UNIVERSITY OF CALGARY | Taylor Institute for Teaching and Learning

# Undergraduate Research Initiative (URI) Report

2022-23

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EXECUTIVE SUMMARY

In this report, we, the Undergraduate Research Initiative (URI) Team, summarize the activities and impact of the URI's signature programs from July 1, 2022 – December 31, 2023. In this period, the URI supported **1,984** undergraduate students in conducting research, 259 instructors and supervisors in mentoring undergraduate researchers, and nine research coaches in supporting instructors and students alike in course-based undergraduate research experiences. Throughout, there were 28 community partnerships.

Campus Networks
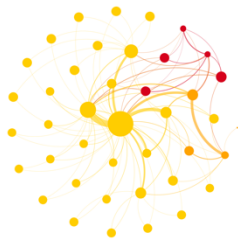
This year, much of our work focused on two strategic areas: "Building networks and sharing knowledge" and "Engaging with community partners." To describe this work, we conducted a social network analysis of our collaborators. This process identified 41 collaborating faculties, units, and initiatives with 540+ points of connection to a URI signature program. Throughout this report, we highlight such contributions by briefly describing collaborators' impacts on undergraduate research at UCalgary. Collaborator highlights include the PURE Faculty Coordinators, Undergraduate Summer Studentships Steering Committee, Office of Equity, Diversity and Inclusion, Libraries and Cultural Resources, and the CURE Community of Practice.

Program for Undergraduate Research Experience (PURE) Award

In 2023, the PURE Award supported the research of 114 students and 106 supervisors, including $135,000 in funding from academic units to support awards. Campus interest in the PURE Award continues to increase each year, and application rates have increased by 26% since 2020. From students and supervisors, we continue to hear reports of the transformational nature of engaging in hands-on research projects at the undergraduate level.

Ready for Research Badge

In 2022-23, the Ready for Research Badge completed its pilot year. Over the Fall and Winter semesters, students participated in four required workshops and selected two of eight optional workshops based on their interests. The pilot cohort launched with 714 registrants, 153 (21%) of which completed the badge component. Participants reported the most gains in their confidence in applying for undergraduate research or engaging in undergraduate research. The 2023-24 cohort launched with 769 registrants, signalling continued student interest in the program.

Course-Based Undergraduate Research Experiences

In 2022-23, 12 course instructors and nine research coaches facilitated 9 CURES in four faculties in second-, third-, and fourth-year undergraduate courses. Across these courses, there were 272 students enrolled. In Fall 2023, 10 past and present CURE instructors from across five faculties gathered as a CURE Community of Practice. Participants brought diverse CURE expertise and experiences, ranging from CURE classes of 8 to 1,200(+) students.

What's Next

The next steps for the URI include increasing our focus on one-on-one and peer-to-peer advising and mentorship for students interested in getting involved in research. Additionally, a generous $500,000 gift from Cenovus Energy will support an additional 60+ students from equity-deserving groups participating in PURE over the next two years.

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INTRODUCTION

Since 2020, the College of Discovery, Creativity, and Innovation (CDCI) has led the Undergraduate Research Initiative (URI) at the University of Calgary (UCalgary). The URI seeks to expand and enhance undergraduate research across campus by providing multiple entry points for students to access research opportunities. To do so, the URI partners with diverse units across campus, including the Provost, Vice-President (Research), and the Vice-Provost (Teaching and Learning) portfolios to support undergraduate research in curricular course-based undergraduate research activities, co-curricular undergraduate research programs, and undergraduate research events, engagement, and outreach.

UCalgary has long considered undergraduate research to be an impactful contributor to the Academic and Research plans. Most recently, in *Ahead of Tomorrow: University of Calgary's 2023-30 Strategic Plan*, "creating research opportunities for undergraduate students" is listed as a cross-cutting initiative in "Strategy 1: Increasing access to impactful and future-focused education." Furthermore, in the *Experiential Learning Plan (2020-25)*, undergraduate research in its diverse forms is listed as a signature form of experiential learning at UCalgary.

In this report, we, the URI Team, build on the analyses and findings in the *2021-22 Undergraduate Research Initiative (URI) Annual Report* to explore the activities and impact of the URI's signature programs from July 1, 2022 to December 31, 2023. Throughout this period, much of our work has focused on two of our strategic areas: "Building networks and sharing knowledge" and "Engaging with community partners." To tell the story of this work, we conducted a social network analysis of the diverse collaborators that made undergraduate research happen at UCalgary during this reporting period. While this analysis mapped who was involved, it could not describe collaborators' unique contributions. Therefore, throughout this report, we feature several "Collaborator Highlights" to celebrate their unique impacts on undergraduate research at UCalgary broadly and URI signature programs specifically.

UNDERGRADUATE RESEARCH INITIATIVE (URI)

Our URI Framework

Undergraduate research is a mentored investigation involving a researchable question or research conducted by an undergraduate student or group of students. It can result in an original contribution to a field of knowledge or provide an opportunity to substantially develop students' research skills, scholarship, or creative expression. We believe that undergraduate research becomes high-quality when it involves four elements (Figure 1):

- **Curiosity:** Evoking students' creativity, questioning, and desire to understand a problem or phenomenon.

- **Discovery:** Engaging students in using discipline-specific research methods to investigate a research question.

- **Dissemination:** Ensuring students have an opportunity to share and communicate their research findings.

- **Reflection:** Extending students learning by making sense of their experience and articulating their learning.
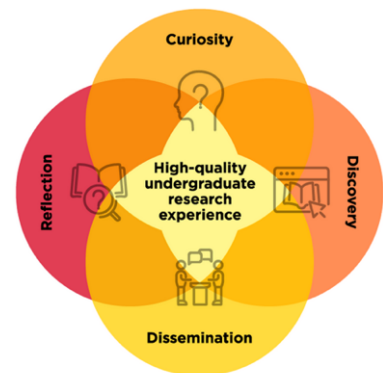
Figure 1 URI Framework

These elements were developed by investigating undergraduate research scholarship and reflecting on our experience developing and engaging in undergraduate research at UCalgary.

Our Signature Programs

Currently, the URI features three signature programs. Each program provides students with a unique path to engage in undergraduate research and provides instructors and research coaches with specialized opportunities to mentor undergraduate researchers. See Appendix A for each program's learning outcomes.

- **Program for Undergraduate Research Experiences (PURE) Award:** The Program for Undergraduate Research Experiences (PURE) Award provides individual undergraduates with up to $7,500 in financial support to undertake a research project between May and August. Throughout the summer, awardees can pursue the Research Skills Foundation Badge, a micro-credential that recognizes their participation and reflections on a series of workshops. After completing their project, awardees may apply for the Graeme Bell Travel Award to support travel costs associated with disseminating their PURE Award research.

- **Ready for Research Badge:** The Ready for Research Badge is a micro-credential (i.e., digital badge) designed to prepare students to participate in research within their undergraduate studies. The badge is a blend of online and in-person workshops, allowing students to choose between various learning activities to match their interests. To receive the badge, students participate in one required workshop and four of ten optional workshops. Then, they reflect on what they have learned in a final "passport" assignment.

- **Course-based Undergraduate Research Experiences (CURE):** Course-based undergraduate research experiences (CURE) incorporate research experiences into the curriculum of a for-credit course. CUREs can apply to any field of study and nearly any undergraduate course, even large classes and remote learning contexts. Faculty, staff, and students participating in CUREs with high student enrolment can also receive support from research coaches, a graduate or upper-level undergraduate student with research experience who can dedicate up to 20 hours per week to supporting a CURE.

In 2022-23, the URI's signature programs supported and engaged 1,900(+) students, 259 instructors and supervisors, nine research coaches, and 28 community partnerships. See Table 1.

Table 1 Signature Program Participant Numbers (2022-23)

Initiative	# Students	# Instructors and Supervisors	# Research Coaches	# Community Partnerships
CURE	272	11	9	9
PURE	236	222	-	19
Ready for Research	1,476	26	-	-
TOTAL	1,984	259	9	28

Our Strategic Areas

Six strategic areas guide the URI:

- **Delivering curricular and non-curricular undergraduate research experiences:** Delivering curricular and non-curricular undergraduate research experiences and supporting an increasing number of course-based undergraduate research experiences across multiple faculties.

- **Reducing barriers and increasing access:** Identifying and reducing the potential barriers to accessing undergraduate research at UCalgary, particularly those experienced by equity-deserving students, such as women and gender non-conforming identities, Indigenous persons, racialized minorities, 2SLGBTQIA+, and persons with disabilities.

- **Building networks and sharing knowledge:** Building and networking connections with faculty members and units across campus and sharing our research, experiences, and reflections with the campus and scholarly community.

- **Developing resources and faculty-development programs:** Developing undergraduate research experience learning resources and programs, including open-access research videos, faculty guides, communities of practice, workshops, and micro-credentials.

- **Engaging with community partners:** Nurturing opportunities for community-integrated undergraduate research. Maximizing undergraduate research impact on local, national, and international communities. Supporting others engaging in research with community partners.

- **Communicating impact:** Evaluating and communicating the value and impact of undergraduate research across programs and activities. Recognizing and celebrating faculty and student achievements and collaborations with industry, community, and external partners.

See Figure 2 for highlights and milestones within our strategic areas for this reporting period.

Figure 2 URI Strategic Areas Highlights and Milestones (July 1, 2022 – December 31, 2023)

Legend

🟥 URI	🟨 CURE	🟧 PURE Award	🟥 Ready for Research	🟩 Summer Studentships

Strategic Areas	2022 (Summer to Fall)	2023 (Winter to Fall)
Deliver undergraduate research experiences	3 CUREs in 2 faculties	5 CUREs in 3 faculties
	122 PURE Award recipients, 116 supervisors	114 PURE Award recipients, 106 supervisors
	26 Research Skills Foundation Badge recipients	153 badge recipients in the 2022-23 cohort
	2022-23 Ready for Research cohort launched with 700+ registrants	2023-24 Ready for Research cohort launched with 760+ registrants
		36 Research Skills Foundation Badge recipients
Reducing barriers and increasing access	Report: *Increasing Indigenous Engagement in Undergraduate Research* (2022)	17 of 23 *EDI Action Plan* recommendations enacted to date
		AwardSpring platform piloted for summer student consolidated application system
		Research Skills Foundation Badge opened to Alberta Innovates and USRA awardees

Building networks and sharing knowledge	🟥 7 URI conference/workshop/ presentations	🟥 1 conference presentation
		🟥 CDCI Academic Lead conducts Undergraduate Research Listening Tour
		🟥 1 publication in the Canadian Journal of Scholarship of Teaching and Learning
		🟧 Transdisciplinary Research Team join PURE Award Faculty Coordinators
		🟩 Creation of Undergraduate Summer Studentship Support Committee (USSSC)
		🟩 Summer Workshop Series collaboration with the Office of Equity, Diversity, and Inclusion
Developing resources and programs		🟨 Launched CURE Community of Practice
		🟩 Created *Applying for Summer Research Studentship: A step-by-step user guide for students* (2023)
Engaging with community partners	🟨 One CUREs with three community partners	🟧 13 PURE awardees report engaging community partners
	🟨 One CURE with six community partners	🟧 Cenovus Energy announces $5ooK contribution to PURE Award
	🟧 Six PURE awardees report engaging community partners	🟥 First of its kind *Faculty Meet and Greet* event co-hosted by PURE Faculty Coordinators
Communicating impact	🟧 PURE Award Celebration of Achievement	🟥 CDCI Academic Lead, Dr. Kyla Flanagan, receives 3M National Teaching Fellowship
	🟧 PURE Awardees featured in four UToday stories	🟧 PURE Awardees featured in four UToday stories
		🟥 Ready for Research Badge recipients featured in a UToday story
		🟩 Celebration of Achievement opened to Alberta Innovates and USRA awardees

2023 was a celebratory year for the URI. In spring, the CDCI Academic Lead, Dr. Kyla Flanagan received a 3M National Teaching Fellowship for exceptional contributions to teaching and learning in 2023. This honour is given to only ten educators in Canada each year.
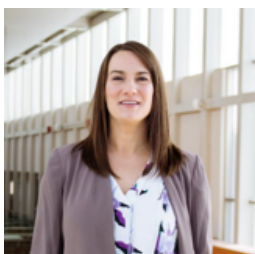
'Take risks in teaching, try new things, experiment, gather feedback, try again' (UToday, 2023)

" *What would you tell yourself, early in your career? Dr. Kyla Flanagan, PhD, has some advice. 'Don't be afraid to take big risks and bite off more than you can chew because it will stretch you more than you ever thought possible.'*

In the summer of 2023, Dr. Flanagan initiated an "**Undergraduate Research Listening Tour**" to learn about the highlights and challenges of undergraduate research from the perspective of academic units at UCalgary. Dr. Flanagan engaged in 11 listening sessions with 10 of 11 academic units across campus. Each gathering was held with small groups of faculty leadership, including Associate Deans, Teaching and Learning, Undergraduate, and Research. Three key themes heard across these conversations.

- **Why Undergraduate Research?** All faculty leaders expressed excitement for the learning that undergraduate research provides. Undergraduate research prompts students to build curiosity, to see themselves within the discipline, and to understand the connections between theory and practice.

- **Who Does Research?** Leaders from seven of ten (70%) faculties reflected on this question. For some disciplines, phrases like "scholarly-informed practice," "business case," and "knowledge mobilization" were better fits. For others, there were questions about "who does research" in teaching and research faculty roles.

- **What Counts as Research?** Leaders from six of ten (60%) faculties reflected on what counts as "real" research. Some units saw value in undergraduate research as a *process* of discovery, even if the outcome was only new to the student and not the discipline. Leaders recommended providing clarity around expectations for research at the undergraduate level.

See Appendix B for a copy of the Undergraduate Research Listening Tour Summary Report.

CAMPUS NETWORKS

Undergraduate research is collaborative by nature. We work better together, be it as a student and supervisor engaging in a research project, an instructor and research coach facilitating a CURE, or as several units coordinating the application, adjudication, and allocation processes for several summer studentships and millions of dollars in funding. The work of the URI would not be possible without the diverse networks and collaborators who work together to make undergraduate research happen broadly across UCalgary and within their units specifically.

To describe and reflect on the way the URI and its collaborators contribute to undergraduate research at UCalgary, we conducted a social network analysis. The intent was to visually map the scale of the URI's signature program and its diverse collaborators. Collaborators were identified by their associated faculty, unit, or initiative. In the final data set, we identified 41 collaborating faculties, units, and initiatives with over 540 points of connection to a URI signature program. See Appendix C for the list of faculties, units, and initiatives, identified. See Figure 3 for the visual of the URI's social network for 2022-23.

Figure 3 URI Social Network Analysis 2022-23
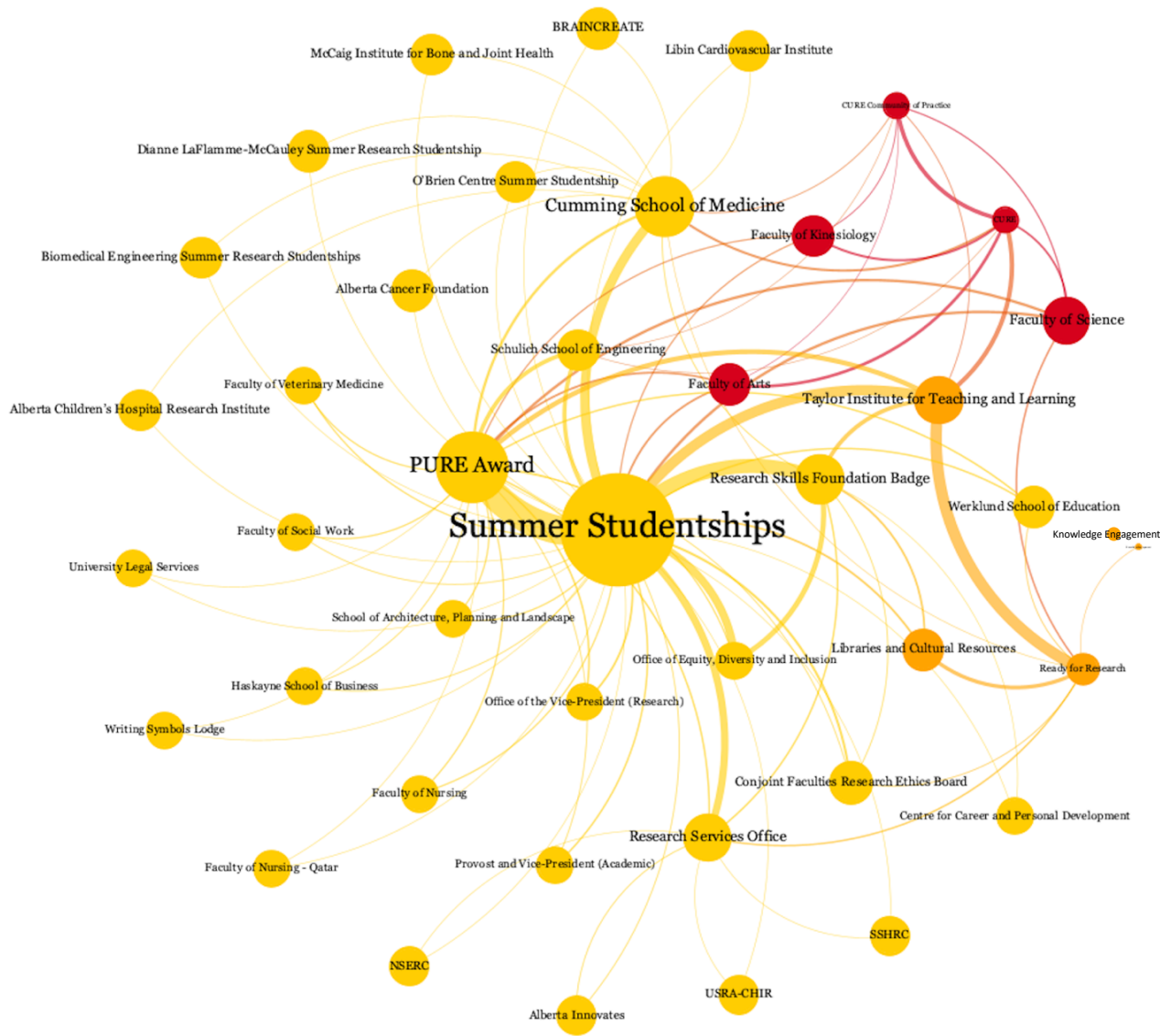
While Figure 3 depicts who was involved in a URI signature program during this reporting period, it cannot capture the depth and breadth of collaborators' contributions. Throughout this report, we seek to put the spotlight on such contributions by telling the story of how their relationships with the URI came to be and briefly describing the impact of their collaborations on undergraduate research at UCalgary.

PURE AWARD

The PURE Award is funded primarily by the Provost and Vice-President (Research) offices. The PURE Award team also supports PURE Awards that are funded by academic units, where units allocate funds to PURE Awardees within their respective faculty. In 2023, we received $131,000 from Faculties. With these funds, 19 additional students received PURE Awards. See Table 2 for a breakdown of PURE Award funds for 2022-23.

Table 2 PURE Award Funds (2022-23)

Year	$ Total Funds	$ Faculty-Funded Awards	# Students	# Supervisors
2022	$856,855	$82,500	122	116
2023	$759,375	$131,250	114	106

In 2023, a total of 650 students applied for the PURE Award, the largest number of applicants the PURE Award has seen to date. Over the last four years, the application rate has increased 26%, from 514 applicants in 2020 to 650 applicants in 2023. In 2023, 114 students were awarded funding, making the overall success rate 17%. This success rate has gone down from the 22% success rate for the 2022 PURE Award cohort. See Figure 3.

Figure 4 PURE Award Applicants and Recipient Numbers
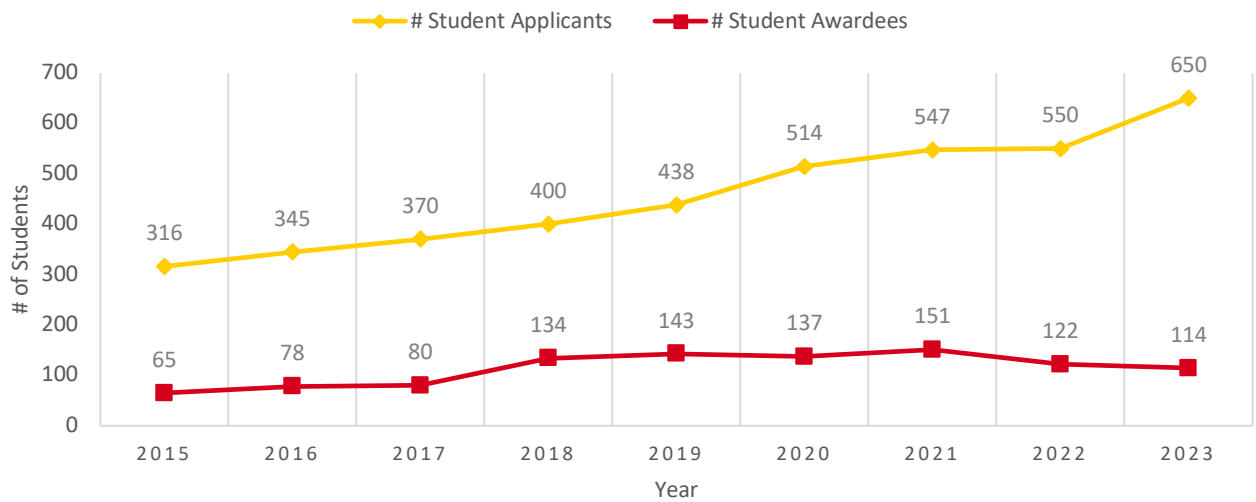
Year after year, the PURE Award Faculty Coordinators contribute exceptional efforts to support students and supervisors in their faculties.

15	11	2	300+
Coordinators	Faculties represented	Members from the Transdisciplinary Scholarship Team	Hosted "Faculty Meet and Greet" networking event with 300+ participants

PURE Award Students and Supervisors

As part of our broader monitoring and evaluation of the PURE Award, we seek to learn about the impact of the program on students and supervisors. This evaluation includes collecting feedback at the start and end of the summer through entry and exit surveys. These surveys ask respondents about their PURE Award experience in relation to the program's outcomes. Completing these surveys is optional, and their findings are used for continuous program learning and development.

From PURE Award students, we continued to hear reports of how transformative their PURE Award experience was. As we have seen in previous years, students' responses indicate a correlation between gains/amplifications of students' research skills with gains/amplifications of their research identity. In the words of two PURE Awardees:

> *I feel more confident in my research skills, especially in my ability to scope a research project and carry it out independently. I also think of myself less as 'an undergraduate trying out research' and more as 'an undergraduate researcher.'*
>
> *I feel much more confident as a researcher. I also have learned that I can be myself in research. I had this idea that I would have to sacrifice personal values/ interests to ask meaningful questions, but now I know that my interests drive me.*

From PURE Award supervisors, we continue to hear that the core of the PURE Award experience is the student and supervisor relationship. While students conduct their research inquiry, supervisors act as mentors and guides. In the supervisor exit survey, we ask supervisors how they would describe supervising a PURE Award student to a colleague. Since 2021, we have continued to hear the following themes across survey respondents:

- **The PURE Award is a great opportunity for students.** For most supervisors, the PURE Award provides "an incredible way" for students to gain hands-on experience in research. Respondents continuously state that the outcomes of this experience can be beneficially applied to the student's future honours thesis, graduate studies, and career plans.

- **The PURE Award is a great opportunity for supervisors.** For many supervisors, the PURE Award is a "fun" and "rewarding" opportunity to mentor the next generation of researchers in their field. For some supervisors, the benefit of supervising a PURE Award student comes from the satisfaction of seeing their student learn. For others, this work provides their research team with new perspectives. Across respondents in this theme, several supervisors also describe their PURE Award experience as amplifying their supervisor, mentor, and leadership development.

- **"My advice is…".** Over the last few years, we have heard supervisors share many pieces of advice they would give a colleague. The needs and interests of each student-supervisor relationship are unique. Nevertheless, each year, we repeatedly hear two recommendations past and present PURE Award supervisors have for mutual student-supervisor success: to align the scope of the student's proposed project with what is feasible over 8-, 12-, or 16-weeks and to set clear expectations from the start of the summer.

In 2022-23, PURE Awardees and supervisors were featured in several UToday stories:

PURE Awards spark enthusiasm for research in students and supervisors (UToday, 2022)

> *'The research Sharmaine did brought me up to speed on the current literature and put me right up front and centre with what was being published at the time,' Friesen says. For faculty who become supervisors for PURE, it's an opportunity to spark new interest in their own research and foster research skills in students. "Her enthusiasm was absolutely contagious," says Friesen of Tay's research.*
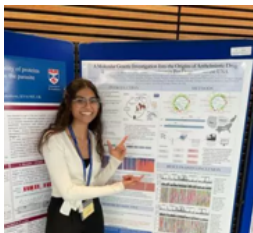
Life-changing' experience as undergrad researcher takes 2nd in poster competition at Edinburgh conference (UToday, 2023)

> *At the conference, Thundathil heard talks from the leading scholars that emphasized the journey of research rather than the destination. 'It's more about what you learn along the way, being passionate about the research you're doing, and the impact you make.'*
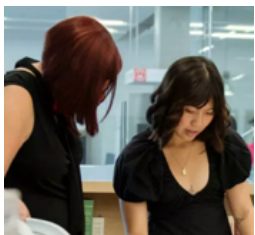
Undergrad digs into mouth-watering histories of Calgary's International Avenue (UToday, 2023)

> *The archives and special collections room contains access to over 12 linear kilometres of archival material and more than 200,000 books but with the expertise of GWRC staff, Qin has found some interesting and relevant records in the collection. 'It's taught me about the importance of librarians and archivists. Everybody works together in this ecosystem to produce the research.'*

UCalgary nursing student creates inclusive guide for starting IVs (UToday, 2023)

> *Adewole and Sealock began the process of creating a lab guide that is standardized, explaining every step in a way that allows all nursing students to see the exact same thing. With the help of the [PURE Award] and the Clinical Simulation Learning Centre (CSLC) at the Faculty of Nursing, Adewole gathered friends and other nursing students in a lab to produce images and video that will be included in the guide.*

Class of 2023: New teacher takes the scare out of science (UToday, 2023)

> *The purpose of my research was to look at practices that teachers can implement to get students to not blindly accept everything they're told," she says. "Honestly, it is just really emphasizing questioning. If they ask you a question, answer them with a question. The thing I found through this research was to just ask kids questions, because this leads to inquiry-based learning.*

Summer Studentships at UCalgary

As UCalgary has long considered undergraduate research to be an impactful contributor to the Academic and Research Plans, summer studentships have long been part of the UCalgary landscape. In 2016, the PURE Award, the O'Brien Centre Summer Studentships, and the Markin Undergraduate Student Research Program collaborated to coordinate summer studentship processes across campus. Over the years, this network grew steadily, bringing in collaborators from the Research Services Office in the Vice-President (Research) portfolio, the Taylor Institute for Teaching and Learning, and the Cumming School of Medicine. A critical focus of this collaboration was creating a consolidated application system whereby students could be considered for multiple awards through a single online application.

In 2022, this network launched AwardSpring, an online award management software capable of managing all summer studentship applications, adjudication, and allocation processes. Currently, there are 15 awards in AwardSpring. See Appendix D for a list. Each award provides up to $7,500 of financial support for a student to learn about research firsthand with a supervisor for 8-, 12-, or 16-weeks between May and August. There are opportunities for undergraduate students in every faculty and every year of study. In 2023, this network formed the Undergraduate Summer Studentships Steering Committee (USSSC) to formalize roles and responsibilities for overseeing summer studentships at UCalgary.

766	**1,532**	**451**	**$3.2M**
received 766 applications	coordinated 1,532 reviews	awarded 451 students	distributed $3.2M in funding

In this spirit of growing collaboration, three PURE Award activities and initiatives were opened to other summer studentship awardees in 2023: the Summer Workshop Series, the Research Skills Foundation Badge, the Celebration of Achievement, and the Graeme Bell Travel Award.

Summer Workshop Series

Throughout the summer, we invite student recipients of a PURE Award, Alberta Innovates Summer Research Studentship, and Undergraduate Student Research Award to participate in a series of optional workshops dedicated to enhancing their research skill development and broadening their areas of interest. In 2023, the Summer Workshop Series consisted of 10 workshops, each facilitated by a campus partner with expertise in the workshop topic. See Table 3.

Table 3 Summer Workshop Series: Workshops and Facilitators

Workshop/Event	**Facilitator**	**Facilitator Faculty/Unit**	**# Participants**
Student Orientation	Kyla Flanagan Rachel Stewart Ghada Sfeir Stephanie Vahaaho	URI Office of Equity, Diversity and Inclusion Research Services Office	*Registration not required. Recording sent to everyone.*
Supervisor Orientation	Kyla Flanagan Rachel Stewart Ghada Sfeir Stephanie Vahaaho	URI Office of Equity, Diversity and Inclusion Research Services Office	*Registration not required. Recording sent to everyone.*
Ethics of Research with Human Participants	Jenny Godley	Conjoint Faculties Research Ethics Board	21
Getting Started with Research	Kyla Flanagan Rachel Stewart Ghada Sfeir Stephanie Vahaaho	URI Office of Equity, Diversity and Inclusion Research Services Office	91
Project Planning and Data Management in Research	Kyla Flanagan Rachel Stewart Heather Ganshorn	URI Libraries and Cultural Resources	102
Sex and Gender in Research	Lauren Drogos	Cumming School of Medicine	71
Research Security	Martha Wallace Clayton Lewis Matthew Gale	Research Services Office	74

	Jessica Edge		
Innovation and Commercialization in Research	Noor Al-Zanoon	Alberta Innovates	61
How to Share and Disseminate Your Research Findings	Kate Cawthorn Kathryn Ruddock	Libraries and Cultural Resources	62
Equity, Diversity and Inclusion in Research	Sevan Beaukian Ghada Sfeir	Office of Equity, Diversity and Inclusion	49
Research Skills Articulation	Kyla Flanagan Lisa Stowe	Taylor Institute for Teaching and Learning	61
Next Step in Research	Liliana Gonzalez	Centre for Career and Professional Development	34

In commitment to supporting equity, diversity, and inclusion (EDI) in undergraduate research, we connected with the Office of Equity, Diversity, and Inclusion to inform the design and content of the Summer Workshop Series.

In 2023, Dr. Ghada Sfeir of the Office of Equity, Diversity and Inclusion supported nearly every Summer Workshop Series facilitator in how to integrate EDI in all stages of the research processes. Dr. Sfeir…

4	**12**	**9**
Co-facilitated four summer studentship events and workshops	Supported 12 Summer Series workshop facilitators	Inspired nine Research Skills Foundation reflections

Research Skills Foundation Badge

As part of the Summer Workshop Series, participants choose four workshops to attend and reflect on to receive a digital badge. The Research Skills Foundation Badge micro-credential allows students to articulate the research skills they developed during their summer studentship digitally. In 2022, the Research Skills Foundation Badge was only open to PURE Award students. Consistent with previous years, the 2022 completion rate was 21%, with 26 of 122 PURE Awardees earning the micro-credential. In 2023, we opened the badge program to students from Alberta Innovates Summer Research Studentship and Undergraduate Student Research Award recipients. Across all three summer studentship awards, 36 (11%) of 338 students completed the badge.

Figure 5 Research Skills Foundation Badge

Celebration of Achievement

Each year, the URI hosts the Celebration of Achievement at the Taylor Institute for Teaching and Learning. The event highlights the incredible accomplishments of undergraduate researchers and their supervisors for that year. The evening features presentations by the Provost, Vice-President (Research), and Vice-Provost (Teaching and Learning). In 2022, the event was exclusive to PURE Award students and supervisors and included a digital expo showcasing several undergraduate research projects. In 2023, the Celebration of Achievement was opened to PURE Award, Alberta Innovates Summer

Research Studentship, and Undergraduate Student Research Award students and supervisors. In addition to a digital expo, the event included a gallery where students could showcase artifacts from their summer studentship projects. Research Rex also made an enthusiastic appearance.

Looking back on a year of exceptional undergraduate research experiences (UToday, 2024)

> *Anastasha Nebres is an engineering student who was awarded an USRA summer studentship to do research at the Laboratory for Turbulence Research in Aerodynamics and Flow Control. 'I had the opportunity to actively apply the knowledge gained in my coursework to a field I'm eager to build a career in, equipping me with practical skills and real-world insights,' she says.*

Graeme Bell Travel Award

The Graeme Bell Travel Award (GBTA) provides funding to students travelling to disseminate their undergraduate research. In 2023, two PURE Award students from the Faculty of Arts and Werklund School of Education received a GBTA to present their research at international conferences in Utrecht, Netherlands, and Hawaii, United States of America. Shortly after, the GBTA was opened to include recipients of the PURE Award, Alberta Innovates Summer Research Studentship, and Undergraduate Student Research Award recipients. At the time of creating this report, adjudication is ongoing. By the application deadline, we received ten applications: five from PURE Award recipients, four from Alberta Innovates Summer Research Studentship recipients, and one from an Undergraduate Student Research Award recipient.

READY FOR RESEARCH

The Ready for Research Badge launched its pilot year in October 2022. Over the Fall and Winter semesters, students participate in four required workshops and select two of eight optional workshops that match their interests. A campus partner with expertise in the workshop topic facilitates each workshop. See Table 5.

Table 4 Ready for Research Workshops and Participants (2022-23)

Status	Workshop	Facilitator	Faculty/Unit	Participants
Required	Getting Involved in Undergraduate Research at UCalgary	Kyla Flanagan	URI	709
	Integrity and Ethics in Undergraduate Research	Jenny Godley	Conjoint Faculties Research Ethics Board	372
	Applying for Undergraduate Research Funding #1	Kyla Flanagan	URI	365
	Applying for Undergraduate Research Funding #2	Kyla Flanagan	URI	315
Optional	Creativity in Research: Getting to a Research Question	Mindi Summers Jen Cuthbertson Kyla Flanagan	Faculty of Science URI	220

Finding Sources to Inform Your Research	James Murphy Bronte Burnette-Chiang Kyla Flanagan	Libraries and Cultural Resources URI	139
Organizing, Managing, and Citing Your Sources	James Murphy Bronte Burnette-Chiang Kyla Flanagan	Libraries and Cultural Resources URI	136
The Basics of Project and Data Management Planning for Research Projects	Heather Ganshorn Kyla Flanagan	Libraries and Cultural Resources URI	131
Research Community Building Panel	Erin Siemans Sharmaine Tay Douglas Li Batool AlMousawi Sigma Azad Harrison Blond	Faculty of Science Faculty of Arts Faculty of Science Cumming School of Medicine Haskayne Faculty of Nursing	39
How to Share and Disseminate Your Research Findings	James Murphy Kathryn Ruddock Kate Cawthorn Kyla Flanagan	Libraries and Cultural Resources URI	76
How to Present Research Visually	James Murphy Bronte Burnette-Chiang John Brosz Kyla Flanagan	Libraries and Cultural Resources Faculty of Science URI	85
Research Skills Articulation: How to Talk About Skills Gained Through Research	Kara Loy Lisa Stowe Kyla Flanagan	URI	72

The 2022-23 pilot cohort launched with 714 registrants, 153 (21%) of which completed the badge component. The 2023-24 cohort launched with 769 registrants, signalling continued student interest in the program.

As part of our broader evaluation of the Ready for Research Badge, we seek to learn about the impact of the program on students. This includes an exit survey for students who complete the micro-credential. This survey aims to learn about respondents' experience completing the badge and their recommendations for future program developments, including workshop topics and modality. Completing this survey is optional.

Figure 6 Ready for Research Badge

In 2023, we prompted badge recipients of the pilot cohort of the Ready for Research Badge to consider how/if their confidence in their ability to engage in research had changed by the end of the program. The three most prominent themes across respondents' answers were:

- **"My confidence in my ability to engage in the process of applying undergraduate research has increased"**: 52% of respondents described increased confidence in processes such as applying for awards and emailing potential supervisors. Many respondents emphasized that now that they know how the application process works, they can envision themselves doing undergraduate research in the future.

- **"My confidence in the skills I have to engage in undergraduate research has increased"**: 33% of respondents reflected on newly identified research skills they want to develop or newly appreciated research skills they already possess. Across both sub-themes, respondents expressed that this knowledge and appreciation affirmed that they were ready to begin their research journey. This sense of affirmation was especially strong in respondents who reported having received an undergraduate research opportunity, such as a research assistantship or summer studentship award.

- **"My confidence has decreased":** 9% of respondents expressed a decreased sense of confidence in their ability to engage in undergraduate research at the end of the program. Broadly, their reasonings were either that they applied for an undergraduate research opportunity but did not receive it or that they perceived research as daunting. In the words of one respondent, "My confidence went down, to be honest. I was intimidated, but hopefully, I would have the courage in the future to apply." In light of this feedback, we have added additional emphasis on resilience in the 2023-24 Ready for Research curricula.

In 2023, the Ready for Research Badge was featured in UToday and the Gauntlet.

Badge program inspires students to become innovators (UToday, 2023)

> *For Jasmine El-Hacha, a fourth-year student in concurrent Bachelor of Education and Arts studies, research hasn't been discussed as openly as in other programs. 'Ready for Research has not only opened me up to the idea of pursuing research myself but shown me that it comes in different forms and all of them are necessary and exciting.'*

New undergrad badge program inspires research involvement amoung students (Gauntlet, 2023)

> *'Students loved the chance to get together and meet with others who were interested in research across campus so that was a neat way to facilitate people to get to know each other through their shared passion for research,' said Flanagan. 'But mostly I think it's really about building up those skills and confidence in students to see themselves as researchers,' she continued.*

Since 2020, the URI and Libraries and Cultural Resources have collaborated to offer undergraduate researchers workshops related to diverse elements of the research process, from finding and managing sources to sharing research findings. In 2023, James Murphy and Bronte Chiang of Libraries and Cultural Resources and Kyla Flanagan and Rachel Stewart of the URI co-presented a poster at the International Society for the Scholarship of Teaching and Learning (ISSOTL) Annual Conference in Utrecht, Netherlands: "Library programming in undergraduate 'Ready for Research' badge: Reflections from librarians and students."

Libraries and Cultural Resources' support and expertise are standing elements in the Summer Workshop Series and Ready for Research Badge curricula. Since 2020, Libraries and Cultural Resources has…

6

Facilitated six Summer Series workshops

6

Facilitated six Ready for Research workshops

1

Presented one poster at ISSOTL 2023

COURSE-BASED UNDERGRADUATE RESEARCH EXPERIENCES (CURE)

From Fall 2022 to Fall 2023, 12 course instructors and nine research coaches facilitated 9 CURES in four faculties in second-, third-, and fourth-year undergraduate courses. Across these courses, 272 students were enrolled. See Table 6.

Table 6 CURE Courses and Instructors (2022-23)

Semester	Faculty	Course	Course Instructor(s)	# Research Coaches	# Students Enrolled
Fall 2022	Arts	COMS 591: Senior Seminar in Communication and Media	Dr. Victoria Guglietti	1	25
		INDG 415: Indigenous Ethics and Protocol	Dr. Adela Kincaid	1	15
	Science	ZOOL 435: Entomology	Dr. Ogonna Nwankwo	1	61
Winter 2023	Arts	ITAl 599: Topics in Italian Studies II	Dr. Eleanora Buonocore	1	8
		LANG 301: Topics in Research Methods and Analysis	Dr. John Scott	1	10
	Cumming	MDCS 301: Introduction to Bioinformatics	Drs. Tatiana Maroilley, Tarailo, Graovac, David Anderson	1	36
	Kinesiology	KNES 503: Special Topics in Kinesiology	Dr. Leigh Gabel	1	32
Fall 2023	Cumming	CORE 435: Research Methods	Dr. Meaghan Edwards	1	45
	Kinesiology	KNES 503: Special Topics in Kinesiology	Dr. Leigh Gabel	1	40

In 2022-23, the URI funded nine research coaches in a CURE. Research coaches are paid graduate or senior undergraduate students who can work up to 20 hours per week to a maximum of 280 hours during the academic term in which the CURE is running. The URI provides research coaches introductory training, and the CURE instructors provide regular mentoring and support.

In the Fall of 2022, two CUREs incorporated nine community partnerships. In INDG 415: "Indigenous Ethics and Protocol," Dr. Adela Kincaid partnered with the Alberta Institute for Wildlife Conservation to apply for a MITACS grant that would provide $60,000 to support four undergraduate research positions at the Alberta Institute for Wildlife Conservation. Their application was successful. In ZOOL 435: "Entomology," Dr. Ogonna Nwankwo partnered their CURE with the Katmai US National Park Service in Alaska, Cornell Laboratory of Ornithology & Birds Canada, CourseSource, Audubon Christmas Bird Count, iNaturalist, and the City of Calgary.

CURE Community of Practice

In Fall 2023, we launched the CURE Community of Practice (CoP). Every six weeks, the CoP brings together past, present, and future CURE instructors to learn from each other, explore scholarly concepts, and reflect on their learning about facilitating undergraduate research through course-based experiences. Each member brings a diverse breadth and depth of experience in offering a CURE in their classrooms. In their inaugural semester, their discussions focused on how applying the Undergraduate Research Framework looks in practice.

Currently, the CURE Community of Practice consists of 10 instructors from five faculties, with past and present CUREs ranging from classes of 8 students to 1,200(+) students:

- Cumming School of Medicine
- Faculty of Arts
- Faculty of Kinesiology
- Faculty of Science
- Schulich School of Engineering

WHAT'S NEXT

At the time of writing this report, UCalgary's *Academic Innovation* and *Research Innovation* plans have been drafted and shared for campus feedback. Already, we can see strong alignment and connection with our work. In the *Academic Innovation Plan,* Domain #3: Leading in Teaching and Learning, undergraduate research is one of a few activities that prepare students to "take on roles as active citizens and to thrive in an increasingly complex world". In the *Research Innovation Plan,* Domain #1: Enhancing Institutional Capacity, undergraduate research is the catalyst to strengthen connections between undergraduate students and "the research ecosystem". Once the final versions of these plans are published, we will be keen to review the strategic activities and initiatives that will support and advance UCalgary's *Ahead of Tomorrow* strategic plan.

In Fall 2023, Cenovus Energy committed a $2M investment to address barriers to equity for UCalgary undergraduate students. $500,000 of this investment went to the PURE Award to support students from equity-deserving groups getting into research. Over the next two years, these funds will support at least 60(+) students engaging in undergraduate research at UCalgary.

Cenovus advances inclusion while building leaders, empowering through research, and committing to innovation at UCalgary (UToday, 2023)

> *UCalgary's PURE Program delivered through the Taylor Institute for Teaching and Learning is now supported by Cenovus Energy, with a focus on advancing opportunities for equity-deserving groups.*

Lastly, after an external review of UCalgary's URI by the University of Alberta, we have set several goals for our programming and initiatives. The biggest gap identified at UCalgary was one-on-one advising and support for students looking to get involved in research. Over the next year, our team would like to pilot new ways to support students navigating undergraduate research. This could be drop-in hours, one-on-one appointments, and peer-to-peer mentorship programming. We will also explore a newsletter and other ways to enhance students' awareness of the programming and supports we offer. We have also begun a collaboration with the Student's Union to create a Student Guide to Undergraduate Research that can be used as a resource to help students get involved in research.

APPENDIX A: URI SIGNATURE PROGRAM LEARNING OUTCOMES

PURE Award

Learning Bundle	Learning Outcomes
Research Skills	Develop a research plan, identify a specific area of inquiry, assess the viability and suitability of research practices, carry out the research plan and communicate research findings
	Collaborate with other researchers in designing, planning, and implementing a research project
	Describe the importance of your research to communities on- and off-campus; effectively communicate the value and impact of your research and conclusions to various audiences
Research Identity	Reflect on and articulate the impact of the PURE research experience on research skill development and researcher identity
Career Goals	Reflect on and articulate the impact of the PURE research experience on academic and professional growth and career goals
Community Building	Establish and participate in a community of scholars, developing a network of undergraduate, graduate, and faculty researchers across campus and beyond

Ready for Research Badge

Outcome	Domains
Describe the undergraduate research context at UCalgary, demonstrating an awareness of undergraduate research opportunities and strategies for engaging in undergraduate research	cognitive domain – comprehend affective domain - value
Demonstrate an appreciation and respect for the diverse ways of knowing and doing research and respect the variety of beliefs and motivations that go into research practices	affective domain – value
Describe and practice research ethically and with integrity, adhering to UCalgary's Research Integrity Policy and Code of Conduct	cognitive domain – comprehend affective domain – internalize values
Develop a reflective research practice, articulating the skills developed through research experiences	affective domain – conceptualize values
Develop an identity as a researcher, displaying confidence to engage in undergraduate research	affective domain – conceptualize and internalize values
Formulate a research journey plan to demonstrate a commitment to engage in undergraduate research	cognitive domain – create affective domain – internalize values

CURE

Participants	Outcomes
Students	Determine a research trajectory by developing a research plan, identifying a specific area of inquiry, assessing the viability and suitability of research practices, carrying out the research plan and communicating research findings
	Collaborate with other researchers to apply disciplinary approaches in designing, planning, and implementing a research project
	Describe the importance of research to communities on- and off-campus; effectively communicate the value and impact of research and conclusions to various audiences
	Reflect on and articulate the impact of the research experience on research skill development and researcher identity
Course Instructors	Design and integrate course activities to focus student learning on knowledge production
	Facilitate students moving through the challenges and opportunities of term-based research
	Participate in a collaborative practice of teaching with innovative, evidence-based pedagogies
	Generate contributions to the scholarship of teaching and learning / educational research
Research Coaches	Develop professional and academic skills in facilitating learning and mentoring research
	Collaborate on the delivery of innovative, research-focused pedagogy
	Advance a scholarly and practical understanding of teaching and learning approaches/techniques

APPENDIX B: *UNDERGRADUATE RESEARCH LISTENING TOUR (2023)*

Undergraduate Research Listening Tour

Undergraduate research enhances students' experience, drives innovation through teaching and research integration, increases research capacity, and connects universities, educators, and learners with campus and external communities. The University of Calgary has long considered undergraduate research to be an impactful contributor to both Academic and Research plans. In *Ahead of Tomorrow: University of Calgary's 2023-30 Strategic Plan*, "creating research opportunities for undergraduate students," is listed as a cross-cutting initiative in "Strategy 1: Increasing access to impactful and future-focused education." As a signature form of Experiential Learning outlined in the *Experiential Learning Plan (2020-25)*, the College of Discovery, Creativity, and Innovation (CDCI) has led an Undergraduate Research Initiative since 2020 to expand and enhance undergraduate research opportunities across campus.

The Listening Process
To learn about the highlights and challenges of undergraduate research from the perspective of academic units at UCalgary, Dr. Kyla Flanagan, Academic Lead of the CDCI, initiated a listening tour with academic units. During the summer of 2023, there were 11 listening sessions with **10 of 11 academic units** across campus. Each gathering was with small groups of faculty leadership, including Associate Deans, Teaching and Learning, Undergraduate, and Research. A common set of questions about undergraduate research priorities, challenges, and opportunities guided these conversations. Listening session notes were shared with units afterwards for review and validation with all participants. Here, we provide a high-level overview of the themes and insights from the listening tour.

Key Themes

Why Undergraduate Research?	*Who Does Research?*	*What Counts as Research?*
Every faculty leader expressed excitement for the hands-on, experiential, and transformative learning that undergraduate research provides students. From engaging in an authentic discovery process to sharing the thrill of an "ah ha" moment, undergraduate research creates a unique learning experience for students to build curiosity, begin seeing themselves within the discipline, and understand the connections between theory and practice.	Leaders from seven of ten (70%) faculties reflected on the question of "who does research?" For some disciplines, the term "research" seemed misaligned with the program's aims. Phrases like "scholarly-informed practice," "business case," and "knowledge mobilization" were better fits. For others, there were questions about "who does research" in teaching and research faculty roles. Consequently, there were thought-provoking conversations about how to prepare undergraduates for research and who mentors undergraduate researchers.	Leaders from six of ten (60%) faculties reflected on what counts as "real" research. Some units saw value in undergraduate research as a *process* of discovery, even if the outcome was only new to the student and not the discipline. Leaders recommended providing clarity around expectations for research at the undergraduate level. Many leaders urged including a broad range of activities from research that's funded and published to research that's focused on curiosity, knowledge generation, and critical thinking.

Highlights for Undergraduate Research

Multiple Points of Pride	Leaders from eight of ten (80%) faculties discussed specific undergraduate research opportunities as a point of pride in their programs, including soon-to-launch programs focused on research, for example: • Werklund School of Education: Bachelor of Education, Honours • School of Architecture, Planning & Landscape: Bachelor of Design in City Innovation • Faculty of Kinesiology: $30M Snyder Gift; undergraduate research seminar courses
Honours degrees	Honours programs featured prominently in the highlights for undergraduate research across programs. In the 2023-24 Academic Calendar, six (55%) out of eleven faculties with undergraduate programs offer honours degrees. This means that 67 (68%) out of 98 majors have options for students to undertake an honours research project.
Research-informed practitioners	Leaders from five (50%) of ten faculties spoke about the critical role of research in shaping the next generation of practitioners in their field, for example, in nursing and education. They talked about the strength of research-informed practitioners in navigating complexity, understanding the nature of knowledge, mobilizing theory to practice, and bringing a "researcher mindset" to their practice.
Summer Studentships	Opportunities for summer research were consistently highlighted as essential for undergraduate research in academic units. Fifteen summer studentships provide up to $7,500 of financial support for UCalgary undergraduates to conduct research between May and August. In 2023, 338 students received $3M (+) in summer studentship awards.

Challenges for Undergraduate Research

Students' Interests & Abilities	Leaders from seven of ten (70%) faculties expressed challenges in matching students' research interests with their abilities. Specifically, researchers would like support in translating their research expertise into undergraduate research-appropriate activities and assessing whether undergraduate students have the knowledge and skills requisite to doing research.
Resources	Leaders from six of ten (60%) faculties described challenges related to the resources required for undergraduate research, including funding, time, and access. Some emphasized the intense and hidden resource costs required to mentor those new to research. Others expressed concern about whether current undergraduate research opportunities provided students with adequate funding. Some students may be able to forgo other paid work to participate in a research studentship, while others may have to decline for financial reasons.
Faculty Capacity	Leaders from five of ten (50%) faculties shared challenges related to the lack of incentives and recognition for mentoring undergraduate research. Factors that impact these challenges include an academic culture that emphasizes graduate student mentorship and high teaching loads for teaching faculty.

Opportunities for Growing Undergraduate Research

Suggestions for enhancing undergraduate research experiences at UCalgary included:
- Integrating meaningful research experiences into the undergraduate curriculum to ensure access and inclusion.
- Creating undergraduate research summer institutes, certificates, or "boot camps," providing new ways for students to engage in research.
- Creating a tool to match faculty and student research interests, including in the scholarship of teaching and learning
- Creating new or growing existing honours programs, further embedding research in curricular programs.
- Leveraging industry, community, or government partnerships to expand opportunities.
- Creating an undergraduate research mentorship award to recognize the efforts of mentors across campus.

APPENDIX C: SOCIAL NETWORK ANALYSIS - FACULTIES, UNITS, AND INITIATIVES IDENTIFIED (2022-23)

Faculties
- Cumming School of Medicine
- Faculty of Arts
- Faculty of Kinesiology
- Faculty of Nursing
- Faculty of Nursing - Qatar
- Faculty of Science
- Faculty of Social Work
- Faculty of Veterinary Medicine
- Haskayne School of Business
- School of Architecture, Planning and Landscape
- Schulich School of Engineering
- Werklund School of Education

Units
- Centre for Career and Personal Development
- Conjoint Faculties Research Ethics Board
- Knowledge Engagement
- Libraries and Cultural Resources
- Office of Equity, Diversity and Inclusion
- Office of the Vice-President (Research)
- Provost and Vice-President (Academic)
- Research Services Office
- Taylor Institute for Teaching and Learning
- University Legal Services
- Writing Symbols Lodge

Initiatives
Summer Studentships
- Alberta Innovates Summer Research Studentship (SRS)
- Biomedical Engineering (BME) Summer Research Studentships
- BRAINCREATE
- Dianne LaFlamme-McCauley Summer Research Studentship
- Libin Cardiovascular Institute: Donald and Loreen Dunklee Summer Studentship in Heart Research
- McCaig Institute for Bone and Joint Health RR Singleton Summer Studentship
- O'Brien Centre Summer Studentship (OCSS)
- Program for Undergraduate Research Experience (PURE) Award
- Undergraduate Student Research Award (USRA)
  - Social Sciences and Humanities Research Council (SSHRC USRA)
  - Natural Sciences and Engineering Research Council (NSERC USRA)
  - Canadian Institutes of Health Research (CIHR USRA)

URI
- Research Skills Foundation Badge

- Ready for Research
- PURE Award
- CURE
- CURE Community of Practice

APPENDIX D: SUMMER STUDENTSHIPS AT UCALGARY

The following summer studentship are currently part of AwardSpring, UCalgary's consolidated application system for undergraduate research awards.

- Alberta Innovates Summer Research Studentship (SRS)
- Biomedical Engineering (BME) Summer Research Studentships
- BRAINCREATE
- Dianne LaFlamme-McCauley Summer Research Studentship
- Libin Cardiovascular Institute: Donald and Loreen Dunklee Summer Studentship in Heart Research
- McCaig Institute for Bone and Joint Health RR Singleton Summer Studentship
- O'Brien Centre Summer Studentship (OCSS)
- Program for Undergraduate Research Experience (PURE) Award
- Undergraduate Student Research Award (USRA)
- Social Sciences and Humanities Research Council (SSHRC USRA)
    - Natural Sciences and Engineering Research Council (NSERC USRA)
        - NSERC USRA for Black Scholars
        - NSERC USRA for Indigenous Scholars
    - Canadian Institutes of Health Research (CIHR USRA)