National Science Challenges | SCIENCE FOR TECHNOLOGICAL INNOVATION | Kia kotahi mai – Te Ao Pūtaiao me Te Ao Hangarau

SEED PROJECTS: 2020 CALL FOR PROPOSALS (CfP)

Objectives of the Seed Project Fund

The Seed Project Fund is intended to bring in new ideas and researchers to the Science for Technological Innovation (SfTI) community. The investigator-led process is designed to balance the mission-led approach used to determine SfTI's Spearhead projects. SfTI is using an open call for projects to initiate about 15 new Seed projects from 1 July 2020.

Seed projects will generally have a single Principal Investigator (PI) and may include other funded contributors such as a post-doctoral researcher, post-graduate student or a research assistant. Seed projects are funded for up to two years with a maximum of $200,000 per project. In the 2020 round, a higher priority will be given to projects that:

- are aligned with the Sensors, Robotics and Automation (SRA) and/or Data Science and Digital Technologies (DSDT) themes - our target is to get at least three-quarters of the funded proposals having strong SRA and/or DSDT alignment
- have a team (including the PI) of emerging researchers*
- involve researchers who are new to SfTI and/or
- have strong Vision Mātauranga alignment.

The background and objectives of SfTI are outlined in Appendix 2.

*Note: An emerging researcher is someone who has spent a maximum of 7 years full-time equivalent in an active research role after completing their highest research degree. A team of emerging researchers may have a senior researcher as an unfunded (zero FTE) mentor.

Seed Projects must:

- Propose clever stretch science and risky new ideas or address a potentially disruptive technology area.
- Focus on physical sciences and engineering research aspects although the context of the project may be in another field e.g. health, biological sciences, food processing or business.
- Align with at least one of the SfTI *technical* Theme areas: Sensors, Robotics and Automation; Data Science and Digital Technologies; and Materials, Manufacturing Technology and Design (MMTD).
- Make a strong case for the New Zealand context and niche, and if successful, a likely strong contribution in the longer-term to New Zealand's economic growth.

Favourable Seed Projects will also have one or more of the following:

- Bring new researchers to SfTI, especially where the team including the PI are emerging researchers pursuing their own independent research.
- Show clear plans for building Māori research capacity and capability (for consideration under Vision Mātauranga priority noting that all projects must align with least one of the SfTI *technical* Themes).
- Result in a technology at the proof of concept stage or an initial prototypes (up to Technology Readiness Level 4, TRL4, as defined in Appendix 3) noting that SfTI does not fund the commercialisation of ideas through seed project funding.
- Include support for post-doctoral fellows or Master's students for up to two years. If support for a PhD student (three years funding) is proposed, the case for a PhD should be made in the application.
- Use social science methodologies and expertise to explore how to build New Zealand's innovation capacity including the social dimensions of technology development and its uptake in alignment with the aims of the Building New Zealand's Innovation Capacity Spearhead (noting that such proposals must also have a

primary technical theme alignment and that applicants seeking funding for a BNZIC aligned project must contact SfTI to confirm eligibility before submitting a proposal).

All applications must demonstrate:

- A strong research plan, explicit stage gate steps (i.e. stop/go/pivot points in the research) and clear sequencing of measurable critical tasks to assist in effective management of the project.
- A commitment of all Seed Project members to participate in SfTI Capacity Development initiatives. (Capacity Development for Vision Mātauranga is compulsory regardless of whether the project aligns to the Vision Mātauranga Theme.)
- A willingness to seek and accept advice on the seed project direction from mentors such as business, Māori or end-users.

Funding Period

All successful projects will normally be contracted to start on 1 July 2020 and are to begin as soon as possible. Projects will not be allowed to commence until all researchers are available including students and those unnamed in the proposal. Project commencement dates may be deferred up to 6 months to accommodate this. For projects longer than 15 months' duration, mandatory stage-gates will be required 9 to 12 months into the project.

Indicative Funding 2020/21

Total Funds (NZ$)	Indicative funding per proposal	Term
$3,000,000 over 2 years	Up to $200,000 in total (smaller projects are welcome)	Up to 2 years

- all funding figures exclude GST
- at least 25% of total funding will be committed to projects that support Vision Mātauranga objectives

Eligibility

- Researchers at New Zealand based organisations, with research capability relevant to the mission, objectives, scope and research domains/Themes of SfTI are eligible to submit proposals.
- Named Researchers already contracted with SfTI research projects since July 2019 are NOT eligible to be part of submitted proposals except as zero FTE mentors (with no direct research role in the project). An exception is that researchers with zero FTE (unfunded) with SfTI research projects since July 2019 (e.g. as a mentor to an emerging researcher leading a project), are eligible to be named in a proposal.
- The project (or a close variation) cannot already be funded by MBIE or another funding agency and any parallel application(s) must be declared in the proposal.
- A researcher can be involved in a maximum of two Seed project proposals concurrently. They can only be named once as the PI; and involvement in more than one Seed project proposal must be declared in each application.
- For the avoidance of doubt, named researchers contracted with SfTI Seed Projects are eligible to be selected for future SfTI Spearhead projects, based on their expertise and capability.

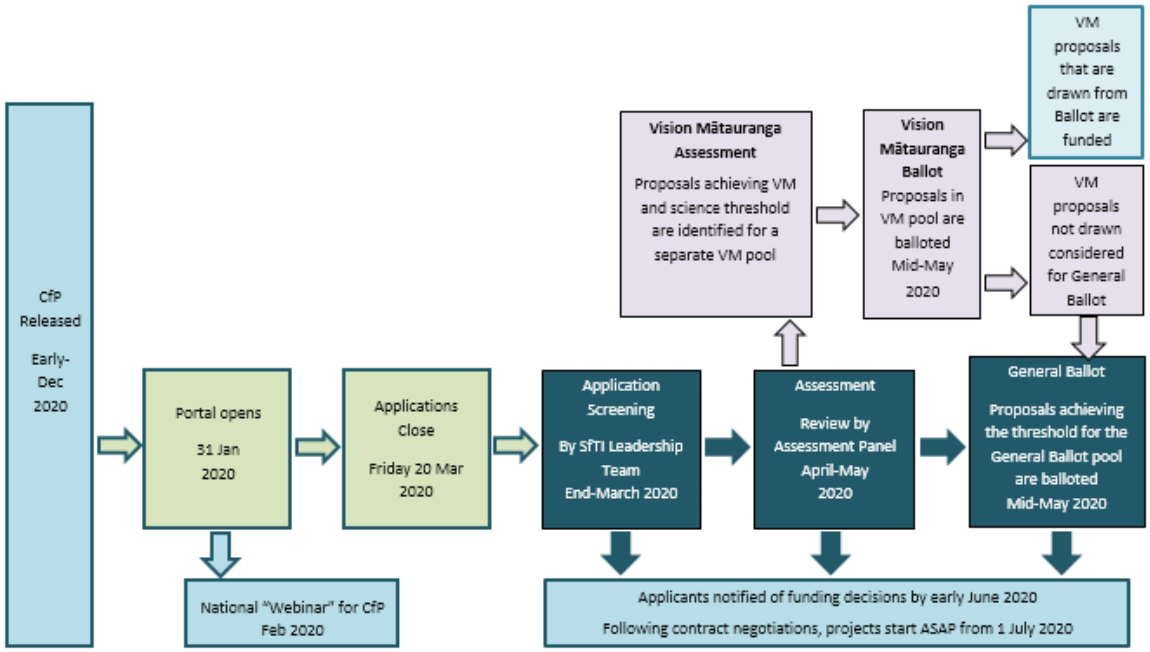
Key Dates

Timeline	**Key Dates**
2020 CfP released	Mid December 2019
Portal opens for applications	31 January 2020
National webinar about CfP	Early February 2020
Applications close	12 noon Friday 20 March 2020

Initial screening for eligibility	End March 2020
Panel assessment of proposals	April to mid-May 2020
Successful applicants are notified and contract negotiations begin	Early June 2020
Projects start	As soon as possible from 1 July 2020
Contract completion date	Max. of 2 years after contracted project start date

Assessment process

The following diagram details the steps in the SfTI Seed Project application and assessment process:



The seed project investment mechanism is a single-stage process; full proposals are submitted for assessment. It is fully contestable and open to applicants that meet the eligibility criteria.

The key assessment criteria to be used by the assessment panel in assessing 2020 proposals are:

	Assessment Criteria	Importance
1	Novel and innovative idea, high quality, stretch science aligned with SfTI Technical Themes	Very High
2	Strong alignment with Vision Mātauranga	High
3	Strong alignment with SRA and/or DSDT themes	High
4	Involve a team of emerging researchers	High
5	Led by researchers who are new to SfTI	Medium
6	Potential contribution in the longer-term to NZ's economic growth, and justification for the NZ context and niche	Medium
7	Likelihood research objectives will be achieved (i.e. there is tight research planning and clear, measurable critical steps, appropriate team capability)	Medium

	Assessment Criteria	Importance
8	Well–defined links to business, and/or capacity development initiatives	Lower
9	Other favourable characteristics (e.g. collaborators)	Lower

Vision Mātauranga Guide

Seed projects will be assessed on Vision Mātauranga alignment based on three principles/*pou*.

Pou 1: Māori knowledge

This *pou* relates to how well Māori knowledge, or mātauranga, is being incorporated and utilised.

Questions to consider:

Have Māori principles or practices been meaningfully incorporated and practised?
Has Māori knowledge been appropriately obtained, understood and applied?
Is intellectual property likely to be discovered that will be of particular benefit or interest to Māori?
Is there any novelty or opportunity by integrating science and technology and mātauranga Māori?

Pou 2: Māori participation

This *pou* relates to how Māori are directly participating in the project.

Questions to consider:

Are Māori part of the leadership of the project? Are Māori involved in the execution of the project?
Did Māori participate in the design and development of the project? Are they the appropriate networks?
Have sufficient resources (human, infrastructure, financial, time) been set aside for the Vision Mātauranga component of the work as a priority?
Does the proposal manage risk (if any) to te Ao Māori. This might include: knowledge asymmetry, consultation 'fatigue', resourcing for 'stakeholders'?

Pou 3: Māori benefit

While it is anticipated that all New Zealanders will benefit from Vision Mātauranga outcomes, this *pou* aims to articulate how Māori will directly benefit from the project.

Questions to consider:

Will products or services be developed that will be of particular benefit to Māori? Will Māori be able to access these products or services easily?
Will the proposal enhance Māori quadruple bottom lines (i.e., economic, social, environmental, cultural)?
Will the proposal have intergenerational impacts (i.e. benefits and risks) for Māori beyond the life of SfTI and are these acknowledged?
Will the project develop Māori capability in some way?
How will the findings be communicated to Māori?

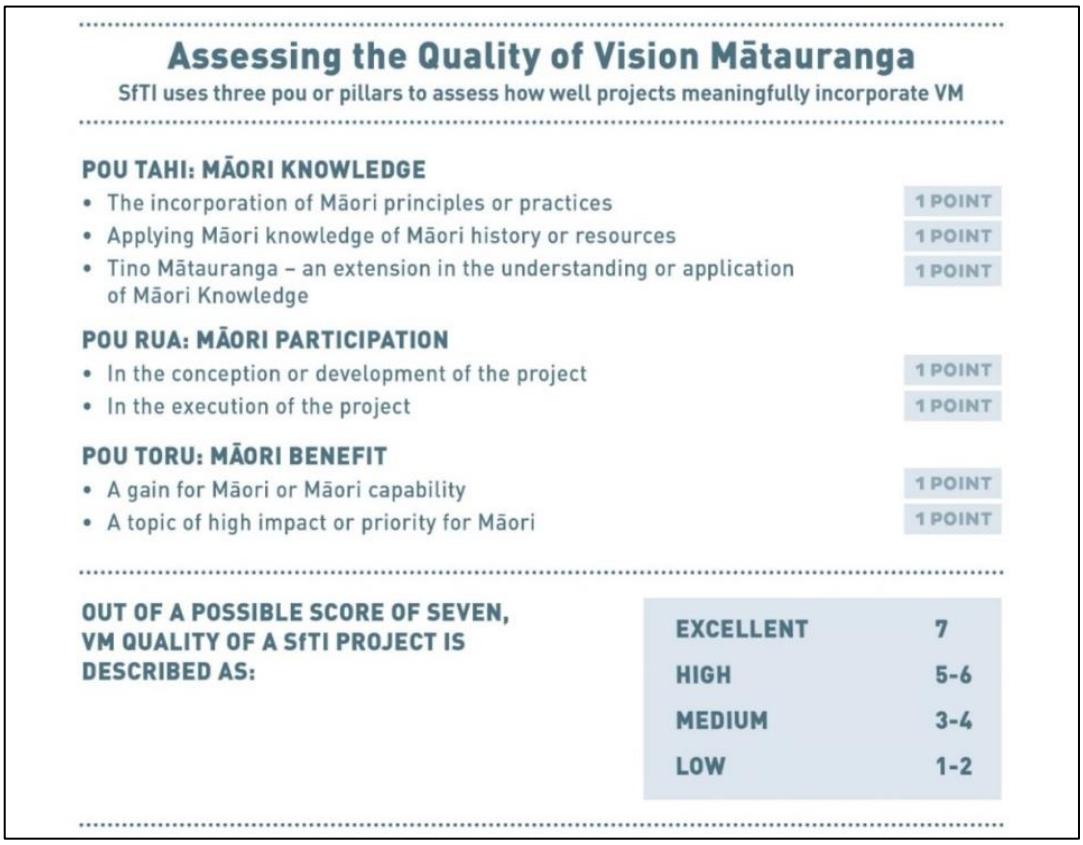
Te Aromatawai - Assessment of Vision Mātauranga alignment

From the three *pou* above, there are a total of seven individual criteria that are possible for each project:

1. The project incorporates Māori principles or practices
2. The project applies Māori knowledge of Māori history or resources
3. Tino Mātauranga – the project extends the understanding or application of Māori knowledge
4. Māori participation is incorporated in the conception or development of the project
5. Māori involvement is incorporated in the execution of the project
6. The project demonstrates a gain for Māori or Māori capability
7. The project addresses a topic of high impact or priority for Māori.

Seed projects will receive a point for each of the above criteria that is meaningfully incorporated in the project. Projects that score multiple points will be viewed favourably but normally a minimum of 3 points will be necessary for a proposal to be eligible for the Vision Mātauranga ballot pool.

The following is a summary of the Vision Mātauranga scoring system:



Application Assessment Process

Phase 1: Initial Screening by the SfTI Leadership Team

The initial proposal screening will be carried out by the SfTI Theme Leaders, plus the Director if required. This is to ensure proposals meet the eligibility criteria, to identify any proposals that are incomplete or clearly not eligible, and to review the alignment of proposals received to SfTI themes.

Phase 2: Review by an Assessment Panel

All eligible proposals will be reviewed by an assessment panel of up to 20 members. Panel members will include 8 Theme leaders from the SfTI Leadership team, plus at least 3 external panel members for each of the science/technical themes, and an external, independent Chair. The panel members will be announced on the SfTI website before the closing date for applications. Vision Mātauranga and Building New Zealand's Innovation Capacity expertise will be provided to the assessment panel from the SfTI Leadership Team and the SfTI Programme Office. An opportunity may be provided for one or two Rangatahi (emerging researchers and industry leaders) not involved in submitted proposals to be invited to observe the assessment process.

The assessment criteria and indicators of importance will be used to inform determination of the overall ranking for each of the proposals. Proposals will be divided into 3 categories:

- category 1: high-quality proposals meeting the assessment criteria (certain to be included in the ballot)
- category 2: proposals with some weaknesses (may be included in the ballot)
- category 3: proposals with major deficiencies.

Proposals with sufficient Vision Mātauranga alignment will be identified for consideration in the Vision Mātauranga pool.

The panel will also consider the funding level requested by each successful proposal and may decide to recommend allocation of a smaller amount than requested.

Phase 3: Vision Mātauranga Ballot

The top-ranked proposals in the Vision Mātauranga pool will be selected for the Vision Mātauranga ballot. The number of proposals selected for the ballot will be the maximum of:

- all proposals in the Vision Mātauranga pool assessed as category 1 proposals
- the top proposals in the Vision Mātauranga pool to a combined value of 25% of the available funding.

SfTI reserves the right to select fewer proposals for the Vision Mātauranga ballot if proposals received are not of sufficient quality. Proposals will be randomly drawn from the ballot pool until approximately 25% of total funding has been reached or all proposals in the ballot are selected. Unfunded proposals from the Vision Mātauranga ballot pool will be considered to enter the general ballot.

Phase 4: General Ballot

The top ranked proposals (excluding those already selected for funding in the Vision Mātauranga ballot) are considered for the general ballot. The number of proposals selected for the ballot will be the maximum of:

- all proposals assessed as category 1 proposals
- the top ranked proposals to a combined value of 100% of the available funding.

SfTI reserves the right to select fewer proposals for the general ballot if proposals received are not of sufficient quality. Proposals will be randomly drawn from the ballot pool until the budgeted funding is allocated or all proposals in the ballot are selected.

Application process

Submitting your Proposal

All applications must be submitted through the Investment Management System (IMS) Portal ("the portal") by **12 noon** on Friday 20 March 2020. The portal will be open from 31 January 2020.

A link will be posted to the SfTI website when the portal opens.

To access the portal, you will require a username and password:

- If you have not used the portal before, you will need to apply for access via your organisation's Research Office
- If you already have access to the portal but wish to change details or need further information, contact: SfTIChallenge@callaghaninnovation.govt.nz

Some notes when using the portal:

- When the portal opens, select the correct investment process - **2020 NSC Science for Technological Innovation Seed Projects** - and 'create' an application
- Ensure you have your information prepared – please refer to the guidance notes below in Appendix 1
- You need to create a single application in the portal for each proposal you are submitting
- You may amend or withdraw your application at any time prior to the closing date. To withdraw an application, notify SfTIChallenge@callaghaninnovation.govt.nz and identify the application to be withdrawn

- When the application is complete ensure it is submitted (not merely created) before the closing date. Once it is submitted it cannot be edited. To access a submitted application (before the closing date) email SfTIChallenge@callaghaninnovation.govt.nz
- SfTI may not acknowledge the submission of applications or the withdrawal of any application. To understand if your proposal has been submitted or not, your proposal will display one of the following statuses in the portal:

  Submitted to IMS – means your application has been received by SfTI

  Submitted for QA - means you do not have the organisational rights to submit an application for funding. Contact your Research Office or SfTI SfTIChallenge@callaghaninnovation.govt.nz

  In Progress – means your application has not been submitted and not been received by SfTI

  Not Progressing or Not Submitted – means the application has been withdrawn (and will not be assessed)

Guidelines for preparing your proposal are detailed in Appendix 1. This includes brief, explanatory statements about what information is required.

Notification and Feedback

Applicants will receive indication of their funding category and brief feedback based on the assessment panel's consensus comments, subject to accepting the funding decision as final.

Contracting and Reporting Process

Contracts

If your proposal is successful, the organisation of the Contact Person (Contracting Organisation) will be responsible for arranging and signing the Contract with Callaghan Innovation (Challenge Contractor and SfTI host). The administration Contact Person on the Seed Project proposal is normally part of the institution's Research Office. A standard contract for research services template will be agreed between SfTI partners prior to contracting and will be the preferred contract for all funded projects.

The Contracting Organisation will be responsible for the fulfilment of the Contract and will be required to guarantee that resources and research time are available.

Projects will be contracted to start on or as soon as possible after 1 July 2020. Project commencement dates and the project timeline may be flexibly deferred by up to 6 months. Projects will not be allowed to commence until all researchers are available including students and those unnamed in the proposal. Projects must end less than 2 years from when they commence (i.e. the end date can be up to 30 months after signing the contract).

Post-graduate student scholarship support for longer than the 2-year term of the project (e.g. PhD students) may be included in the budget but the Contracting Organisation is responsible for any accrual of project funds beyond the project end date to allow this to occur. Further, any student research critical to achieving the project critical steps must be completed within the contracted term of the project (maximum of 2 years).

For projects longer than 15 months duration, mandatory stage-gate critical steps will be expected around 9 to 12 months into the project.

Projects longer than 15 months duration will be allowed to pivot (i.e. make a significant change in critical steps) once over the project term without penalty, subject to approval by the SfTI Leadership Team.

If critical steps, particularly stage gates, are not achieved and a satisfactory pivot is not agreed, then subsequent funding may be reduced or withdrawn based on an assessment by the SfTI Leadership Team. If so, any support for students (e.g. scholarships) will be maintained so long as they continue to research in an area that aligns with the SfTI mission. The project team will remain eligible to participate in SfTI events and activities, and the PI must continue reporting any further progress with the project to SfTI, as set out in the contract.

Wherever possible, contracts will be based on the information contained in the proposal.

Reporting

A contract requirement will be the completion and submission of information describing the progress of the research.

Annual reporting linked to the information supplied in your proposal including:

- information to assist SfTI complete an Annual Progress Report for MBIE, such as reporting against SfTI KPIs and providing project-level achievements

Regular reporting:

- tracking progress towards and achievement of contracted critical steps including stage-gate critical steps
- any significant risks and issues that arise that will affect achievement of the project objectives

Ad hoc reporting

- "no surprises" updates
- involvement in and response to reviews such as science quality reviews
- significant deviations from the budget
- revisions to the research plan and critical steps and stage gates if changes are proposed
- written reports on research achievements for publicity purposes

Closure reporting at the end of the project providing an overview of what the project achieved including:

- key results and outcomes of the project (including what went well/didn't go well in the project)
- what are the future plans the next research stages and/or commercialisation
- reporting against SfTI KPIs

Post-project updates to keep SfTI informed about progress of technologies developed from the project including Technology Readiness Level, to enable SfTI to report on its "impact" KPIs to MBIE.

Confidentiality

SfTI will treat your proposal as confidential, but you should be aware that SfTI is subject to the Official Information Act 1982 and may be required to release information supplied in your proposal in accordance with that Act, or as otherwise required by law. You will be consulted before the release of any information under the Official Information Act. SfTI may confidentially share your proposal with MBIE.

If your proposal contains confidential or sensitive material, please indicate this at the start of the "Summary" section of your proposal.

Conflicts of Interest

Any conflicts of interest you are aware of should be noted in your proposal, including the reason why you consider them conflicts. Conflicts could arise with SfTI Leadership Team members and the external panel members. SfTI will post a list of panellists on the SfTI website.

The assessment panel will operate a Conflicts of Interest register. Panellists will be excluded from assessment of a proposal for which they have a significant Conflict of Interest.

SfTI Seed Project Contact Details

SfTI Seed Project contact details:

Email: SfTIChallenge@callaghaninnovation.govt.nz

APPENDIX 1: Application and Guidelines for Completing Proposals

This section describes what information is required for your proposal and is intended for use in the preparation of your SfTI Seed Project funding application in the portal.

For information about your Application or help with the portal email:
SfTIChallenge@callaghaninnovation.govt.nz

Formatting Guidelines

Please follow these rules when completing your application in the portal.

- Use the downloadable templates provided and follow instructions and formatting guidelines. You will find a word doc template in the portal for the Research Proposal section; and an excel template in the portal for the Budget section
- CVs should use the standard RSNZ format (5 pages maximum each, with both Part 1 and Part 2 completed)
- No additional attachments are allowed.

Content

In the preparation of your application, please ensure that the following key elements of your research proposal are addressed:

- alignment with SfTI Technical Theme(s)
- the physical sciences and engineering research focus, particularly if the context of the research is another field e.g. health, biological sciences, food processing or business
- novelty and potential of the idea (stretch), citing current supporting evidence
- justification for the New Zealand context and niche
- detailed research plan including measurable critical steps, stating which critical steps are to be *stage-gates*, timelines, and intended Technology Readiness Level (TRL) at project completion
- details of the research team capability and competencies, track record, including any industry or end-user mentor or collaborators, and how this capability will contribute to the project success
- any planned capacity development initiatives
- the budget and justification for the funding sought

What characteristics do we consider make a "Good" application?

- concise wording
- a strong focus on alignment with the assessment criteria
- clear descriptions and justifications of the science/research novelty and/or stretch
- clear descriptions of measurable critical steps and stage-gates
- the stretch in the research is clearly defined especially for research in applied fields and technology development
- careful and minimal use of jargon

Audiences

The *Project Title* and *Summary of Research* section will be made publicly available if your proposal is funded. This should be written in plain language for an audience with a general understanding and contain **no** confidential information.

The *Proposed Research* section should address panellists with broad scientific knowledge rather than specialists in the field.

SECTION 1: APPLICATION SUMMARY	
Contracting Organisation:	• The Contracting Organisation is the organisation that will be responsible for signing the Contract for Research Services should this application be successful. • This information is populated automatically based on the selection at the time of creating an application. It is not editable.
Postal and Courier address	• This information is populated automatically based on the Contracting Organisation, it is not editable. If there are changes required, please email: investmentsupport@callaghaninnovation.govt.nz
Total Funding Requested:	• This section is populated automatically from the Requested Funding sub-section (2.4)
Project Short Title:	• Please use fewer than 10 words
Investment Mechanism:	• Please select "SfTI Seed Project" from the drop-down list
Contact Person in Contracting Organisation	• Please state name and email of Contact Person (normally this would be a relevant person based in the Contracting Organisation's Research Office)
Number of years Funding Requested:	• Up to 2 years

Alignment with SfTI Theme areas:
(Primary and Secondary)
	• Please indicate SfTI Theme/s alignment
	• All proposals must have **primary** alignment with one of the SfTI science/technical themes:
	  ○ Materials, Manufacturing Technology and Design
	  ○ Sensors, Robotics and Automation
	  ○ Data Science and Digital Technologies
	• In addition to the science/technical themes above, proposals *may* indicate **secondary** alignment to:
	  ○ Vision Mātauranga
	  ○ Building NZ's Innovation Capacity (BNZIC SfTI Spearhead)
	  ○ One of the above science/technical themes
	See details of the SfTI Themes in Appendix 1 of the CfP. Only claim secondary alignment if a significant part of the proposed research matches the other domain. Applicants seeking funding for a BNZIC aligned seed project must contact SfTI to confirm eligibility before submitting a proposal.

SECTION 2: RESEARCH PROPOSAL	
SUBSECTION 2.1: RESEARCH PROPOSAL	
a) Summary of Research Proposal (maximum 250 words)	• Summarise your proposed research project using plain language, but without over-simplification • This should be a structured or semi-structured abstract covering background/context, science stretch and question, methods, and potential science and economic impact • This summary will be made publicly available should your proposal be successful. Write it in plain language for a general audience. • Do not include confidential or sensitive material.
b) Proposed Research (maximum 2200 words plus up to 1 page of references)	**Download the Proposed Research template from the portal and complete; please include section headings** • Background/Context - provide context by detailing the state of knowledge in this field (about 300 words) • Aims and Objectives – state the overall goal and specific aims/objective(s) of the research (about 200 words)

	• Science Stretch and Novelty (about 200 words) – explain how the science is new and high-risk • Describe the potential contribution to NZ economic growth and links to NZ businesses if any, and how the research aligns to the assessment criteria detailed in the CfP, including justification of the New Zealand context and niche (about 200 words) • Detailed Methodology – describe the research plan– the hypothesis/ses being tested, methodology being used, methods of analysis. This should cover the total funding period and include contributions from collaborators (about 600 words) • Intellectual Property (IP) – describe the IP that might arise from the project and the proposed methods to protect the IP before publication (about 200 words). If relevant, also include results from a scan of existing technologies and patents in the field of interest (about 200 words) • State the TRL level target for the project and possible future work if this project is successful (about 200 words). **Upload the completed template to the portal**
SUBSECTION 2.2: CRITICAL STEPS, STAGE-GATES AND TIMELINE	
a) Critical Steps, Stage-gates and Timeline	Input the research aims and specific objectives for the project in the following format to match the portal: • Impact Statement Title **ONLY ONE IMPACT STATEMENT IS PERMITTED** - enter the overall goal of your project (maximum 20 words) • Research Aim Title – enter a brief description • Research Aim Statement – clearly describe the specific aim(s)/objective(s) of the research under each Research Aim • Critical Step Title - enter a brief title of fewer than 10 words • Critical Step Statement - enter a brief description • Critical Step Achievement Measure - clearly describe in specific and measurable terms what is needed to achieve or successfully complete the critical step** • Stage Gate – write "Stage Gate" in the Critical Step Title if the Critical Step is also a Stage Gate. The stage gate/s are stop/go/pivot points in the research plan that are essential to achieving the research objectives and economic potential. • Enter due date for each critical step and/or stage gate critical step These critical steps will form the basis of contracting and of your regular reporting requirements, if your proposal is successful. If your project duration is greater than 15 months, one of your critical steps *must* be identified as a stage-gate about 9 to 12 months after project commencement. Measurable critical steps/stage gates will be confirmed at contracting by the SfTI Leadership Team member assigned to your project. **Achievement Measures should usually be quantitative performance or quality targets that need to be achieved at that stage in the research if the project is to remain on track to achieve its economic potential. The measures may be related to the performance of competing/existing methods or technology that the research hopes to supersede and often may reflect the criteria that investors will demand to justify further research/commercialisation funding. For example – the "performance" will be higher than … or xx% higher than … e.g. an existing benchmark; the projected cost is less than $yyy or yy% lower than… etc. Performance might be defined as yield, cost, purity, customer satisfaction, prediction accuracy, strength, efficiency or equivalent for the research topic.
SUBSECTION 2.3: ALIGNMENT WITH SFTI AND RELATIONSHIP WITH OTHER WORK	
a) Alignment with SfTI (maximum of 200 words)	• Describe how the proposed research aligns with SfTI Themes and describe any direct relationships with other research teams and projects within SfTI. Alignment with SfTI Spearhead BNZIC should only be claimed if eligibility to do so has been confirmed by the SfTI leadership Team (refer Appendix 2).

b) Relationship with other research (maximum of 200 words)	• Provide details of the relationship between this research and other work being undertaken elsewhere - the proposal should demonstrate the research is novel and not an evolutionary extension of an existing programme. The project will not be funded if funding is already in place for this or closely related research. • State if you are a named researcher in another SfTI Seed Project application. • Indicate whether other funding has been received, or is currently being applied for, for this research or for research relevant to this proposal - e.g. MBIE, Marsden, CoRE.
SUBSECTION 2.4: REQUESTED FUNDING BY YEAR	
Requested Funding by year	• Enter the amount of funding requested for each year of your research project Year 1 $000 ex gst Year 2 $000 ex gst

SECTION 3: VISION MĀTAURANGA

Giving effect to Vision Mātauranga (maximum of 400 words)	• Describe how the research gives effect to Vision Mātauranga, including benefits to Māori (iwi, communities/groups and/or businesses)? • If your research is of relevance for Māori, or involves Māori, outline the steps you have taken to identify research opportunities relevant to Māori interests, including te reo Māori, how Māori have been or will be engaged, what Māori innovations/bodies of knowledge you will draw from and integrate into the research and what Vision Mātauranga outcome benefits are envisioned • Vision Mātauranga should be given serious consideration on all proposals, but alignment it is not compulsory. Only confirmed Vision Mātauranga alignment or actions should be included in your application. • Vision Mātauranga capacity development is a compulsory expectation for all research teams, even if Vision Mātauranga alignment is not claimed. • **Please refer to the Vision Mātauranga Guide in the CfP for further information on how Vision Mātauranga proposals will be assessed.** Only claim Vision Mātauranga alignment if you believe your proposal meaningfully addresses more than 1 of the 7 assessment criteria.

SECTION 4: RESEARCH TEAM AND CAPACITY DEVELOPMENT

SUBSECTION 4.1: PROJECT TEAM

Project Team	• Create one entry for each person funded by SfTI in the project
	• Indicate the name, organisation, role and annual full-time equivalent (FTE) commitment to the project for each person listed
	• If a person is yet to be appointed, list as "Unnamed" in the name field
	• Significant FTE is expected for the PI e.g. at least 0.1 FTE
	• Supervision time of postgraduate students should NOT be included in the supervisor's FTE
	• Key researchers may be from the Contracting Organisation or from a sub-contracted organisation
	• Create an entry for any unfunded individuals (zero FTE) where their involvement is critical for project support e.g. mentor to emerging researcher(s)
	• Upload CVs of all named researchers with funded FTE using standard RSNZ CV format (both Part 1 and Part 2 should be completed)
	• CVs must NOT be included for individuals such as mentors involved in the project at zero FTE (unfunded)
	• Within the portal, the project roles available are:
	  ○ Science Leader (= Principal Investigator)
	  ○ Key Researcher (= Associate Investigator)
	  ○ Post-Doctoral Researcher

	○ Masters student ○ PhD Student ○ Student i.e. summer student or intern ○ Other ○ Contact Person (= Contact from Contracting Organisation's Research Office)
SUBSECTION 4.2: ROLES AND RESPONSIBILITIES	
a) Roles and Responsibilities (maximum of 300 words)	Clearly explain the role in the project of each team member. Include details of their research expertise and describe how this expertise contributes to the research project. As well as key research and subcontracted personnel, provide details for others such as mentors (non-funded), collaborators, Māori advisors, industry advisors, end-users, etc.
b) What intentions do these researchers have regarding participation in capacity development initiatives? (maximum of 200 words)	Describe any proposed capacity development initiatives directed towards building the human and relational capacity of the research team (refer Appendix 2). These can include facilitated discussions between researchers and industry stakeholders, engagement with iwi, leadership training and other joint activities with industry end users.
SUBSECTION 4.3: SUBCONTRACTING	
Detail intended subcontractors	Enter in this section: - Name of Subcontracting Organisation - Status of subcontracting (drop down box) e.g. MOU in place - Year 1 $000 ex gst - Year 2 $000 ex gst

SECTION 5: BUDGET	
a) Budget (use downloadable template)	**Download the Budget template from the portal** Complete a budget for the project using the template provided including the following budget lines detailed by year: • Personnel Costs - enter team member name (including subcontracted personnel), salary costs (=salary including salary-related costs for superannuation, ACC etc, plus overheads) and FTE contribution to the project. • PhD students will be funded at $27,500 p.a. tax-free scholarship plus $7,500 p.a. contribution to tuition fees for a maximum of 3 years (the 3 years funding will be provided over 2 years) • Masters students will be funded at $27,500 p.a. tax-free scholarship plus $7,500 p.a. contribution to tuition fees for a maximum of 2 years (i.e. at the same annual level as PhD students) • Direct Costs / Operational Costs ○ travel & accommodation (SfTI supports travel only directly related to project execution and emerging researcher capacity development and does NOT support extensive conference travel) ○ consumables ○ other miscellaneous costs • Equipment depreciation / rental (SfTI does not fund the purchase of equipment directly, but may allow for a contribution to depreciation or rental costs, for access to critical equipment) • Extraordinary expenditure (any special equipment or resources required) **Upload the completed budget template** Use the text box to provide a justification for any major non-personnel budget items such as travel (200 words maximum).

SECTION 6: OBLIGATIONS AND CONFLICTS OF INTEREST

SUBSECTION 6.1: CONFLICTS OF INTEREST	
Conflicts of Interest (100 words maximum)	Use the text box to identify any conflicts of interest you are aware of at this stage and why. Refer to SfTI Leadership Team and assessment panel members as appropriate. Conflicts may occur at various levels: • direct conflicts – when a panellist is directly involved with a proposal or has a close personal relationship with you; • indirect conflicts – when a panellistis employed by an organisation involved in your proposal but is not part of your research programme, or when a panellist has a personal or professional relationship with you; • if a panellist has an involvement (direct or indirect) with a proposal in direct competition with your proposal or where the outcomes proposed by your proposal may compete with the panellist's business interests. The assessment panel will operate a Conflicts of Interest register. A panellist will be excluded from the assessment of a proposal for which they have a significant Conflict of Interest.
SUBSECTION 6.2: ETHICAL OR REGULATORY OBLIGATIONS	
Ethical or Regulatory Obligations (50 words maximum)	It is your responsibility to ensure that all ethical or regulatory obligations are met (for example, from ERMA, MPI, Animal Ethics, Human Ethics). Detail in the text box any required approvals anticipated or gained necessary to conduct the intended research.

DECLARATION

This is a tick box in the portal

The person in your organisation submitting the application to SfTI, is asked to declare and acknowledge the following:

- I am authorised to submit the application on behalf of the applicant;
- The applicant is a legal entity capable of entering into a contract with the SfTI host, Callaghan Innovation;
- The information in the application is true and correct;
- All parties mentioned in the proposal who are not employed by the applicant have confirmed that the nature and level of their involvement in the work described in the proposal is correct;
- Information received and generated by SfTI in relation to this application may be released in accordance with SfTI's external reporting requirements or if required by law, including in accordance with the requirements of the Official Information Act 1982 or the Privacy Act 1993.

APPENDIX 2: SfTI Background and Objectives

The Science for Technological Innovation, Kia Kotahi Mai: Te Ao Pūtaiao me Te Ao Hangarau (SfTI) Challenge's objective is for a New Zealand that has a vibrant, prosperous, technology-driven economy in which researchers are fully integrated and actively contributing to strategy, government policies, and daily activities with new businesses who are offering high-value products and services that may not yet have been invented.

SfTI has a mandate to support research that makes sense for New Zealand because it can 'stick' in New Zealand, building on our unique capabilities and competitive advantages, now and in the future.

The following sections give a brief overview of the themes and the rationale for capacity development.

SfTI Themes and Alignments

Within SfTI there are the following themes, and Seed project proposals must be aligned to at least one of the three science/technical themes.

Data Science and Digital Technologies

This science/technical theme (renamed in 2019 from IT, Data Analytics and Modelling to encompass the recent emphasis on data science, machine learning and artificial intelligence) is aimed at developing innovative algorithms, models, methods, tools and practices that could underpin new or enhanced business processes, hardware components, and systems and software applications, enabling industry to customise and turn these technologies into economically valuable products and services. Some of the research conducted under this theme will seek to develop entirely new data science and digital technology innovations. Research involving the use of existing technologies to transform a range of sectors is acceptable but must clearly define the stretch or novelty of the proposed research (i.e. routine use of an existing technology or methodology to a new field of application will not normally be funded).

Materials, Manufacturing Technology and Design

This science/technical theme (renamed in 2019 from Materials, Manufacturing and Design) focuses on new technologies for future manufacturing, not current manufacturing technologies, as well as materials and design innovation. The aim is to advance the reputation of New Zealand's small, vibrant hi-technology processing and manufacturing sector so it is seen as a leader in smart, green manufacturing processes and materials. As a result, products, services and processes are developed that position New Zealand's brand well in premium export markets. Design is a key factor, as are both materials and production processes.

Sensors, Robotics and Automation

This science/technical theme broadly encompasses research to develop sensors, robotics and automation for use in a wide range of products and applications. The focus includes technologies for precision monitoring, management, and actuation across all sectors, cost reduction that improves NZ's economic outputs, improved productivity by automating tasks currently done by humans, improved safety in dangerous environments, , and undertaking tasks which wouldn't be economically viable otherwise.

Vision Mātauranga (VM)

In addition to science/technical themes, SfTI has a Vision Mātauranga Theme.

Vision Mātauranga guides researchers on how to integrate technical science with mātauranga Māori (Māori knowledge) to explore new opportunities to build a prosperous, technology-driven economy.

Vision Mātauranga objectives seek to explore innovative and distinctive opportunities for mātauranga Māori, for Māori resources and for relationships with Māori that are beneficial to both Māori and New Zealand as a whole. Applicable research is research that engages with Māori people, practices and/or knowledge in a meaningful way. Research approaches are content specific and may range from full Kaupapa Māori driven research to research likely to improve Māori outcomes and/or raise Māori capacity in hi-tech sectors.

At least 25% of total funding in this round will be committed to projects that support Vision Mātauranga objectives. All projects aligning with Vision Mātauranga must also align to one of SfTI's science/technical themes.

Building New Zealand's Innovation Capacity (SfTI Spearhead)

In addition to the above themes, SfTI has an under-pinning social science spearhead research project called "Building New Zealand's Innovation Capacity" (BNZIC).

Proposals aligning with BNZIC should also have a **primary alignment** with at least one of the SfTI science/technical themes, although the methodology will be drawn from social science. If BNZIC alignment is claimed there must be relevant expertise in the team to carry out that aspect of the research.

BNZIC's vision is to establish a high-performing seamless New Zealand commercialisation environment that has **enhanced co-innovation capacities** within and between physical sciences and engineering teams and a wide range of industry sectors. This includes:

- Human capacity - the ability of researchers to contextualise their research in terms that business and Māori enterprises can understand, and to place their research in the context of New Zealand and its economic growth;
- Relational capacity - the ways teams of researchers work, network and engage with users (including Māori) organisations.

The research is based on the concept of 'open innovation' which argues that to create value, enterprises need to acquire, assimilate and exploit knowledge from not only their own internal resources but also external sources. How enterprises and research teams connect is dependent on their capacity to connect.

BNZIC is using multiple research approaches including surveys, case studies, action research, ethnography and observations of the process of research and industry engagement in the spearhead, seed projects and capacity development programme. The objective is to understand macro (societal), meso (organisational) and micro (team and individual) barriers and enablers in the New Zealand context and then to propose areas for acceleration or improvement. BNZIC research focuses on science **and** industry/Māori technical, human and relational capacity. Since the Māori economy has distinctive features, we are interested in cases of co-innovation between SfTI researchers and Māori organisations.

Capacity Development

SfTI's mission is to **enhance the capacity** of New Zealand to use physical sciences and engineering for economic growth.

This capacity (or capability) development has 3 dimensions – technical, human and relational. SfTI aims to improve the technical capacity of researchers (in the form of new technical knowledge, platforms, and tools) through the research they perform. SfTI researchers will also be expected to improve their ability to connect with end users of research at all of the project concept, design , execution and delivery stages so that technical achievements can be more readily translated into business and economic outcomes. This is the development of their human and relational capacity. Some capacity development initiatives will be funded separately and all SfTI researchers are expected to participate.

More information of SfTI's capacity development programme can be found on the SfTI website:

http://www.sftichallenge.govt.nz/capacity-development

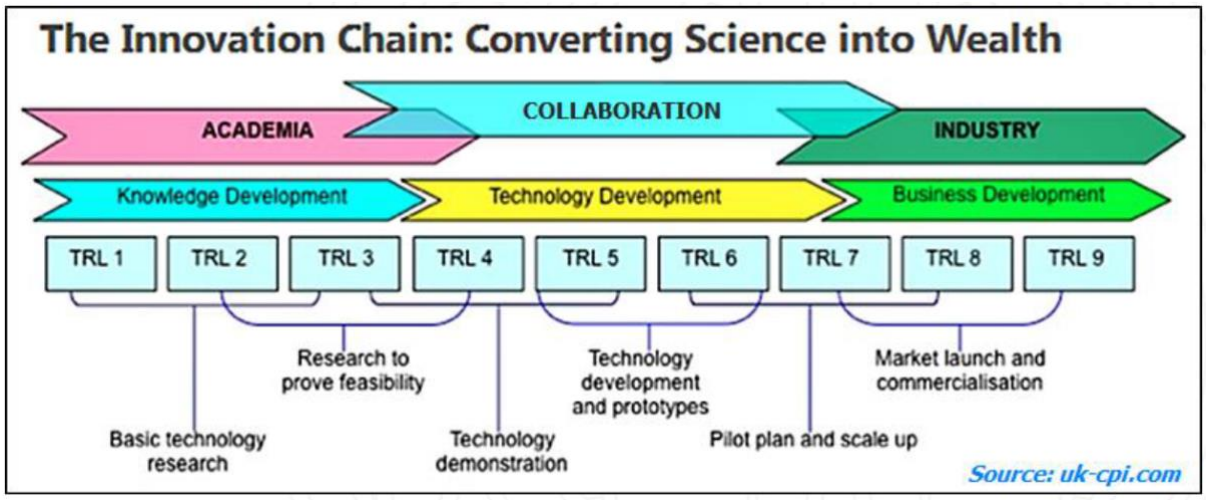
Background about SfTI

More information about SfTI can be found on the SfTI website: https://www.sftichallenge.govt.nz/publications

SfTI Challenge Partners (under a signed Collaboration Agreement)

Callaghan Innovation (SfTI host)
AgResearch
AUT
GNS Science
Lincoln Agritech Ltd
Lincoln University
Massey University
Scion
University of Auckland
University of Canterbury
University of Otago
University of Waikato
Victoria University of Wellington

APPENDIX 3: Technology Readiness Levels (TRLs)



Summary of the US Department of Energy Technology Readiness Levels. Adapted from *Technology Readiness Assessment Guide (DOE G 413.3-4)*, US DOE Office of Management, 12 October 2009. http://doe.test.doxcelerate.com/directives/archive-directives/413.3-EGuide-04/view

Technology Readiness Levels (TRL)	
TRL 1	Scientific research begins translation to applied R&D - Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties.
TRL 2	Invention begins - Once basic principles are observed, practical applications can be invented. Applications are speculative and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies.
TRL 3	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
TRL 4	Basic technological components are integrated - Basic technological components are integrated to establish that the pieces will work together.
TRL 5	Fidelity of breadboard technology improves significantly - The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.
TRL 6	Model/prototype is tested in relevant environment - Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high-fidelity laboratory environment or in simulated operational environment.
TRL 7	Prototype near or at planned operational system - Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in an operational environment.
TRL 8	Technology is proven to work - Actual technology completed and qualified through test and demonstration.
TRL 9	Actual application of technology is in its final form - Technology proven through successful operations.