Creating a University Research Framework

Version: Climate Change and Environmental Research

September 2025

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2 RESEARCH GOVERNANCE AND LEADERSHIP 21

- **Research Advisory Committee:** A research committee or council responsible for overseeing research policies, practices, procedures and ethical standards.
    - Working Area
- **Research Office:** A central office responsible for managing research administration, providing support to researchers, and ensuring compliance with funding requirements and ethical standards.
    - Working Area
- **Research Leadership:** Academic leaders in the institution (such as Deans, Research Directors, Vice-Presidents or Chancellors) responsible for setting research priorities, guiding research development, and maintaining institutional accountability.

3 RESEARCH ETHICS AND ACADEMIC INTEGRITY 32

- **Ethical Approval Policies and Processes:** Describes or refers to the ethical policy and processes that guide the ethical integrity of research involving human and/or animal participants, and the institutional bodies involved (e.g., Research Ethics Board – REB; or Ethics Committee).
- **Compliance:** Details areas requiring ethical compliance including, but not limited to, those concerning research involving human and animal participants.
    - Working Area
- **Academic Integrity Policies and Processes:** Describes or refers to the institutional policies and processes in place to ensure ethical conduct in research and prevent research misconduct. This could include policies related to plagiarism, data falsification, bias, and reporting.

4 COLLABORATION AND PARTNERSHIPS 36

- **Internal Collaboration:** Details rationale and processes for intra-institutional collaboration amongst researchers across departments to address research focused on complex societal challenges.
    - Working Area
- **External & International Collaborations:** Details rational and processes for inter-institutional collaboration with other universities, research organizations, industry, and government bodies to enhance research capacity and impact.
    - Working Area
- **Community-based Research:** Details the rationale for working with local communities/ entities to address complex societal challenges to ensure relevance and impact of research.

5 RESEARCH CAPACITY BUILDING 42

- **Research Training and Development:** Details initiatives/programs designed to provide ongoing training (e.g., research skills, grant writing, data management, publishing) and capacity building for researchers (faculty, staff, and students).
    - Workshops for grant-writing
    - Digital Research Methods
    - Working Area
- **Support for Early-Career Researchers:** Describes initiatives/programs specifically designed for supporting early-career researchers (e.g., postdoctoral scholars, new faculty, Indigenous faculty), such as career-development strategies and mentoring.
    - Working Area

6 RESEARCH COMMUNICATION, OUTPUTS AND KNOWLEDGE EXCHANGE 45

A. Publication and Dissemination Strategies: Describes expectations and opportunities for disseminating research findings, including institutional preferences for types of journals (e.g., peer-reviewed, open-access, conference presentations).

- **Peer-review Publications and Academic Outputs**
- **Open Access and Knowledge Equity**
- **Conferences, Networking, Knowledge Sharing**
- Working Area

B. Outputs

- **Performance Metrics:** Details indicators (e.g., publications, citations, community presentations, conference presentations, external funding secured, commercial impacts) used to assess and evaluate the success and impact of research efforts.
    - **Research Output Metrics**
    - **Student Research**
    - **Commercialization**
    - Working Area

C. Knowledge mobilization and translation: Describes knowledge mobilization strategies, institutional (e.g., university sponsored conferences and publishing initiatives) and processes for transating research into proactical applications.

- **influencing policy or industry practices**
- **Potential for commercialization of outputs**
- Working Area

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Authors: Dr. Robin Cox, Dr. Michelle Hamilton-Page, Jennifer Hoffman, Dr. Deborah Zornes

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Introduction & Rationale

INTRODUCTION & RATIONALE

Description of the university and their mission

Universities play a pivotal role in equipping current and future decision-makers with research-based insights to identify critical climate impacts and develop evidence-informed strategies to mitigate these challenges. Given the scale, complexity, and urgency of environmental and social crises such as climate change, addressing these issues demands a transformative, integrated approach. This entails embedding climate-focused inquiry across all academic fields and disciplines.

A growing trend in academia is the establishment of multidisciplinary and cross-institutional research teams or centers. These collaborative initiatives are essential to ensuring research capacity—expertise, resources, and tools—is commensurate with the magnitude and complexity of the challenges. Such teams foster learning-oriented, problem-focused approaches (Cundill et al., 2019) and encourage mutual learning across disciplinary divides and knowledge domains (Filho et al., 2024). Furthermore, their interdisciplinary nature supports the training and mentorship of emerging researchers through interdisciplinary thesis committees, training events, and partnerships that bridge the academic, policy, and civil sectors.

Notable examples of interdisciplinary research initiatives include the Partnership for European Environmental Research (PEER) and the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) (To learn more about CARIAA see: https://climate-change.canada.ca/finance/details.aspx?id=438). These and similar collaborations demonstrate how multidisciplinary approaches can effectively address the increasing shift in research funding towards tackling complex societal challenges, including climate change. Beyond generating new knowledge, such initiatives drive innovation and provide actionable, evidence-based solutions for operationalizing change (Filho et al., 2024).

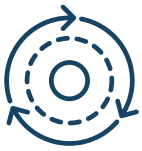
For universities to fully embrace and support collaborative research, a systematic, institution-wide approach is essential. This involves leveraging existing and emerging academic expertise through a comprehensive, context-specific research framework. Such a framework ensures that research initiatives align with the institution's strategic vision, mission, goals, and priorities. It also establishes the policies, systems, and structures required to enable collaboration, uphold rigorous research standards, and deliver impactful, high-quality outputs.

BEST PRACTICES IN THE DESIGN AND DEVELOPMENT OF A UNIVERSITY RESEARCH FRAMEWORK

A well-crafted institutional research framework is a cornerstone for advancing the research and academic mission of higher-education institutions. It provides strategic guidance and operational tools to ensure that research efforts are purposeful, efficient, and impactful. Below are key functions and best practices to consider when developing an institutional research framework:

1. Establish Clear Objectives and Research Priorities

An institutional research framework serves as a roadmap, aligning research objectives with the university's mission, vision, and strategic goals. This alignment ensures that research initiatives contribute meaningfully to the institution's broader academic and societal aspirations, fostering purpose-driven scholarship.



2. Standardize Research Protocols and Policies

By systematizing research policies and protocols across faculties, departments, and interest-holders (faculty, staff, and students), the framework can ensure consistency. Such standardization is critical for maintaining the quality, validity, and reliability of research outputs, reinforcing the institution's academic credibility.

3. Facilitate Inter- and Transdisciplinary Collaboration

The framework should provide shared guidelines and tools to encourage collaboration among researchers across disciplines, faculties (or departments), and research centers. By promoting common goals, data management standards, and governance practices, such a framework can foster synergy among diverse knowledge domains and enable interdisciplinary research excellence.

4. Streamline Research Processes

A robust framework simplifies research workflows, offering structured pathways for grant applications (internal and external), ethical reviews, financial and project management, and knowledge mobilization. By minimizing administrative hurdles, it allows researchers to focus more on innovation and inquiry.

5. Enhance Data Management and Sharing

Effective research frameworks include clear guidelines for data governance, encompassing data collection, storage, and sharing practices that comply with ethical and legal standards. This transparency supports secondary research, reproducibility, and long-term accessibility, enhancing the impact and credibility of the institution's research.

6. Promote Research Quality and Rigor

By establishing principles for ethical, inclusive, and high-quality research, the framework can optimize the capacity of the university to produce outputs that meet the expectations of funders, policymakers, and the public. Upholding these standards bolsters trust and confidence in the institution's research contributions.

7. Build Research Capacity

The framework should provide shared guidelines and tools to encourage collaboration among researchers across disciplines, faculties (or departments), and research centers. By promoting common goals, data management standards, and governance practices, such a framework can foster synergy among diverse knowledge domains and enable interdisciplinary research excellence.

8. Facilitate Accountability and Impact Assessment

Research frameworks can be considered as iterative documents that are revised overtime to ensure that the framework adapts to changes in the university's strategic priorities and the local, regional, and international context of research. As such, the framework should incorporate metrics and tools for evaluating the academic, societal, and economic impacts of research activities and their alignment with the university's strategic plan. This accountability ensures the effective and equitable use of resources, aligns research initiatives with institutional priorities, and provides opportunities to iteratively improve research quality and consistency.

SUMMARY

A research framework provides a structured and systematic approach to research within a university, fostering consistency, collaboration, and alignment with the university's strategic goal. A well-designed framework streamlines processes, ensures quality, and builds research capacity, all while promoting accountability and societal impact. In the context of increasingly complex academic and societal challenges, a purposeful research framework is essential to support higher-education institutions to contribute to understanding and providing solutions to these challenges and position itself as a trusted contributor to knowledge, innovation, and societal progress. By adopting such a framework, universities can enhance their reputation, attract funding, and make meaningful contributions to knowledge creation and dissemination.

WORKBOOK AREA (Click in box to type):

The Workbook

OVERVIEW

This workbook is organized according to the table of contents (ToC) outline of a comprehensive university research framework. Each section of the ToC is described in detail, with evidence-informed good practice to guide its development. For every section and subsection there are curated examples from Canadian universities.

These examples are not intended to be prescriptive but are offered as starting points, providing practical insights and ideas based on well-developed institutional research frameworks. For the purposes of this project, the focus of all sections of the proposed research framework has been narrowed to emphasize climate change and environmental research, however the principles and guidelines applied here can be extended in the later creation of a research framework that address all priority themes.

A Gender-Based Analysis Plus (GBA+) is integrated throughout this workbook, and is recommended as a lens for constructing Research Framework. GBA+ is a tool for analyzing how different groups of people might be impacted by policies, programs, and initiatives. The following prompts can help guide the application of this lens.

THE ABCs OF GBA+

A

WHAT ASSUMPTIONS ARE YOU MAKING?

- Are you making assumptions as to who your audience/clients are?
- Are you assuming what is best for your audience?
- What social factors, norms, or stereotypes are informing your assumptions?

B

WHO COULD BE LEFT BEHIND?

- Are generalizations being made that could lead you to various groups or genders falling through the cracks of the policy/program/legislation?
- How is this detrimental?

C

WHO DID YOU CONSULT?

- Did you consult those who will be directly affected by your decision/policy?
- What informed your decision of who to consult?
- Were consultations made with those who had been identified as at risk of being left behind?
- Was voice given to those who are often mis- or underrepresented?

D

WHAT DATA DID YOU LOOK AT?

» Is your data disaggregated by various intersections such as sex, gender, age, ethnicity, indigeneity?

» Does your analysis and presentation of data reflect social factors, norms and roles?

E

HOW ARE YOU ENSURING EQUALITY OF OUTCOMES?

» Are equity measures being used?

» Are those measures taking intersectional factors into consideration?

Consider also applying the principles of intersectionality as seen in Figure 1. below. An intersectional approach specifically emphasizes the connections between various factors and the collaborative processes that lead to differences.

GBA+ Resources:

- Resources for Government of Canada's Gender-Based Analysis + policy and the Intersectionality 101

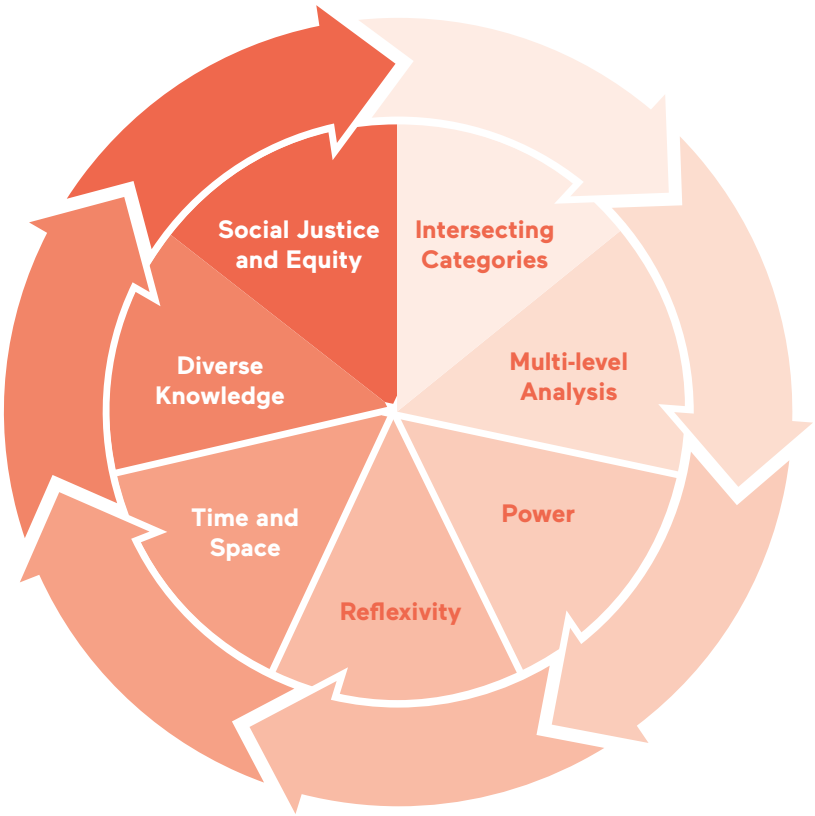


Figure 1. Principles of Intersectional Analysis, adapted from Hankivsky, O, 2014.

1

Institutional Research Vision and Strategy

A. Strategic Research Vision and Goals

B. Guiding Principles & Values

C. Priority Research Themes

1 INSTITUTIONAL RESEARCH VISION AND STRATEGY

This section articulates the overarching vision and strategic direction for research at the University, ensuring alignment with institutional priorities, societal needs, and global trends. It defines the broader goals and priorities for research within the institution which should align with university's mission. (Provide link to or insert university's mission statement in this section).

A. STRATEGIC RESEARCH VISION AND GOALS

This subsection outlines the institution's long-term vision for research and its strategic goals. It should address the following:

- **What type of research is prioritized?**
  - **Interdisciplinary:** Research that bridges traditional academic boundaries, integrating methods and insights from multiple disciplines to address complex issues (e.g., climate change or healthcare innovation).
  - **Transdisciplinary:** Involving not only academics but also external interest-holders (e.g., policymakers, industry leaders, and community members) to create actionable, real-world solutions anchored in gender equity and social inclusion.
  - **International:** Collaborative research across borders, building partnerships to address global challenges and advance the institution's reputation.
- **Key focus areas for research advancement:**
  - Fostering innovation and creativity in addressing pressing local and global challenges.
  - Strengthening the institution's contribution to knowledge production and dissemination.
  - Building a supportive ecosystem for early-career researchers and graduate students.

ACTIONS

- Engage interest-holders, including faculty, students, policymakers, and industry partners, to define a shared vision.
- Ensure alignment between research goals and relevant institutional, national and international guidance documents or policies (e.g., Sustainable Development Goals – SDGs; National Determined Contributions – NDCs; University Mission statement).
- Incorporate measurable objectives to track progress over time. Consider the SMART approach to establishing objectives: Specific, Measurable, Achievable, Realistic, and Timely. For more on SMART objectives see Government of Canada: Writing Smart Objectives
- Apply and integrate a gender-based equity and social inclusion lens when identifying and crafting institutional research vision and goals.

EXAMPLES

1. From the **University of Prince Edward Island Strategic Research Plan (2023-2028)**

Research Vision and Mission

The University of Prince Edward Island (UPEI) offers a comprehensive range of academic programs with a vision of becoming a leading research institution nationally when compared with other universities of comparable size. The vision and mission of the

University's research mandate are summarized below.

Vision:

The University of Prince Edward Island will be one of the most distinguished research universities nationally, when compared with other universities of comparable size, while fulfilling its special obligation to PEI as the only university in the province. In pursuing this objective, UPEI will foster the principles of equity, diversity, inclusion, and Indigenous reconciliation.

Mission:

UPEI is dedicated to the highest quality of intellectual, scholarly and creative endeavours that focus on the discovery, integration, interpretation and application of new knowledge. This research aims to make a positive impact on society, locally, nationally and internationally. As part of this vision and mission, UPEI will cultivate a climate of research excellence that enables leading-edge research to flourish. It aims to be recognized for its impact, regionally, nationally and internationally. As stated in its vision, it will foster the principles of equity, diversity, and inclusion in all aspects of its research mandate. The University will exemplify best practices in research communication, knowledge dissemination, and knowledge utilization.

2. From **Royal Roads University's Strategic Vision, Learning for Life: 2045 and Beyond.**

Goal 2: Explore, Share, Advance

Royal Roads research seeks to transform lives, communities and societies. Our research:

- is purposefully designed to directly benefit the communities in which we live, work and play, be they local, national, or international.
- inspires action and solves real-world problems as we prepare for disruption on many fronts including education, technology, the natural world, and economic and social systems.
- is primarily inter-and transdisciplinary, which by its nature is collaborative.
- knows no borders and seeks to inform both local and global contexts.
- is designed to be shared and developed with practitioners who will implement the findings and results.

At Royal Roads, research is integral to and inextricably linked with our learning and teaching. It informs learning and teaching. In turn, teaching and learning is explored through research. Partnerships with those who may be affected by, or use, our research, are critical. Finally, research informs the university's operations and how we live and work at Royal Roads. We move forward with a spirit of inquiry, a quest for knowledge, and a commitment to action. Our aim is to teach students to explore, share and advance solutions to critical issues, and ultimately show up as sought-after leaders in communities around the world.

3. From **Simon Fraser University's Strategic Research Plan**

A Culture of Inquiry

We are here to advance knowledge and understanding on a wide range of topics from a wide range of perspectives. Our researchers will ask hard questions about challenging topics. SFU's support of academic freedom should create a safe environment in which these topics can be addressed.

Indigenous Approaches, and Knowledges

To understand and then address the complexity and urgency of many of the problems our society faces, we recognize that we need a broad and inclusive understanding of the world that incorporates many knowledge systems and world views. Our commitment to reconciliation with Indigenous peoples includes reconciling different approaches to understanding the world. Frameworks such as two-eyed seeing and walking on two legs guide our approach.

Interdisciplinarity

Many of the most interesting academic questions are rooted in very complex problems that cannot be solved by a single researcher. Team-based work—often requiring team members from a variety of disciplines and trained in multiple methodologies—is the path to answering these questions. In addition to offering strong support for specialized disciplinary work, at SFU we support scholars working across disciplines by supporting partnerships both within the university and with other universities.

Linking Research to Teaching and Learning

We mentor students to be the next generation of

researchers, innovators, and educators by engaging them in research processes. This enriches their education and the research produced. We embed practices of systematic inquiry, mentorship and apprenticeship in our research programs and extend and model these practices in preparation of educators who go on to work in early learning, K-12, community and post-secondary contexts.

Engagement with Partners and Communities

In many fields of inquiry, engaging with communities outside academia leads to better scholarship. Those communities may include individuals, municipalities, First Nations, industry, NGOs or others. At SFU we support partnership within and outside academia to drive better scholarship and greater impact. This includes local and regional partnerships, national partnerships and international partnerships.

Knowledge Mobilization

Research is not complete until the created knowledge is shared. That sharing happens via many mechanisms including traditional academic publication, policy creation, newspaper op-eds, white papers, social media, performances, creative artifacts, patents/licensing, new product development, creation of a company and other forms. At SFU we embrace open science, data and publishing. We also foster a culture of innovation both in the way that we perform scholarly work and in the way that we support it.

WORKBOOK AREA (Click in box to type):

B. GUIDING PRINCIPLES & VALUES

The guiding principles serve as the foundation for all research activities, reflecting the institution's core values. Consider including principles such as:

- **Collaboration:** Encouraging partnerships across disciplines, faculties, and external organizations.
- **Integrate principles of Gender-based Analysis Plus (GBA+):** Embedding GBA+ into all aspects of research, from recruitment to knowledge dissemination. This involves understanding (1) how an opportunity (e.g., hiring; research funding) or a research topic/issue being addressed can be framed in ways that anticipate and mitigate barriers to accessing or benefitting from that opportunity and (2) ensuring that research design, data collection, and analysis account for varied perspectives and identify inequalities. Essentially this is about avoiding assumptions about a "universal" experience by applying an intersectional lens that considers biological (sex) and socio-cultural (gender) differences along with other factors such as age, disability, education, ethnicity, economic status, geography, language, race, and religion. (More information and a free, self-guided online training course, here.)
- **Changemaking:** Promoting research with a tangible societal impact, driving change in local and global communities.
- **Ethical Conduct:** Upholding integrity, transparency, and responsibility in all research endeavors.

ACTIONS

- Make these principles actionable by embedding them in policies, training, and evaluation criteria.
- Regularly revisit and refine principles to ensure they remain relevant and aligned with emerging societal needs and any changes and updates to the university's strategic plan.
- Promote these values through university-wide research initiatives and public communications including promotions related to specific research projects and outputs.

EXAMPLES

1. From: **University of Alberta Strategic Plan for Research and Innovation**

Guiding Principles

Our guiding principles underpin everything we do, including the work laid out in this Strategic Plan for Research and Innovation. These principles are the foundation on which we operate:

- The University of Alberta is committed to academic freedom, where individual researchers determine their own research area, focus, and pursuits, which in turn are supported at the faculty, college and institutional level.
- Research and creative activity are the core focus and foundation of our university. They are the drivers of new knowledge and understanding that fuel applications, innovation, knowledge mobilization, technology transfer, and broad societal impact.
- Our research excellence is underpinned by the principle of equity and the practices of inclusion and decolonisation. By remaining accountable to these principles and practices, we strive to build a culture where diversity flourishes. We work in partnership to challenge the status quo with ethical integrity and social responsibility while upholding the primacy of academic freedom.
- We support Indigenous initiatives, knowledges, communities, and research engagement, and take steps to deliver on the Truth and Reconciliation Commission of Canada's Calls to Action.
- We are committed to safe, responsible research, creative work, social and technological innovation, and commercialization activities, regardless of disciplines and our partners' geographic locations.

2. From: **Royal Roads University's Learning Teaching & Research Model**

Applied and authentic

We see our university as a network of global citizens. We're unique, passionate, determined lifelong learners, up for the hands-on challenges we face. Our flexible, individualized approach lets you apply your learning, and learn from your experiences. Our model challenges you to tackle complex, real-life problems by learning to connect ideas from diverse perspectives.

Caring and community-based

We learn from each other's unique experiences. Our model encourages our whole community to foster this learning with creativity, dialogue and debate. At any age, at any stage of your learning, you'll know you're at a university that values you.

Transformational

We embrace innovation, and we respect tradition. We seek to make the world a better place by solving difficult problems — something we call changemaking. Our model encourages us all to reflect on our own impact, and on how we can do better — for everyone's benefit.

WORKBOOK AREA (Click in box to type):

C. PRIORITY RESEARCH THEMES

Globally communities and countries face imminent climate threats, including rising sea levels, coral reef degradation, wildfires, bushfires, extreme weather events, and resource scarcity. Universities have a critical role in advancing research that supports national and international climate resilience, policy development, and community adaptation strategies.

The research framework should align with the university's mandate and mission and with local, regional, and national climate change priorities. The guide below provides a structured approach to establishing climate change and environmental research priorities.

The following guide is drawn from multiple sources but primarily the Australian NSW government Ministry of Health's publication *Setting Research Priorities: A Guide* and the principles of the James Lind Alliance approach to setting research priorities, namely: equal participation, transparency, inclusivity and drawing on and contributing to the evidence base (Jongsma et al., 2020). Both of these resources focus on setting research priorities in health care research. The principles and basic methodology apply to other settings in which setting research priorities may involve and affect multiple diverse interest holders.

A structured research priority-setting process ensures that:

- Research efforts align with relevant (e.g., national, regional) environmental policies and national development plans.
- Limited resources are directed toward high-impact and urgent issues.
- Collaboration between researchers, government, and local communities is strengthened.
- Decisions are informed by current evidence and practical feasibility.
- Funding proposals and external partnerships are strategically aligned with national needs.

Levels of Research Priorities

Research priorities can be structured at different levels to ensure comprehensive focus and adaptability. The examples below are focused on climate change and environmental research but the principles apply to all research themes. Because of where the original workbook was designed, the examples reflect the potential priorities of a Small Island Developing State (SIDS) and are offered only to prompt thinking and provide concrete examples of how a theme might be shaped at each level. Themes should be relevant to the context, culture, and priorities of the university.

1. Broad Themes

These overarching areas represent major environmental challenges and opportunities for sustainable development in SIDS:

- **Climate Resilience & Adaptation:** Coastal protection, disaster preparedness, sustainable island development
- **Marine & Coastal Conservation:** Coral reef restoration, biodiversity protection, sustainable fisheries
- **Renewable Energy & Sustainability:** Solar energy integration, green island infrastructure, waste-to-energy solutions
- **Water Security & Waste Management:** Groundwater conservation, sustainable desalination, plastic pollution mitigation

2. Intermediate Topics

These bridge broad themes and specific research questions, guiding targeted studies:

- Innovative coastal defense mechanisms for island erosion prevention
- Impacts of coral bleaching on fisheries and tourism-dependent communities
- Sustainable energy transition for remote islands
- Health and socioeconomic effects of climate migration in atoll populations

3. Specific Research Questions

Focusing on concrete, policy-relevant investigations,

these guide faculty and student research projects:

- What are the most effective adaptation strategies for islands at risk of submersion?
- How can local waste management practices be improved to reduce ocean plastic pollution?
- What community-led conservation models best support coral reef resilience?
- What role can seagrass meadows play in mitigating the impacts of climate change on coast lines?

Additional Focus Areas

- **Population Groups:** Coastal communities, youth, policymakers, tourism industry interest-holders
- **Settings:** Urban vs. rural atolls, marine ecosystems, climate-vulnerable islands
- **Research Types:** Applied environmental science, policy-oriented studies, community-led initiatives
- **Emerging Issues:** Sea-level rise impact modeling, climate justice, blue economy strategies

Core Principles for Research Priority Setting

To ensure effectiveness, research priority setting should be systematic, transparent, and inclusive:

- **Evidence-Based:** Decisions should be grounded in the latest climate data, national reports, and scientific findings.
- **Inclusive & Collaborative:** Engage government agencies, NGOs, industry leaders, and local communities.
- **Transparent & Justifiable:** Utilize clear, predefined criteria for selecting priority research areas.
- **Flexible & Responsive:** Ensure adaptability to emerging climate challenges and global trends.

Step-by-Step Process for Setting Research Priorities

1. Background Investigation & Preparation

This stage ensures that research priorities are aligned with national needs and informed by existing knowledge.

- **Review Climate & Environmental Data:** Examine local and global reports, including IPCC findings, national climate policies, and the university's past research contributions.
- **interest-holder Identification & Engagement:** Define key partners, such as government agencies, international research bodies, local communities, and businesses.
- **Assess the University's Strengths & Resources:** Focus on areas where the university can make the most impact, leveraging faculty expertise and institutional capabilities.
- **Define Research Scope & Objectives:** Ensure clarity on whether research priorities will focus on policy development, technological innovation, or social adaptation strategies.

2. Generating & Refining Research Priorities

This stage involves gathering input from multiple sources and applying structured evaluation criteria.

- **interest-holder Consultation:** Host workshops, interviews, and surveys to capture insights from researchers, policymakers, industry leaders, and local communities.
- **Compile & Rank Research Areas:** Use a scoring system based on:
  - Urgency (immediate vs. long-term climate risks)
  - Impact potential (national vs. local-scale solutions)
  - Feasibility (available expertise, funding, and data availability)
  - Alignment with national policies (e..g national adaptation plans, national stated priorities and, where relevant, regional priorities)
- **Validation & Consensus Building:** Present preliminary priorities to faculty committees, research centers, and government representatives for refinement.

3. Finalize & Disseminate Research Priorities

This stage provides guidance on socializing the determined research priorities to ensure they are clearly communicated to researchers (faculty, staff, and students) at the university and to external funders, and that these priorities are integrated into relevant institutional strategies.

- **Develop a Formal Research Strategy:** Publish a university Climate & Environmental Research Roadmap.
- **Align Funding & Grant Proposals:** Ensure that funding applications reflect the universities strategic research priorities.
- **Promote Cross-Disciplinary Collaboration:** Encourage joint projects between faculties (environmental science, engineering, social policy, tourism, business studies).
- **Engage the Public & Policymakers:** Share findings via policy briefs, community outreach, and academic conferences.

4. Periodic Review & Continuous Improvement

This stage details the ongoing institutional process for reviewing and assessing the relevance of research priorities, and updating accordingly.

- **Conduct Reviews Every 3-5 Years:** Adapt to new scientific evidence, policy shifts, and emerging climate risks.
- **Monitor Research Impact:** Track how university-led research influences policies, local adaptation projects, and national sustainability efforts.
- **Encourage Ongoing Stakeholder Involvement:** Maintain dialogue with government agencies, research partners, and communities to refine research focus areas

Figure 2. Suggested four-stage process for setting and reviewing research priorities, adapted from Center for Epidemiology and Evidence, 2023.

Recommended Approach:

To ensure the institution's vision for climate change and environmental research is clear, actionable, and aligned with both internal and external priorities and opportunities, consider the following evidence-informed guidelines.

- Examine the University Strategic Plan and consider the Steps for Strategic Planning Process articulated therein and how these might be adapted and applied in the process of setting research priority themes for example:
  - Conduct a SWOT analysis or self-evaluation review to identify key areas of institutional expertise. This environmental scan should identify areas of strength within the institution and gaps in national or international research.
- Align themes with funding opportunities, societal challenges, and institutional mandates and mission (i.e., Vision and Mission in the University Strategic Plan) and the goal of developing a Climate Change and Environmental Research Framework.
- Ensure flexibility to accommodate emerging research trends and societal needs.
- Use clear metrics and benchmarks to evaluate the institution's impact within these themes over time.

Integrating a Gender-based and Intersectional Analysis

As with other elements of the research framework, applying GBA+ and Principles of Intersectionality should be considered when crafting Priority Research themes.

ACTIONS

- Integrate GBA+ considerations and Principles of Intersectionality into the development of Priority Research themes.
- Review and enhance research theme descriptions to ensure they reflect diverse perspectives and experiences.
- Evaluate how current research priorities address issues of inclusivity and equity across different demographics.
- Determine specific strategies for incorporating these principles into all stages of research planning and implementation, ensuring broader impact and relevance.

EXAMPLES

1. From: **The University of Prince Edward Island Strategic Research Plan** (2023-2028)

The UPEI Senate approved a new strategic research plan titled Strategic Research Plan (2023–2028): Roadmap to Research Excellence. The plan aims to build upon the University's past success and commitment to excellence in research. Its goals and objectives span a broad range of intellectual, scholarly, and creative endeavours at the University. During the consultation process, five signature areas of excellence emerged:

1. Humanity, Justice, and Organizations;
2. Environmental Stewardship;
3. Healthy Communities;
4. Healthy Animals; and
5. Sustainable Development.

Other areas that were identified crossed boundaries of multiple fields: Bioscience; Island Studies; Data Science; and One Health. The plan describes how UPEI supports the full range of research programs across the University, including those that may not fall within one of the signature areas.

2. From: **Royal Roads University Research Themes**

Research at Royal Roads engages three main themes.

Theme 1: Transformational learning

This theme focuses on learning that creates opportunities to generate knowledge and to empower and effect change. Research explores models of knowledge generation and dissemination, ways of knowing and learning, participatory learning, emerging technologies, reflective engagement, and transformative inquiry. The theme considers learning at the level of society and organizations, the scholarship of teaching and learning, the design of education, the future of learning, and the development of skills to enable students to apply their learning in their own situations in real time.

Theme 2: Climate action, wellbeing and the environment (formerly Sustainable communities, livelihoods and the environment)

This theme focuses on the Earth, the biodiversity of life on it, and the wellbeing and interconnectedness

of all life. Research explores ways for individuals, organizations, communities and societies to examine how the Earth connects its assets—natural, physical, human, financial and social. Research also considers the wellbeing of organisms, animals, individuals, communities and societies, and seeks to ensure multidimensional understandings of how systems—social, political, environmental (natural and built), and economic—intersect and influence each other. Research under this theme also focuses on the climate crisis, its impact on all life, and the way forward for that life. It explores regenerative sustainability, degrowth, biodiversity, energy transformation and the future of the world.

Theme 3: Leadership, organizations and an equitable, inclusive society (formerly Thriving organizations)

This theme focuses on connections and interactions among people. This includes diverse accountabilities within systems and sectors, communities, organizations, families, cultures and society in general. Research explores how ideas evolve and how individuals and groups of individuals adapt, innovate and lead with a vision of the future. Research explores human and operational dimensions, seeks to foster individual and organizational capabilities, and considers communication a fundamental enabling process. The theme also explores issues such as resiliency, responsibility, authentic engagement, design, culture, change, equity, diversity and inclusivity, and Indigenous Truth and Reconciliation.

WORKBOOK AREA (Click in box to type):

2

Research Governance and Leadership

- Research Advisory Committee
- Research Office
- Research Leadership

2 RESEARCH GOVERNANCE AND LEADERSHIP

RESEARCH ADVISORY COMMITTEE

Many universities establish research advisory committees to oversee a systematic, inclusive, ethical, and transparent process for setting research policies, practices, and priorities. Establishing a Research Advisory Committee (RAC) at a university can significantly enhance the institution's research endeavors. Such committees, as exemplified by those at Canadian institutions like St. Francis Xavier University and the University of Ottawa, play a pivotal role in shaping research policies and practices. The RAC at St. Francis Xavier University, for instance, advises on university policies related to research, supports the development of initiatives that encourage faculty and student research, and provides recommendations on the allocation of internal research funds.

By establishing an RAC, a university can benefit from diverse perspectives, ensuring that its research strategies are comprehensive and aligned with both academic standards and societal needs. Such committees can also enhance the institution's reputation by promoting research excellence and fostering innovation.

An RAC is usually advisory to the Vice President Research or Vice President Academic. A RAC should provide recommendations and feedback on the university's strategic research plan, priority areas of research for the institution, policies and procedures related to research, and research communication, dissemination and mobilization initiatives.

In some universities the RAC also adjudicates internal research-related awards. Adjudication occurs via ranking of competitive faculty applications by members of the RAC who hold academic appointments. The RAC discusses priority areas and ranking criteria for applications in advance of issuance of the call, and provides feedback to all applicants. Having a committee that reviews and allocates internal grants for research, and having clear priority areas and ranking criteria for internal grants for research ensures transparency for the adjudication and allocation of funds. In the event that a member of the RAC also submits a proposal for funding, they would recuse themselves from some or all of the discussion regarding applications.

A RAC could include: Vice President (Chair); Dean of Research; University Librarian (if Librarians would be eligible for funding); three-five faculty members appointed by a Dean each serving two year terms. Faculty members should be active researchers, and given the focus on climate and environmental research, at least half should have direct research experience around climate action.

ACTIONS

- Consider establishing a Research Advisory Committee (RAC) or expanding the role of the existing Research Committee if there is one, to oversee and enhance the university's research policies, practices, and priorities.
- If a RAC is to be established, explore membership which could include leadership by the Dean of Research, and three to five faculty members serving two-year terms.
- If a RAC is to be established, then explore whether this would apply to all research (likely) or only to Climate and Environmental research (less likely). With that in mind the membership should reflect the focus and/or diversity of of the mandate and include faculty and staff researchers with direct experience in research reflecting the priority areas.
- Develop clear guidelines for RAC responsibilities, including advising on the strategic research plan, prioritizing research areas, and ensuring practices align with academic and societal needs.
- Review and as needed refine existing internal grant review processes to ensure transparency, with RAC members excluding themselves from discussions if they have submitted proposals.

- Regularly review and adjust the committee's structure and processes to align with evolving research goals and community needs.

EXAMPLES

1. St. Francis Xavier University (STFX)

The Research Advisory Committee (RAC) at St. Francis Xavier University plays a pivotal role in shaping research policies and practices. It provides strategic advice to the Associate Vice-President of Research and Graduate Studies, overseeing research progress, distributing funding, and celebrating achievements. The RAC promotes research opportunities for faculty, as well as graduate and undergraduate students. It evaluates proposals for new Research Centres, Institutes, and Research Chair appointments. The committee also guides university services, overhead support, and external policies like the Strategic Research Plan. Furthermore, the RAC influences decisions by academic entities such as the Senate and AP&P, and advises on strategies to enhance funding, research dissemination, and communication both internally and externally, including updates to the Research Website.

2. University of Ottawa ISSP

Similarly, the University of Ottawa's Institute for Science, Society and Policy (ISSP) has an advisory committee comprising interest-holders from academic, public, and private sectors. This committee reviews and challenges the scope of ISSP activities, ensuring they align with broader societal needs.

By establishing an RAC, a university can benefit from diverse perspectives, ensuring that its research strategies are comprehensive and aligned with both academic standards and societal needs. Such committees can also enhance the institution's reputation by promoting research excellence and fostering innovation.

WORKBOOK AREA (Click in box to type):

RESEARCH OFFICE (RO)

The Research office in most universities plays a critical role in shaping the research structures, systems, and the development of capacity across the university. The following are examples of the kinds of roles that a research office might play and the additional actions the research office (or RO) might take to enhance climate and environmental research capacity at the university:

1. **Conduct research on important social matters to make public polices to be based on evidence.**

   ACTION:

   - Consider clarifying whether this is research by the staff within the RO and/or research done by all faculty.

2. **Conduct contract research and earn revenue to manage the place.**

   ACTIONS:

   - Consider clarifying what is meant by "manage the place: Does this mean to fund the operations of the RO (staff salaries and benefits), money for internal grants, funds for the university itself?
   - Consider clarifying and or identifying whether the university conducts any contract research and if so whether this is conducted by the RO or other faculty.

3. **Aid concerned parties to write research proposals.**

   ACTIONS:

   - Consider clarifying whether this includes searching for grant funding
   - Consider clarifying what this aid entails. For example:
     - reviewing drafts
     - developing or co-developing budgets
     - commenting on methodology and methods
     - providing expertise/ideas around connections to climate change, climate resilience, biodiversity
     - Providing expertise/ideas around knowledge translation and mobilization/dissemination
     - Providing expertise/ideas around equity, diversity and inclusion
     - Providing expertise/ideas regarding Indigenous issues
     - Providing expertise on research outcomes and research impact
   - Consider whether this includes any process related to the submission of grant applications. For example, is there a Notice of Intent that alerts the RO and any other relevant department that a faculty/staff member is applying for external grants? Such an NOI can inform department heads/Deans to consider whether there are or may be workload issues, and can signal the RO regarding who will administer the grant (RRU) assigns someone at the initial grant development stage who works with faculty members as a grant facilitator, reviews drafts, helps with budget and ensures all approvals are in place. If the grant is successful, the RO also helps manage the award)
   - Consider setting up a tracking system that accounts for various steps (intent to apply, application submission, whether the grant is awarded, etc)
   - Consider setting up a final report at the end of externally funded grants. Those reports could include: a summary of the research results, research outputs (articles, presentations, etc.), number of students/highly qualified personnel involved in the research, number of community groups or partner organizations involved in the research, any specific details regarding the priority research theme that the grants focused on [e.g., climate/climate action], next steps for the research including whether other funds are being sought, whether partnerships will continue, whether there are specific recommendations for the university, for government, for organizations as a result of the research, or how the research contributes to teaching at the university.

4. **Internal research grants**

   ACTIONS:

   - Detail how these are applied for, adjudicated, reported on.
   - Internal grants are a great resource in terms of telling the story of the impact, importance and value of research. All grant holders should be required to provide a final report at the end of the grant - those reports could include: a summary of the research results, number of

students/highly qualified personnel involved in the research, number of community groups or partner organizations involved in the research, any specific details regarding the priority research theme that the grants focused on [e.g., climate/climate action], next steps for the research including whether other funds are being sought, whether partnerships will continue, whether there are specific recommendations for the university, for government, for organizations as a result of the research, how the research contributes to teaching at the university.

5. **Manage matters relating to ethics of conducting major research.**

   ACTION:

   - Refer to ethics section of the framework.

6. **Promote and publish research.**

   ACTIONS:

   - Refer to knowledge dissemination section of the framework.
   - Review RO's annual list of research outputs on an annual basis. This can include: books authored/ edited, book chapters, journal articles, conference proceedings, conference presentations, other peaking engagements, non-refereed publications, popular press, blogs, podcasts, etc.
   - There may also be a role for the RO in determining trends nationally and internationally.

7. **To aid postgraduate research students that centres to which they belong are unable to provide.**

   ACTION:

   - Consider clarifying whether this help includes finding funding, support for them to lead research initiatives and/or support for knowledge dissemination/translation.

Other considerations to include in this section

- Is there a role or connection with regard to student research as well? And if so, in what ways? Support for standards in terms of skills development? methodologies/methods? Support for knowledge mobilization/exchange? Are students used as RAs by faculty?
- Whether the RO has a role to play:
  - Liaising with funding agencies.
  - Post award support [assisting with project management, reviewing all project expenditures, and coordinating all financial and narrative reporting].
  - Communicating research outcomes and impacts and determining trends nationally and internationally regarding both research and research administration.

WORKBOOK AREA (Click in box to type):

RESEARCH LEADERSHIP

Research Leadership: This includes the roles of academic leaders (such as Deans, Research Directors/Deans, or Vice-Chancellors) in setting research priorities, guiding research activities, and maintaining institutional accountability.

ACTIONS

- Explore adding the role descriptions for those working in the RO.
- Explore the role of the key leaders in the university to see what they include in terms of research.
  - Do they also include specific tasks/competencies around climate action and sustainability?

EXAMPLES

The following position descriptions are drawn from **Royal Roads University's Research Office** and are offered as examples only.

RESEARCH DEVELOPMENT COORDINATOR

Position Summary - The Research Development Coordinator (RDC) provides pre- and post-award support by: facilitating, guiding and supporting the development of competitive, high quality research proposals at both the divisional and institutional level. This involves networking and liaison with external research funders including federal and provincial granting agencies, research foundations, and private organizations, as well as with current and potential research partners. Working in a multi-tasking, team environment, the RDC is responsible for:

- research prospecting; funder cultivation, engagement and solicitation;
- pre- and post- award support;
- financial management;
- liaison with researchers and department staff in identification of new funding opportunities;
- proposal and report editing; project development and grant stewardship;
- liaison with RRU Finance division with respect to research grants administration;
- maintaining the grant reporting calendar for Office of Research;
- working with, and generating reports from, the Research Project Management database;
- and the production of research annual reports as well as other communications activities and duties as required.

This role requires strong relationship cultivation skills, a high level of personal organization and ability to prioritize, and a commitment to service and leadership.

At the pre-award stage, the RDC will work with the faculty member to develop the proposal advising on areas as appropriate (e.g., methodology, methods, timelines, knowledge mobilization, budget, research data management plans, etc.). They will liaise with the funder and work with the faculty member and all partners to ensure all aspects of the proposal are complete (partner letters of support, partner contributions, etc.). Relationship development and maintenance is a key aspect of this position.

At the post award stage, the RDC will be responsible for reviewing the contract provided by the funder and advising the faculty member with regard to the terms (e.g., intellectual property, commercialization, terms and conditions, etc.). The RDC will be responsible for coordinating timely report stewardship interacting with internal interest-holders and the funder. This will entail reviewing and coding expenses and invoices to ensure compliance with funder guidelines and approved budgets; developing and processing contracts; working with faculty and HR to hire research assistants, researchers and post doctoral scholars, following up with project principal investigators and Finance to inform them of reporting guidelines and timelines, providing assistance, where necessary, in obtaining and presenting the necessary data, developing financial reports and ensuring accuracy and quality of those reports. The RDC will be responsible for negotiating, when necessary, no-cost extensions and coordinating clarification of questions surrounding grant stewardship with the funder.

The RDC will also be involved in supporting appropriate data management and reporting of research activities including research outputs, outcomes and impacts. This will include special projects to showcase faculty and student research (e.g., Research in Action; Grants and Publication booklet; Roads to Research; Author showcase

event; etc.). The RDC will remain informed about current research through thorough analysis of funding agencies' web sites and other information sources including national and international colleague networks. In addition, the position involves participating in certain project-related events, travel to professional conferences and workshops, travel to meetings with funders and other interest-holders and potential partners, and other research functions as assigned.

Primary Position Outcomes

- **Proposal Development**

  Ensures that each research proposal meets a high research standard, demonstrating academic soundness and integrity as well as congruence with RRU's overall research agenda. Works closely with core and associate faculty in the development of research proposals, ensuring solid conceptual development, appropriate budget requests, strategic positioning for funding opportunities as well as strategic alignment with RRU's research framework, excellence in writing, including appropriate language and style, and proper presentation, meeting specific funder guidelines.

- **Funding Identification and Funder Liaison**

  Researches and identifies appropriate new and existing funding opportunities for research initiatives among federal and provincial government sources, foundations, and private sector sources that meet RRU's research agenda. Ensures that a broad range of opportunities is presented to faculty for consideration. Encourages new faculty research and collaboration between campus colleagues within their own division and across divisions, as well as outside partners. Upon decision to target a specific funding opportunity, takes the lead on establishing a relationship with the funder to develop awareness of RRU research capacity and expertise and to ensure the necessary intelligence – strategic and factual – has been obtained with regard to submitting for a grant or contract. Once a proposal has been submitted, follows-up where necessary and ensures feedback is forthcoming once a decision has been made. With the Director, Research Services, negotiates disbursal or contract terms where applicable.

- **Funder Reporting**

  Ensures that RRU establishes and maintains an excellent reputation as an institution that conducts superior and accountable applied research. To that end, ensures that funder reporting requirements are met on time. Negotiates no-cost extensions with the funder, when necessary. Notifies the lead researcher of reporting guidelines and deadlines, provides assistance where necessary in obtaining the necessary data, and reviews and edits the final report. Provides all financial reports to Financial Services for their review.

- **Research Project Support**

  Provides project support at multiple levels to ensure high quality research. Provides assistance in such areas as: contract review, project implementation, financial support and review (including requesting project cost centres, tracking and monitoring expenses), assisting with hiring RAs, reviewing and processing contract requests, coordination of the research agenda, attendance at research events, record keeping, and reporting. In the case of projects based directly in the Office of Research, takes the lead on the development and coordination of these, ensuring that cross-divisional and university-wide research goals are met.

- **Research Communication**

  Works closely with the Director, Research Services to develop and implement the research communications strategy, which serves to articulate RRU's research agenda and research initiatives to both internal and external audiences. Organizes research related events (forum, Roads to Research, visiting professors, conferences, workshops, author recognition, etc.). Undertakes a variety of projects and tasks related to the communication of the importance of research at RRU which showcase faculty and student research (faculty research panels; student research panels; faculty research videos; grants and publication booklet; Research in Action; etc.)

- **Other**

  Works closely with the Director, Research Services to assess and further develop systems that ensure a high

standard of efficient and effective service delivery and processes (e.g. in the areas of proposal development, research project tracking, report preparation and project communication/dissemination). Attends project-related events associated with existing and potential grants, travels to professional conferences and workshops, attends meetings with funders and other interest-holders and potential partners to advance, promote and strengthen the RRU research agenda.

The RDC manages internal faculty grant programs including reviewing applications for completeness, working with the various committees re adjudication, liaising with Financial services, post award management, and reporting. The RDC is expected to develop and maintain excellent relationships with faculty, meeting regularly to discuss and help develop the faculty members' research agenda. The RDC supervises casual and temporary staff as directed and will be involved with other projects as appropriate.

Required Qualifications/Competencies -

- Master's degree (preference for a social science degree) and at least 5 years of experience (or equivalent combination of education & experience) in the areas of grants management and research administration and development, including significant experience with preparation of research proposals, budgets, financial management and reporting as well prior experience working in the strategic management of funder relations.
- Exceptional communication and interpersonal skills
- Strong diplomatic skills and the ability to exercise sound judgment
- Ability to analyze the current environment for appropriate and fitting projects and partners for RRU and maintain an in-depth knowledge of domestic and international research development by liaising with interest-holders and constituencies using appropriate discernment and discretion (critical)
- Ability to liaise effectively with a wide variety of interest-holders, both internally and externally, and maintain a professional approach to working relationships and conflict resolution
- Solid writing skills
- Developed project management skills
- Advanced computer skills (including MS Office Suite)
- Positive attitude
- Comfortable working in a team-based, collaborative environment
- Ability to work independently
- Ability to work a flexible work schedule

INTERNAL RESEARCH GRANTS COORDINATOR

Position Summary - Reporting to the Director Research & Innovation, the Internal Research Grants Coordinator (IRGC) supports the VP Research & International (VP R&I) in the management and administration of Royal Roads internal research grant programs. They provide expert advice to the adjudication committees and the VP R&I regarding guidelines, review submitted proposals for completeness and compliance, and coordinate the review by the adjudication committees. The IRGC is responsible for all post award financial management and works with the Research Development Coordinator(s) and Human Resources to organize and facilitate the hiring, renewal and tracking of Research Assistants.

The IRGC works collaboratively across all RRU departments to ensure university and funder financial compliance in terms of budget development, ongoing financial monitoring, quarterly variance reporting, reconciliation, fiscal year end reconciliations and reporting as related to internal research grants. The IRGC deals with a variety of internal interest-holders including the VP Research & International, senior university administrators, faculty members, Advancement and Communications personnel, Human Resources personnel, Financial Services personnel, Business Planning personnel and other members of the Royal Roads community. The IRGC deals with a variety of external interest-holders who provide funds for internal research grants including the Social Sciences and Humanities Research Council of Canada (SSHRC); and the BC Government Ministry of Health.

The IRGC manages eight separate and distinct internal grant competitions totalling approximately $300,000 per year. Within the varied research grant competitions, the IRGC deals with approximately 150+ individual projects

each year. Along with the management of each fund, the IRGC also provides reporting information on all internal research grants for senior management, the Program and Research Council, and others as required. The IRGC provides back up support for the Research and Scholarly Leave process and administration (RASL). As a member of the Research and Innovation team the IRGC assists with post award support for external grants including all RA related tasks, processing travel requests, reviewing expense claims, initiating and monitoring contracts for services, and processing invoices; and provides back up support for the Research Development Coordinators where and when appropriate.

Primary Position Outcomes

- Develops funding calls for all internal research grant opportunities and sends out to all eligible potential applicants.
- Provides guidance to the VP Research & International and adjudication committees on internal grant guidelines, providing background information and potential solutions for anomalies.
- Provides guidance to RRU faculty during the development and submission of internal research grant proposals, including advising on the development of budgets.
- Provides administrative assistance and support to all internal grant adjudication committees, including meeting coordination, answering award related questions and note taking.
- Manages all post award change requests; has authority to approve requests that fall within grant guidelines.
- Responsible for providing post adjudication follow up with feedback to applicants as needed, drafting award letters and working with financial services and business planning to set up internal award accounts.
- Provides financial guidance and assistance to faculty including, monitoring expenses, setting up contracts, hiring RAs, processing expense claims and invoices, processing travel requests, record keeping, and reporting.
- Under direction from the Director of Research and Innovation the IRGC liaises and coordinates with outside funding agencies that provide Royal Roads University with monies for internal awards and ensures that funder reporting requirements and all aspects of compliance are met.
- This role requires strong relationship cultivation skills, a high level of personal organization, ability to prioritize, and a commitment to service and leadership. Relationship development and maintenance are key aspects of this position.

Required Qualifications/Competencies

- Undergraduate degree or professional diploma in a related area (administration, accounting, etc.) and at least three years of related experience preferably in the areas of grants management and research administration and development, including significant experience with internal awards management. An equivalent combination of education and experience will be considered.
- Ability to develop and maintain administration systems necessary to manage, monitor and report on timelines, budgets, and resources for multiple research projects.
- Demonstrated budget development and financial coordination experience.
- Demonstrated ability to process, interpret and administer written policy and guidelines to ensure compliance and adherence to necessary RRU and external funder requirements.
- Ability to multitask, adapt to shifting priorities, work under pressure and meet deadlines.
- Strong diplomatic skills and the ability to exercise sound judgment.
- Ability to liaise effectively with a wide variety of interest-holders, both internally and externally, and maintain a professional approach to working relationships and conflict resolution.
- Strong organizational abilities, including priority setting, time management and project management skills.
- Strong research skills and demonstrated analytical and problem-solving abilities.
- Knowledge of research funding environment and university policies and procedures related to same would be considered an asset.
- Solid office management skills and experience, including developing, implementing and monitoring policy, procedures and systems.
- Demonstrated strong orientation to detail and strong writing skills.

- Advanced computer skills (including MS Office Suite).
- Positive attitude.
- Comfortable working in a team-based, collaborative environment.
- Ability to work independently.
- Ability to work a flexible work schedule.

WORKBOOK AREA (Click in box to type):

3

Research Ethics and Academic Integrity

- Ethical Approval Policies and Processes
- Academic Integrity Policies and Processes
- Compliance

3 RESEARCH ETHICS AND ACADEMIC INTEGRITY

ETHICAL APPROVAL POLICIES AND PROCESSES

Ethical Approval Policies and Processes: An academic research framework ensures that all research projects, especially those involving human or animal subjects, adhere to ethical guidelines. The university's ethics framework and policies should be periodically reviewed and updatedto address specific issues related to climate change. This might include considering the carbon footprint of research activities, and including explicit mention of potential ethical issues that may arise specific to research on climate change and the environment. Include in the framework a hyperlinked reference to or the inclusion of the institutions Research Ethics Policy.

Examples of research policy implications of climate change and environmental research:

- University of Bath's **Principles related to the Ethical implications of the impact of climate change research**.
- AGU: Advancing Earth and Space Sciences **Ethical Framework Principles for Climate Intervention Research** which "provides guidance for ensuring: 1. Responsible research, 2. Climate justice, 3. Inclusive public participation, 4. Transparency, and 5. Informed governance."

COMPLIANCE

Compliance: Along with requirements to ensure ethical conduct for research involving human subjects, there are often other broader areas of compliance. These include research on animals, dangerous goods, controlled goods, specimens, etc. There are also likely to be financial compliance requirements for financial monitoring and reporting.

ACTIONS

- Consider what compliance requirements the university may be responsible for.
- Consider whether there are other requirements with larger external funding agencies/ organizations? For example, in Canada, all universities have to comply with the Agreement on the Administration of Agency Grants and Awards by Research Institutions. This agreement outlines specific policies and procedures that the universities must have in place.
- Consider, from a risk perspective, what information the university might require from potential partners [e.g., if a partner will receive money what controls are in place regarding the release and monitoring of funds, does the university require the partner to provide copies of audited financial statements?]. How is risk with partners mitigated?

ACADEMIC INTEGRITY POLICIES AND PROCESSES

Academic Integrity Policies and Processes: If the university has existing policies related to Academic Integrity, review those policies to ensure that all research processes and in particular the ethical approval process align with these existing policies.

WORKBOOK AREA (Click in box to type):

4

Collaboration and Partnerships

- Internal Collaboration
- External & International Collaborations
- Community-based Research

4 COLLABORATION AND PARTNERSHIPS

While the Strategic Research Vision and Goals provide high-level and often long-term strategic priorities, fostering collaboration and partnerships enhances innovation and enables researchers to tackle complex problems such as climate change more holistically. Collaboration and partnerships are foundational to advancing effective climate and environmental research in order to address the complexity of the root causes, arising issues, and interconnected and intersecting systems involved.

While high-level strategic priorities set the direction, a robust research framework also provides some guidance and principles to support collaboration and partnership to operationalize these priorities. These principles should be accompanied by actionable steps to foster both internal and external collaborations, ensuring that research efforts are cohesive, inclusive, and impactful.

INTERNAL COLLABORATION

The framework promotes collaboration across departments, disciplines, and external partners to foster innovation and mutual learning in order to explore complex challenges. Internal collaboration is essential for addressing the multifaceted nature of climate change and environmental challenges which cut across disciplines such as engineering, health, social sciences, economics and public policy. This can include exploring collaborative partnerships with other regional, national, or internationalinstitutes and universities, industry and non-governmental organizations, and government agencies. An example of such collaboration is the Imperial College of London's **Grantham Institute – Climate Change and the Environment**

ACTIONS

- Support interdisciplinary collaboration by exploring the idea of dedicated research clusters or centers that focus on identified research priority themes or thematic areas.
- Incentivize collaboration through internal funding mechanisms, external funding, and recognition programs that require or encourage such collaboration.
- Create opportunities to facilitate the exchange of ideas and foster relationships and partnerships by designing or expanding communication channels between RO and university researchers. This can include internal research publications, and exploring opportunities for regular interdepartmental workshops, seminars, and collaborative research planning meetings.

EXTERNAL & INTERNATIONAL COLLABORATIONS

External and international partnerships are essential for scaling up climate change and environmental research and addressing transboundary climate and environmental issues. They are also a core element of extending research capacity, funding opportunities, and increasing the national and global impact of a university's research program.

ACTIONS

- Encourage the participation of researchers and departments in relevant climate and environmental organizations through mechanisms such as subsidized membership fees, funding for conference participation, and support for research collaborations
- Identify and explore funding initiatives that encourage/require collaborative international partnerships especially as this pertains to large scale, regional projects on issues such as adaptation, renewable energy and the energy transition, ocean and coral health, food security.
- Formalize partnerships through memoranda of understand agreements (MOUs) with government and non-governmental agencies, industrial partners, and international institutions that can provide a framework and support for long-term collaboration.

COMMUNITY-BASED RESEARCH

Encourages researchers to work with local communities to address societal challenges and ensure that research outcomes are relevant to local needs, contexts, and have uptake by affected communities. Working with communities can ensure that research is inclusive, equitable and responsive to local needs and priorities in the context of the disproportionate effects of climate impacts/environmental issues on vulnerable communities.

ACTIONS

- Support the establishment of partnerships between researchers (or the RO) and community-based organizations can facilitate research that is relevant to and impactful for local communities and populations
- Provide researchers (faculty, staff, and students) with the skills to engage communities effectively, ensuring that research processes are respectful, inclusive, and ethical.
- Establish mechanisms for disseminating research outcomes (internally and externally) to communities, to ensure transparency and knowledge mobilization. Consider public workshops, seminars, multi-lingual reports, and other strategies to enhance trust and accountability.

EXAMPLES

From **Simon Fraser University's 2023-2028 Strategic Research Plan**

Internal Collaboration

- **Indigenous Approaches, and Knowledge(s) (respect and reciprocity; engagement and openness; equity and belonging; and excellence and responsibility):** To understand and then address the complexity and urgency of many of the problems our society faces, we recognize that we need a broad and inclusive understanding of the world that incorporates many knowledge systems and world views. Our commitment to reconciliation with Indigenous peoples includes reconciling different approaches to understanding the world. Frameworks such as two-eyed seeing, a concept coined by Mi'kma Elder Albert Marshal in 2004 which emphasized integrating the strengths of both Western and Indigenous knowledge systems for comprehensive understanding (Bartlett, Marshall, & Marshall, 2012).
- **Interdisciplinarity (engagement and openness; innovation and adaptability; excellence and responsibility; and respect and reciprocity):** Many of the most interesting academic questions are rooted in very complex problems that cannot be solved by a single researcher. Team-based work—often requiring team members from a variety of disciplines and trained in multiple methodologies—is the path to answering these questions. In addition to offering strong support for specialized disciplinary work, at SFU we support scholars working across disciplines by supporting partnerships both within the university and with other universities.

External Collaboration

- **Engagement with Partners or Communities (excellence and responsibility; respect and reciprocity; resilience and sustainability; engagement and openness; and innovation and adaptability):** In many fields of inquiry, engaging with communities outside academia leads to better scholarship. Those communities may include individuals, municipalities, First Nations, industry, NGOs or others. At SFU we support partnership within and outside academia to drive better scholarship and greater impact. This includes local and regional partnerships, national partnerships and international partnerships.

The University of Toronto Mississauga Research Framework

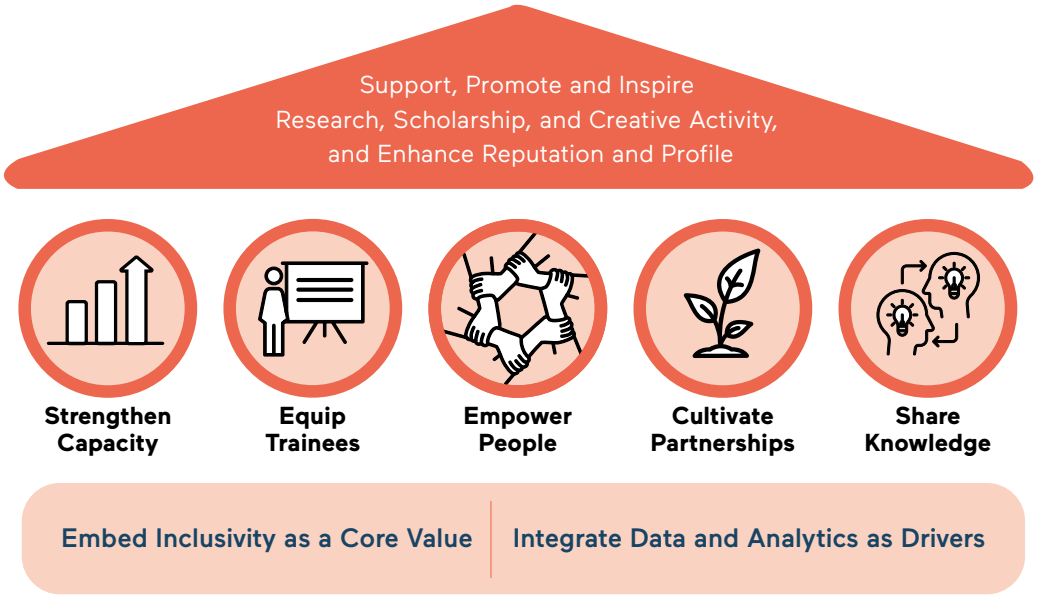
"The University of Toronto Mississauga's Research Strategic Framework is built on five pillars:

1. Strengthen Capacity
2. Equip Trainees
3. Empower People
4. Cultivate Partnerships
5. Share Knowledge

These pillars are non-hierarchical, working in synergy to advance the larger research goals of the University of Toronto Mississauga. They guide our thinking, our actions, and our interactions, and reflect UTM's principles as a dynamic, inclusive, and innovative institution of higher learning.

Each pillar is made up of the Goals we will set out to achieve. The correlating Actions outline the approaches we are taking to meet each goal. A set of Outcomes indicates the ways we will measure and track our progress.

Figure 3. Adapted from The University of Toronto Mississauga Research Framework.



From **SFU Strategic Research Plan 2023-2028**

Advancing Community-Centred Climate Innovation (C3I) (Sustainable Development Goals 3, 6, 7, 8, 9, 10, 11, 13)

Climate change represents one of the greatest challenges of our age. As a research topic, it crosses disciplines, touching deep societal, health and justice issues as well as climate science, mathematical modelling, biodiversity, and profound technological and economic change. While climate change is a global issue, its effects and the resources available to adapt and to mitigate future warming differ from community to community. Some communities will be pressed to adapt to drought and fire, while others will be combatting floods and landslides. Some will have access to considerable local renewable energy sources, and some will not. Different communities may then embrace different paths to resilience. Helping communities become resilient to the effects of the changing climate by integrating low-carbon approaches into their planning is a daunting multidisciplinary challenge. With research strengths that span all of the relevant disciplines, SFU is well-positioned to take on this challenge. This priority area engages our researchers with all levels of government, industry and community members.

EXAMPLES

Simon Fraser University implementation plan for SFU's 2023-2028 Strategic Research Plan

SUPPORTING STRATEGIC RESEARCH PLAN PRIORITY AREAS

Challenge: Solving society's great research challenges requires collaboration across departmental, institutional, sectoral and international boundaries. The strategic priority areas described in the SRP are each multi-disciplinary in nature. Researchers are sometimes faced with barriers to collaboration across departmental, faculty and institutional boundaries. Researchers also sometimes do not feel connected to the priority areas described in a Strategic Research Plan.

Action: Working with deans, chairs and directors, faculty members, postdoctoral fellows and graduate students, we will identify a program of support for internal community-building and external partnership tailored for each strategic priority area. We will also identify institutional barriers to collaboration and feelings of inclusion in these internal communities. In year one, we will implement a set of supports around one of the priority areas. In future years, external (including international) partnership strategies for each priority area will be developed.

SUPPORTING RESEARCH GRADUATE STUDENTS

Challenge: Graduate students are key drivers of research activity in an institution. Vancouver is an attractive destination, but the high cost of living presents a challenge to our graduate students.

Action: Working closely with the provost, the dean of graduate and postdoctoral studies, SFU Advancement and with graduate students (through the Graduate Student Society), we will study ways to shift our limited resources to better support research graduate students. This includes study of tuition waivers, scholarships and bursaries. We will also work with SFU Advancement, provincial and federal funding agencies to grow resources available for graduate student support both for existing graduate students and to grow our research graduate student body. Within a year, we will set a university-wide minimum funding level for PhD students.

SUPPORTING POSTDOCTORAL FELLOWS

Challenge: SFU hosts a relatively small number of postdoctoral (postdoc) fellows for our number of faculty members. Existing postdocs sometimes feel like they "fall between the cracks" at SFU. They are neither faculty members nor students, and they have identified that many systems at SFU do not cope well with their in-between status.

Action: Working with the provost, the dean of graduate and postdoctoral studies, SFU Human Resources, and the Postdoctoral Association we will identify the concerns of postdocs and—within a year—provide a central managed point for support of postdocs. We will work with SFU Advancement to create an institutional postdoc program.

WORKBOOK AREA (Click in box to type):

5

Research Capacity Building

- Research Training and Development
- Support for Early-Career Researchers

5 RESEARCH CAPACITY BUILDING

RESEARCH TRAINING AND DEVELOPMENT

Universities can benefit from providing ongoing training for faculty, students, and researchers in various skills. These can include such things as grant writing, research methodologies, data analysis and data management strategies, and academic and open publishing. Upskilling might also include exploring the use of common methodologies to support collaboration, or other goals such as how to support and amplify Indigenous research. In addition to skills development, it can be useful to provide researchers (students, faculty, and staff) with access to reliable qualitative and quantitative data analysis software, and data management tools.

ACTIONS

- Conduct a gap analysis to identify gaps in research capacity with faculty and staff researchers which could include training, financial administration of grants, administration of research projects, network building, or issues with organizational structures and systems to guide investments in capacity building.
- Conduct a gap analysis with students to identify student expectations, needs, and challenges regarding research to guide investments in capacity building
- Develop and deliver workshops for grant writing to support the capacity of researchers to access funding. These could be general in terms of what makes a good proposal, or specific to a current or repeated research call/funding opportunity.
- Develop and deliver workshops that support researchers writing research proposals, research results, journal (and other) articles, and conference presentations.
- Design and deliver skills building workshops for graduate students on developing thesis proposals including designing effective research questions, organizing and writing thesis manuscripts, exploring different methodologies and methods, data management strategies
- Provide guidelines and training for digital research methods and the use of data analysis software (e.g., NVivo, SPSS, Survey tools, AtlasTi)

SUPPORT FOR EARLY-CAREER RESEARCHERS (ECRs)

Support for Early-Career Researchers (ECRs): Frameworks often include programs aimed at mentoring and supporting early-career researchers and postdoctoral scholars to enhance their research output and career development. Such frameworks often incorporate mentorship programs and initiatives aimed at strengthening research outputs and fostering professional development. To do this requires programs (e.g., training, workshops, events) that offer support tailored to their unique needs, including opportunities for skill development, networking, and career advancement.

Targeted support is necessary to help balance the challenges ECRs can face balancing the demands of teaching, administration, and research; resource constraints; unclear career trajectories; the pressure to publish; accessing and/or modifying research space; and purchasing and installing research equipment at the same time they are teaching new (to them) courses and settling into a new community.

Large and well-funded Canadian universities, including the University of British Columbia (UBC) and McGill University, have established successful mentoring programs, career development workshops, and interdisciplinary research opportunities to address these challenges. UBC's "Postdoctoral Fellows Office" provides not only administrative support but also professional development seminars and networking opportunities for postdocs, while McGill offers a comprehensive "Career Planning and Placement" service that helps ECRs navigate the academic job market and transition into tenure-track positions. While these types of supports may or may not be realistic in all university contexts, other support options such as grant-writing workshops, mentorship, and career planning may better prepare the next generation of researchers to thrive.

ACTIONS

1. Most of the actions articulated above would apply to ECRs but there may be need for additional mentorship from more experienced researchers and faculty members.
2. Consider developing a values and principles guide that can be used by researchers (and instructors) as a tool to shape research and teaching activities in ways that align with the university's primary functions and values.

EXAMPLES

1. From University of British Columbia: Public Scholars Initiative.
2. From Royal Roads University: www.royalroads.ca/news/new-emerging-indigenous-scholars-circle-offers-mentorship-and-support

WORKBOOK AREA (Click in box to type):

6

Research Communication, Outputs and Knowledge Exchange

A. Publication and Dissemination Strategies

B. Outputs

C. Knowledge Mobilization and Translation

6 RESEARCH COMMUNICATION, OUTPUTS AND KNOWLEDGE EXCHANGE

A well-defined institutional research framework establishes clear expectations for how research findings should be shared, ensuring that knowledge contributes to both academic discourse and societal impact. This includes both how and where research is disseminated, potential policies on open access and knowledge equity, the quality of outputs, and potentially preferences for specific platforms (e.g., peer reviewed, conference presentations, open access).

A. PUBLICATION AND DISSEMINATION STRATEGIES

Publication and Dissemination Strategies: Effective dissemination strategies enhance the visibility, credibility, and accessibility of research while promoting transparency and engagement with diverse audiences.

- **Peer-review Publications and Academic Outputs -** In the context of interdisciplinary climate change research it may be particularly important to prioritize journals and outputs that reach diverse audience such that the research findings can be considered across disciplines like environmental science, policy, economics, and health.
- **Open Access and Knowledge Equity -** Open access is a growing trend in institutional research frameworks because it enhances the accessibility of findings to interest holders beyond academia. By publishing in open-access journals or depositing articles in institutional repositories, researchers ensure that their work is freely available to policymakers, practitioners, other researchers, and the public. This is particularly critical in areas like climate change, where timely access to knowledge can inform urgent policy decisions and drive global action. This section could include information relevant to open access including any policies and/or funding available to support publishing in open access journals.
- **Conferences, Networking, Knowledge Sharing -** this could include reference to/information on any university sponsored conferences, and any capacity building initiatives or resources such as training in science communication, data visualization, writing for non specialist audiences, and any funding mechanisms for conference participation.

ACTIONS

Consider the following in crafting this section:

- Who are the target audiences for research outputs (e.g., academic peers, policymakers, practitioners, general public)?
- How is societal impact of the research maximized (particularly important given the urgency of climate change and environmental research)?
- What principles (e.g., transparency, accessibility, engagement) should be considered to help facilitate the flow of knowledge across disciplinary, geographic, and sectoral boundaries? This is particularly important when considering interdisciplinary and cross sector research addressing complex challenges like climate change)?
- How is societal impact maximized?

B. OUTPUTS

Increasingly there are calls to re-evaluate research outputs in our hiring and promotion as well as in the grant application and review process. DORA, the San Francisco Declaration on Research Assessment offers an opportunity to consider alternatives to traditional journal impact factors. For institutions, there are suggestions to: 1) Be explicit about the criteria used to reach hiring, tenure, and promotion decisions, clearly highlighting, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published; and 2) For the purposes of research assessment, consider the value

and impact of all research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.

The Declaration on Research Assessment (DORA) recognizes the need to improve the ways in which the outputs of scholarly research are evaluated. The declaration was developed in 2012 during the Annual Meeting of the American Society for Cell Biology in San Francisco. It has become a worldwide initiative covering all scholarly disciplines and all key interest-holders including funders, publishers, professional societies, institutions, and researchers.

ACTIONS

- Consider not using journal-based metrics, such as Journal Impact Factors, as a surrogate measure of the quality of individual research articles, to assess an individual scientist's contributions, or in hiring, promotion, or funding decisions. Instead consider the DORA recommendations and whether the university wants to sign the declaration if they have not already done so.
- Refer to any policies related to criteria used to reach hiring, tenure, and promotion decisions. These should be explicit and clearly highlight, especially for early-stage investigators, that the scientific content of a paper is much more important than publication metrics or the identity of the journal in which it was published.
- For the purposes of research assessment, consider the value and impact of all research outputs (including datasets and software) in addition to research publications, and consider a broad range of impact measures including qualitative indicators of research impact, such as influence on policy and practice.
- Consider adopting DORA as a signatory if that has not already been explored. Adopting DORA does not mean a university abandons traditional metrics, rather it is a way to broaden our understanding of, and valuing of, other ways of considering research impact. If DORA is adopted, it would be recommended that the university then explore the development of a set of consistent, transparent criteria for research assessment for use at the university to contribute to decisions regarding promotion and continuing status and hiring.
- Explore the various signatories to the Declaration - in particular those from Sri Lanka and India if there are close partnerships for research in those countries.
- Consider developing a **Performance Metrics** (if one is not already in place): Institutions may use indicators such as research outputs (e.g publications, citations, community presentations, conference presentations), external funding secured, and the commercial impact of research to evaluate the success and impact of their research efforts.
  - **Performance metrics** could include: number of proposals worked on; number of proposals submitted; success rates; research intensity (value of external funding / number of faculty conducting funded research/any research); number of community partnerships (formal and informal); number of organizational partnerships; number of government department partnerships; value of external funding for research (total value of the projects including in kind contribution, amount of cash/deferred revenue) number of internal grants awarded; value of internal grants; number of students involved in research projects; policies changed; white papers; government advisories.
  - **Research output metrics:** books (authored, co-authored, edited, co-edited) and book chapters; contributions to refereed publications; presentations, proceedings and panels; non-refereed publications, professional and other activities [e.g., reviewer for journals/conferences/ external grants, Advisory Boards, book reviews, article reviews, editorial boards, professional memberships], popular press and media coverage, videos and films, video screenings, honours and awards.

    In addition - stories that provide the results of research, the value and importance of the research are recommended - a biannual booklet and/or videos. This could also include follow-up stories that describe the longer term impacts (3-5 years post research) of projects which may be particularly important for climate focused research. For tips on how to promote research see: Research Impact Canada.

EXAMPLES

1. From Royal Roads University www.royalroads.ca/research/research-rru/research-action-faculty-student-research
2. From University of Saskatchewan vpresearch.usask.ca/research-support/profile-and-impact/research-communications.php
    - **Student research** should/could also be showcased - have students provide a summary of their research upon graduation; consider something like having each student do a 3 minute summary of their results, next steps for future research, and how the research
    - **Commercialization:** consider how commercialization of research outputs is handled. This could include guidance and/or policies related to such commercialization.

C. KNOWLEDGE TRANSLATION

Knowledge Translation: Frameworks may emphasize how research can be translated into practical applications that inform policy, industry practices, and societal decision-making. Effective knowledge translation ensures that research moves beyond academic settings to drive real-world impact, bridging the gap between discovery and implementation. In fields such as climate change and environmental research, where research findings can directly influence sustainability and climate policies and corporate strategies, structured approaches to knowledge translation are particularly crucial.

Institutional research frameworks can support this process by promoting engagement with policymakers, businesses, and civil society to translate research into actionable strategies including:

- developing policy briefs,
- engaging in advisory roles,
- collaborating with industry partners,
- creating publicly accessible reports.

ACTION

- Embed knowledge translation within the research framework and consider how to support these efforts by providing resources for science communication, facilitating partnerships with decision-makers, and encouraging interdisciplinary collaboration to enhance the applicability of research.

EXAMPLES

From: **SFU 2023-2028 Strategic Research Plan**

- **Knowledge Mobilization (innovation and adaptability; excellence and responsibility):** Research is not complete until the created knowledge is shared. That sharing happens via many mechanisms including traditional academic publication, policy creation, newspaper op-eds, white papers, social media, performances, creative artifacts, patents/licensing, new product development, creation of a company and other forms. At SFU we embrace open science, data and publishing. We also foster a culture of innovation both in the way that we perform scholarly work and in the way that we support it.
- **Transforming Industry and Economies through Technology, Management and Policy** (SDGs 9, 12)

  Technology impacts every aspect of our lives—at multiple scales—from nanotechnology to satellite communication to technology for work and home life. These technologies are applied to all areas of human endeavor, from building a sustainable world, to improving human health, to transforming the way we teach and learn. SFU researchers are involved in new technology creation at all levels: creating the new materials that enable those technologies; engaging in design research and developing creative technologies that change how we interact with technology and each other; developing new types of hardware to enable future platforms like quantum computers; writing the algorithms required to process data and model the world around us; and integrating and adapting existing technologies to a changing world.

  The adoption and use of emerging technologies are guided by management and policy research as one means to create economic and societal value. These research domains investigate the economic, environmental, health, political and societal tradeoffs between incumbent industries and technologies and the emerging alternatives. SFU researchers also study the processes that underlie the adoption and

use of new technologies—the process of bringing technologies "out of the lab" and into the hands of consumers and communities, as well as inequalities in technological uptake and impacts.

From: **University of Toronto Mississauga**

The Framework

UTM's scholars generate world-class research outputs, lead multidisciplinary and public-facing collaborations, and shape cross-divisional initiatives that expand the University's scope and impact. Our researchers leverage their discoveries to take on pressing challenges and make the world a better place. So, the OVPR seeks to promote this research discovery, to effect positive change, and to elevate UTM's standing as a research-intensive institution — one that's both of and for Mississauga and that lifts up our region and our world.

To achieve the goals of our office and to enact the campus-wide priorities outlined in UTM's Strategic Framework, the OVPR is committed to our ongoing work in the following areas:

- Expanding communications efforts to showcase the work, scope, and impact of our diverse research community.
- Collaborating with units across our campus and the University at large.
- Enhancing our core facilities and enabling unique experimentation on the UTM campus.
- Building out our strategy and supports for strong external partnerships and research-based entrepreneurship.

WORKBOOK AREA (Click in box to type):

7

Research Data Management

A. Data Management Plans (DMPs)

B. Tools for Managing Data

7 RESEARCH DATA MANAGEMENT

Research Data Management (RDM) refers to the practices and strategies employed to handle, store, organize, and share research data throughout its lifecycle, from collection to long-term preservation. It involves planning how data will be organized, documented, and shared, ensuring that it adheres to ethical, legal, and funding requirements.

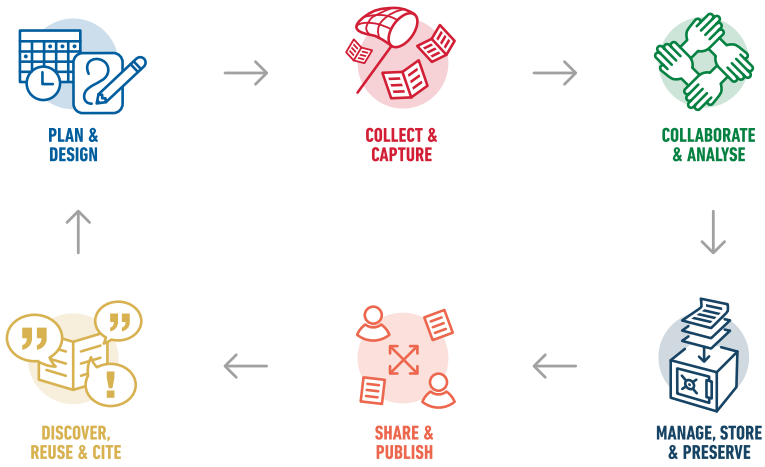
Specifically, RDM is the *process of managing data throughout the research process (from plan and design through data collection and analysis, to knowledge translation and mobilization, to longer term storage and preservation).*

Effective RDM includes proper data documentation to facilitate reuse, ensuring security and confidentiality, selecting appropriate storage solutions, and creating clear data management plans. Additionally, RDM addresses issues like data sharing, accessibility, and compliance with open data mandates, while promoting the sustainability and integrity of research data for future use by other researchers.

KEY STEPS IN THE RDM LIFECYCLE

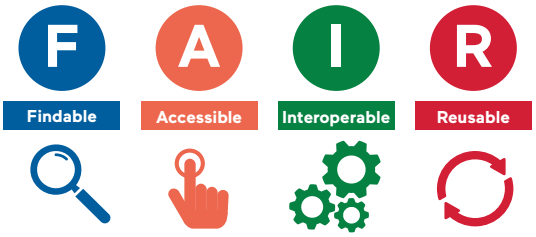
- Plan and design your research project
- Collect and capture data
- Collaborate and analyze data
- Manage, store and preserve data
- Share and publish data
- Discover, reuse and cite

Figure 4. The Research Data Management (RDM) lifecycle at the University of Cape Town (UCT).



FAIR PRINCIPLES FOR RDM

Research data can be anything from numbers on a spreadsheet to physical artefacts (e.g., photos, texts, transcripts, surveys, etc.). The FAIR Principle provides guidance for managing and sharing research data. To read more about FAIR see: 'FAIR Guiding Principles for scientific data management and stewardship' provides guidance for managing and sharing research data:



- **F**indable: Standard practices for identifying, opening, etc.
- **A**ccessible: Open, free, accessible
- **I**nteroperable: Able to be used across – machine readable
- **R**eusable: Clearly described, outlined, enabling others to reuse

FIgure5. Doubleday, 2020

A NOTE ABOUT INDIGENOUS RESEARCH DATA:

A tension can exist between the principles of open data and Indigenous rights and Indigenous data sovereignty, as Indigenous communities seek greater control over how their data is used. The use of Indigenous data should lead to meaningful and tangible benefits for Indigenous peoples.

RATIONALE FOR RDM

Implementing Research Data Management (RDM) can result in improvements in:

- **Data Discovery:** Through consistent naming conventions and version control it is easier to stay organized.
- **Data Backup and Loss Prevention:** This supports higher research quality and reproducibility, essential when collaborating with policymakers and other interest-holders.
- **Facilitating Data Sharing:** This includes using platforms and other international data repositories.
- **Selective Sharing:** Helps ensure only metadata is shared when the sensitivity or identifiability of certain data is required.
- **Compliance With Mandates:** Increasing there are requirements for data management and deposit in institutional repositories.
- **Responsible Data Stewardship:** Foundational to good scholarship, minimizes duplication of effort, accelerates project completion, and aligns with journal policies requiring data or code availability.

A. DATA MANAGEMENT PLANS

The following description of data management plans is based on presentation by Amber Gallant, Librarian Data Services, Royal Roads University (2025). A Data Management Plan (DMP) is a living document that outlines how a researcher or research team will manage data over the life of a project. It addresses the questions and considerations related to data management across the research lifecycle. Increasingly DMPs are required by funders.

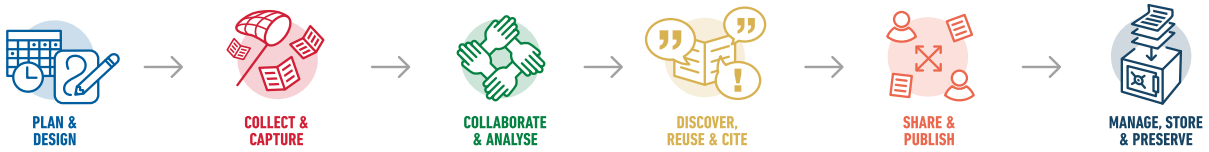
There are free resources available to help researchers, such as the DMP assistant (see "B. Tools for Managing Data, below, for more details). It is important to remember that creating a plan for storing data also requires having a safe and secure data repository and addressing Indigenous data sovereignty..

DATA MANAGEMENT PLANNING GOALS

- Establish consistent strategies, tools, and workflows for managing data
- Assess strengths and weaknesses in current data practices
- Prepare data for reuse, long-term preservation, and sharing
- Align team members on data management roles and responsibilities

KEY COMPONENT OF A DMP

When is the best time to start creating a Data Management Plan? At any stage during the research data management lifecycle as per figure 4 repeated below).



Key components of a DMP include:

1. Data Collection

- **File formats:** Clearly define and organize the types of files you will generate and use during the project.
  - *Scripts:* Include any code, scripts, or software used or created.
  - *Data:* Raw data and accompanying metadata collected or generated.
  - *Results:* Files produced from data cleaning, processing, or analysis.
  - *Documents:* Additional materials such as protocols, notes, or reports relevant to the project.
- **File naming conventions:** Establish a consistent and clear approach to naming files.
  - Keep names short yet descriptive.
  - Avoid using special characters (e.g., !, %, &, *).
  - Use CAPITAL letters and underscores ("_") to separate words.
  - Use the date format YYYY-MM-DD to maintain chronological order.
  - Above all, maintain consistency across all project files.
- **Version control:** Track changes and iterations using a simple, standardized method.
  - Use underscores followed by a version number (e.g., _v01, _v02).
  - Avoid vague labels like "final" or "latest."

2. Documentation & Metadata

- **ReadMe file:** Include a plain-text file that provides an overview of the dataset.
  - Describe the project, its purpose, and the contents of the data files.
  - Include information about file structure, variable definitions, and any dependencies or requirements.
  - Save the ReadMe in a central, visible location so it's easily found and used by others.
- **Metadata:** Use metadata to describe the characteristics of individual data files or elements.
  - Metadata should be standardized and machine-readable where possible (e.g., using schema like Dublin Core or DataCite).
  - Include key details such as file creator, date, format, subject, methodology, and version.

3. Storage & Backup

- **Plan for storage needs:**
  - Estimate how much storage will be required throughout the project.
  - Define a backup and data retention schedule and establish clear access controls.
- **Follow the 3-2-1 backup rule:**
  - Keep **three** copies of your data.
  - Store them on **two** different types of media (e.g., external hard drive and cloud storage).
  - Ensure **one** copy is stored off-site (e.g., a secure cloud platform like OneDrive or an institutional server).
- **Secure physical storage:**
  - External drives (e.g., hard drives, USBs) should be password-protected and stored in a secure, locked location.
- **Be cautious with cloud storage:**
  - Know where cloud servers are physically located—this affects privacy and legal compliance.
  - Never store sensitive or identifiable data on unsecured platforms like Google Drive or personal cloud accounts.

4. Preservation

- **Develop a long-term storage plan:** Ensure important data remains accessible and usable over time.
- **Differentiate storage from preservation:** Devices like hard drives or USBs are for short-term storage and are not reliable long-term preservation.
- **Use open file formats:** Convert data from proprietary formats (e.g., .xlsx, .sav) to open, non-proprietary formats (e.g., .csv, .txt, .xml) to increase longevity and accessibility.
- **Decide what to preserve:** Not all data must be kept indefinitely—prioritize:
  - Data that is unique or cannot be recreated
  - Data from one-time events or time-sensitive observations
  - Experimental data
  - Data that would be costly or impractical to reproduce

5. Responsibilities & Resources

- **Data deposit options:** Identify appropriate repositories for storing and sharing your data.
  - Use institutional repositories when available (e.g., Dataverse).
  - Where they exist, national repositories are often used for large datasets.
  - Use discipline-specific repositories tailored to your research field.
  - Generalist and source code repositories (e.g., Mendeley Data, GitHub) can also be used, depending on data type.

- **Roles and responsibilities:** Clearly define who is responsible for managing the data throughout the research lifecycle.
  - Assign data stewardship roles during and after the project.
  - Identify who will clean, curate, and prepare the data for sharing.
  - Plan for who will handle repository submission and ensure metadata is complete.
  - Consider funding, time, and resources needed for long-term access and maintenance.

6. Sensitive Data & Legal Compliance

- **Ethics approval:** Ensure that all research involving sensitive data complies with ethical guidelines and has been approved by relevant ethics boards.
- **De-identification procedures:** Apply methods to remove or anonymize direct identifiers (e.g., names, addresses, personal records) from datasets, especially when dealing with personal information, sensitive ecological data, or Indigenous cultural practices.
- **Restricted access protocols:** Implement protocols to control access to sensitive or restricted data, ensuring that only authorized individuals can access it.
- **Remove direct identifiers:** Eliminate personally identifiable information (PII) from datasets to protect individuals' privacy.
- **Mitigate risks:** Identify any potential risks associated with sensitive data and remove or anonymize any primary keys that could link data back to individuals.
- **Data placement considerations:** Carefully consider where to store sensitive data, taking into account security and legal requirements.
- **Access control:** Define who will have access to sensitive data and under what conditions to ensure compliance with legal and ethical standards.

7. Sharing & Reuse

- **Data sharing considerations:** Ensure that data is shared in a way that protects privacy and complies with ethical guidelines.
  - **Remove direct identifiers:** Eliminate personally identifiable information (PII) from datasets before sharing.
  - **Mitigate risks:** Identify potential risks to privacy or confidentiality and take steps to remove or anonymize primary keys that could link data to individuals.
  - **Consider storage location:** Decide where the data will be shared or hosted, ensuring the platform meets security and accessibility standards.
  - **Access control:** Clearly define who will have access to the data, ensuring that only authorized users can view or reuse sensitive information.

A data management checklist can be a useful tool as data management practices become more formalized. See Appendix for a sample checklist.

B. TOOLS FOR MANAGING DATA

A number of tools are available to support the planning, documentation, and long-term management of research data. In addition to DMP Assistant, there are several other reputable tools, templates, and resources that can support data management planning—particularly in the natural sciences.

- Discipline-Specific Templates:
  - Alliance Template for Open Science Workflows:
- A strong match for work in the natural sciences.
  - Alliance Template for Water Quality Research:
- Particularly useful for guidance in the Data Collection section, as it highlights discipline-specific data standards that are more common in the natural sciences than in the social sciences.
- Examples of Completed DMPs:
  - McMaster Data Management Plan Database:
- A robust, publicly available resource containing over 400 completed DMPs from Canada, the U.S., and the U.K.
- Includes several strong examples from the natural sciences that can serve as useful references.
- Guidance on Data Repositories (International):
  - While much repository guidance is country-specific, some resources offer adaptable advice:
- Digital Curation Centre's "Where to Keep Research Data"
- Science Europe's Practical Guide to the International Alignment of Research Data (see especially the "Criteria for Trustworthy Repositories" section)
- Benchmarking Tools & Checklists:
  - Digital Curation Centre's Checklist for a Data Management Plan:
- A concise, practical checklist that outlines key elements to include in a DMP.
  - The Data Curation Network's CURATE(D) Steps:
- An excellent step-by-step guide to preparing data for repository deposit.
- Includes discipline-specific primers, with guidance on arts and culture data, Indigenous data, and recent data rescue efforts.
  - Harvard's Research Data Management Checklist:
- A high-level overview of tasks and best practices across all stages of the research data lifecycle.

REFERENCES

Bartlett C., Marshall M., Marshall A. (2012). Two-eyed seeing and other lessons learned within a co-learning journey of bringing together indigenous and mainstream knowledges and ways of knowing. Journal of Environmental Studies and Sciences, 2, 331–340.

Centre for Epidemiology and Evidence. (2023). Setting research priorities: A guide. Evidence and Evaluation Guidance Series, Population and Public Health Division. Sydney: NSW Ministry of Health. https://www.health.nsw.gov.au/research/Publications/research-priorities-guide.pdf

Cundhill, C., Harvey, B., Tebboth, M., Cochrane, L., Currie-Alder, B., et al (2018). Large-Scale Transdisciplinary Collaboration for Adaptation Research: Challenges and Insights. Global Challenges, [NB: Global Challenges in italics] https://doi.org/10.1002/gch2.201700132

Filho, W. L., Fritzen, B., Salvia, A.L. et al. (2024). The transformative power of networking in the implementation of the Sustainable Development Goals. Discov Sustain [NB: Discov Sustain in italics] 5, 380. https://doi.org/10.1007/s43621-024-00591-x

Hankivsky, O. (2014) Intersectionality 101. The Institute for Intersectionality Research & Policy, SFU. https://bccampus.ca/wp-content/uploads/2020/07/

Hankivsky, O., Grace, D., Hunting, G. et al. (2014). An intersectionality-based policy analysis framework: critical reflections on a methodology for advancing equity. International Journal of Equity in Health [NB: International Journal of Equity in Health in italics] 13, 119. https://doi.org/10.1186/ s12939-014-0119-x

Jongsma, K., van Seventer, J., Verwoerd, A. et al., (2020). Recommendations from a James Lind Alliance priority setting partnership - a qualitative interview study. Research Involvement and Engagement [NB: journal title in italics] 6, 68 https://doi.org/10.1186/s40900-020-00240-3

GBA+ RESOURCES

- Status of Women Canada: What is GBA+?
- GBA+ Online Tutorial
- City of Edmonton "Gender-Based Analysis + : What is it and Why?" video
- Gender Responsive and Inclusive Approaches in Municipal Government: Annotated Resource list
- Federation of Canadian Municipalities. 2004. A City Tailored to Women. (1.5MB)

APPENDIX

RESEARCH DATA MANAGEMENT CHECKLIST

Developing a comprehensive Research Data Management (RDM) plan is crucial for ensuring the integrity, accessibility, and preservation of research data throughout a project's lifecycle. Drawing on established practices from Canadian universities, here's a detailed checklist to guide your RDM planning.

About the Checklist: The checklist covers how you will handle data at each stage of the research lifecycle - from active data collection to preserving your data after the research is complete. It's best to think about how you will handle your data at each phase while you are planning your project, but this checklist can be completed at any time and will serve as a useful resource throughout your project.

This resource was developed for the Technical Assistance Partnership-Expert Deployment Mechanisms (TAP-EDM) initiative "Strengthening Research on Climate Change and Environmental Sustainability for Small Island Developing States.

1. Data Collection:

☐ Identify the types of data to be collected or generated (e.g., textual, numerical, audiovisual, geospatial, or written code).

☐ Specify the file formats to be used and justify their selection, considering factors like software requirements and long-term accessibility.

TIP: Specify whether you will be storing your data in proprietary or non-proprietary file formats. Non-proprietary is best for sharing, accessibility, and re-use! Read more from the UK Data Service.

☐ Outline data collection methods, including tools, instruments, and protocols to ensure consistency and quality.

☐ Establish clear file naming conventions and directory structures to facilitate organization and retrieval.

TIP: Using a file naming convention worksheet to decide what convention you will use, before collecting data, can be helpful! See an example of a file naming convention worksheet here.

☐ Implement quality assurance and quality control measures during data collection and entry.

TIP: Describe how you will ensure that each member of your team records data in the same way (using a chosen date/time standard, for example), and how you will correct data if errors are identified.

2. Documentation and Metadata:

☐ Describe the documentation that will accompany the data, such as codebooks, data dictionaries, or README files.

TIP: Information included should be information that a future re-user would need to know to re-use/interpret it correctly.

☐ Determine the metadata standards relevant to your discipline and ensure consistent application.

TIP: Many disciplines don't have a metadata standard, but establishing a minimum metadata standard might be helpful! For geospatial data, you might try the OGM Aardvark standard. You can also visit the Digital Curation Centre to see if there is a disciplinary standard. ISO standards can also be useful, such as the ISO 19115 standard for geographic metadata.

3. Storage and Backup (During Project):

☐ Estimate total storage requirements and plan for scalable solutions.

TIP: Storage-space estimates should take into account requirements for file versioning, backups, and growth over time.

☐ Define backup procedures, including frequency, methods, and storage locations.

TIP: Following data backup procedures can help minimize data loss. To find out more about where to backup and how often to backup, read about backups from the UK Data Service.

☐ Ensure secure storage solutions that protect data integrity and confidentiality.

TIP: The best solution is one that ensures the integrity of the data while being able to be adopted and used by members of the research team with little training.

☐ Implement version control mechanisms to track changes and maintain data integrity.

TIP: Version control can become part of your file naming convention!

4. Data Preservation (After Project):

☐ Select appropriate repositories or archives for long-term data preservation.

☐ Prepare data for deposit, including necessary documentation and metadata.

TIP: Preparing your data for deposit will include using non-proprietary, preservation-friendly file formats; inclusion of supporting documentation; ensuring file integrity, and ensuring that human participant data is de-identified or anonymized.

☐ Determine the retention period for different data types, considering legal and ethical obligations.

☐ Plan for data formats that ensure long-term accessibility and usability.

TIP: Some repositories curate data for you, but others do not! If you are curating your data for preservation yourself, you may want to check out resources such as the Data Curation Primers from the Data Curation Network. They have several excellent primers, including primers for Geodatabases, GeoJSON, GeoTIFF, and Sensitive Biodiversity.

5. Data Access and Reuse:

☐ Define which data will be shared and under what conditions, considering sensitivity and confidentiality.

TIP: Will you share raw data, analyzed data, or the final processed data? All three? What data needs to be restricted?

☐ Choose appropriate licenses to specify terms of use and reuse.

TIP: There are several types of standard licenses, including Creative Commons and Open Data Commons licenses. Read more about licensing from the Digital Curation Centre.

☐ Identify potential users and uses of the data beyond the original research scope.

☐ Develop strategies to promote data discoverability, such as indexing in relevant databases.

TIP: If possible, deposit in a repository that can assign a DOI to your dataset. The dataset can then be cited! Proper metadata will also help with data discoverability.

6. Responsibilities and Resources:

☐ Assign roles and responsibilities for data management tasks within the research team.

TIP: Think about what responsibilities might need to be shifted, and to who, if the research team changes.

☐ Identify required resources, including funding, personnel, and infrastructure.

☐ Develop a budget that accounts for data management activities, such as storage, backup, and preservation.

TIP: This will include any potential costs associated with storage as well as hours of the research team's time (translated into pay).

☐ Ensure team members receive training on data management best practices and tools.

TIP: Practical resources that may help your team work toward a shared understanding of data management in practice, in addition to the links shared in this document, include the University of Edinburgh's MANTRA RDM training (particularly the "organising data" section) and CESSDA's Data Management Expert Guide. Both are self-paced online modules designed for researchers.

7. Ethics and Legal Compliance:

☐ Address ethical considerations related to data collection, storage, sharing, and reuse.

☐ Ensure compliance with relevant legal and regulatory requirements, including data protection laws.

TIP: Compliance with privacy legislation and research ethics requirements can be discussed with your institution's research office.

☐ Obtain necessary approvals from ethics review boards or committees.

TIP: If your data is human participant data, you will need to consider whether you have informed participants about how and where the data will be shared in the informed consent form. It's best to include this information in the informed consent up front.

☐ Implement measures to protect sensitive or confidential information, such as anonymization or controlled access.

TIP: There are several great primers on anonymizing data from UBC and the UK Data Service. If you need to restrict access to your data, you may want to consider creating a data sharing or data use agreement for future re-users. University of Saskatchewan has a great resource on categorizing your data.

☐ Clarify data ownership and intellectual property rights among interest-holders.

TIP: State terms of reuse of the data, in line with relevant legal and ethical requirements where applicable (e.g., subject consent, permissions, restrictions, etc.).

By following this detailed checklist, you can develop a robust RDM plan that aligns with best practices and meets institutional and funding agency requirements. Utilizing tools like the DMP Assistant can further streamline the planning process and ensure adherence to common research standards.

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