



Nucleate Australia welcomes the opportunity to contribute to the strategic examination of Australia's research and development (R&D) system. Nucleate empowers the next-generation of biotech leaders by educating today's academic trainees. Since 2019, Nucleate has built strong capabilities for biotech founders out of academia, supporting the creation of 101 companies who have raised over USD400M. As a grassroots, nonprofit organisation dedicated to empowering early-career bio-innovators worldwide, we are uniquely positioned to observe both the potential and limitations of Australia's current R&D landscape.

We propose:

- 1. Establishing an Australian Advanced Research Projects Agency (AARPA)**
- 2. Dedicated Finance to Bridge the Funding Gap for Technology Scale-Up**
- 3. Facilitate PhD Research Spin-Outs through fair University Equity Policies**
- 4. Embrace alternative funding models**

Enhancing R&D Investment and Establishing an Australian Advanced Research Projects Agency (AARPA)

Australia's gross expenditure on R&D is significantly below the OECD average. This underinvestment hampers our ability to translate world-class scientific research into commercial and societal outcomes. To compete globally and build sovereign capacity in critical industries—including biotechnology, clean energy, and AI—we must uplift our national R&D intensity through bold structural reform and targeted investment.

We advocate for the creation of a new mission-oriented, high-agility funding body modelled on the US ARPA framework like the [UK's Advanced Research and Invention Agency \(ARIA\)](#). To understand the value that an AARPA would bring, consider that, for decades, DARPA has been the world leader in funding transformative technologies. It created programs that gave us mRNA vaccines, GPS, drones, the internet and many other technologies that define the 21st century and have delivered billions of dollars in economic growth, not just in the US but worldwide.

Unlike the ARC or NHMRC which make use of peer review boards to decide grants, an Australian organisation using the ARPA model would employ sector experts as term-limited program managers who are given autonomy in the design of funding programs. They would focus on [high-risk, high-reward projects](#), creating breakthrough technologies in national priority areas. The current research council grant process can take up to 9 months and often requires preliminary data. This usually results in funding incremental research from established researchers limiting the grants possible impact through funding the potentially revolutionary ideas of earlier career researchers. In the US, DARPA's speed and independence enables it to respond to new developments and bet on technologies with transformational potential that would otherwise go unfunded. AARPA would complement the existing research councils by acting as a dynamic funding body able to invest in research across academia, government and industry.



Over the past 3 years the UK has stood-up ARIA to empower scientists and engineers to pursue research that is too speculative, too hard, or too interdisciplinary to pursue elsewhere. Lots could be learnt from the current ARIA leadership about how to do this in Australia. In the UK Nucleate has partnered with ARIA to develop biotech talent and activate innovation.

An Australian equivalent should:

- Operate independently of existing bureaucratic funding structures with a substantial budget
- Fund high-risk, high-reward research aligned with long-term national priorities
- Attract and empower top talent by enabling independent program managers to identify and and fund priority areas

Current funding mechanisms are too conservative and slow to respond to emerging challenges or support interdisciplinary ventures. An AARPA would complement traditional R&D institutions by seeding transformative innovation, de-risking early-stage technologies, and accelerating collaboration across academia, startups, and industry.

Bridging the Funding Gap for Technology Scale-Up

A critical challenge in Australia's innovation ecosystem is the "valley of death," where emerging technologies struggle to secure funding between venture capital and traditional finance. This gap often stalls the progression of promising innovations from prototype to market-ready products. We recommend the establishment of targeted financial instruments, such as growth-stage grants or government-backed loans, to support companies in this transitional phase. Such initiatives would encourage private investment by mitigating risk and demonstrating public commitment to nurturing high-potential technologies.

Facilitating PhD Research Spin-Outs through Reduced University Equity

The commercialization of PhD research is vital for translating academic discoveries into real-world applications. However, high university equity stakes in spin-out companies can deter entrepreneurs and investors. We propose that the government encourage universities to adopt more entrepreneur-friendly policies by reducing their equity demands, thereby incentivizing researchers to pursue commercialization. Aligning university interests with those of innovators will foster a more vibrant startup culture and accelerate the translation of research into impactful products and services.

Implementing Proof-of-Concept Grants

Embracing alternative funding models like Focused Research Organizations (FROs) and Fast Grants could significantly enhance Australia's R&D ecosystem. FROs are specialized entities designed to tackle clearly defined scientific and technological challenges through coordinated, time-bound efforts, producing high-impact public goods. Similarly, Fast Grants provide rapid, flexible funding to researchers, enabling swift responses to pressing scientific needs without the delays of traditional grant processes. Implementing such models in Australia could address



current funding challenges, such as the reliance on short-term grants and the difficulty in commercializing university research. By adopting these innovative approaches, Australia can foster a more agile and effective research environment, accelerating scientific progress and enhancing global competitiveness.

Early-stage funding is essential for validating and de-risking novel ideas. Innovate UK provides proof-of-concept grants that support the commercialisation of research and the development of new products, processes, or services. We advocate for the creation of similar Australian grants to offer proof-of-concept funding, enabling early career innovators to bridge the gap between research and market application. This would not only accelerate the development of new technologies but also enhance Australia's competitiveness in the global innovation landscape.

More detail on alternative funding models can be found in our supporting documents.

In conclusion, strengthening Australia's R&D system requires a multifaceted approach encompassing increased investment, innovative funding mechanisms, supportive university policies, and dedicated agencies for proof-of-concept and advanced research. By implementing these recommendations, Australia can unlock its full potential for innovation, drive economic growth, and establish itself as a global leader in critical technology sectors.

Jack Dalton - Advisor - Nucleate Australia and Nucleate UK

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Nicolai Jung - Co-Managing Director - Nucleate Australia

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