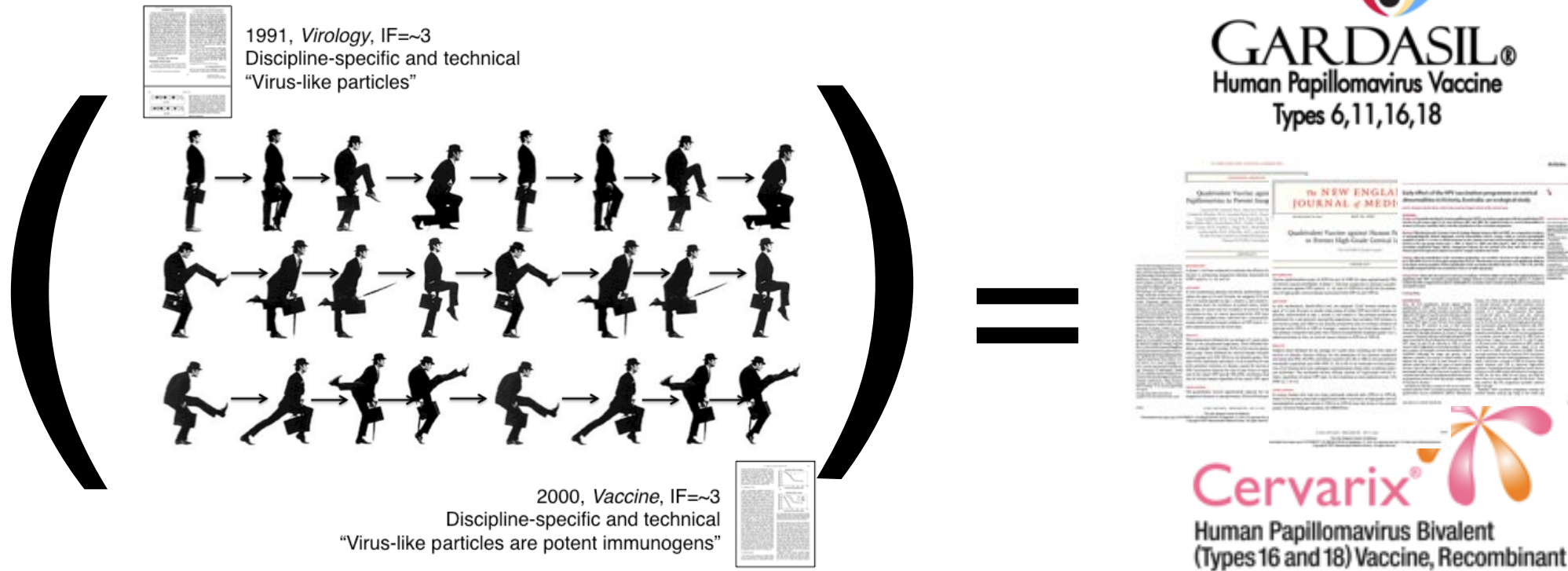


# Why do research?



- Fun
- Curiosity
- Discovery
- Invention
- Change
- ... to make a positive impact

# Research always has impact



- Accumulation of non-linear steps
- A complex equation of research impact
- Safe and ~100% effective vaccines
- Reduction of precancer within 3 years of introduction



**A Cosmic Genealogy**

The flowchart illustrates the career and research paths of various scientists and engineers, primarily centered around CSIRO and the development of radio astronomy and telecommunications technologies. The chart starts with 'Foundations' and 'Strategy' and branches out into numerous projects and collaborations, ending with 'Radiata builds up staffing' and 'Radiata gets START funding and Develops chip'.

**Foundations:**

- Foundations
- Mead Conway
- CSIRO VLSI Program
- Craig Mudge
- AUSTEK Microstems
- Jon Ables Correlator Chip Development
- Warwick Wilson devlops correlator
- Australia Telescope
- OTC Antennas Gungaharra and Vietnam
- \$100M estimated return to Australia (Peter Meulman)
- Aussat Antennas Galaxy antennae etc
- Multibeam antennae
- Dave McGrath and Brian Connolly start Lake DSP \$30 M Cap
- Defense contracts
- Radiata demonstrates - bought out CISCO \$600M

**Strategy:**

- Strategy
- Neil Weste completes PhD in Adelaide and goes to USA to Bell Labs, Symbolics then TLW
- Neil Weste writes now classic book on CMOS design with KE
- Neil Weste President of Symbolics
- Neil Weste recruited to Macquarie
- Funding for collab program with RP through Macquarie JRC
- Excicom 38 GHz links

**Key Projects and Collaborations:**

- Culgoora Radioheliograph
- Interscan
- DNC and Geoff Poulton move to new program
- Comugated feed horn - BMT
- Graham Daniels joins CSIRO
- Summit Systems
- Datamax
- Continuing RA program, refurbishing Parkes + NASA + ESA etc, etc
- Antennas
- Signal Processing
- FFT Chip Design
- FFT Chip John O'Sullivan IR&D funding
- JDOS' PLANS Program - FFT techniques in Wireless Networks
- Ad Chip for audio applications Accusound Loudspeakers
- Wireless Lan Patent - O'Sullivan, Percival, Deane, Ostry, Daniels
- License for technologies
- Radiata 1 formed by Dave, Neil and Terry
- Radiata builds up staffing
- Radiata gets START funding and Develops chip

**Other Key Figures and Events:**

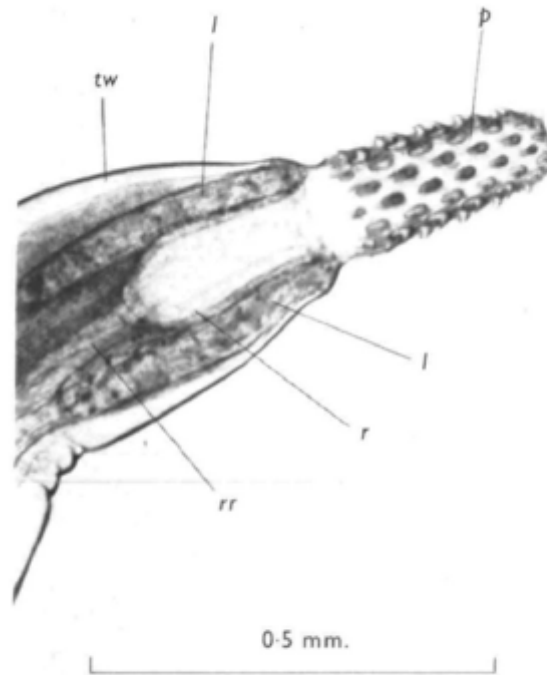
- Chris Joins SUEED Looks for Big Project to provide PG training
- Chris involves Ron Altkhison, Cyril Murray and Ian Docherty in new projects
- Chris Joins SUEED
- CSIRO Div of Radiophysics circa 1960
- Collaboration with Bernie Mills commenced - RHF joins group - also works with Hanbury Brown
- Bernie Mills joins SU Physics - gets US funding
- Mills Cross commenced
- Transconductance Multiplier
- Flours Given to SUEED
- Work started on FST
- Paul Jackson completes PhD Graham Daniels moves as well
- Chin Kwong leaves to start company
- Development of FST as basis for EE PhD projects
- RHF Joins RP with plan for rebuilding RP 1980
- JOS joins RP to run SP Prog
- JA joins RP to run GaAs Prog
- TP Joins RP
- John O'Sullivan completes PhD and goes to Holland
- John Archer completes PhD and goes to USA
- Terry Percival completes PhD, joins AT project then OTC
- Dave Skellern completes PhD - sets up Comms Lab at SUEED - establishes collaborations with HP etc
- Dave Skellern joins Macquarie as Prof of Electronics



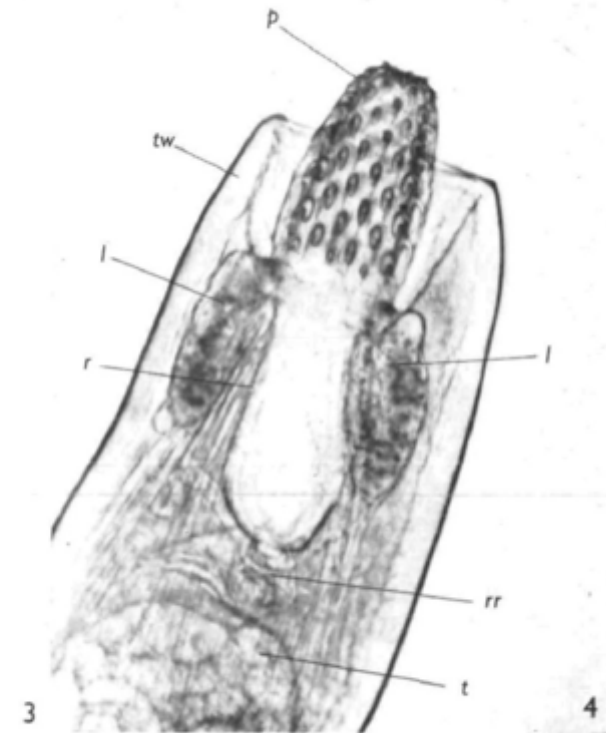
32

# Delayed and unpredictable research impact

- Hammond, R. A. The proboscis mechanism of *Acanthocephalus Ranae*. *J. Exp. Biol.* 45, 203–213 (1966).
- 22 citations...  
and then a 23<sup>rd</sup>.



R. A. HAMMOND



(Facing p. 213)

# Delayed and unpredictable research impact

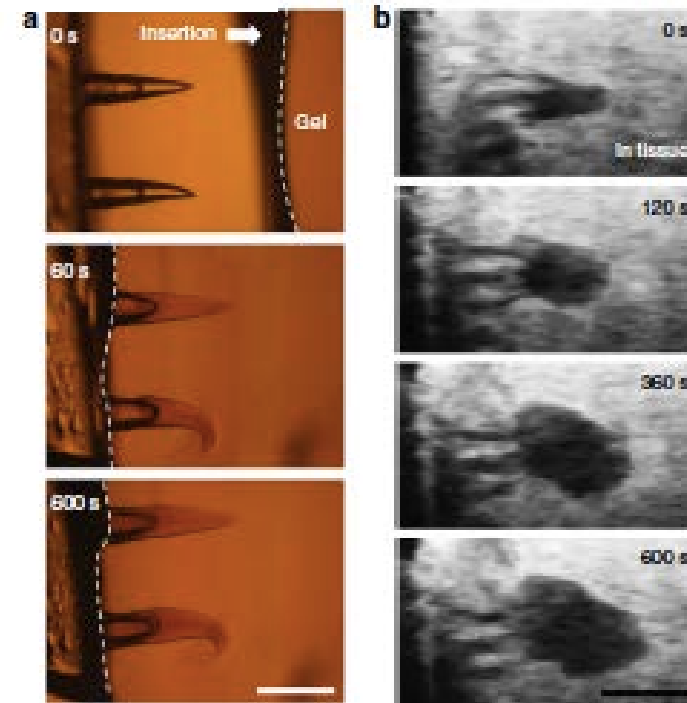
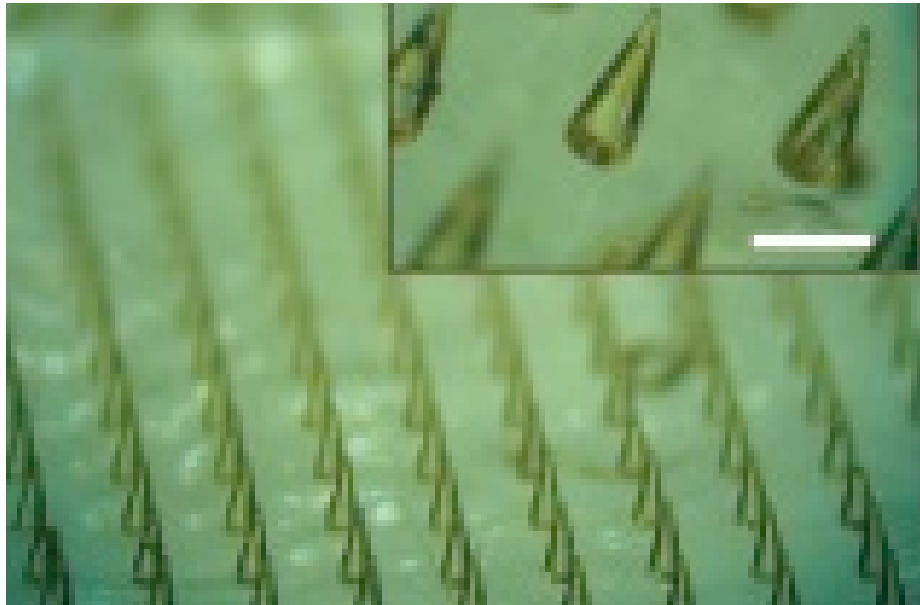
## ARTICLE

Received 27 Nov 2012 | Accepted 6 Mar 2013 | Published 16 Apr 2013

DOI: 10.1038/ncomms2715

## A bio-inspired swellable microneedle adhesive for mechanical interlocking with tissue

Seung Yun Yang<sup>1,2,3</sup>, Eoin D. O'Cearbhaill<sup>1,2,3</sup>, Geoffroy C. Sisk<sup>4</sup>, Kyeng Min Park<sup>5</sup>, Woo Kyung Cho<sup>1,3</sup>, Martin Villiger<sup>6</sup>, Brett E. Bouma<sup>3,6</sup>, Bohdan Pomahac<sup>4</sup> & Jeffrey M. Karp<sup>1,2,3</sup>



# Research impact and trust

- Research generates knowledge and always has impact
- The impact of research appears broad and unpredictable
- *Because of this we must be able to trust research*

## 1. What do end users of research need?

We will use this session to more deeply explore the ideas raised in the plenary session and develop a set of use cases to support the importance of the topic, and guide further work in the Focus Track

What do the end users of research expect from research?

How do these needs align with the principles of research integrity?

What can we learn from the expectations of end users about integrity in innovation and impact?

# Activity: Use Cases

In small groups,

Example use case

2. What principles apply? Do we need more?

The principles of research integrity are well captured, but what do they mean for innovation and impact?



Monday 3 June 2019

Time	Idea	Items/Questions	Products
11:00	Welcome Introductions  Setting the Fundamentals	1. Research ecosystem <b>2. Definitions</b> 3. Singapore Statement on Research Integrity 4. CSIRO Impact Framework	Test and refine the definitions
11:30	RI principles and their relationship to innovation processes and impact	Question Set 1	Reflection on Singapore Statement  Venn diagram
12:00	Continued... Responsibilities of others for research integrity	Question Set 1	Principles of integrity in innovation and impact
12:30	Finish		

Tuesday 4 June 2019

Time			
11:00			
11:30	RI in the assessment of impact		
12:00	Integrity in assessment of researchers – Our link to the HKM		
12:30	Finish		

# Focus Track

## Ensuring integrity in impact and innovation

Daniel Barr and Maura Hiney with Zoë Hammatt

Research ecosystem

Definitions

Singapore Statement on Research Integrity

CSIRO Impact Framework

## Definitions

**Research** is the systematic investigation and study of materials and sources in order to establish facts and arguments, and to reach new conclusions

**Research integrity** is the consistent and coherent adherence to principles in order for research to be trustworthy

**Research impact** is the consequence of the use of research.

**Innovation** is the making of changes in something established, especially by introducing new methods, ideas, or products.

Innovation – translation new and existing knowledge to benefit the triple bottom line – environmental, societal, financial

Wealth generation – funding to progress environment/societal change – coarse difference/definition – research \$ into knowledge ; innovation knowledge into \$\$\$

What can we learn from the expectations of industry end-users about integrity in innovation and impact? What do the end-users of our research expect from research? How do these needs align with the principles of research integrity?

Do the principles of research integrity apply to research innovation processes and the translation of research outputs to impacts? Are certain principles of research integrity more important than others for research innovation and impact processes? What additional principles might be required in order to ensure that the translation of research is as honest and trustworthy as the research itself?

How can we ensure responsible use of the outputs of research in innovation and impact? As stakeholders, are there principles-based responsibilities for industry or end-users to ensure integrity in innovation and impact?

**Answers include reflection on the Singapore Statement**

**Product is a reemphasis/revision/addition of the principles and responsibilities, Shown as a Principles Venn diagram – research integrity and innovation/impact integrity**



What are the challenges or opportunities that can arise by such an outward focus that are then placed on researchers and research institutions?

How might the outward focus on innovation and impact, and partnering with industry, positively or negatively affect the responsible conduct of research from the perspective of academics, industry and end-users?

- 1. In assessing research impact, how can we ensure that we are measuring the right outputs? Are there markers or characteristics of trustworthy and honest research that are captured by these assessments of research impact?**
- 2. What might the coupling of performance in impact assessment to institutional or other funding encourage?**

“...it can be argued that RRI is essentially an attempt to govern research and innovation in order to include all the stakeholders and the public in the early stages of research and development. The inclusion of different actors and the public is, in turn, meant to increase the possibilities to anticipate and discern how research and innovation can or may benefit society as well as prevent any negative consequences from happening.”

Burget, M. et al., Sci Eng Ethics (2017) 23:1–19

inclusion, anticipation, responsiveness and reflexivity  
+- sustainability and care

“Responsible Research and Innovation is a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view on the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society).”

von Schomberg, R. (Ed.). (2011). Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields. Luxembourg: Publications Office of the European Union. [http://ec.europa.eu/research/science-society/document\\_library/pdf\\_06/mep rapport-2011\\_en.pdf](http://ec.europa.eu/research/science-society/document_library/pdf_06/mep rapport-2011_en.pdf). Last accessed 2 June 2019.