

# Individual Submission on Te Ara Paerangi

## Introduction

Tēnā koutou,

I am an early career scientist working at Te Pū Ao GNS Science. I am a Volcanic Fluid Geochemist, broadly researching volcanic and geothermal fluids, as well as collecting, analysing, and interpreting geochemical fluid data on volcanoes in Aotearoa for volcano monitoring by GeoNet. I have been a member of the governing group for of our Early Career Staff Network at Te Pū Ao GNS Science since October 2022 and I have strongly drawn upon this group to form my submission.

My submission is the result of a significant collaboration with my early career peers. Though my opinions are surely contained in its body, so too are those of the early career community at Te Pū Ao. Because I believe in the early career cause, I have adopted these common views alongside my own, making them indistinguishable.

I am aware that Te Pū Ao is preparing a collective submission for Te Ara Paerangi to speak for the organisation. I have absolute trust that this submission will share many of the sentiments of my own and speak fairly for the organisation's many peoples, perspectives, and interests. Though I am an employee of Te Pū Ao, my submission is not associated with the organisation, does not reflect its views, and should not be interpreted in any way as representative of the organisation.

Lastly, I would like to thank MBIE sincerely for the opportunity to share my views on the future of the RSI system. If you would like to discuss further any of these views, please do not hesitate to contact me.

Ngā mihi nui,

Ery Hughes

## **GNS Science Te Pū Ao Early Career Staff Network**

The GNS Science Te Pū Ao Early Career Staff Network (ECSN) was established in 2019 with a dual purpose; to improve connection between early career staff (ECS) in the organisation, and to advocate for their interests. The ECSN comprises a self-selecting group of science professionals and students facilitated by a rotating representative council of 12 ECS. The ECSN comprises approximately 150 members with 24 having held roles on the council. While still nascent, the ECSN has proved a valuable institution and is doing well to connect, empower, and inspire those in its membership.

## **The Early Career Staff Network and Te Ara Paerangi**

The ECSN has strongly engaged with the Te Ara Paerangi consultation and is deeply appreciative of the opportunity for its members to share their thoughts on the Research, Science and Innovation (RSI) system and its potential reform. The ECSN has sent representatives and encouraged its members to attend various MBIE Q&A sessions including those on early career research, institutions, and workforce themes; provided representatives at the GNS Science Te Pū Ao, Royal Society Early Career Researcher, pan-CRI discussions and group submissions; and has hosted its own discussion session to elicit ECSN perspectives on the state of the RSI system and the questions and proposals of Te Ara Paerangi. Through these various engagement efforts, I have derived my submission.

Though I am one person, the value of my submission lies in the broad base of the people I have engaged with to derive it. Because the ECSN's membership captures representatives from every aspect of the RSI system as it exists in Te Pū Ao, the commonality of their thoughts together can speak to various cross-sections of the RSI system: from knowledge generation to the integration of knowledge in minds and processes, from management through to delivery and impact, and again to many more dimensions besides.

The growing number of science applications and services distinct to research has led to the emergence of a class of science professionals who cannot be viewed through the traditional perspective of "all scientists are researchers". Research scientists are of course science professionals, but so are science specialists (non-research scientists), technicians, professional services, people leaders and line managers, and all combinations thereof. Continuing to view science as the sole output of research scientists dismisses the ecosystem of roles through which science is undertaken and its potential realised. Similarly, continuing to view the RSI system as one that is driven by research alone misses the increasingly important role of those in non-research roles and those doing commercial work to secure the funding necessary for institutes to function and for our value to society to be realised. This concept is my first feedback to Te Ara Paerangi; to be blunt, and my apologies for being so, but if you mean to say "Early Career Science Professionals", please do not say "Early Career Researchers". Moreover, if you mean to elicit early career perspectives, it is important to consider the inherent inequality in experience within the whole RSI system. Asking questions that draw on experience to inform Te Ara Paerangi is sensible, but ignores the inequity such questions creates between those who are newer to the system and those who are longer standing. Even so, I appreciate that the intent of sincere early career inclusion was always present from MBIE throughout the consultation period, and I am deeply appreciative of that.

## **This Submission**

In my submission I have chosen to answer a selection of three questions in Te Ara Paerangi (questions 2, 8, and 9) that I felt most suited to speak to and that together cover the relevant range of my perspective. That said, there are a few caveats I hope you will keep in mind. I explicitly do not answer any of the questions in section “Te Tiriti, Mātauranga Māori, and Supporting Māori Aspirations”, noting that Māori are deeply under-represented in my networks and that I cannot answer these questions for them in any case. Moreover, I do not feel that these questions should be answered by only those in the RSI science system but should also be asked of Treaty partners. I also do not answer any questions in the “Research Infrastructure” section because I believe other submissions will speak to these topics much better than I can given the experience I am able to draw on. Furthermore, in many cases questions are outside of my grasp as an early career professional, so I trust that those more established will make valuable submissions in my place. Because of the wide base I have drawn this submission from, I hope you will find my position and perspective as equally representing and addressing impacts on all early career science professionals regardless of job type, discipline, or employer.

OUTCOME-BASED	EQUITY, DIVERSITY, AND INCLUSION	COLLABORATION
<b>2: (A) What principles should guide a national research priority-setting process? (B) How can this process best give effect to Te Tiriti?</b>		
<p>Research is only one fruit of the science system. I see the expectations of RSI increasing through organisational values, including our own, to contribute to a prosperous Aotearoa. This should be a guiding principle in defining national research priorities.</p> <p>This acknowledges that research excellence is not the only priority, but is complementary to collaboration, relationship building, engagement, and career development of all science professionals to enable ongoing contribution to Aotearoa in meaningful ways.</p>	<p>Diverse perspectives and support for broader than purely academic career pathways will help to achieve prosperity. Representation of Māori and Pasifika staff needs to increase so that they reflect Aotearoa’s population and can self-determine research needs. Organisational support to better engage with iwi partners, improve accessibility to science careers by minoritized groups, and recognition for team-oriented projects rather than individual leaders will help to achieve equality and diversity. Furthermore, early career representation should exist at all levels of strategy and management to ensure developing challenges are incorporated at an early stage in organisational planning. This could be supported by MBIE and Science NZ through pan-CRI networks.</p> <p>I hope that this review of the RSI system allows a reimagination of the system, that destroys the barriers for those who have been marginalised.</p>	<p>The current level of competition stifles innovation. Better collaboration across CRIs would ensure that the best minds and resources are being used more efficiently. The challenges we face today require a wider approach than one CRI can provide. National Priorities could be held by two or more CRIs to support this collaboration systematically. A coordinated approach across CRIs and a national network documenting relations with iwi partners and public engagement (where you are encouraged to work with teams already involved in a region to understand the challenges for a community) would be more conducive to trusted relationships with CRIs. This speaks to “science for the people” encouraging awareness of previous research in the area and how it could be built on by various CRIs. The Regional Hubs may support this but should involve public committees and regional councils, and must support two-way communication between Māori and those within the RSI system.</p>
<b>8: Do you think a base grant funding model will improve stability and resilience for organisations, and how should we go about designing and implementing such a funding model?</b>		
<p>A base grant funding model is a great idea. It would reduce the time chasing grants (which is</p>	<p>A base grant needs to be able to support equity in how different career pathways and skillsets are</p>	<p>Specifically, I hope that with lower overheads, funding would be freer to include operational</p>

<p>presently inefficient and often does not return feedback if unsuccessful) and allow dedicated money for training detached from specific projects. Specifically, I hope that a base grant would support recognition of outcomes that are essential to the future of science yet difficult for some staff in CRIs to achieve without external funding support, e.g., relationship building, engagement, better acknowledgment of the team contribution, upskilling, and broadening expertise.</p> <p>What about an early career grant conferred by MBIE? This would allow a degree of autonomy, self-determination, and safety for ECS, creating time to think freely and experiment with their future. This could include both hours and disbursements to cover personal development (e.g., training, travel, conferences, experimentation), allowing people to join projects without costing extra, hence supporting connection and collaboration. Such a grant should not be targeted just at researchers but all early career professionals in the RSI system to allow their flourishing wholesale. Without such protected resourcing coming from a “higher power”, early career staff may continue to be exploited for their outputs and not nurtured for their potential and self-determined desires.</p>	<p>valued. “Science Operations” is an increasing part of the science system. This includes everything from applied science through to operations itself, e.g., the work of technicians, analysts, and corporate staff. Science operations is one way the impact of science becomes realised, and it is also a fundamental part of the science services which are ever-growing as research becomes increasingly focused on the analysis-presentation slice of the end-to-end needs of science and the other aspects are taken up by non-research science professionals. The apparent trend of the science profession’s bifurcation and increasing complexity in addition to this can be expected to further grow the science services to meet expanding non-research needs. What we value needs to reflect what is already valued implicitly in the RSI system through this meeting of needs; we need to make what is implicit, explicit.</p> <p>High overheads are a particular concern for ECS in CRIs, who are unable to request the full time required to learn peripheral skills that expand their capability and opens their future pathways, such as project and team management and the building of relationships with potential working partners. Additionally, a base grant would hopefully remove some of the precarity in job security in the sector, which is a key concern for ECS.</p>	<p>staff, non-academic external experts, iwi partners, and internships (providing a pathway into science careers by non-academic means). This would build a culture of collaboration and team work rather than traditional individually-driven research achievements (you’re still important and perhaps critical even if you’re not leading the research/work; everyone who contributes is valuable and worth celebrating).</p>
<p><b>9: How do we design collaborative, adaptive and agile research institutions that will serve our current and future needs?</b></p>		

<p>Most research institutes (including universities) have a single-role model. This reduces the ability to communicate across research programmes and organisations as researchers are encouraged to develop expertise in one area. While this is required in many aspects of RSI, it often inhibits innovation because learnt skills are not being applied in different areas and researchers are not encouraged to develop skills outside their speciality. Supporting basic and universal skills that can be applied across many areas of research would create a more secure science system. For the purposes of a prosperous Aotearoa, understanding challenges faced by different communities including government (national and regional) can be increased by supporting secondment and short-term transfers across CRIs, other research institutes and government bodies (leading to better collaboration) and would see skills applied in new areas, further increasing collaboration and workforce development. Furthermore, such a secondment model would allow greater options for career development and would support a constantly evolving and dynamic workforce that is less dependent on highly specialist positions but can contribute widely to organisations that need more in-house science input and perspectives.</p>	<p>Non-academic pathways into science are necessary for a more diverse science system. Practical skills and non-traditional science knowledge are often poorly valued in the science system. However, there is a need for these types of people to create an Aotearoa-representative RSI and to realise the full potential of the RSI system. This may also be addressed through Regional Hubs, which remove barriers such as the cost of living and transport in our major cities and extend the franchise of RSI contribution to those unable to collocate with existing physical institutions. The cost of living is a key concern for ECS, and the question of remote working, collaborative workspaces in smaller towns for CRIs, and whether that could be linked with Regional Hubs or Regional Councils, is of significant interest to early career staff looking for alternatives to expensive and precarious city living or living in places poorly aligned with their cultural needs.</p> <p>There needs to be a focus in STEM education on the wider context of science (it does not happen in a vacuum and is heavily intertwined in society) and on other knowledge systems so those in the STEM field are equipped for working in this field.</p> <p>There needs to be a move away from the career pipeline model, which does not represent the current careers in STEM and actively contributes to the exclusion of minoritized groups</p> <p><a href="https://eos.org/opinions/reimagining-stem-">https://eos.org/opinions/reimagining-stem-</a></p>	<p>ECS have a strong desire to connect and collaborate. This includes the traditional view of collaboration in research as well as more expansive ones, such as with industry and with government. The specialisation required to perform our roles and the under resourcing that results in our overcommitment can pigeonhole us despite being told that more generalist skillsets and wide collaborative is valued. This predicament proves difficult when considering transferability and growth across academic, industry, and government. Regional Hubs, collaborative spaces (across CRIs, government and industry) or a centre for research excellence are possible ways to encourage these desirable developments, but would only be attempts to manage symptoms rather than to cure the underlying disease in the absence of increased early career autonomy.</p>
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<p>Additionally, there needs to be a shift in how outputs in the RSI are valued, especially increasing the appreciation of non-traditional academic outputs. There also needs to be a greater emphasis on open science, including free and accessible outputs (e.g., plan S in Europe <a href="https://www.coalition-s.org/">https://www.coalition-s.org/</a>). There are also gaps between: (1) science and its uptake as a useful tool; (2) what the point of a PhD is (to produce researchers or research cheaply?); and (3) the opportunities for employment for post-graduation (i.e., often more experience is needed but where to get it?). There needs to be clarity on the types of jobs needed in RSI and how to get into them for students and graduates so that they might make more strategic decisions about their future.</p>	<p><a href="#">workforce-development-as-a-braided-river</a>). A braided river is a much better analogy, especially for promoting inclusivity and responsiveness and highlights there should be many paths into a career in STEM. Also, it is not a “leaky pipeline” for minoritized groups, but a hostile obstacle course that prevents them succeeding (<a href="https://www.nature.com/articles/s41561-021-00868-0">https://www.nature.com/articles/s41561-021-00868-0</a>).</p>	
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