

TIPS: ONTARIO RESEARCH FUND – RESEARCH EXCELLENCE ROUND 11 (2022) STREAM 2

OVERVIEW

The Ontario Research Fund Research Excellence (ORF-RE) program promotes research excellence of strategic value to Ontario by supporting new leading-edge, transformative, and internationally significant research.

Applications are reviewed against the following criteria:

- **Research Excellence:** Scientific merit, proposed innovation, credentials and appropriateness of the research and development team, degree of inter-institutional and international research and development collaboration (where appropriate).
- **Commercialization Potential:** Innovation to be commercialized and market analysis.
- **Strategic Value to Ontario:** Anticipated value/impact to Ontario in the following three categories (as relevant to the project) – Commercialization, Economic Benefits, and/or Societal Benefits.
- **Plan for Achieving Impact:** Steps that will be taken to achieve the proposed impact.
- **Development of Research Talent:** A clear plan for training highly qualified personnel.
- **Project Management and Governance:** Management of the project, including governance structure, sustainability, budget, and milestones.

Application Streams:

Round 11 consists of two streams. Applicants should select the stream that best suits their proposal. The instructions below are for Stream 2 only - if your proposal fits better with Stream 1, please refer to that Tips sheet instead.

Stream 1: General – Basic and Applied Research

- Open to all research disciplines.
- Priority will be given to applications focused on connected, autonomous, electric vehicle (including battery and powertrain technology) as well as industrial/mining technologies as it relates to electric vehicles, spanning the entire value chain from minerals to manufacturing to recovering resources from vehicles or their component parts at end-of-life.
- Funds projects from \$500,000 to \$2,000,000 (Ontario portion).
- Funds projects up to a maximum of five years.

Stream 2: Targeted – Experimental Research

- Funds projects that demonstrate strong commercialization potential, where the innovation is at a Technology Readiness Level (TRL) of 3 or higher (see Appendix B of the [Program Guidelines](#) for details).
- Targets projects in research fields that align to areas with Ontario industry receptor capacity. The targeted sectors include:
 - Information Communications Technologies (which will include priority areas of distributed ledger technology, fintech and smart cities /internet of things, artificial intelligence and machine learning);
 - Life Sciences and Medical Devices; and
 - Industrial Technologies (e.g., advanced manufacturing, advanced materials, robotics, 3D Printing, logistics, vehicle manufacturing and critical minerals and related speciality materials).
- Priority will be given to applications focused on connected, autonomous, electric vehicle (including battery and powertrain technology) as well as industrial/mining technologies as it relates to electric vehicles, spanning the entire value chain from minerals to manufacturing to recovering resources from vehicles or their component parts at end-of-life.
- Requires collaboration with at least one Ontario-based company (refer to the Definitions section of the [Program Guidelines](#)).
- Funds projects from \$300,000 - \$1,000,000 (Ontario portion).
- Funds projects up to a maximum of 4 years.

Review Process:

After submission, applications will undergo four stages of adjudication review:

1. **Written Expert Review:** Written reviews are provided by two subject matter experts. No applications are removed from the competition at this stage. These reviews provide input for the next stage of review.
2. **Peer Review Panels:** The second stage of review is composed of multiple panels based on research discipline. All aspects of the proposal and all adjudication criteria are reviewed.
3. **ORF Advisory Board:** The ORFAB reviews the recommendations of the Peer Review Panels and makes a recommendation to the Minister.
4. **Minister Decision:** The final funding decision rests with the Minister of Colleges and Universities.

Applications should include a detailed scientific description of the project aimed at expert reviewers, but should also be accessible to non-specialist reviewers.

For examples of past reviewers, please see the [UofT Funding Opportunity page](#).

Competition Timeline:

December 10, 2021 – Internal Notice of Intent (NOI) due to the Research Services Office (RSO)

February 4, 2022 – Full draft budget due to RSO for budgetary review

February 11, 2022 – Full final draft of the application due to RSO for editorial review

March 16, 2022 – Full final application due to RSO

March 21, 2022 (Sponsor Deadline) – RSO will forward the application directly to the Ministry

For submissions, please contact Amanda Pennings, Research Funding Officer

amanda.pennings@utoronto.ca | (416) 946-3723

Formatting and Attachments:

- Sections 2–9 **can be a maximum of 30 pages.**
- Section 12 (attachments) **can be a maximum of 20 pages.**
- Use font Arial 11 if you copy and paste text into the application form.
- Electronic attachments should be clearly named using the following format: Institution Name_Pi Last Name_Attachment Type. For example, University of Toronto_Smith_CVs.
- All documents of a single type (e.g., CVs, Letters of Support) should be combined into a single file with a cover page listing the contents.
- If scanning PDF documents, use a lower resolution to minimize the size of the file.
- NOTE: no paper copies are required.

GENERAL TIPS

This tip sheet does not discuss all sections on the application form and should be consulted in conjunction with the ORF-RE Round 11 Program Guidelines. **This tip sheet does not replace a close and careful reading of the ORF-RE guidelines.**

As you write and revise your proposal, please ensure that the application:

- Clearly describes how the proposal relates to or differs from the current state-of-the-art research in the field, within Ontario as well as nationally and internationally;
- Has a clear focus/hypothesis and is not a collection of unrelated sub-projects;
- Describes the preliminary research that led to the proposed new concept;
- Demonstrates the novelty and impact of the research;
- Does not “oversell” the research impact;
- Describes the steps to achieving the research impacts;
- Describes your engagement with next-stage recipients and end-users of the research;
- Includes a budget that is realistic and adequately justified;
- Includes feasible timelines for deliverables;
- Discusses anticipated challenges (e.g., of a particular technology, approach, phase, or sub-project);
- Presents a team with the necessary expertise in both the research area(s) and the research impact (product design, prototyping, regulatory hurdles, etc.); and

- Includes strong support from private sector partners (e.g., partner letters address the specific projects; cash/in-kind contributions).

SECTION-SPECIFIC TIPS

Sections 2–9 can be a maximum of 30 pages (not including references and figures). The exact distribution of pages among sections is at the applicant’s discretion. A suggested distribution of pages is as follows:

Research Excellence Scientific Merit (.5p) Linkages to previously funded ORF-RE projects (.5p) Proposal Integration (.5–1p) Research Collaboration (.5–1p) PI & Co-Investigator Info (1–1.5p)	4-4.5 pages
Commercialization Potential Proposal Brief (3 lines) Proposal Abstract (.5p) Proposal Description (6–7pp) Proposal Innovation (.5–1p) Market Analysis (.5p) PI & Co-Investigator Info (1–1.5p)	8.5–10.5 pages
Strategic Value to Ontario	5 pages
Plan for Achieving Impact Commercialization Implementation Plan (.5–1p) Commercialization Financial Strategy (.5–1p) Commercialization Management Plan (.5–1p) Intellectual Property Strategy (.5p)	2–3.5 pages
Development of Research Talent	1 page
Project Management and Governance	1.5 pages
Other Project Requirements Intellectual Property Training (.5p) Youth Outreach Plan (.5p)	1 page
Milestones and Deliverables (250-character limit for each)	2–3 pages

1. GENERAL INFORMATION

Technology Readiness Level:

In 0.5 pages, explain why the proposed innovation is at the identified technology Readiness Level Ready (TRL).

- Use the TRL definitions in [Appendix B of the program guidelines](#).

- Use the funder’s language to describe your project’s TRL. You may want to adapt this language to create headings, e.g., “Active Research and Development Initiated” (Level 3), “Prototype at Planned Operational Level” (Level 7), etc.
- Describe your project’s activities.

2. RESEARCH EXCELLENCE

Scientific Merit:

Describe what is new and significant about the research that has led you to the proposed experimental research project.

- Emphasize the novelty of the research underlying the current proposal.
- Contextualize the research locally and internationally.
- Briefly explain the benefits of the research to Ontario, nationally, internationally, as well as to relevant research communities.

Linkages to previously funded ORF-RE projects:

Describe how this proposal builds on and improves previously funded ORF-RE project(s), if applicable.

- Explain how the previous project(s) inform the current one.
- Describe any continuities between the project teams, research goals, theories/methodologies, and/or hypotheses.
- Emphasize the ways in which the current proposal adds value to the previous one(s).

Proposal Integration:

If the proposal includes multiple sub-projects, describe how you plan on integrating the projects/topics.

- Explain how and why the various parts of the project are relevant and necessary to the project as a whole.
- Restate your overarching project vision and illustrate how each sub-project contributes to this unifying vision.

Research Collaboration:

Describe the nature and level of inter-institutional and/or international research collaboration.

- Identify and justify the role of collaborators involved in the project, and briefly outline the expertise they bring to the collaboration.
- You are strongly encouraged to include an international component in these collaborations, but all research supported by ORF funds must take place in Ontario. Funds provided by Ontario cannot be spent elsewhere. Approved multi-institutional

projects must have an Inter-Institutional Agreement (see pages 7–8 of the Program Guidelines) in place prior to the first disbursement of funds.

Principal Investigator and Co-Investigators (maximum 0.5 pages per investigator):

Describe the Principal Investigator and Co-Investigators.

- Include their titles, department(s), and institution(s).
- Briefly describe their relevant qualifications and unique ability to significantly contribute to the research objectives. Focus on how these qualifications relate to research excellence only – you’ll be asked to describe the study team’s expertise regarding commercialization in the following section.
- Indicate the percentage of each investigator’s time spent on the proposed project (this percentage should also be reflected in the budget).
- Identify whether the PI or a co-investigator is also working on another project submitted to or currently being funded by the ORF-RE program (indicate the project’s name and lead institution).
- Ensure that the number of co-investigators in this section corresponds to the figure entered in the “Number of Co-investigators” box in section 1.
- Please observe the **half-page maximum** for each investigator.
- CVs for each investigator (maximum two pages) will be attached in section 11. See page 19 of the Program Guidelines for details.

3. COMMERCIALIZATION POTENTIAL

Proposal Brief (no more than three lines):

Please observe the three-line limit (not three sentences) and make sure that the description can be understood by a non-specialist reader. Clearly lay out the objectives, key elements, and strategic value for Ontario.

Proposal Abstract:

Summarize the research project in plain language so that it can be understood by a non-specialist reader.

Proposal Description:

Describe your research plan and scientific methodology.

Opening paragraph:

- Begin with a strong statement about the vision driving your project.
- Indicate how your project will directly benefit Ontario.
- Emphasize the potentially transformative aspects of the research.

Description of proposed research:

- Clearly state your hypotheses and objectives.
- Describe the preliminary research that led to this project.
- Describe your research plan and methodology within the context of current advances in your discipline.
- Provide sufficient details about specific research activities and methods to allow reviewers to assess their appropriateness and feasibility.
- Describe unique features of your scientific environment and how these features will contribute to the probability of success.

If the proposed project is a continuation of previous ORF-RE funding, please clearly describe how this work is different and/or builds on the previous funding.

Proposal Innovation:

Describe what is new and significant about the proposed research.

- Demonstrate the significance and novelty of your project by comparing it to other state-of-the-art research in the field, locally and internationally.
- Directly explain how your research is leading edge.
- Explain how your research goals, theory/methodology, and/or hypothesis will advance knowledge in your field.
- Assert the timeliness and relevance of your research within a broader national and international context and, if applicable, within the context of previous Ontario government funding.

Market Analysis

Describe the market opportunity and primary competitors.

- Describe the size of the market for your innovation locally and internationally, as appropriate.
- Describe the current state of the industry and the products/services offered by your innovation's main competitors.
- Identify the gap(s) in the market that your innovation will fill, i.e., the problem(s) that your innovation will solve.
- Explain why your innovation is better than the alternatives, e.g., faster, more cost effective, lower environmental impact, etc.

Principal Investigator and Co-Investigators (maximum 0.5 pages per investigator):

Include relevant experience and expertise as it relates to the commercialization of the proposed innovation.

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RESEARCH SERVICES OFFICE, 3rd Floor McMurrich Building, 12 Queen's Park Crescent, Toronto, ON, M5S 1S8, Canada.

See contact information on the website: research.utoronto.ca

- Focus on the study team’s experience and expertise in knowledge transfer and commercialization.
- Do not repeat the description of the study team’s expertise from the Scientific Merit section.

4. STRATEGIC VALUE TO ONTARIO

Describe the research impact and the anticipated value of the proposal to Ontario.

- As applicable to your research, address the three types of impacts (commercialization, economic benefits, and societal benefits – see ORF-RE Program Guidelines for a list of examples). You may address all three impacts, but be sure to emphasize those that are most relevant to your project.
- In all cases, the impacts may be short- or long-term, but specific timeframes for achieving the research impacts should be included; these timeframes are an important part of the review process.
- It is strongly recommended that, in completing this section, you consult with U of T’s Innovations and Partnerships Office (IPO) as well as with your external partners.
- Quantitative information will strengthen the discussion of anticipated impacts. Provide supporting analysis of the areas being discussed, including the sources of the information. Do not oversell or overstate the benefits that will be produced by your research.

Possible sources for this information include the following:

- Market data available through [U of T Library's Guide to Entrepreneurship](#)
- [Innovation, Science, and Economic Development Canada](#) (provides information by sector)
- [Invest Ontario](#)
- [Statistics Canada](#) (some information is broken down by province)
- [Ontario Ministry of Health and Long-Term Care—Ministry Reports](#)
- [Canadian Institute for Health Information—Quick Stats](#) (some information is broken down by province)
- [Canadian Institute for Health Information—National Health Expenditures](#) (expenditures by province and territory)
- Relevant [Government of Ontario ministry websites](#) (some pages outline challenges facing the province and give you a sense of the language used to describe them)

5. PLAN FOR ACHIEVING IMPACT

Commercialization Implementation Plan

Describe the planned path to commercialization within the project timeframe, including a strategy for achieving commercialization potential and practical application to industry.

- Describe the **concrete steps** that will be undertaken to achieve the research impacts addressed in section 4.

Commercialization Financial Strategy

Outline your financial plan for commercialization.

- Describe your financing options for each step of the path to commercialization and industry application discussed in the Commercialization Plan.
- Explain why the option(s) you have selected are the best one(s) for this project.

Commercialization Management Plan

Identify the commercialization team. Explain the roles of your private sector partners, industry liaison office or other commercially experienced advisors involved in the commercial or IP tracking and actions and outline accountability and reporting mechanisms.

Intellectual Property Strategy

Explain your proposed IP strategy and how it will generate benefits to Ontario and Ontarians.

- Explain the roles of your industry and community partners, institutional liaison offices, or other experienced advisors involved in the translation of your research. Applicants are encouraged to consider inter-institutional partnerships to maximize translation, such as partnerships between universities and Colleges of Applied Arts and Technology.
- Describe the engagement plan for potential recipients of your research and/or end users (see ORF-RE Program Guidelines for a list of examples).
- Describe the strategic alliances, partnerships, or licensing agreements you have, or plan to have, in place with these recipients.
- Emphasize your track record of past collaboration with these next-stage recipients and end-users, and describe how this past experience will contribute to your achievement of impact going forward.
- Discuss the strength and commitment of your partners (including private sector and community partners) and demonstrate this commitment through financial contributions and/or strong evidence of vested interest in the research. Where appropriate, please attach end-user letters of support in section 12.
- Identify potential risks that may limit the ability to achieve the research impacts and include a plan for mitigating these risks. Outline a technical or methodological risk assessment and identify alternative strategies and approaches.

Please see the instructions in the Stream 1 section of this document for intellectual property boilerplate text.

6. DEVELOPMENT OF RESEARCH TALENT

Plan for Development of Research Talent:

Briefly outline the plan for the development of Highly Qualified People (HQP).

- Demonstrate that there will be meaningful engagement of undergraduate and graduate students and postdoctoral fellows in the various stages of the research project. Include their specific roles and responsibilities.
- Briefly indicate your recruitment plan.
- Describe the new skills that HQP will acquire from their involvement in this project and make the case that they will fill the projected needs/demands of the Ontario/Canadian labour markets.
- Where possible, include examples of “experiential learning” (see ORF-RE Program Guidelines for examples).
- Document your excellent track record of training HQP.
- Ensure that your budget clearly supports the HQP plan described in this section.

Total Number of HQP Trained:

Describe the total number of HQP trained.

- Indicate the total number of HQP you plan on training over the life of the project, as well as their level (e.g., undergraduate, master’s, PhD, postdoc) and the planned learning outcomes. Ensure that the anticipated number and type of HQP is consistent with your proposed budget and is appropriate to the milestones in section 9.

7. PROJECT MANAGEMENT AND GOVERNANCE

Outline how the project will be managed.

- Describe your governance structure, including boards or committees, the role and function of the project manager, and other key staff.
- Demonstrate your ability to manage a project of the scope and scale requested by describing a clear and appropriate management plan. For example,
 - Who will be responsible for day-to-day and emergency decisions?
 - How will the research direction of the project be determined?
 - Who will supervise HQP and technical personnel?
- Depending on the program size, a Director who is not the Principal Investigator may be required. For smaller-scale projects (typically under \$3M), the PI can assume the management role. Project management should be discussed with your unit head and

with the Research Services Office.

- Include a sustainability plan for the research capacity that will be created by the requested ORF-RE funding.
 - Describe how this research capacity will be maintained after the project has ended (i.e., beyond the period of government funding).
 - Indicate how the project will be financially sustainable (e.g., identify other sources of funding, including external research grants and industry support, as applicable)
 - Indicate how research will continue (e.g., the training of HQP, the creation of research networks, the development of ongoing collaborations).
- Summarize or highlight the milestones listed in section 9.
- Briefly address the project budget to describe your method for ensuring an accurate forecast of project expenditures.
- The ORF-RE guidelines strongly encourage you to **include a figure or image** of the governance structure. Insert this image directly into the box in section 7. *For examples of governance structures, please contact the Research Services Office.*

Boilerplate text for project financial management (applicant may incorporate relevant text):

The University of Toronto must maintain high legal, ethical, managerial, and professional standards in the management of the resources entrusted to it as a publicly and privately funded institution.

The university is dedicated to ensuring the highest standard of financial accountability. The university administers externally sponsored research funds on behalf of the principal investigator, who shares the responsibility for financial accounting and compliance with the agreed-upon terms and conditions of the award. All awards have independently established accounts within the university accounting system. Financial accountability precludes the transfer of funds between grants for the purpose of pooling or saving money.

The project leader exercises financial control over grant funds through review of supporting documentation, the authorization of all expenditures, and the review of all applicable financial reports. Financial reports can be viewed by the project leader on the university's intranet.

Although primary fiduciary responsibility rests with the project leader, the administrative unit is responsible for implementing departmental guidelines and procedures, which ensure compliance with university and sponsoring agency policies and procedures.

8. OTHER PROJECT REQUIREMENTS

Intellectual Property Training:

List (if any) IP training the research team has undertaken recently either through their

respective institution or through [Ontario's intellectual property resources](#) and the [Canadian Intellectual Property Office \(CIPO\)](#).

- Organize this section by team member and give training dates.

Youth Outreach Plan:

Describe a plan for youth outreach activities.

- Discuss your plans to engage **elementary and/or high school students**. Describe outreach activities relevant to your ORF-RE project (see ORF-RE Program Guidelines for a list of examples).
- You may use up to 1% of the ORF portion of funding for activities, but it is not mandatory to use these funds.
- If your department or division has existing outreach programs in place and/or has a high school liaison, you can build upon those programs.
- You may participate in existing activities operated by science awareness organizations, such as [Science Rendez-Vous](#), which U of T sponsors, and the [Science and Technology Awareness Network](#). Organizations relevant to outreach for social sciences and humanities research might include libraries, museums, art galleries, heritage sites, and community groups.
- Youth outreach activities must occur in each year of the ORF-RE.

9. MILESTONES AND DELIVERABLES

List major milestones, the significance of these milestones (where appropriate), and indicate the expected project year of completion (years 1 through 5). **Each milestone has a 250-character limit.**

- Use simple and non-technical language to describe the milestones and deliverables regarding project management, research capacity building, research excellence, achieving research impacts, youth outreach, and other milestones (e.g., external leveraged funding, sustainability, etc.).
- Measures are very specific, quantifiable achievements by which ORF-RE can judge your progress. Examples of measures might include the following:
 - increased numbers of highly qualified personnel
 - numbers of new faculty recruited
 - an increased graduate student complement
 - new undergraduate training opportunities
 - publications
 - spin-off companies
 - number of sponsors, including private-sector

- number of conferences, symposia, workshops
- level of external funding
- new partnerships/collaborations
- If your research will have a commercialization impact, use the Achieving Research Impact Milestones subsection to list major milestones and deliverables related to the execution of the commercialization plan during the term of the project. Include the evaluation of IP and the development of a commercialization plan; the development of an IP protection plan; the development of a patent filing strategy; and the transfer of technology to partners and others. State the frequency of project reviews and identify who will be responsible for assessing IP and technology outputs and actions required.
- Briefly identify general follow-on steps by the researcher and/or institution after the funding period. Avoid listing the filing of patents, as that step is generally taken post-project. For research projects with a long-term commercialization potential only, pre-commercialization activities are sufficient (e.g., regular reporting of your progress).

10. PROJECT BUDGET

Budget Justification:

Provide a detailed justification for the amount requested in each expense category.

- For personnel, indicate the percentage of their time that will be dedicated to the project and pro-rate their salary (and benefits, where appropriate) accordingly. Senior personnel should be listed separately. For other types of personnel, it may be more appropriate to consolidate their salaries. For all personnel, indicate the duration for which they will be engaged in the project. Include the names of individuals involved in your project (if known), describe their function and or/activities in the project, and explain the need for that function/role in the project.
- For Facilities and Equipment, Other Direct Research Expenses, and Management and Administration, provide a justification of the main expenses involved in completing the project. Include any assumptions that were used to develop your estimate. When completing the justification, provide sufficient information to illustrate that the requested resources are necessary and appropriate for the proposed project.

13. MITIGATING ECONOMIC AND GEOPOLITICAL RISK CHECKLIST

Potential Risk Identified & Risk Mitigation Plan:

Provide information regarding any risks which you identified in the Checklist portion of this section. Explain what steps you have taken to identify, evaluate and measure these risks.

Maximum 5,600 characters.

- Use the guidelines [Mitigating Economic and/or Geopolitical Risks in Sensitive Research Projects: A Tool for University Researchers](#) to develop this section.

- Use the headings in the checklist to organize this section.
- Describe how the research team has created a plan for mitigating risks.
- Provide a detailed explanation of how the research team will approach each potential risk identified in the checklist, e.g., specific steps to reduce or remove the risk entirely, timelines for implementation, and how you plan to monitor effectiveness.

Last updated: December 3, 2021 (AP)