Research funds

Sarah McDermott , *MBIE*

Simon Douglas, *NZ Automobile Association*

Mark Stagg, *Royal Society*

Ministry of Transport TE MANATŪ WAKA

WAKA KOTAHI NZ TRANSPORT AGENCY

Nō te rere moana Aotearoa MARITIME NEW ZEALAND

KiwiRail

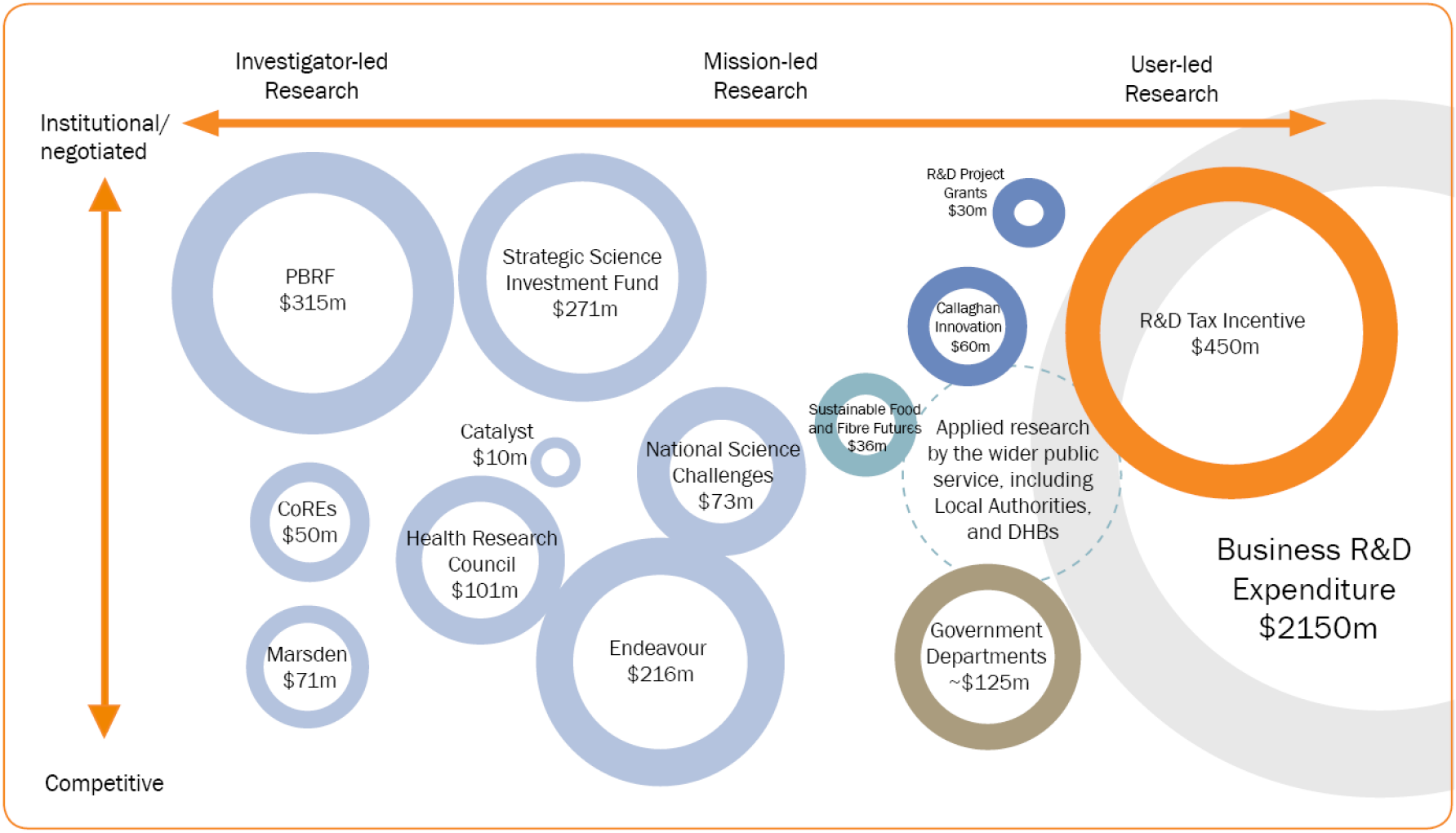
CAA CIVIL AVIATION AUTHORITY OF NEW ZEALAND Te Mana Rererangi Tūmatanui o Aotearoa

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

Transport Research Colloquium

Sarah McDermott November 2019

Research funding landscape



Endeavour Fund

Who can apply? Any research organisation, see the annual Call for Proposals

Scope? Research aimed at delivering economic, environmental or societal outcomes

Smart Ideas: catalyse and rapidly test promising, innovative research ideas

- Two or three years
- $400k - $1 million

Research Programmes: support ambitious, excellent and well-defined research ideas

- Three, four or five years
- $500k or more per year, no upper limit
- Increasingly focused on 'transformational' projects.

Investment Signals

General signals

- Excellent research, with high potential impact in areas of future value, growth or critical need for New Zealand
- Leverage wider investment and knowledge, in New Zealand and overseas
- Give effect to Vision Mātauranga
- Take account of broader Government policy and strategy documents

Three year specific signals

- Creating and growing knowledge-intensive industries
- Supporting the transition to a low-emissions economy

Titanium Foam Thermal Shielding - Returning Small Payloads from Space

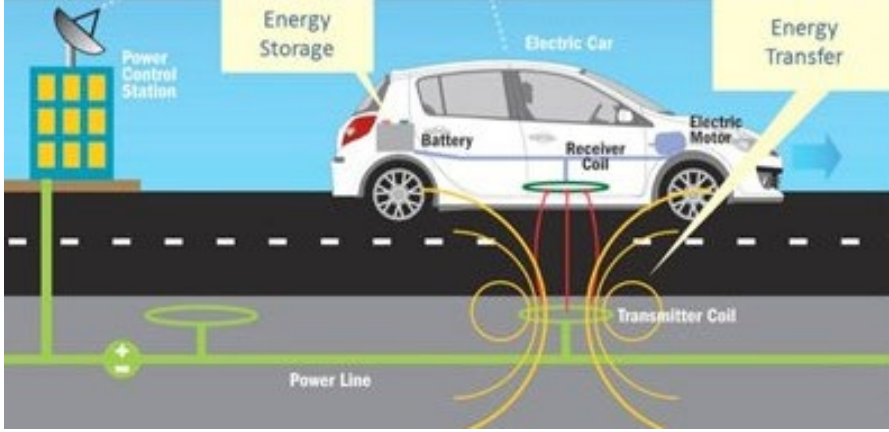
- **University of Auckland**
- **2018 – 2021, $1m**
- Develop a lightweight metal foam that will create a shield to protect a small object returning from orbit. Create a range of foams made from titanium alloys.
- Enable the recovery of high value payloads from orbit for subsequent analysis. Recovering payloads that have been launched into orbit are exposed to extremely high temperatures.
- Contribute to the development of the titanium industry and the high value manufacturing sector.

Photo: NASA

Ultra-high speed superconducting machines for hybrid-electric aircraft

- **Victoria University Wellington**
- **2017 – 2022, $6.3m**
- Developing clean aviation technologies hybrid electric aircraft. International partners include Lockheed, Boeing, and NASA.
- This research programme is part of a 30-year programme of leading high-temperature superconducting work.

Development of robust IPT pavement systems for EVs



- **University of Auckland**
- **2017 – 2022, $11.8 million**
- Technology to charge EVs as they are parked or moving on a road.
- This involves: new charging pads that can survive being put into the roadway, new charging materials made of soft composites, and modified construction of the roadway itself so the charging system will perform well over years.
- Wireless charging technology was developed by NZ researchers and we now have an opportunity to export a novel roadway charging technology to the world.
- Making the switch to EVs is an essential part of meeting our international commitments.

Healthy Future Mobility Solutions

- **Mackie Research**
- **2015 – 2019, $2.2 million**
- Explore how mobility systems in New Zealand can best support active and healthy transport solutions, and the benefits this offers for social and economic wellbeing.
- Focus on active and public transport solutions, in ways that are responsive to disruptive changes underway.
- Optimising routes in towns and cities (Future Streets).
- The future of the bike, including e-bikes.
- Active school travel, testing enhanced models.
- Cities for youth, understanding the mobility needs, system barriers and enablers for young people.

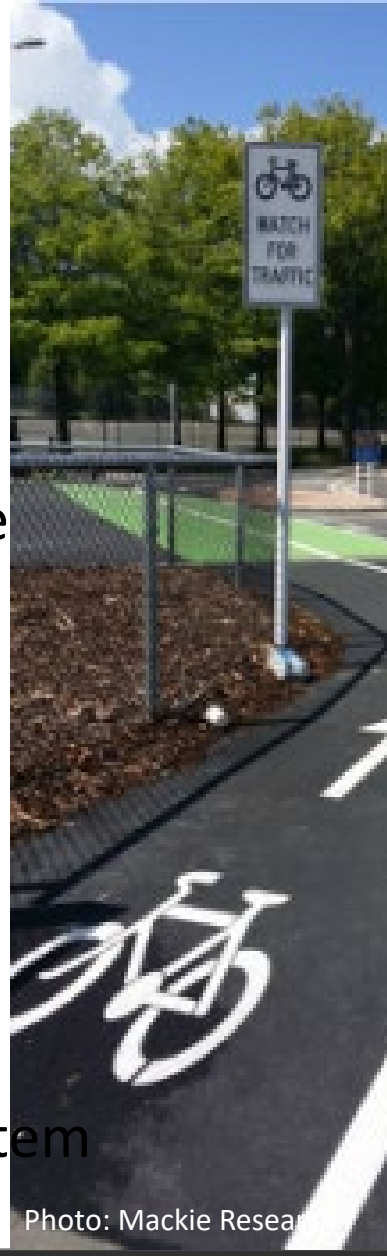


Photo: Mackie Research

Waterproof Roads

- **Opus Research**
- **2015 – 2019, $3 million**
- Develop novel, cost effective waterproofing materials and innovative road construction methodologies that will be become the accepted industry standard in New Zealand and overseas.
- Seals are not effective in waterproofing the base course layer (i.e. they leak), results in disbonding of the bitumen from the stone surface that leads to ‘flushing’.
- Significantly reduce the annual maintenance and construction costs to roading authorities that result from water damage to road surfaces and underlying pavement layers.

Examples from Resilience National Science Challenge

- **Opus, Resilience governance in New Zealand's Future**
- **2015-2019, ~ $1 million**
- Includes Transport Corridor Forum workshops, also review information flows following the Kaikōura earthquake . Using actor mapping methodology to reveal insights on how to enhance transport network resilience in New Zealand.
- **University of Auckland, Infrastructure and built-environment solutions**
- **2015-2019, ~ $2 million**
- With stakeholders, develop methodologies to quantify system-level performance of nationally critical infrastructure when subject to natural hazards and cascading impacts. A new road criticality rating framework was implemented for Auckland

Other investments

General research relevant to multiple sectors, such as hazards-related work, sea level rise, weather forecasting.

Example:

- **GNS Science, Earthquake-induced hazards**
- **2017-2022, $8.2 million**

- For months following the 14 November 2016, MW 7.8 Kaikoura Earthquake , landslides closed SH1 and the North Line of the South Island's main trunk rail line.
- Tools to effectively manage risks to people and infrastructure from landslide and sediment hazards generated by earthquakes and post-earthquake rain and aftershocks.

Thank you

Simon Douglas

NZ Automobile Association

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Royal Society Te Apārangi

Dr Mark Stagg, Director — Research Funding

December 2019

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ROYAL SOCIETY TE APĀRANGI

Who are we?

- We foster a culture that supports science, technology, and the humanities by:
  - raising public awareness, knowledge, and understanding
  - advancing education
- We will encourage, promote, and recognise excellence
- We support infrastructure for professional development
- We maintain a Code of Professional Standards and Ethics
- We provide expert advice on important public issues

Research Funding at Royal Society Te Apārangi

- **Marsden Fund** ($80m p.a.); *Supporting excellent investigator-initiated research*
  - Marsden Fund Council Award, Standard and Fast-Start grants
- **Catalyst Fund** ($2.5m p.a.) *Advancing global science partnerships for New Zealand*
  - Catalyst: Influence, Leaders and Seeding
- **Society-Led Fellowships for Excellence** ($9.7m p.a) *Supporting individual Fellowship and scholarship opportunities*
  - Rutherford Foundation, Rutherford Discovery Fellowships, James Cook Research Fellowships, Cambridge-Rutherford Memorial PhD Scholarship
- **NEW: Human Frontier Science Program** (International award) *Funding high-risk, interdisciplinary, intercontinental, collaborative, fundamental life science research, with a philosophy of "science without borders"*
  - Long-term and Cross-Disciplinary Postdoctoral Fellowships
  - Program and Emerging Investigator Grants

Marsden Fund – Transport projects

(2012) Institutional change, path dependence and public transport planning in Auckland

Dr I Muhammad, School of People, Environment & Planning, Massey University

Marsden Fund

(2014) Modelling, inference and prediction for dynamic traffic networks

Professor ML Hazelton, Massey University (in collaboration with the Hong Kong University of Science and Technology, University of York, University of Leeds, University of Salerno (Italy))

Catalyst: Leaders – Transport project

(2018) New materials delivering rapid rail transport and renewable generation

Dr Rodney Badcock, Victoria University of Wellington (with Professor Jin Fang, Beijing Jiaotong University)

Rutherford Foundation – Transport project

(2014) Improving the Life of Our Roads - Reducing Moisture Damage of New Zealand's Road Pavements

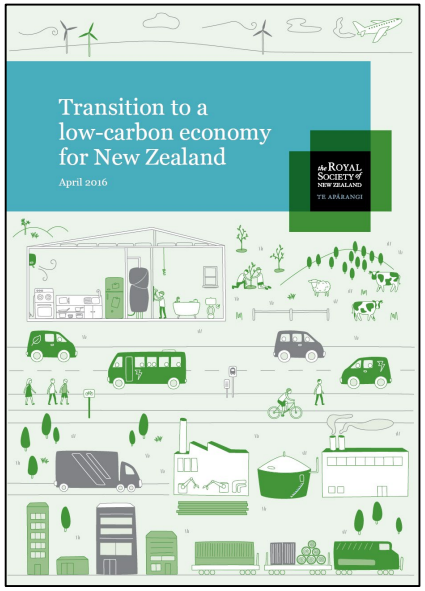
Dr Sachi Kodippily (Department of Civil and Environmental Engineering, The University of Auckland)

Expert Advice– Transport related topics

(2016) Transition to a Low-Carbon Economy for New Zealand

Transport mitigation options:

- Sources of transport fuels
- Greenhouse gas emissions
- Mitigating actions
- Biofuel potential for the future
- Transport fleet of the future
- Knowledge gaps



Expert Advice

(2018) Blue light Aotearoa

Transport related topics of:

- Street lighting and road safety
- Mitigating the harmful ecological effects if artificial blue light
- Mitigating the impact of artificial blue light on the night sky

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Expert Advice

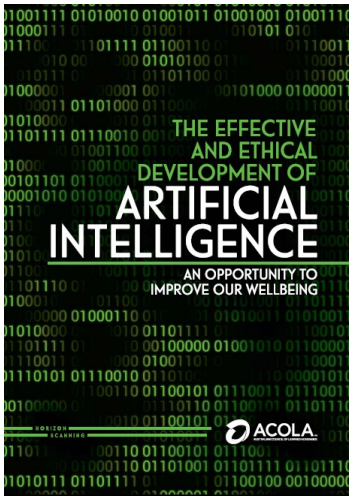
(2019) The Effective and Ethical Development of Artificial Intelligence

AI in practice - transport

- Impact of AI and autonomous vehicles on social inequalities

Regulation and regulatory frameworks

- Liability and autonomous vehicles



Speaker's Science Forum - transport

2019 transport topics:

- Roadside drug testing (*Dr Mary-Jane McCarthy, ESR*)

- New methods to understand the contributing factors to crashes, using latest Human Factors principles *(Dr Hamish Mackie, Mackie Research*)

2018 transport topics:

- Driverless cars, delivery drones, alcohol interlocks: regulatory strategies and challenges (*Associate Professor Colin Gavaghan, University of Otago)*

- System-based perspectives for transport (*Dr Maggie Trotter, Opus Research*)

Thank you

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ROYAL SOCIETY TE APĀRANGI

Other Royal Society Te Apārangi opportunities

- **Schools and Teachers**; *Providing teachers and students with learning and leadership opportunities*
  - Science Teaching Leadership, CREST, Powering Potential, Talented Schools Travel Award

- **Postgraduate Awards**; *Supporting with study scholarships and travel awards*
  - Raewyn Good Study Award for Māori and Pasifika Social Science Research, RHT Bates Postgraduate Scholarship, SCAR Biology Travel Award, New Zealand Ecohydraulics Trust Travel Award, Falling Walls Lab New Zealand, Sir Hugh Kawharu Masters Scholarship

- **Early Career Researchers;** *Supporting with research fellowships and travel awards*
  - Falling Walls Lab New Zealand, World Data System Data Stewardship Award, James G. Hay Travel Award

- **Researchers**; *Supports with research funding, fellowships and awards*
  - James G. Hay Travel Award, Charles Fleming Senior Scientist Award, Charles Fleming Award for Environmental Achievement, Hutton Fund, Skinner Fund, Charles Fleming Publishing Award