THE UNIVERSITY OF BRITISH COLUMBIA
Faculty of Pharmaceutical Sciences

UNDERGRADUATE SUMMER STUDENT RESEARCH PROGRAM (SSRP)
2025 PROJECT LIST

Content updated: February 12, 2025

Projects are posted in the order in which they are received. **Please keep checking the website as this list may be added to until the application deadline

Projects:

Summer Student Research Program Project Description

Project #: SSRP25-Conklin
Supervisors: Annalijn I. Conklin
Project Title: An environmental scan of traditional or cultural foods among Indigenous people

This project is only eligible for the Indigenous Undergraduate-SSRP (IU-SSRP) funding stream (i.e. only eligible Indigenous undergraduate students are invited to apply).

Hypothesis or Research Question being addressed:
What resources are available on Indigenous cultural food in Canada? What do Indigenous people in Canada identify as traditional/cultural foods? Are there similarities between Indigenous cultural foods across regions or communities?

Project Description:

"Food is medicine" is a common Way of Knowing among Indigenous communities. But ongoing colonization has effectively disrupted and/or destroyed access to traditional lands and traditional food sources and practices. We recently surveyed Indigenous people in BC about the importance of cultural/traditional foods as menu options in hospital settings and found that 83% of the respondents said that it was indeed important for Indigenous patients to have cultural/traditional foods as menu options. There is limited research on Indigenous health and nutrition in general, and thus little is known about the knowledge environment and resources to support awareness about and inclusion of Indigenous cultural/traditional foods in healthcare in Canada.

This project will scan the publication environment (grey literature) to identify potential resources and lists of cultural foods and thus gather information that can be used to inform future healthcare decision-making. The project will include scanning resources to identify potential sources of information on cultural foods, extracting data on identified foods, classifying the foods into the five main food groups, and potentially analyzing the data using quantitative content analysis and descriptive statistics.

Qualifications:

- This project needs students who have some experience searching and reading literature (e.g. reports, websites, working papers, books).
- Key skills that are also needed include:
    - attention to detail
    - critical thinking
    - time-management
    - verbal and written communication.

Summer Student Research Program Project Description

Project #: SSRP25-Zhang-01
Supervisors: Wei Zhang
Project Title: Preferences for working in rural and remote communities among pharmacy students and pharmacists in British Columbia

Hypothesis or Research Question being addressed:
How well do clinical trials with sites in Canada fare in terms of reaching the projected sample size? What factors influence achieving recruitment success?

Project Description
Rationale:
There is a lack of pharmacists in rural and remote communities in in British Columbia (BC). Recruitment and retention of the pharmacist workforce in rural and remote communities is critical for timely and equitable access to pharmacy services including pharmacist-delivered clinical services in BC. Factors such as previous rural education or practice placements, incentives, workload, non-pharmacist staff support, and living environment may influence decisions about working in rural and remote communities. Initiatives such as rural placement awards for students and experiential learning may help foster rural recruitment. In order to understand what existing or novel initiatives may help attracting pharmacists and pharmacy students to work in rural communities, we need to first understand their preferences when they think about where to work. This will include identifying the key factors influencing their preferences for working in rural and remote communities and assessing their trade-offs between these factors. This SSRP position will support this upcoming research project.

Approach:
The incumbent student will begin by reviewing the literature on recruitment and retention of rural and remote community pharmacists and synthesizing the influencing factors. The student will identify examples of surveys that measure pharmacy students' and pharmacists' preferences for working in different communities. Then, they will support the development of a survey and other research material to collect key information. They will support the planning of the survey pretesting among pharmacy students and pharmacists.

Expected Outcomes:
The review of literature is expected to be completed within the funding period. It is also expected that the student will develop a survey that is ready to be pretested, but the actual survey pretesting may not begin within the funding period. The supervisor will work closely with the student to prepare a short research summary (such as an abstract) before the end of the funding period. The supervisor will support the student for the SSRP poster competition held in September. In addition to working closely with the supervisor, the student will have opportunities to work or connect with investigators, research staff and trainees in the Centre for Advancing Health Outcomes and in the Collaboration for Outcomes Research and Evaluation. Opportunities may be available to the student to continue working on the survey beyond the end of the funding period.

Qualifications:

- 3rd or 4th year PharmD student
- Experience in literature review and survey development is an asset
- Knowledge about the delivery of pharmacy and/or clinical services in rural or remote communities is an asset
- Excellent analytical, problem-solving, communication (oral and written) and organizational skills
- Ability to prioritize work and meet deadlines
- Ability to maintain accuracy and attention to detail
- Proficient in MS office (Word, Excel and PowerPoint)
- We will accommodate the student's clerkship schedules

Summer Student Research Program Project Description

Project #: SSRP25-Zhang-02
Supervisors: Wei Zhang
Project Title: Drug shortages and therapeutic importance of medicines in Canada, the United States, and other OECD countries

Hypothesis or Research Question being addressed:

There are two research objectives/questions:

1. How prevalent are national and multi-national drug shortages?
2. What are the characteristics of the drugs are in shortage?

Project Description

Rationale:

Drug shortages are a longstanding challenge that have strained health care systems around the world. Shortages may result in delays to necessary treatments and the use of less effective alternative treatments, which affect the quality of patient care. Governments have implemented different strategies to monitor and to mitigate drug shortages. Initiatives for tracking and reporting shortages are present in a number of countries. Publicly available databases of reported drug shortages are available at the national level in these countries. However, drug shortages can occur in multiple countries and hence a global issue. In this case, it may mean that policies to address drug shortages in one country may not be effective, or they may transfer the burden to another country. To better understand multi-national drug shortages, we propose to pool available public registers from different countries into one linked database.

Approach:

The incumbent student will begin by reviewing the drug shortage databases available in a list of candidate countries. The student will identify the definition of drug shortages used by each country for their registry. These databases will be linked together, such as by the active ingredient(s) and dose strength, to create a uniform database indicating in which country a given drug is in short supply. In addition to establishing this database, the student will leverage their knowledge of drug products to rate the therapeutic importance of medicines based on the ratings from existing agencies. The shortages will be analyzed by different factors including the therapeutic importance of medicines.

Expected Outcomes:

The creation of the uniform database is expected to be completed within the funding period. It is also expected that the student will produce summary tables describing drug shortages and their characteristics in different countries. The supervisor will work closely with the student to prepare a short research summary (such as an abstract) before the end of the funding period. The supervisor will support the student for the SSRP poster competition held in September. In addition to working closely with the supervisor, the student will have opportunities to work or connect with investigators, research staff and trainees in the Centre for Advancing Health Outcomes and in the Collaboration for Outcomes Research and Evaluation.

Opportunities may be available to the student to contribute more broadly to the preparation of additional research reporting; however, this will fall outside the scope of the funding period and would thus be considered voluntary.

Qualifications:

- 3rd or 4th year Pharmacy student
- Knowledge of active ingredients, drug dosage forms, drug interchangeability and therapeutic classes
- Knowledge of regulatory approval process of drug products in multiple countries is an asset
- Excellent analytical, problem-solving, communication (oral and written) and organizational skills
- Ability to prioritize work and meet deadlines
- Ability to maintain accuracy and attention to detail
- Proficient in MS office (Word, Excel and PowerPoint)

Summer Student Research Program Project Description

Project #: SSRP25-Reardon/Ziemczonek
Supervisors: Jillian Reardon, Adrian Ziemczonek
Project Title: Impact of a clinical immersion in shaping pharmacy student's professional identities

This project is only eligible for the Indigenous Undergraduate-SSRP (IU-SSRP) and the Enhanced Opportunities Undergraduate-SSRP (EOU-SSRP) funding streams.

Hypothesis or Research Question being addressed:
The objective of this project is to determine if a relatively simple immersion in a direct patient care setting with clinical pharmacists as role models can support professional identity formation

Project Description
Background and Rationale:
Professional identity formation (PIF) begins during undergraduate pharmacy education and is an important process where learners begin to understand future professional roles and behaviors. Research in this area suggests that aspects of professional identity are best formed through real-world interactions with patients and professional role models. Despite findings that PIF is a vital pharmacy education goal, there is little data, especially in primary care, to inform how to best achieve this. Given the expansion of primary care pharmacist roles and scope of practice such as prescribing and ordering laboratory tests in several Canadian jurisdictions, it is increasingly important to determine how to prepare students to work as professionals in these circumstances. This project's purpose is to determine whether a brief immersion in a direct patient care setting with clinical pharmacists as role models can support PIF in UBC pharmacy students.

Research Approach:
We are currently in the first phase of this research project, where UBC E2P PharmD students enrolled in PHRM300D Primary Care elective (this past Winter 2024 term) were invited to partake in a clinical immersion activity at the UBC Pharmacists Clinic (Clinic). This study was funded through a UBC PharmSci SoTL Seed Grant. Students were scheduled to shadow a clinical pharmacist at the Clinic during a direct patient care appointment, where a pharmacist provided comprehensive medication management services either in-person or virtually. Students were provided with open-ended reflection-based survey questions which they completed both before and 1 week after the immersion experience. Out of 30 students that were enrolled in the course, 29 responses were collected and will be analyzed using both deductive and inductive thematic analysis to develop themes and understand the activity's impact on pharmacy student PIF in this direct patient care setting.

The next phase of this project and the focus for this summer research program activity will be reviewing results to determine the impact of the immersion experience, as well as forming recommendations for design improvement and future activity expansion.

Project Outcomes:
The expected project outcomes include summarizing results, reviewing the learning activity with recommendations for design improvements, supporting the development of a knowledge translation plan, and exploring strategies for expanding and scaling the activity to reach all UBC pharmacy students over the course of their undergraduate curriculum.

Qualifications:

- Self-directed and independent, along with strong time management and organizational skills
- Strong oral and written communication skills
- High level of accuracy and attention to detail
- Experience searching and analyzing primary literature
- Interest in pharmacy education or delivery of direct patient care services
- Proficiency in basic computer software (i.e. Microsoft Word, Excel)

Summer Student Research Program Project Description

Project #: SSRP25-Ziemczonek/Poonja/Meng
Supervisors: Adrian Ziemczonek, Nasheena Poonja, Yuki Meng
Project Title: Pathways to Care: Virtual Pharmacist Prescribing for Minor Ailment and Contraception in Indigenous Rural and Remote Communities

This project is only eligible for the Indigenous Undergraduate-SSRP (IU-SSRP) and the Enhanced Opportunities Undergraduate-SSRP (EOU-SSRP) funding streams.

Hypothesis or Research Question being addressed:
How can a virtual pharmacist prescribing minor ailments and contraception service (PPMAC) be implemented for Indigenous rural and remote communities? How can community members be engaged in co-developing and evaluating the service? What outcomes can be achieved with implementation of the service?

Project Description
Background and Rationale:
Indigenous rural and remote communities in British Columbia face significant challenges to accessing healthcare services, including limited access to pharmacy care, due to geographic isolation, fewer health human resources, and systemic inequities due to the ongoing legacy of colonization. These challenges contribute to unmet healthcare needs and increased health disparities.

A novel service model is being piloted at the UBC Pharmacists Clinic, where PPMAC is offered virtually (i.e., phone, video requiring stable internet connection) to improve access and bridge geographical gaps. This innovative approach can potentially improve healthcare access by leveraging technology to deliver pharmacy services directly to communities. As well, virtual PPMAC can complement existing community health services by connecting clients to resources, supporting care coordination and access, and facilitating follow-ups. However, for this service model to succeed, it should align with the values, priorities, and self-determined health and wellness goals of Indigenous communities.

This project seeks to explore how virtual pharmacy services such as PPMAC can be adapted and implemented to meet Nation-specific priorities and healthcare needs, recognizing that each community has its own unique circumstances and goals. By engaging directly with community members and healthcare providers, this research aims to identify opportunities, barriers, and culturally safe solutions to enhance access to pharmacy care in Indigenous rural and remote communities.

Research Approach:
The student will conduct a literature review to understand the development and delivery of existing virtual health service models for rural and remote Indigenous communities. This literature review will be used to inform the development of discussion questions to be used during sharing circles. Sharing circles will be conducted with community members and local healthcare providers to gather insights about how to best implement virtual PPMAC.

The student will also review existing plans, policies, and community priorities to align findings with Indigenous self-determined healthcare goals. Based on the literature review, the student can develop a sharing circle session and create discussion points.

Project Outcomes:
In collaboration with the project team:

- Summary report of literature review findings
- Sharing circle protocol + discussion questions for community members and local healthcare providers
- Research ethics submission

Qualifications:

- An Indigenous student enrolled in an undergraduate program at the University of British Columbia
- Experience with either working or living in a rural and remote community would be an asset
- Strong oral and written communication skills
- A strong understanding of community and primary care pharmacy practice in BC
- Interest in cultural safety, Indigenous health, and community engagement
- Self-directed and independent
- Strong time management skills
- Exemplifies professionalism
- Proficiency in basic computer software (e.g., Microsoft Word, Excel)

Summer Student Research Program Project Description

Project #: SSRP25-Ross
Supervisors: Colin Ross
Project Title: Lipid nanoparticles for gene therapy and genome editing.

Hypothesis or Research Question being addressed:
Our hypothesis is that we can improve the efficacy and safety of genome editing by using new formulations of lipid nanoparticles (LNPs) to deliver gene editing components to cell lines and animal models. Our specific research questions for this project investigate novel lipid formulations and novel genome editors for their efficacy and safety of genome editing. Our lab is collaborating with several labs, e.g., P. Cullis, M. Cheng, and A. Blakney labs, for access to new RNA and lipid nanoparticle formulations to evaluate. In addition, we have developed several novel base editor formulations to examine their efficacy and safety.

Project Description
Outline of research project:
This project will investigate using lipid nanoparticles (LNPs) as a method to deliver gene editing components to cell lines with the goal of improving both the LNP delivery system and gene editing efficiency. Gene editing has the potential to correct thousands of genetic diseases which currently have no treatment options. This project will primarily use base editors – a technology which corrects single nucleotides at a specific site in the genome which is designated by a guide RNA. To effectively correct a cell, both the base editor and the guide RNA must be able to get inside the cell. The project will use different LNPs to deliver mRNA which encodes for a base editor and guide RNA. LNPs have an advantage over current systems as they are less toxic to cells and can be more easily translated to animal models. The student will learn how to conduct mammalian cell culture and will administer LNPs to different cell lines. They will be responsible for the data collection within this project with the ultimate goal of identifying a top LNP for transfection of cell lines and an optimized protocol to use within this project. The summer student will be involved in all steps of this project – from learning about experimental design to analysis of results.

Student responsibilities:
The student will be responsible for several tasks, for which they will receive detailed hands-on training beforehand. A typical week will consist of (1) maintenance and plating of cell culture colonies, (2) transfecting cells with LNPs, (3) preparing cells for flow cytometry, and (4) conducting and analyzing flow cytometry experiments. The student will learn proper aseptic techniques and protocols for the care and maintenance of HEK293T cells. Flow cytometry is a powerful tool to analyze editing efficiency – the student will learn how to remove cells from a plate and prepare them for analysis. The student will be taught how to run a flow cytometer and analyze the results. These skills are highly transferrable to other labs and industry, providing the student with valuable knowledge. There are opportunities for the student to learn a wider array of techniques if they are interested as well including PCR, DNA sequencing and bacterial cloning.

The student will work closely with a PhD student with whom the student will interact daily. The student will meet at least two times a week with Dr. Ross, including a one-hour lab bench-side discussion on weekly progress. The student will also attend weekly lab meetings, where they will present their results and receive support from a wider team. At the end of the summer, the student will present their poster at the SSRP poster competition.

Skills gained:

- Mammalian cell culture & transfection protocols. Biosafety and chemical safety
- Flow cytometry, PCR, DNA extraction & DNA sequencing, and gel electrophoresis
- Cloning, bacterial culture, gene therapy, gene editing

Qualifications:

- The student will be taught all relevant techniques but previous knowledge in genetics, basic laboratory techniques and biochemistry is an asset.
- 2nd or 3rd year in a BPSc (or similar) with an interest in gene editing and gene therapy.
- Previous lab experience or the completion of advanced laboratory courses is an asset.

Summer Student Research Program Project Description

Project #: SSRP25-Nislow
Supervisors: Corey Nislow
Project Title: Yeast chemogenomic technology development

Hypothesis or Research Question being addressed:
Our lab is interested in understanding how genes determine the organism's response to stress. To accomplish this we use quantitative genome-wide screens combined with machine learning.

Project Description:
The Nislow-Giaever laboratory in the UBC Pharmaceutical Sciences Building is a genomics research laboratory that uses cutting edge technologies, including; chemogenomics, next-generation sequencing, laboratory automation and bioinformatics to understand the relationship between genotype, phenotype and the response to both drug exposure and environmental stresses. Most recently we have begun to use synthetic biology to engineer model organisms, especially yeast with genes from extremophiles in order to allow them to survive the rigors of the space environment. This work has direct applications to allowing human astronauts to thrive on long term space missions.

The laboratory is seeking an undergraduate student to join our dynamic team as a project worker with two goals in mind. The first will be to assist the day-to- day operation of the lab, and maintenance and programming of our laboratory robotics. Specific activities will include stocking the lab consumables, drafting and revising standard operating procedures for equipment, writing and validating protocols for different experimental techniques, preparing stock solutions for genomic molecular biology experiments, preparing liquid solid media, and culturing and harvesting yeast cells for functional chemogenomic studies.

The student will receive extensive training from the principal investigator and his graduate student learn these tasks, which are of moderate complexity. If the tasks are completed in a timely manner, the student will also have the opportunity to work on his/her own research project. The student will be mentored and directly supervised by the principal investigator. He/she will meet with the principal investigator once a week to monitor work progress. The student will attend biweekly team meetings to further enhance his/her exposure to scientific research. Finally, the student will be encouraged to present their work at local conferences and relevant UBC events.

This is an excellent opportunity for undergraduate students considering a career in research to obtain work experience in a real research setting, to apply knowledge gained from classes to real life research problems, and to further develop research and communications skills through direct participation in functional genomics research. Equally importantly, the student will be able to experience the day-to-day excitement of working as part of a modern research team. Such valuable experience will contribute to achieving personal learning goals, development of professional skills, and expansion of the student's professional network. The skills that comprise this training experience will be widely applicable to diverse scientific fields, and equally importantly, the student will get real world exposure to the acquisition and application of critical scientific thinking.

Qualifications:
This position is suitable to an undergraduate student enrolled in a UBC life science program (including but not limited to; biochemistry, biology, microbiology). Previous experience in working in a research laboratory is required, as is basic familiarity with bioinformatic analysis. Other qualities required for the

project worker include excellent organization, time management, oral and written communication skills, the ability to multi-task and work in a team environment, genuine interests in research, and attentive to details. A good understanding of safe laboratory practices and completion of the UBC biological safety and chemical safety training courses would be desirable.