

WISEST Summer Research Program

Journal of Student Research 2021



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Introduction

Each summer, WISEST places 45-50 grade 11 students in a 6-week paid internship called the Summer Research Program (SRP). Students gain experience in projects where their genders are considered underrepresented. Female and gender diverse students are placed in Science, Technology, Engineering or Math (STEM) projects, and we place a few male students who demonstrate a genuine interest in nursing, nutrition, and/or human ecology. This year's WISEST Summer Research Program was a virtual program for the second year in a row. WISEST was able to place 39 students in research placements for a 6-week program with students working remotely to complete their projects and participate in professional development, mentoring research tours, and social activities.

Goals of the SRP for our students

- Broaden awareness about less-traditional fields of study and diverse career options.
- Engage with other participants who share similar interests.
- Learn about the techniques and types of research conducted in different STEM fields.
- Connect with and learn from successful professionals in the STEM fields.
- Develop key professional skills.
- Contribute to trailblazing research (in the lab or the field).
- Become familiar with academic and university life at the University of Alberta.

We are a donor- and volunteer-driven Community of Catalysts!

Although based on the University of Alberta campus, WISEST relies almost completely on donations from corporations, foundations, individuals and the public sector to develop and deliver our innovative programs. Contrary to perception, WISEST does not receive any core funding from the University of Alberta, but we are grateful for in-kind contributions such as space and access to campus resources.

Our Volunteers

Our program would not be possible without the Principal Investigators who invite these students into their research and the Supervisors and Research Team Members who provide mentorship and support for the students throughout the program and the volunteers who support our Professional Development Sessions. In 2021, 155 people gave 4279 hours of their time to support this program.

Thank You to Our 2021 Supporters:

Faculties and Labs from across Campus

- Faculty of Arts
- Faculty of ALES
- Faculty of Science
- Faculty of Engineering
- Faculty of Nursing
- Faculty of Medicine & Dentistry
- School of Public Health
- Dean of Students

Off Campus Supporters

- Andrea Macyk-Davey and Robert Davey
- Teresa Brychcy
- And numerous individual donors through the Spring 2021 CrowdSource Fundraising Campaign.



MOTOROLA



The Spirit of Dr. Armour Award



WISEST lost an important member of our community last spring when Dr. Margaret-Ann Armour passed away. Margaret-Ann Armour dedicated her life and career to diversity and the advancement of women in the sciences. But more fundamentally, she dedicated her spirit and her passion to people. Over the years, she became a recognized leader in raising national awareness among school-aged girls, educators, parents, and employers of the importance of encouraging women to take up careers in science and engineering. Simultaneously, she became a beloved member of numerous groups and networks through her genuine enthusiasm for individuals and sincere belief in the power of community. She loved people and people loved her back. In her own words “Learning what different groups do, think and believe, can lead to empowerment”.

Margaret-Ann is deeply missed by countless people whose lives were touched by her tireless determination to make an impact and bring change to the world. She leaves us all with a call to action:

“I give you my greatest wish - to go meet your dreams”

It is in this vein that WISEST is pleased to continue the **“Spirit of Dr. Armour Award”**, for the second year this award is dedicated in her memory and her honour, to individuals whose spirit and enthusiasm for diversity in STEM is genuine, infectious and intentional.

The Advocate Award

This award is presented to a principal investigator or supervisor, who through their participation in the Summer Research Program has shown advocacy in creating a more diverse STEM community including:

- Enthusiastically mentoring SRP students
- Promoting the SRP & WISEST
- Participation in the SRP program with high student satisfaction results

SRP Student Award

This award is presented to a grade 11 student, who, through their participation in the Summer Research Program has shown:

- a genuine interest and passion in pursuing a STEM education
- leadership and engaged participation in all the SRP program offers
- collaborative interactions with other SRP participants, Principal Investigators, graduate students, WISEST staff, and the lab staff
- an innovative and creative problem-solving approach
- demonstrated resilience in overcoming barriers and obstacles

*In this presentation,
WISEST would like to recognize:
**Stephanie Chute-Ibsen &
Kyla Fald**
with the Dr. Armour Spirit Awards.*



**Stephanie
Chute-Ibsen**

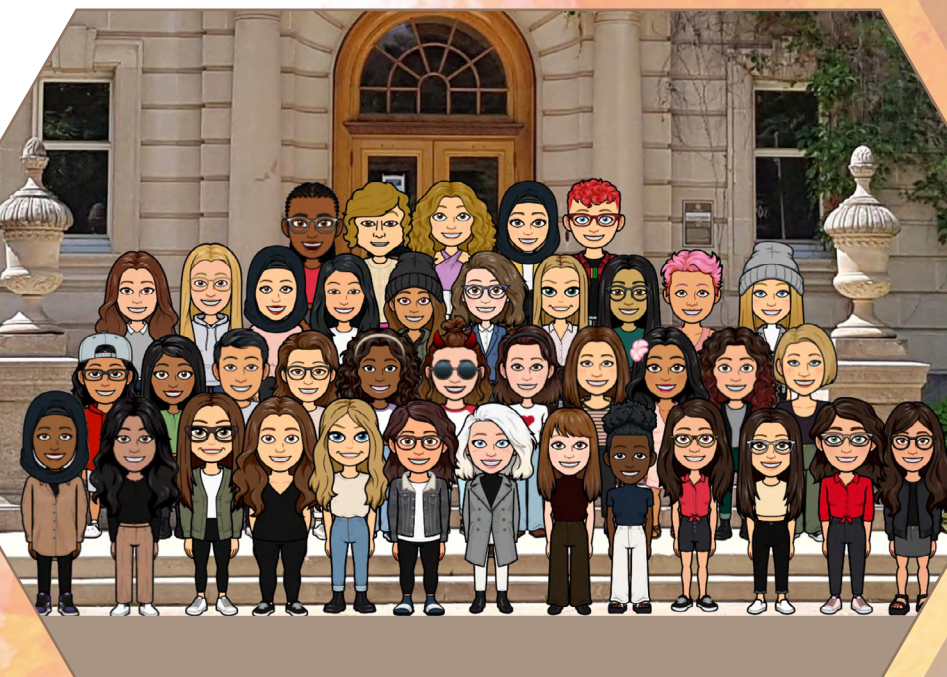
*Photo Credit:
Liam Mackenzie*

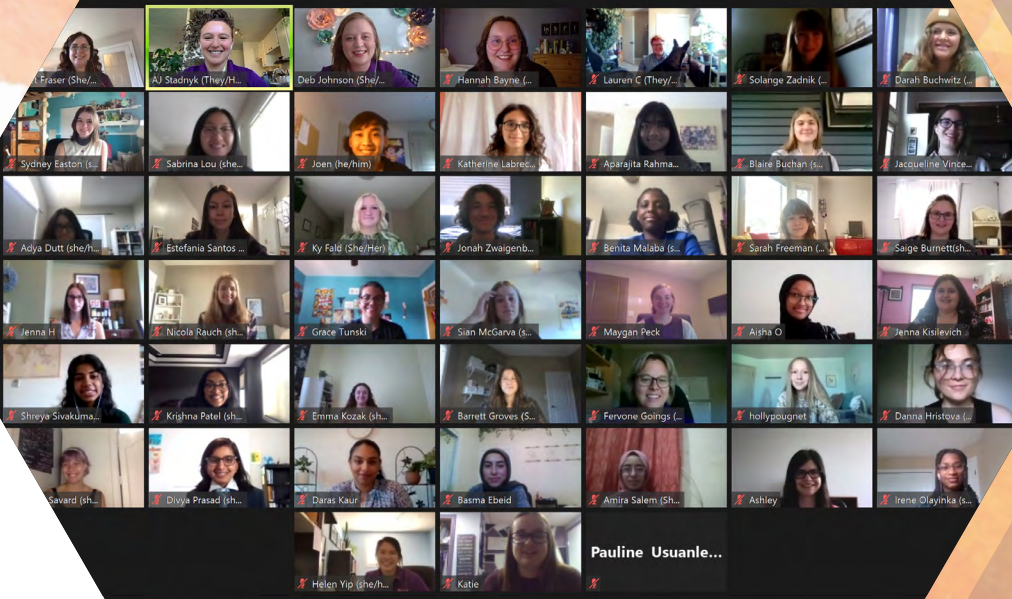


Kyla Fald

A Snapshot of the Summer

The virtual nature of this year's program meant that, while students were unable to conduct research in a laboratory setting or visit campus, they had a lot of fun interacting over video calls and conferencing this summer! This page provides a snapshot of some of the first and last times, and laughter had during professional development sessions and social activities, such as the student-organized "Show & Tell."





Celebration of Research

Our annual Celebration of Research was hosted in a virtual setting this year. This has enabled WISEST to record and capture a glimpse of the hard work and opportunities the students were involved in this summer! Emceed by Ingrid Pederson and WISEST Co-Chair, Dr. Tian Tang, and greeted by both the Honourable MP Heather McPherson and the Honourable MLA Janis Irwin, the students presented their research and experience in the Summer Research Program. This was followed by recognition from the WISEST Team Lead, Fervone Goings, and presentations of The Spirit of Dr. Armour Awards.

If you would like to watch the WISEST Summer Research Program's Celebration of Research, please visit www.youtube.com/watch?v=HYZhKNuMCho or click below.





Our SRP Students Researchers

Take a moment to meet some of our SRP Students as their enthusiasm and honesty will inspire you. These capable young people are building a strong foundation for their future success, contributing to a stronger STEM community, and preparing to change the world.

Blaire Buchan



High School

Memorial Composite High School

Lab Placement

Mechanical Engineering, Faculty of Engineering

Project Title

Aeroponic Potato Pot

Final Project

drive.google.com/file/d/1ValjkaPqZYeuk8e3n5GUVMU8KfNvs2Ui/view?usp=sharing

Supporter

Google

I am 17 years old, I use she/her pronouns and grew up in Parkland County, AB. I attended Muir Lake school from kindergarten to grade 9 and from grade 10 to grade 12, I attended Memorial Composite High school. My abstract goal in life is to become a mechanical engineer but I have yet to decide what I want to do in the long run. I applied for the Summer Research Program primarily to better understand engineering and STEM so that going into university I would have a better idea of what I will do. Unfortunately, the program was so informative that I now have so many more branches of engineering that I am now considering going into. The primary driver for getting this information was with the mentor sessions. I have never had an opportunity to listen to a wide variety of professionals talk about their work and experiences and I always came out of a session questioning if that career was the one for me.

Outside of trying to figure out my future, I also applied to the Summer Research Program to build a community. As a woman I often feel invalidated in my interests and because WISEST is for gender minorities within certain fields a lot of researchers had similar experiences to me. This included the coordinators and mentors who talked about the imposter syndrome and how they have gone about combating biases in their life. I would definitely suggest WISEST to anyone who is a gender minority in their field of interest because of the safe space and how much you learn during the program. A very memorable moment during WISEST was the talent show where researchers got to show

off their skills. Having social events like this helped build a strong community even though we were all online and the first time some of us were able to meet up in person, I was amazed at how it felt like I already knew them all.

For my project placement, I was in the LIMDA lab and my brief was to design a 3D model of an aeroponic planter that could be used in the home. From there I decided to design a planter pot for a potato plant. I quickly realized that very little research has been done on potato aeroponics but this did not deter me from completing my project. I did finish my design with only a few issues and I can say that I am extremely proud of my accomplishments in the Summer Research Program. The program could not have been possible without the supporters, volunteers, and our coordinators. Their commitment and time to this program were invaluable and I appreciate all of them.

Darah Buchwitz



High School

J. C. Charyk Hanna School

Lab Placement

Agriculture, Life, and Environmental Sciences, Faculty of Agriculture, Life, and Environmental Sciences

Project Title

An examination of muscle fibres, connective tissue and meat quality in pork from low birth

Final Project

drive.google.com/file/d/1ABlx7cuu0LZVDBD2ni0mGG4Gyx8x2TVy/view?usp=sharing

Supporter

Faculty of Agriculture, Life, and Environmental Sciences

I am a grade 12 student at J. C. Charyk Hanna School in Hanna, Alberta. I have lived on a farm my entire life raising cattle and various other trouble-making animals. I spend most of my spare time learning rare facts, writing short stories, and making art. I have loved every science class I have been in and I intend on attending the University of Alberta.

This summer I was placed in the Faculty of Agriculture, Life, and Environmental Sciences in Dr. Heather Bruce's lab. My project was looking at the effects of different fat-content diets on the growth rates of low birth weight piglets and how meat quality was affected.

I applied for WISEST for the same reason I do so many things; to see if I could. I believe in testing myself, but when I realized I had gotten into the program, I didn't feel like I had done anything. I was the first person from my school to apply for WISEST, let alone get in. Even though I had heard the number of applications that had come in, I didn't process that I had done something pretty amazing, at least not until a little way into the program. I learned that most of the other participants were taking AP and IB courses, whereas I started the program still believing that these classes were something that only existed in the USA. I learned that I had accomplished something pretty amazing that day.

I would highly recommend that students apply for the program in the future. There can be a lot of 'ifs' and 'buts', however, these are just unanswered questions that will continue to go unanswered if they don't try. Even if an applicant ends up in a lab that isn't exactly what they are looking for, they need to understand that they will learn something from the experience and that they are going to meet so many amazing people.

I would like to thank Canada Summer Jobs and the Faculty of ALES for providing me with the support that allowed me to have a spot in WISEST this summer, as well as WISEST for providing me with some amazing opportunities and the ability to meet so many cool people.

Saige Burnett

High School

Roland Michener Secondary School

Lab Placement

Biological Sciences, Faculty of Science

Project Title

Bias: How people of science view minorities

Final Project

drive.google.com/file/d/1PdAGg_VRXZo5nwzJLhAABhiSBHcxQbxy/view?usp=sharing

Supporter

Faculty of Science



Hello, I am Saige Burnett, I was a Student Researcher with the WISEST 2021 Summer Research Program. Growing up in a small town there aren't many opportunities, combine that with a pandemic, and few opportunities become no opportunities. School has always been a big part of my life, simply because I enjoy it, and every year I enjoy it more because the material gets better. Chemistry, biology and math are my favourite classes. I plan on using my passion for these subjects to pursue post-secondary education, and either graduate education or medical school.

My time in the SRP taught me that there is no rush to make a decision, and changing your mind isn't a roadblock but more of a stoplight, where the light doesn't turn green until you're ready to go. The SRP, for anyone on the fence about applying, is worth it. Not only do you learn the fundamentals of research and lab work, but you are also taught about life skills, such as writing a resume, or presenting yourself well on social media. The experience in itself, just doing the work and learning about a topic you're interested in is enjoyable.

Of course, I have to mention the relationships you will form in the SRP. You're being exposed to a group of people with interests similar to yours, all of whom are looking to make connections, and are close in age. The program allows for plenty of time to bond with your cohort, whether it's by playing games, doing ice breakers, or encouraging casual conversation. The program presents many opportunities to meet with mentors. Any questions you have about pursuing STEM, or a specific career, will be answered, you can quote me on that.

Overall the SRP is just an outstanding experience, really a once-in-a-lifetime opportunity. It's so important to promote diversity in science, as I learned this year with my project. I looked into bias and how it can affect the perceptions of students, or employees based on racial or gender stereotypes. It was extremely eye-opening and exposed me to issues I didn't even know existed. I want to personally thank all of my sponsors this year for providing me with the chance to participate in the program and supporting me the whole way. Starting with my PI Dr. Lisa Willis, it was great to meet you this year, and your patience has shown me that there is always someone willing to help. Thank you to the University of Alberta, The University of Alberta Faculty of Science and Canadian Summer Jobs for financially supporting the program, and therefore the students. And finally WISEST, for coordinating the entire program, and taking an active step to promote diversity in science.

Lauren Cote



High School

North Peace Secondary School

Lab Placement

Biological Sciences, Faculty of Science

Project Title

Wapiti River and Pipestone Creek Site Map Correlation

Final Project

drive.google.com/file/d/1rr6kv-4yO9jK3ZXC76YXvL3Ue-KpSEY9/view?usp=sharing

Supporter

Faculty of Science

My name is Lauren Cote and I am a student at North Peace Secondary School in Fort St John, BC. I have always been interested in sciences, and Paleontology has been my passion and my future career goal since I was young.

My placement this year was in the paleontology lab under Dr. Philip Currie, Clive Coy, and my supervisor Howard Gibbins. The research project I undertook during the program focused on compiling maps of bone beds in northern Alberta to document the discoveries made year by year. This entailed tracing out all of the specimens present on each map, deciphering fossil ID labels, cropping the 1-meter square grids down, and piecing them together to show the entire bone bed in one image. I found the work incredibly interesting and also quite fun!

Due to my interest in Paleontology and the reputation of the University of Alberta Dino Lab, I have been looking into attending the University of Alberta for quite a while and jumped at the chance to apply when I discovered the WISEST Summer Research Program. The SRP has been an absolutely amazing experience and I have gained so many invaluable skills from it, including networking and communication skills that will be incredibly useful in the future. As well, WISEST has fostered connections with so many amazing, like-minded students who I've befriended throughout the 6 weeks of the program. Being able to experience working firsthand in a field of science that has interested me for so long has been amazing, and has solidified my pursuit of Paleontology as a career.

It has been an unforgettable experience participating in the program, and I could not have done it without the support of my fellow students, the WISEST Coordinators, my supervisor Mr. Gibbins, and my sponsors, who made my participation in the program possible. Thank you all so much for making this program such an amazing experience!

Ashley Dugarte



High School

Lillian Osborne High School

Lab Placement

Linguistics, Faculty of Art

Project Title

Realization of word-final taps in Spanish infinitive verbs

Final Project

drive.google.com/file/d/1TOWbDECvXMD17OBlhZ02ExnR-6nEPWn_/view?usp=sharing

Supporter

Faculty of Arts

My name is Ashley Dugarte, I attend Lillian Osborne High School in Edmonton Alberta, where I love learning about math, physics, and art. I have always been a person with a wide array of interests, even some that seem conflicting, but something that has always stayed with me has been a love for learning.

This summer I was placed in the linguistics lab, where I researched the pronunciation of Spanish sounds by analyzing spectrograms of conversations to find where and how sounds are reduced.

I think my biggest takeaway from the SRP was to have faith in myself. Before starting the program I felt like I was unworthy of being here, and that the only reason I got in was through a stroke of luck. However, meeting this cohort and the uplifting space we created changed this so quickly. This program was a testament to self-discipline and the drive to learn more. It really takes you out of your comfort zone, but that's what allows it to be such an impactful learning experience. The first week was full of PD sessions that made the expectations clear and gave us the tools to succeed: guidance on how to read literature effectively, tips on time management, and help to make online communication more efficient. Although it took some time to get used to working with little supervision, it never became overwhelming thanks to all the support that we received from WISEST.

The most amazing part of this summer was how much I was able to learn in six weeks; from knowing nothing about phonetics to discussing the implications of my findings with my supervisor. I am now much more aware of my potential as an individual and as a researcher. Meeting incredible mentors who shared their experiences has opened my eyes to so many paths that I now know are within my reach. This program has fueled my curiosity and taught me how to apply it to make a difference. I cannot recommend it enough, I got to learn so much about my fields of interest, got skills that will benefit any career, met the most amazing people, and got to surprise myself with how much I was able to accomplish during these six weeks.

Finally, I would like to extend my gratitude to the Alberta Phonetics Lab, my Principal Investigator, Benjamin V. Tucker and my supervisor, Scott Perry for their guidance and support. I would also like to thank the Faculty of Arts for making this opportunity possible.

Adya Dutt



High School

Bishop P.F. Reding Catholic Secondary School

Lab Placement

Computing Science, Faculty of Science

Project Title

Analysis of an Extracted Discipline-Specific Computer Science Vocabulary List

Final Project

drive.google.com/file/d/1Zv8OYLSgxYIRhrpkP61Npty_61VLIft/view?usp=sharing

Supporter

Motorola Solutions Foundation

My name is Adya Dutt and this summer I was a student researcher through WISEST's summer research program. I am an incoming grade 12 student at Bishop Reding Catholic Secondary School in Milton, Ontario. STEM, especially the technology side, has always been of interest to me. At school, my favourite subjects include computer science, math and surprisingly, history. Outside of school, my interest in computer science persists, as I teach coding to younger students and work on various programming projects. I hope to continue this interest into postsecondary by pursuing a degree in computer science.

This summer, my research project involved using the programming language Python and Natural Language Processing techniques to create a computer-science vocabulary list that can be used to enhance student learning. Since no specific vocabulary list exists, this list can strengthen computer science curricula and the automated nature of this project can be applied to creating vocabulary lists for other disciplines. On the side, I also helped compile and organize a library of resources for the Cree language, which will be used to train a model that helps with speech recognition and text prediction in Cree.

The summer research program has benefited me in numerous ways. Working in an environment that understands and caters to the success of women and non-binary students in STEM has given me the confidence to pursue research in the future. Conducting research as a high school student and gaining guidance from

professional investigators and supervisors has allowed me to improve my skillset and professional interactions. Aside from the research, I have learned many new skills from the professional development sessions and I especially value the "Art of Networking" session. I had multiple opportunities to apply my newfound networking skills in mentor meetings and virtual lab tours. Additionally, the connections I have made with my fellow student researchers are the highlight of my summer and I look forward to continuing our bond over STEM for years to come.

I would like to thank my principal investigator Carrie Demmans Epp, my supervisor Daniela Teodorescu, and the EdTeKLA lab for guiding me through the art of research this summer and providing an overall support structure. A huge thank you goes to the WISEST coordinators for all their hard work and dedication in maintaining an unforgettable summer. I would also like to extend my appreciation to the Motorola Solutions Foundation for sponsoring my time at the SRP. My incredible experience at the SRP would not have been possible without any of the supporters involved.

Sydney Easton



High School

Central Memorial High School

Lab Placement

Electrical and Computer Engineering, Faculty of Engineering

Project Title

Coding in the Real World

Final Project

drive.google.com/file/d/1lascOgZ68472xP8HB79C4KxnyUo-jC-q/view?usp=sharing

ERA-AV Link

drive.google.com/file/d/1XQYwTR_P8BHmftSY_d_lhJhakNitdlU-/view?usp=sharing

Supporter

Process Solutions and Dr. Jason Myatt

My name is Sydney Easton and as of 2021, I attend Central Memorial High School in Calgary. My passions lay in mechatronics engineering, physics, and innovation as a whole. One of my lifelong dreams is to be able to create automated systems that work in space. Over the summer I was placed in the Electrical and Computer Engineering Faculty and worked with Dr. Jason Myatt as well as fellow researcher Krishna Patel to create a plasma calculator with the python programming language. The purpose of the calculator was to prevent the user from having to do any manual unit conversions or type in any formulas.

One of the things I'm most proud of achieving over the summer was completing the first prototype of the plasma calculator. Before WISEST I have had very minimal exposure to coding anything from scratch and had no experience with Python. The journey of not only learning the syntax and capabilities of the python programming language but also, then applying the knowledge that I had learned from all the tutorials and books and applying it to a completely new program that doesn't have a pre-existing prototype or anything to build off of. The fact that I, along with my lab partner Krishna, were able to learn python as well as create an almost fully functional calculator in less than six weeks still blows my mind.

During the WISEST SRP, I learned a lot from many different people of all different backgrounds, however, what I believe to be the most impactful lesson taught to me was how to network and present yourself online. This skill will

help me in many different ways and in many different environments from the world of academia, to internships, to the workplace, as well as the conventions I will be attending in the future. The SRP engineered opportunities for us to practice networking and self-branding techniques in a safe environment. Overall the ability to build up the skills of networking and personal branding makes applying it in the future seem less daunting.

I would like to express my deep and sincere gratitude to my PI Dr. Jason Myatt, for all of his guidance and support over the past six weeks. I feel very fortunate that I was able to take part in research and acknowledge that my lab would not have been possible without Dr. Myatt. I would also like to extend a thank you to the WISEST Summer Research Program team for their constant support. The SRP has allowed me to gain and practice professional skills that will heavily impact my future careers. My research opportunity would not have even been possible without my sponsors: Process Solutions, Canada Summer Jobs, and Dr. Jason Myatt. I thank all those listed for making this program possible, and for granting me this fantastic experience.

Basma Ebeid

High School

Edmonton Islamic Academy

Lab Placement

Civil and Environmental Engineering, Faculty of Engineering

Project Title

Condition Evaluation of Railway Tracks

Final Project

docs.google.com/presentation/d/1DxyIBFguWelm-0Oq-huy2IY5ndKOXXRthJLFCtNoXOY/edit?usp=sharing

Supporter

Faculty of Engineering and Dr. Michael Hendry



My name is Basma Ebeid and I am entering grade 12 at the Edmonton Islamic academy. I have a passion for learning, but some of my favourite subjects are math and chemistry. In the future, I would like to pursue a stem-related career. Prior to the summer research program (SRP), I strongly aspired to be an engineer but over the past 6 weeks, the program has opened my horizons to the limitless things I can do in my future. I hope that in university I will find something that I am passionate about, good at, and will help me make an impact on the world.

Over the summer I had the pleasure of working alongside the Canadian railway research laboratory (CaRRL) at the department of civil and environmental engineering. My project was a part of a condition evaluation research project on railway tracks. I evaluated and assessed track conditions using cutting-edge technologies to help reduce track failure in railway operation and increase track safety and efficiency. The track evaluation I conducted in the past 6 weeks will help the railway industry save lives and money, help engineers focus on problem areas, and help researchers develop new tech to approach track problems. My placement has taught me important research, organizational and professional skills. I have learned how to code in MatLab, make Gantt charts to organize and schedule my tasks, present my research in an understandable manner, and develop my professional networks. Overall I have gained invaluable knowledge that I will use for the rest of my academic journey.

This program was an opportunity to expand my knowledge of engineering, science, and technology career paths. It helped me explore my options for post-secondary education and gain invaluable experience in a professional work/ academic environment. I have built relationships with individuals with similar interests and leaders in the science, engineering, and technology fields, as well as exposed me to different perspectives. I was given the chance to apply my skills, knowledge, and resourcefulness to an area of study that I'm passionate about. As a grade 11 student, I was highly doubtful about applying to the program. This program has changed my mindset for the better, it has taught me to be confident in myself and jump at opportunities. If you are a grade 11 student with great enthusiasm for science I urge you to apply. I'm glad to have taken the first big step in my future education path and aspirations through this program.

I would like to thank WISEST for giving me this great opportunity and always pushing me to do my best. I would like to thank the Canadian Rail Research Laboratory for accepting me with open arms and making me feel like I belong. Lastly, I would like to thank my teachers for believing in me, I never would have been able to do it without them!

Kyla Fald



High School

Memorial Composite High School

Lab Placement

Mechanical Engineering, Faculty of Engineering

Project Title

Robot Seeding Mechanism Design and Application

Final Project

drive.google.com/file/d/1iuKsiGkpCR93DIsAsY-XBc1dyPhPodwg/view?usp=sharing

Supporter

Syncrude

My name is Kyla Fald, I am from Stony Plain Alberta, and I go to Memorial Composite High School. In my spare time, I love building robots through our school robotics club and learning all about the universe through physics. In the future, I hope to pursue mechatronics engineering through the University of Alberta to fuel my passion for engineering. My project over the summer was to build an end effector for a seed planting robot. This robot will be used in hydroponics and aquaponics to help automate the seed germination process.

This project taught me creative problem-solving skills as well as crucial research skills. Overall this incredible opportunity would not be possible without the WISEST staff, my Principal Investigator Dr. Rafiq Ahmad, my direct supervisor Rabiya Abbasi, my fellow SRP researchers, my teachers, and my sponsor Syncrude. My motivation for joining the WISEST program was primarily the opportunity to get involved with STEM research and be able to learn from knowledgeable mentors.

I have always wanted to go into engineering and post-secondary but this goal seemed incredibly daunting to do on my own. WISEST gave me the tools and confidence to succeed and flourish in my pursuit of a career in engineering which I am exceedingly grateful for. This summer I learned to be confident in myself and my skills. It's always hard to believe that you are capable enough

and belong in an incredible program like WISEST. Impostor syndrome is something that people who are of the minority often struggle with, including me. Even though it may be hard to believe in yourself, just know that you are amazing and are capable of great things. I also learned that relying on others is something that can be incredibly valuable. Asking for help does not make you any less valuable than doing everything by yourself, and the reality is that there are so many people from whom you can learn. Lastly, I learned to think outside the box and do science differently. Through WISEST, I was able to meet scientists who strive to do science through lenses that were not the default. Through paradigm-shifting, they were able to use their research to lift the voices of those who are underrepresented in the STEM field. Moving forward, I hope to follow in their footsteps and be an ambassador for those whose voice is often missed in science and engineering. Additionally, I strive to recognize my own unconscious biases and educate myself to not let myself be affected by them.

Sarah Freeman



High School

Strathcona High School

Lab Placement

Secondary Education, Faculty of Education

Project Title

Examining the Alberta K-6 Draft Science Curriculum for Markers of Colonial Influence

Final Project

drive.google.com/file/d/1xmWia9fN1eXqM0lkWZlvKZOQwUjTd_sf/view?usp=sharing

Supporter

WISEST

My name is Sarah Freeman and I attend Strathcona High School in Edmonton, Alberta. Growing up, I always had mixed interests in science and the humanities, and I thought I would have to choose between them for my future career path.

Through my SRP placement in the Faculty of Education at the University of Alberta, I learned that I might be able to pursue both. For my project, I analyzed the Alberta draft K-6 science curriculum for markers of colonialism - anything from the misrepresentation or erasure of Indigenous perspectives to the assertion of Western dominance. I gained new scientific knowledge, while also using literary analysis techniques and refining my writing skills.

From my placement, I learned how valuable interdisciplinary work can be; it became clear that the separation of science from the arts is hindering our ability to truly understand what scientific progress might look like. This broadened my view of what my future career may look like, and I'm now hoping to pursue studies that bridge the gap between science and the humanities.

Beyond the clarity that I gained for my career path, through the SRP I also became part of a community that has given me the confidence to pursue these future goals. I met peers who shared my ambitions, mentors that showed me the many, many different ways to pursue science, and SRP alumni who discussed the opportunities this program can open for former participants. The support, reassurance, and

stories of these people made me feel prepared to move forward into the future and make my career in science into what I want it to be.

The community that I had, helped me grow through my challenges during the program. While I was conducting my analysis and writing my final report, I doubted my own ability to do justice to the topics I was writing about; I put a lot of pressure on myself to make it perfect. It was only through conversations with my peers and feedback from my supervisors that I came to realize that my report didn't need to be perfect to be thoughtful and well-written. These people helped me approach my work from a renewed perspective, and I attribute a lot of my growth this summer to the people I met and connected with.

I want to extend my appreciation to everyone that supported me along the way. Thank you to my peers in the SRP, to the mentors we met, and to everyone that volunteered their time for us. I'd also like to thank my supervisor, Bridget Fraser, and my PI, Dr. Marc Higgins, for their guidance and insightful feedback. And, thank you to my sponsors, the WISEST Advisory Board and Canada Summer Jobs. To everyone that made this experience possible, I am so grateful for your contributions.

Barrett Groves



High School

École Secondaire St. Albert Catholic High School

Lab Placement

Biological Sciences, Faculty of Science

Project Title

Predicted Data Analysis: The Impacts of Implicit Bias on Evaluations of Graduate Student Applications

Final Project

drive.google.com/file/d/1XDhSPPeU_r5s_nhAxo_QXktAvrK6dZbN/view?usp=sharing

Supporter

Faculty of Science

My name is Barrett Groves, and I am an anatomy and physiology enthusiast from St. Albert, Alberta. As a life-long athlete, I have suffered quite a few injuries. After deciding to look into the anatomy of an ankle sprain, I grew a fascination for the human body. Although I am a huge fan of biology, I also thoroughly enjoy physics, chemistry, and math. Utilizing my interests, I would love to get a degree in biochemistry or physiology and ultimately pursue my dream career in medicine or medical research. Outside of academics, I started a diversity group at school in my eleventh-grade year. With the goal to encourage and incorporate the ideals of diversity and acceptance throughout my school, we have been able to educate students on issues that are prevalent in our society through social media platforms, informational posters within the school, and in-class presentations and recorded interviews.

This summer, I was placed in a diversity, equity, and inclusion project. My research group was seeking to understand how personal information impacts the evaluation of a graduate applicant. Since revealing personal information, such as names and pronouns, can allow for an evaluator's implicit biases to be provoked during the evaluation, these biases can consequently impact the evaluation. We hope that our experiment can help identify effective ways to limit or eliminate biases, such as through bias video interventions or anonymizing information, and aid in the creation of an equal playing field within STEM. I would like to thank my PI, Dr. Lisa Willis, and my supervisor, Ronak Patel, for having me in their lab this summer and providing me with guidance and support

throughout this program. My participation in this program would not have been possible without my sponsors Dr. Matina Kalcounis-Rueppell and Canada Summer Jobs.

As a life-long biology enthusiast and overall science fanatic, it became very overwhelming when trying to determine where my future career lies in the very vast world of STEM. I applied to the WISEST summer research program because I believed that it would provide me with the opportunity to temporarily become immersed within the world of STEM, a position in which I would be able to strengthen my interests, explore my options, and converse with knowledgeable individuals. I loved that this program allowed me to be a part of current research at a respected university. From the conversations during the mentor sessions to the skills learnt while working on my project, this program has been absolutely life-changing. Through WISEST mentorship sessions, I have been able to converse with individuals within and outside of my fields of interest and gain valuable insight into potential careers and degrees. Through participating in lab research, I have gained extremely useful and applicable critical thinking, communication, and literary skills, which have helped me gain confidence in my abilities. As my lab required statistical analysis of data, I learnt how to use R Studio, a program heavily used by researchers and STEM University students. I am now confident in pursuing STEM!

Jenna Harrison



High School

Frank Maddock High School

Lab Placement

Chemistry, Faculty of Science

Project Title

The Determination of Response Factors for Reaction Monitoring by Gas Chromatography

Final Project

drive.google.com/file/d/1IR_nd0-L6EZogQTgKW9KwYTjqeKBX0AS/view?usp=sharing

Supporter

International Paper Company and Dr. Rylan Lundgren

My name is Jenna Harrison and I go to Frank Maddock High School in Drayton Valley, Alberta. My placement for the SRP was in a Chemistry lab where I developed response factors for reaction monitoring using gas chromatography. Chemistry is one of my favourite subjects in school and probably what I will take in university because it's just so interesting!

When I found out the program would be running virtually again, I was a little worried that I'd just be doing data analysis and entry, but this was not the case; I was actually a part of the lab! I had the opportunity to sit in on lab meetings and a practice candidacy exam (which both went way over my head, but were still so amazing), I got to meet and work with different members of the lab and I was still able to run my own experiments through the campus VPN! Other lab members prepared samples for me, but I could connect to the computers in the lab and use a robot to run the instrument and analyze my own data.

Participating in the SRP was such an incredible experience. Being from a smaller oil town, I haven't had a lot of opportunities to explore STEM beyond the high school curriculum and there aren't many role models in STEM in my community for me to engage with or look up to. I have learned so much from the various PD sessions, the mentors, my PI, my peers and especially my supervisor. I had the opportunity to interact with a diverse group of people of all ages and experience levels and learn about their lives in school and industry. Before the SRP I had no idea how much was out there; now I can head into my

grade 12 year with a better picture of what is to come and what a future in STEM means. I think one of my biggest takeaways is that I don't have to have the rest of my life planned out right now, I can spend time exploring my options and finding exactly what I'm passionate about. I seriously cannot express how grateful I am to have been in the SRP. For anyone who is considering applying, DO IT!!!!

Finally, I would like to thank WISEST and the WISEST coordinators for putting on incredible PD sessions and guiding us through the program, to my sponsors, International Paper and Dr. Rylan Lundgren, for making my placement in the program possible, to the Lundgren lab group for having me in their lab, and a HUGE thank you to my supervisor, Wes McNutt, for teaching me about chemistry theory and industry, answering all of my questions, giving me an exciting assignment, sharing his experiences and above all else, sharing his passion. I can honestly say that this program has changed my life in so many ways.

Danna Hristova



High School

Old Scona Academic High School

Lab Placement

Mechanical Engineering, Faculty of Engineering

Project Title

Literature Review: Summarization of Recent Additive Manufacturing of Polymers and Prospective.

Final Project

drive.google.com/file/d/15sMxZ4qG6XKmNxCjOiGyLHyq17KUZsZs/view?usp=sharing

Supporter

Threshold Impact

My name is Danna Hristova and I am going into Grade 12 at Old Scona Academic High School in Edmonton, Alberta. At school I love all of my STEM courses including physics, chemistry, biology and math, however having a passion for writing and history as well, I am a part of the international baccalaureate diploma programme. Outside of STEM I debate competitively and am an avid dancer and swimmer. I'm very passionate about mental health and youth advocacy and as such hold several leadership positions on youth councils and organizations such as Neurohealth. I hope to pursue a degree in mechanical engineering and potentially pursue the Biomedical option. This summer I was placed in a mechanical engineering lab where I examined the use of polymers in several Additive manufacturing methods. I compared the properties of several different polymers and summarized their advantages and disadvantages.

One of the most important things I learned this summer was how much you are capable of achieving if you are willing to put the work in. At the start of this program I had no previous knowledge about 3D printing or additive manufacturing, nor did I have the degree of previous chemistry knowledge that was required to accurately assess the given polymers. This contributed to a feeling of disappointment in myself because I felt unworthy of the larger-than-life opportunity I was given, however with support from my PI I found that I could change my disappointment into a passion to learn - to not only overcome the challenge but thrive within it. 40 summarized research papers and hundreds of questions later I was able to understand the subject well enough to generate my own paper!

I would recommend the WISEST program to other students, simply because it provides you with the opportunity to work truly independently in a research field and see if it suits you best. In addition, this program allows you to expand your professional network with professors who conduct research in fields of study you are interested in, which provides a chance for you to learn incredible facts and cultivate diverse, lifelong connections that you can draw on at a later time.

Thank you to the WISEST team - Bridget, Hannah, AJ, Fervone, Deb and Helen for allowing me the opportunity to embark on my research journey this summer. Your support inside and outside of the research project has been truly valuable. Thank you to Threshold Impact for generously sponsoring my participation in the program. Furthermore thank you to my Principal Investigator - Jiawei (Laura) Chen and my supervisors - Dr. Tian Tang and Dr. Cagri Ayranci for your continuous support of my research and learning process. Thank you for always allowing me to ask even the simplest of questions and giving me an opportunity to learn about the research process in a safe and constructive environment. Your constant encouragement and support have allowed me to not only exceed my previous limits but redefine them. An additional acknowledgment goes towards everyone who helped create this experience!

Daras Kaur

High School

Ross Sheppard High School

Lab Placement

Engineering Safety and Risk Management, Faculty of Engineering

Project Title

Bow Tie Analysis of the Lac-Mégantic Rail Disaster

Final Project

drive.google.com/file/d/1Spi_VbYq6hNALpIRs1THdYofmsHpGx3s/view?usp=sharing

Supporter

WISEST



My name is Daras Kaur, I'm from Edmonton Alberta and I attend Ross Sheppard High School. I'm very excited to tell you all what my experience in the WISEST SRP was like and why I decided to apply.

In elementary school, a guest speaker came to talk to us about science. Her name was Dr. Margrett Ann Armour. At the time, I had no idea who she was, but her talk and demonstration were very interesting and engaging, and really inspired me to learn more about science and how everything around me works. I later found out about Dr. Armour's legacy and of her impact on so many lives. A few years later, I attended a seminar given by Professor Jocelyn Bell Burnell at the University of Alberta, in which she talked about her discovery of pulsars. When I learned that she had been passed up for the Nobel Prize for that discovery, in favour of her junior male co-researchers, I was both incensed and motivated. It was then that I resolved to pursue STEM. I had always had a passion for learning about STEM and so I competed in the Science Olympics, attended the WISEST Choices Conference, and enrolled in a BSc Honours Mathematics degree from the Open University, UK. When I heard about the WISEST SRP, I just knew how much this program would benefit me and how much I could contribute.

This program has given me more than I could have imagined. We had incredible mentor sessions with WISEST alumni. I learned much from their experiences and their guidance. We also had professional development sessions that gave us invaluable knowledge about networking,

EDI (Equity, Diversity, and Inclusion), and social media. These sessions allowed me to truly understand how to connect with people and how to flourish as a woman in STEM. We are living in exciting times – it is awe-inspiring to read about the break-neck speed of development of Artificial Intelligence; Quantum Computing; discoveries in stem cells and other areas of microbiology; new and fascinating discoveries in physics and cosmology; advances in materials science; and a better understanding of brain functioning, among many other exciting topics. Having had the privilege of working in the WISEST program this summer has only increased my passion to work in these exciting fields. I am truly thankful for having been given this experience.

Lastly, I would like to talk about my work this summer. I was placed in the engineering safety lab with PI's, Dr. Lisa White and Professor John Cocchio, and supervisor, Hadiseh Ebrahimi. Together we wrote a research paper on the Lac-Mégantic rail derailment and crash. We studied this disaster using risk analysis techniques such as Event Tree Analysis, Root Cause Analysis, and the Bow Tie Diagram. We will now further develop this paper in hopes that we can submit it to a peer-reviewed journal. The most rewarding part of this summer for me was seeing all my research come together to form a research paper. I'd like to thank the WISEST team for giving me this opportunity and for funding this research, and my PI's and Supervisors for mentoring and supporting me.

Jenna Kisilevich



High School

M.E. LaZerte

Lab Placement

Biological Sciences, Faculty of Science

Project Title

Potential Sources of Error and Uncertainty in Radiocarbon Dates from North American Sites

Final Project

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Supporter

WISEST

My name is Jenna Kisilevich, and I currently attend M.E. LaZerte High School in Edmonton, Alberta. In school, I have interests in all subjects; however, my preferred subjects are the sciences. I have taken biology, chemistry, and physics, but all are so vastly different that I cannot say which is my favourite. This is why interdisciplinary sciences fascinate me: they take aspects from biology, chemistry, and physics to produce a different body of knowledge. In the future, I know that I want to pursue a bachelor's degree in science. Although the future is uncertain, the SRP has helped me realize my passion for science, and I plan to continue with that passion in university.

This summer, I worked in the geobiology lab under Dr. Andria Dawson. I researched correlations with uncertainty in radiocarbon dates from fossil pollen sediment cores. All of the data was from the Neotoma Paleoecology Database, and we used R to interpret and subset the large dataset. Not only did we analyze radiocarbon ages, but also the sizes of the lakes from which the sediment cores were taken. The sizes helped us to estimate the source vegetation area of the lake, and whether it represented a local or regional ecosystem. This research is important because pinpointing correlations with uncertainty is the first step in decreasing said uncertainty; if scientists then develop methods to date materials more precisely and accurately, the decreased error could lead to knowing more specifically when and where a past ecological event occurred.

However, this summer was not just about research and data analysis. It was also about gaining transferable skills such as public speaking, networking, and personal branding. Before the SRP, I had no social media experience, so through the digital science communication and personal branding sessions, I gained skills that I can now use online; I also gained confidence in myself and my abilities. These sessions taught me the importance of making accessible and true content that can be consumed by any social media user.

Going back to the beginning, I was motivated to apply for this program because I was hoping to refine my interests and find a career of interest. Looking back, the SRP has done much more than that for me. I would highly recommend this program for anyone who is hoping to pursue a STEM career in which their gender is underrepresented. The SRP drives young people to follow their passions, appreciate their strengths, and dream big.

Finally, I would like to thank my teachers, Ms. Higham and Mrs. Malayko, for their support of my many endeavours. Also, I would like to thank my wonderful PI, Dr. Andria Dawson, for her guidance and willingness for me to participate in her research. Thank you to the WISEST team and my fellow student researchers who were always there to help with anything. Lastly, I would like to thank my sponsors at WISEST for their contribution to my experience. This has been an amazing experience which I will never forget.

Emma Kozak



High School

Lillian Osborne High School

Lab Placement

Biological Sciences, Faculty of Science

Project Title

The Distribution of Ankylosauridae, Hadrosauridae, and Ceratopsidae Dinosaurs Across Alberta

Final Project

drive.google.com/file/d/113YahNeuOMNftr82VxhBpukraV341hOU/view?usp=sharing

Supporter

WISEST

My name is Emma Kozak, I am from Edmonton, Alberta and I go to Lillian Osborne High School. I love learning about biology (specifically physiology) and astronomy, and my education and career interests lie in physiology and astrogeology. This summer, I looked through various paleontology papers to find the localities of Ankylosauridae, Hadrosauridae, and Ceratopsidae specimens. I then mapped those localities in Google Earth Pro to show their distribution across Alberta. I would like to extend a huge thank you to my sponsors for funding me and making it possible for me to participate this summer, the WISEST Coordinators for planning and creating an amazing summer program for us, and my direct supervisor, Howard Gibbins, for being super patient and supportive throughout the entire summer, for answering all my questions, and helping me while I was figuring out what I was doing.

Networking is one skill that I learned during the program that will help me in my future academics and career. Near the beginning of the program, we had a PD session all about the how-tos of networking, and it was a very valuable session. It set the groundwork for the mentor opportunities we had throughout the program and gave us some ideas for what to talk about and some examples of questions to ask if we were ever stuck or couldn't think of something to say. I know that this knowledge will be very useful and valuable in the coming years in university, and beyond.

The 3 most important things I learned this summer: Number one: I learned how to ask questions. We had a networking PD session and lots of mentor opportunities and lab tours where we learned about and gained experience in talking to professionals to learn more about them and their careers. Number two: I learned that it is worth it to come out of my shell and talk to others. I was quite shy throughout the program, and it was only closer to the end where I really started talking to my peers. I know that in the future when I am put into scenarios where I don't know many people, I will feel more comfortable reaching out to others. Number three: I learned some really useful ways to keep myself focused and on track. I made use of Google Calendar a lot this summer to keep track of my schedule, and I also used sticky notes and a variety of apps to keep me on topic and on track, make to-do lists, keep track of things I had already completed, and more.

Katherine Labreche



High School

St Martin de Porres High School

Lab Placement

Renewable Resources, Faculty of Agricultural, Life and Environmental Sciences

Project Title

The Bugs In Our Backyard: Beetles Used As Indicators Of Land Reclamation Success

Final Project

drive.google.com/file/d/1XHnPCp9etP3PweKPw5loyeqb7SN8JY80/view?usp=sharing

Supporter

Syncrude

My name is Katherine Labreche, and I am from Airdrie, Alberta. I am going into grade 12 at St. Martin de Porres High School. In school, I like figuring out math problems and understanding how things work in Chemistry, Biology and Physics. I want to get a bachelors' degree in an environmental STEM field and hopefully pursue a Ph.D. in the future. During the SRP I worked on a project in Land Reclamation, which is returning a disturbed land back to a functioning environment. I examined how beetles have been used as indicators of land reclamation success.

A skill that I learned in the SRP is how to write a literature review. When creating this review, I gained many other skills. For scientific writing, you need to write concisely and in writing my literature review I gained this skill. I also learned how to use citations and ways to keep them organized. For a review, you need to look at multiple research papers and I learned how to read them. So when I need to read a bunch of papers in post-secondary, it will be a breeze. An important skill I learned is how to network better. During the program, we had multiple opportunities that allowed us to network and talk to multiple individuals. Before I didn't know what kinds of questions to ask but now I know how to better navigate conversations. My go-to question for networking is asking what is their favourite part about what they do.

I would recommend this program to other students because school can only teach you so much. This program allows you hands-on experience and knowledge of stem careers that you don't get from a classroom setting. You

can see how what you have been learning can be applied. This program is great for those who enjoy science and math but don't know what they want it to do because it allows them to explore options that they might not have heard of before. I gained confidence and feel so much more knowledgeable for a future that is uncertain and I want others to feel that way as well. I have created many connections with peers and mentors and anyone can benefit from making connections.

I would like to thank Stephanie Chute-Ibsen for all their help in these six weeks. I thank Sarah Wilkinson and Yihan Zhao for all their edits and feedback. Thank you to Valerie Miller for telling me about her research and all your participation even though you were not a supervisor. I would like to thank Dr.M. Anne Naeth for all her wisdom and guidance. Thank you to Syncrude for their contribution. Thank you to the WISEST team for creating a wonderful summer program experience. Thank you to my teachers, friends and family for all their support.

Sabrina Lou



High School

Sir Winston Churchill High School

Lab Placement

Computing Science, Faculty of Science

Project Title

User Interface Enhancements to a Google Extension Grammar Checker for ESL Learners

Final Project

drive.google.com/file/d/1mQkl6ip6mEDOD5SXMVVNc9bNWPs3xhF3/view?usp=sharing

Supporter

Motorola Solutions Foundation

My name is Sabrina Lou and I attend Sir Winston Churchill High School in Calgary, Alberta. In school, I enjoy math, chemistry, and English class, but my school's computing science class has especially stuck out to me for being such a career-focused subject and has inspired me to pursue a career in STEM. Outside of school, I play competitive basketball and am hoping to win my first hackathon soon. In the future, I'd like to pursue a career in computer science or software engineering because of my love for technology and how it affects our everyday lives! A big thing I've learned over the course of the Summer Research Program is that networking is a huge part of being proactive in your career. By building up this skill and widening my network through WISEST, I've gained confidence in myself as a student and as an aspiring female leader in STEM.

I was placed in the EdTeKLA research lab this summer, a lab that focuses on creating technologies to study and support people's learning. For my research project, I improved the usability of a Google writing extension interface for second language English learners. The writing extension uses a model trained by my supervisor to identify negative language transfer errors- errors caused by the tendency to transfer the syntax of your first language to a second language, and gives feedback to them based on their error. An extra project I got to work on within the lab involved gathering Cree texts for a corpus of Cree resources, something there is very little of on the internet. This corpus can be used to create a predictive text and translation

tool, helping to revitalize and preserve the language for future generations. Being a part of the EdTeKLA lab was an amazing learning opportunity. I got to sit in on lab meetings, learn University level concepts like learning analytics and natural language processing, and gain career mentorship from my supervisors and principal investigator. I also gained access to the team's Github repository and it allowed me to learn how to use this coding platform to collaborate effectively with others in my future career.

I would like to thank my principal investigator, Carrie Demmans Epp, and my supervisors, Leticia Farias Wanderley and Daniela Teodorescu for taking the time to give me kindness, support, and mentorship throughout my placement. I feel like I have gained not just valuable guidance from them, but friendships that will continue with me as I pursue my career. Speaking of friendships, I'd like to thank my fellow researchers for creating such a safe, supportive, and fun community. I've made long-lasting friendships and I am excited to see where we all go in the future. Lastly, I'd like to thank the UofA, WISEST, and Motorola Solutions Foundation for their support in giving me this opportunity to explore my potential.

Benita Malaba



High School

École Maurice-Lavallée

Lab Placement

Chemistry, Faculty of Science

Project Title

Self-decontaminating and Rechargeable Fabrics

Final Project

drive.google.com/file/d/1pQkOGa-DJIH0RzEXS0gaOKpo6o4m-fjn/view?usp=sharing

Supporter

Isomass Scientific Inc. and Dr. James Harynuk

Hello, my name is Benita Malaba and I attend École Maurice-Lavallée in Edmonton, Alberta. As I inched closer to my graduation I was getting worried because I had no idea of what I wanted to do afterwards. Although I've never had a favourite subject, I've always excelled in my math and science classes, which motivated the idea of pursuing a career in STEM. This summer I was placed in a chemistry lab that was creating self-disinfectant and rechargeable fabrics, using chlorine and polymer. This experience solidified my idea and I'm currently planning on going into material sciences at the University of Alberta!

The WISEST SRP is so important because it was created with the philosophy of being a stepping stone for unpolished gems. It's packed with PD, mentor and EDI sessions, lab tours, etc. Its main goal is to mould the future of STEM (and other careers with underrepresentation like nursing and nutrition) into more inclusive and diverse spaces, therefore helping them progress past what they are today.

This summer my biggest adversary was myself, more specifically my imposter syndrome. In the first days of the SRP, no matter what I did, I felt like I didn't belong. I was convinced I wouldn't reach everyone's expectations and I was chosen by mistake. This initially made it difficult to participate in the meetings as I was afraid of being 'found out' and told to leave. Thankfully, I discovered this sentiment to be a universal feeling amongst many of my peers. Moreover, our coordinators assured us all that we deserved to hold our positions and that we belonged in

ways that went beyond just science. I wondered why I expected myself to fail, instead of enjoying the moment. This leads to the thing I'm most proud of, my improved confidence. This summer I've learnt that you need to be put in a few uncomfortable situations in hopes to grow. When I realized this, I found myself feeling a lot less worried around others. One of my highlights would be the chlorine presentation I gave to my lab and the drop-in lunches I had with my peers. I'd give up my comfort any day if it meant making the most out of what life has to offer!

Ultimately, this was one of the most memorable experiences of my life, where I grew both professionally and personally. Therefore, I'd like to extend my gratitude to Dr. James Harynuk - my Principal Investigator and Sheri Schmidt - my supervisor, for making me feel welcome in your labs and answering all my questions diligently and with care. To Isomass Scientific Inc, Canada Summer Jobs and Dr. Harynuk, for your generous support. To the WISEST team for giving me this opportunity, for our PD sessions and our weekly one-on-ones. And finally, thank you to all the friends I've made this summer, for your constant encouragement. I can't wait to see what the future has in store for us!

Sian McGarva

High School

St. Andre Bessette Catholic School

Lab Placement

Biomechanical Engineering, Faculty of Engineering

Project Title

Literature Review: Design of Experiments in Cartilage Properties Research

Final Project

drive.google.com/file/d/1oRI-ix6xdVmUQXwly_knl2mzseT2GBBb/view?usp=sharing

Supporter

Rotary Club of Edmonton Glenora



My name is Sian McGarva and I attend St. Andre Bessette Catholic School in Fort Saskatchewan, Alberta. Growing up, I was always a very curious kid. My love of science was driven by this curiosity, which I still see today. While I'm not sure exactly what career I want to pursue, I hope that this curiosity continues to inspire me to grow and succeed as a future scientist. This summer, I was placed in a Biomechanical engineering lab, focusing on the Design of Experiments. For my project, I conducted a literature review of six papers that used Design of Experiments methods and included the property of cartilage as a factor in their experiments. I truly could not have accomplished this without my principal investigator, Dr. Kajsa Duke, her Ph.D. student Maha Ead, and my lab partner, Shreya Sivakumar. My whole WISEST SRP experience could not have been possible without my sponsor, the Rotary Club of Edmonton- Glenora, and the coordinators at WISEST.

As a confused grade eleven student who was starting to think about university applications, the Summer Research Program seemed like an interesting way to explore my options. I knew that I wanted to go into sciences, especially scientific research, but I wasn't sure which field. The virtual tours and mentor sessions allowed me to learn about fields that I didn't even know existed. Before the SRP, I didn't even fully understand what engineering is. Now, I've spent six weeks in an engineering lab, going on virtual lab tours, and having mentor opportunities where I got to speak with women who have been in engineering for years. All of these experiences have educated me on which fields interest me, and which do not.

On the second day of the program, we had a PD session called "The Art of Networking". Little did I know that that one hour and fifteen minutes would be the most important to the entire program. During that PD session, we learned how to talk professionally in a work environment, ask networking questions, and follow up on connections that we have made throughout the program. These skills helped me communicate professionally and make lasting connections with the mentors I have met along the way.

My favourite social event from the SRP was definitely the paint night. It was great to be able to relax and talk in a more casual setting. While we were all extremely passionate about STEM, paint night gave us an opportunity to do something more art-based, which was a nice break. I really enjoyed being able to express myself doing something that I usually wouldn't do, while getting to know my peers better.

Irene Olayinka



High School

Westwood Community High School

Lab Placement

Computing Science, Faculty of Science

Project Title

Agent Tamer The Secret Life Of Algorithms

Final Project

drive.google.com/file/d/1qljOJ1eNTv-OQAL2Jc3AJMX6PP0aU2CN/view?usp=sharing

Supporter

Syncrude

My name is Irene Olayinka and I am a student at Westwood Community High School in Fort McMurray. I am equally curious about STEM and the humanities, and I am passionate about exploring the intersection of these disciplines. Because of my varied interests, I find myself uncertain about my career path. However, the Summer Research Program has been instrumental in narrowing my options. My placement in the Department of Computer Science has shone a light on a field about which I previously had a poor understanding. My research observed how changes to the inputs of an algorithm called TAMER would affect its performance. For everything that WISEST has done, I am grateful. Thank you to the team of dedicated staff that worked tirelessly to make our summer memorable, and to my principal investigator, my supervisor, and the Intelligent Robot Learning Lab for the hours spent sweating over the TAMER code. I appreciate the support from Syncrude, Ltd. and Canada Summer Jobs.

Important things I learned this summer:

I learned that research comes with a lot of flexibility and requires you to set your own goals and timelines. The independence was new and unexpected for a high school student.

self-directed learning is valuable. Setting your deadlines, reaching out when you need help, and communicating effectively are not skills that are explicitly taught in most high schools, but they certainly are used throughout the SRP. Self-discipline is vital to success in whichever placement you find yourself in.

With all of the mentorship and PD sessions, it would be impossible for SRP students to complete the program without understanding how vital connections are to their personal growth and professional success. I have learned more about networking during these six weeks than I had previously known in the year leading up to WISEST, and I am all the wiser for it.

The WISEST SRP is incredibly important, both to the students who have the opportunity to participate in it. Women and gender non-conforming folk are shockingly underrepresented in most STEM fields, and a program that aims to address the issue at a fundamental level is the first step towards making STEM more equitable. The work that we have done this summer is integral to the future of STEM because we sow the seeds of diversity in a traditionally homogenous discipline.

Aisha Osman

High School

Queen Elizabeth High School

Lab Placement

Civil and Environmental Engineering, Faculty of Engineering

Project Title

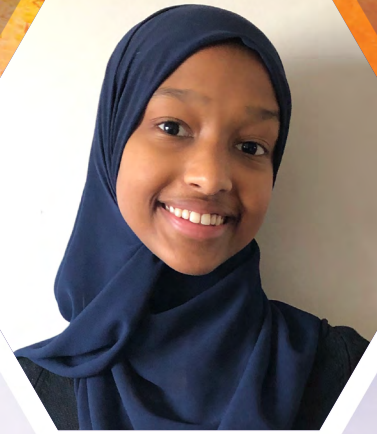
Long Term Effects of Polymer Treatment on Oil Sand Tailings

Final Project

drive.google.com/file/d/1WBGGe2dtqAsew2T8WU7cfAmoom1Y4lnBM/view?usp=sharing

Supporter

Syncrude, Dr. Ahlam Abdulnabi and Dr. Nicholas Beier



My name is Aisha Osman and I attend Queen Elizabeth High School in Edmonton Alberta. My placement as a part of this year's WISEST SRP was in the Civil / Environmental lab. My project was specifically looking at the long-term effects of polymer treatment on oil sand tailings. Oil sand tailings are a waste byproduct of oil sand mining operations and the polymer treatment was initially intended to speed up the dewatering process. My job was specifically looking at what the treatment actually ends up doing to the tailings when you look at the data for a longer period of time.

The WISEST SRP was a life-changing experience for me. I was able to learn so many valuable skills in the research world and outside of it. Through various PD sessions and mentor opportunities, I was always able to walk away a little wiser. I learned how to network, chase opportunities, and develop confidence in my work. We spoke about important topics like tackling imposter syndrome and looking at science from multiple angles. It was always an incredible learning experience. Through my research (and learning about other fields of research), I was able to see how much depth there is to everything around us. From the way we speak to the food we eat, generally, there's always a deeper meaning. Asking questions was the most important part of this project for me. It is extremely important to realize that you do not know everything and that the only way to gain more knowledge is to ask questions. The more questions you ask, the better you understand your research and the more excited you are

about it. Luckily my PIs were always extremely helpful in clarifying any confusion for me. Because I asked questions, I was able to publish work I'm proud of and for that I am grateful.

One of my main takeaways from this summer is that there is no limit to what you can do. Before I started this program, everything seemed so daunting and I was not sure how well I would do. Looking back, that was a little foolish of me. This program definitely inspired us to push our limits and I walked away with so much wisdom because of it. However, it has also taught me that we don't have limits. These boundaries that we put on ourselves are only holding us back. I walk away from this program with more confidence in my capabilities and surety in my future than ever before. So thank you to everyone who made this possible.

I thoroughly enjoyed speaking to the other SRP students. This program is so incredibly valuable in the fact that it allows you to meet such like-minded students. It was always interesting to learn about the research that they were conducting and the lessons that they were learning. We went through the ups and downs together, and I hope to keep some of these friendships long after the program has ended.

Krishna Patel



High School

Harry Ainlay High School

Lab Placement

Electrical and Computer Engineering, Faculty of Engineering

Project Title

Programming a Plasma Physics Calculator with the Use of Python

Final Project

drive.google.com/file/d/1K_kvp9CWkLI5kf3eoEDt2qGur0Yh4cSR/view?usp=sharing

Supporter

Process Solutions, and Dr. Jason Myatt

My name is Krishna Patel, I attend Harry Ainlay High School, in Edmonton, Alberta. Ever since elementary school I've thoroughly enjoyed math because I find it somehow calming to just sit down and calculate or factor, whatever it may be. Due to this, I hope to pursue computer engineering in the future and what I love about this field is that it's rapidly developing and so there is so much room for new discoveries and out-of-the-box thinking.

This summer I programmed a plasma Physics calculator using python. This calculator not only converted units but also performed various formulas that can be used by students and researchers in the plasma physics field. The reason I applied to the Summer Research Program was that although I grew up loving both technology and math, when I thought of STEM, all I really knew was medicine or engineering. I had no real idea what other careers existed, and if I would enjoy them. When I saw that throughout the six weeks we would get to not only meet industry professionals in STEM fields but also get to broaden our awareness about underrepresented fields, I thought it would be a great way for me to explore my likes and dislikes!

One of the biggest skills I've learnt and gotten to practice throughout the 6 weeks is the importance of networking. I never would have thought I would have the chance to meet so many mentors and industry professionals, all of which have provided me with amazing advice that will foster my future. The skill of networking was one I never

really understood till the Summer Research Program when we had the Art of Networking PD session. Through the session, I got to learn how to ask questions, what proper body language is, how to approach someone and more.

Participating in WISEST allowed me to find some amazing peers to whom I can relate more than anyone else. Often in school, you feel left out when it comes to certain things but throughout the summer getting to talk to everyone about experiences we've faced and share how we've dealt with it was truly one of the greatest things I gained this summer. It helped me feel as though someone understood me and that is something so valuable to have. Moving forward I know that there will always be a group of people I can go and talk to and know they will understand where I am coming from.

My experiences this summer are truly unforgettable and for this, I would like to thank my Principal Investigator and Supervisor Dr. Jason Myatt for his support and mentorship throughout the program. I would also like to thank WISEST for giving me this opportunity and Process Solutions as well as Dr. Jason Myatt for sponsoring me in this program.

Maygan Peck



High School

Onoway Junior-Senior High School

Lab Placement

Biological Sciences, Faculty of Science

Project Title

Speciation of The Warbling Vireo

Final Project

drive.google.com/file/d/1gHnG7_vl6B1dU6tEszriPUBNjRnlypof/view?usp=sharing

Supporter

International Paper Company and Dr. Erin Bayne

I'm Maygan Peck, and I'm from Onoway, Alberta. I enjoy spending time outside learning about plants and ecosystems and am passionate about biology, which is why I'm planning on pursuing a career in ecology in the future.

This summer, I was placed in the biological sciences lab. There, I studied the speciation of Warbling Vireos by analyzing their songs. We also looked into how habitat impacts the vocalization of Warbling Vireos and if that had any effect on our study. We found that the subspecies have specific differences in their vocalizations, prefer different habitats, and the differences in the song do not correlate directly to the differences in habitat. These results somewhat support speciation. However, the topic requires further research to understand the effects of habitat on the song of Warbling Vireos.

Firstly, I would like to thank Dr. Richard Hedley, who guided me through this summer. I would also like to thank Dr. Erin Bayne, Samuelle Simard-Provençal, Chloe Riesen-Sivard, the entire WISEST team, and International Paper for all of their support.

I truly believe that the Summer Research Program has been an invaluable experience for me. I would strongly urge any student interested in a field where their gender is underrepresented to apply to WISEST. Women and non-binary individuals are underrepresented in STEM because of challenges such as lack of role models, cultural norms, lack of confidence, and unconscious bias. WISEST directly combats these issues and helps women succeed

in STEM. After participating in the WISEST Summer Research Program, I feel empowered to move into a career in science. I believe that WISEST can equip many more students moving into university. I would also recommend the program because it offers real hands-on experience in a working lab. Many of my peers and I actively participated in cutting-edge research that will help shape the future of our fields!

The SRP introduced me to the atmosphere of the university and exposed me to a similar workload to what I might experience in postsecondary. To me, that's invaluable because it has not only prepared me for postsecondary to some degree, but it has given me the confidence to feel ready to take that next step. The SRP has also taught me many skills that I will continue to use throughout my academic and professional life. I have learned how to read academic papers, the process of research, online communication skills, resume and cover letter building, social media and networking skills, and public speaking. Throughout the program, I have met many mentors who have given me constructive advice and helped me create a better view of my path ahead. The SRP has been an amazing experience with countless benefits.

Joen Pedregosa



High School

Austin O'Brien High School

Lab Placement

Nursing, Faculty of Nursing

Project Title

The Intersections Of Mental Health And The Newcomer Young Men In Canada

Final Project

Poster: drive.google.com/file/d/1S70CgG6rGvBh16rm_wZTl8Cy3qRnu7GY/view?usp=sharing

Video: drive.google.com/file/d/1t4nARX5uD8ydeb72qDaTYg2-5H8vzfY4/view?usp=sharing

Supporter

WISEST and The Faculty of Nursing

My name is Joen Pedregosa and I am entering my grade 12 year at Austin O'Brien in Edmonton, Alberta. The things that I find interesting in school are music class (I play the alto saxophone) and Biology class! I also am a proud member of the AOB peer support team, a group created to spread awareness about different stigmas surrounding mental health. My project over the summer was to make a literature review on the mental health of newcomer young men in Canada. My process included reading multiple articles surrounding the topic and finding the common themes, gaps, agreements, and disagreements between literature. The articles shared common ideas of masculinity: that men should be stoic, have control, never cry, or show emotion. They also shared common factors of the mental health of newcomer young men – cultural difference, age difference, immigration status and integration. I also read about the dangers of internalizing masculinity, especially for those who immigrated to Canada, as there are multiple forms of masculinity in Canada.

The most impactful parts of the program for me were the book club, and the Equity, Diversity, and Inclusion (EDI) PD sessions. In the book club, we read *Invisible Women* by Caroline Criado Perez which sparked conversations about the importance of including gendered data in everyday studies, and the dangers of having a “male default” in data. The EDI sessions were also important to me, especially because we live in Canada, a country working to be more diverse and inclusive. These sessions held by Bridget Fraser were important because they gave us perspective on the purpose of EDI and how we can use them in the

workplace when we become adults. I've achieved multiple skills from this program, but the biggest skill I've taken away was the ability to make questions and answer questions about our work on the spot. During the WISER networking event on the 26th, we were grouped with university students in the WISER program who asked us questions about our research. We also practiced this skill through the Celebration of Research presentation practice and question period post-presentation. This program was the most fun and educational thing I've ever done over a summer, and I am so grateful for having the opportunity to be able to know such brilliant people. I would not have spent the summer any other way.

I would like to thank my supporters: The WISEST Co-chairs, the WISEST advisory board, and the Faculty of Nursing at the U of A. I'd also like to thank my teachers Ms. Jonzon, and Mr. Wells for being my references in the application process. I would also like to thank the WISEST coordinators and fellow researchers for making this summer the best summer ever!

Holly Pougnet



High School

Spruce Grove Composite High School

Lab Placement

Mechanical Engineering, Faculty of Engineering

Project Title

The Application of Bio-based Composites in Wind Turbine Blades

Final Project

drive.google.com/file/d/1XOdKwFNiDfxg8Fi0lvQei5QhoXsV5thg/view?usp=sharing

Supporter

Threshold Impact

My name is Holly, I'm from Spruce Grove and I attend Spruce Grove Composite High School. My favourite classes are math, chemistry and bio. In the future, I hope to attend the U of A and get an undergraduate degree in engineering or anything else in the STEM field. In the more distant future, I'd like to do some research. This summer I was exploring bio-based composite materials in a wind turbine blade application. So basically designing a blade made out of natural fibres like hemp, flax and jute! Thank you so much to my PI, Dr. Carey for welcoming me into your lab this summer. Thank you to my supervisors Mr. Lepp and Mr. Ead for helping me so much throughout the entire project and answering all of my questions. Also a huge thanks to my sponsors Threshold Impact and Canada Summer Jobs. Lastly, thank you to WISEST and the University of Alberta for having this amazing program.

This summer, I learned a crazy amount of information about wind turbines and composite materials. But outside of the research, I learned a lot of very important other things. Going into the program, I was worried about speaking up during conversations and timid about sharing my ideas. However, WISEST taught me to step outside of my comfort zone and contribute to discussions. I also learned the importance of digital science communication. In a world where social media is filled with confusing information, it's hard to know what is possibly false. I learned how it is our responsibility as future generations of scientists to communicate scientific information to the

general public in a way that is easily accessible and makes sense. Finally, I learned about "doing science differently". In this PD session, we learned about how bias can influence scientific research and why it is essential to dig deeper into the research we consume and consider what lens it is from.

The application process might be daunting, but if you're already here reading the journal of student research, just go for it. If you are even slightly interested in any aspect of STEM, you have nothing to lose by applying so put yourself out there. It's very hard to explain how useful this program is and you will never fully understand until you have experienced it yourself. You will meet so many inspiring individuals from your fellow researchers to role models. The PD sessions will provide you with so many important life skills and set you up for a great future. The whole research experience will push you to think about things differently, find solutions to problems and look at a single topic in a way you probably never have before. Overall, the entire experience is so rewarding and if the opportunity is taken to its full advantage it can definitely be one of the most rewarding experiences you will ever have in high school.

Divya Prasad



High School

Tempo School

Lab Placement

Computing Science, Faculty of Science

Project Title

Help! What Should I Say Next?: An Interface for Predictive Text in Plains Cree

Final Project

drive.google.com/file/d/1kDC_kfeeLQ0NttEHdUd7BaeUj658wIET/view?usp=sharing

Supporter

Motorola Solutions

I'm Divya Prasad and I go to Tempo School in Edmonton, Alberta. I enjoy learning about anything as long as it gets my attention. This summer I got to work with Dr. Carrie Demmans Epp (my principal investigator), Daniela Teodorescu and Josie Matalski (my supervisors), and the EdTeKLA team to design a website interface for predictive text models in Plains Cree. Essentially, it helps with text creation for Plains Cree speakers, kind of like when one is texting on their phone and the three words that appear on top of the keyboard that guesses what the user is going to say next. It merged technology with efforts to preserve the Cree language and I enjoyed working on it!

I first heard about WISEST in grade nine when a couple of people in my school had gotten accepted into the program. Once they had completed the program, the students did a speech at a school assembly about their WISEST experience and I remember frantically googling about WISEST when I came home from school. I then learnt about the SET conference and went with a few friends and I loved the atmosphere WISEST provided. Since then, my life goal was to become a WISEST researcher and I was thrilled when I got my acceptance. Being placed in a research lab gave me the experience in professional work and networking and interpersonal skills that I would have not gained anywhere else and I am grateful for this opportunity.

One of my favourite Personal Development sessions we had was called "Dream Big" and it was led by Fervone, the WISEST team lead. She talked about the root of the issue of

why many women and non-binary people choose to avoid going into STEM fields: Imposter Syndrome. Essentially, it is when a person starts doubting their skills and starts feeling like a fraud. The way that science is currently portrayed in the media encourages men to go into STEM but it discourages others. Thus, we learnt the necessary skills (such as developing confidence) to overcome Imposter Syndrome as it will likely hurdle us in our professional careers.

This program has provided me with the necessary skills, confidence, and general advice for my university life and future profession. One of my favourite aspects of the program is meeting all the other student researchers; the SRP brings together like-minded individuals from all over Canada. Overall, it is a rewarding experience that you cannot find anywhere else.

Aparajita Rahman



High School

Lloydminster Comprehensive High School

Lab Placement

Communication Sciences, Faculty of Rehabilitation Medicine

Project Title

Validating Koalacademy, a neuro-guided language learning platform

Final Project

drive.google.com/file/d/13IZYJ2lqPf4IB4KveWc8BPsgdQhHzO_H/view?usp=sharing

Supporter

Motorola Solutions

My name is Aparajita Rahman and I attend Lloydminster Comprehensive High School in Alberta. This summer I was placed in a neurotechnology lab. My placement matched my deep interest in the interdisciplinary field of neuroscience. To me, neuroscience is the juncture of everything that makes us human, but also the base of our more primitive tendencies, and it can tie into several other fields.

My research this summer, for example, was on validating Koalacademy, a web-based neuro-guided language learning platform that uses data from brain waves inputted via commercial brain-computer interface electroencephalography headsets to predict whether or not you will remember something, then uses that information to help you learn Mandarin. Fields that seem unrelated, like neurotechnology and linguistics, interspersed to create the stuff of sci-fi movies, and an end-product that can be modified to aid learning disabilities and pathologies like ADHD, as well as improve the efficacy and success-rate of learning for the everyday person.

When applying to WISEST, I wanted to be considered because my life requires plans for a future that is no longer a vague dream, but a quickly approaching reality. Any career in STEM requires time. I did not want to pick the wrong one and land myself in an existential crisis. I felt otherwise ill-equipped to pursue any career without exploring the field first. Scientists have the prerogative to adapt to new data: Similarly, I reserved the right to choose my career, based on prospects the program uncovered.

This summer I tenaciously integrated my learned skills and passions in exploring my place in the uncharted

world of STEM research. I learned to network, read papers, and present my research to an audience. Research is a significant career option because the discoveries made can be useful to someone, somewhere, at some point in time. There are hurdles, especially when exploring uncharted territory in something like my project, where every answer reveals more questions. However, the work was interesting and purposeful beyond its relation to myself and thus fulfilling.

I come from a smaller city where opportunities like these are scarce, and it has thus rendered me something of an opportunist. Everyone is dealt a specific hand of cards and fate may be a fickle mistress—sometimes, our environments and external traits may pose limits—however, each of us holds the opportunity to play our cards right and exceed these barriers. WISEST is the opportunity that has changed the trajectory of my life by broadcasting the possibilities ahead.

I owe everything to my principal investigator, Dr. Jacqueline Cummine for her sound mentorship advice; my supervisor, Eden Redman, for teaching me so much about everything from software to leadership and letting me attend his hackathon; Avary Kostiw for always being my sounding board and never declining my absurd requests for “emotional support” virtual meets where I yelled about the code; Motorola and Canada Summer Jobs for sponsoring me; Alexia Rizea and Ushra Soroardy for being my cheerleaders; Mr. Friesen and Ms. Charlesworth for being the best teachers ever and writing my reference letters; and, finally, Bridget, AJ, Hannah, Deb, Helen, and Fervone for their authenticity and dedication in changing my life.

Nicola Rauch



High School

The Centre for Learning at Home

Lab Placement

Biological Sciences, Faculty of Science

Project Title

The Differential Effects of Glycans in Males and Females

Final Project

drive.google.com/file/d/1qshgwUVBIPpXoJD229SbHV5xsKQSgnTz/view?usp=sharing

Supporter

International Paper Company

My name is Nicola Rauch, and I live in Grande Prairie, Alberta. This fall, I'll be going into my senior year at the Centre for Learning at Home. Subjects like Chemistry and Biology have always been favourites of mine, along with Math and English, but I'm still not exactly sure where I'm headed in terms of a career. Each of these subjects has piqued my interest and as so, I've continued to explore them more and more through opportunities like WISEST.

For my time in the program, I was placed in the glycobiology lab. My research project was on the different roles glycans play in males and females, as well as other factors, besides sex, that manipulate these functions. I also looked at how cutting-edge science is involved in this research, through examples like disease treatment and forensic sciences.

My experience in the WISEST program was absolutely amazing, and I'm honestly so grateful that I had the opportunity to be a part of it. I learnt so much about myself and got a small taste of what it's like to do research in a lab. I learnt a variety of practical and educational skills from my PI and her lab, and overall, I feel way more knowledgeable in the area of glycobiology. The program really helped broaden my horizons in regards to all the different career options in STEM and now I feel I have a better understanding when it comes to picking a career path. With all that in mind, I'm most proud of the personal growth I accomplished over the past 6 weeks. I was able to create a project that stretched beyond what I thought I was capable of making. I learnt so many new skills and

continued to work on the strengths I already had. It's crazy to look back, as I feel like a totally different person than I was only just 6 weeks ago.

I want to say a huge thank you to my PI Dr. Willis and her lab, the Willis lab, for taking me under their wings and mentoring me. It truly was a pleasure working in your lab and I'm so grateful for everything I learnt. A massive thank you as well to the International Paper Company for sponsoring my time in the program. I would not have had the amazing opportunity at WISEST without you!

Chloe Riesen-Savard



High School

Archbishop Macdonald High School

Lab Placement

Biological Sciences, Faculty of Science

Project Title

Identifying subspecies of Warbling Vireo through spectrogram analysis of birdsong

Final Project

drive.google.com/file/d/1Yy1ltj2f43SW7sXDv9BBItP5LKKhTmT0/view?usp=sharing

Supporter

WISEST and Dr. Erin Bayne

My name is Chloe Riesen-Savard, my pronouns are they/them, and I study birds. Specifically, Warbling Vireo birdsong. My work was in the Bioacoustic Unit under Dr. Richard Hedley and Dr. Erin Bayne, where I compared the songs of Eastern and Western subspecies by way of spectrogram analysis. This is a lengthy way of saying that I listened to a LOT of birds. On that note, I cannot extend enough gratitude to my lab partner, Maygan Peck, to our lab's undergraduate researcher, Samuelle Simard-Provençal, to my Supervisor and PI, as well as to all of my sponsors. You will hear student researchers repeat this over and over again because all the thanks in the world do not compare to the patience, knowledge, and support these individuals have provided throughout the summer.

How many high school students do you know that have worked in research? Not just in a school lab, but at a University under the supervision of accredited professionals? All of the wonderful experiences that make the Summer Research Program worth pursuing tie back to this — no other institute offers this breadth of program, let alone to teenagers.

WISEST has created a program that's designed for you to succeed. When I began my internship I barely knew what a spectrogram was, let alone that I would be annotating several every day. Six weeks ago I knew maybe one individual in the UofA faculty, now I know enough to fill a room. All thirty-nine of the student researchers agreed that we had no idea what we were doing when we started, but

the program doesn't expect you to know. If you take the opportunities that it provides, from networking sessions to lab tours, the rest will figure itself out.

I wish that someone had told me in February of last year that your placement is trivial. I wish I had known this when I was in your position, reading the Journal of Research and thinking about applying because what you do is infinitely less important than how you do it.

I've learned that opportunities like this aren't asking the world of you, that no one expects you to know everything, but they are designed to weed out those who are unwilling to try. What do you do when software stops running your code? How do you attack problems that affect an entire lab? Will you accept criticism, and how will you learn from it? From Nursing to Linguistics, it truly doesn't matter where you go; thinking like a scientist is universal.

Thank you again to WISEST and all of my coordinators for showing me how much things can change in the span of a summer, for showing me how to think like a scientist. I am beyond proud to call myself a member of the 2021 Summer Research Program.

Amira Salem

High School

École Michaëlle-Jean

Lab Placement

Psychology, Faculty of Science

Project Title

Social Contexts: Infants and Songbirds

Final Project

drive.google.com/file/d/11fzTwq2gcxUfXmZ4J-aEUXNOHsskDMro/view?usp=sharing

Supporter

Faculty of Science and Dr. Christopher Sturdy



My name is Amira Salem and I am going into grade 12 at École Secondaire Michaelle-Jean in Edmonton, Alberta. Since a very young age, I have always been passionate about science and after I entered high school, this passion only grew. Therefore, I hope to be able to continue my post-secondary studies in this field and to hopefully have the opportunity to make real and impactful changes in this domain.

This summer I had the opportunity to be placed in a psychology lab in the faculty of science at the University of Alberta, where I had the chance to conduct a comparative study on the impact of social interactions on the development and behaviours of infants and songbirds. Such research is of great importance because it allows us to deepen our knowledge on the development of infants and songbirds unlike if we conducted the study on only one of these two species. It also allows us to see how many similarities in behaviour and development there can be between species with completely different structures.

This program was not only about research, it was also about discovering and learning about myself and my interests. My experience in the WISEST SRP definitely made me see the STEM Fields from a different perspective and allowed me to discover so many careers that I had no idea existed before as well as many STEM fields in which my gender is underrepresented. Without forgetting the countless mentor sessions and PD sessions that allowed me to learn more about my interests but also to gain incredible skills that I don't think I could have learned

anywhere else. Finally, I surely can not speak about my experience in the WISEST SRP without speaking about the valuable meetings and the bonds that I had the opportunity to make throughout the program with brilliant and like-minded student researchers.

I believe that the WISEST SRP is one of the most important and valuable programs ever created because it is a program that allows us to learn a lot about ourselves, to discover ourselves in other words. It is a program that gives us the chance and encourages us to pursue our passion and especially to go meet our dreams as Dr. Armour says so well. It is also a program that values diversity and encourages individuals to pursue their passion in STEM fields where their gender is underrepresented. In short, it is a program with great values that gives us the chance to go meet our dreams. What more could we ask for!

Finally, I would like to thank Ms. Moriah Deimeke for all of her support throughout the program, as well as Mr. Parateek Sahu and Dr. Christopher Sturdy. I would also like to thank my sponsors, the Faculty of Science and Canada Summer Jobs for making my participation in the SRP possible, as well as all of the people who helped get me through this program namely the WSRP Coordinators, Deb, Bridget, Hannah and AJ, and my fellow student researchers.

Estefania Santos



High School

École McTavish Public High School

Lab Placement

Mechanical Engineering, Faculty of Engineering

Project Title

Above the Knee Prosthetic Lining Using Braided Composites and Natural Fibers

Final Project

drive.google.com/file/d/1gfhQtjBYyIsEw4Ew9-q5YJcYSqmmY4T/view?usp=sharing

Supporter

Syncrude

I'm Estefania Santos and I'm from Fort McMurray, Alberta. Over the past couple of years, my love of the sciences has bloomed, especially chemistry. Although I'm not entirely sure what career I'd like to pursue, the WISEST mentor sessions opened my eyes to fields I hadn't even heard of and it helped me narrow down what I'd like to learn about and work in for the rest of my life. Currently, I dream of developing life-saving cures for illnesses. But mainly, I want to work in a lab with a microscope and Petri dishes with the goal being to help others.

This summer for the WISEST SRP, I was placed in a braided composite lab in the department of mechanical engineering. My project was to design an above-the-knee prosthetic lining with the goal of maximizing air circulation inside the lining using a braided composite. I analyzed the structure of my design and spent the majority of my time finding the best material for this application. All things considered, the summer research program was an amazing experience. Even though I won't be entering the field that I worked in this summer, the program taught me many skills like networking and communication and it connected me to amazing mentors and friends. Halfway through the program, my supervisor taught me beginner-level Python which helped me realize that coding will be very useful to learn even if I don't go into computer science. This, however, is part of a bigger conclusion I came to during the end of the program. After attending the mentor sessions and the PD sessions I noticed that STEM is very

interdisciplinary. In fact, a single company would need to hire professionals from many different fields like biology, physics and most surprisingly: business to succeed and flourish.

Reflecting back on this summer, I can say without a doubt that the summer research program is an experience that young women interested in STEM should strongly consider applying to. It placed me in a safe environment with girls that had the same drive and curiosity as myself. I have never felt so connected to the people around me as I did during the program.

None of this would have been possible without my sponsor, Syncrude, and without the WISEST coordinators, especially Bridget, Hannah, AJ and Fervone. The PD sessions you all planned were enlightening and helped me develop as a professional. I would also like to thank my PI Dr. Jason Carey, Samir Ead and Eric Lepp for welcoming me into your lab with open arms and contagious enthusiasm. Finally, thank you to my dad for strongly encouraging me to apply to the SRP, to begin with, and my family and friends for supporting me this entire summer.

Shreya Sivakumar



High School

Mount Douglas Secondary School

Lab Placement

Biomechanical Engineering, Faculty of Engineering

Project Title

Literature Review: Design Of Experiments In Finite Element Analysis Scoliosis And Spinal Procedure

Final Project

drive.google.com/file/d/1Y74EuUecHWyv0oUVMNJ5AbniT_ZqD9rb/view?usp=sharing

Supporter

Threshold Impact

My name is Shreya Sivakumar and I am an incoming grade 12 student at Mount Douglas Secondary School in Victoria, British Columbia. In school, my interests lie in math and physics. In the near future, I hope to pursue a degree in either Biomedical or Mechatronics Engineering. This summer at WISEST, I was placed in the Department of Mechanical Engineering where I analyzed the different types of Design of Experiments and Factorial Design efficiencies of five scoliosis and spinal research studies. The efficiencies were then compared to two fundamental papers written by Dr. Dar in 2002 and Dr. Li in 2006 to draw conclusions about the field of spinal research within Biomechanical Engineering. I would like to thank the WISEST coordinators for their excellent organization, Threshold Impact for funding my project, Dr. Kajsia Duke and Maha Ead for their constant encouragement and valuable guidance, and my lab partner Sian McGarva.

By residing in Victoria, I did not come to hear of the program through the school or SRP alumni like many of my fellow researchers. I came across the Summer Research Program online when looking for STEM opportunities for the summer. Growing up, I knew that I loved science and math and wanted an experience that would allow me to dive deeper into one subject and give me an idea of what a future in engineering could be like for me. I have always had the motivation to apply for opportunities as I want to broaden my STEM knowledge and strengthen my skills.

Through the WISEST SRP, I have met amazing people in the industry, learned about the diverse career pathways within engineering, and also made lifelong friends that I can genuinely relate to. Through the dozens of opportunities I was given to meet researchers and professionals in the industry, I have learned how to ask extensive and relevant questions to practice my networking skills. Over these six weeks, I also learned about the diverse career options that exist within STEM, and engineering in particular. I was introduced to countless options that I didn't even know existed before WISEST, and have thoroughly enjoyed hearing about STEM professionals' education path, life experiences, and day-to-day tasks in their respective careers.

Though I have strengthened and earned numerous amount of skills this summer, the most valuable skill I have developed is confidence. Before the program, I was moderately confident in my speaking abilities but would never voluntarily speak for anything. During the program, I saw myself, and my speaking abilities develop substantially as I volunteered to host events like the Talent Show, and just got to know and communicate with my fellow researchers better. This transferable skill will help me share my creative solutions to solving complex problems, overcome diversities, and better understand people and situations.

Grace Tunski



High School

Victoria School of the Arts

Lab Placement

Geobiology, Faculty of Science

Project Title

Uncertainties in Radiocarbon Dating

Final Project

drive.google.com/file/d/14k-Vjwr2Mmiysr3H9qcc7RPONdtDA1Ce/view?usp=sharing

Supporter

Rotary Club of Edmonton Glenora

My name is Grace Tunski. I live in Edmonton, Alberta, and attend Victoria School where I try my best to balance my passions of writing, playing music, and of course, anything science. In the future, I hope to study ecology and evolutionary biology. This summer, I was placed in a lab where we studied radiocarbon dating and the uncertainties that occur in that process, as well as how pollen dispersal and lake size relate. Both of these concepts will help us better understand how ecosystems responded to climate change in the past and therefore give us a better picture of how they will respond to the current climate crisis. I would like to thank Dr. Andria Dawson for being an outstanding PI and role model this summer.

What are you most proud of after completing the WISEST SRP?

Simply put, I'm proud that I finished it. I have never had an academic experience outside of school, and I found this opportunity to push myself and work hard in a very self-directed way difficult at times but overall incredibly valuable. I did it!

Describe at least one skill that you learned during the SRP that will help you in your future academics or career.

Communication! Especially with being online for the whole program, clear communication over email or Zoom became our bread and butter. Additionally, there was an added layer of difficulty because there was no in-person foundation for our relationships. I quickly learned the art of well-worded emails, as well as the importance of asking lots of questions.

Why would you recommend this Program to other Students?

I think this program will help anyone with finding the right path for post-secondary, exploring the world of science outside of school, and finding a community of like-minded people that just get you. It is a fantastic experience that will leave you feeling more prepared for whatever life can throw at you.

Pauline Usuanlele



High School

Archbishop Macdonald High School

Lab Placement

Psychiatry & the Neuroscience and Mental Health Institute,
Faculty of Medicine and Dentistry

Project Title

Coding Neuroimaging Masks to Improve Mice Brain Imaging Analysis

Final Project

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Supporter

Dr. Andrea Macyk-Davey

My name is Pauline Usuanlele and I go to Archbishop MacDonald Highschool in Edmonton, Alberta. My favourite subjects are biology and English; I love a good book and a good dissection lab! I have always loved learning in school so WISEST was very appealing to me.

The opportunity to spend 6 weeks working in a lab and learning skills, and information that I would not learn until at least university sounded too good to be true. The WISEST SRP is so important because it gives other people with a love of learning and science, the chance to immerse themselves in it on a whole other level. It can be difficult to pursue STEM fields when there are more obstacles for marginalized people, but WISEST helps give us an edge and the confidence to continue on the path that we are on.

This summer I was placed in the Neuroscience and Mental Health Institute where I worked on a new method of measuring spontaneous brain activity in mice called the Functional Region method. Then I compared if there were differences from the more common method, the Region of Interest method.

One of my greatest challenges this summer was learning how to code so that I could measure brain activity because I did not have much prior experience in it. I benefited so much from the PD sessions during the program. I gained several skills from them that I can use in the future such as networking, personal branding and public speaking. With these, I feel more prepared for university and to pursue a career in STEM.

After completing the WISEST SRP, I am most proud of how I managed to tackle daily challenges to research and produce a project on a topic that I had almost no prior knowledge about.

The three most important things I learned this summer were the importance of communication in the workplace, especially online, how to deal with nerves when public speaking, and to keep an open mind when choosing a career path because you never know where life might take you. I had a wonderful time meeting and working with like-minded teenagers who have the same love of science and research as me. I made great connections with them that I hope will last a long time. I would recommend the SRP to anyone who loves science and learning. It is a great opportunity to have a unique hands-on experience that is hard to get at this age. It is an extremely exciting, extremely memorable, worthwhile adventure.

Finally, I want to thank Dr. Allen Chan, my PI for his guidance and support, and my supervisors Ryan Zahacy and Landon Fuhr for all their help and their countless hours helping me fix my coding. I also want to thank Dr. Andrea Macyk - Davey and Mr. Robert Davey, my generous SRP supporters. Lastly, I want to thank the WISEST team for being there every step of the way and making this summer possible.

Jacqueline Vincent



High School

George McDougall High School

Lab Placement

Biochemistry, Faculty of Medicine and Dentistry

Project Title

The Structure of a Virus-Encoded Nucleosome

Final Project

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Supporter

Teresa Brychcy

I am Jacqueline Vincent, a student at George McDougall High School in Airdrie, Alberta. I am a founding member of our school's science club and I love to play hockey, as well. I have always known I wanted to go into science as a career. After taking biology 30 and learning about genetics, I knew I wanted to explore how the body works on a molecular level. Chemistry also helped me develop my passion, as I loved how everything seemed so logical and cohesive! It was very exciting to get placed in a biochemical lab during my time with the WISEST Summer Research Program! I spent six weeks doing a literature review on the article: "The structure of virus-encoded nucleosomes", written by Armanche's lab at New York University. Nucleosomes are subunits of chromosomes and are composed of histone proteins and DNA. I compared the viral nucleosome to eukaryotes and noted differences.

I learned so much this summer! Both from studying nucleosomes and from participating in the program as a whole. I learned about how essential proteins are for our bodies. Proteins are composed of amino acids that interact and fold with each other. These can go on to create bigger and more complicated structures and regulate many systems in nature! Another thing that I learnt was that I need to be an advocate for myself and be unafraid to reach out for support. There are many underlying biases in science and being aware of them allows me to fight for myself and other underrepresented groups to have a voice. I learnt that my mentors are extremely valuable assets of knowledge and they will often enthusiastically share their perspectives when I have a question.

Some of my main interests in life have always been learning, science and helping others. I was also considering a career going into research, so when I heard about WISEST, I knew immediately it was something I was interested in! It would be a program where I am constantly learning, from my research, my lab, my peers and mentors. It would also give me the opportunity to peek into what my future career would look like and that was something important and beneficial! I also wanted to find a community of scientists that promotes diversity and inclusion. I had hoped to find a group of people with diverse and amazing ideas and I certainly found it.

It wouldn't have been possible for me to have had such an amazing summer without the support of my PI, Dr. Mark Glover and my sponsor Teresa Brychcy, so I'd like to thank them. I am also extremely grateful for supervisor Dr. Rashmi Panigrahi, she was always encouraging me to ask questions and helping me. Thank you WISEST for putting me under her tutelage and for providing me with many, many other opportunities to flourish in the program! Also, thank you to all my teachers who have helped develop my love of science over the years.

Katie Walline



High School

Central High Sedgewick Public School

Lab Placement

Biological Sciences, Faculty of Science

Project Title

A Review of Sex Differences: Glycobiology and Immunology

Final Project

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Supporter

WISEST

My name is Katie, and I am from a small town called Killam. I attend high school at Central High Sedgewick Public School. I came into WISEST not knowing what to expect and came out amazed at what I have learned and accomplished. I was placed in a glycobiology lab which allowed me to explore many disciplines such as biology, biochemistry and immunology. Following the WISEST program, I know that I want to do lab work, but my field of choice is yet to be determined. My project focused on sex differences in glycans and how they affect the immune system of males and females. This research is consequential because females are underrepresented in research and clinical studies leading to a lack of effective treatment. I owe this opportunity to the WISEST Co-Chairs and Advisory Board as they were my supporters.

My biggest challenge this summer was my imposter's syndrome. I felt that everyone in the program was more qualified than me. However, this is not true. I learned that we all deserved to be in the program. We all struggled to learn how to do our work, but the struggle brought us closer as a community. The commonality of imposter syndrome and other obstacles made facing my assignments with confidence easier because I knew that I was not alone.

One thing that concerned me about a virtual program was the lack of connection to my peers. However, this dissipated rather quickly. Through a book club, movie nights, game nights, and other social activities I connected

with my peers. The other participants were all accepting of each other and open to everything. I enjoyed getting to know everyone, and I know that I made some life-long connections.

Through PD sessions and mentor opportunities, I learned so much. One takeaway is my newfound confidence. Through the support of the coordinators, mentors, and peers, I learned so much about myself. Whether it was how to take advantage of my strengths, or recognizing how capable I am, I have gained so much self-knowledge from the program. Another thing that I learned during my time in the SRP is that not everyone will be your biggest fan, especially as a woman pursuing a career in STEM; this is why it is so momentous to network with those who do support you. Create an environment where you feel safe, supported, and welcomed. My final and most significant takeaway from the program comes from a mentor. She told me that getting stuck in an idea of where I believe I should be, will hold me back from reaching my full potential. When an opportunity emerges that interests you, like WISEST, grasp it as it could take you to a life that you never imagined.

Solange Zadnik



High School

Strathcona Composite High School

Lab Placement

Linguistics, Faculty of Arts

Project Title

Variability of /ð/ and /θ/ in the Casual Speech of Native English Speakers

Final Project

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Supporter

Faculty of Arts

My name is Solange Zadnik and I attend Strathcona Composite High School in Edmonton, Alberta. I have always loved learning about various topics and have had a special interest in STEM for the stimulation and fascination it provided. While I am still unsure about the path my studies will take, I am hoping to find a field in STEM that opens many doors and allows me to collaborate with many fields. During the 2021 SRP, I was placed in Linguistics with the Alberta Phonetics Lab under the supervision of Dr. Benjamin V. Tucker and Scott James Perry. There, I studied the variations in the pronunciation of the sounds “th” and “dh” in the casual speech of native English speakers by labelling and categorizing spectrograms. I also had the opportunity to do some spectrogram corrections for Scott James Perry’s research.

How was your experience at WISEST?

The SRP was the most open-minded, welcoming, supportive, and educational environment I have experienced. I had the opportunity to meet many like-minded and diverse people and create connections on many levels. I learned so much about myself, from how I interact in professional settings to my working habits and preferences for the future workplace. The program immersed us in science and motivated us to make the field a more equitable and diverse place while giving us the means to do so by introducing us to a supportive community.

What skills did you learn during the SRP that will serve you in the future?

Our coordinators organized many PD sessions for us where we learned important skills such as resume building,

online presence and personal branding. However, the most valuable skill is the networking experience I received. Many networking events were organized where we got the opportunity to talk with professionals and connect with them later. The tools we were given to converse with professionals in this setting allowed me to gain new mentors that I value enormously for their advice, support, and friendship! Through my research, I was also able to discover how to learn quickly in a completely foreign environment, work past obstacles and communicate with supervisors about challenges, explore new programs (Praat, Zoom, Gathertown, Excel, Slack), and conduct research.

Acknowledgements

This experience has been life-changing and could not have been possible without many people. I would like to start by thanking my teachers who have inspired me to pursue STEM and introduced me to WISEST. The SRP could not be possible without sponsors, therefore, I would like to thank the Faculty of Arts. Furthermore, I am grateful to Benjamin V. Tucker for being an amazing PI who was always open to questions. Thank you to Scott James Perry who gave so much of his time to teach me everything I wanted to know about phonetics and helped solve many obstacles. Finally, I would like to extend a huge thank you to the amazing, dedicated, and supportive WISEST team. To everyone who made this possible and to all my fellow SRP researchers who have made this the most fun experience, I can not express the extent of my gratitude!”

Jonah Zwaigenbaum



High School

Ross Sheppard

Lab Placement

Nursing, Faculty of Nursing

Project Title

The Ongoing Exploitation of Temporary Foreign Workers

Final Project

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Supporter

WISEST and Faculty of Nursing

Hello, my name is Jonah Zwaigenbaum, I go to Ross Sheppard high school, and one day, I hope to become a nurse. With the help of my PI, Dr. Bukola Salami, and supervisor, Mia Tulli, I conducted a literature review on the exploitation of Temporary Foreign Workers in Canada for the lab's much larger paper on the exploitation of foreign workers. This involved searching many academic databases for articles, reading them, writing down what they were about, and writing down what they found. The many articles were compared and contrasted to identify what we as know about the subject, so our research can go on to address what we don't.

When I applied to WISEST, I was looking for an opportunity to learn more about nursing. It was a career I was considering (albeit I was very much unsure about it), and I thought a summer internship was an amazing opportunity to learn more about it. The Summer Research Program turned out to be so much more than that. It changed my life. I know that I want to become a nurse, and I will continue to pursue activism related to my research until the issue is resolved.

What are you most proud of after completing the WISEST SRP?

The feeling of satisfaction, having finished my paper, and presented my research to over 100 guests at the celebration of research was incredible. I truly felt knowledgeable about my field, despite knowing nothing about it at the start of the summer. After it was over I couldn't stop smiling, it was one of the most fulfilling experiences of my life.

What are some other fun experiences you had while in the SRP?

Preparing for the show and tell; the social event was one of the most fun experiences I had during WISEST. I was part of two groups, a band producing a cover of "Sunglasses at Night", and a drama group, producing a puppet show known only as "The Sockumentary". Rehearsing for both groups was wacky entertaining fun. Drama rehearsals included collaborating on a script full of sock puns, and each other the glorious puppets created (there were engineers in the group and it showed). Band rehearsals were also delightful, as we jammed out, and learned more about each other. The fact that all of this was done online is hard to believe but awesome.

I would like to thank my PI, Dr. Salami, and supervisor, Mia Tulli, for all of their assistance with my project over the summer. They made what seemed like a daunting task, very obtainable, with their eloquent explanations, and by answering all my questions. Thank you Higinio Fernandez for instilling a passion for nursing in me during our mentor session. Most importantly, thank you to WISEST and its small but mighty team of coordinators for making this magical summer experience a reality.