

UNIVERSITY OF CALGARY | Taylor Institute for Teaching and Learning

2020 Program for Undergraduate Research Experience (PURE)

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EXECUTIVE SUMMARY

The Program for Undergraduate Research Experience (PURE) provides student-led experiential research opportunities for University of Calgary undergraduate students. PURE recipients receive up to \$6,000 to undertake an 8, 12, or 16-week research project conducted between May and August. Throughout, PURE supervisors provide essential mentorship on research and professional skills development. Since 2004, the Vice-President Academic and Vice-President Research have provided matching funds for PURE as a unique program at the intersection of teaching and research. The PURE team also supports and administers Faculty-funded PUREs, in a partnership model where the academic units sponsor PURE awards and those awards go to students enrolled in programs within their units. PURE is led by staff in College of Discovery, Creativity and Innovation -- a hub within the Office of Experiential Learning -- with the support of the Vice-Provost, Teaching and Learning, the Vice-President Academic, and the Vice-President Research. PURE contributes to priorities in the Academic and Research Plans and exemplifies *Research-Based Experiential Learning*, as defined in the University of Calgary's Experiential Learning Plan.

In March 2020, the PURE cohort shifted from in-person to remote delivery in response to the physical distancing mandates of COVID-19. In this report, we, the PURE Team, summarize program activities and outcomes for 2020 and provide strategic priorities and directions for 2021 and beyond.

Recipients and Funding

In 2020, PURE supported 137 students and 122 supervisors. A total of 514 students applied to the program, a record number of applicants. Most PURE students elected to conduct a 16-week research-term and were in their third year of study. In 2020, three academic units supported Faculty-funded PURE awards, bringing the total PURE funds to \$765,000.

2020 Program Enhancements

In commitment to continuously improving the PURE experience, we made four program enhancements for 2020: offered eight new workshops and events for students and supervisors, launched the Research Skills Foundation Badge (a micro-credential), upgraded the student final assignment, and developed a new program evaluation and reporting plan. PURE students and supervisors were also highlighted in four UToday stories, receiving 1,331 non-unique page views.

Innovation and Impact

Our new program evaluation plan included entry and exit student surveys, a focus group for students, and an exit survey for supervisors. Findings highlighted the positive impact PURE continues to have on undergraduate research at UCalgary. Student data repeatedly emphasized positive gains in four skillsets: reading and understanding literature, working independently and resiliently, writing for a research audience, and understanding the research process. Students also connected these gains to their future aspirations (graduate school, work in their chosen field, etc.). For supervisors, 98.4% of survey respondents stated that based on their experience this year, they were moderately to extremely likely to supervise another PURE student in the future. Supervisors' recommendations for how PURE can improve were diverse, e.g., additional student workshops, funding, and supervisor supports.

Conclusions and Future Directions

Despite the shift to remote delivery, PURE students and supervisors repeatedly demonstrated innovation and resilience in research. As the PURE team, we were also able to make substantial program enhancements. Considering our 2020 evaluation findings, for 2021 we will continue to evolve PURE activities and opportunities for students and supervisors. Foremost, we commit to examining PURE with an Equity, Diversity, and Inclusion (EDI) lens, from both student and faculty perspectives. We also commit to implementing student writing clubs, integrating with the FUSION Skill Development Program, and creating optional resources for PURE supervisors.

For 2021 and beyond, we will continue to ensure PURE is an accessible, high-quality undergraduate research and experiential learning opportunity at UCalgary. To achieve this, we intend to increase the monthly student stipends and the number of awards we allocate by expanding partnerships with Faculties and connecting with the Office of Advancement to seek external funding.

INTRODUCTION

For over sixteen years, the Program for Undergraduate Research Experience (PURE) Award has been a signature experiential learning activity at the University of Calgary. **PURE provides individual undergraduate students with up to \$6,000 of financial support to undertake an 8, 12, or 16-week research project conducted between May and August.** Entry into the program is via a competitive application process. Students initiate ideas for a research topic and question and partner with a faculty supervisor to collaboratively develop a proposal. Once awarded, students and supervisors engage in an immersive, hands-on, student-led research experience, implementing the student's project from design to dissemination. In tandem with their supervisor's mentorship, students can participate in workshops on various research skills, e.g., writing systematic literature reviews led by the PURE Team.

Since 2004, the Vice-President Academic and Vice-President Research have provided equally matched funding for PURE. PURE operates out of the Office of Experiential Learning, with the support of the Vice-Provost, Teaching and Learning, the Provost, and the Vice-President Research. The program also supports *Faculty funded* PURE awards allocated to students within the respective Faculty. These unique contributions ensure that PURE profoundly contributes to the [Academic](#) and [Research](#) Plans by enhancing student experience and impact, driving innovation through teaching and research integration, increasing research capacity, and connecting communities. PURE is also an exemplar of *Research-Based Experiential Learning*, as defined in the [Experiential Learning Plan](#). Such activities support students in developing skills and capacities for creativity, innovation, and discovery by leading or contributing to a research project. There are two experiential learning programs affiliated with PURE: the Graeme Bell Travel Award (GBTA) and the Research Skills Foundations Badge. The GBTA provides funding to students travelling to disseminate their PURE research (modified this year to support *virtual* conferences or symposiums). The Research Skills Foundations Badge is a new **micro-credential** that recognizes students' participation in and reflection on PURE activities.

The program application and allocation processes are administered in partnership with awards in the Cumming School of Medicine and the Research Services Office. Collectively, these awards are known as the Undergraduate Research Awards or the Summer Studentship Awards. Research applications are submitted through a Consolidated Application System (CAS), wherein students submit *one* application per academic year to be considered for *many* undergraduate research awards valued at \$6,000. Over the years, the CAS has been designed by UCalgary IT services specialists to meet each award's unique eligibility and adjudication criteria, including different rubrics for health-related and non-health-related applications. The automation of eligibility criteria, and ability to evaluate applications within the CAS has substantially streamlined the award allocation process for faculty member adjudicators and program administrators. The CAS, adjudication, and award allocation processes are coordinated collaboratively by PURE team, members of the Cummings School of Medicine, and Research Services Office. This collaborative effort allows for as many students as possible to receive an undergraduate research award, while minimizing the administrative burden of the awards.

In March 2020, plans for the PURE 2020 cohort were dramatically altered by the COVID-19 pandemic. Within days, UCalgary shifted from primarily in-person to remote teaching and research as governments

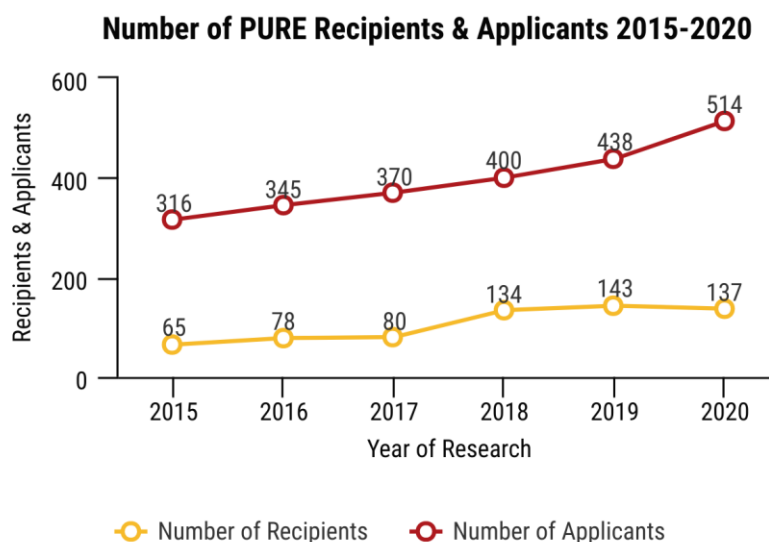
implemented physical distancing mandates. The Vice-President Academic and Vice-President Research maintained their commitment to support undergraduate research, and PURE shifted exclusively to remote programming just weeks before program launch. For students and supervisors, proposed research projects were adjusted for a remote setting or re-designed entirely. Some students returned to campus to conduct in-person research in August once UCalgary COVID-19 Expanded Research Designation protocols allowed. One student withdrew from PURE within the first couple weeks of their research term due to personal concerns associated with COVID-19.

The total 2020 PURE student awards budget was \$765,000. This funding supported research projects for 137 students and 122 supervisors from ten academic units: Arts, Cumming School of Medicine, Haskayne School of Business, Kinesiology, Nursing, Schulich School of Engineering, Science, Social Work, Veterinary Medicine, and Werklund School of Education. In this report, we, the PURE Team, summarize the program activities and outcomes for 2020. We outline recipient information and funding and detail the program enhancements for 2020, including new workshops and events and a comprehensive program evaluation plan. We also highlight PURE students’ and supervisors’ research innovation, impact, and resilience in response to COVID-19. To conclude, we reflect on our findings and provide strategic priorities and directions for 2021 and beyond.

2020 RECIPIENT INFORMATION

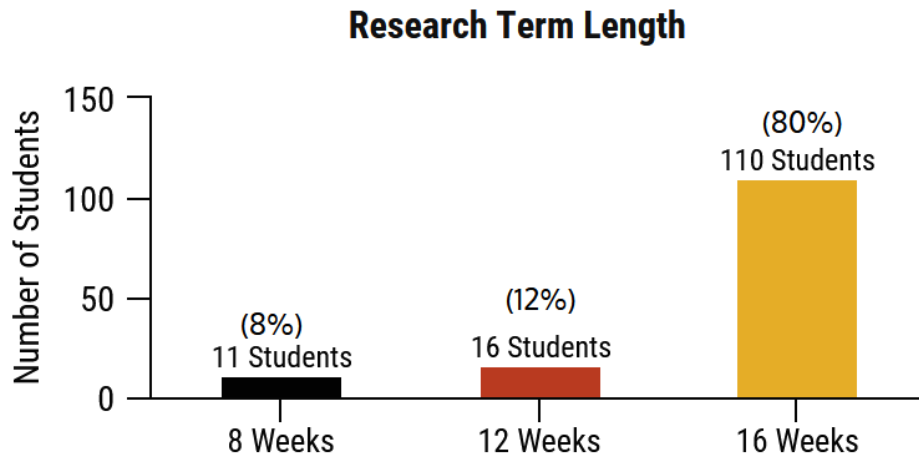
In 2020, the PURE program supported the research of 137 students and 122 supervisors between May-August. A total of 514 students applied to the program, a record number of applicants. This represents a 17% increase in applicants from 2019 and is consistent with the program growth over the past five years (Figure 1). The applicants’ overall success rate, including Faculty funded awards, was 27%, down slightly from 33% in 2019 due to the increase in applicants.

Figure 1 PURE Recipients and Applicants 2015-2020



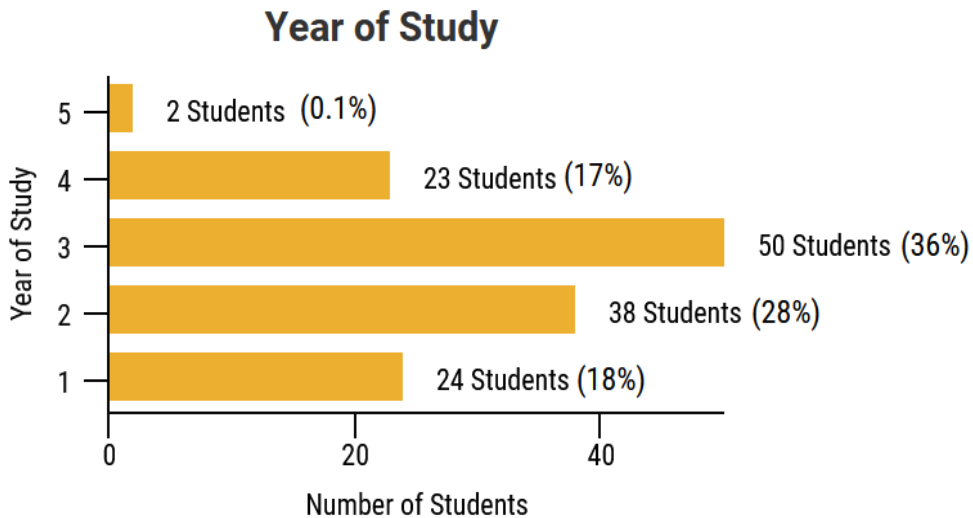
The majority of PURE students (80%) elected to conduct a 16-week research-term (Figure 2). The breakdown of research term lengths has been consistent over the last five years, with between 75 – 80% of students selecting 16-week research terms.

Figure 2 PURE 2020 Student Research Term Lengths



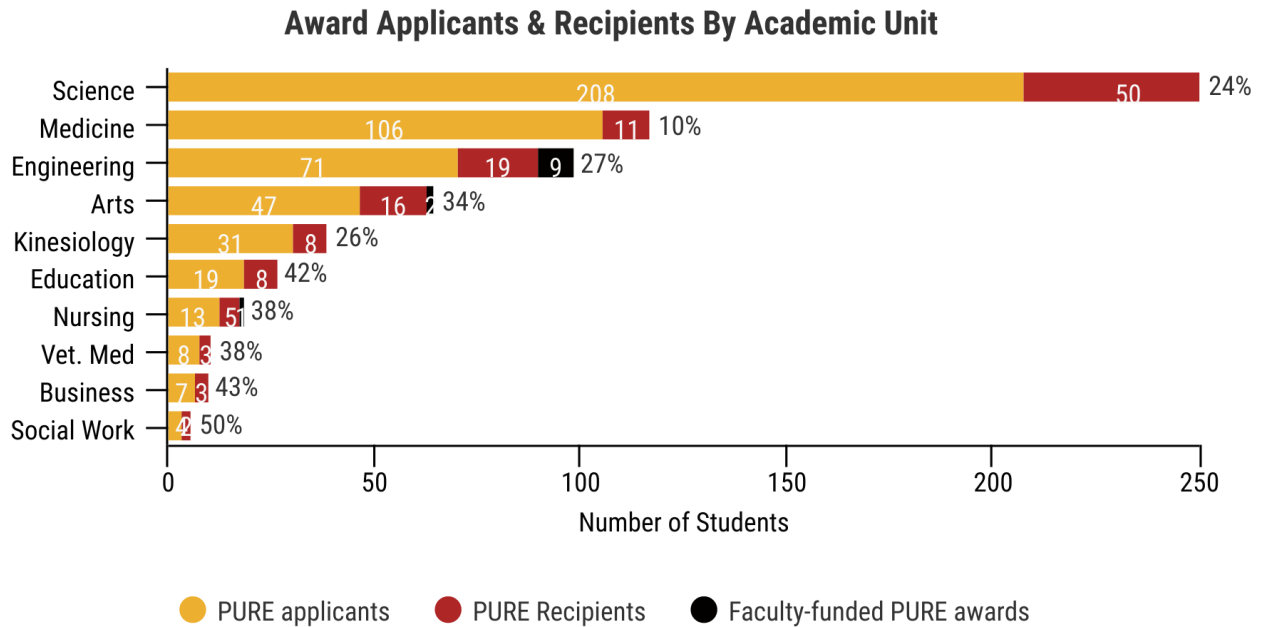
PURE students were most commonly in their third year (36%), but there was a strong representation from first to fourth year (Figure 3).

Figure 3 Year of Study for PURE 2020 Students



Faculty of Science students held the most PURE awards (50), with the next highest number being in the Schulich School of Engineering (28) and then students in the Faculty of Arts (18) (Figure 4). We aimed to apply a consistent success rate across the applicant pools for each Academic Unit in award allocation.

Figure 4 Award Applicant and Recipients by Academic Unit in 2020



*Engineering, Arts, and Nursing had Faculty funded PURE awards, shown in black. The percentage success rate shown was determined by excluding Faculty funded awards.

2020 PURE FUNDING

The total PURE funds for 2020 was \$765,000 (Table 1). Most of the PURE budget is from the offices of the Provost and Vice-President Research. We allocated \$3,500 for the Celebration of Achievement; however, this event was held virtually, and the event allocation was carried forward to 2021.

Table 1 Finding Sources and Amounts

Funding Source	Amount
Total VPR and VPA	\$704,000
Total Faculty Funded Awards	\$70,500
Total Funds	\$765,000

The PURE team also supports *Faculty funded* PURE awards allocated to students within the respective Faculty. The Schulich School of Engineering has a partnership model where additional PURE awards are supported 50% by the Faculty and 50% by the research supervisor. Other Faculties offered additional PURE awards valued at \$6k to support their students (Arts, Nursing).

MITACS RESEARCH TRAINING AWARD (RTA)

In 2020, the PURE Team supported the implementation of the MITACS Research Training Award (RTA), an emergency fund developed by MITACS to support post-secondary students during the pandemic. In collaboration with UCalgary Research Services Office, 63 unfunded PURE-eligible students who applied through the Consolidated Application System were offered and accepted the MITACS RTA. Of the 63 acceptances, one student later withdrew from their award, resulting in 62 MITACS RTA students. Students started their 12-16 week research terms before Aug 31, 2020 and were awarded \$6,000.

2020 PROGRAM ENHANCEMENTS

As a commitment to continuously improving the student and supervisor PURE experience, we made four substantial program enhancements for 2020: offered new workshops and events, launched the Research Skills Foundation Badge, upgraded student final assignment, and developed a new program evaluation plan and reporting.

New Workshops and Event Offerings

We created **eight** new workshops and events for both PURE students and supervisors. See Table 2 for the programming schedule. We would particularly like to highlight the successes of:

- **Supervisor orientation:** Many faculty members were new to PURE. In early May, we hosted **two** supervisor orientations, which 43% (52) of supervisors attended, and these events were well-received. Based on this success, these will become permanent program offerings.
- **Systematic review workshops:** Drs. Alix Hayden and Zahra Premji of Libraries and Cultural Resources facilitated **seven** workshops on conducting a systematic literature review. Students and supervisors resoundingly praised the positive impact of this workshop on student success, particularly given the applicability of systematic reviews to remote research.
- **Community building workshop:** In collaboration with Kevan Coyle (Hunter Hub for Entrepreneurial Thinking), we hosted a research community building workshop. A panel of early-career researchers from diverse research disciplines discussed how community building impacted their research and career after graduation.

Table 2 PURE Programming, Facilitators and Participants Numbers

Date	Session Title	Facilitator(s)	Number of Participants
May 1	PURE Student Orientation	Flanagan	132
May 5	*NEW* PURE Research Supervisor Orientation #1	Flanagan	39
May 6	*NEW* Supervisor workshop for Systematic Reviews	Hayden & Premji	23
May 7	*NEW* Systematic Review workshop #1 (am session)	Hayden & Premji	41
May 7	*NEW* Systematic Review workshop #1 (pm session)	Hayden & Premji	30
May 8	*NEW* PURE Research Supervisor Orientation #2	Flanagan	13
May 14	*NEW* Systematic Review workshop #2 (am session)	Hayden & Premji	45
May 14	*NEW* Systematic Review workshop #2 (pm session)	Hayden & Premji	26
May 21	*NEW* Systematic Review workshop #3 (am session)	Hayden & Premji	35
May 21	*NEW* Systematic Review workshop #3 (pm session)	Hayden & Premji	23

June 11	*NEW* Community Building workshop	Flanagan & Coyle	39
July 16	*NEW* Research Skills workshop (writing abstracts)	Flanagan	80
Aug 13	*NEW* Research Skills workshop (critical reflection)	Flanagan	66
Sept 28	Celebration of Achievement	Flanagan & Team	90
Total (non-unique) Participants			682

Research Skills Foundation Badge



To recognize and celebrate students' participation in PURE workshops, we created the Research Skills Foundation Badge. With a focus on creativity, discovery, and innovation, this micro-credential empowers students to engage with and reflect upon their research skills with confidence. This optional micro-credential acknowledges in a sharable, portable, digital way students' research skills developed through PURE programming. Participants chose four workshops or events to attend and reflect on for badge submission and credit, based on their areas of interest and desired research skills development. **24 students** earned the elective micro-credential.

New Final Assignment

As a condition of the PURE award, students are required to submit a final assignment. This year, we developed a new final assignment aligned with our modified program learning outcomes (Appendix A). This assignment consisted of three parts. First, students had to create a written or visual abstract of their PURE project. The abstracts were collected into a *Book of Abstracts* shared with students and supervisors at the end of September. Second, students had to disseminate their research process, findings, and synthesis. This component was flexible in format so long as it was agreed upon with their supervisor. Last, students used the DEAL Model (a critical reflection tool for experiential learning that frames how students can *describe* their experience, *examine* it, and *articulate* their *learning*) to reflect on the impact of their PURE experience regarding their skill development, researcher identity, academic/professional growth, and career goals.

New Evaluation Plan & Reporting

To document and understand student and supervisor outcomes and experiences in PURE, we created a new PURE evaluation and reporting plan. The evaluation included: launching student entry and exit surveys (Appendix B) aligned with program outcomes and undergraduate research scholarship, creating a supervisor exit survey (Appendix C) focused on supervisor experience, and conducting focus groups on student experience and skill development. Individual evaluations (e.g., student entry survey) informed messaging, communications, and content for PURE workshops and resources. Collectively, evaluation findings illuminated strengths and potential growth areas, experience and engagement, and program processes and outcomes.

Additional Program Enhancements

We also incorporated several smaller program enhancements that were targeted in our 2019 report. Highlights include:

- Development of the PURE D2L (learning management) site as a student-facing repository of resources, guides, timelines, and asynchronous learning materials. Examples of new resources include new-to-research tips, timelines, risk management, difficult conversations, and working conditions.
- Creation of supervisor D2L resources with supervisors having access to the PURE D2L site.
- Delivered PURE virtual social events to promote community building and peer connection.
- Delivered a monthly newsletter to PURE supervisors, including program updates and best practices for mentoring undergraduate research.

STORYTELLING

Featured stories



From pandemic data storytelling to topographical brain maps, PURE undergrad researchers are at forefront of digital data transformation

Students use advanced research and data literacy techniques to develop next-generation digital skills...

[Read more »](#)



Nursing students benefit from 2020 PURE studentships

[Read more »](#)



Award ignites UCalgary student's interest in studying accessible mobility on post-secondary campuses

[Read more »](#)



Undergrad students spend summer working with Indigenous youth

[Read more »](#)

Image 1: Screenshot of PURE UToday Stories

UToday stories featured and celebrated the diverse achievement of PURE students across campus:

- “Award ignites UCalgary student’s interest in studying accessible mobility on post-secondary campuses” ([link](#)) - 233 unique pageviews.
- “Undergrad students spend summer working with Indigenous Youth” ([link](#)) - 352 unique pageviews.
- “From pandemic data storytelling to topographical brain maps, PURE undergrad researchers are at the forefront of digital media transformation” ([link](#)) - 408 unique pageviews.
- “Nursing students benefit from 2020 PURE studentships” ([link](#)) - 338 unique pageviews.

INNOVATION AND IMPACT

Each PURE award is a unique opportunity for a student to develop a research question, explore personal research interests, practice research and professional skills, and receive mentorship from a Faculty member. See Table 3 for examples of the innovative student projects made possible by PURE. In response to COVID-19 physical distancing mandates, eight students in five faculties adapted their

research topics to something related to COVID-19 (Schulich: 4, Werklund: 1, Kinesiology: 1, Medicine: 1, and Nursing: 1).

Table 3 Sample PURE Research Project Titles

Faculty	PURE Project Title
Arts	The remote autobiographical memory questionnaire (RAMQ): assessing the accuracy of childhood memories in older adults
	International Indigenous employment: a comprehensive content analysis of empirical studies
	Science in nineteenth-century periodical the Boy's Own Paper
Haskayne	Perception of hiring algorithms
	Advancing ii'taa'poh'to'p: best practices within Indigenous Studies
	Omar Khadr v. Supreme Court of Canada – the unanswered questions
Kinesiology	Obesity, early life gut microbiota and antibiotics
	Differences in student experience and learning outcomes after experiential learning reform in a senior level undergraduate exercise physiology lab
	Sikh religious leadership's perception of how a community-centered religious organization can play a role in increasing health and wellness literacy
Medicine	Alberta opioid and cannabis-related emergency department visits in the COVID-19 context
	A new therapeutic approach to facilitate joint attention in autism spectrum disorder: a prospective pilot study
	The impact of virtual visitations on patient and physician satisfaction in cardiology
Nursing	Grand challenges as educational innovations in higher education: a scoping review of the literature
	The future of cultural humility training: using virtual simulation to teach undergraduate nursing students' cultural humility
	Frost: factors predicting orthopaedic trauma volumes
Schulich	Mapping COVID
	Breaking out of the traditional: implementation of an educational robot in the Faculty of Engineering
	Life cycle assessment of residential buildings to support sustainable development of communities
Science	Several testable hypotheses for inferring biogeochemical conditions in paleolake waters based on the chemistry of Mg-silicate clays
	What happens after a breast cancer diagnosis?
	The effect of localized surface plasmon resonance on host-guest chemistry
Social Work	Building cross-cultural social work competencies and international collaboration: an online teaching and learning initiative between Hong Kong and the Philippines
Vet Med	Systematic review and meta-analysis of genome-wide association studies on mastitis
	Allometric changes in skeletal elements of Longshanks mice
	Investigating trace mineral levels in cows at calving and the effects on colostrum immunoglobulin G concentration
Werklund	Fostering genetic mathematical understanding through the early STEM classroom
	Pre-service teacher preparation to educate citizenship: an analysis of the discourses of civics and citizenship education
	Sacred beginnings

We collected student feedback at the start and end of the program through entry and exit surveys and one focus group. 86% of PURE students responded to the entry survey, 51% responded to the exit survey, and 3% participated in the exit focus group. Survey results affirm the positive impact that the PURE Award continues to have on undergraduate research at UCalgary.

Student Entry Survey: Our findings highlighted two key characteristics of students entering PURE. First, PURE students are likely to have existing connections to faculty, and these faculty connections have a significant impact on students' motivation to apply. 46% of students reported first hearing of PURE from a faculty member, and 13% selected "PURE was suggested to me by a mentor" as one of their motivations for applying. This has implications on how we think about PURE recruitment, particularly about recruiting faculty members interested in undergraduate research, as well as recruiting students with a curiosity they have not had the opportunity to explore. Second, despite students' diverse years of study, 50% reported no prior research experience at the start of PURE. While initially unsurprising, this finding was significant because most respondents estimated their current abilities between "a moderate amount" and "a great deal." In the short term, we applied these findings immediately and adapted messaging about the workshops to appeal to students' self-reported confidence (e.g., "Level-up your research skills"). In the long term, we seek to learn more about students' knowledge of research at the start of their PURE experience and how it changes by the end.

Student Exit Survey and Focus Group: In the exit survey, there was a noticeable shift in respondents' self-reported research understanding, ability, and skill. When asked the extent to which PURE improved their abilities in nine research areas, the top three most reported areas were "understanding of the research process," "understanding of how researchers work on real problems," and "ability to work independently." Across both exit survey and focus group data, students repeatedly emphasized positive gains in four skillsets: reading and understanding literature, working independently and resiliently, writing for a research audience, and understanding the research process. Reported gains in reading and understanding literature were often connected to the PURE Systematic Review Workshops. Students reported new skillsets such as creating bibliographies, reading primary and secondary literature, and conducting literature reviews. Gains in independence and resilience were strongly correlated to the remote environment required by COVID-19. Researching remotely was simultaneously a source of challenge and strength. While some students (at times) felt isolated from people, space, and equipment, many intentionally and deliberately leaned in to finding personal strategies to increase their self-reliance, time management, and problem-solving capabilities. Gains in writing for a research audience included writing concisely, collaborating with others in the writing process, and implementing feedback. Gains in understanding the research process highlighted new or amplified skills in writing research questions, planning a research project, and collecting data via diverse research methods. Throughout, students reflected that their gains helped them better understand that research is not a linear process, and critical thinking and creative problem solving are required throughout.



I consider myself now part of an academic community of people who consult and learn from one another, share ideas and generate information that is of interest to a broader audience rather than simply a student (or professional) who completes specific, necessary assignments. This new perspective is a very empowering one, and encourages me to seek further opportunities to research, develop, and share meaningful knowledge.



PURE 2020 Student

Lastly, students repeatedly connected their gains to their future goals and aspirations, including additional research projects, graduate school, or working in their chosen field after graduation. In the exit survey, **19%** of respondents stated that publications or presentations from their PURE project had happened or were in progress. The unique student-led experience of PURE transformed how they see themselves engaging in their discipline. As one focus group member stated, “PURE is like the bridge between your undergrad and your future.”

Supervisor Exit Survey: 53% of PURE supervisors answered the supervisor exit survey. Respondents came from all ten of the academic units represented in PURE. 80% of respondents were either first-time supervisors or supervisors with no more than three PURE students in previous years. 98.4% of respondents stated that based on their experience this year, they were moderately to extremely likely to supervise another PURE student in the future. 91% of respondents stated they were moderately to extremely likely to recommend supervising a PURE student to a colleague. We followed up these questions by asking, “If you were to recommend supervising a PURE student to a colleague, what would you say?”. The three most-mentioned themes were how positively worthwhile PURE is for both supervisors and students, favourite strategies to ensure PURE student and supervisor success, and how PURE is “a great source of funding” that provides “a fabulous opportunity” to engage in undergraduate research.



The PURE experience was a very positive one [...] I was positively surprised by the level of engagement that the student had with the group and their eagerness to learn. If you spend the time to stimulate and direct them in the desired general directions, you will both learn a lot!



PURE 2020 Supervisor

While supervisors reported overall positive experiences supervising a PURE student, their experiences of PURE activities (e.g., Supervisor Orientation) and recommendations for how the program can improve are considerably more diverse. This makes sense given supervisors’ diverse disciplinary backgrounds and previous experiences with PURE or similar funding opportunities. Key recommendations for future program additions included: student workshops, funding, and supervisor supports (e.g., peer support and knowledge-sharing).

CONCLUSIONS AND FUTURE DIRECTIONS

The 2020 PURE term was unlike any other. Despite significant challenges in shifting all programming to a remote context, students and supervisors remained committed and repeatedly demonstrated resilience and creativity. In uncertain times, we supported the research of 137 students and 122 supervisors from ten academic units across campus. We were able to make substantial program enhancements, including new workshops and event offerings for students and supervisors, the launch of the Research Skills Foundation Badge, upgraded the final assignment, and developed a new program evaluation plan and reporting mechanism. The Graeme Bell Travel Award was modified to allow students to safely attend virtual conferences and symposiums to disseminate their PURE research findings.



The Program for Undergraduate Research Experience (PURE) has been instrumental in helping the undergraduate students I have supervised not only gain experience in conducting research, but realize that research is one of their passions, and thereby shape their career paths. In the past few years, three PURE awardees have gone on to graduate schools. With the recent addition of workshops to help develop key research skills, the program has become even more valuable, to the students and their mentors.



PURE 2020 Supervisor

For PURE 2021, one of our top priorities is examining PURE through an Equity, Diversity, and Inclusion (EDI) lens, from both student and faculty perspectives. We added EDI questions to the application process for the five equity-seeking groups in Canada to track demographic information about the PURE applicant pool and ensure there are no biases in our adjudication and award allocation. To increase the accessibility of PURE as a research opportunity, we will explore whether students could conduct research on a part-time basis to allow other employment, curricular, or caregiving commitments. We will also inquire about supervisors' perspectives on the impact of a PURE award on their research objectives and ability to support undergraduate student researchers. Lastly, we will continue to highlight in our communications, recruitment materials, and information sessions that students from all academic backgrounds are eligible to apply for PURE. We have a comprehensive understanding of the diverse nature of what research looks like across disciplines and aim to celebrate this diversity.

In addition to ensuring the PURE program is accessible, diverse and inclusive, we will be looking to increase the monthly stipend students receive in the program. The stipend amount has not changed in over a decade and we need to ensure that the monthly stipend is keeping in line with similar summer undergraduate research programs, and is not serving as a barrier to participation for students.

We are also incorporating the FUSION modules into our PURE programming to further integrate experiential learning into the PURE program. The FUSION Skill Development Program is a 10-hour online curriculum comprised of six modules designed to complement students' experiential learning. Through the program, students will develop their complex thinking (metacognition), communication, and

problem-solving skills, and then integrate and use those skills to solve a challenge encountered in their experiential learning program. Students who complete the FUSION Skill Development Program will achieve a digital badge to recognize their learning.

Inspired by feedback in the student exit survey, we would like to create a writing club for PURE students. The writing club would begin during the PURE term and could continue into the academic term for those students who are keen to maintain connections with their PURE cohort and continuously improve their writing skills.

Based on the supervisor exit survey feedback, we will develop optional resources for PURE supervisors. While some supervisors are happy to conduct and mentor research with students on their own, others expressed keen interest to engage with a community of PURE supervisors mentoring undergraduate researchers. The purpose of this community would be to share best practices and resources and to provide peer support.

The UCalgary Research, Academic, and Experiential Learning Plans highlight the need for robust programs that expand research capacity, drive innovation, and enhance the student experience. To amplify PURE's impact on undergraduate research and experiential learning at UCalgary, we are driven to continue increasing opportunities for students and supervisors to be leaders in research innovation. To achieve this, we intend grow the program over time and will be exploring opportunities for fund development in this area to continue to support and grow undergraduate research experiences through PURE in the future.

For more information about the PURE program, please visit our webpage:

taylorinstitute.ucalgary.ca/pure-awards

ACKNOWLEDGEMENTS

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APPENDIX A: PURE PROGRAM OUTCOMES

LEARNING BUNDLE	LEARNING OUTCOME	CORE SKILLS
Research Skills	By the end of PURE, students will be able to:	<ul style="list-style-type: none"> • Problem-solving • Communication • Organizational skills • Learning independently • Applying research skills and tools • Judgement • Organization • Creativity
	<p><i>Develop</i> a research plan, <i>identify</i> a specific area of inquiry, <i>assess</i> the viability and suitability of research practices, <i>carry-out</i> the research plan and <i>communicate</i> research findings. (More specific sub-outcomes)</p> <ul style="list-style-type: none"> • <i>Formulate</i> a research question, study aims, and hypotheses • <i>Identify</i> the knowledge required to meet research aims anticipating ethical, cultural, and social considerations. • <i>Identify & generate</i> information/data required using appropriate methodology. • <i>Evaluate</i> the credibility of sources, information & data and can make your research processes visible. • <i>Organize</i> information & data to reveal patterns/themes, managing teams & processes. • <i>Analyze</i> information/data critically & synthesize new knowledge to produce a coherent understanding. 	
	<p><i>Collaborate</i> with other researchers in the design, planning, and implementation of a research project.</p>	
Research Identity	<p><i>Describe</i> the importance of your research to communities on- and off-campus; effectively <i>communicate</i> the value and impact of your research and conclusions to a variety of audiences.</p>	<ul style="list-style-type: none"> • Reflective practice • Organizational Skills • Learning independently • Judgement
	<p><i>Reflect</i> on and <i>articulate</i> the impact of the PURE research experience on research skill development and researcher identity.</p>	
Career Goals	<p><i>Reflect</i> on and <i>articulate</i> the impact of the PURE research experience on academic and professional growth and career goals.</p>	<ul style="list-style-type: none"> • Reflective practice • Learning independently • Communication • Judgement
Community Building	<p><i>Establish</i> and <i>participate</i> in a community of scholars, <i>developing</i> a network of undergraduate, graduate, and faculty researchers across campus and beyond.</p>	<ul style="list-style-type: none"> • Reflective practice • Collaboration • Communication

APPENDIX B: STUDENT SURVEY AND FOCUS GROUP QUESTIONS

Student Entry Survey Questions

1. What is your home faculty?
2. What is your year of study?
3. What is your PURE research term length?
4. How did you first hear about PURE?
5. Have you participated in research before?
6. What motivated you to apply for the PURE award? Select all that apply.
7. For each element, give an estimate of your current level of... ((none, a little, a moderate amount, a great deal, extensive):
 - 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 interpretation of results
 - Understanding of research
 - Understanding of ethical conduct in your field
 - Understanding of techniques and research questions in your field
 - Understanding how researchers work on real problems
8. For each element, give an estimate of your current level of ability... ((none, a little, a moderate amount, a great deal, extensive):
 - To assign yourself a role in a group project based on our own strengths
 - To actively communicate your ideas, skills, and opinions with group members
 - To identify necessary changes and to encourage group action for change
 - To value, encourage, and acknowledge the work of other group members
9. For each element, give an estimate of your current level of... (none, a little, a moderate amount, a great deal, extensive):
 - Skill in writing and communication to a variety of audiences
 - Skill in communicating research findings in a variety of formats
10. Give an estimate of your current sense of... (none, a little, a moderate amount, a great deal, extensive):
 - Certainty of your desired career path
 - Belonging to a learning community
11. Please share your experience with the PURE application process. Do you have any suggestions for improving the application process?

Student Exit Survey Questions

1. What is your home faculty? (drop-down menu)
 - Cumming School of Medicine
 - Faculty of Arts
 - Faculty of Kinesiology
 - Faculty of Law
 - Faculty of Nursing
 - Faculty of Science
 - Faculty of Social Work
 - Faculty of Veterinary Medicine
 - Haskayne School of Business
 - Interdisciplinary
 - Schulich School of Engineering
 - Werklund School of Education
2. What is your year of study?
 - Year 1
 - Year 2
 - Year 3
 - Year 4
 - Year 5+
3. How long was your PURE research term?
 - 8 weeks
 - 12 weeks
 - 16 weeks
4. To what extent do you think the following activities **enhanced your PURE experience?** (none, a little, a moderate amount, a great deal, extensive):
 - Orientation
 - 3 Systematic Review Workshops
 - Community Building Workshop and Panel
 - Research Skills Workshop: Abstracts
 - Skills Articulation Workshop: Reflection
 - Final Report
 - Celebration of Achievement
5. On average, approximately how many hours did you work on your PURE project per week?
 - Less than 25 hours per week
 - Between 25-30 hours per week
 - Between 30-35 hours per week
 - Between 35-40 hours per week
 - Over 40 hours per week
6. Did this weekly workload align with your expectations of the time required for a PURE project?
 - Not at all – it took much less time
 - Somewhat – it took a little less time
 - It aligned well with my expectations
 - Somewhat – it took a little more time
 - Not at all – it took much more time

7. In terms of research skills, give an estimate of your **current** level of... (none, a little, a moderate amount, a great deal, extensive):
 - 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 of the research process
 - Understanding of ethical conduct in your field
 - Understanding of techniques and research methods in your field
 - Understanding of how researchers work on real problems
8. In terms of collaboration skills, give an estimate of your **current** level of ability... (none, a little, a moderate amount, a great deal, extensive):
 - To assign yourself a role in a group research project based on your strengths
 - To actively communicate your ideas, skills, and opinions with group members
 - To identify necessary changes and to encourage group action for change
 - To value, encourage, and acknowledge the work of other group members
9. In terms of communication skills, give an estimate of your **current** level of... (none, a little, a moderate amount, a great deal, extensive):
 - Skill in writing and communication to a variety of audiences
 - Skill in communicating research findings in a variety of formats
10. In terms of career development and community building, give an estimate of your **current** sense of...(none, a little, a moderate amount, a great deal, extensive):
 - Career/professional interests
 - Being part of a learning community
11. For the next **five** questions, think back to the beginning of PURE. In terms of research skills, give an estimate of the extent to which **PURE improved your ability** in the following areas (none, a little, a moderate amount, a great deal, extensive):
 - 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 of the research process
 - Understanding of ethical conduct in your field
 - Understanding of techniques and research methods in your field
 - Understanding of how researchers work on real problems
12. In terms of collaboration skills, give an estimate of the extent to which **PURE improved your ability** in the following areas (none, a little, a moderate amount, a great deal, extensive):
 - To assign yourself a role in a group research project based on your strengths
 - To actively communicate your ideas, skills, and opinions with group members
 - To identify necessary changes and to encourage group action for change
 - To value, encourage, and acknowledge the work of other group members
13. In terms of communication skills, give an estimate of the extent to which **PURE improved your ability** in the following areas (none, a little, a moderate amount, a great deal, extensive):

- Skill in writing and communication to a variety of audiences
 - Skill in communicating research findings in a variety of formats
14. In terms of career development and community building, give an estimate of the extent to which **PURE changed your perspectives** in the following areas (none, a little, a moderate amount, a great deal, extensive)
- Career/professional interests
 - Being part of a learning community
15. Reflect on your research skill development throughout your PURE Award. What is *one* research skill you have gained or amplified during PURE? (approximately 100 words)
16. How has your identity as a researcher changed because of PURE? (approximately 100 words)
17. How have your career interests and goals changed because of PURE? (approximately 100 words)
18. PURE seeks to empower students to establish and participate in a community of scholars. When did you feel *most* connected to such a community? (approximately 100 words)
19. When did you feel *least* connected to a community of scholars? What would have helped in moments like this? (approximately 100 words)
20. To help us get a sense of your community of scholars, please indicate who you have discussed your PURE project with. Select all that apply:
- My parents or guardian
 - Other family members (siblings, etc.)
 - Other PURE students
 - Students who are not in PURE, but attend UCalgary
 - Students who do not attend UCalgary
 - UCalgary Professors other than my supervisor
 - Professors who do not work at UCalgary
 - Community members not affiliated with UCalgary
21. Below is a list of community partners affiliated with UCalgary. Please indicate if your research included any community partners. Select all that apply:
- I did not connect with UCalgary community partners
 - United Way
 - Beakerhead,
 - City of Calgary
 - Calgary Pride
 - Calgary Economic Development
 - Alberta Health Services
 - Calgary Public Library
 - Calgary Youth Science Fair
 - Alberta Ballet
 - South Shaganappi Area Strategic Planning Group
 - Wilson Center
 - Other: Please state.
22. Will you continue researching your topic after your summer studentship is complete?
- Yes
 - Maybe
 - No
 - Don't know
23. Please list any publications and/or presentations resulting from your research.

24. Regarding the application process for summer students, which of the following do you most agree with?
- I would prefer to submit a SINGLE application for consideration in several summer studentship opportunities.
 - I would prefer to submit applications to EACH summer studentship opportunity SEPARATELY.
25. Do you have any suggestions for how could PURE be improved? (approx. 100 words). Please note, if you have any questions or concerns regarding your experience that you would like to speak to the PURE Team about, email pure@ucalgary.ca.
26. We are conducting one-hour focus groups to find out more about your PURE experience, to generate ideas for next year, and to tell the story of undergraduate research at the University of Calgary. Findings and student testimonials will be used in three ways: reporting to University Leadership, program development/improvements, and communications (e.g., website content). Would you be interested in participating?
- Yes. Click here to be taken to a separate sign-up page. Your survey data will remain anonymous.
 - No, thank you.

Student Focus Group Questions

1. *Warm-up/Opening Question:* In 1-2 sentences, tell us about your PURE topics.
2. *Introductory Question:* What made you want to pursue this topic through the PURE Award?
3. *Transition Question:* The PURE Award is a unique opportunity for undergraduate students to take the lead in a research project. What did you like most about choosing and designing your own research project?
4. *Key question 1:* What has been your biggest personal gain from your PURE Award experience?
5. *Key question 2:* Given your experience, how does the PURE Award help connect research to skills, identity, career development, and community?
6. *Ending question:* If you could recommend any changes or additions to the PURE program that would enhance student success, what would they be?

APPENDIX C: SUPERVISOR SURVEY QUESTIONS

1. What is your home faculty? (drop-down menu)
 - a. Cumming School of Medicine
 - b. Faculty of Arts
 - c. Faculty of Kinesiology
 - d. Faculty of Law
 - e. Faculty of Nursing
 - f. Faculty of Science
 - g. Faculty of Social Work
 - h. Faculty of Veterinary Medicine
 - i. Haskayne School of Business
 - j. Interdisciplinary
 - k. Schulich School of Engineering
 - l. Werklund School of Education
2. Have you supervised a PURE Award student before?
 - a. No, this was my first time
 - b. Yes. I have supervised 1-3 PURE students in previous years
 - c. Yes. I have supervised 4-6 PURE students in previous years
 - d. Yes. I have supervised 7-9 PURE students in previous years
 - e. Yes. I have supervised 10+ PURE students in previous years
3. To what extent do you think the following activities enhanced your PURE supervisor experience? (none, a little, a moderate amount, a great deal, extensive):
 - a. Orientation
 - b. Monthly Newsletters
 - c. Celebration of Achievement
4. Based on your experience this year, how likely are you to **supervise a PURE Award student again** in the future?
 - a. Not at all likely
 - b. Less likely
 - c. Moderately likely
 - d. More likely
 - e. Extremely likely
5. Based on your experience this year, how likely are you to recommend supervising a PURE Award recipient **to a colleague**?
 - a. Not at all likely
 - b. Less likely
 - c. Moderately likely
 - d. More likely
 - e. Extremely likely
6. What other activities or resources could the PURE Team do to enhance the PURE supervisor experience? (Approx. 100 words).
7. If you were to recommend supervising a PURE student to a colleague, what would you say? (Approx. 100 words).

Do you have recommendations for how the PURE Award could be improved? (Approx. 100 words). Please note, if you have any questions or concerns regarding your experience that you would like to speak to the PURE Team about, email pure@ucalgary.ca.