UNIVERSITY OF CALGARY

Undergraduate Research Guide

A companion for undergraduate students learning about research types, opportunities and practices

Preface & Acknowledgement

"It all starts with wonder"

Hello! I'm Sandra Amin, a fellow undergraduate student. Undergraduate research is a transformative experience. As a student who was once in your shoes, I understand the value undergraduate research brings, but also the challenges and barriers that are faced when pursuing research opportunities. This guide is designed to empower you to discover opportunities, contribute meaningfully to your fields, and share your findings confidently.

I wanted to take a moment to recognize the support and inspiration of the brilliant individuals who contributed to this work.

The inception of this guide started as an idea between Dr. Kyla Flanagan and I, as we hoped to provide an accessible resource to support all undergraduate students in what can seem to be a complicated process to secure research. Dr. Kyla Flanagan saw great potential in this idea, and for that, I am truly grateful. She generously brought her wealth of experience in supporting students to ensure this guide is not only comprehensive but also genuinely helpful for those navigating their research journey.

As the project grew, our partnership expanded to include Stephanie Vahaaho and Ana D'Aubeterre, whose contributions in brainstorming key ideas helped shape the foundation of this guide. Over time, the team evolved, and I was fortunate to have Cynthia Tahhan join the creation process. Cynthia Tahhan's insights as another undergraduate student provided a fresh perspective, which was instrumental in refining and bringing this guide to life.

The development of this guide would not have been possible without the unwavering support and mentorship of Dr. Maria Victoria Guglietti. Dr. Maria Victoria Guglietti came in at a critical point, ensuring the project stayed on course and giving us the momentum needed to bring this guide to life. Dr. Maria Victoria Guglietti's patience, insight, and encouragement not only guided me through the world of research but also reinforced the importance of creating a resource that continues to grow.

I hope this guide helps you as much as the community around me has helped me. The first chapter explores the value of undergraduate research as well as steps you can take to find and secure opportunities. Future chapters will guide you through the research process, from project management to dissemination, ensuring a supportive resource throughout your academic journey. Think of this guide as your friendly companion for making the most of your research journey. Let's dive in!

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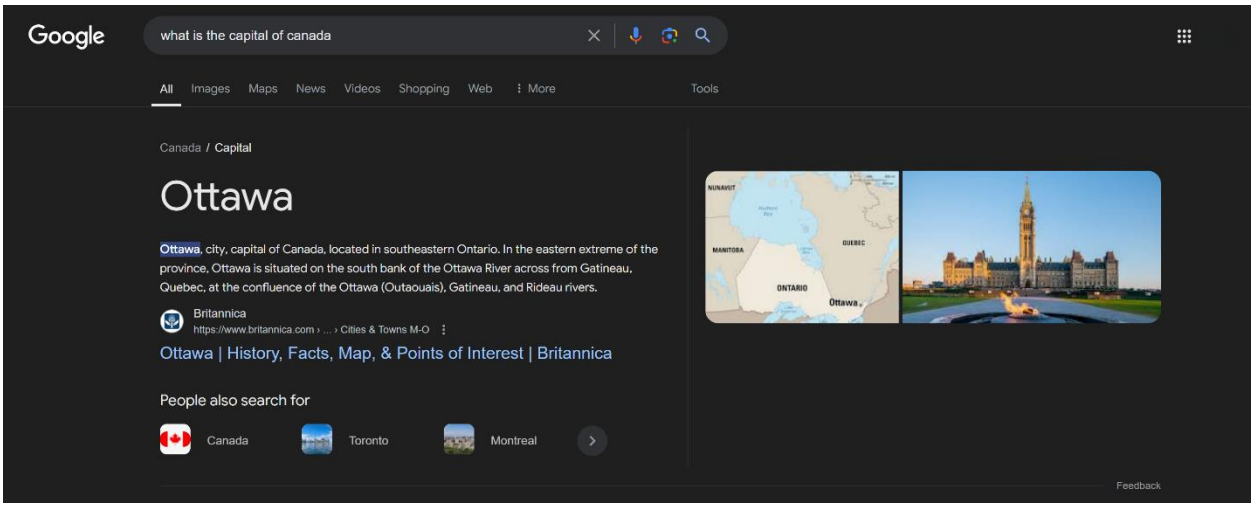
1.1 What is Research?

Search vs Research

First, let's explore a term you are likely familiar with – Search. Whether you are entering keywords into Google or asking ChatGPT a question, *Searching* is used to find information for non-complex questions (Kungu, n.d.). This type of information is simple and generally non-disputed in nature.

For instance, asking Google "What is the capital of Canada?" is an example of a search.



Research, on the other hand, is an iterative process of "creative and systematic work" to unveil new knowledge (OECD, 2015) – hence, research is to re-search, based in searching for information, connecting ideas, and asking questions with the intention to build onto our current knowledge.

An example of this includes asking "How has Ottawa's role influenced the representation and integration of diverse cultures in Canada?" This is not a question that has a direct answer when searched for, but it requires critical connection and evaluation of different sources of information. This is what *research* looks like.

Searching and *researching* work hand-in-hand to build new knowledge in the context of academic research.

Undergraduate Research

Undergraduate research experiences are unique because of the personalized mentorship we receive. Unlike graduate students, undergraduate students are not expected to be experts in their area of study. According to the *Council on Undergraduate Research* (n.d.), an undergraduate research experience is "a mentored

investigation or creative inquiry conducted by undergraduates that seeks to make a scholarly or artistic contribution to knowledge." (para. 1)

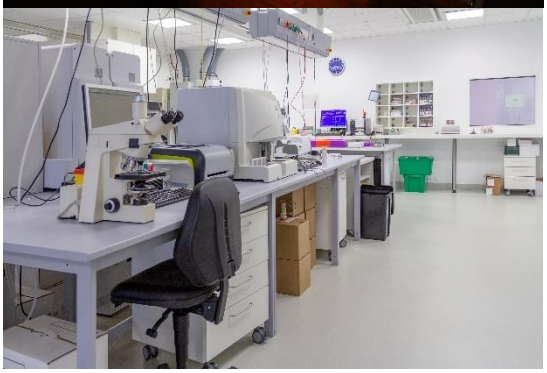
This definition could be expanded to capture undergraduate students' contributions to all kinds of knowledge. Students gain experience and develop a research identity that may inspire and mentor other students to pursue research and make direct contributions to the field. The only difference between seeking and making that contribution is students' willingness to speak about their experience and disseminate their valuable work in scholarly and other formats.

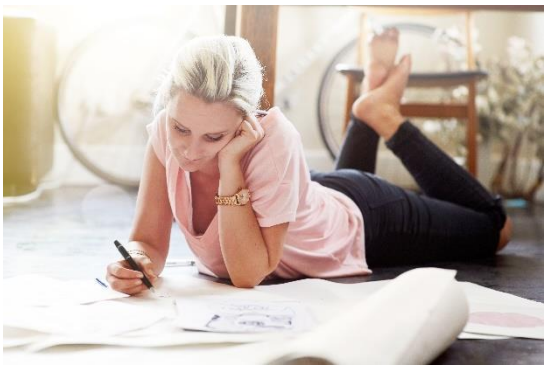
For our purposes, we define undergraduate research as a mentored investigation or creative inquiry conducted by undergraduates that **contributes** to scholarly or artistic reservoir of knowledge.

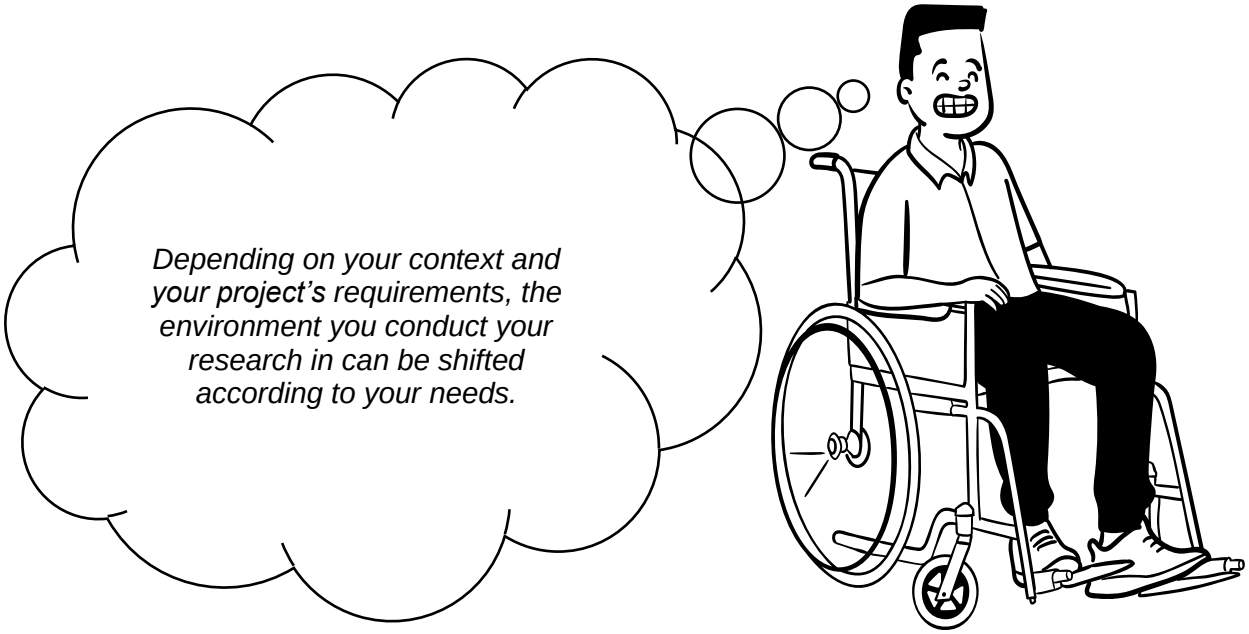
Let's further explore the types of research as well as the research opportunities that are available to undergraduate students on campus.

Types of Research Environments

Research does not only happen in a traditional lab, but in many types of environments; and sometimes, in more than one place. Below are some examples of what research environments look like.



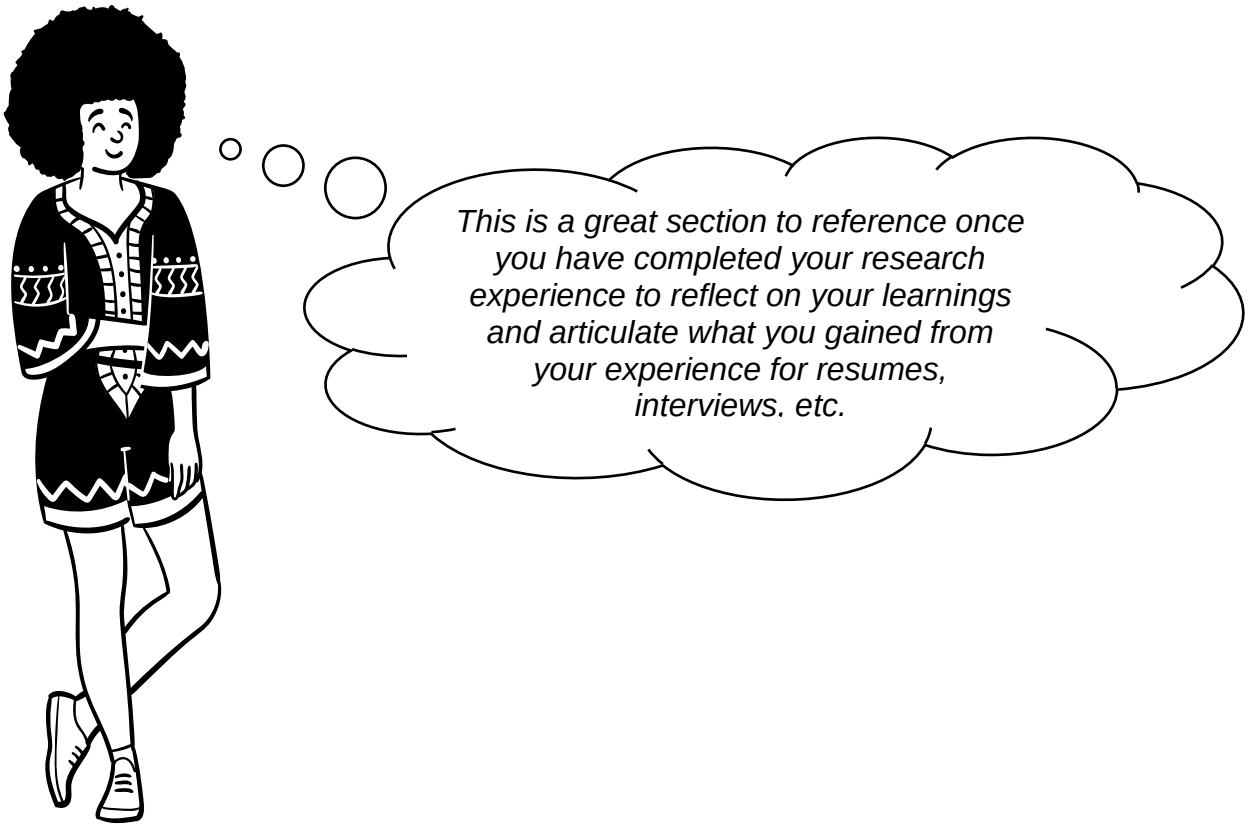




For currently available opportunities, visit *Elevate*. *Elevate* is a repository of all experiences on campus. For more information on how to use *Elevate* to support your research, click here.

1.2 How do I benefit from Undergraduate Research?

There is much to gain from pursuing research in any of its forms. We will be discussing these benefits by dividing them into the following sections: Intellectual, Professional, and Personal benefits.



Intellectual Benefits

The main intellectual benefit of a research experience is the development of academic skills that will ultimately lead to improved academic performance. Let's further explore what this may entails for you:

- Learn, discover, and explore your research interests (Lopatto et al., 2020; Queen's University, 2023; Russell et al., 2007)
- Gain more knowledge of your chosen discipline
- Gain deeper understanding of concepts you studied (Nodeh, n.d.)
- Improve your motivation as you better understand your course content (Nodeh, n.d.)
- Contributing to and advancing a research field (Flanagan et al., 2023; Nodeh, n.d.; Queen's University, 2023)
- Make an impact in the community (Flanagan et al., 2023)
- Increase authentic representation and visibility of equity-deserving groups.

- Challenge narratives and misinformation of everyday media by learning to set aside your opinions and recognizing your biases in favor of focusing on the facts.

Professional Benefits

The professional benefit you get from undergraduate research includes transferable skills for future professional goals, whether it is further pursuing graduate school or exploring career opportunities in industry. There are many skills and benefits to be gained from research:

- Acquisition, development, and gain confidence in transferrable skills such as: (Flanagan et al., 2023)
    - Problem-solving, (Craney et al., 2011; Ishiyama, 2002; Lopatto, 2003, 2004; Seymour et al., 2004)
    - Reading and critical analysis (Ishiyama, 2002; Lopatto, 2003, 2004; Seymour et al., 2004)
    - Synthesizing information, (Ishiyama, 2002; Lopatto, 2003, 2004; Seymour et al., 2004)
    - Working as part of a team (Craney et al., 2011; Queen's University, 2023)
    - Writing, discussing, contextualizing, and presenting findings (Lopatto, 2003, 2004; Queen's University, 2023; Seymour et al., 2004)

- Acquisition and development of research-specific skills including:
    - Identifying knowledge gaps (Orsillo, 2022)
    - Conducting literature review (Orsillo, 2022)
    - Designing study or research project (Orsillo, 2022)
    - Collecting data (Orsillo, 2022)
    - Developing discipline-specific technical and analytical skill (Flanagan et al., 2023)
    - Managing and analyzing data (Orsillo, 2022)
    - Developing resilience in overcoming obstacles by pursuing the iterative research process (Flanagan et al., 2023)
    - Identifying and considering ethical issues related to your discipline and/or topic (Orsillo, 2022)

Personal Benefits

An often overlooked, but transformative, set of benefits from research experiences include its ability to empower undergraduate students to grow as researchers, and shaping them as members of society.

If you identify as part of an equity-deserving group, research provides an empowering opportunity to bring awareness to your community's voice and inspires others like you to pursue what was once only a space for those that are privileged.

Personal benefits include:

- Empower yourself to have independent thought and formulate original ideas (Lopatto, 2007)
- Build personal resilience (Nodeh, n.d.)
- Build empathy as you place yourself in others' shoes to understand their experiences through data interpretation.
- Identify, explore, and challenge your personal biases
- Develop your voice and individual autonomy
- Heal and encourage the growth of your inner self (Marion, 2024).

For more information regarding any of the above skills, or if you would like to explore others, visit **Ready for Research***.*

1.3 How do I secure a research opportunity?

Step 1) Explore Research Opportunity Types, Funding, and Timelines

It is important to consider all types of research opportunities, available compensation, and timelines to decide on what suits your needs best.

Research Opportunity Types

Research experiences are often shaped by the disciplinary context. As part of your academic experience, you are likely to be asked to conduct research in your courses as you investigate various topics specific to your discipline.

Research that is a requirement of a course is known as “curricular” research and typically involves data collection, analysis and communicating findings through papers and presentations. As an undergraduate student, you can also enroll in Independent Study Research Course, which is a specific course that allows you to investigate a question, and/or learn new research techniques under the supervision of an academic staff member

Here, we will discuss research experiences outside of the classroom.

Type of Opportunity	Description	Benefit
Summer Research Studentship	A summer position under the supervision of an academic staff member to investigate a specified question. These opportunities are shaped by the student.	Experience Funding
Research Assistantship	A position that is delegated specific tasks to support a research team, ranging from supporting a specific research project to supporting the general work of the research team.	Experience Funding or Credit
Volunteering in a Research lab	Supporting a research team in their work, ranging from supporting general technical work to working on a specific research project.	Experience

For currently available opportunities, visit *Elevate*. *Elevate* is a repository of all experiences on campus. For more information on how to use *Elevate* to support your research, click here.

Funding Opportunities

There are multiple funding opportunities when pursuing undergraduate research– these can range from supervisors compensating students using their research grants to students securing an external grant. In this section, we will explore the most common types of funding undergraduate students secure when pursuing their research. Keep in mind that depending on the type of opportunity you are pursuing, there are different types of compensation available.

Summer Research Studentships. Studentships are awards that allow students to conduct summer research over the summer in collaboration with a research supervisor. Most UCalgary funding opportunities are housed under the *Undergraduate Research Summer Studentship* Common Application. In other words, you only need to apply through one application to be assessed for eligibility and considered for all UCalgary awards. Award periods and values include:

- 8-week: $3,750
- 12-week: $5,625
- 16-week: $7,500

Research Assistantship. Most funding for this type of research opportunity is typically provided by the supervisor. If available, this is funding that supervisors use from their research grants and/or other faculty-specific funding sources. Talk to your supervisor about expectations related to this position's compensation.

Other Funding. Mitacs is another significant source of research funding for undergraduate research. Mitacs research programs focus on innovation built through many types of partnerships – so, projects funded by Mitacs require a supervising professor AND industry/community partner.

Note, this award is NOT part of the *Undergraduate Research Summer Studentship* Common Application. This is an external funding body, and thus requirements and eligibility are different. Learn more at the Mitacs Website.

Research Timelines and Action Items

Similar to funding, timelines differ depending on the type of research opportunity you are pursuing.

Summer Research Studentships. Below, you will find the timeline for submitting the *Undergraduate Research Summer Studentship* Common Application

Figure. Timeline to apply for Summer Research Studentships using the Undergraduate Research Summer Studentship Common Application.

Action		Find Supervisor ❯	Finalize Draft of Application for Supervisor Review ❯	Submit your portion of Summer Studentship Application ❯	Supervisor Submits their application portion ❯	Notifications sent out to Successful applicants
Timeline		**End of November**	**First day of Winter Semester**	**End of Janurary/Early Feburary***	**Mid Feburary****	**Late March/Early April**

* For the 2025 Summer Studentship Cohort, the *STUDENT* portion of the *Undergraduate Research Summer Studentship* Common Application is due January 27th, 2025 @ 11:59pm

** For the 2025 Summer Studentship Cohort, the *SUPERVISOR* portion of the *Undergraduate Research Summer Studentship* Common Application is due January 31st, 2025 @ 11:59pm

MITACS. Mitacs funding supports undergraduate students in an experience that ranges from a 4-month to 6-month term. Though applications are open year-round, there is a required 6–8 weeks peer review period to gain feedback and refine your proposal. With this in mind, applications need to be submitted a minimum of 3 months before the starting date of the research opportunity to make sure there is enough time to submit revisions and amendments.

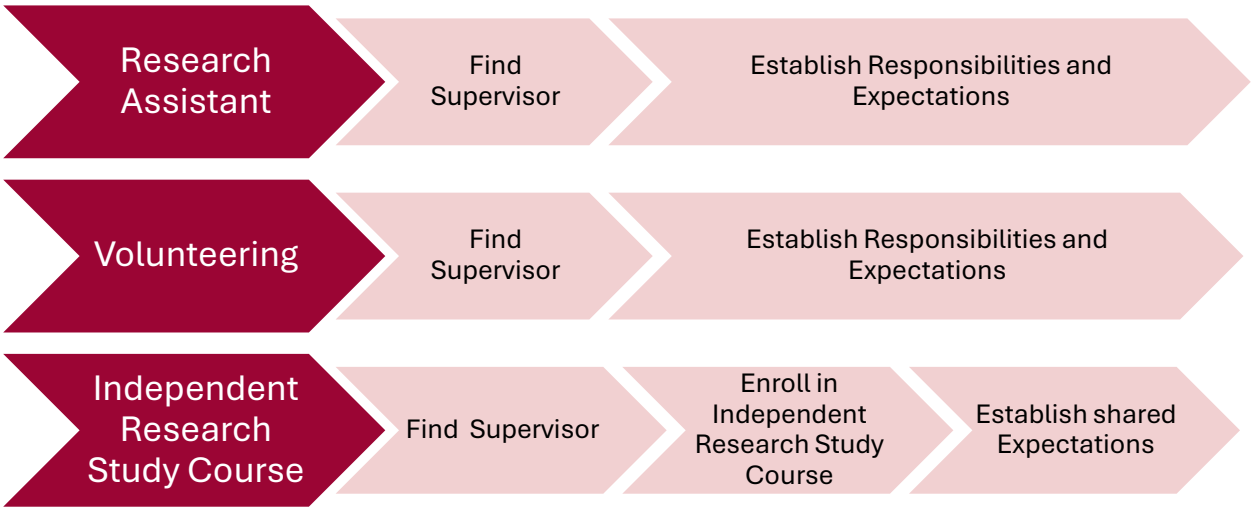
If you are interested in starting and completing your research opportunity over the summer, the submission timeline is similar to *Undergraduate Research Summer Studentship* Common Application.

Figure. Timeline to apply for Summer Research Studentships using the Mitacs Application.

Action		Find Supervisor	Finalize Draft of Application for Supervisor Review	Submit Application	**IF APPLICABLE** Refine Proposal as requested by Peer Reviewers	Notifications sent out to Successful applicants
Timeline		**End of November**	**First day of Winter Semester**	**Early Feburary**	**Late March/Early April**	**Mid to Late April**

Other Research Experiences. If you are pursuing research as a Research Assistant, Volunteer, or through an Independent Study Course or Independent Project, there is no specific timeline to follow. However, there are still some common action items that you need to complete.

The following graphic outlines typical steps taken to secure other research experiences. Note that commonalities include finding a supervisor and discussing your opportunity's expectations with your supervisor.



Step 2) Find a Supervisor

Finding a Research Supervisor can be a daunting task. Whether you are unsure where to look for supervisors or are nervous about the initial meeting to secure your spot, this section will provide you with some tips and tricks to get through this part of the research process with a supervisor that is the best fit for you.

To start, finding a supervisor can be split into the following actions.

i. Looking for Potential Supervisors → ii. Reaching out to Potential Supervisors → iii. Meeting with Potential Supervisors

Let's dive deeper into each of these actions.

i. Where to look for Potential Supervisors?

Explore the UCalgary Directory	Explore Opportunities on Elevate	Talk to Course Instructors	Attend UCalgary academic events

The above are some strategies to look for potential supervisors. Remember to do some research into each supervisor's field and projects (past and present) to ensure that you are interested in their work.

ii. How to reach out to Potential Supervisors?

Rule of Thumb: Reach out to 1 to 2 supervisors each week

Email Potential Supervisors (See below for more info)	Go to Course Instructors' Office Hours

If your potential supervisor does not respond within 1 week, follow up by with a gentle reminder.

If you don't hear back within 2 weeks from a potential supervisor or they responded with "no", do not be discouraged! This is not a reflection on you but is usually because the supervisor has a lot on their plate.

An unexplained lack of response on the side of a potential supervisor also reflects their ability to communicate and hints that this not be the best opportunity for you.

Cold emailing a supervisor is a task that many undergraduate students find difficult – whether it is tone and etiquette or not knowing what to include in an email, here are some tips to keep in mind when formulating an email.

Remember, emails should:

- Use a **Professional Tone**
- Be **Short and Specific** to the point
- Use your **UCalgary email**

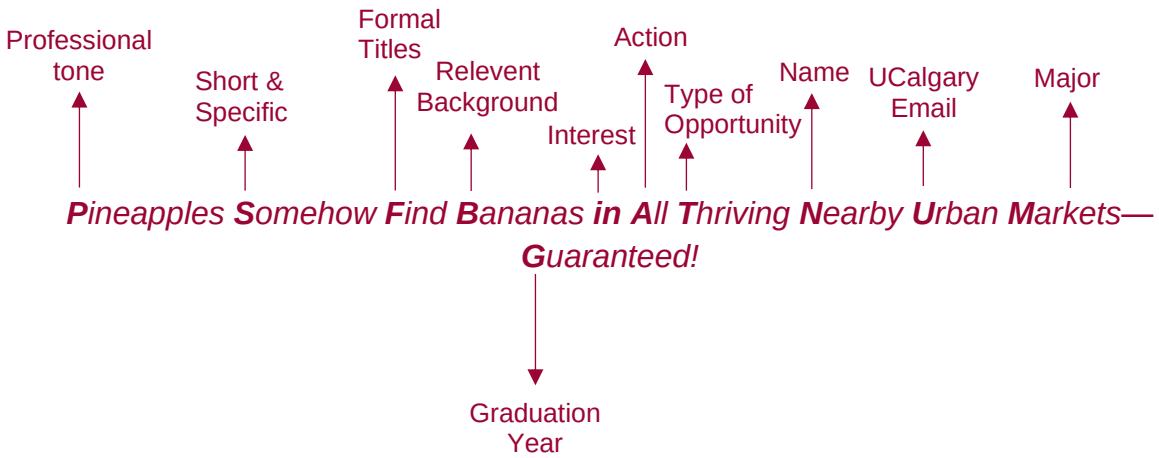
When drafting the email body, you should:

- Use **Formal Titles** – that includes "*Dr.*" or "*Professor*" when addressing the supervisor
- Include **Relevant Background** that shows you are a good fit
- Show your **Interest** in the supervisor's research – be specific
- State what **Type of Research Opportunity** you are seeking – it is important to be transparent, but also remember to be open minded
- Include an **Action** for the supervisor you are reaching out to – this is generally a meeting to better understand expectations on both sides

When signing off your email, remember to include:

- Your **Name**
- Your **Major**
- Your **Graduation Year**

This can be a lot of information to remember, but you can use this fun mnemonic as a guide:



Below, you will find an email template that you can use to reach out to potential supervisors. Remember to fill in your information and make each email specific to each supervisor.

Reaching out to a Potential Supervisor – Email Template

***Subject Line*:** Undergraduate interested in **[RESEARCH PROJECT/FIELD]**

***Body*:**

Good morning Dr. **[SUPERVISOR NAME],**

My name is **[YOUR NAME]** and | am currently in my **[YOUR YEAR]** of a bachelor of **[BACHELORS]** in **[MAJOR]**. Having taken several courses where I have learned about the research process and methodologies within **[YOUR FIELD]**, I am looking for opportunities to expand my experience in conducting research.

I am particularly interested in **[YOUR INTEREST]**. | read your recent paper, **[RELEVENT SUPERVISOR'S WORK]**.

After reviewing several of your other publications, I am very interested in both learning more about **[YOUR INTEREST AS CONNECTED TO SUPERVISOR'S WORK]**and how I can contribute to that area of research.

If you are available, | would love to meet to further discuss your research and if there is opportunity for undergraduate students to participate, I hope to **[TYPE OF RESEARCH OPPORTUNITY YOU ARE SEEKING]**, but I am also open to considering other opportunities.

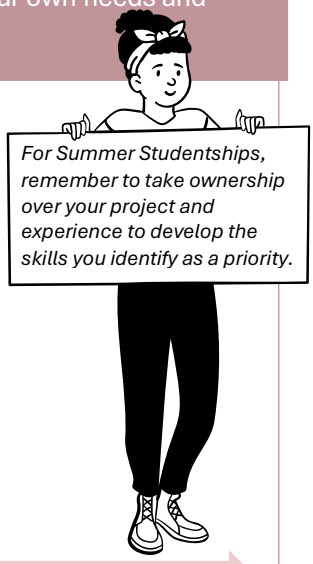
I look forward to hearing from you. thank you for your time and consideration.

Regards,
[YOUR NAME]
[YOUR MAJOR], Class of **[YOUR GRADUATION YEAR]**

iii. How to ace your initial meeting with a potential supervisor?

Most undergraduate students make the mistake in assuming the initial meeting with a supervisor is an interview to secure the research opportunity. Though meeting structure can be different between disciplines and every individual supervisor, it is just as important for you to know if the research opportunity is a right fit for you as it is for the supervisor to establish their expectations.

Before your initial meeting, here are some questions to reflect on to understanding your own needs and expectations for the position (Part A)



☐ What are some strengths that I bring to this opportunity?

☐ Reviewing the skills listed below, what are some skills that I would like to work on?

	Ability to read and understand the primary literature
	Ability to work independently
	Ability to analyze data and other information
	Ability to integrate theory and practice
	Skill in the interpretation of results
	Understanding the research process
	Understanding of ethical conduct in your field
	Understanding how researchers work on real problems

(Check off all that apply)

☐ What structure would I prefer and would work best for me based on my needs?

Set and Structured Working Hours ⟷ **Independent and Flexible Working Hours**

☐ Does my physical environment impact my ability to learn? If so, what physical environment would best suit my needs?

☐ What level of research autonomy can support me while still challenging myself? *(Click here for more information)*

(Willison & O'Regan, 2023)

Prescribed Research ⟷ **Bounded** ⟷ **Scaffolded** ⟷ **Open-ended** ⟷ **Unbounded Research**

Some questions you might want to discuss with your supervisor includes the following – feel free to add to this list as relevent to you or modify to your research opportunity type (Part B)

☐ "Tell me more about this field/[PROJECT X]."

☐ "Will I be creating my own research question, or will I be working on an ongoing project?"

☐ "What are your expectations about my responsibilities?"

☐ "What is the working structure for [POSITON]?"

☐ "What are your expectations around compensation?" *(This question is **NOT** for Summer Research Studentships)*

☐ "What are your goals surrounding [PROJECT X]?"

After your initial meeting, reflect on your answers from Part A and the supervisor's responses from Part B to ensure that this is the right research opportunity for you.

If you are still unsure, feel free to talk to other students who have worked with the supervisor about their experiences.

Depending on the type of research opportuntiy (i.e., Research Assistant, Volunteering, Independent Research Course or Project) this may be the last step you need to take before embarking on your research journey.

If you are pursuing a Summer Research Studentship, there are a few additional tasks that need to be completed.

Step 3) Collaboratively write and submit a Research Project Proposal

(ONLY FOR SUMMER RESEARCH STUDENTSHIP APPLICATIONS)

If you are pursuing a Summer Research Studentship, here are some steps to support you in submitting a research proposal.

Establish a Research Question with your Supervisor

Create a research question for your project. Make sure that you have discussed and agreed on your research question with your supervisor. Make sure to also discuss **how this research question is significant** to the field and/or community.

Develop a Comprehensive Research Plan

Research your topic – use a comfortable format (i.e., bullet points, webs, etc.) to capture important pieces of information.

1. Start by reviewing and researching academic papers in an area relevent research question, noting down any important information you come across.
2. Based on your review, articulate the purpose and objectives of your research.
3. Explore the steps you will use to conduct your research. Ensure to include your audience, materials and procedure.

Finalize Project Details with Supervisor

Before delving into the application, review your work with your supervisor. Make sure to note down any adjustments to your project as needed – **DO NOT adjust for the purpose of aligning your project with your supervisors'**, rather adjustments should be made to improve your project and ensure it is realistic and manageable for the Summer Research Studentship Period.

Write, Write, Write!

Now that you have done your preparatory work, time to draft your application! See the application questions here.

Send Draft to Supervisor for Review

After finalizing your application draft, send this draft to your supervisor for review. Depending on your supervisor, you can book a meeting to review the draft together or email it to them to return with written feedback.

Add Supervisor Feedback and Final Edits

Once you have received your supervisor's review, make sure to implement their feedback. Remember to ask questions if any of their feedback is unclear.
Read over your application to edit for spelling or grammatical mistakes.

Submit Application

Once you are ready, **submit your application**.
And you are done!

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