

Journal of Student Research 2018



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Introduction

Each summer, WISEST places 40 grade 11 students in a 6-week paid internship called the Summer Research Program (SRP). Students gain experience in projects that may be considered less traditional to them. Female and non-binary students are placed in a Science, Technology, Engineering or Math (STEM) project, and we place a few male students who demonstrate a genuine interest in nursing, nutrition, and/or human ecology.

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 in 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 U of A campus, WISEST relies almost completely on donations from corporations, foundations, individuals and the public sector in order to develop and deliver our innovative programs. Contrary to perception, WISEST does not receive any core funding from the U of A, 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 the Friday afternoon Professional Development Sessions. In 2018, 172 people gave 6,438 hours of their time to support this program.

Thank you to our 2018 Funders:



Dr. Wilsun Xu





Our SRP Students

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.

Safiya Ahmad



My name is Safiya Ahmad and I am from Fort McMurray where I attend Fort McMurray Composite High School. My favorite subjects are math, physics, and chemistry. In the future, I am considering a career in biomedical engineering, however, I am not certain what path I would like to take. I would like to study abroad and attain my masters degree.

Tell us about your placement.

I was placed in the Department of Mechanical Engineering in the Laboratory of Intelligent Manufacturing, Design and Automation (LIMDA) for my WISEST SRP placement. My assignment for the summer was to utilize engineering design processes to design and manufacture a reconfigurable product. Firstly, I had to understand the concept of what 'reconfigurable' was and understand the limitations that follow with FDM 3D printing and the materials we used. Then I had to design the product I drafted, and, after several failed concepts, an approved concept was moved onto the detailed design phase. Using SolidWorks I modelled my 3D design, enabling me to manufacture and print it using a 3D printer. The printed product was not perfect as there were imperfections from the printer and supports that are added to help the structure while it is being printed. These parts were removed post-printing to allow the product to be assembled.

What did you learn this summer?

From the WISEST Summer Research Program, I learned so much about the endless academic and career paths that can be taken in my future post-secondary selection. The ability to meet and speak with many professionals in fields of interest and learn from them provided a unique opportunity for us students. I learned how to use a 3D modeling software called SolidWorks and how to apply the engineering design process. This experience allowed me to see what research as an engineer could include and what engineering was really about. I walked away from this summer experience more confident in myself and the work I put forward.

Why do you feel the WISEST Summer Research Program is important?

This program is important not only because it allows young women and men to explore non-traditional fields in STEM, but because of the transferable skills it allows students to develop and the opportunities that are presented throughout. It is an experience that has influenced me significantly and I have enjoyed meeting people who are just as driven and excited by science and math. It is a great environment to thrive and grow in.

What skills did you gain from your placement?

Among the many skills that I gained during the SRP, the few that I found will help me the most in my future academic and professional career were communication and interpersonal skills, networking and time management. The ability to clearly convey and communicate a message is necessary in all life paths as well as balancing work and extracurricular activities. All of these skills I will definitely use in the future.

Who would you like to thank?

I would like to thank the WISEST team for all their hard work and for this opportunity. I would also like to thank the LIMDA team for welcoming me in their lab, in particular my supervisor, Dr. Rafiq Ahmad, for his help throughout the program. I would like to thank my lab partner, Olivia Lotzer, for everything. I would like to express my deepest thanks to St. Joseph's College for hosting us and to our R.A, Kate, for opening so many doors for me and for making the Edmonton experience that much better. I would like to thank everyone in residence: Laura, Emma, Dylan, Olivia, Kaitlyn, Golie, Laura, Jess, Kendall and Emily for making this experience so memorable. Thank you to my friends and family who supported and encouraged me.

Hamdi Ali

My name is Hamdi Ali and I'm a high school student at Edmonton Islamic Academy, a school that I have been attending since I was in grade 2. As you can imagine, spending nearly ten years going to the same school, with the same people and same friends, can make everything so familiar. In the past few years I have been trying to branch out and figure out who I am and what I have the potential to be, including reconciling my interests with the confining expectations placed on me. While it sounds very vague and kind of pretentious, this just meant that I got involved in attempting things like playing basketball and realizing that I am in no way whatsoever a basketball player, starting unnecessary clubs, and joining the school rugby team and finding out I actually really love rugby. At any given moment I am probably reading, swimming, watching TV shows, or half-heartedly trying to learn Spanish (shoutout to Duolingo!).



Tell us about your placement.

Diamonds are formed deep in the mantle and come up to the surface encased in hard rocks called eclogite. Currently, the mining industry separates diamonds from eclogite using mechanical crushing, which causes preventable damage to diamonds. They are always searching for new, better methods to free the diamonds while preserving them to maintain financial value, and so this summer I have been testing the hypothesis that electronically disaggregating diamonds from their host rock using high-voltage technology is a more efficient method. I also performed a variety of tests on the diamonds I liberated, because by analyzing the temperature, pressure, and nitrogen concentration we get valuable data on where in the mantle and when my diamonds were formed and the diamond potential of Roberts Vector mine.

How did you fit into the bigger picture of your lab placement's overall research?

My work on assessing the viability of the SELFRAG, the instrument that aims to release more diamonds with fewer fracture and signs of breakage, has many practical applications within diamond studies and the mining industry. By finding more practical ways to mine diamonds, the research I have been involved with is helpful if nothing more than the fact that more efficient mining = more diamonds = the more work that can be done on diamonds.

What did you learn about yourself from your placement?

This summer I learnt that I am really interested in geology, and I am actually thinking about pursuing geology in post-secondary! Before entering this program, I had no idea what being a geologist entailed and I had not even thought of it as an option for future studies, but now I can see a future in geology and I am excited to see all that it holds. Of course, getting to go on a trip with the Society of Economic Geologists and getting a taste for the life of a geologist, which included hiking volcanoes and pulling over on the highway in the middle of the Rockies to get a better look at some rock formations definitely was a factor in my decision!

Who would you like to thank?

I would like to thank Graham Pearson for taking me on and signing up for WISEST for the first time, without his dedication to WISEST I would not have had the opportunity to have the time of my life. I would also like to thank Margo for taking the time to mentor me and for being the best boss ever. Special shoutout to SEG for taking me on the trip and Natasha for organizing it, as well as Janina, Will, Kelsey, Nicole, Elaine, Deni, Ben and Matt for all their help, support, and awesome advice. Above all, shoutout to Graham's army (ESB 1-52, you guys know who you are!!) for fighting the good fight.

Alysha Ambrosio



My name is Alysha Ambrosio and I am currently a student at Archbishop O'Leary High School in Edmonton, Alberta. I aspire to attend the University of Alberta upon graduating from high school studying in the fields of engineering or medicine. I have always obtained a strong passion for the sciences and mathematics and I especially enjoy biology and chemistry. My love for biology stemmed from my dance career as I am a competitive dancer and teacher, thus, allowing me to learn about the human body and its mechanisms over time. My passion for math has been obtained over the years as I have a strong love for problem solving.

Tell us about your placement.

This summer I had the opportunity to work alongside incredible minds, including Dr. Elahi and Ms. Koleva, studying microbiology and immunology. Dr. Elahi's lab is based out of the Faculty of Medicine and Dentistry and the main focus of this lab is discovering the role and functions of the CD71 cell. Dr. Elahi discovered the CD71 cell in 2013 and continues to pursue research regarding the immune system. CD71 cells are immature red blood cells, meaning they obtain a nucleus. Our lab has recently proven that these cells possess immunosuppressive and immunomodulatory properties, as well as play a role in one's digestive health. My main research project entailed discovering the correlation of CD71 cells and bacteria in different compartments of the gut. In order to determine this, we dissected mice and depicted the quantity of cells in the particular regions. We then quantified three types of bacteria in the gut and performed a correlation analysis. By demonstrating the difference of cell population in each region, it can help us determine the role and function of the CD71 cell as it interacts with particular bacteria. We discovered that a higher frequency of CD71 cells were found in the compartments with the highest concentration of bacteria, which provided pilot evidence that there is interaction.

Why would you recommend the WISEST Summer Research Program to other students?

WISEST was a perfect program to broaden my knowledge of all the opportunities that women are traditionally not informed about. WISEST would allow me to see what kind of career I would enjoy as I have not fully decided what I wanted to pursue. Genetic researching, pediatric surgery, chemical engineering, biomedical engineering, and flight engineering are few of the careers I have attained interest in.

How did you benefit from the WISEST Summer Research program?

As a participant of the summer research program I obtained not only knowledge in my field of study, but knowledge about other individuals, other programs, the university, myself, and my future. Throughout the first week, I discovered numerous unfamiliar careers in STEM fields that I didn't know existed, working alongside many intelligent individuals. This helped me develop skills in the professional world. It helped build my confidence and allowed me to make contacts that not only inspire me, but can benefit me in the future. WISEST provided me insight to my future and gave me an opportunity to prepare for the rest of my life as well as unfold the capabilities and knowledge I did not know I obtained. WISEST also gave me skills and friends that you could not learn in school, and I am forever thankful.

Who would you like to thank?

I would like to extend a special thank you to WISEST and Dr. Elahi for providing me with this exceptional opportunity and experience. Additionally, thank you to Petya Koleva for mentoring and guiding me, the members of the Elahi lab, and the supportive WISEST team. As well as a great appreciation to Edmonton Chapter Beta Sigma Phi and Canada Summer Jobs for sponsoring this unforgettable program. I would also like to thank my teachers, parents, and friends for the unconditional support and encouragement.

Amy Au



My name is Amy Au, I am going into grade 12 at Ross Sheppard High School in Edmonton. I find my science, math, and language classes really interesting, and I enjoy being a part of my schools Leadership program. I have always been curious about science and interested in new discoveries, so I am inclined towards academia and scientific research, particularly in the fields of physics, biophysics, and chemistry.

Tell us about your placement.

This summer, I worked in an organic chemistry lab on campus under Todd Lowary and two amazing supervisors. My placement involved working on two projects which involved the synthesis of potential glycosylated anticancer drugs, or the creation of possible cancer drugs with an attached sugar group. These projects each focused on a different compound which was shown to be an effective or potentially effective anticancer agent. The purpose of attaching a sugar was to increase the compounds solubility in water and hopefully improve the pharmacological properties of the compound.

Why is the WISEST Summer Research Program important?

I realized I definitely want to do scientific research in the future and it erased a lot of uncertainty. That kind of certainty is invaluable going into the last stretch of high school and I believe that the WISEST SRP program provides an experience that allows for that self-realization and creates an environment that encourages learning and development without any judgement. Being around other young people with shared interests and who support curiosity made me feel comfortable talking about my interests and exploring them. Having a supportive friend group that encourages one's interests is so hard to find in high school, especially when those interests are in STEM, and the SRP students all understand and feel this. Whether it be someone finding a new joy in a STEM field, affirming their interest in a STEM field, or even realizing exactly what they do not want to do in the future, the SRP program is a crucial step in truly understanding what path one wants to follow. The professional development sessions and even the reputation of the program itself also give the WISEST Student Researchers a foot in the door for university and the skills to succeed in their career.

What did you learn about yourself through your Summer Research Program experience?

I learned that I love research this summer! The interplay of creativity and scientific knowledge that the problem-solving process requires was exciting to be a part of and was an entirely new learning environment for me. Watching how research took place and the focus on achieving positive results rather than focusing on what went wrong also led me to think of new ways to utilize my strengths and weaknesses to succeed. This approach to learning was probably the most important thing I learned this summer. Being a part of the WISEST SRP itself is something I am incredibly proud of, but I also feel very proud of my contribution to new research. The fact that I worked on research involving anticancer drugs is really cool and I am proud of my involvement.

Who would you like to thank?

I would like to thank the WISEST Team, Deb, Angela, Joelle, and Fervone, and everyone who helped run this program, as well as acknowledge my sponsors, Alberta Education and the University of Alberta Faculty of Science. I would also like to thank my PI, Todd Lowary, and my supervisors, Chun-Jui (Anthony) Chu and Vitor Cunha for an amazing summer in the lab.

Alex Barber-Cross



My name is Alex Barber-Cross, and I am from Spruce Grove, Alberta. I have always been interested in all areas of science, but my favourite subject is biology. I am hoping to study physiology, immunology, or possibly neuroscience, at either the UofA or UBC. I have no clue what I will be doing ten years from now, I am undecided between pursuing a career in academia, medicine, or physiotherapy. I pursued the WISEST SRP as I have always been told that a career in research would be perfect for me, but I could not see myself as a researcher. I was also uncertain about what a career in research or academia would look like, and this program opened that door for me.

Tell us about your placement.

I was placed in the Construction Simulation lab within the department of Engineering. For my project, I firstly had to learn to code. After my coding skills were sufficient, I was given a huge database from an old industrial construction project that included over 14 000 different scaffolding requests and 27 variables. I cleaned up the database because there was a lot of human error and inconsistency, and I also combined variables to make new ones. After preparing the data, I graphed different variables together and found the relationships within the data. The main focus of my research was on finding the variables which affected the total amount of work/time that each scaffolding required, so that I could make a model that would predict the number of man-hours it would take to build future scaffolds. I ended up creating two different models using different algorithms and, after running tests to see how they performed, I identified the best model that could be made using the database I was given.

What did you learn this summer?

Three of the most important things I learn this summer were that there are many different ways to do research, and each lab looks different. You also do not need to know exactly what you want to do with your life, and changing your mind as you go along is okay. Lastly, liquid nitrogen ice cream is the best kind of ice cream!

How would you summarize your experience?

Upon completion of the SRP I am most glad I took the initiative to apply for such a challenging program. My greatest challenge this summer was trying to be confident in my abilities, despite being surrounded by incredibly smart PhD students and professors. The WISEST SRP is a tremendous aid in aiding students in deciding what kind of education or career they want to pursue. You get to try out a job as a researcher and you get to hear from people in many different professions, all with very different educational backgrounds.

Who would you like to thank?

I would like to thank my supervisor, Lingzi, for deciding to take a WISEST student on.

Hannah Bayne

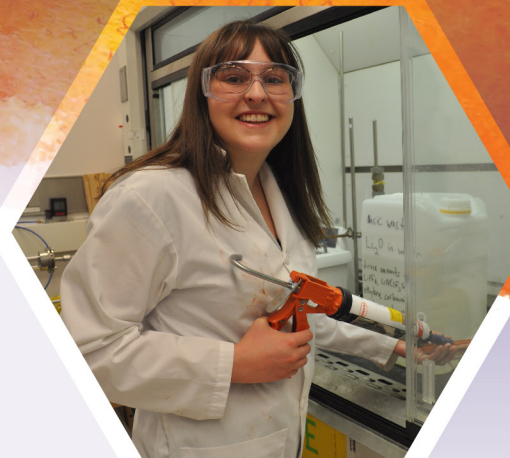
My name is Hannah Bayne and I am from Sherwood Park, Alberta. I am passionate about physics and music and they are what I enjoy most at school. Physics interests me because I find the application of math to real world problems fascinating and challenging. The more I learn about physics, the more I see how it connects to everything around me. From the more obvious ties to chemistry and biology to the more subtle links to music, physics interconnects our world in a beautiful way. I plan to get my PhD in a STEM field and become a researcher and professor. I hope to create a better world through science!

Tell us about your placement.

I was placed in a physics lab in the Nanotechnology Research Centre and my lab was focused on developing lithium-ion batteries that could work effectively at high temperatures. My project was to design a test unit that could reach and maintain high temperatures so that we could test cells in extreme environments. I built, tested, and analyzed data that came from the test units to improve their accuracy. I first chose the different materials to make the units based on temperature and their stability. I chose to use an aluminum tube, with a silicone lining to act as an oven for the cell and placed our Resistance Temperature Detector (RTD) on top of the tube. An RTD is a device whose resistance varies with temperature according to a known function. The RTDs we used can measure absolute temperatures within ± 0.15 °C. Then I changed the computer code that ran the test units so there would be no temperature fluctuations and so that the set temperature would be reached. To achieve the smooth rise to temperature I changed the PID (proportional-integral-derivative) control loop feedback mechanism. Overall, my experiment was a success since the accuracy of the test unit improved by 1000%.

How did you benefit from the Summer Research Program?

My experience in the Summer Research Program was incredible. Going into the program, I was certain I enjoyed science and was looking forward to gaining hands-on research experience. However, coming out of the program I realized I gained more than I ever thought was possible in six weeks. I expected to develop skills in data analysis, troubleshooting, computer coding, and experiment setup. I developed all of these skills and was very grateful to have done so. I will use them in my future education and my career. On top of these incredibly useful skills, I gained confidence during the Summer Research Program. I finished the program with a newfound confidence in



myself and my ideas. I now feel comfortable sharing my ideas and suggestions because I have seen how useful a unique perspective can be. This confidence has also led to me being entirely certain the academic and career path I plan to pursue is the right choice for me. Through the Summer Research Program I have become entirely certain that research is the avenue that I am going to pursue in my studies and for my career. This confidence is incredibly reassuring heading into university. The Summer Research Program helped me meet new people who share my passion for science and equality in STEM. I made some great friends and gained many mentors through the program and I know that these connections will last a lifetime.

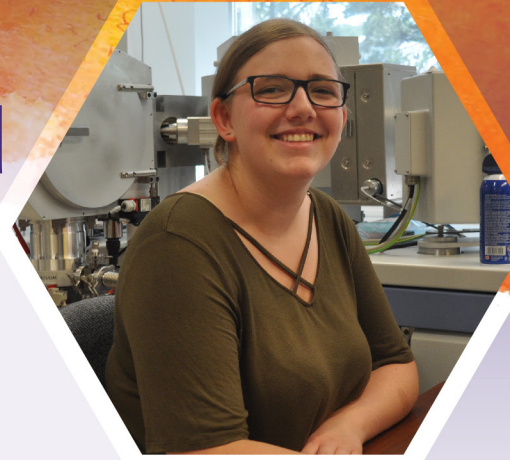
Would you recommend the Summer Research Program to other students?

Overall, my experience in the program was absolutely incredible. I would recommend this program to anyone who is passionate and interested in non-traditional careers because the experience you gain and the things you learn will propel your academics and future careers to new levels of extraordinary. You will learn, create, innovate, and become inspired through this program. You will also gain confidence and meet some amazing people. I would highly recommend this program to people who are dedicated to changing our world for the better because this is a great place to start.

Who would you like to thank?

I would like to thank my Principal Investigator, Michael Fleischauer, for his support and teaching. I would also like to thank the Government of Canada and the National Research Council for funding important scientific research in our country. I would like to thank Threshold Impact and Summer Jobs Canada for their sponsorship, and finally, I would like to thank WISEST for believing in young women and men in non-traditional STEM fields and for running such an important program.

Alexis Blanchette-Arnold



I am Alexis and I am a science loving person from Edmonton who wants to most likely pursue a career in research or engineering. Science has been a passion of mine since I was quite young and it is something that has not gone away, as my science classes are still what I find the most interesting in school. My future career path is uncertain to me, I have always known it would be within a science field, but the precise area was never really known to myself. My interests have broadened and now I am thinking about engineering. Overall, science is my passion, but I am unsure where this passion will take me.

Tell us about your placement.

In my placement we were dating the molybdenite inclusions within pyrite and its accessory minerals using the rhenium and osmium isotopes. This was done using a variety of techniques to go from the actual rock sample to the isotopic elements of rhenium and osmium. This included techniques that ranged from crushing the rock samples, to using chemistry to get to our rhenium and osmium. I fit into the bigger picture of the research in my lab placement by continuing to analyse samples that had been run previously. The research was to gather more data on the ages of the samples and then we could compare them to the pre-existing data that was found on them.

How did you benefit from the WISEST Summer Research Program?

I had an absolutely fantastic experience within the WISEST Summer Research Program. I feel like my interest in STEM fields definitely grew over the course of this program. Additionally, I gained the insightful knowledge through my participation that research is actually something that I quite enjoy doing, and that if I wanted to pursue a career in research it would be a career I would enjoy. Another way I benefited from the program was being able to connect with other youth who shared my interest and passion in STEM. I got to thrive in an environment with people who are just as passionate as I am.

What was the biggest challenge you faced during the Summer Research Program?

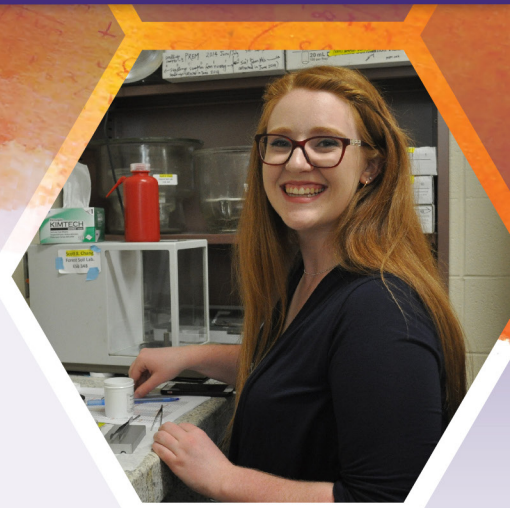
Getting over the intimidation of working in a university research lab was probably the biggest challenge for me. I felt nervous to be working in a research lab, mainly due to the fear that I was going to mess something up and

everyone in the lab would get mad at me. When I actually got into the lab it was not as intimidating as I thought it would be. Once you get used to being there it really loses its intimidation. Completing the research poster was a huge highlight of this program, giving me the ability to demonstrate all the cool work I had completed throughout the summer. The feeling of having something you can show about all the research you accomplished over the summer is amazing, and you cannot help but feel proud of yourself.

Who would you like to thank?

I would like to thank the WISEST team for running the Summer Research Program and providing fantastic support throughout the program. As well as my principal investigator, Dr. Robert Creaser, for giving me the opportunity to work in his lab. A huge thanks to my direct supervisor, Sam Bowman, for guiding and supporting me through this research project. I would also like to express my gratitude to Canada Summer Jobs and The Edmonton Chapter of Beta Sigma Phi for their sponsorship of me in this program.

Emma Bowman



My name is Emma Bowman and I am a 17 year old from Edson Alberta. I am involved in the arts, sports, and academic programs in my school! My favourite subjects are math and physics, as they go hand in hand with one another. I hope one day to become an environmental lawyer, and help maintain a sustainable future for our future generations. I read about all the experiences that the WISEST alumni have had throughout the years, and the knowledge and memories that they gained and decided that I wanted to have these experiences and applied to the program!

Tell us about your placement.

I was placed in an Agro-Forestry Lab this summer where a four year research project is underway that is funded by Agriculture and Agri-Food Canada to find out ways to increase carbon storage within the soil and reduce greenhouse gases. Myself and another WISEST student prepared the soil by sieving it, crushing it with a mortar and pestle, and then washing and labelling vials.

What did you learn this summer?

It was amazing being put in a professional lab environment that gave me a taste of university life alongside a researchers life! This summer I learned how to ask questions to professionals and peers without feeling embarrassed for not knowing. I also learned how to be fun and professional in a work environment so that the lab was never boring, but never immature. When you are in a university, it is important to be both book smart and well rounded. They don't solely base a person off of their grades, they base them also off of character and their willingness to learn. The WISEST on Friday sessions made me feel like I can take on any adult task. I feel more prepared for university life, and even adulthood.

Why is the WISEST Summer Research Program important?

This program is so important! Women and men need to be represented in fields that they are underrepresented in! This is 2018, let's keep the equality ball rolling!

Who would you like to thank?

I would like to thank my parents and teachers for making me who I am today, and without them I would never have been able to partake in this program.

Harveen Brar



I'm Harveen, and I am from Edmonton. I intend to study cognitive science at university, and then see where the world takes me. I want to work in a career related to artificial intelligence, neural prosthetics, and trauma medicine, mostly because it is super cool. To be more eloquent, the intersection of these industries will be defining and expanding the borders of human experience itself. It's baffling how much has already been achieved through implants and prostheses and I hope to accomplish more.

What motivated you to apply to the WISEST Summer Research Program?

I learned about WISEST back in Grade 6, when my science teacher (now my Advanced Placement Chemistry teacher) took us to a WISEST conference. Ever since then, it has been my goal to be a WISEST researcher, and I have been coming to the SET conference frequently. Having participated in a research lab at this age not only provides me with guidance as to whether I would like to pursue a career in scholarship, but in addition it provides a priceless opportunity as to getting experience in the difficult-to-enter world of academic research.

Tell us about your placement.

My placement in the Alberta Phonetics Lab was primarily about speech recognition and processing. Along with running our auditory lexical decision experiment (where the participant has to choose whether the sound they hear is a real word or not), I also performed data analysis on the MALD database from my lab. I decided to make the focus of my project on bilingualism, and thus my research was on how bilinguals process English differently from native speakers. I ran participants through our experiment in two different locations: the lab at the University of Alberta, and also the Telus World of Science, where we collected data to see how language perception can be affected by a noisy environment. The MALD database for which we were collecting data is the largest of its kind in the English language (an auditory lexical decision database).

What did you learn this summer?

This summer I learned how to network with different people and I was encouraged to learn coding which I now intend to do. I even joined a university club - AlbertaSAT! I would recommend the WISEST SRP to all Grade 11 students; it is a wonderful opportunity and it breaks down gender stereotypes, encourages diversity, and offers an experience that you cannot get anywhere else.

Who would you like to thank?

I would like to thank Shirley May, my supervisor, and everyone at the WISEST office for helping me through this entire experience.

Genna Cockburn

My name is Genna Cockburn and I was born and raised in Edmonton, Alberta. I enjoy computer science, band, and water polo and I plan on majoring in computer science once I attend University.



Tell us about your placement.

The goal of the research project I was placed in was to create a word sense disambiguation system, which is a system that would be able to define the appropriate meaning of a word, using the context of a text, when a word has multiple meanings. An example of a word with multiple meanings would be the word gob as gob has three senses; a sailor, a lump of slimy stuff, and the mouth. The research group was planning on doing this by using the principle that senses (meanings) that come from a different etymologies (origins) tend to translate differently into other languages. Thus, by translating the entire sentence, and using the context, the sentence would translate differently based on the definition of the sense and the system would know which sense was in the sentence. My role in this research was to figure out the etymological language and word of every sense as well as a synonym for the sense. I placed this information into a spreadsheet, to be used later on during the development and testing of the Word Sense Disambiguation system.

How did you benefit from the WISEST Summer Research Program?

I have gained much over the course of this program. My newfound confidence, professional skills and experience will aid me in my pursuit of a career in a STEM field. I have discovered that when I am passionate about something, it is far easier and more natural for me to talk to others about the subject. A skill I learned over the course of this program was networking. Networking is a great way to spread

and gain information and prospects as well as to create a supporting and encouraging community for anyone going into a field where they are underrepresented. This particular skill will help me find other people, within my high school and University, that I can depend on and share my interests with.

Who would you like to thank?

I would like to thank Dr. Greg Kondrak and Bradley Hauer for this opportunity to learn and experience research within the computer science field and for being understanding and patient with me. I would also like to thank Amy Hua for supervising and answering any questions I had. Finally I would like to thank both WISEST and Canada Summer Jobs for sponsoring me.

Sophia Danesik



My name is Sophia Danesik and although I am a student of Victoria School of the Arts, I have discovered over the course of my schooling that I have always had an admiration for math and science. As my second year of high school progressed, I found a particular satisfaction in my math and chemistry classes, yet I also deeply enjoyed physics and biology as well. Having lived in Edmonton my whole life, I find this city abundant with opportunity in the sciences, especially in engineering and medicine; future paths I have been considering since junior high.

Tell us about your placement.

When I was accepted into the Summer Research Program, I was informed that I would be placed in a geobiology/geochemistry lab. Over the summer I have worked on two projects regarding these fields. Firstly, I helped conduct experiments to determine if clay particles act as sources or sinks for trace metals. This was where the majority of my hands-on lab work was completed. It is known that clay particle surfaces can react with metals depending on ionic strength. The metal chosen for the experiments was cadmium, concentrated into a 1000ppm stock solution. Different concentrations of salt water stock solutions were made to imitate fresh water and sea water. The reactivity of the cadmium was compared to the clays montmorillonite, illite, and kaolinite in the different salt water conditions with varying concentrations of the cadmium stock solution. My second project was more academic, but still required some hands-on work. I looked into how cyanobacteria aided in the creation of banded iron formations; rock layers of silica and iron that settled at the bottom of the ocean over billions of years. We had set up a settling tank filled with salt water and added cyanobacteria, iron solution, and silicate solution into the tank and observed the settling rate. We then completed a control experiment where we again compared the settling rate of iron and silica without cyanobacteria. The results of both projects could potentially be vital to industry and the restoration of bodies of water that have been contaminated by dangerous trace metals.

What did you learn this summer?

Despite not being nearly as knowledgeable and experienced as my supervisors, and quite frankly, prone to error in my work as I learned, I became aware of how tedious research can be and the amount of work that goes into it. I realized that without my participation in the lab

over the summer that my supervisor would have had to complete the workload of three people independently. This has shown me that although my work was minimal compared to the years of project development taking place in my lab, that I had impacted the results of my projects and the pace at which they occur.

How did you benefit from the WISEST Summer Research Program?

Not only did I gain experience from my lab placement and the opportunity to learn about something I never would have even considered otherwise, but I have obtained wisdom from other women about their experiences in industry and science professions through social networking, research tours, industry tours, and Q and A sessions. I have also gained a better understanding of what I want out of my university experience and future career, as well as who I am as an individual and what traits I value most about myself: independence, change, and a strong work ethic. Overall, I feel like I have a better sense of direction in my life and where I would like to be in the nearby future.

Who would you like to thank?

I would like to thank all of my brilliant math and science teachers for supporting me in this journey and for giving me so much to reach for in both academics and life. I would also like to thank my Principal Investigator and Direct Supervisors for taking the time to mentor me about the work they are so passionate about, my lab partner, and my friend who I met in math 20 who introduced me to this program, encouraged me to strive for excellence, and revealed to me a world of possibility about personal growth and change. I wish you all the utmost happiness and success.

Elizabeth Evans



My name is Elizabeth Evans and, like most, if not all of the Summer Researchers, I am interested in math and sciences. This passion stems from my curiosity and love for learning. With all of these traits combined, it is only natural for my favourite subjects in school to be math and science. However, with all of my diverse interests, I find it hard to narrow down the long list of possible careers as I am learning about new ones almost daily. Although I still do not have a clear idea of what I want to pursue after high school, the Summer Research Program has helped me to develop my interests and renew my fascination in the world of STEM.

What motivated you to apply to the WISEST Summer Research Program?

What drew me in to the WISEST Summer Research Program was not only the incredible exposure it would give me to diverse fields in STEM, but also the professional development skills that will help me start my career. The combination of my aptitude in math and sciences with the fields that women are underrepresented in was the perfect fit and I have no problem with being unconventional.

Tell us about your placement.

My placement in Civil Engineering involved learning about masonry blocks and the forces that it must be able to withstand during an earthquake. My partner and I assisted our supervisor in conducting research on the resistance provided from the foundation for masonry walls. The part that I was involved with was testing smaller walls to find their compressive strength to be able to predict how the final experiment would go.

How did you benefit from the WISEST Summer Research Program?

I think that one of the biggest impacts that the SRP has had on me is illustrating how wide the range of careers in STEM is. It has helped open my eyes to different subjects that can lead to new connections and potential careers. The WISEST Program is essential in helping to bridge the gender gap in STEM and get young people excited about what their future holds. The enthusiasm that each participant brings to the Program is amplified by all the other researchers creating a group that encourages each other and uplifts

one another. I would recommend the SRP because of the people that you get to surround yourself with and the soft skills that you learn. The SRP is a great environment to grow because of all of the supportive student researchers and the WISEST team behind the scenes. They support not only learning and research, but also the fun stuff too such as social activities. If that's not enough, the opportunity to learn soft skills such as networking and public speaking by the pros is advantageous in the short term and in future careers.

Who would you like to thank?

I would like to thank my supervisor, Clayton Pettit, my PI Dr. Carlos "Lobo" Cruz Noguez, and all of the WISEST team.

Emily Harrison



I'm Emily Harrison, and I'm from Terrace, British Columbia. At school, I love all math and science courses, particularly math and biology. I think the reason I love them so much is that you can see how everything is interconnected. In the future, I would like to pursue either engineering or kinesiology at the University of Alberta. I hope to one day do research in engineering, be a physiotherapist or be an orthopaedic surgeon.

Tell us about your placement.

For the summer, I was placed in a mechanical engineering lab that works with composites, along with another WISEST student. My project was to create a bike frame model on a computer program called Solidworks and design an experiment that could be used in the future to test various materials for use in my frame. I chose to test my frame with aluminum, carbon fibre and Kevlar braids. Aluminum and carbon fibre are already used in bike frames, however, they would be used as a control to compare Kevlar to. Kevlar is still an experimental material in bike frames, and it is unknown if they will work or not. My WISEST partner and I largely worked on personal projects, separate from the rest of the lab. In addition to our personal projects, we were also able to help other members of my lab with their projects - from helping make composite braids with a braiding machine, curing braids with resin, or prepping braids for testing, we were always busy. We also were able to help design an experiment for one of the other members of our team to improve his DIC (Digital Image Correlation) results. The improved DIC results will continue to help my team as they carry on with their research.

What did you learn this summer?

Three of the most important things I learned this summer was firstly, even when something doesn't look like it will work out, keep trying because it might just work. Secondly, sometimes change is needed in order for experiments to run smoothly, be open to changing plans a few times. And lastly, have fun and enjoy yourself, because six weeks is not enough time to be stressed over the little things.

What are you most proud of after completing the Summer Research Program?

After completing the WISEST SRP, I am most proud of how far I have come as a person. Before arriving in Edmonton at the beginning of July, I had not spent more than three weeks away from home at once, or more than a week away from my family. This summer, I spent nearly six weeks away, went home for a weekend, and then came back for another week and a half. In addition, this summer I learned to appreciate life in a big city, which took a lot of effort as I am not a big fan of large cities. Now, I feel ready to conquer whatever city or cities I may live in after I graduate high school.

Who would you like to thank?

I would like to thank my team: Brianna, Samir and Jason and everyone else, as well as my sponsors: Canada Summer Jobs and the Faculty of Engineering, for my time here this summer. As a residence student, I would also like to thank the staff at St. Joseph's College for hosting us this summer, and both NSERC PromoScience and the Margaret-Ann Armour Endowment Fund for Rural Students. A huge thank you goes out to our wonderful WISEST RA, Kate, as well as the whole WISEST team and all of our presenters this summer for making this the best summer yet.

Keeley Hatch

My name is Keeley Hatch. I live in Sherwood Park, Alberta and I go to Archbishop Jordan Catholic School. I have a great interest in science, especially in Chemistry and Biology. I am in the Advanced Placement program at my school and have always loved to ask further questions about science, and not just learn and memorize the material. I am also a high level basketball player and have played for the University of Alberta Junior Pandas. I also do cross country running. In the future, I am planning, as of now, to go into engineering, specifically biomedical engineering, or I want to be a biologist, studying cancer cells, etc...which I hope to do at the University of Alberta.



Tell us about your placement.

This summer, I had the privilege to work in the Palaeontology lab. I spent the summer working with a program called Agisoft PhotoScan in order to compile many images from all the way around a certain specimen (in my case, of all of the parts of Albertosaurus, a relative of Tyrannosaurus Rex that is a bit smaller, scanned separately, including the head, pelvis, tail, spine, arms, feet, and all 24 ribs). We put all of these images into the program, where it made a 3D model on the computer. We then took these 3D models and put them into a program called Maya (this is the program that they use to make professional animated movies). This allowed us to assemble the entire specimen into a complete 3-dimensional model. For our results, we found that it was easier to assemble the photographs if the background was as simple as possible. This model can be used to create archives or databases of specimens for further analysis, to help a person visualize a certain specimen or protect a fragile specimen from breaking due to handling, as a reference for building future specimens, to be put into Finite Element Analysis to test stresses or it can be animated to show how it would have moved, etc... These files can also be sent abroad for others to study, or it can be 3D printed, which we were also able to do during the Summer Research Program in order to study it.

What did you learn this summer?

The main skill that I learned during the Summer Research Program was, as basic and obvious as it seems, how to work in a research environment. I learned how to work independently, figuring things out by trial and error, which is what research is all about. I also learned how to put what I found out about what I was researching onto a research poster that explained clearly what it was I was doing.

What was your greatest challenge this summer?

I think my greatest challenge this summer was realizing that the 37 other people in the program are just like me in the way that we are smart young women and men that share a common love of STEM. I had trouble in the first part of the program recognizing that I could be my nerdy, sciencey self and no one would judge or look at me differently. All of the students in the program bonded over loving science. We all love the fact that there is always one right answer in STEM, it is just a matter of finding it. I was also surprised to learn that everyone in the program always wanted to learn more. They wanted to learn about anything, as long as they were learning and no one was "too cool" to raise their hand and ask a question about the topic, which I loved.

Who would you like to thank?

I would like to thank my family for being so supportive through the entire process of the WISEST program. They listened to everything I had to tell them, even if I did not stop talking from the minute I got home about my awesome day. I would also like to thank Mr. Howard Gibbins for all of his help and knowledge. He always went the extra mile to help us out and put up with all of our craziness for the entire six weeks. Thanks also to Dr. Philip Currie for the help with our posters, the support and the willingness to share his extremely abundant knowledge. Thanks to Alyson Katerenchuk for making my experience even better, putting up with me and making me laugh. Thank you so much to my sponsors, Alberta Education and Faculty of Science, for enabling me to have this amazing opportunity. Finally, thank you to Mr. Clive Coy, Mr. Scott Persons, Ms. Oksana Vernygora and Dr. Corwin Sullivan.

Alyson Katerenchuk



Hi, my name is Alyson Katerenchuk! I have been granted the ability to spend my winters in the city, and my summers outside at my family farm. When I signed up for the WISEST Summer Research Program, I knew getting accepted would mean giving up spending my summer outside with my family, but I do not regret my decision. Growing up I was immersed with math and science with both my parents, and now my brother, being engineers. Following in their footsteps and becoming an engineer arose as the path I felt like I was destined to take, and I disregarded any other fields, but this program has broadened my perspective to numerous other fields and disciplines. While I am known for being a shy and reserved person, I am rarely one to say no to experience new things.

Tell us about your placement.

During the summer, I worked in palaeontology in the Dino Lab alongside a fellow WISEST SRP student. We spent the first few days learning about the lab, and working alongside some of the volunteers who come in to clean fossils. Throughout these few days, we became aware of the exhausting and tedious work which goes into cleaning these artefacts, and eventually became a part of the few people to have been given the opportunity to witness and work with the ancient bones of a dinosaur. My partner and I spent the first half of the program working on a project which became her research poster; we compiled pictures of a model of an Albertosaurus onto a computer, and formulated a realistic 3D image. Through this process, they are then able to utilize these designs for research purposes, and the theorization of how the dinosaur would have moved, what movements they used certain body parts for, how much force they could have exerted with their body, and more. The second project we worked on was recovering old excavation sites using aerial photographs and topographic maps by determining their exact coordinates. These coordinates enable researchers to then go into the field, and see if the fossils still remain, or if they have already been excavated. They can also match up fossils in storage to the quarry site to learn more about the physiology of the dinosaur it belonged to.

How did you benefit from the WISEST Summer Research Program?

The time we spent going on Industry Lab tours, hearing from different researchers, the networking fair, among all the other opportunities, provided me with a new perspective on university life, and career choices. This program opened my eyes to the limitless possibilities available to us in STEM, and how through looking in

the right places, and asking questions, opportunities arise when you least expect them to. I initially began the SRP with the idea that I would spend most of my time alone, or feeling as if I did not belong. This perspective changed almost instantaneously when I walked into the program. The days not only outside of the lab, but also in, were filled with endless laughter and conversations, which continuously flowed.

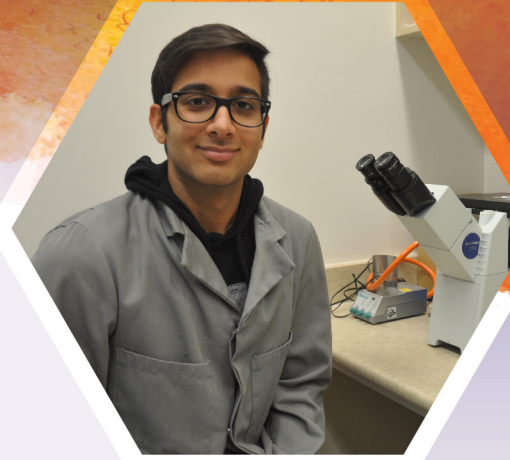
What are you most proud of after completing the Summer Research Program?

Talking with everyone made me realize how proud I am of what I have accomplished both academically and in other aspects of life. It made me realize that I should not be ashamed of what I have achieved, or for the dreams I have in the future. The people in the program helped me to feel more confident in wanting to go for my dreams which have been either been frowned upon, or judged for being either too ambitious or impractical by some. I no longer doubt myself, but am proud of who I am and what I am interested in.

Who would you like to thank?

I would like to thank my parents, siblings, and teachers for encouraging me to apply for this program and for their inspiration to pursue my interests and push myself. I would also like to thank my direct supervisor, Howard Gibbons for his daily guidance and patience over the summer, as well as Clive Coy, Dr. Philip J. Currie, and everyone else in the lab for their help and support throughout the program. Also, thank you to Keeley Hatch and all other WISEST students for making this summer the memorable summer it was. Finally, I would like to thank WISEST and my sponsor Canada Summer Jobs for making this program possible, and enabling myself and the other students to have such an incredible summer.

Amn Khaliqdina



My name is Amn Khaliqdina and I am going into grade 12 at Lillian Osborne High School for the upcoming academic year. My interests lie between many math and science courses, but one course that stands out to me is biology. It is fascinating to know about the many processes that occur within us, as well as around us. It is also encouraging to know that many concepts that are learned in biology can be applied to one's day to day life. With my interest in biology, I know that I want to definitely go into a field in the future that involves biology. One field that definitely stands out to me is nutrition, and it will definitely be a field I consider. I do know that no matter what field I go into, I will want to end up in a career where I am helping out those around me. This is the mindset I will take into university when I choose what I would like to go into.

Tell us about your placement.

The project I was involved with this summer looked at the effects of diets containing high fat or low fat cheese on epididymal adipose tissue morphology. Due to being in the lab for only six weeks, the work I conducted within the lab was a portion of this overall project. My job involved taking slides that were prepared, and putting them under a microscope at 20x magnification. After taking a great deal of pictures from each slide, I put the pictures onto a software in order to measure the areas of the cells within the pictures. The data I collected was then input into a software in order to be analyzed. In taking pictures of the slides as well as by measuring the areas of the cells, I was able to interpret my results both qualitatively and quantitatively. Along with the data I collected, there was also data collected by other lab members on additional parts of the project. This helped me to compare relationships with different aspects of the project. As well as working on my own project, I was given the chance to work with the lab members on the projects they were conducting, as well as learn to perform many lab tasks such as pipetting and autoclaving. Overall, the lab was quite dynamic in process, and it helped me to develop skills I would never have been able to in high school.

How did you benefit from the WISEST Summer Research Program?

My experience in the WISEST SRP was nothing short of excellent, and it came along with many great benefits. All of the professional development sessions were quite helpful in developing my skills in various areas. These ranged from the learning how to network to learning how better public speak. In addition to this, the lab placement was quite beneficial as I got to learn many lab skills and techniques I normally would not have been able to. I do

believe that this program was an effective way to spend my summer, and I would definitely recommend it to those around me. This program allowed me to step out of my comfort zone and gave me a push to take risks and gain the full WISEST experience. One such example of this was public speaking. Prior to WISEST, public speaking was something I was not a big fan of, but by taking risks and getting away from my comfort zone, I started to enjoy public speaking. This helped out at the Celebration of Research where I needed to speak about my research poster to groups of people. In not being afraid of public speaking, I actually enjoyed sharing my project to others. This was something that would never have been possible without the help of WISEST.

Who would you like to thank?

I would like to thank my Principal Investigator, Dr. Catherine Chan, my supervisor, Dr. Zohre Hashemi, and all the members of the Chan lab. Over the course of this program, they all acted as valuable mentors, always willing to help me out. They made the lab environment quite enjoyable, one that I would be excited to go to each and every single morning. Without all of their hard work and dedication, this summer would not have been as great as it was. I would also like to thank my sponsors, The Faculty of ALES and Canada Summer Jobs for giving me the opportunity to be apart of this program. I would also like to thank the WISEST staff for all their hard work. They always went the extra mile to help support each summer researcher to be able to achieve our goals. Along with this, they went out of their way to make sure each session was educational, but also enjoyable. Without them, a wonderful program like this would not be possible. Lastly, I would like to thank my teacher references, Ms. Santos and Mr. Dargatz. They always made an effort to help me succeed academically.

Olivia Lotzer



My name is Olivia Lotzer, and I am from Calgary, Alberta. I have enjoyed every high school science course I've taken thus far, but have a particular affinity for math and physics (which I take as IB HL courses). I am not entirely sure where I see myself in the future, but I hope to travel throughout university, whether that be in the form of moving away for school or taking any other opportunity that comes my way.

Tell us about your placement.

My placement this summer was in LIMDA (Laboratory of Intelligent Manufacturing, Design, and Automation), and my project was researching how 3D printing could be optimally used to make engineering prototypes. My prototype also had to be reconfigurable, self-locking, and keyless, which are all up-and-coming technologies. The idea of this project was to be able to mess around with the engineering design process and see how much planning and effort goes into making everything around us, which I found extremely valuable.

Why is the WISEST Summer Research Program important?

It is easy for people to say that men and women are treated equally in STEM before you experience it yourself. But being exposed to professional workplaces in a world-class institution and really seeing the inequality for yourself is eye-opening. In universities across the country, women consistently represent only ~20% of engineering undergraduate students, and this number only decreases as education continues and women enter the workforce. In my experience, there was a scarcity of women in my building and women need to see other women in their fields, or starting their careers can be daunting. This program allows for exactly this kind of representation, and gives young women a starting point so they truly do feel like they are supposed to be in these fields. This summer, I learned that I do belong in STEM, no matter which discipline I choose to pursue. Women are so powerful, and our voices need to be heard in every field. I learned that I have valuable contributions to make to STEM and that science needs me to make them. I also learned that I am capable of so much more than I thought I was, and that I really can do great things with my life if I work hard enough for them.

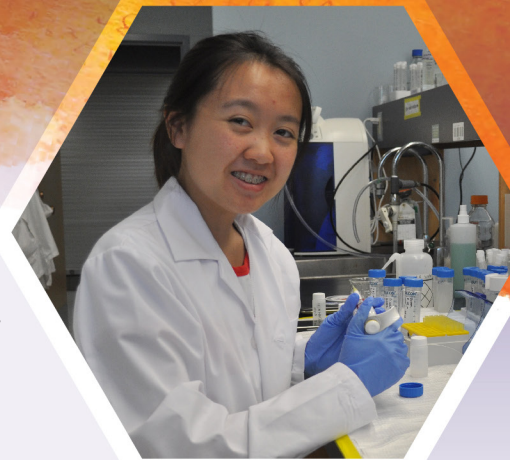
What was your greatest challenge this summer?

My greatest challenge this summer was becoming accustomed to a new lifestyle; living in a different city, taking care of a dorm room with some other teenagers, working a full-time job in a professional environment, and so many more new experiences. Though the changes were quite drastic and overwhelming at first, they eventually became mundane, and I learned to love what I was doing and the way I was adapting to it.

Who would you like to thank?

I would like to thank all of my math and science teachers for sparking my love for STEM, but particularly my chemistry teacher, Ms. Jones, for helping me get into the program in the first place. Your constant excitement and support means the world to me. I would also like to thank our Resident Advisor, Kate Pundyk, for getting me through some particularly stressful days during the program, and for being the best mentor anyone could ask for. Your faith in my capabilities and your help in making some important life decisions gave me more hope for my future than is reasonable, but I truly do appreciate it. Finally, I would like to thank my family, for believing in and loving me unconditionally. I wouldn't be where I am today if any of these people weren't in my life, and I'm grateful for the luck I have had in having all of them.

Jessica Lui



My name is Jessica Lui and I am a grade 11 IB student studying at Bayview S.S. in Toronto, Ontario. Some of my interests and hobbies include math, physics, acting, playing the guitar, camping, and badminton. Although I am unsure about what exactly I want to study in post-secondary, I know that I am interested in pursuing an interdisciplinary field in engineering, whether that be biomedical, environmental, or chemical.

Tell us about your placement.

This summer, I studied the trace metal adsorption capacity of clays and how their behaviour changed as they moved from riverine to marine conditions. The two main factors affecting adsorption capacity, ionic strength and pH level, were varied to simulate the different water conditions. The project's main goal was to determine whether clays acted as a sink or a source of trace metals (in this experiment, Cadmium was used) as they moved from river to estuary to ocean conditions.

How did you benefit from the WISEST Summer Research Program?

The WISEST SRP allowed me to explore a field of study I would have never been exposed to otherwise. I was able to gain valuable research experience and meet a multitude of incredibly inspiring and intelligent individuals. Moreover, being from Toronto, I was given the opportunity to explore an entire new city and gain a close knit group of friends in residence. I learned many valuable things this summer including that geology is incredibly underrated and research is not always fast-paced and immediate and is instead often repetitive and takes a long time. Additionally, it is alright to change your mind and to be unsure of what exact career path you want to pursue.

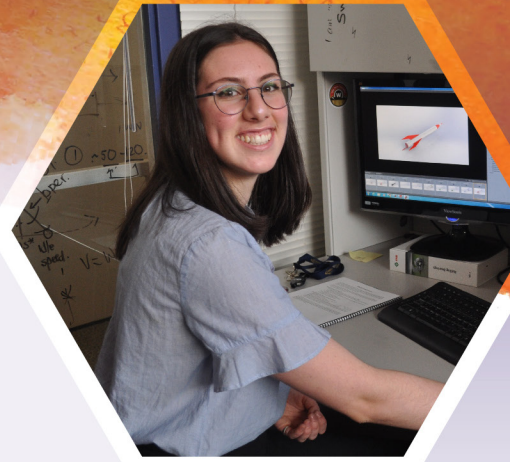
Why would you recommend the WISEST Summer Research Program to other students?

This program gives you valuable real-world work experience that is very difficult to find as a teenager. This summer I realized the importance of having clear communication with supervisors. I definitely learned how to more effectively interact with higher-ups, whether in person or through emails.

Who would you like to thank?

I want to thank my supervisor Weiduo Hao for helping me so much through this program, as well as Kate Pundyk for being a fantastic resident advisor.

Emma Marsales



My name is Emma Marsales and I am a grade 11 student at George McDougall High School in Airdrie, Alberta. I live about twenty minutes outside of Airdrie on an acreage with my parents and pets. I work really hard on my schoolwork, and spend a lot of my time studying for various subjects. I am very interested in space and the cosmos, and want to become an astronaut when I am older. I am not one hundred percent sure of exactly what I want to take when I go to university, but because of this program I have found some interests in engineering that I might pursue. Outside of school, I love to read, draw, paint, hike, and garden. I am also involved in dance; I take tap and jazz classes and have been dancing for twelve years. My hope for my future is to find a career that I can enjoy with all my heart, something that I will be content with for the rest of my life.

Tell us about your placement.

I was placed into the mechanical engineering lab under Dr. Jason Carey, and my supervisors created my project outline for the summer. I was responsible for designing and building a rocket on Solidworks (a modeling and design computer program), and selected different materials to be used for it prior to simulating different loads being applied to the structure. Unfortunately, the simulation program was not able to be used, so we tweaked the purpose of our projects a bit. The new project was similar, design three rockets, choose three different materials, and design an experiment that could be used to test the structural integrity of the rockets. I created an excel sheet listing all the manipulated variables in the experiment to calculate the amount of test samples would be needed and created an experiment with them.

Why is the Summer Research Program important?

The WISEST program is so incredibly important because there are countless young women out in the world who believe that their futures are restricted because of their gender, and we need a way to show them that that is not true. WISEST is helping young women realize that they are powerful and should never feel like a lesser person because of their gender, race, age, sexuality, religion, culture, etc. Involving young men in this program is such an incredible idea as well, because then the program is teaching young women and men about underrepresentation in the workplace, because it is not just women who are underrepresented in certain fields. WISEST is proving to the world that anyone can go on to be anything they want.

What did you learn this summer?

I think the most important skills I have learned through this program is how to act in a post secondary school environment, in a professional work environment, and how to network and create bonds with others. Being able to communicate effectively and professionally with others is a skill that everyone should have, and I feel much more confident about those skills because of the Summer Research Program. My greatest challenge this summer was living away from home for the six weeks. Living in residence was one of the best experiences of my life, but it can't get rid of homesickness. Learning how to take care of myself and my living space was a bit of a challenge. That, along with budgeting money, cleaning our dorm room, and figuring out the bus and train schedules was hard to keep up with for six weeks. My roommates were some of the most beautiful, kind, amazing, and hilarious people I have ever met, and without them I would not have been able to live away from home for so long.

Who would you like to thank?

I want to thank my chemistry teacher, Diana Stapor, for all her encouragement and for getting me involved in the WISEST program. I would also like to thank everyone in the Carey Lab for being so welcoming and kind. I always felt respected, safe, involved, and encouraged in the lab. For everything you have all done for me, I thank you from the bottom of my heart.

Keegan Martin



I'm Keegan Martin and I come from a small town north of Edmonton called Athabasca. I am interested in the sciences especially biology and chemistry. I hope for my future to include going to the university of Alberta and follow a career in the sciences. I come from a small town in northern Alberta, the small population causes the ability to meet and work with new people to be a rarity. This summer I witnessed myself being extremely open and found joy in meeting new faces. The summer research project exposed this part of my character that I hope to exercise in the future.

What did you learn this summer?

The WISEST Summer Research Program opened my mind to all the different professions available in the STEM fields. Before attending the SRP I never would have fathomed the diversity in research that is conducted at the UofA. By attending the summer research program I have a newfound confidence and appreciation going into my last year of high school. While attending high-school it is easy to lose sight of the bigger picture, the SRP reinstated that perspective for me. The WISEST program has given me the opportunity to connect with academically inclined peers, as well as professionals. The importance of the program resides in this characteristic of the SRP.

Tell us about your placement.

This placement was with Principle Investigator Dr. Sangita Sharma, under the direct supervision of Jane De Pauw. Dr. Sharma is the lead of the Indigenous and Global Health Research Group. A cancer research project was conducted from 2013-2017 documenting the thought and ideas of Indigenous people as to why they do or do not use cancer screening services and what could be done to increase the use of those screening services. This placement involved documenting the entire process of the video production aspect of the development of educational materials.

What are you most proud of after completing the Summer Research Program?

I am most proud of all the connections I created over the course of the SRP, professional and casual. This summer I learnt the importance of being studious, resilient, and persistent. During my time at the UofA, I learnt to be more studious and learnt the necessary material to be able to adequately participate in the research. This summer my research team and the entire SRP has taught me how to be more resilient and overcome many adversities. One needs persistence to be able to continue on with something when you may not be entirely motivated to do, such as repetitive work. My greatest challenge this summer was overcoming being a minority, being one of two men participating in the program. However, I am proud of all the connections I created over the course of the SRP.

Who would you like to thank?

I would like to thank my supervisor Jane De Paux and colleague Yashar Rahimoghliurk for a great summer experience working at the University of Alberta.

Golie Masoumian



My name is Golie Masoumian and I am from Fort McMurray, AB. Throughout my life, I have always been interested in understanding the laws of the universe and when I took my first physics class, I fell in love with the concept of finding out the science behind the little things in life. In the near future, I hope to pursue a career that involves physics and since almost everyone in my family is an engineer, I figured I should follow in their footsteps.

Tell us about your placement.

My placement this summer was in the Department of Electrical and Computer Engineering in Dr. Wilsun Xu's lab. I worked on measuring electrical disturbances that I created in the lab and analyzing the waveforms using Matlab on the computer. I recorded the waveforms of different objects such as a motor, laptop, different light bulbs and a heater and I used coding to analyze the graphs. By measuring disturbances that I conducted in the lab, I helped other members to improve the power quality and power systems of buildings and to create more efficient devices. In extreme cases such as medical field, it is very important to have high efficiency devices since a small error is a huge one when someone's life is at risk.

How did you benefit from the WISEST Summer Research Program?

I came from outside of Edmonton and being away from home for the summer, I was expecting myself to not be at my best since it was my first time away from my family. However, I walked into the room on Orientation day and the welcoming atmosphere made me feel at home. Working in my lab was the best job experience I could have asked for and the placement being in the Engineering Faculty was better than I expected. Living on campus and working at the University of Alberta helped me get familiar with the city and the opportunities that were offered to the students. Overall, this summer was the best summer of my life and I will treasure this forever.

What did you learn this summer?

One particular skill that I learnt this summer that will stay with me into my future career is that of networking. Networking is a universal skill that enables opportunities and allows one to meet new people with different interests that can benefit you. I would recommend this Program to everyone because it is a unique experience that will help you in the future when applying for jobs and even universities. It can help you connect with others who share the same career interests and meet lifelong friends.

Who would you like to thank?

I would like to thank the WISEST team and my Principal Investigator, Dr. Wilsun Xu and my Supervisor and PostDoc Dr. Jing Yong and Difei Tang. A big thank you also to my sponsors Syncrude, Dr. Wilsun Xu and Canada Summer Jobs for making this opportunity possible for me.

Laura Morin



My name is Laura Morin and I am from Winnipeg, Manitoba. I really enjoy biology, chemistry and math both in and out of school. One day I would like to have a career that revolves around one or more of those three subjects. My main goals right now are to pursue engineering, but currently I have no specific discipline in mind. I applied to the WISEST Summer Research Program because while I have always been interested in pursuing a career in STEM, but I never really knew what my options were. The SRP provided a platform to explore the many possibilities varying STEM fields have to offer.

Tell us about your placement.

I was placed in a structural engineering lab, which is a specialty of civil engineering. The placement involved assisting designing an experiment to test full-scale masonry walls when they are anchored into the ground. My partner Liz and I assisted in the testing of masonry prisms. Masonry prisms are smaller versions of masonry walls that are 4 feet in height and one masonry block wide. We worked with both grouted (filled with concrete) and ungrouted masonry because a full-scale wall would have both components. Our lab was basically a construction site, so we were able to wear all the cool safety equipment when we were in there. We wore everything, from a hard hat, to a full on jumpsuit! We prepared the prisms for testing which involved pouring plaster on them, sanding down that plaster, and painting them so DIC sensors could measure how much strain they could handle. Testing the prisms involved crushing them with an MTS press (like you see in hydraulic press videos on YouTube), from our tests we were able to find a strength value for each type of prism. We created an excel sheet that would allow you to input a strength value for grouted and ungrouted masonry and would output a prediction for the behavior of a full-scale wall.

How did you benefit from the WISEST Summer Research Program?

My time with the WISEST Summer Research Program has honestly been the best summer I have ever had. I never knew what it was like to be around people my age that have the same passions and aspirations that I have. Being surrounded by people who wanted nothing more than for me to succeed and grow with me has given me so much confidence. I know now more than ever that I can succeed in any career I choose, and that there will always be people rooting for me even if I don't know it.

Who would you like to thank?

I would like to thank my Principal Investigator, Dr. Carlos Cruz Noguez and my supervisor, Clayton Pettit for creating such a positive environment that encourage our academic growth. Throughout the program they welcomed my partner and I into their lab and I learned lessons from them regarding not only research and future careers, but life as well. I will be forever grateful for that. Thank you.

Kendall Musgrave



My name is Kendall Musgrave and I attend Two Hills School in Two Hills. Growing up and receiving an education from a smaller school has given me a different perspective than of those from a larger school. There are fewer resources and class options, so for some of my core classes, I have had to take them through distance education. Although it may seem like a disadvantage, I believe that it has pushed me further and given me more motivation to achieve. I discovered my love for the sciences while teaching myself physics and chemistry. Along with math, these classes always seemed to be able to put a smile on my face even on the hardest days. Before the WISEST Summer Research Program, I had no clue of what I wanted to pursue in post-secondary, which was quite stressful. After the six weeks, I have realized that I do not have to make a decisive decision, however, the program did allow me the opportunity to learn about many careers in STEM which led me to discover an interest in engineering. I do not need to make a definite decision on my future, but I have a good idea of the direction I want to go thanks to the WISEST Summer Research Program.

Tell us about your placement.

For the duration of the six weeks, I worked under Dr. Erin Bayne and Dr. Richard Hedley in the Biological Department. The Bayne lab specializes in bioacoustic research. This research involved deploying audio recording units to capture animals calls and songs in their natural environments. These recordings were analyzed so that each species present in the recording is identified and the data documented. Researchers can use the data collected from the audio recording units to conduct studies looking into certain species, focusing on migration patterns, breeding ranges, overall behavior, population, and more. An example of a research project that would use bioacoustic data is determining whether or not a particular species needs conservation measures put in place. The data is also shared with other organizations and companies to help increase awareness for Alberta's biodiversity.

What did you learn this summer?

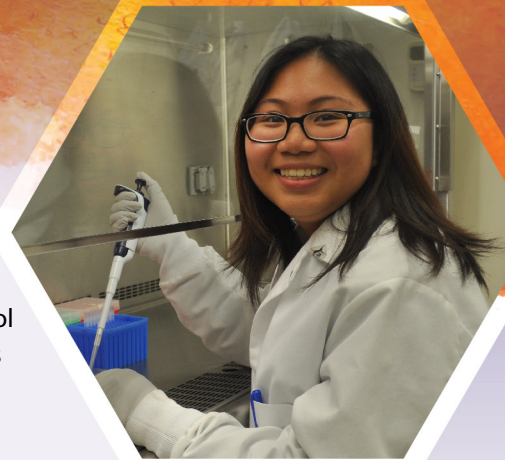
I have learned so much about myself over the summer, but the most important lesson that I have learned is that I am capable of whatever I set my mind to. This realization would have never happened if I didn't gain the self-confidence that I was lacking when I came into the program. So much more in life can be achieved if you put away your fears and go for the risk. During the application process, I was terrified of not being good enough and scared to put myself out there, but I can not express how thankful I am that I still applied. This summer has been life changing in so many aspects of my life, most importantly my confidence. Without a doubt, I can say now that I will

never settle on something because of fear of putting myself out there. The risk for the reward is often more worth it than regret.

Who do you want to thank?

I want to start off by thanking my parents and family for supporting and helping me pursue this. Without your encouragement I do not know that I would have had the courage to be a part of this program or be the person I have become. I would like to acknowledge all those who helped me in Two Hills, especially Mr. and Mrs. Warawa; thank you for always being there and for supporting me on this journey. A huge thank you to my Principal Investigator Dr. Erin Bayne and my Supervisor, Dr. Richard Hedley for this remarkable opportunity to work within their lab, as well as Justin Johnson, Jeremiah Kennedy, Cesar Estevo, Kathleen Enns and Harsimran Bains for all the help and encouragement, and all those who have welcomed us into Bayne Lab. Without the support of the residence girls this summer I would truly not have been the same, so thank you girls. Shout out to the best birdy I know, Dylan. Without them I would not have had such a remarkable summer and nobody to drink French Vanilla's with. I would also like to acknowledge my amazing RA, Kate, she went way beyond expectations and without her, the transition away from home would not have been as smooth. And finally thank you to WISEST and STEP for sponsoring me and making this summer possible. My life has been forever changed thanks to your contributions. Thank you to all the WISEST volunteers and the incredible WISEST team for making this summer so memorable!

Noemi Napoles



My name is Noemi Napoles, a grade 11 student from Holy Redeemer Catholic High School in Edson, Alberta. For the longest time, Science and Math have been my favorite subjects at school. I have deep passion and great yearning to expand my knowledge about the future careers that are possible for women in STEM fields. In the future, I want to become a successful Chemical Engineer and someone who possess great passion for her work.

What motivated you to apply to the WISEST Summer Research Program?

The WISEST Program is an uplifting program that represents women in underrepresented fields. I wanted to apply to WISEST Summer Research Program because I wanted to expand my knowledge in science and learn about other career options that are possible for young women like me. I wanted to challenge myself by entering a program full of talented young minds. Witnessing and hearing that there is a very small percentage of women in most STEM fields, I was motivated to join this program. I wanted to change the perception the women are not suited to pursue a career in STEM. I wanted to become one of the young women that will challenge the unequal perspective that our society possess.

Tell us about your placement.

I was placed in an Immunology lab to study the presence of CD71+ immature red blood cells in the gut and its relationship with gut bacteria. Previous research found that when newborn babies are first exposed in the outside environment, their immune systems adapts to the bacterial colonization with the help of immature red blood cells. Therefore, in this research we wanted to study the role of these cells in the gut system. We collected and processed mice gut tissues. By analyzing them, we discovered that there is a big population of immature red blood cells in the gut of newborn mice but it decreases significantly towards adulthood. After proving their presence, we wanted to check if there is an indirect relationship between these cells and the gut bacteria. In order to do that, we removed all of the immature red blood cells in the gut of our mice sample. Then, we checked for the gene expression levels of Toll-like Receptors 3 and 4. These receptors are present in the surface of epithelial and most immune cells. Whenever a bacteria passes through the epithelial cells, these

receptors sends a signal to the immune cells. However, when we depleted the immature red blood cells, there was an increase in the gene expression of these receptors meaning they have been sending multiple and continuous signals to the immune cells. In result, the immune cells will overreact. The overreaction of immune cells may cause inflammation in the gut of newborn mice and human.

What is the WISEST Summer Research Program important?

The WISEST SRP Program is very important in our educational community. This program shapes the mind of both young men and women. The program gives the students the privilege to work in a professional setting in order to gain important life and lab skills.

Who would you like to thank?

I would like to thank all of the students in the program especially to those that I made an awesome connections with. I would also like to express my gratitude to Petya Koleva and Dr. Shokrollah Elahi for providing me with an amazing lab experience. Last but not the least, thank to our WISEST team for this unforgettable summer experience.

Emily Redmond



My name is Emily Redmond, and I am a student at Archbishop Macdonald High School in Edmonton, Alberta. My favourite subjects are math and physics, and I hope to study engineering in university. I am not sure which career path I will take after school, but as of now, I think that a master's degree would be an interesting option to pursue, even though it is not very common for many types of engineering. Right now, I am looking forward to studying calculus in grade twelve, and in the more distant future, I look forward to being not only an engineer, but also an innovator and a leader in my field, regardless of my gender. Science communication is another interest of mine, and I definitely foresee continued involvement in it through both participating in and volunteering for WISEST and similar organizations. Apart from my academic interests, I am a competitive alpine ski racer, and I love to get out and explore nature!

Tell us about your placement.

This summer I 'interned' with the City of Edmonton Integrated Infrastructure and Engineering Services Department. I spent about a week with each sub-group of the department learning about the lab work, architecture, and various types of engineering that go into building all of the infrastructure in Edmonton. I had a huge variety of exposure to different branches of engineering and saw STEM being put into place in an industry setting. Having an industry placement, I did not directly contribute to research. However, I helped out in some of the Quality Assurance materials labs where I spent my first week, and I was able to help on various small process. My time during the rest of my placement was a little less hands-on, but that is just the nature of the professions that I was getting a glimpse into. I was able to help with office organization when I had a spare minute and with some note-taking during meetings. Although there was not much research-type work for me to "fit into", I never felt like a hindrance to my supervisors. My experience was one more similar to 'learning by absorption', by getting to be a 'fly on the wall' in a wide variety of situations, and I am very satisfied with my experience.

Why would you recommend the WISEST Summer Research Program to other students?

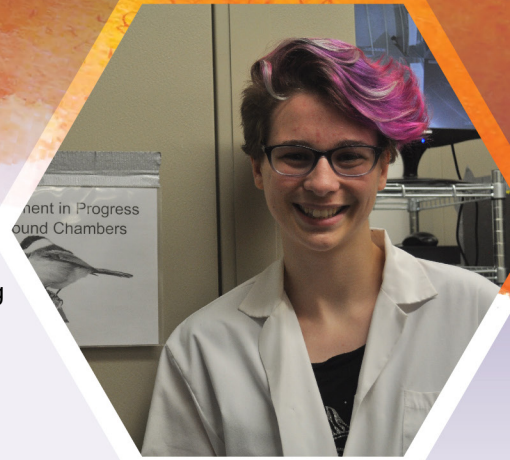
I would highly recommend this program to anyone in Grade 11 that is interested in STEM. You don't need to know that you want to be a scientist, engineer, or even researcher to take part in WISEST. You just have to be willing to meet new people and to want to explore

STEM. Your lab or industry placement will no doubt be educational and unlike any other summer job that you could have coming out of grade eleven, but the skills you will learn and the people (friends AND mentors!) will be the true highlight of your summer. I would 100% recommend this program to anyone whether they think they know exactly what they want to study in university or whether they're still unsure but are willing to discover new options.

Who would you like to thank?

I would like to thank all of my wonderful supervisors at the City of Edmonton for volunteering their time to show me their profession. Each person that I worked with was willing and excited to answer all of my (many) questions and was determined to make my experience not only an educational one, but also an enjoyable one! Thank you to everyone who tolerated a high school student in their office during the busiest weeks of the construction year. Also, a big thank you to the whole WISEST staff for facilitating the wonderful program and the WISEST Advisory Board for sponsoring my placement.

Emma Reid



My name is Emma Reid and I have lived in Edmonton for my entire life. Edmonton is a big city, so I have had a lot of opportunities to explore what I like to do. I've been in martial arts since I was four, and plan to continue for as long as I am able to. Kung-fu, wrestling, and brazilian jiu jitsu are also interests of mine. In school I love math, biology, language arts, and visual art. I spend most of my time outside of school studying, reading fantasy novels, and watching Netflix with my family. My interests flip-flop between careers, but currently my plan is to get my degree in medical microbiology, immunology, or parasitology and then I would like to teach junior high or high school. I want to be that teacher that encourages kids to follow their dreams, and who provides a safe place for them if they ever need help or support.

Tell us about your placement.

I was placed in a psychology lab doing research on the behaviour and cognition of black-capped chickadees. I participated in a pilot study testing for the food preference of the chickadees. I assisted with the design and daily procedure of the experiment, as well as data input after each run was finished. My daily duties included reading articles and papers, cleaning, coding video footage of the experiment, and handling the chickadees. This placement was perfect for me. The atmosphere was so welcoming and fun, and the research being done in our lab is interesting and relevant. I had such a great experience that I plan to return to the lab next summer as a volunteer. Thank you Sturdy Lab for letting me be a part of this amazing research!

What did you learn this summer?

I can't say enough about how amazing this experience has been, everyone should have the opportunity to try it for themselves. Everyone deserves the confidence that every alumnus of the program feels when they leave. I learnt that it is important to calm down, no one expects you to understand everything, or to have any idea what you are doing right away. Just be honest with people when you do not understand and let them know when you make a mistake. It's really not that big of a deal. I also learnt to be myself and be flexible - graduate and PhD students are just regular people. They like making jokes and having a good time at work just like everyone else. Treat them like you would any other coworker, they're not scary. Animal research can be very volatile, you need to be able to think on your feet and react to things as they come up. Flexibility is an imperative skill in the world of scientific research, and it'll make you a more well-adjusted human overall.

Who would you like to thank?

I would like to thank my research team. They were so welcoming and kind to me, it really helped me work through the nerves I experienced early on in the program. Thank you all, you made this summer one of the best of my life!

Laura Rib



My name is Laura Rib and I am from Innisfail Alberta, where I attend Innisfail Jr/Sr High School. I find chemistry, biology, physics, and math interesting in school, as well as piano and art outside of school. However, I am unsure as to where I want to be in the future. As of now, I plan to take either engineering or science courses in university with possibly a minor in music or a second language, and if possible, study abroad. My goal is to obtain a science career that I am passionate about.

What motivated you to apply to the WISEST Summer Research Program?

The uncertainty of my future motivated me to apply to the WISEST Summer Research Program. I hoped that by working in a research lab for six weeks, it would give me enough experience to strengthen my understanding of what the work is like, and if I want to pursue such a career. As well, I wanted to seize the opportunity to live on campus before becoming a university student. This would allow me to better adjust to the living environment of a university campus.

Tell us about your placement.

I was placed in the Agricultural, Food, and Nutritional Science department, and had the opportunity to work with Muhammad Zubair and Dr. Aman Ullah in the Utilization of Lipids lab. I worked with keratin, a protein we extracted from chicken feathers, as well as other chemicals, to create a membrane for water remediation (heavy metal adsorption). We modified keratin with chitosan, a polysaccharide, since when combining both of their chemical properties - the new substance exhibits more enhanced properties than either alone. Electrostatic attraction describes the ways in which keratin and chitosan bond, as their opposite charges cause a strong attraction to be made between them. When the membrane is formed, the new functional groups that have been created could possibly attract heavy metals, by electrostatic attraction as well as dative bonding. However, in the lab we had no time to test for heavy metal adsorption, so we tested the chemical and physical properties of keratin, chitosan, and the hybrid membrane instead. The results then compared the properties of the three substances. One thing I found was that the hybrid membrane has a higher thermal capacity than keratin, and therefore its properties had been enhanced by our procedures. This research

would fit into a larger framework, as it could provide the methods necessary to form a successful membrane that could adsorb heavy metals, thus purifying drinking water from these contaminants. Since the membrane is made from biodegradable materials, this procedure would have a low risk of being harmful.

Who would you like to thank?

I would like to thank Dr. Aman Ullah and Muhammad Zubair for welcoming me into their lab. I'd like to further thank Mr. Zubair for answering all of my questions, and helping me with the project throughout the summer. I would like to acknowledge NSERC Promoscience for their sponsorship, as without them I wouldn't have had such a great experience. Lastly, I am very grateful for all WISEST volunteers and coordinators for making the program possible. Their contribution helped instill confidence in many young students including myself, and I hope they continue to do such amazing work.

Sukhmani Saggu



My name is Sukhmani Kaur Saggu and I am from Edmonton, Alberta. I attend Lillian Osborne High School and I have found mathematics and the sciences to be incredibly interesting subjects. Most importantly, these subjects will be key in getting me into my profession of choice, medicine. Despite this, research in the field of chemistry is also a promising aspect in my post-secondary career. Another interest that I have is leadership, and community involvement. To fulfill this interest I hold many roles at school; for example, I am the president of UNICEF club, and the leader of the Lillian Osborne Art Arts Council just to name a few. I have also taken part in my school's concert band.

Tell us about your placement.

My placement this summer was in chemistry with the Dr. Michaelis Research Group under the supervision of Michelle Ha. My placement was based on studying hybrid perovskites through the lens of Density Functional Theory (DFT) calculations. As the human population increases, it is only logical that the need for energy will increase proportionally. To sustain economic growth and to preserve the environment, alternative methods of power generation are being developed. My project was based on finding the effects of changing the basis set on the resulting values obtained from the DFT calculations. To complete this task, I conducted a series of DFT calculations to find the desired quantities of different model complexes of MASnX_3 in the form of $[\text{SnX}_6]^{4-}$. Consequently, I conducted statistical analysis of the quantities obtained from the calculations.

How did you benefit from the WISEST Summer Research Program?

Throughout these six weeks, I experienced the life of a student researcher. I developed the professional skills that are required in research including having a systematic approach to a problem, problem solving, brainstorming, statistical analysis, safety in the lab, coordination with other lab members, and writing reports. I strongly believe these developed skills will help me in my future endeavours. There exists a steep learning curve in research, which I overcame with patience, resilience and my consistent efforts. I learned that with a positive attitude and the necessary skills required, I can complete any task given.

Who would you like to thank?

I would like to thank the University of Alberta for allowing the Michaelis Research Group to use the campus for their research, as well as providing a platform for volunteers. I would also like to thank the WISEST administrative team and the Michaelis Research Group for their support and encouragement. Finally, I would like to thank the Natural Science and Engineering Research Council (NSERC) for their funding, scholarship and financial support.

Mehera Salah



My name is Mehera Salah and I am a student from Edmonton attending M.E LaZerte high school. WISEST was a perfect fit for me: I could explore, at 16, the inherently interdisciplinary aspects of science and its relations in STEM. This is a pursuit I felt motivated to really understand as I have always seen science as a fixture in my life. In my future, I hope to create my own niche in the STEM world, combining my interests instead of discarding any, I hope to still pursue engineering, biology, writing and environmental activism in a creative and rewarding way, possibly through research itself.

Tell us about your placement.

WISEST promotes young women and men pursue STEM fields that are underrepresented for their gender. This program supports being a pioneer, fostering diversity in unlikely pursuits and promoting the underrepresented and their scientific passions. The program actively supports exposing youth and the public to the world of STEM. In keeping with this, during my summer I explored a digital gender gap, one witnessed on Digital Science Communication platforms. The social media platforms we analyzed were ones of common popularity: Instagram, Facebook, LinkedIn etc... but within them STEM content produced by females was startlingly low. Through our research we hoped to encourage females to be vocal about their research and the scientific passions they harbored.

How important is the WISEST Summer Research program?

It is my belief that the WISEST SRP is essential. Education is fundamental to our world, but the pride and experience that comes with being given a chance to explore your future is an absolutely vital thing, a future that for some may have even seemed unattainable. I learned this summer to value innovation and creativity and I am proud of the amount of information I could learn when truly absorbed in something.

Who would you like to thank?

I would like to thank Ms.Higham and Ms.Fischer for thoughtfully recommending me, and believing I was right for this opportunity. Additionally, the WISEST teams who have continued advocating for diversity in these amazing fields even 35 years later.

Summer Smyth

My name is Summer Smyth and over the two months of summer vacation, I participated in the Summer Research Program. I would have never known how entertaining research could be were it not for this opportunity. My vacation was not sacrificed, rather, it was the best summer vacation ever. The placement also helped me decide which field to study in university. Science, math, and music, are my three favourite subjects. However, I was also interested in studying music. Before working in a lab, I saw sciences as interesting, but less entertaining compared to playing an instrument. Lab work taught me that studying a science field gives the same freedom to be creative as music does. Now, I wish to study chemistry and keep making molecules.

Tell us about your placement.

I had the opportunity to work in Dr. Tykwinski's lab synthesizing molecules for solar cells. The molecules we were synthesizing could make solar cells more efficient, although these molecules would decompose quickly. We were researching which modifications to the "pentacene" molecules would allow it to convert the most solar energy into a usable form of energy. Our work involved synthesizing these molecules. Based on theoretical knowledge of chemical reactions, which I learned about in the six weeks, there would be a procedure to form our molecules. After completing the procedures, our desired product had to be isolated from contamination and the material left over from starting the reaction. The methods which I used to isolate our target compound included using the column, thin-layer chromatography, and crystallization, used the polarity of molecules to separate our impure product into its different parts. The molecules that were suspected of being the product would then be taken to the Nuclear Magnetic Resonance room which would provide a graph for analysis.

How did you benefit from the WISEST Summer Research Program?

The WISEST Summer Research Program was not only helpful in expanding my knowledge of organic chemistry, but also helped to develop professional skills. The WOW and WOF sessions pushed me out of my comfort zone. The Networking Fair was an event in which WISEST students had the opportunity to interview role models. To be honest, I was a bit intimidated by the prospect of meeting new people in a room and network for an hour. These mandatory events developed our interpersonal skills. Without being pushed out of our comfort zone, it could have took a lot longer to learn that talking to other professionals aren't as scary as we think it is.



Describe one skill that you learned during the Summer Research Program that will help you in the future?

Among many, the most significant skill learned during the Summer Research Program is to be willing to learn about a variety of different fields. During the Networking Fair, I talked to a former WISEST Research Student who said she decided to minor in Women's Studies after attending a conference. I will transfer this attitude of being open minded to different studies in the future because one event may give an individual a chance to expand their academic knowledge based on their interests.

Who would you like to thank?

I would like to thank my Supervisors Parisa and Funda for being so friendly and helpful. They answered all my questions and were patient when I first did not know what to do in the lab. Without the permission from Dr. Tykwinski, I could not have participated in the project which I love so much. Thank you also to my Sponsor, NSERC Promoscience. It is the sponsorship that allows young women to explore opportunities in STEM fields. I thank the WISEST team for arranging the Professional Development activities and putting in the effort to initiate the program. Lastly, but not least of all, I thank my teachers for encouraging me to apply.

Anaka Sparrow



I'm Anaka Sparrow and I love computing science in school. I took all the computers classes in my school and I have always been interested in science and math and have just gotten more engaged by it throughout the years. My computer science teacher encouraged me to apply for the WISEST Summer Research Program and I was thrilled to hear about the opportunity.

Tell us about your placement.

I was placed in a computing science lab for my Summer Research placement and given the task of making a game to help motivate language learners! By the end of the summer I had created a space invaders themed game that enforced the basics of the crew alphabet. There were several big projects under my lab, all focused mainly on language and analysis of learning. I was placed under a project called CreeTutor which had about three people working on it at the time.

How did you benefit from the WISEST Summer Research Program?

My experience with the WISEST SRP has enabled me to feel more confident about going into university with the experience I gained from this program. I was reassured constantly that this was the best opportunity I could have taken and I feel like going back to high school will be a breeze. I would recommend this program because of all the connections and opportunities it exposed me to. These will help me make my way through university and my career, even if you do not get placed exactly where you want to, it is worth it, and the encouragement you get from everyone around you will make you confident in yourself.

Who would you like to thank?

I would love to thank Dr. Carrie Demmans Epp, and Delaney Lothian for being my motivators this summer and teaching me more than I imagined I would and treating me like a part of the team I would also like to thank Syncrude Canada for sponsoring me and showing such interest in my Research.

Kaitlyn Thomson



My name is Kaitlyn and I am from a Northern Alberta town, Grande Prairie. Within school, I enjoy my science classes including Chemistry and Biology. Among these two subjects I also enjoy Math. All of these classes have made me particularly interested in following a science career path. Before going into this program, I was unsure of what opportunities lay ahead including the different areas of study that I would be interested in learning, in university. As I look to continuing studies after high school, I believe going to UofA is the best option for me in terms of the amazing science programs they have to offer.

Tell us about your project.

Within the chemistry lab I was placed in, I was given an amazing opportunity to work a little bit with both Biology and Chemistry. The project I was given involved working with a hydrophobic peptide, called subtilisin A, and determining its 3D structure. In order to do this, our goal was to attach a linker, which was a carbon chain and another protein, to the peptide and crystallize it. Scientists are studying subtilisin A because it could be a potential alternative in food production and pharmaceutical industries.

How did you benefit from the WISEST Summer Research Program.

I benefited from this program by taking networking opportunities WISEST presented and using them to my advantage. I networked with a few women in STEM fields and I learned all about different career options, educational opportunities and challenges/successful outcomes they overcame. The networking opportunities gave me a chance to actually meet wonderful women who taught me the importance of making connections.

What did you learn this summer?

The three most important things I learned this summer involve friendship, teamwork and communication skills. Intertwining with each other, all of these skills were important both in and outside of the lab. Friendship was most important to me throughout this program because of the people who I was surrounded by in residency, fellow peers of the WISEST program and students I interacted with, in the research lab. Without friendship, I would not have had the support that all my friends gave. I also learned better teamwork and communication skills from this program by having to work with others and communicate ideas.

Why would you recommend the WISEST Summer Research Program to other students?

This program has the ability to open doors to future careers can help guide people, especially women, into STEM related fields. This program empowers young men and women to explore opportunities in fields underrepresented by their gender. This gives people a great experience in the paid research program and helps students explore opportunities they may have been unaware of. Although experimentation within the lab were exciting, it was also a pleasure to experience WISEST PD sessions which gave students a chance to network with working professionals, help aid in poster making, allowed for tours on and off campus and plenty more. These sessions guided students and allowed for exploration of many different opportunities presented.

Who would you like to thank?

I would like to thank WISEST for this wonderful opportunity and giving me a special gift of an amazing summer. The program was filled with emotions; joy, excitement, nervousness, high-spirits and many more feelings of sentiment. WISEST presented opportunities I never knew existed. This program also prepared me for university life and has demonstrated this importance of grabbing all opportunities and using them to my advantage. I would also like to thank all of the residency kids for allowing me to have one of the best summers ever. They truly impacted my life all in different areas and by the end, I have never felt more close to a group of people in my life. They are my family that I will keep in touch with for years. They are my other half.

Keeley Toope



My name is Keeley Toope and since I was young I have had a great interest in STEM that has grown with me into high school. I particularly enjoy math and physics in school and code in my spare time. I'm hoping to transform my interests into a career, possibly as an engineer or computer scientist. When I am not learning something new about science, math or technology I play the celtic harp, run or volunteer with Girl Guides.

What motivated you to apply to the WISEST Summer Research Program?

When I heard about the WISEST Summer Research Program, I knew it was a great opportunity for me, since the program is focused on gaining real hands-on work experience in STEM research and I am very interested in a career in a STEM field. I also admire the WISEST mission to improve representation of women and men in non-traditional fields.

Tell us about your placement.

In my placement this summer, I worked to improve a message board software that is used in University level classes. My research team found that a display of information about students (such as word counts in posts) that is used by professors has a very plain look and is essentially a list of numbers, which is very ineffective at presenting the information. We decided to use a circle chart where each student's data is used to create a circle that has a size based off the data and the other students. I programmed this chart using JavaScript to make it appealing and interactive. This will be integrated into the message board, where we believe that it will improve the experience for professors and their classes.

What was your greatest challenge this summer?

The learning curve was a challenge at first. I had to try to remember all the basic HTML and CSS programming skills I had learned while also trying to expand and apply the slight amount of JavaScript I knew. I also had to learn to use GitHub—an online storage for code that uses totally text based and somewhat confusing commands done through a computer's command line. I quickly improved my skills and now feel very proud of my accomplishments. I am very proud of the work I was a part of this summer. I believe the interactive chart I made for the message board will really help professors manage their classes. It's thrilling that I actually developed a working program in 6 weeks that will soon be used by someone other than myself.

Who would you like to thank?

I would like to thank my supervisor, Ryan Perez as well as my principal investigator, Carrie Demmans Epp. Both guided and encouraged my work across the six weeks. As well, thank you to both the members of my research team who were not directly involved in my work as well as the other research team that shared our lab space. I would also like to acknowledge WISEST for placing me in my lab and my sponsors- Process Solutions and Canada Summer Jobs for supporting my research.

Dylan Vadnais



My name is Dylan Vadnais. I am from Vegreville, a small town East of Edmonton and I go to Vegreville Composite High School. I have always loved science as well as music. I am a part of my school's student council as well as two bands and love getting involved in my community. I also really love my English class and am excited to go to post-secondary after I finish my grade twelve year. I want to pursue science, specifically engineering at this point, and am looking forward to being more involved with science in general.

Tell us about your project.

I worked in the Bioacoustic Unit under Dr. Erin Bayne and Dr. Richard Hedley for the duration of the SRP. We used programs like Praat and Audacity to clip recordings of birds to be put into a database of songs for research, and used a technique called sound localization to determine where a bird was singing within a grid of 15 microphones. This was used to determine if/when birds were using rehabilitated forest habitats like seismic lines and wells. For my research, I used localization to determine how far one microphone could detect each of four species of birds within a grid to then determine how far a single microphone can do so.

How did you fit into the bigger picture of your lab placement's overall research?

My partner and I helped the Bioacoustic lab to build a large data set of 100 clips of each song (sometimes there are more than one) of each species in Alberta. We also were able to help a grad student with some of the findings for his thesis on Ovenbird migration and arrival times in relation to latitude. We also started determining how far each of the autonomous recording units (ARU's) could detect different bird species that will be looked at further but will help in future research involving ARU's.

What did you learn this summer?

This summer I learned a lot about patience through the research I did in my lab. Research is not as fast as it is made out to be. I also learned that there are a huge amount of people in the world with similar interests and values. This may seem like an obvious fact, but coming from a small town I have limited opportunities to meet a more diverse range of people like the ones in this program. Finally, I learned how to love and be confident in myself. Both through staying in residence and working on campus with the aforementioned amazing people I was shown my worth, my intelligence, and my strength in the face of everything the world can offer.

How important is the WISEST Summer Research Program?

On a scale of one to important, I would say the WISEST Summer Research Program is really important. Encouraging diversity both in STEM as well as workplaces and educational establishments is essential. Might I bring up the case of early airbags killing women and children after being modeled solely based on the average man. In this case, only one collective's voice was heard leading to a device that was meant to save lives to take them. This program encourages young women and men to pursue education and careers in areas underrepresented by their gender. This helps increase the collective intelligence and prevents accidents like the one previously mentioned and makes the world a stronger, better place.

Who would you like to thank?

I would like to thank our Principal Investigator Erin Bayne and Supervisor Richard Hedley for accepting and supporting us in their lab. I would also like to send a thank you to Kathleen Enns for being able to put up with my lab partner Kendall and I, as well as the volunteers and other grad students in our lab. Also I'd like to thank Kendall for keeping me sane and being my birdy buddy, also all the French Vanilla's. We're actually writing these at the same time, fun fact. I want to thank my parents for finding a way to send me here and sacrificing one of their last summer's with me. I really want to thank my Dadcu (Grandpa) and Grandma for funding me; I cannot express my thanks enough because this has been the best experience of my life and I am forever in your debt. Finally to all my fellow researchers and especially the girls from residence for the support and laughs throughout this whole program, I don't know what I'll do without you.

Sydney Visser



My name is Sydney Visser, and I am from a small community located close to the town of Barrhead. I have always found math and sciences to be interesting in school and in the future I hope to go into a career that incorporates those aspects of school.

Tell us about your placement.

I worked in a chemistry lab this summer, with my research focusing on forming a compound that could potentially be potent towards HIV. We formed the design for our compound using information from a previously written research paper that showed the compound they formed had promising results, and we based the structure of our compound off of that one, and we created different derivatives of that compound.

How did you Benefit from the WISEST Summer Research Program?

I benefited from the WISEST SRP in many ways. I learned how research works and what working in a lab really looks like. I also learned skills that can be applied anywhere, not just in a lab, and they will benefit me for the rest of my life. It was also a great opportunity to meet people who share the same interests as I do and who I hope to be friends with for a long time after the program is done.

What did you learn about yourself through your SRP experience?

One thing I learned about myself this summer, is that I really can do anything I put my mind to. I feel so much more confident going forward about maybe pursuing a career in a STEM field and I am sure that whatever I decide to do, I will be able to succeed. My greatest challenge this summer was learning that sometimes research does not work out the way you hope, and that's okay. You just have to keep pushing forwards and try something different, and learn from your mistakes.

Who would you like to thank?

I would like to thank my Principal Investigator, Dr. Todd Lowary for the opportunity to work in his lab, and my supervisor, Dr. Tzu-Ting Kao, for teaching me so much this summer. I would also like to acknowledge everybody else in the lab that I worked in, that helped me learn more about chemistry and research.

Amy Wohlgemuth



My name is Amy Wohlgemuth. I am currently attending Charles Spencer High School in Grande Prairie Alberta and my favourite subjects are math and chemistry. Grade 3 is the first time I can clearly remember thinking I loved math and knowing that math just made sense to me. Chemistry is a passion I have only recently discovered and one that was strengthened enormously throughout the summer research program. While working in an organic chemistry lab throughout the summer I was able to confirm my idea of pursuing a Bachelor of Science with a major in chemistry and a minor in mathematics. My path may change throughout post-secondary; however, I am certain it will remain science based. Currently I would love to work in the lab of a production facility; an idea I came aware of while touring industries as part of WISEST professional development sessions. However, in the next five years career path may take unforeseen curves. I aim to pursue my passion for science and be flexible as to where my strengths lead me in the various career options of a STEM women.

Tell us about your placement.

My summer included working with the Lundgren group, an organic chemistry research group at the University of Alberta. I researched different ways to synthesis Z-Olefins, a compound which has potential to be very useful in the production of drug like products and has previously been used in glaucoma eye drops and anticancer medications. These Z-Olefins are thermodynamically unstable and thus difficult to synthesize. I used a new technique of reducing dienes in order to synthesis these Z-Olefins. This method has been proven to work with various functionalities and produce excellent yield. My dad to day work included but was not limited to seating up reactions on the bench or in the glovebox (sealed nitrogen environment), monitoring the progress of reactions and purifying reactions.

What did you learn this summer?

I could not list off every lesson, skill and piece of information I learned this summer; however, I can summarize my lessons into three big concepts. Firstly, I learned how to network. I find this skill very valuable as I will need connections within the STEM field and I will be networking with those around me. My networking skills have already been an assets to me as I have connected with mentors at Professional Development sessions and toured their workplaces. Secondly, I learned various soft skills. Skills such as pipetting and measuring mass to making a poster and all in between. The third and most important thing, as well as most impactful thing I learned this summer, is that I should be proud of my academic ability. I should never ever again be ashamed of my academics. WISEST has taught me that I should and will now discuss my accomplishments and successes with pride in myself.

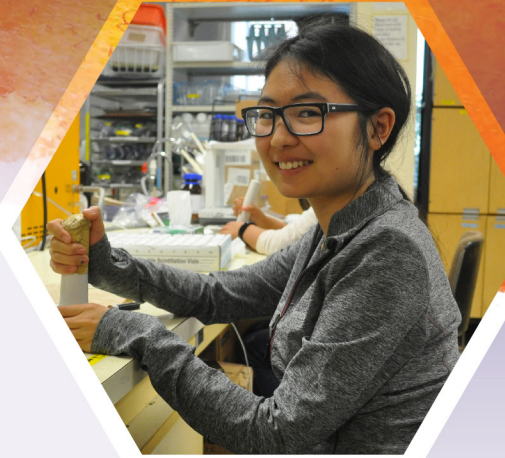
What are you most proud of after completing the Summer Research Program?

This summer I am proud of how I pushed past the limits and stereotypes set in place for me. I am proud to say that I excel at math and chemistry and that I am now confident in my academics. Following my passion despite the challenges already put in place, and those I will overcome in the future, is important to me. It is important to prove stereotypes wrong rather than be submissive to them. I am also proud of my family as this program has taught me that not every female receives the support, faith, and love I receive from my family. Their support has helped me to pursue STEM fields and I know that this career path would be a lot more difficult without the encouragement of my grandparents, confidence of my parents, and the mentors I saw in my siblings. I am happy to be proud of my family, and all that they have done for me and in support of all people in STEM fields.

Who would you like to thank?

I would like to thank the Lundgren group, specifically Dr.Lundgren, for welcoming me into their lab. As well as Raphael Dada for being a supervisor who went above and beyond; challenging, teaching and mentoring me, and Alexis Gabbey, an undergraduate working in the lab and the only other female I saw on the floor, for the encouragement and frequent hellos. Additionally, this experience would not have happened without the support of International Paper and Canada Summer Jobs. Finally, those in the WISEST office who work year long to prepare this program for the next batch of students. Thank you Deb and Angela, as well as all WISEST employees and volunteers for your time and support.

Wendi Yu



I am Wendi with an “i” because I’m special like that! I like stationery, trivia, and brownie recipes. Though I want to go into STEM in post-secondary, my favourite class in school right now is band. Maybe I’ll find a job that combines the two in the future! I applied for the WISEST Summer Research Program because I wanted to be able to experience a side of science that I was not exposed to in the classroom. I was unsure whether I wanted to go into academia in the future, and I thought that being exposed to lab work experience would be the perfect way of seeing what the environment was like and what the work would actually entail, and whether it would fit me or not.

Tell us about your placement.

In my summer research placement, I was involved in a project that looked at how different farming techniques would affect the amount of carbon that the cropland soil would hold, and the amount of greenhouse gases it would generate. The techniques that they looked at included using different fertilizers, and having different types of trees growing between fields of crops. To that end, I took the samples that had been collected from different sites, and prepared them for analysis. This involved sieving the soils, grinding them, and folding 40mg tins of them to put in the machine that tells you their carbon and nitrogen contents. On the side, there was also a lot of miscellaneous weighing and washing and labelling just to facilitate the actual science.

How did you benefit from the WISEST Summer Research Program?

I benefited the most from the authenticity of our research experiences this summer. There are obviously “researcher for a day” events going on decently often, but those do not offer the same experience as this program. A six week placement does not just show you the nit-picked fun parts of research, but inevitably the drudgery and failure too which is far more useful in helping you decide your career, and preparing you for it. This program is the best thing since sliced bread! The opportunity it offers people is so incredible - how many high schoolers get the opportunity to do actual research at a world-class institution? Especially for girls, it is so empowering and it inspires confidence in your abilities in STEM fields. Fear of the unknown is such a huge barrier for everyone, I think, so removing the “unknown” element from research for young women is important for encouraging us to pursue careers in STEM.

What are you most proud of after completing the Summer Research Program?

I have never given a formal speech before but I took the plunge and did it for the Celebration of Research. At the end, and it went really well (or so I hope)! I think that small success really reminds me of why I should take risks and seize new opportunities, because they pay off. I would recommend this program to every grade eleven student as there is nothing like having a full-time job for six weeks, in a field you may wish to pursue as a career. It’s a snippet of what life could be like in the future if you pursue this path, interspersed with professional development sessions designed to help you get there and to succeed. The knowledge and experience it provides is invaluable, and so are the friendships you’ll make with the people you’ll meet.

Who would you like to thank?

I would like to thank Emma Bowman for being weird with me together in the lab, and to Cole Gross for putting up with our combined weirdness. SHENME?