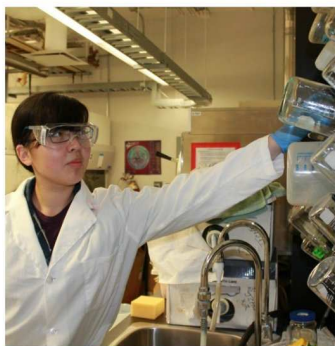
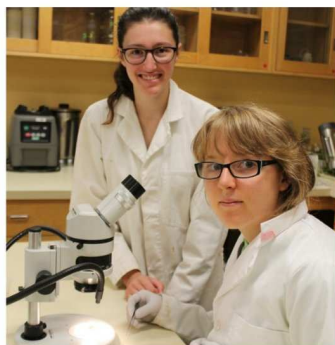


WISEST

women in scholarship, engineering, science & technology



JOURNAL OF STUDENT RESEARCH 2015

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WISEST



SUMMER RESEARCH PROGRAM 2015

The WISEST Summer Research Program is a six-week paid experience for young women and men who have completed grade 11 to gain first-hand experience about diverse science and engineering disciplines. It is an exceptional opportunity for the students to learn about innovative research, participate in current investigations, meet incredible people, and broaden their horizons. The young women experience research in science, engineering and technology, fields that are currently experiencing an underrepresentation of women, whereas the young men are placed in fields that have fewer men, such as nursing, nutrition and human ecology.

Photo: Kaylin Lynett

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WISEST ENCOURAGES DIVERSITY

In 1982, WISEST was created by the University of Alberta to find the reasons why so few women were choosing careers in engineering and science and then to 'do' something to change it. Our vision is to **empower women in the sciences, engineering and technology**. We offer programs and networks that are designed to provide opportunities and hands-on experiences that promote and nurture interest in careers that are currently experiencing an underrepresentation of women.

Community outreach events hosted by WISEST are dedicated to building a stronger, more diverse work force in science, engineering and technology. WISEST initiatives are funded through donations from corporations, individuals and the public sector.

Choices - a fabulous day of science, engineering & technology activities for 600 Grade 6 girls and their teachers.

SET - a one day Science, Engineering & Technology conference that provides young women in grades 10-12 with the opportunity to engage in hands-on experiences and learn more about careers and studies in the SET fields.

Summer Research Program - a once-in-a-lifetime six-week paid research work experience for young men and women in Grade 11. This unique program allows students to be actual researchers in fields such as science, engineering, nutrition and nursing.

Meet-a-Mentor – video conferenced experiments presented by researchers in science, engineering and technology.

Tales from the Science Buffalo - a series of interactive, hands-on classroom presentations that honour Aboriginal Ways of Knowing and introduce careers in the sciences.

UA-WiSE Network – a learning and support group for undergraduate women in the fields of science and engineering.

WISER Network - connects early-career women in STEM fields with one other and with the information, resources, support and professional development opportunities they require to advance in their careers.

WISEST Annual Guest Lectureship - raises awareness of the importance and value of diverse voices being heard in all areas of science, engineering and technology.

WISEST Annual Golf Tournament - an important fund-raising event to support WISEST in the promotion of diversity in the fields of science, technology and engineering.



WISEST's vision is to **empower women in the sciences, engineering and technology**.

Photo: Kujtesa Beka

THANK YOU TO THE WISEST COMMUNITY

The WISEST Team would like to extend its sincere appreciation to the many thoughtful, dedicated people who make our remarkable Summer Research Program possible for the students involved. Thank you all for your amazing work!

We are grateful for all of the high-school teachers throughout Alberta that support WISEST by publicizing information about our programs. It is often teachers who first spark their students' interest and enthusiasm in the science, engineering or technology fields.

We are also immensely thankful for the University of Alberta faculty and their research teams who volunteer to provide our students with a positive and meaningful experience. Their guidance and mentorship inspires and teaches WISEST students in a challenging research setting, helping them realize their full potential in world full of possibilities.

The many learning sessions that WISEST incorporates into this program would not be possible without the support of volunteers from many different sectors. Throughout the program, numerous people from the science, engineering and technology communities share their experiences and wisdom with our students and help to broaden their awareness of diverse career options available to them. They do so by giving tours of research facilities, teaching students how to create research posters, giving tips on how to make effective presentations and above all, by building the students' confidence to succeed in the science, engineering and technology fields. Volunteers are the backbone of WISEST and the key to the success of our programs.

Once WISEST has the high-school students and the in-kind support of hundreds of volunteers in place, we need the financial support of the broader community. It is important to acknowledge the financial commitment given by local industries, philanthropic groups, the Provincial and Federal governments and the University of Alberta. We simply could not present the WISEST Summer Research Program without their financial support.

Everyone's commitment to the Summer Research Program means so much to WISEST but even more to the students we interact with through our inspirational programs.

Thank you from the WISEST Team.



WISEST Staff (left to right):

Dr. Denise Hemmings,
Kristy Burke, Angela
Wilson, and Rhea Kachroo.

Photo: Kujtesa Beka

2015 PARTNERS AND CONTRIBUTORS



Alberta Education

Alberta Innovates: Health Solutions

Alberta Women's Science Network

Canada Summer Jobs

Edmonton Area Council: Beta Sigma Phi

Edmonton Glenora Rotary Club

Government of Alberta

Honda Canada Inc.

Nexen Energy

NSERC PromoScience

Process Solutions Canada Ltd.

Royal Glenora Rotary

Syncrude Canada Ltd.

Society of Petroleum Engineers Canadian Educational Trust Fund

University of Alberta

Faculty of Agricultural, Life & Environmental Sciences

Faculty of Medicine & Dentistry

Faculty of Nursing

Faculty of Science

Weyerhaeuser

WISEST Golf Tournament

Contributors

New Paradigm Engineering Ltd.

St. John's Institute

A WELCOME TO WISEST



Photo: Rhea Kachroo

Weekly seminars help WISEST students develop important leadership skills and gain insight into diverse careers and academic opportunities.

GUEST LECTURE: Dr. Margaret-Ann Armour



By Julia Tran

Photo: Rhea Kachroo

Dr. Margaret-Ann Armour is the associate dean of diversity for the Faculty of Science, and has been named one of Canada's top 100 influential women. She was the WISEST founding chair. She has been named to the order of Canada, and has received a Governor General's Award.

When I learnt of Dr. Armour's background, I was taken aback at this opportunity to meet such a highly respected role model. I was truly honoured and delighted to meet her. Certainly if it was not for Dr. Armour and the other founding members, WISEST would not have existed.

Dr. Armour's presentation focused on nurturing and maintaining our passion for science. Effectively, she described various aspects including supportive communities, engagement and diversity. She also emphasized the need for personal skills such as: dreaming and planning, communication, seeking mentors and advocates and being cooperative in a team. This information was not presented blandly, though: Dr. Armour intrigued our attention by informing us of her own journey in the field of science.

One particular moment of Dr. Armour's presentation that really stood out to me was when she specifically stressed the need for women in science: "We need you." She made a notable effort in expressing the need for diversity as a key for successful science. I believe this was a major confidence booster for the majority of the other students in the room along with me. It was motivating to hear someone believe in us so much.

One particular mentor of Dr. Armour's also caught my interest because of her philosophy that is captured in this quote: "Doing science as if people matter." – Dr. Ursula Franklin. I believe having the work you love contribute to something that helps other people is a very special and meaningful opportunity for scientists.

Sincerely, Dr. Armour wanted for us, her audience, to be able to embrace our eagerness and interests in order to obtain that satisfaction of working in science. Understanding methods in encouraging that motivation was also very important. She was extremely inspirational and I would like to thank her for sharing her time and experiences with the WISEST students.

WISEST 101/LIBRARY ORIENTATION

By Lauren MacDonald

Three days into the program and a vast majority of us had yet to overcome our intimidation and nervousness. Many had never experienced the University campus in this setting, nor had we been in the lab environment like we were. We all had unanswered questions and unfading fears. WISEST was well aware of our inexperience and set us up with an afternoon full of resources and reassurance.

WISEST first brought in four student volunteers from previous years and sat them down to answer all our questions. This was their way to sooth our fears and prepare us for the upcoming six weeks. From engineering to chemistry, all our concerns were touched on. Things such as lab experience, writing reports, networking and everything in between, were discussed. We were all reassured as the girls explained their own period of nervousness at the beginning of the program, similar to ours at that moment and how it had faded.

The other part of the afternoon was left to Elizabeth Wallace from the Cameron library. She was to present to us the inner working of the library system and assure us that we could access resources that would be useful to our projects. Elizabeth directed us through the extensive databases that the libraries held. She explained to us how to access the resources not only in the library, but the many scholarly journals and articles found in the online databases. Rest assured, by the end of the afternoon, we were all a little calmer.



Photo: Kujtesa Beka

Social Science Challenge

By Danielle Ma

It was the first official day of the WISEST Summer Research Program, and everyone was buzzing from their compelling experiences working in research labs. As the afternoon came, we all headed to the Central Academic Building, excited about what was in store for us this time. Our minds flowed freely with ideas about what this challenge could be, ranging from complex to simple.

Upon arriving, we were quickly introduced to what the challenge entailed: a hydraulics challenge, with the task to create a device that was hydraulic-powered that could either lift a plastic cup of water or tip the cup over. The hydraulic power came from syringes attached to tubes that were filled with water. We were separated into groups and Rhea gave us quick background information on hydraulics and a template to help us get started. The materials that we could use were: cardboard, scissors, elastic bands, push pins, tape, three syringes for each group and tubes. This challenge proved to be more difficult than at first glance, but really encouraged communication between all members of the group in order to come up with ideas. Teamwork was absolutely necessary in constructing the device and the room was an enjoyable competitive environment, filled with laughter and cries of success or sorrow. Everyone became more familiar with their group members and each group shared a certain sense of pride within themselves upon the success of building a hydraulic-powered device, a pride that brought us closer together.

After, we had the chance to see each group present their device and see a demonstration. Everyone's devices were so unique, and it was amazing to see how creative people could be. All in all, it is safe to say that many of us greatly enjoyed the Social Science Challenge because it was a real demonstration of different perspectives and ideas from different people coming together in a strong display of teamwork. It was just what we needed to help us adjust to the program and to relax for an afternoon of pure fun and competition. It was the beginning of lasting friendships that we would make and an activity that put smiles on all our faces, while being inspired by the power of teamwork and creative ideas.



Photo: Kujtesa Beka

LEARNING OPPORTUNITIES

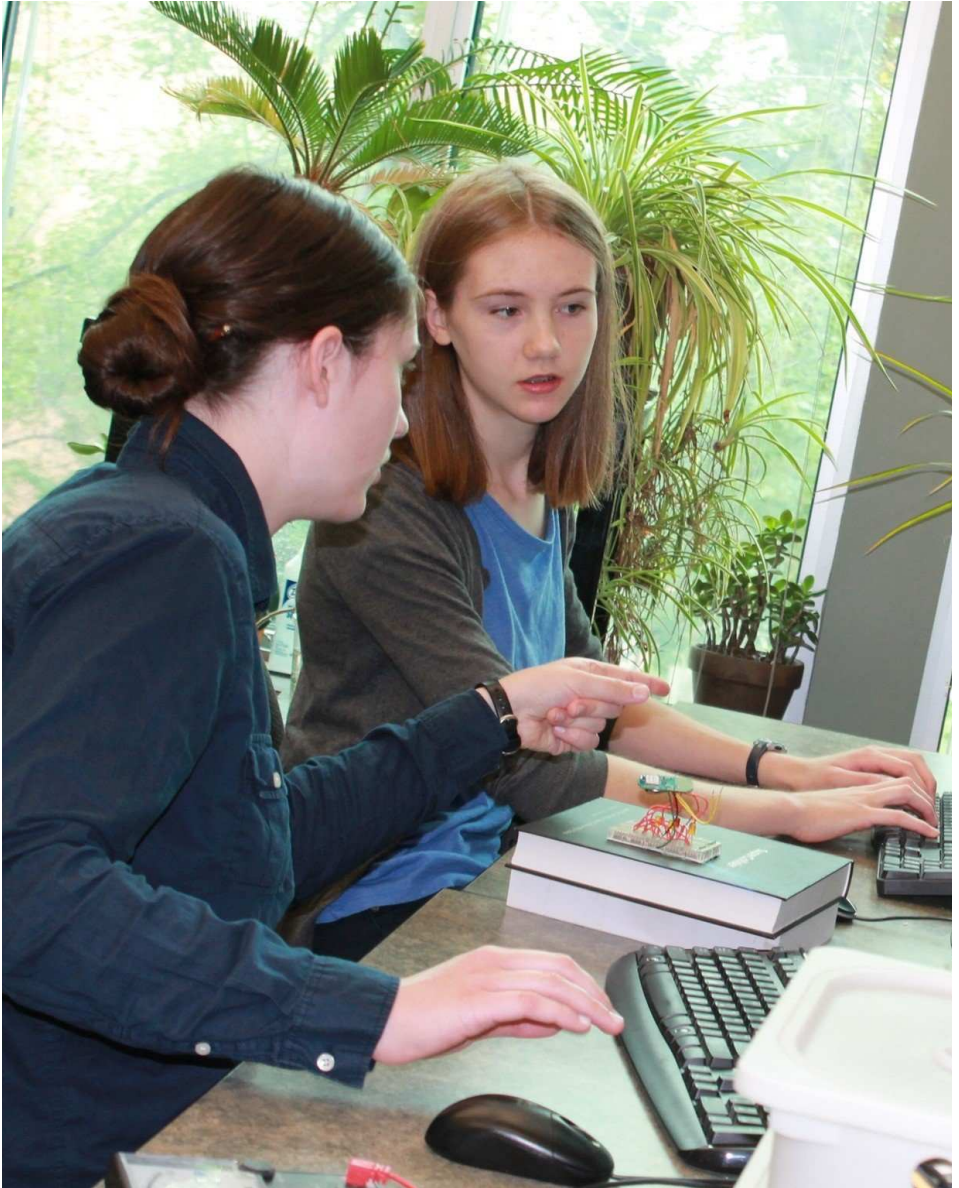


Photo: Kujtesa Beka

The WISEST Summer Research Program is more than just a summer job. It is full of opportunities to help students learn and to grow as individuals.

EXPLORING U OF A RESEARCH: NANOFAB



By Ritika Mandi

Photo: Kujtesa Beka

Since I was a child, I was always intrigued by the idea of minuscule things. I think as humans we all are fascinated by what is out of the ordinary, whether it's too vast to visualize or too miniature to see. Ideas, rather than evidence, can confuse us beyond imagination and make us exercise our minds. Life is all about perspective, and in the prospect of the endless sea known as the universe it is astounding that Earth, the land we know to be so massive is as insignificant as a speck of dust. Yet, the seemingly insignificant speck has the potential to nurture the lives of billions and have a meaningful impact.

The tour of the NanoFAB at the University of Alberta illustrated a similar phenomenon. In the NanoFAB, tiny devices are developed with the smallest component being a hundred times smaller than the width of a strand of hair! At one point in the tour, the director told us about a nanoscale bridge that was designed, which had a length that was 200 times its width. The device was tested to get higher peaks for resonance frequencies, which could further be used in telecommunications. He also mentioned how a bridge such as that could not realistically be built in the real world. Just as Earth is in the universe, the micro sized structure could be usefully applied in a way that nothing 'ordinary' in life could.

As the tour progressed, we were able to view clean rooms and discuss the building's maintenance needs. Clean rooms require constant air filtration and pressure control systems, head to toe body gear for entry, and special yellow lighting, as some lighting can damage the devices and the tiniest dust particle can have a grave impact. The purest form of water is used, and the room rests on its own foundation, so that vibrations cannot alter the structures.

The NanoFAB depicted the precautions necessary for protecting a seemingly insignificant device, similar to the precautions necessary for protecting our seemingly insignificant planet. The tour was a remarkable experience and I would like to thank the WISEST team and the NanoFAB directors for giving WISEST participants the opportunity

RESEARCH IN ACTION: QUANTIAM TOUR

By Tina Friesen

The Summer Research program provides many opportunities to learn about different careers in science and engineering. Before Quantiam, I had no idea how important it can be to coarse the inside of pipes. The trip to Quantiam also helped me understand the different ways a researcher can be employed.

Quantiam Technologies Inc. is a company that coats the inside of a tubular structure and surfaces to reduce wear and corrosion. In turn, this process reduces energy consumption and gas emissions. Quantiam coats surfaces for use in petrochemical, oil and gas production, and aerospace defense. The research and innovations they have in mind include converting pollution gases into helpful gases as well as alternate energy materials.

When we first arrived at Quantiam, we were led to a conference room where we were introduced to important women working in the company. We were shown a small video of what their company was about and shown two pieces of a pipe. The cleanest looking pipe had their coating, while the other pipe (which had a lot of buildup) did not have any coating. They also stressed how much the company values safety. That being said, we were given safety glasses before the tour to protect our eyes from radiation. Some of what we were shown included: their lab, lab equipment and a peak into a warehouse where the surfaces were coated and readied to be transported. At the end, we were allowed to ask any questions we might have for the women giving the tour.

What interested me the most on this tour was learning different ways a researcher could be employed besides just researching at a university. I really enjoyed being able to ask questions at the end of the tour. I had no idea what it would be like to be a researcher for a company until we had the tour. I also enjoyed seeing the different types of equipment they used, such as the scanning electron microscope.

Photo: Kujtesa Beka



"The trip to Quantiam also helped me understand the different ways a researcher can be employed..."



RESEARCH IN ACTION: SYNCRUDE

By Kaylin Lynett

Being from Fort McMurray, I like to think I know a lot about the oil sands. But after going on the Syncrude Research Facility tour, I realized how little I actually know. For example, did you know that after the bitumen is separated using hot water it is diluted with naphtha before it goes through a series of centrifuges? Over 99% of that naphtha is recovered and can be reused!

When people think of oil sands, many think about an anti-environmental corporation, but they in fact are not. The Syncrude Research Facility was no exception. Since Syncrude was the last stop on the bus, the anticipation grew thicker and thicker as we dropped off each of the groups. I remember feeling this massive “wow” factor when I walked in. We saw an aquarium with three fish swimming in water that Syncrude had used and treated, which demonstrated that the oil sands are reclaimable.

After receiving our name tags, we made our way to the boardroom, where our tour guide showed us a fascinating video about how Syncrude makes their oil. We proceeded to get our hard hats and lab coats, and then we set off to tour the research facility.

The most exhilarating part of the tour was hands down learning the process that oil goes through. It was cool to learn how oil goes from being crude oil to bitumen and finally slurry, which is sent through pipelines. We got to see all kinds of cutting-edge machinery, such as a Coker unit, and a machine that converts heavy bitumen into light crude oil. When inside the Coker, the bitumen is heated until it cracks into smaller bits and all that is left is hydrocarbon gas, naphtha, and gas oil. Going back to Fort McMurray, I know that I will have a much deeper understanding of how oil is produced. Thank you Syncrude for giving us this amazing opportunity to further our knowledge!

RESEARCH IN ACTION: GILEAD INDUSTRY TOUR

By Alana Tollenaar

One of the most memorable Mondays of my experience with the WISEST Summer Research Program was Monday, July 20. On this particular afternoon, WISEST students were given the chance to visit one of four select research facilities in the Edmonton area. I had the privilege of attending the tour to Gilead Alberta, a pharmaceutical company invested in the research and development of innovative medicine.

Our journey began with some background information about Gilead and its many roles, followed by a walking tour of the facility where we were exposed to the processes by which the company carries out its research as well as creates the many different products they contribute to the pharmaceutical market. Gilead is unique in that their work is centred around creating solutions in areas of unmet need; HIV/AIDS, for example. We concluded our time at the facility with an open networking period where we got the chance to speak to any of the staff members present in the conference room about their positions within Gilead. The backgrounds of the staff were diverse; their educational backgrounds ranging from technical degree to PhD in fields varying from chemistry to engineering. Never would I have thought that people with so many different career paths would all be working for the same company.

Because I have never really had a particular interest in the biomedical field, I wasn't sure the Gilead tour was going to be for me, but it ended up being one of the most valuable experiences during my time in the program. Not only was it eye-opening to be in such an innovative and effectual facility, but I also realized that there are so many aspects to every industry that there is bound to be a career for me in whatever field I choose to go into.

RESEARCH IN ACTION: MICRALYNE INC.



By Julie McIntosh

Photo: Kujtesa Beka

Near the middle of the WISEST summer research program, the participants were given the opportunity to tour one of three local industries. The group I chose visited Micralyne, a microelectromechanical systems (MEMs) foundry, where small electronic and mechanical components are made in labs suited for microfabrication. The tour consisted of a trip through the labs, seeing scientists and technicians building devices and a question and answer session with a member of the staff.

I think everyone in our group was most excited to see the inside of such an advanced laboratory, and Micralyne didn't disappoint. A few lucky WISEST students got to try on laboratory suits, complete with goggles, gloves, full body coverings and boots. The tour took us as close as possible to the action in the lab, and we got to see machines and processes up close (but behind a glass wall).

The most eye-opening part of the foundry tour for me didn't actually occur during the tour of the labs however. My mind was blown during the question and answer session when our tour leader mentioned a project the foundry had worked on that sent a small moisture detection chip on a probe to detect water in extraterrestrial bodies. The idea that the technology that I was seeing around me had the potential to help in making such large scale projects happen was the biggest eye-opener for me and really showed how valuable and exciting work in a lab can be.

In these ways I got a deeper picture of what impact science can have on the world, even at the scale of a local company. I left the building feeling more excited about what a career in the sciences could offer and with a greater respect for those who are behind the innovative technology that keeps us moving forward.

**~An afternoon at the Edmonton Research Park~
Quantiam Technologies Inc.
Syncrude Canada Ltd.
Gilead Industry Tour
Micralyne Inc.**

WISEST NETWORKING FAIR



"One of the most important lessons we came away with after the fair was that there is no one right way to develop a career."

Photo: Kujtesa Beka

By Tehzeeb Sayed

While in high school, we are constantly thinking about our careers, and though we may have many ideas about what we want to do, the questions of how to get there and what those jobs entail remain unanswered. But at the WISEST Networking Fair, we were able to do just that by talking to professionals in a variety of careers.

The WISEST students were divided into four groups with four to five mentors in each group to answer questions. The diversity of careers simply in my group was astounding, ranging from the study of snowshoe hares in northern Canada to the improvement of dams to control storm waters. The professionals present represented a variety of fields and experience levels and as such, they each had different valuable perspectives to offer on many science-based occupations. We were able to ask about not only the specifics of a profession, but also about the many opportunities available to discover new paths.

One of the most important lessons we came away with after the fair was that there is no one right way to develop a career. There are many ways to a single destination and one's goals can change as interest changes. A particularly memorable story by a role model explained how she chose to be a water resources engineer after experiencing a flood, instead of becoming an artist as she had originally planned. During the large gathering of all the students and role models after the group sessions, I discovered that nearly all the professionals had experienced such changes, both big and small, in their careers.

The Networking Fair was an amazing opportunity to meet people in a large range of careers and it couldn't have taken place without the gracious professionals who took the time to answer our detailed questions and introduce us to their careers. In the words of one role model: "It's answering the small questions that allows us to see the big picture."

EFFECTIVE PRESENTATIONS

By Sarah Song

A presentation is only as good as the delivery. The key to delivering an effective presentation is not only through the transmission of the message, but also through the reception of the message. It was through an engaging seminar dedicated to the intricacies of public address that we learnt to deliver a message with potency. Throughout the session, four impactful speakers probed at the inner workings of the art of communicating with power and confidence.

With a commanding voice, Ingrid Pederson, our first speaker, laid the foundation for harnessing effective presentation techniques. Although there were a variety of useful tips, each focussed on audience appeal by prioritizing the topic and using visuals to enhance the message. “Be relentlessly pleasant,” Kim Hauer stressed during her humorous spiel on impromptu speaking. As she introduced strategies such as the O.R.E.O. method, the importance of treating your impromptu response as a mini-speech with a proper introduction, body, and conclusion, was emphasized. To further our understanding of public speaking, Martha Vega-Smith detailed the mechanisms of providing and receiving feedback. She tackled the need to be specific and to focus on the behaviour, not the individual.

The new skills we had acquired were put to the test. As groups of three, each had a moderator who appointed someone in favour of, and someone in opposition of a predetermined topic. Although impromptu speaking is infamously frightening, everyone argued their respective positions surprisingly well. I, along with several of my WISEST peers, had the additional challenge of playing devil’s advocate. It was undeniably difficult to question your own opinion; however, it was extremely valuable realizing that perhaps our answer was incomplete in the first place, that there is another side to the coin we had not seen before, regardless of our reluctance to admit it.

Finally, Dr. Stephens returned with her expertise on presenting research posters, tying a graceful knot to an informative afternoon. Through this well-crafted, thorough, and interactive workshop, we gained insight into the means of success by expressing yourself clearly, confidently and concisely. Armed with a new appreciation for language and voice, we felt more prepared than ever for our upcoming poster presentations. We not only gained useful resources key to our roles as WISEST Ambassadors, but also to our future professional careers.



Photo: Kujtesa Beka

WISEST: THE MALE PERSPECTIVE

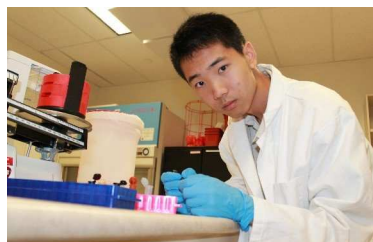
By Kai Zhang

One would assume Women in Scholarship, Engineering, Science and Technology would only be for women, however this assumption is incorrect as men are also a part of the program. Because the word “women” is in the WISEST acronym, I thought that young men could not be in the summer research program. I scoffed at my friend who suggested this idea to me. However, by pure coincidence I later stumbled upon their website and much to my embarrassment learned that it was so much more than empowering women. Its underlying values seek to promote gender diversity in underrepresented fields so that all genders have opportunities to experience the miraculous paths that scientific research can provide.

To gain new insights into underrepresented fields, the other male WISEST student from this summer's cohort was placed in pediatrics while I was placed in nutrition. Both of these were fields primarily dominated by women, creating an initial sense of discrepancy. However this impression was short lived because research became the principal focus and the arduous pursuit of knowledge was unbiased to gender. Perhaps the most pivotal insight I gained was that intellects seek their aspirations with such tenacity that they shatter both social and gender barriers.

Not only was I outnumbered by women in my lab, but also in the summer research program itself. This made me rather anxious, yet by meeting with my peers in the program who are primarily women, I have learned that we shared the same initial concerns. Would it be hard to fit in? Would I be judged? When I reflect upon these concerns, they seem trivial because in the end being a man in the program was irrelevant. What united us was that we were all people who strived to learn more through science.

"[WISEST] seeks to promote gender diversity in underrepresented fields so that all genders have opportunities to experience the miraculous paths that scientific research can provide."



LUNCH N' LEARNS

UofA Q&A

By Emily Redford & Sheri Schmidt

During the WISEST Summer Research Program, participants got to experience multiple Lunch 'n' Learn sessions. One of these sessions included the U of A Q&A. This session informed students of the myths of university and allowed for the high school students to connect with and ask questions to U of A Ambassadors. The students were able to ask questions about anything from walking around campus to what classes to take.

This Lunch 'n' Learn was particularly helpful to the WISEST students because it gave them a chance to know what life is really like in university and separated the myths from the facts. A common misconception about university is that it is difficult and expensive to change your path once enrolled. Throughout the lunch the students learned the contrary; it is quite common to change courses, can be easily done and is not looked down upon. The summer students also learned that not all classes have hundreds of students; in fact 80% of the classes have less than 50 students.

University is thought of as a big scary step for high school students, full of responsibility and change; this session allowed the high school students to talk with the Ambassadors and realise that, yes it is a big change; however, it is a great change and amazing experience for many.



"University [...] is a great change and amazing experience for many."

Designing a Research Poster

By Kendra McQuaig

Throughout the summer, WISEST provided the summer research students with various different lunch and learn sessions which prepared us for upcoming Professional Development seminars we would encounter the next Monday while others provided us with helpful insight and tips for the future. But the most helpful of these sessions was the one offered by Dr. Stephen's called designing a research poster. She was confident and very professional, telling us everything from what content to include, to organisation and overall appeal of the poster.

WISEST students had the privilege not only to learn from someone who had made many research posters but who now also graded them as a professor. Dr. Marilee Stephens gave insight on the do's and don'ts of research posters and how to capture your audience with a minimal amount of text and an emphasis on graphs and pictures. She also provided us with some of her own personal tips and tricks like putting the purpose as its own heading so that people can understand the real world application of your project thus gaining their interest.

I felt that this session provided me with the guidelines I needed to prepare my poster. Having never made a research poster I felt that the requirements were very vague and I was concerned about not doing it correctly but this session helped me understand the purpose of a research poster along with how to be unique without straying from making the poster professional.

"...this session helped me understand the purpose of a research poster."

Photo: Kujtesa Bekka



LUNCH N' LEARNS

The Art of Networking

By Veronica Salm

Networking is an important skill to have; one that has far wider applications than simply connecting WISEST students with professional mentors. For example, people network to get their children into a good school, to find a new apartment in a great location or to discover exciting business opportunities. Because of this, the Art of Networking Lunch 'n' Learn is one of the most valuable experiences the WISEST summer research program affords its students. At the very least, I think I can speak for many of the WISEST students when I say that I was glad to get the chance to learn some networking tips and tricks before the big Networking Fair. After all, networking essentially involves approaching a complete stranger whose career you admire and walking away with their phone number or email address. It can certainly be a daunting task.

Fortunately, thanks to the Art of Networking Lunch 'n' Learn, we were able to learn how to be calm, confident, and collected networkers. During the session, we learned that networking is about being genuine and sincere, asking good questions, and forming mutually beneficial relationships with people we admire. We also learned that it is important to find something in common with those we are talking to. Later on, a video we were shown about "power posing" taught us that a simple change in posture can affect the way we perform in the eyes of interviewers and potential mentors. Most importantly, we learned that networking is really about forming connections with people and figuring out what we can do for them, and not just what they can give to us. Overall, this Lunch 'n' Learn was a success, and definitely helped prepare us to use our newfound skills both at the Networking Fair and in our lives beyond the WISEST Summer Research Program.

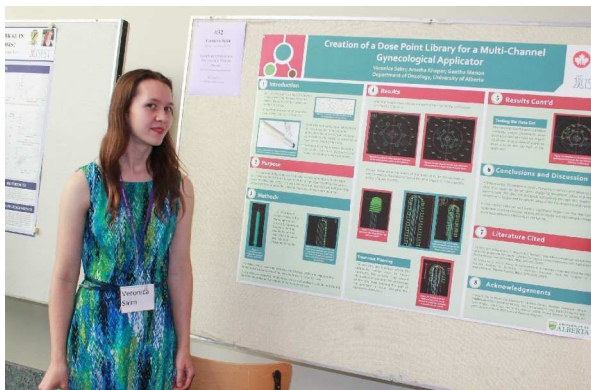


Photo: Kujtesa Beka

LUNCH N' LEARNS

Writing a Professional Report

By *Melina Lee*

Another Lunch 'n' Learn has yet again brought us new and helpful information. In this particular session, how to write a professional report, was one that I believe most WISEST students would be familiar with. Our curiosity for this awesome program has lead us to the student journals on the WISEST website to learn more about the fun that has yet to come.

The speaker of the session was Angela Wilson, who directed us through the procedure on how to write a focused and clear report. I knew that the report was the time for us to spill out our amazing experience of the program; however, there was also the need to make them informative to our peers, family, sponsors and future WISEST students about the ways this program successfully influenced us. The session made me realise that the report should also include elements of self-reflection, such as " were there any changes to my perceptions?"

Aside from the focus of the report, we were also given a mini refresher about common grammar mistakes that I enjoyed because they were mistakes that I would have committed if not given a brief reminder. The most interactive and enjoyable part of the session was critiquing and learning from the report examples. Everybody would voice their opinions on what made the reports good and bad, giving me an insight on how I can make my report successful. This Lunch 'n' Learn was a really fun and informative way to learn about report writing.



"The six weeks that were spent in the WISEST program, were full of incredible opportunities..."

Photo: Kujtesa Beka

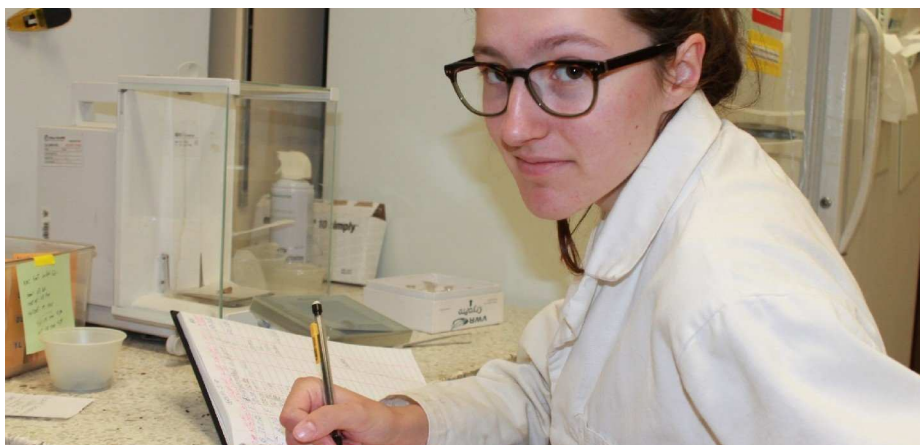
Sharing the WISEST Experience

By *Michaella Chemello*

After completing almost six weeks of the program, WISEST students came together for one final Lunch n' Learn. This was their final opportunity to meet new WISEST students, catch up on other research projects, but most importantly, it was a time for each individual WISEST student to reflect on the six weeks they had spent in this life changing program. A handout was provided with question prompts to start the reflection process. The students had time to think about their professional skill development, all the amazing opportunities to interact with inspiring role models, what university life is all about, the increased awareness of careers in science, engineering and technology and the impact of being around like minded people. These questions also helped the students to think about some of the ways they might answer questions asked by their school come the new school year. This reflection period offered students time to truly think about everything they have achieved, new friends they have made, what they have gained from the experience and what they will take from it.

After having individual reflection time, students formed small groups and shared their thoughts with other WISEST students. Sharing their thoughts with each other helped solidify the wealth of knowledge gained and the amazing experience they had over the past six weeks. The six weeks that were spent in the WISEST program, were full of incredible opportunities, experiences, successes and frustrations. This reflection time allowed us to remember the amazing summer one last time.

LIVING IN ST. JOHN'S INSTITUTE



By Ciara Verstrate

Photo: Kujtesa Beka

Living in residence gave the Summer Research Program an entire new dimension. It gave us the opportunity to grow in our independence and learn to live alongside others. I remember walking into St. John's Institute on the first day with nerves twisting my stomach due to the prospect of being on my own for six weeks. Then, it had seemed like such a long time. Now – as most of us in residence would agree – it's not nearly long enough.

We have all come together as a family here in residence. If we aren't together we're texting and phoning one another. We make sure to always help each other out; it's incredible knowing that nine people have your back. We have listened to each other's rants; rushed over to each other's rooms to help prevent near fashion disasters; given each other advice when it came to designing our posters and made sure that no one went out on an adventure alone.

Our resident advisor, Brittany, made sure our time here in residence was a positive experience. She kept us entertained by always having activities planned for us. From the Muttart Conservatory and a Paleontology tour, to Crankpots and West Edmonton Mall, we never had a dull moment. On top of her efforts to plan activities, Brittany made sure to always be available to us. She was always there when we needed her and did an excellent job of being our stand in mom, big sister, role model and most importantly, our friend.

Along with us WISEST students staying at St. John's, there were four HYRS students and their resident advisor. We adopted them into our family and include them in our activities. At dinner we sat together and shared stories from our day, bonding over our shared love of learning.

Overall, our stay in residence was an unbelievable experience which provided us with an idea of life away from home. I feel as though we're better prepared for university life now. I am so thankful that I got the occasion of living with these personable individuals. I will miss them all very much.

SPECIAL EVENTS



Photo: Kujtesa Beka

The Celebration of Research

By Zainab Azhar

A whole six weeks and the WISEST 2015 students have finally made it. Six weeks, yet it still seems as if Orientation was just yesterday. The Celebration of Research. The excitement was just as strong as when we all received the call from the WISEST coordinators that started it all. However, this time, the excitement stemmed from what each student researcher had finally accomplished. The learning that was gained, the hard work that was put in, the determination each student developed throughout the program - it all led to the final product: six weeks of research represented by the posters that were displayed and the information bursting from every student to any intrigued passer-by.

Every aspect of research had been visited by the student researchers throughout the six weeks. Running tests, collecting and analysing data, designing and constructing were all learned and performed by every student, whether their research project was based in engineering, the sciences or technology. What remained, however, was the part where all the knowledge gained by each WISEST student researcher was presented. Lab supervisors and members, as well as, the students' parents and siblings at last, could see the final product of each research project - the individual paths taken to reach The Celebration of Research were all shared with every eager spectator. To come so far in such a seemingly short span of time was proved to be quite possible by the immense accomplishments of every striving student.

As the last day of the 2015 SRP (summer research program) slipped by, audience and students alike rushed to make the most of every fleeting moment and to reflect on the whirlwind of support received by every lab and family member. The snapping of cameras, hugs and good-byes, setting up and cleaning up, every second had lead up to the last. To the other side of the city or across the province, too soon, every student researcher had to head back home; all with the resonating thought that the WISEST SRP 2015 had set a stage for self-growth and learning in an unexpected and extraordinary way. Every student walked out a little smarter, a little more sophisticated and a whole lot more confident.

*Nobody trips over mountains. It is the small pebble that causes you to stumble.
Pass all the pebbles in your path and you will find you have crossed the mountain. - Anonymous*

Being a part of WISEST was a series of pebbles to pass - whether by stumbling or leaping - that will no doubt aid every student to cross the mountains that will be faced in the coming future.



"Every student walked out a little smarter, a little more sophisticated and a whole lot more confident...."

Photo: Kujtesa Beka

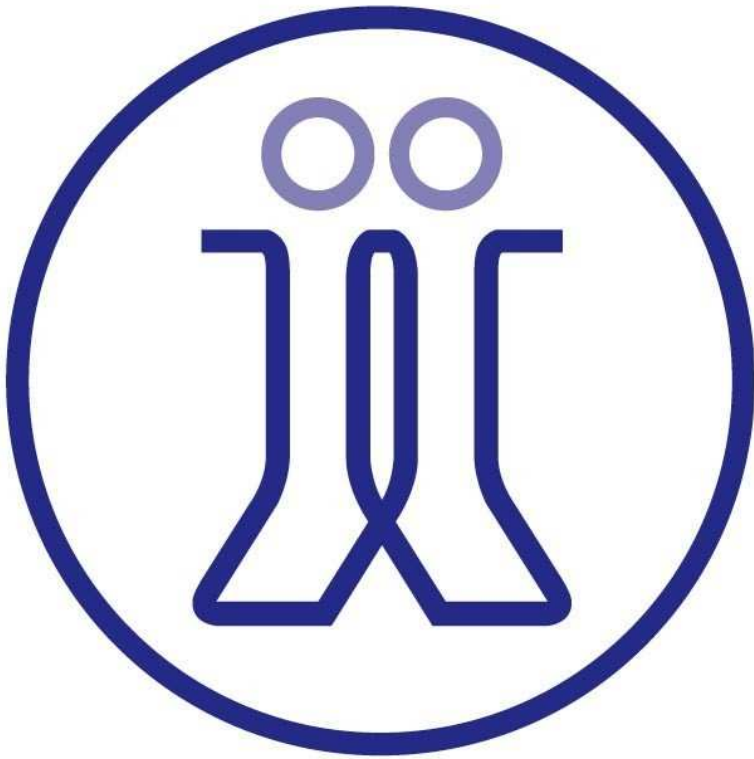
The Celebration of Research

Finally, during the afternoon of the final day of the program, students are able to share their successes with their friends, family and members of the community. Visitors are invited to view students' work, to ask questions and to learn more about this transformational experience. Representatives of sponsoring organizations are also invited to see just how much their contributions have impacted these young people.

Student researchers, **Emily Redford**, **Kaylin Lynett**, and **Emma Dodyk** gave wonderful speeches to highlight some of their experiences. The WISEST team was extremely proud of the high calibre of work conducted by these 40 students.

Photos: Kujtesa Beka





STUDENT REPORTS



*Photo:
All student portraits (pg 32-71): Kujtesa Beka*

Zainab Azhar

Supervisor:
Dr. Jason Carey

Department:
**Mechanical
Engineering**

Sponsor:
**Alberta Innovates
Health Solutions**



With the final couple days of the research program just around the corner, without a doubt, the last five weeks have been unforgettable. Although it has only been but a glimpse into a life of research and endless learning, it is safe to say that the experience can easily be tagged as life-changing. Knowing that I have now actually been able to take part in a research project and been exposed to different fields of study, the realization that there are so many options out there has become so much stronger.

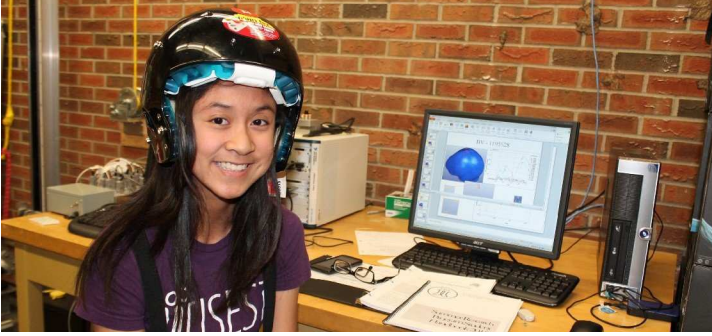
Throughout my research I have learned the significance of something that everyone takes for granted: the human hand. To lose the sound functioning of a single hand can have an immense impact on everyday interactions in one's life. Those who suffer ailments such as stroke or paralysis need to undergo therapy in an attempt to regain hand function. Promising new technologies to make patient rehabilitation more efficient have emerged in the form of hand exoskeletons. My research objective was to design and construct a hand exoskeleton prototype allowing for five different grasping patterns.

In order to construct the hand exoskeleton, it first needed to be designed using a computer program called SolidWorks. All of the parts were designed, measured and assembled in the program. 3D printers were used to print the parts in a material similar to everyday plastic, called polylactic acid (PLA). The PLA components allowed for lab-feasible construction and design testing. An electrical component also was put together to control the exoskeleton and add grasping patterns. Using EMG (electromyographical) signals to actuate servo motors attached to each finger along with coded Arduino software, five grasp patterns were made possible and a hand exoskeleton was created. In theory, the prototype can be used in future research to study different complexities in designs of the technology as well as accessibility for patients in need of hand-related rehab.

Research is a long and arduous task. Designing, constructing, testing, collecting and then repeating, all seems to take too much time. When you look back though, it is amazing how much has been accomplished and that there is potential for that research to go towards groundbreaking applications in the future. A huge thanks goes out to my lab partners including Jonathon Schofield and the principal investigator, Dr. Jason Carey, as well as, Ms. Thurber from Alberta Innovates Health Solutions for sponsoring my student researcher position with WISEST this summer - this research experience has been so much more than I expected.

Truly, learning is not a concept one would generally associate with summer break. However my time as a student researcher in the WISEST 2015 Summer Research Program has proved that learning comes into play in all sorts of ways - from meeting new people, teamwork in the lab and actually working in a research lab, to the weekly Lunch 'n' Learns, sharing laughter with fellow WISEST students and getting a taste of university life. I have learned something from every moment and memory.

Jocelyn Bartolome



Supervisor:
Dr. Christopher
Dennison

Department:
Mechanical
Engineering

Sponsor: Society of
Petroleum
Engineers
Canadian
Educational Trust
Fund

Although the topics are challenging and daunting, I've always been interested in math and physics. As a kid, I would climb up to the top of my bunk bed and use pulley systems to create an elevator for my stuffed animals. As well, I would work on my math homework instead of practicing piano. On top of that, I spent quite a bit of time memorizing algorithms in order to solve a Rubik's Cube. I heard about the WISEST Summer Research Program from a friend of mine, Brynn Lewis, who I had met through the drama department of my school. She gave my physics class a presentation on her experience as a WISEST Student Researcher, and I was instantly intrigued. It was the perfect opportunity to explore diverse career options as it would help me determine what I would like to study in University.

I was nervous when walking onto the University grounds for the first time, especially on engineering territory. The formulas engraved into the buildings, and the familiar engineering logo made me feel as though I was not worthy enough to be a part of this community. Though, my negative thoughts quickly vanished once I was greeted by my supervisor Samantha MacGillivray and my Principal Investigator, Dr. Christopher Dennison.

Dr. Dennison's Biomedical Instrumentation Lab focuses on the prevention of head and brain injuries, exposing me to helmet testing equipment, engineering software, and the intricacies involved in research. During my time in the lab, I was working on two different projects. The first project involved work comparing the kinematic data of two types of accelerometers. The acceleration data that comes from these accelerometers is a good indication of brain injuries, such as a concussion. The second project analyzes the effects of double impacts on the head in prediction of a life-threatening brain injury known as a subdural hematoma. This work involves experimental drops using the lab's drop tower, and analyzing the acceleration data that occurred from these drops.

Outside of the lab I had numerous opportunities to learn about the university, different areas of study and the importance of diversity within the workforce. I have been inspired by guest speakers, current university students and role models as they have encouraged us to be open-minded and to take risks. My favourite professional development seminar was the Networking Fair where I got the chance to socialize with successful women and hear their stories. Most importantly, I've learned that it is okay to be unsure of the future since the circumstances in life are constantly changing.

The Summer Research Program has been an incredible learning opportunity, and I am glad to have been a part of it. I would like to thank my teachers for helping me develop my passion for sciences. Additionally, I am extremely grateful for my sponsors and the WISEST coordinators for providing me with this experience. Last, I would like to thank Dr. Dennison for welcoming me into his lab and especially my supervisor, Samantha MacGillivray, for being a mentor, role model, teacher and friend.

Michaela Chemello

Supervisor:
Dr. Suzanne Krista

Department:
**Chemicals and
Materials
Engineering**

Sponsor:
Nexen Energy ULC



Five years ago if someone asked me what I wanted to become when I grew up, I would have said a teacher. Things changed once I entered high school. Taking the math and science courses opened my eyes to the many possibilities of careers. When one of my teachers recommended me for the WISEST Summer Research Program, there was no doubt in my mind that I wanted to do it. Coming into the program, I was excited and ready to begin a new journey. I didn't know what to expect of the program, but I hoped it would help solidify my career choice and provide me with an experience of a lifetime.

Over the course of the six weeks, I was working in the department of Chemical and Materials Engineering under Dr. Suzanne Kresta. I helped my supervisor, Nitin Arora, and his research partner, Colin Saraka, examine the effect of demulsifier and mixing parameters to aid bitumen froth clarification. Once a week, I would perform an experiment and take samples at different times and heights to better understand the settling of water and solids in bitumen. I spent most of my time analyzing many samples under the microscope, looking for different indications of water and solid aggregates such as chains or clusters and their types, (water-water, water-solid or solid-solid). I also performed Karl Fischer analysis on some of the samples to test for the percentage of water. The results obtained from both the microscope and Karl Fischer Analysis will enhance the understanding of water and solid removal and improve it further for downstream upgrading.

Not only did I learn an endless wealth of information in the lab, but I was also exposed to new knowledge through the WISEST Professional Development Seminars and Lunch n' Learns. Through these sessions, I was able to expand my professional skills and knowledge in fields that are underrepresented by women. I had the opportunity to go on an industry tour to Gilead and learn how items are manufactured in the lab and applied to the real world. At the Networking Fair, I had the chance to talk with inspiring women who currently work in these male dominated fields about their careers choices that interested me. They were able to answer a lot of questions, which increased my awareness about these fields and helped me narrow down the fields that interest me.

The WISEST Summer Research Program was everything I had hoped for and more. I have gained so much valuable information throughout my six week placement that I will carry with me for the rest of my academic pursuits. This program has helped me solidify my career choice and will open many doors. I would like to thank Nexen for their financial support during this once in a life time experience and WISEST for offering me this opportunity and inspiring me in my future academics. I would also like to show my appreciation and gratitude to Dr. Suzanne Kresta for allowing me to work in the lab and Nitin Arora, my supervisor, for mentoring me and answering my multitude of questions while not overwhelming me with information. I would like to thank the others in the research team, Colin Saraka and Akshay Bhalerao for welcoming me in the lab and always being supportive. Without all of you, this experience would not have been possible.

This opportunity is one that I will remember for the rest of my life; it went above and beyond anything I thought possible.

Andrew Crawford



Supervisor:
Dr. Irena Buka

Department:
Pediatrics

Sponsor:
Faculty of Nursing,
Edmonton Chapter
Beta Sigma Phi

Growing up in rural Alberta makes it challenging to see oneself going further than the oil fields. You grow up hearing how it is the best route to success and that science is a fleeting dream. Upon hearing about the Women In Scholarship, Engineering, Science & Technology Summer Research Project (WISEST Summer Research Project), it seemed like a pretty far-fetched idea and I didn't even anticipate on following through with applying. I thought that it was unlikely that I would be accepted and that it just wasn't realistic. However, despite my own personal doubts, I applied and it was by far one of the best decisions I had ever made. Through WISEST, I have been exposed to fields of science I never even knew existed and I have found myself immersed in this wonderful experience with a diverse and great bunch of people to share it with.

I was placed in the field of Pediatrics along side Dr. Irena Buka and environmental health specialist Lesley Brennan at the Misericordia Hospital. When I finally found out what my project would be based on, I realized that I would be focusing on environmental health in regards to how it affects children. After meeting my supervisors, I was left to decide what I wanted my project to focus on, which came as a major relief due to the panic I felt about potentially not liking the work I was doing. I decided to do research on particulate matter and how it affects children and their development. Because respiratory issues are a major health concern amongst children, particulate matter is of special interest due to its health affects and children being more susceptible. Despite not being in a lab, I still gained valuable knowledge on how to navigate through research articles and how to make conclusions based on other people's studies.

Outside of the workplace, WISEST presented numerous opportunities to me and opened my mind to various new fields of science and the countless jobs affiliated with them. Growing up, most children see science as this one entity and then maybe see branching off as a doctor, but they never take it any further or realize how diverse the sciences are. I feel that this awareness is the biggest thing WISEST has contributed to. Without it, I would still be sitting in Slave Lake unbeknownst as to what is available to me and what jobs I am eligible to pursue. Through the various Lunch n' Learn sessions, the field trips, and networking fairs I was able to get a better picture of what university life was like and how to navigate through all the opportunities available to me.

In the end, WISEST has opened so many doors for me and it has helped me build up the confidence necessary to take on the next chapter of my life and to pursue a path less traditional for my gender. I would like to thank my sponsors, Canada Summer Jobs, the University of Alberta Faculty of Nursing and Edmonton Chapter Beta Sigma Phi. I would also like to thank my supervisors Lesley Brennan and Dr. Irena Buka, who never once showed disinterest in my yearning to learn and who were always willing to help me when needed. And lastly, I would like to thank WISEST, without whom I would never have been chosen for this wonderful and exciting opportunity.

Hannah Debenham

Supervisor:
Dr. Jie Chen

Department:
**Electrical &
Computer
Engineering**

Sponsor:
Honda Canada Inc.



Ever since my older sister participated in the Heritage Youth Research Summer program and told me about WISEST I was hooked on the idea of being a WISEST student. It sounded like the kind of program that would fit me perfectly. I poured over my application for days and anxiously waited three months for a response. When I heard that I was accepted, I was ridiculously excited. I spent one month waiting, imagining and building up the program in my mind. We were barely into the first day and I knew that WISEST was everything that I had dreamt it to be and more. Not one of the days since has let me down.

This summer I was working underneath Dr. Jie Chen in the Department of Electrical and Computer Engineering. My main project was improving the efficiency of converting second generation bio waste (lignocellulosic material) into bioethanol. It was fascinating to learn all the ways that the process could be tweaked and how these little changes could impact the outcome so drastically. The method that we focused on more clearly was the impact of Low-Intensity Pulsed Ultrasound (LIPUS). Unfortunately, my lab partner and I didn't have the opportunity to do much lab work; however, this didn't take away from the experience. We were too busy meeting interesting people, learning new things and working hard on other projects for it to matter. I had the opportunity to design a circuit board, solder my own board as well as animate videos relating to my projects. There was always so much that was going on in our lab. There were several different projects happening all at once and everyone was working on different things so there was always something new to see or do. It took me by surprise how many different people you can find on campus, and how each of them has found their own unique niche among the buildings and classrooms.

I can say as many good things about the research as I want but the truth is that my favourite part of the WISEST experience were the sessions. Being able to spend time with such an amazing group of people, who were similar to me in ways that I never expected, it made the entire summer that much better. Even though I came to the program alone, I left it with the kind of friends that I never expected to find. Every week there was something new for us to do and each activity was as unique and as useful as the last. Somehow WISEST has managed to teach me how to take control of my career and education while simultaneously letting me have so much fun. I didn't want to go home at the end of the day. I was there to learn the science and love the science and because all the people around me just wanted to do the same thing, the days were a blast from start to finish.

There was something surreal about this program, a feeling that I couldn't really put down in words. Everyday that I got to walk on campus I became a different person, a new person, someone that belonged at the University. The people, the research, the opportunities and most importantly the memories that I found here are not something I could ever recreate. For this reason I will forever treasure them.

Willow Dew



Supervisor:
Dr. Michael Serpe

Department:
Chemistry

Sponsor:
**Alberta Women's
Science Network**

I applied to the Women in Scholarship, Engineering, Science & Technology (WISEST) Summer Research Program because of my interest in gaining lab experience in order to acquire the skills necessary for a future in a non-traditional career, and I thought that this opportunity would be a perfect platform to begin this journey. My expectations were more than met; they were exceeded in countless ways. Not only did I acquire experiential knowledge of research in a field for which I have always had a passion, I gained an invaluable opportunity to interact with amazing people who shared similar interests, establish friendships, and overall have a unique and memorable summer.

During the six weeks of the program, I was placed in the lab of Dr. Michael Serpe in the Department of Chemistry. The Serpe Group researches different applications of stimuli responsive polymers; I was astounded to see some of their amazing creations, with purposes from artificial muscle replacements to water remediation. The three projects I worked on were centered around using these polymers for targeted and responsive drug delivery systems. The goal of the first project is to release the drug gemfibrozil into the bloodstream to combat high triglyceride levels, which involved immobilizing the drug and the enzyme lipase into the polymer poly(4-vinylpyridine) and adding varying amounts of a fatty acid to test release. The second project is along similar lines, however it uses glucose oxidase and Poly (N-isopropylacrylamide)-co-(acrylic acid) to release insulin in response to glucose levels. The third project involved using sodium alginate, which formed spheres in the crosslinker calcium chloride, to release a drug through diffusion. By varying the concentration of alginate we could control the release rate, and we could combine this technique with the responsive polymers to release multiple drugs independently from one alginate sphere. Several methods of controlling release were also investigated. I was heavily involved in the preparation as well as the testing of these samples, and often contributed to the design of the experiments. This was made possible by my research team, and throughout the summer I had the privilege of working with amazing people who facilitated my continual learning and my success.

Some of the key factors that made this experience so enlightening were the WISEST sessions, the Weekly Professional Development Seminars and the Lunch'n'Leans. We learned valuable skills which would assist us in the professional world, such as creating research posters and public speaking. Additionally, we were given the opportunity to tour other research labs on campus as well as visit an industrial lab in our Research in Action session. There I had the pleasure of touring the Syncrude Research and Development Facility, which hugely furthered my understanding of the oil industry, as well as the variety of jobs within it. These sessions were instrumental in the outstanding effectiveness of the summer research program as an opportunity for academic, professional and personal growth and development.

I would like to thank Dr. Serpe and the Serpe group for welcoming me into their lab, putting up with my relentless questioning, and allowing me to truly maximize the benefits of this experience to all aspects of my life. I would also like to thank my sponsor, the Alberta Women's Science Network; without them none of this would have been possible. I also want to thank WISEST team for coordinating each and every one of these special sessions and events that have greatly contributed to my growth as a student and as a person.

Emma Dodyk



***Supervisor:
Dr. John Shaw***

***Department:
Chemical and
Materials
Engineering***

***Sponsor:
Nexen Energy ULC***

I have known for many years that I wanted to pursue a career in the sciences, and took any opportunity I could through school and extracurriculars to learn more about my chosen profession. In high school, I had the opportunity to attend the Science, Engineering, and Technology (SET) Conference coordinated by the WISEST organization. Through the conference I heard about the WISEST Summer Research Program (SRP), and decided to apply after learning more about the program throughout the school year. I was extremely excited to discover I had been accepted, and hoped to learn skills specific to a career in the scientific community. I was less concerned with subject-exclusive knowledge, but wanted to gain insight into the application of the scientific method and the workings of a research environment. Laboratory work was more diverse than I predicted, and I learned many transferrable skills such as organizing data, following detailed instructions, using Microsoft Excel, and communicating my results. My project taught me not only about the topic I was working on, but also valuable future skills.

During my time in the SRP, I worked in the Petroleum Thermodynamics lab in the Department of Chemical and Materials Engineering under the supervision of Mildred Becerra and Dr. John Shaw. My project assisted a graduate student's thesis by modeling a mixture of crude oil and a less viscous compound such as carbon dioxide using glycerol and 1-pentanol. Glycerol simulated oil in the mixture, while the 1-pentanol represented a lighter compound which may be mixed with crude oil in the extraction process. We wanted to know if the mixture would have a higher density and viscosity than either sample unmixed, which would provide information about the behaviour of a similar mixture of oil and a lighter compound in the industry. Through my project, I learned a lot about lab duties, the structure of research, and the scientific method. I also learned about the importance of recording and communicating observations and ideas to clearly convey both what I had done and what I was planning to do next. Before entering the SRP, I had a perception of work in a research laboratory as constantly exciting and groundbreaking, whereas I learned in reality it is often not exciting until analyzing the results. Day-to-day duties are very routine because consistency is important to experimental results, and a lot of time is spent waiting for measurements to finish.

The professional development sessions also gave valuable information applicable to both WISEST activities and opportunities post-university. The Designing a Research Poster seminar was extremely helpful, as I was completely unfamiliar with the process and it provided solid guidelines to begin formatting my poster and organizing my results. The Micalyne industry tour was also interesting to me, as it presented ideas of the work available to me when I finish my university education. When I return to high school, I will retain the lab specific skills I learned through my project, as well as familiarity with the scientific method. However, the most important lesson I learned through the SRP is that research is not exciting. Research is frustrating, complex, and confusing. I learned over these six weeks that results are exciting, and the knowledge gained makes the infuriation worthwhile.

Thank you very much to Mildred Becerra and Dr. John Shaw for providing the incredible opportunity to work with them this summer. Throughout my time in their lab they ensured I understood everything I did and were always available to answer my questions. Also, thank you to Nexen Energy ULC for their generous sponsorship of my position and support for the WISEST Summer Research Program.

Sophie Filion

Supervisor:
Dr. Manisha Gupta

Department:
**Electrical &
Computer
Engineering**

Sponsor:
**Edmonton Chapter
Beta Sigma Phi**



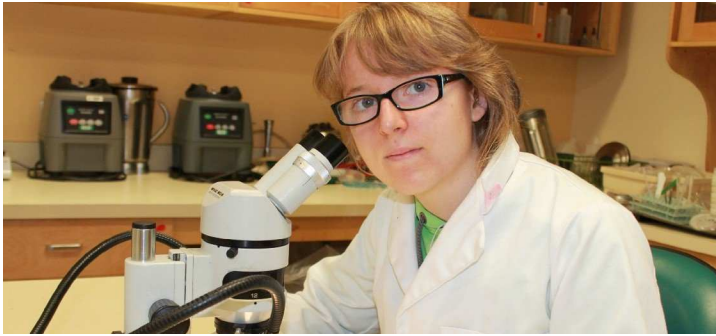
It is hard to imagine life as it was just a mere six weeks ago. If you had asked me then, I would not have been able to tell you what an “undergraduate” was, or even begun to explain the format of a research poster. I had never set foot in a lab or walked the pathways of North Campus. It is even stranger to think that up until a few months ago, I had never even heard of Women In Scholarship, Engineering, Science, and Technology (WISEST), much less their Summer Research Program. And now, here I am, on the cusp of its completion.

I will admit that I had only a vague sense of what I was getting into when I applied for the WISEST Summer Research Program. I knew only that I liked science, a lot, and of course the idea of equal gender-representation, which is a main component of the WISEST philosophy. The application itself was very official, unlike anything I had ever done before. For that reason, it was slightly daunting, as was the thought of working a full-time job and living alone for a whole six weeks. But after a few games of Apples to Apples in the residence recreation room and participating in the WISEST Orientation Day ice-breakers, I felt the opposite of alone. On Orientation Day, everyone was quite curious about one another’s research projects. We had all received brief overviews of our assigned labs, but I do not think many of us had any notion of what our work would look like in reality. I, for one, had no idea what an “organic electrochemical transistor” was, nor how it could be applied to the exotic-sounding “neurochemical sensor” also mentioned in the first line of the project description. Now, however, I know the meaning of these terms, as I have been working with them for the duration of the program.

To put it simply, the project I was assigned combines aspects of electrical and computer engineering with neuroscience in order to produce flexible brain sensors. These sensors are being designed to detect early-signs of mental disease by measuring neurochemical levels. Of course, this is the final goal of the research. Do not worry - they did not trust me to do anything as dramatic as brain surgery. I, alongside a third-year engineering summer student from India, prepared and tested samples in order to optimize the properties of the sensors. Our work involved a variety of settings: some days were spent in the lab, others in the office plotting graphs, and some even in the clean-room (where you put on really stylish, white, full-body suits).

My supervisor showed me everything there was to see and taught me more than I thought was possible to learn in such a short time period. She even went as far as to organize tours of other research labs for me, which broadened my perspective of career options in science and engineering on top of what was being provided by the program itself. I am very grateful to have had her as my guide and mentor. I would also like to thank my principal investigator for taking the time to make my experience as fulfilling as possible, and my sponsor, Edmonton Chapter Beta Sigma Phi, for so generously supporting my participation. And to the WISEST team itself - what you are doing is very important not only to the participants, but to society itself. Thank you. To anyone considering applying for the WISEST Summer Research Program, my only advice is to *do it* - with open-mindedness and passion and curiosity.

Tina Friesen



Supervisor:
Dr. Maya Evenden

Department:
Biological Sciences

Sponsor:
NSERC
PromoScience

I had no idea what research really was until I participated in the Summer Research Program. My prior assumptions included: doing an experiment repetitively until you could determine, with some degree of confidence, the results. Sure the experiments we do at school are supposed to give us a taste of what research is like, but it completely misses the major parts of being a researcher. To me, researching is making mistakes and having to back track. That said, researching is finding unplanned results, and being ecstatic when all the data that you worked hard to get, finally comes together.

One of the great things about the research experiment I was assigned was that it was simple enough for me to understand. My research examined the effect of different sugar diets on Bertha Armyworm moth oviposition (egg laying). I had hypothesized that of the five diets we fed them, which were dextrose (glucose), fructose, sucrose, honey and water(control variable), dextrose would have a higher total and fertile egg average because it was the basic sugar needed for cellular respiration (energy production). But before we even began the experiment we had to raise the larvae on a specific diet until they became pupae (a cocoon like stage). Once the moths emerged from being a pupae, our experiment started. We found that honey (which is a mix of sugars), fructose and dextrose had the highest count of total and fertile eggs. Interestingly enough, while water had the lowest count of total and fertile eggs, it had the highest mean percentage of fertile eggs.

I don't know about the other experiments done by WISEST, but I felt that I had the luxury of doing most of the experiments myself (of course, I was first shown how to do it and then supervised). My supervisor, Chaminda Weeraddana, introduced me to many new methods, most notably how use the Bunsen Burner. And, if you are anything like me, I had no clue how to use it. A Bunsen Burner is an open a very hot flame which creates a clean, sanitized sphere around the flame. We used it to make a clean place to pour our autoclaved (the bottle was put under intense heat to sanitize) bottles of sugar diets into diet cups to feed our moths. I had to open the bottle near the flame, wave the lid and the top of the open bottle before pouring it into the cups, and then repeat the first step to close it. I felt like I was doing alchemy, it seemed a bit mystical to me.

The Summer Research Program has turned out to be more than I could imagine. I never could have guessed how much I would develop socially in this program, or how much of an understanding I would gain of the diverse careers in sciences, such as being a researcher. I had a blast doing research, even in times when we were just doing mundane tasks. I am so certain, now, that it would be something I would enjoy as a career.

Thanks to the social aspects of the seminars, I have become more sociable with people. And, therefore, I have become more confident in myself. The networking fair helped me a lot in terms of learning how to approach people. I learned how to engage people in interesting conversations about their career paths. Also, many events, such as the University of Alberta q and a and all of the seminars, made me feel more prepared and excited to go into University. The Summer Research Program has been a valuable and fun experience for me, and I wouldn't be able to replicate all it has done this summer myself.

Emily Green

Supervisor:
Dr. Erin Bayne

Department:
Biological Sciences

Sponsor:
Faculty of Science



Not many high school students can say they spent their summer doing cutting-edge research alongside graduate students but thanks to the WISEST Summer Research Program, I had that opportunity. This program has given me the most productive summer of my life. Honestly, I mostly wanted to apply to the summer research program to enhance my resume for university and to learn more about the university life I've dreamed of. This program has exceeded every expectation I've had for it. The WISEST Summer Research program is about so much more than placing students in a lab for six weeks of summer. WISEST and the weekly sessions we had were a resource to help us to grow professionally and as people. It was really excellent to be surrounded by women who have the same interests as me.

In my lab, I learned a lot about birds. I was analyzing data collected from autonomous recording units (ARUs) placed in the forest around Northern Canada. The data was run through recognizers which are supposed to identify a certain species based on its call, we made these in the lab. I had to listen to what the recognizers thought were a species and verify if it was right. We took that data and used geographic information systems (GIS) to find the habitat that a certain bird likes the most. It was very exciting to learn more about birds but it was even more exciting to learn how to use the technology and programs required to complete my project. I'm excited that the skills I've learned in this lab can and will help me in the future.

The people in my lab are amazing. I expected to be a nuisance to my professor and mentors but all of them were excited I was there. They were eager to help me in any aspect of university life whether it be a question with the lab work or how to maneuver the transit system. In my lab I worked mostly with graduate students. It's a wonderful feeling to be learning from someone who doesn't feel that much older than you but has so much more knowledge to share.

WISEST put on so many exceptional sessions to help us explore our options and speak to women who work in fields where they are underrepresented. My favourite session WISEST held was the Networking Fair because I got to speak to women who are in a field I aspire to be in. I especially enjoyed getting to speak one-on-one to a few ladies to learn exactly what got them there. I met a few truly amazing female engineers who encouraged me to continue to strive for what I want. When someone who is knowledgeable in the field I want to be in saw my potential, it ignited a confidence and drive to succeed I couldn't have gotten anywhere else.

I would like to take the time to thank my entire research team. I will be forever grateful to Dr Bayne, Hedwig Lankau and a handful of amazing people I've worked with that have made this summer as wonderful as it was. I would also like to thank the Faculty of Science for sponsoring me and making my time here possible. Finally, I would like to thank the WISEST coordinators, Angela and Rhea for their countless hours planning to make this summer perfect for us.

Aparna Gupta



Supervisor:
Dr. Thomas Estell
&
Dr. Amir Hanifi

Department:
Chemical and
Materials
Engineering

Sponsor:
Syncrude Canada
Inc.

The Women in Scholarship, Engineering, Science and Technology (WISEST) Summer Research Program has been truly an enriching experience. This program allowed me to further expand my mind in a post-secondary academic environment where I also met other young women who shared an interest in science and how things work. Through this program I got to not only witness science in action, but to have an insight into life as a researcher. I became aware of the abundant number of opportunities that the University of Alberta has to offer in the field of Sciences. I acquired skills and knowledge that I will need in order to succeed in university, and in fields of science, engineering, and technology.

This summer I was placed in the department of Chemical and Material Engineering under the supervision of Dr. Thomas Etsell, Dr. Amir Hanifi, and Navjot Kaur Sandhu. My project focused on the fabrication of solid oxide fuel cells (SOFC), which are an environmentally friendly substitute for fossil fuels. The main advantages of SOFCs are that they are designed to be run on more than one fuel (fuel flexibility). They produce high quality waste heat that can be used for other applications, and have a good power performance. This project allowed me to enhance my knowledge about fuel cells, and perform extraordinary tasks such as slip casting, and infiltrating the cells. The objective of my project was to implement anode infiltrations on the cells in order to improve their conductivity. Anode infiltration is the process of permeating an anode solution inside the cell pores; it is proven to have a high catalytic activity towards fuel oxidation.

When I first began this project I believed that I would get the results right away. However, reality struck me when my supervisor informed me that we did not succeed with the batch, and needed to try again. It was an extremely devastating moment, but I gradually learned that research is a field where I need to have patience and a strong willpower.

Beyond the lab experience WISEST also arranged events such as the Networking Fair, Research in Action, and Exploring U of A Research, which allowed me to broaden my horizon about distinctive disciplines in science and interact with influential role models. The lunch n' learns not only helped me gain knowledge, but also helped me build new friendships with other WISEST summer research members. These seminars improved my leadership, communication, and interpersonal skills.

Thank you WISEST, Syncrude, and Canada Summer Jobs for providing me the opportunity to do a summer research project under the Chemical and Material Engineering Department at the University of Alberta. I would like to genuinely give a special thanks to Navjot Kaur Sandhu for her mentorship, encouragement, and support throughout this project. I greatly appreciate all the time and energy she put into helping me throughout the six weeks. Thank you to Dr. Amir Reza Hanifi and Dr. Tom Etsell for expanding my knowledge about fuel cells. This was an unforgettable summer!

Jasmine Hafso

Supervisor:
Dr. Aman Ullah

Department:
**Agriculture, Food,
and Nutritional
Science**

**Sponsor: Faculty
of Agricultural,
Life,
Environmental
Sciences**



The most important lesson that I learned from the WISEST Summer Research Program is to take risks. I first learned about the WISEST program at the University of Alberta's open house. I was hesitant about applying to the program because I knew that I would not be able to control the outcome of my application. However, applying to this program has been one of my best decisions. The research that I was able to assist my supervisor in was fascinating and the professional development sessions that WISEST students attended were beyond helpful. When I applied to this program, I did not know which type of research I would be placed in, this uncertainty was another element of risk that was involved in submitting an application to this program. Because I took this risk, I experienced an incredible summer that could not have been more exciting!

I was placed in a lipids group where I researched how to create bio-renewable and biocompatible drug carriers that can be used in cancer and tumour treatment. The drug carriers that we were in the process of creating are called amphiphilic micelles. Micelles are amphiphilic, because they consist of both a hydrophobic and hydrophilic component. My role in the research was to focus on creating the hydrophobic part of the micelle from canola oil while my partner focused on creating the hydrophilic part of the micelle. With every day in this program, I learned more about the research and further developed my lab skills. The research never grew dull; it only became more interesting when I learned more about it and delved deeper into the topic.

My favourite session that was organized by WISEST was the Gilead Industry Tour. Gilead is a pharmaceutical company that develops and manufactures medicinal drugs. The tour broadened my awareness regarding the real world application of chemistry and science in general. The tour gave me the opportunity to meet other women in leadership positions who had obtained a doctorate degree in science. It was inspiring to meet other people who were using their education to help people by working in a pharmaceutical company.

The WISEST Summer Research program was an incredible experience that would not have been possible without my sponsors. I would like to thank my sponsors for their generous contributions to this program. I would also like to thank my principle investigator, Dr. Ullah. Dr. Ullah was always willing to answer any questions that my partner and I might have regarding the research project. He was also extremely helpful when giving suggestions to my partner and I about our research posters. My direct supervisor, Dr. Arshad, taught my partner and I about his research and was always patient when explaining new concepts. I would like to thank Dr. Arshad for making this summer an incredible experience by teaching me about working in the lab and about his research. Dr. Arshad was an excellent supervisor. My partner, Kendra McQuaig, was brilliant, kind and patient throughout each stage of the research. I would like to thank her for being an amazing partner. I would also like to thank the WISEST coordinators for always being helpful and for being influential in creating a great research program this year. This program allowed me to explore many aspects of science and research. Because of this program, this summer has been unforgettable.

Pawanpreet Kaur Gill



Supervisor:
Dr. Christopher
Sturdy

Department:
Psychology

Sponsor:
NSERC
PromoScience

I heard about WISEST through a teacher of mine a month before the deadline; when I heard about it I was super thrilled, because I knew that I could take this opportunity to explore what careers were out there. But, I was also scared because I knew I had a month to apply, and with continuous exams and projects I didn't know if I could do it. When I decided to apply one weekend I thought all of the questions were easy to answer and fun, because for once someone was willing to listen to me talk about my passion. Now the only thing I had to do was wait for the phone to ring and change my life.

Throughout my six weeks at WISEST I worked in the Bird Song Laboratory under the supervision of Dr. Christopher Sturdy. My research was to analyze how black-capped chickadees' vocalizations differ between sexes. Working with the black-capped chickadee was super exciting because they were all so cute. The thing I was frightened about was when we had to feed them worms, but I eventually learnt to cope with them. I was really scared on my first day because I was going to work with grad and undergrad students and I wasn't really sure how I would talk to them. But everyone in the lab turned out to be super nice and made me feel like I was a part of their little family.

WISEST has given me the opportunity to explore many fields where women are underrepresented. The research in action tour gave us an insight of what happens after you get a degree and where you could possibly work. Dr. Margaret-Ann Armour's speech was powerful and inspiring as she talked about her role models and how they influenced her life in different ways, during various stages.

During WISEST I learnt that it's okay to change career paths because there are many career options that you may have not heard of before. The networking fair also gave us the opportunity to listen to successful women talk about not only their success, but also their struggles. WISEST also provides the opportunity to develop a research poster; during our library orientation a previous WISEST student told us that in university she looked back at her notes for one of her posters. It's also nice to know that when I attend university in the future I will have an awareness of the campus and won't be needing a map.

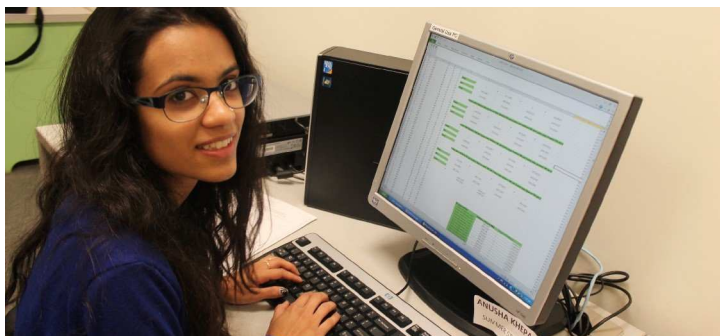
During WISEST I have made many friendships and met many wonderful people. One thing I learnt is that everyone is more than willing to answer any questions you may have. I don't think I can narrow one thing down that I will take with me because everything was awesome. The six weeks go by so fast, one day you're sitting at the orientation and next thing you know you're presenting a poster. I would like to thank my sponsor Mr. Norman Marcotte of NSERC Promo Science for funding my position. I would also like to thank my teacher, Ms. Teri Lynn Stowe, for believing in me and telling me about WISEST because without her I wouldn't be here on this great journey.

Anusha Khepar

Supervisor:
Dr. Heather
Warkentin

Department:
Oncology, Medical
Physics

Sponsors:
Weyerhaeuser



We all know the saying, “Time flies when you’re having fun.” For me, the Women in Scholarship, Engineering, Science and Technology (WISEST) Summer Research Program is an experience that demonstrates the truth of this cliché. At the beginning of the program six weeks seemed a long time, but as our days became filled with research and various fun activities, the weeks flew by.

During my time at University of Alberta, I was placed in the Department of Oncology, in the Division of Medical Physics at the Cross Cancer Institute (CCI). While there, I had the opportunity to work on a project that focused on determining the effectiveness of the radiation shielding in the walls of the treatment units at the CCI. This involved using Microsoft Excel (a program I was not very familiar with) to determine how much radiation would be directed at each of the walls in all of the treatment units over a period of six months. Using dosimeters, I had to measure the amount of radiation that escaped from the primary barrier of the treatment vault and compare it to the radiation dose recommended to ensure a safe environment for the radiation workers and the public in the building. Although the high level of autonomy I had working on my research project presented a steep learning curve, I enjoyed the challenge of creating my own methods of addressing the problems and issues that I faced. Through this experience, I have grown more confident in my abilities to work independently and have learned how to persevere through the successes and frustrations inherent to all research.

The summer research program also provided me with the opportunity to meet with professionals and students in various fields of science. Through these encounters, I was able to learn more about various careers in nanotechnology, computing science, engineering and medical physics. The careers that I have discovered this summer have provided me with insight on the numerous career paths available to me. Although this exposure to various jobs has made it more difficult to select just one, it has also strengthened my commitment to pursuing a career in a field of science. In addition to increasing my awareness about less traditional jobs, this summer research program taught me a number of valuable skills through the Professional Development sessions and the Lunch and Learns. Networking skills and the ability to execute an effective presentation are just a few of the things learned in these sessions that I will take with me beyond this program.

However, the WISEST Summer Research Program offers more than just research experience, exploration of less traditional fields and skillset development. I have also had many opportunities to develop lasting friendships with fellow WISEST students through on-campus living, and activities within and outside of the program such as the Social Science Challenge and local festivals.

Although the past six weeks have passed by quickly, I am sure that the knowledge and skills that I have acquired through the various aspects of this program will be long lasting. I would like to thank my sponsors for their support and I am very grateful to my supervisors, who have made my participation in the 2015 WISEST Summer Research Program an unforgettable experience.

Kaelin Koufogiannakis



Supervisor:
Dr. Thomas Etsell
Dr. Amir Hanifi

Department:
Chemical and
Materials
Engineering

Sponsors: Society
of Petroleum
Engineers
Canadian T. F.

For six weeks this summer I was part of the WISEST Summer Research program, and I can definitely say that I have become 'wiser' for it. Through lab and university experience, sessions exploring science in action, and Friday Lunch n' Learns, the program has given me an invaluable glimpse into the vast possibilities for my future in science. From the beginning I was very excited to be able to meet so many women in science, and I found these mentors to be in areas that I had not even considered as career options. Because of this, my favourite out-of-lab experience of the summer was our off-campus field trip, when I got to tour Micralyne with other WISEST students. We saw research in action with women at the helm, and I found it very interesting to see the 'clean rooms' where nano-sized technologies are made.

However, my favourite part of the summer was working in the lab and having the opportunity to complete my own research project while contributing to the big picture of our lab's research. My project involved fabricating and testing fuel cells with the purpose of making them more efficient, through different current collection methods. We were working on tubular solid oxide fuel cells, which are ceramic based and convert hydrogen and oxygen fuel into water and electricity. I had never heard of fuel cells before the program, so finding out about this clean type of alternative energy was very interesting to me. I first had to fabricate a batch of cells, which involved things like slip casting, dip coating, infiltration, and many other methods that I had to learn in the lab. I then tested different current collection materials to see which would have the highest output energy. The most aggravating, but perhaps my favourite, part of the project was when a material would not give a good result and we would have to come up with why it may have failed, and think up what to try next to improve it. This happened with a paste we were trying, which turned out to be too thick and blocked the diffusion of hydrogen gas through the cell. Without fuel, there could be no electricity, so it was back to the drawing board. I found it very rewarding to be contributing to my lab's research, which holds huge potential for clean alternative energy.

By working in a lab, I gained an awareness of how research happens; instead of a question and conclusion in one day, it takes long hours of fabrication, testing and waiting to come to your results. Even within a full six weeks, we only came to preliminary results on my project, which will be continued by my lab after WISEST finishes. With this in mind, I know that the patience, perseverance and commitment it takes to work in research are lessons that I can take back to my final year of high school and university in the future. I would like to thank the WISEST team and my sponsors, Society of Petroleum Engineers Canadian Educational Trust Fund and Canada Summer Jobs, for making this possible, as well as everyone in my research lab, especially Dr. Etsell, Dr. Hanifi, and Navjot Sandhu, for being there to answer all my questions and guide me through this new experience while making the lab a fun place to come to every day. The Summer Research Program has been an amazing six weeks, which I hope can be experienced by many years of young women in science to come.

Rachel (Junyi) Lang

Supervisor:
Dr. Jie Chen

Department:
**Electrical &
Computer
Engineering**

**Sponsor: Society of
Petroleum
Engineers
Canadian
Educational T. F.**



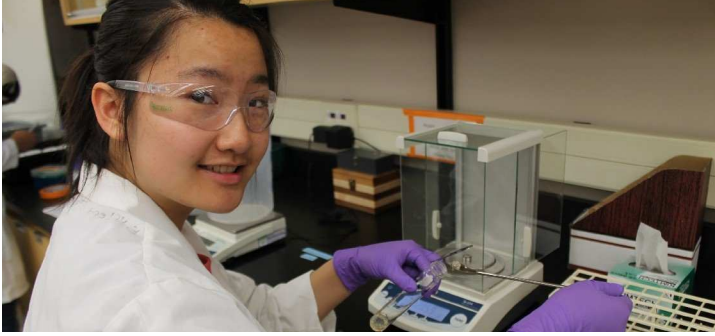
Living as an individual in society often presents us with colossal challenges that we have to face. It can be daunting to be suddenly weighed down by a large responsibility or project. But this is the type of situation I know how to deal with after the Summer Research Program: to deconstruct a daunting problem and synthesize ideas. During my time at the Faculty of Electrical and Computer Engineering, I was faced with a colossal problem: to create a video promoting our research project that will be uploaded to the Internet for all to see and will be shown to researchers across the globe and high-profile businessmen interested in our project. Over the last six weeks, I learned to turn just a simple task request at hand- to make a video- into a grand project that we even showed to high-profile Chinese business representatives. The path to our success was one of a steep learning curve, but also one of great fun and excitement to be able to cooperate with friends to reach our goal.

The research project that we would make a video on concerned bioethanol, a potential source of renewable energy. Biofuels can become a viable energy source for a world that is too dependent on fossil fuels, but they are extremely expensive. Our research dealt with increasing the efficiency of creating bioethanol using ultrasonic treatment at various steps of conversion, resulting in not only increased yield, but decreased cost. This project addresses a critical problem in our society, and I felt that I was playing a part in making the future a better place. I learned to be independent while I investigated numerous research papers and talked with those involved in the project. To create the video, we used Adobe Flash Professional CC 2015, which seemed daunting at first. However, through consulting more experienced colleagues, I quickly learned to use a variety of drawing and animation tools. However, the most rewarding experience of all was learning to collaborate and discuss the project with others. With the help of other people's opinions, I was able to start my climb to the top of our task, starting from creating a suitable script, to adding voice synchronization and finishing touches. I also experienced independence in exposing my creative mind, which helped me realize what I was capable of. My motto during my experience was "Make it as complicated as you can". With this thought I was able to realize the project and truly discover my potential.

My work experience was not the only thing that impacted my experience; WISEST's numerous activities and seminars to develop us as professionals were also essential to my development. First of all, Dr. Margaret Ann's incredibly motivating speech boosted me into the program by giving me the confidence to succeed, while the Effective Presentation session gave me a needed lesson about public speaking and giving engaging presentations- skills which would become critical for my future.

The Summer Research Program has truly given me the opportunity to experience the workplace that I applied for. Most of all, I learned to manage large scale projects by narrowing the large scope and cooperating with my colleagues. From my WISEST seminars, I learned a great deal about the importance of presentation, public speaking, and how to do those effectively. I would like to thank my professor Dr. Jie Chen, my dear colleagues who have worked with me along this exciting journey, WISEST coordinators Angela and Rhea, and of course, the Society of Petroleum Engineers for making all of this possible. The Summer Research Program is one that I will not only retain in my mind, but in my life for the future to come.

Melina Lee



Supervisor:
Dr. Heather Bruce

Department:
**Agriculture, Food,
and Nutritional
Science**

Sponsor:
**Faculty of
Agricultural, Life,
Environmental
Sciences**

I heard about the amazing WISEST Summer Research Program at school; however, being focused on other work I didn't give the effort to actually learn just how awesome the program really was. That's why I'm really grateful to my science teachers who encouraged me into the program that went well beyond my expectations. Throughout the program I was constantly faced with new challenges and knowledge that helped develop my personal skills that will be needed in my future career option. My summer couldn't have been spent in a more productive and enhancing way.

When I was informed that I was doing research on gelatin extracted from bovine heart, all I could think about was the cool ways gelatin is applied in our food products. However, under the guidance of Dr. Heather Bruce and her research team, I was able to expand my knowledge of gelatin beyond that of food. Gelatin can be applied in medicine, photography, cosmetics and much more because of its unique thermo-reversible properties. Since bovine heart is readily available and is typically an unused part of the animal, a goal in my lab was to determine whether gelatin extracted from bovine heart would be a good source. By doing lab work that tested the properties of gelatin, such as gel strength, foaming capacity, viscoelasticity and colour determination, I realised the many applications where this unique biopolymer can be utilized. From the moment I started doing hands on work in the lab, using professional lab equipment, I felt like I was valued as a member of a research community. Another aspect I enjoyed about my lab was meeting different people who all had different cultural backgrounds. I was able to ask them their reason for being in the lab and what their future goals were. The experience I got out of my lab was invaluable and memorable. What more could I ask for?

Aside from doing lab work, WISEST also had in mind some fun Professional Development seminars and Lunch 'n' Learns twice a week. During the sessions I was able to meet new people who also had a passion in sciences. I really enjoyed the Social Science Challenge and the Public Speaking workshop because in both cases it made us break out of our comfort zone. These sessions gave me an opportunity to cooperate and communicate with people I didn't know. Among the many sessions were opportunities to meet with undergraduate students and women who were already in the working field. This gave me many encounters where I was able to ask questions about their perspective on university life and the field they worked in, which gave me confidence in pursuing my future career path. These are sessions that I will value because of the many new connections with people made and the social skills taught.

Overall, WISEST was an opportunity that went well beyond science research, for it delved into building a social community by delivering us the skills to do so. I would like to thank my science and math teachers for encouraging me into the program. My family was really supportive for me going into the program, so big thanks to them. I would also like to show my gratitude to Canada Summer Jobs and the Faculty of Agricultural, Life and Environmental Sciences for sponsoring me. And, I'm really grateful towards the WISEST team and the University of Alberta for making this amazing opportunity possible!

Rita Lester

Supervisor:
Dr. Abram Hindle

Department:
Computing Science

Sponsor:
Process Solutions



When I applied to the WISEST Summer Research Program, I was hoping to be placed anywhere but computing science. I'd been writing code since I was eleven years old, and I knew far more about it than I knew about chemistry, biology, or physics. Six years ago, I was sure I wanted to be a programmer, but lately I'd been considering other careers, like engineering. I admit I felt a bit of disappointment when I was told I was being placed in a software engineering research lab, but I'm really, really glad that I was. When I got to the lab, it felt like coming home. I was surrounded by people who spoke my language—and they were far more fluent than I was. I was used to knowing more about computers than anyone around me, but compared to the people in the lab, I knew next to nothing. I wanted to know what they knew. I wanted to get to where they were. I'd found my place.

Over the six weeks I worked in the lab, I learned a lot. The other WISEST student in the lab and I were given a project, and some resources, then were basically turned loose. There was always help when we needed it, but the project, and all the problems that needed to be solved in order to make it work were ours to manage. We were supposed to build a set of drumsticks with a row of lights on them, which would produce a pattern of light in the air when waved in the dark during a performance, much like the light trails of a burning stick in the night.

During the first week and a half, we learned the basics of two programming languages: Python, and SuperCollider. Then we put those away for a while, and started working with an Arduino LightBlue Bean—a tiny microcontroller that's programmed over Bluetooth. We used it to make a single light blink and change colours with tilt, then to control nine LEDs in a grid, simulating the face of a die that generated and displayed a random number when shaken. Finally, two weeks from the end of the program, we stated on the final project. After many hours of coding, debugging, jabbing things with wires, and chiseling grooves in drumsticks, it was done. It was an amazing feeling, having done all of that, but we had a lot of help. Our direct supervisor gave us lots of tips and guidance, and soldered everything together for us. When we weren't sure what to do next, our principal investigator was always there to answer our questions. I'm extremely grateful to both of them.

Not all of my time in the Summer Research Program was spent in the lab; WISEST offered many different seminars, each of them an opportunity to learn something new and useful. Two sessions that stand out to me are the Social Science Challenge, and Dr Margaret-Ann Armour's lecture. I never thought I could enjoy something called the "Social Science Challenge"—I got stressed out just reading the title on the calendar—but it turned out to be kind of fun. We were put into groups, and given the task of building a simple hydraulic lifting machine out of cardboard, plastic syringes, and rubber tubes. It seemed almost impossible, then we talked about it, and then we did it. Listening to Dr Armour speak was an amazing experience. She's a wonderful, interesting, brilliant woman, and hearing what she had to say opened my mind, while at the same time solidifying my certainty that I was headed in the right direction.

Actually, that's true about the program in general. I came into it uncertain, but hopeful, and I'm leaving with renewed passion, drive, and confidence. I'd like to thank Process Solutions for sponsoring me, and giving me the chance to have this amazing experience.

Drew Loutitt



**Supervisor:
Dr. Cynthia
Paszkowski**

**Department:
Biological Sciences**

**Sponsor:
Syncrude Canada
Ltd.**

I look at WISEST as my first leap into the journey down the science path I'm prepared to take. When a representative came into my chemistry class and introduced the program, I was hooked throughout the whole presentation. I knew that this was the biggest career opportunity of my lifetime and that I wasn't going to miss my chance. I thought this was something I could tremendously benefit from, and knew very well there was no harm in applying. When I got the call back, I was pumped. I walked back to class, my head held high, receiving congratulations from my classmates and teachers; it was a moment of joy and I felt a ping of success. I didn't really know what to expect and coming to the day of orientation I remember feeling thrilled but nervous at the same time. Throughout the journey there was nothing less than memorable experiences and endless learning opportunities; I overcame my nervousness and found myself being more comfortable with what I was doing and who I wanted to be.

Orientation day consisted of meeting new people and trying to understand the complicated curves of the university campus. We were presented with empowering speakers from all of the WISEST team, including Dr. Margaret-Ann Armour. By the end of the day, I was ready for the six week journey ahead of me and had a great outlook of it being nothing but a spectacular experience. I really enjoyed the WISEST 101 seminar because it gave us a chance to listen to previous WISEST student's experiences and to see where they are now in science and engineering. This session helped me gain confidence by realizing that they were once in my shoes and that I could be where they are, or anywhere I wanted to be for that matter. The "Lunch 'n' Learn" sessions and regular lunches gave us many chances to talk amongst ourselves and to gain new insights on other research projects. I enjoyed talking with other WISEST students because they all had different interests and the enthusiasm they shared was contagious!

I was put under the department of Biological Sciences and this was great since I always considered wildlife biology and ecology being in my main interest. I was glad I got to meet my principal investigator, Dr. Cynthia Paszkowski and supervisor Dr. Arthur Whiting; they were always so friendly and helpful when I needed them. My research was analyzing sonograms of amphibian calls within the disturbed landfill site of Secure Energy. It was brought to interest because Western Toads are federally claimed under special concern. Recorders were set up in and around the site so that later I could view them as auditory and visual representations (sonograms). The result output was that the Western Toads preferred the disturbed areas over the natural sites. I was surprised by this, and the surprise feeling gave me a spark of love for research.

WISEST has been nothing but amazing. Every event they held for us gave us an occasion to learn something new and shape us as a collective and individuals. I would like to thank my research team for showing me what it is like working in a biological research office and expanding my horizons on career opportunities. I also want to thank my sponsors, Syncrude and Canada Summer Jobs, because without sponsorship I wouldn't have been able to participate in this wonderful program. Finally I would like to thank wonderful Dr. Armour herself, for giving financial assistance to allow me and my peers who do not live in Edmonton stay in residence. This experience has been nothing but fulfilling.

Kaylin Lynett

Supervisor:
Dr. Anastasia Elias

Department:
**Chemical and
Materials
Engineering**

Sponsor:
**Syncrude Canada
Ltd.**



From only having taken Physics 20 and Chem 20, I wasn't sure what to expect from the Women in Scholarship, Engineering, Science and Technology (WISEST) Summer Research Program. How was I, someone who has only scratched the surface of these fundamental sciences, supposed to be able to work with university students? Much to my surprise, they not only patiently answered all of my questions, but they also created a fun learning environment.

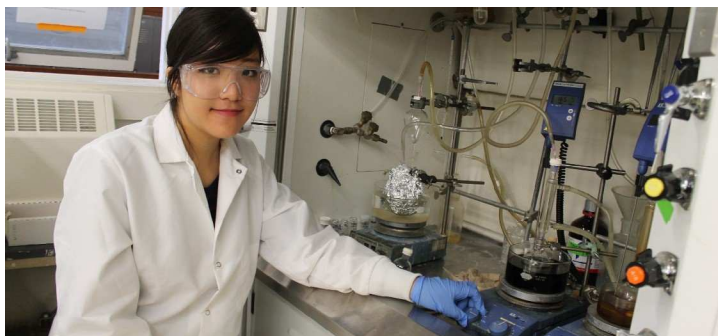
I was placed in a lab in the department of Chemical and Materials Engineering, and worked under the supervision of Dr. Anastasia Elias, Preetam Anbukarasu, and Michelle Hoang. My project consisted of mixing a biodegradable plastic with chloroform and adding various concentrations of graphene (two dimensional carbon) to later pour into a mold made of polytetrafluoroethylene (Teflon) in order to test its electrical resistance. Then we would surround the sample with Kapton, and place a PDMS sample (a silicon-based organic polymer) on it. The PDMS sample contained a slot so we could pour an enzyme on and measured how its electrical resistance would change. The purpose of the project was to create eco-friendly electronics. Each year, around 40 million metric tons of electronic waste (e-waste) gets disposed globally. Unfortunately, the vast majority of it occurs in developing countries. However, the major problem is that when they burn e-waste, all of its toxins are released into bodies of water, groundwater, the air and soil. This not only affects wild and domestic animals, but also us, humans.

The WISEST Summer Research Program was much more than just a summer research job. It was an experience that will never be forgotten. Whether it was learning how to network at the Friday Lunch 'n' Learn sessions, or visiting Syncrude during one of the Professional Development Seminars on Monday afternoons, there was never a dull day. There was always something new to learn, and amazing new people to meet.

I was also fortunate enough to live in residence. Living away from home allowed me to learn what it would be like to live on my own, from learning how to save money for groceries to taking the garbage out before the room would gain a foul smell. It also gave me the chance to explore Edmonton.

None of this would have been possible without the support of Syncrude Canada and Canada Summer Jobs. My experience would not have been the same without the help and all the time donated by Dr. Anastasia Elias, Preetam Anbukarasu, and Michelle Hoang. I would not have been exposed to the amazing learning opportunities if it weren't for all of their hard work. And, last but certainly not least, I would like to thank the WISEST team for not only selecting me to be a part of such an amazing program, but for all the hard work that they have put into the program. Thank you so much for making this one of the most memorable summers yet!

Danielle Ma



Supervisor:
Dr. John Vederas

Department:
Chemistry

Sponsor:
Faculty of Science

When you're in high school, the thought of graduating and moving on to university or college is both a daunting and exciting prospect. Many of my fellow peers and I have always expressed a deep worry over the responsibility of choosing the right path and making the right decisions. The WISEST Summer Research Program is a program that takes that worry away and exposes you to beneficial opportunities about your career of interest early on. It gives you peace of mind about university and valuable skills that will aid you immensely, as well as experience and mentorship from role models. I first heard about WISEST when a couple of students gave a presentation during the lunch hour at my school, showcasing what they learned. I really loved what they did and thought that it would be such a great thing to experience for myself, especially since I enjoyed science from a young age and I desired to learn more about what careers in science I could pursue. WISEST exceeded all my expectations and really helped me gain hands-on experience in the lab and encouraged me to pursue careers in nontraditional fields, inspiring me to become part of a diverse community that could benefit others and advance science.

Throughout the six-weeks, I worked in the Chemistry Department of the University of Alberta on synthesizing proposed intermediates for the enzyme LovB, found naturally in the fungus *Aspergillus terreus*. LovB produces lovastatin, a successful cholesterol-lowering drug for humans. The aim was to find out if the proposed intermediates were true intermediates, eventually better understanding LovB and other enzymes like it, in order to be able to produce improved pharmaceuticals in the future. We synthesized three proposed intermediates by a series of chemical reactions and we purified the products using column and thin layer chromatography (TLC). We also checked the structure of the products using nuclear magnetic resonance (NMR) spectroscopy. I learned advantageous skills such as measuring reagents using proper tools, aseptic technique, using the NMR, how to set up TLC and more. I loved working in my lab because everyone in my lab was friendly, enthusiastic about their work, very knowledgeable and open to inquiring questions.

Additionally, I loved that the Professional Development Seminars and the Lunch'n' Learns further enriched our experiences in WISEST. The research tours provided a strong insight on what a career in research looks like as well as give us more career ideas. I really enjoyed the UofA Q&A because it familiarized us with the campus and classes, giving us a much easier time when we enter university. We also learned practical skills like writing a professional report, giving effective presentations, making a research poster, how to network and more, which are skills useful for my whole life. I got to know my fellow WISEST students through these sessions and I made lasting friends, a warm community that will be able to motivate each other.

I am forever grateful to the WISEST team for making my learning experience possible, my research team for answering all my questions, being patient, kind and supportive, my fellow WISEST students for showing me how to have a blast and being so friendly, and the Faculty of Science and Canada Summer Jobs for sponsoring me the whole way. I honestly couldn't have had this life-changing experience if it weren't for all of these people who showed me the way with their passionate personalities. WISEST has gifted me beyond belief and changed me for the better, I am so appreciative of the encouragement, exposure and confidence bestowed upon me. I leave the program with less worry and indecisiveness, while looking forward to the future.

Lauren MacDonald

Supervisor:
Dr. Michael Chan

Department:
Internal Medicine

Sponsor:
Weyerhaeuser



My expectations for WISEST were pretty high. Throughout the application process I had thought that WISEST was going to be this amazing experience filled with lots of new and exiting science. What I got was so much more than just amazing science, although there was a lot of that too. Through WISEST, I have gained knowledge beyond my years, a secure networking system, life long friends and a view of science that I have never seen before. WISEST exceeded all expectations. In short terms: it blew my mind!

I had the opportunity to work in the cardiology department at the Royal Alexandra Hospital under Sylvia Martin and Dr. Michael Chan. My experience differs from many in this program because I was doing clinical research. I was expecting physical chemistry, lab bench type work. What I got, however, was a unique and astounding view on research. I was able to work with real patients and be exposed to the inner workings of a hospital. My project was specifically looking at how cardiac resynchronization therapy affected daily physical activity in patients with chronic heart failure. We wanted to know if our heart failure treatment actually improved the patient's quality of life. To test this, we used three assessments: a six-minute walk test to look for functional capacity, a quality of life questionnaire to look for perceived improvement and a four-day period where patients wear an armband that measures energy expenditure. Within this project, I searched patient files for demographics. This information was then sent to Rehabilitation Medicine at the University of Alberta, where I had the chance to work with Sandra Gawad Gad in the analysis of this studies information. I looked at data from the armband regarding steps taken, amount of time in exercise, and energy expenditure using programs such as SPSS and Sigma.

My main goal for working in the hospital was to try to gain exposure in multiple areas of medicine. I met many people: from cardiologists to nurses, researchers, dieticians, radiologists and medical students of all disciplines. Each and every single person I met took the time out of their day to explain their career or patiently answer any questions I had. The hospital environment was warm and welcoming. Every morning I was invited to do rounds in the intensive cardiac care unit. I would go down and follow the doctors as they discussed and treated the patients with the most serious heart ailments. I learnt the most from this. I picked up on medical language, the hospital atmosphere, and the likes of patient contact. This experience allowed me to see a hospital as it really was, not like on Grey's Anatomy or House, and I can say one thing: I really, *really* liked it!

I have learned so much from hospital life. Things about treatment, clinical research regulations, or just plain cool science about the heart. However, my job was not the only place where knowledge was shared. Through the WISEST events I learned about new careers, what it is like to work in a non-traditional field, tips on post-secondary and much more. Through WISEST I have formed a strong network, found amazing role models and met life long friends. None of this would have been possible without the support I received from Weyerhaeuser, Sylvia Martin, Dr. Michael Chan, Sandra Gawad Gad, and the WISEST crew. WISEST has given me life long memories and a skill set that you can't find anywhere else. I will always remember WISEST and how it blew my mind!

Ritika Mandi

Supervisor:
Dr. Jing-Li Luo

Department:
**Chemical and
Materials
Engineering**

Sponsor:
**NSERC
PromoScience**



It is difficult to put into words the emotions that I felt during my journey participating in the WISEST Summer Research Program. The experience was one with intrigue, excitement, confusion, and like any one of life's journeys, some adversity. There were some moments when I made mistakes, some when I felt disappointment, and even some when I was bored; but the discoveries that I made overpowered all those small moments, and made my summer a memorable one.

I spent the six weeks in the department of Chemical and Materials Engineering, working in Dr. Jing-li Luo's lab, developing solid oxide fuel cells. Fuel cells are electrochemical devices that use the reaction between oxygen ions and hydrogen (or a hydrocarbon) to produce electricity. The process has little to no emission of carbon dioxide, making it a clean energy solution. My project involved manipulating the anode material in the cathode-electrolyte-anode set-up, and determining whether a porous or non-porous material increased the cell efficiency. I got the opportunity to make the electrolyte disks, mix various chemicals to make the anodes and cathodes, and paste the anode and cathode inks onto the electrolytes, using a screen printer.

One of the most essential skills that I was able to take away from the lab is patience. I had to be patient with myself in perfecting the tasks, patient with the processes used, and patient in waiting for an exciting new task, when nothing further could be done to the fuel cells that day. The act of waiting can often feel unbearable for humans, but without the wait the tasks and results would not be as fascinating; I think that is part of what research is all about. Along with learning patience, the last six weeks brought major confusion. When I applied for the WISEST Summer Research Program, I thought that I would go into engineering after high school. I was open to learning about more careers to consider, but what I did not realize was just how many career options there are! Rather than helping me decide the right path for me, it made me confused more than ever. However, the experience did teach me that I do not have to follow set footprints on the road to the future, and that any interest can be pursued, even if it seems as though there are less opportunities in a field.

Organized events such as the Networking Fair and the Exploring University of Alberta Research gave us the ability to learn more about science and available fields. The WISEST coordinators organized numerous events for us outside of the lab, so that our learning curves could be maximized, and we would get more inspired about making a career in an underrepresented field. Every Monday, there was a Professional Development Seminar such as the industry tours and every Friday there was a lunch n' learn session that gave us vital information, such as how to design a research poster. There were also lunches with the HYRS students and Ada's team planned to provide us the opportunities to build connections and meet new people.

The WISEST Summer Research Program has been an astounding experience and I am thankful to the sponsors, Canada Summer Jobs and NSERC for providing the funding necessary to enable my participation. I would like to thank Dr. Jing-li Luo for inviting me to work in her lab and my supervisor Mr. Yifei Sun for mentoring me during the program. A special thanks to Yaqian Zhang for teaching me important lab techniques and to the rest of the research team for being supportive in my lab endeavours.

Alycia Matchatis



Supervisor:
Dr. Kim Chow

Department:
Physics

**Sponsor: Alberta
Education -
Student Learning
Standards**

Working in a research lab for six weeks was a remarkable experience. I was able to learn new knowledge and gain insight on how university life is. Attending the Lunch 'n' Learns, along with the professional development sessions, allowed me to absorb useful information that can be used contemporarily and in the future. Participating in WISEST was a significant learning opportunity and I am thankful for being part of this program.

I was working as a summer research assistant and was placed in the Department of Physics. Throughout the six weeks of this program, I was investigating certain properties of manganite samples. The samples were about 2mm by 10mm and made from disturbing a microscopic layer of LCMO film on a STO substrate. I started off constructing small wires for the samples so they could be measured by the Anisotropic-magnetoresistance (AMR) system. Each sample required four wires and I measured about 20 samples. That being said, I spent a decent amount of time making wires. Later on, I would graph the data of each sample. Our main goal was to find properties such as magnetoresistance (MR) and anisotropic magnetoresistance (AMR). These properties are important because they are essential to making modern technologies work. Without them the devices can't read the data.

I first heard of WISEST when I was in the tenth grade. My teacher mentioned how I'm a suitable person who should apply for this program. The only down side was I had to wait a whole year to apply. The reason why I applied was to gain knowledge, experience and useful tips for when I decide to apply to a University. When I got the news of being accepted I was really happy and excited to take the opportunity. Being part of WISEST has given me influential guidance towards the beginning of my post-secondary life.

I appreciate the well-organized coordinators who took the time to arrange superb seminars. My favourite session was when the two astrophysics professors came to answer questions. I really liked how they were both so enthusiastic about their jobs and that they have no major regrets about their career. The social science challenge was enjoyable because it permitted me to interact with new people in an entertaining way. The research in action was also a seminar that I liked. We were able to take a trip outside campus and I enjoyed learning about Syncrude and how it contributes 60% of their earnings to environmental purposes.

In conclusion, I would really like to thank my principal investigator Dr. Kim H. Chow and my main supervisors Jaechun Jeon and Serhat Alagoz for donating their time. I would also like to thank Alberta Education for sponsoring me. Without their assistance I would have not had this chance. Time sure flew by, but I guess that's what happens when you're having fun. I had a wonderful time learning about this research and how it can be practical to real word situations. My memory of participating in WISEST is something I am going to cherish for a long time.

Julie McIntosh

Supervisor:
Dr. Abram Hindle

Department:
Computing Science

Sponsor:
NSERC
PromoScience



The WISEST summer research program gave me an opportunity to learn and grow in ways that have developed me as a student and given me ideas as to a direction for my future. This summer I was given the opportunity to participate in research at the University of Alberta for six weeks. I worked in a computer science lab along with one other WISEST student. Under the guidance of Dr. Abram Hindle we built and programmed a pair of drumsticks that use persistence of vision to create temporary images and messages in the air as they are used.

We spent more than half of the program learning two different coding languages, Arduino C and SuperCollider, to program a small computer chip and to experiment with sound. Our first practice project was using one of these small chips, a LightBlue Bean produced by PunchThrough Designs, to create a small array of independently controlled light emitting diodes (LEDs). We expanded on this project to practice using the Arduino coding language by creating a die simulator to generate and display a random number when shaken. Dr. Hindle encouraged us to experiment with sound generation using the SuperCollider software, so we added sound generation to our program that makes a clattering sound when the die is shaken based on the acceleration of the chip. With the die project completed, we began the drumsticks. Because so much of our code from the die project involved acceleration, we were able to draw from those concepts and pull together a working prototype quickly. A few days later our finished drumsticks could produce red glowing letters and patterns and allowed a user to enter a phrase to display. However, the project did not happen without setbacks. We had to troubleshoot upside-down letters and work around the slower speed of our chip. Some days were spent entirely on troubleshooting and hunting out bugs in our code. But the excitement of finishing our working prototype made the long hard days seem worthwhile.

Throughout our rewarding and frustrating days our direct supervisor Joshua Campbell was always willing to give advice, solder our wiring or answer questions. Our personal investigator was also available for questions and guidance, and together these two mentors ensured that whenever we hit a wall we were able get over it or find another way. I'd like to thank them for their patience and hard work. And of course the entire experience would not have been possible without my sponsor, NSERC PromoScience, and the support of the WISEST team.

One of my biggest lessons from the sessions with University of Alberta faculty and local professionals was that it is alright, and even normal, to change plans or be unsure as to what you want to study or pursue. In addition to this encouraging message I also gained a further understanding of what field I might fit into moving forwards, and how some of my interests could form engaging paths for study. And besides these revelations, there were opportunities to improve public speaking skills, writing and networking skills, and be introduced to new people with the possibility of forming new friendships.

In these ways I was exposed to new ideas, gained new skills, and made new friends. I feel more confident about my path beyond high school, and know my way around campus pretty well should I ever study at the University of Alberta. The WISEST summer research program provided an engaging, productive, and fun way to spend six weeks, and gave a very positive introduction into the world of research.

Kendra McQuaig



Supervisor:
Dr. Aman Ullah

Department:
**Agriculture, Food,
and Nutritional
Sciences**

Sponsor:
Weyerhaeuser

I applied for the WISEST Summer Research Program in hopes of broadening my knowledge base and finding my passion. I wanted to be a part of WISEST program to gain confidence in myself and the decision to pursue a career in the math, science or technology fields. This program has not only opened my eyes to the endless possibilities, but it has also given me the experience of a lifetime. Having almost finished the program my expectations have been by far exceeded, I've spent every day in the lab working on a project that has never been done before. I was able to see what it's really like to be a researcher and wake up every morning and live the life of one, doing research that will hopefully play a small part of helping others. In and outside of the lab I have received mentorship from some truly amazing role models and learned life skills that I can use in the future.

My project was to create a new biodegradable and renewable drug carrier for cancer and tumour treatments. My partner and I preceded various different reactions in the lab each day, in efforts to synthesize the components of a block copolymer which will then self-assemble in solution to form micelles and encapsulate the drugs. I was really glad I was placed in this lab because I am interested in the medical field and helping others. In saying that, I was wondering where I would fit into the medical field, knowing I couldn't physically be a doctor or nurse. Working in the lab everyday showed me that you don't need to see patients every day to be helping them. Although I might not find the cure I could contribute to it.

Not all of my time was spent in the lab though, WISEST provides weekly seminars and lunch and learns for students, which included everything from industry tours to networking with mentors. For me, I can't decide which of those the most valuable session was because although they were some of the most different sessions they were the most helpful. I attended the Gilead facility, where they do research to make new drugs and manufacture them on a large scale. It was great to see where a PhD in chemistry could get me if that was the route I chose. It's important to see what you would be doing every day and if you would enjoy it or not. Secondly, at the networking fair I was given the privilege to talk to mentor Clara who had a very similar outlook on life as me, she is currently a chemical engineer but is going back to grad school to take biomedical engineering. Her reasoning was simple; it wasn't about the money it was about her. Clara wanted a job that she enjoyed where she could fulfill her goal and aspiration to help others, a job she didn't mind working overtime for. This mentor knew what it was like to balance work and life; I hope one day I can do it as well as her.

I would like to thank my sponsor Weyerhaeuser for making this experience possible, my supervisor and Principle Investigator for this opportunity and all of their help along the way. This program has made this summer one to remember and I'd like to thank all of the WISEST staff for all their hard work in planning and organising everything.

Meghan Northmore

Supervisor:
Dr. Heather Bruce

Department:
**Agriculture, Food,
and Nutritional
Science**

**Sponsor: Faculty
of Agricultural,
Life,
Environmental
Sciences**



When I first heard of the WISEST Summer Research Program (SRP), it sparked an interest in me for a couple of reasons. Firstly, the entire motivation behind WISEST is to promote gender equality in education and the workplace, which is a value that I firmly stand behind. Additionally, the SRP seemed to be a great opportunity to get a better idea of what I wanted to explore in post-secondary education, and develop a plan for my career further down the line. Looking back on the past six weeks, my perspective has definitely widened, as I have been exposed to various fields of science that I had not even considered, as well as meet some intelligent and inspiring people. In addition, the opportunity to work in a university research lab and get a taste of university life was of indescribable value.

My primary project was sensory testing of pork loins of varying muscle pH and fat content, with the aim to discover which pork loins were most acceptable by the consumer for the attributes of texture and juiciness. Sensory testing involves a number of panelists evaluating a product, typically food, based on the senses of touch, taste, sound, sight and hearing. This research project took place in Dr. Heather Bruce's lab in the Department of Agriculture, Food and Nutritional Science, under the supervision of Linda Ho, who helped show me the ropes of sensory testing and the various applications and importance of food science as a whole. This was one of the many instances during the SRP that I was exposed to diverse career opportunities, as I saw the numerous careers that stemmed from food science alone. During this research project, I assisted in preparing the pork samples for the consumer panel, and supervising the actual sensory evaluation. Overall, learning about this unique branch of science has led me to realize that there are endless career opportunities to explore, no matter what your interests.

In addition to research in the lab, WISEST also provided Professional Development and Lunch N' Learn sessions to extend our learning experience beyond the lab. During these sessions, I gained some indispensable skills such as learning to design a research poster, how to communicate effectively, and how to network with industry professionals. One of my favorite sessions was the Networking Fair, which was an excellent experience as I got to meet and chat one-on-one with influential women in a variety of fields in science and engineering. These highly successful and passionate women gave many helpful tips on choosing a career path and overcoming gender inequalities in the workplace. Their sharing of their own personal experiences, which was also of immense value, complemented this advice. Despite coming from a variety of fields and backgrounds, the passion for their careers was something all the women had in common. Through this session I learned the valuable lesson of pursuing your passions, no matter how daunting the circumstances.

Overall, the WISEST summer research program was an amazing six weeks that allowed me to grow as an individual, scientist, and learner. However, despite all that I learned within doing research, it was the people who made this a truly remarkable experience. That being said, I extend my thanks to the Faculty of Agriculture, Life and Environmental Sciences and Canada Summer Jobs for funding my position. I would also like to thank Dr. Heather Bruce, Linda Ho, Dr. Bimol Roy as well as other members of the research team, for their mentorship and assistance throughout the program. Lastly, I would like to thank WISEST for this amazing opportunity that has led to a memorable summer.

Megan Paliwoda



Supervisor:
Dr. Ian McDonald

Department:
**Ophthalmology &
Visual Sciences**

Sponsor:
**NSERC
PromoScience**

I once knew a young girl whose dreams were never restricted by the disapproval of others, in fact, disapproval only strengthened her resolve. She wished to bring change to the world and to inspire people. My greatest regret is that I was unable to see her dreams grow as she grew into a woman. However, when my biology teacher pulled me aside one day to introduce me to the world of the Women in Scholarship, Engineering, Science, and Technology (WISEST) Summer Research Program (SRP), I was reunited with the spirit of that young girl whom I had buried deep inside me. Thankfully, the WISEST SRP helped me find her and dream as big as I once did. My entire experience was almost too good to be true, because the SRP placed me into a job in medicine, a field of career I was previously too hesitant to pursue. For once in my life the product of my hard work was not a high mark or just money, it was the knowledge that I was helping real people.

Throughout the summer, I worked in the department of ophthalmology under my principal investigator, Dr. Ian MacDonald. I worked at the Royal Alexandra Hospital where I took part in a study conducted to improve re-operation rate for strabismus surgery, a type of eye surgery where the muscles of the eye are manipulated to correct issues such as lazy eye. Our study was intended to develop techniques that could prevent unnecessary surgeries and the work I did greatly helped in the study. I entered in 20 years of vital data that we analyzed for the study. I was also privileged with two opportunities to witness strabismus surgeries in the O.R. room as well as the chance to shadow two eye doctors who are also surgeons at the Royal Alexandra Hospital. Sitting beside a surgeon as they operate is a surreal experience that most grade 11 students will never experience if not for a program such as the WISEST SRP.

From the Lunch n' Learn Sessions to the Professional Development Seminars, the SRP provided every one of us with valuable skills and knowledge which cannot be paid back by mere thanks. Although each session was as informative as the last, my favorite session had to be the Networking Fair, where I became inspired by numerous role models. The women I talked to were very relatable people and were open to any question I had. It was an inspirational and irreplaceable experience that only further enhanced my enthusiasm. When the WISEST SRP picked, "more than just a summer job," for their motto, they couldn't have put more accuracy into words. From the knowledge I gained, inspiration I received, and friends I made, I can hardly call it a job at all!

With my deepest sincerity, I want to thank my sponsor NSERC PromoScience for funding my experience as well as Angela and Rhea along with the whole WISEST SRP team who delivered this experience. Also I would like to give a large thank you to Julianna Wozniak, who set me up to view surgeries and shadow surgeons, along with Dr. Ian MacDonald at the Royal Alexandra Hospital for their constant guidance and kindness throughout the program. Thank you to Dr. Kam Kassiri, Dr. Carlos Solarte, and Dr. Natashka Pollock for being wonderful teachers and allowing me to shadow them! Finally, thank you to my biology teacher, Mr. Milne, who recommended the WISEST SRP to me!

Jolene Poulin

Supervisor:
Dr. Jason Carey

Department:
**Mechanical
Engineering**

Sponsor:
**Alberta Innovates
Health Solutions**



On the first day of the Summer Research Program (SRP), held by Women in Scholarship, Engineering, Science and Technology (WISEST), I was nervous about what lay ahead. Working in an actual research lab with accomplished graduate and undergraduate students seemed like a daunting task. However, my nervousness soon became excitement, and for good reason too.

Over the past six weeks, I have been working in Dr. Jason Carey's biomechanical engineering lab developing a three dimensional (3D) model of the lower lumbar spine. My specific task was to design the intervertebral disc (the flexible part of the spine found in between two vertebrae) for my direct supervisor, Nathaniel Maeda. The process to develop the model was long, but extremely rewarding in the end. After using a software program to design the spine model, I printed it using the lab's desktop 3D printers. The printers were impressive with what they could do and I even got to run material tests on the types of plastic we could print in the lab. This was a great opportunity to witness a more typical activity that engineering students would do and gave me a glimpse of the student experience at the University of Alberta. By the end of the six weeks, I assembled a full model of two lumbar vertebrae, very similar to those in the human body, which simply needed to be glued together. As spine mechanics is a fairly new area of research, little information on this topic is available in literature; this model will assist my supervisor in better understanding the mechanics of the spine, an important aspect of his research.

To add to the excitement of working in the lab, WISEST held many out-of-lab activities. These activities ranged from tours of research facilities on and off campus, guest speakers, a networking fair and multiple Lunch 'n' Learn sessions. From these activities, I learned many important skills; I now understand the value of proper communication, the career possibilities that exist in the Edmonton area, and which programs I should consider taking in university to achieve my career goals. These sessions were the most obvious learning opportunities in the SRP, but my everyday activities were also filled with new information and new problems to solve. I learned things that were very specific to my job, such as the operation of software programs and how to change the filament in a 3D printer, but I also learned the importance of teamwork and patience, which are useful skills for life in general. My team members also taught me how to make an effective poster and I had never before realized the art of online file sharing, which was shown to me during my stay in the lab. Overall, I obtained many valuable skills during the SRP that I can and will apply in my future academic ventures, but also in my day-to-day life.

Coming into the SRP, I was hoping to participate in an exciting, innovative research project, meet like-minded people, learn new information and, ultimately, have a good time. The SRP delivered in all these aspects and provided much more, creating an overall unforgettable experience. I am grateful to WISEST for offering me the opportunity to be a part of this program; the people I've met and the skills I've gained will last a lifetime. Lastly, I need to thank Alberta Innovates Health Solutions for funding my experience in, arguably, the best summer program Edmonton has to offer.

Aida Radu



Supervisor:
Dr. Christopher
Sturdy

Department:
Psychology

Sponsor:
NSERC
PromoScience

I am not ashamed to say that when I learned I had been accepted to the WISEST Summer Research Program, I nearly cried. Before the program started, I had expected to enjoy a summer working in a lab, gaining some work experience, and perhaps learning more about different scientific fields that interested me. My original expectations were far exceeded, and seem miniscule now, compared to my experiences this summer. However, one thing I had not expected was to become a completely different person than I was at the beginning of these six weeks.

This summer, I was placed in the lab of Dr. Christopher Sturdy, in the psychology department. My research project focused on studying chickadee calls to determine changes in the calls of individuals across different seasons. I was trained in using SIGNAL bioacoustics software, and my responsibilities in the lab included identifying vocalizations and using the software to cut the calls from longer recordings. I then standardized individual notes in the calls, and measured their frequency. The work I contributed to the lab will go on to further our knowledge of how vocal acquisition occurs in songbirds and to determine if they serve as an effective model to human vocal learning. During my time in the lab, I also had the opportunity to feed the chickadees-- which were adorable--supplements of boiled eggs or live worms every day; it was one of the most exciting parts of the summer for me.

I could not have asked to be placed into a more rewarding position than the one I was in. Though I was in the psychology department, I gained invaluable knowledge about language, biology, and, most surprisingly, computers. However, it is the knowledge I gained from the students in my lab that is most precious to me, because I can carry it into any field I choose. Their commitment to my success, their insight into university life and their general life advice are things I never could have gotten from a textbook.

On top of the unforgettable lab experience, WISEST also provided me with the opportunity to attend group activities, where I learned the value of networking, and was able to learn about accessing the University of Alberta libraries. These skills and memories will be extremely useful tools when I eventually apply to university next year. An especially memorable session was the guest lecture by Dr. Margaret-Ann Armour; she inspired me to believe in my capabilities and use them to reach my dreams.

This project changed the way I saw myself; I feel so much more confident of my options in the science field than I have ever felt before. I have learned about university first hand, familiarized myself with the layout of the University of Alberta campus, and enhanced my excitement for the sciences. Now, I will enter my final year of high school knowing that the next step won't be as scary as it would have been without the Summer Research Program.

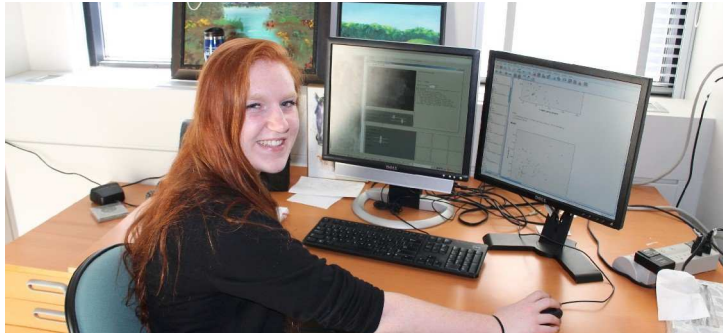
I want to thank the WISEST coordinators and my sponsor, the Natural Sciences and Engineering Research Council of Canada PromoScience program, for giving me this opportunity. As well, my direct supervisors and Dr. Sturdy, for making me feel welcome and appreciated in the lab. I will never forget this extraordinary experience.

Emily Redford

Supervisor:
Dr. Eric Parent

Department:
Physical Therapy

Sponsor:
Edmonton Chapter
Beta Sigma Phi



The WISEST Summer Research Program was all I could have hoped for and more. I came upon it very much by accident; my friend first introduced me to the program at the U of A open house, I took a brochure and didn't really think about it for a while until a teacher at my school, not even one of my own, suggested the program to me. I did more research on the program and sent in my hopeful application. My interests had changed from when I first applied to when I got my phone call, "anything but engineering" I kept repeating in my head listening to the lady on the other end of the phone and when she said I was in the department of physical therapy I was so excited. Going into the program, I expected to broaden my knowledge of the body and my passion for health related careers but I came out with all that and so much more.

I was assigned to the rehabilitation therapy lab of Dr. Eric Parent and worked on a project researching Scoliosis; a word I'd never heard before but would soon come to love. Scoliosis is a 3D deformity of the spine characterized by lateral curvature and vertebral rotation. Typically, X-rays are used to assess the internal deformity and are harmful to the patients. Our project was researching the effectiveness of a noninvasive assessment as a replacement. My lab partner, Sheri (another WISEST student), and I spent the summer on the computer measuring the vertebral rotation of over 400 patients, finding lost data from a data crash and measuring the surface topography scans. We also got to see patient evaluations for a separate project Dr. Parent was working on. I learned plenty about the anatomy of the spine and abdomen, as well as how to determine skeletal maturity, classify scoliosis curves and write a research article. The biggest thing I realized throughout this program is that there is a lot of nitty gritty that is not represented when talking about research and that trial and error is a large part of research. My professor taught me that sometimes in order to take a leap forward you have to be willing to take a couple steps backwards.

The WISEST Summer Research Program gave me the opportunity to make lifelong connections and friendships while getting the opportunity to experience what research and University life is like. The program also included professional development seminars, workshops and events. They covered a variety of topics including talking to Alumni and current students at the WISEST 101 and U of A Q&A sessions, as well as tours of the U of A and industry research labs. My favourite sessions were the Networking Fair and Effective Presentations because I believe they will be most helpful to me in my future. The Networking Fair allowed us to connect with professionals in careers we were interested in, and the Effective Presentations was a workshop that gave us the tools to give impressive presentations in addition to meaningful conversations and first impressions. I am so grateful for my experience, to Dr. Parent for welcoming me into his lab, to WISEST for accepting me for the program, and to Edmonton Chapter Beta Sigma Phi, my personal sponsors, without whom I wouldn't have been able to participate in this program.

Veronica Salm



***Supervisor:
Dr. Heather
Warkentin***

***Department:
Medical Physics***

***Sponsor: NSERC
PromoScience***

When I dropped my WISEST Summer Research Program application off in the mail in early April of this year, I had no idea what it would be like to be a WISEST student. On the first day of the program, I arrived anxious but excited. Although I sat among 39 other students that morning before orientation, the room was dead silent. Everyone was anticipating their first meeting with their supervisors and the unknown expanse of the summer to come, myself included.

That afternoon, I met my supervisors for the first time and we walked down to the Cross Cancer Institute, where I would be spending the next six weeks. I had been assigned to the Division of Medical Physics in the Department of Oncology and I spent the summer researching the applications of radiation therapy in cancer treatment. While I had the opportunity to work on several projects over the course of the summer, the one I focused on most strongly involved brachytherapy, the practice of applying radiation either inside the body or on its surface using radioactive isotopes instead of using external beams to treat a tumour. For my project, I used Excel to create a dose point library for a multi-channel gynecological applicator (MCA), a tool typically used to administer brachytherapy treatments to patients with vaginal and cervical cancers. The data set I created will allow dosimetrists to copy and paste dose points from Excel into the treatment planning software. This method will improve treatment planning by creating a quick way to design accurate brachytherapy treatments.

Although the focus of the program was on research, I feel that I benefitted at least as much from other parts of the experience as I did from my work. For one thing, I had fantastic supervisors who were willing to arrange tours and meetings for me and answer all of the many questions I had without making me feel stupid for asking them. Thanks to my supervisors, I got to learn how a linear accelerator works, visit a new cyclotron facility, watch an MRI magnet in action, and talk to many different grad students and researchers about their educational and career paths. Professional Development sessions and Lunch 'n' Learns also enabled me to expand my awareness of careers in which women are under-represented. Organized lunches and pockets of free time in between working hours gave me the chance to meet new people and develop strong friendships. As a Social Coordinator, I was even able to organize an event myself, and I relished the opportunity to talk to other young people as intelligent and as interested in science and learning as I am.

As the summer draws to a close, I still feel that same excitement and desire to learn that I did at the start of the program. It would be easy to compare myself to a sponge, soaking everything in and enjoying every minute of it. This summer has been an amazing and formative experience, and I will never forget it.

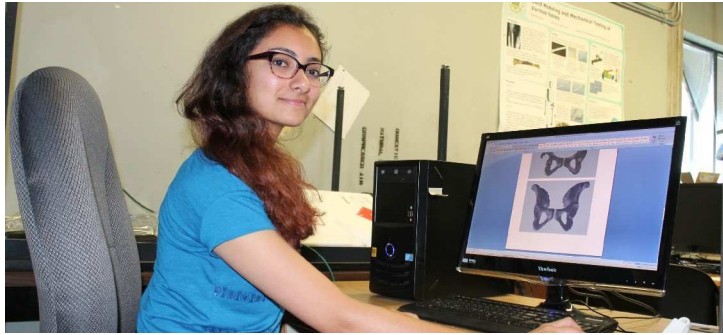
I would like to thank my supervisors and my sponsor, NSERC Promo Science, for allowing me this incredible opportunity. I am so glad that I got to spend six weeks in the Division of Medical Physics and that I decided to apply to the WISEST Summer Research Program in the first place.

Tehzeeb Sayed

Supervisor:
Dr. Kajsa Duke

Department:
**Mechanical
Engineering**

Sponsor:
**Alberta Innovates
Health Solutions**



Upon applying to the WISEST Summer Research Program, I expected it to be a wonderful opportunity to observe life in a lab setting and meet both students and faculty who shared my interests. However, this summer has been much more than that, from the chance to develop my own methods in a lab, to the WISEST sessions that introduced us to professionals in a variety of fields.

I worked in the mechanical engineering lab of Dr. Kajsa Duke, to develop a process that would take patient computerized tomography (CT) scans of fractured pelvises, create virtual 3D models, and then virtually repair them. The ultimate goal of this project is to create custom plates for patients who have to undergo surgery for pelvic fractures. The current plating method is more time consuming because the plates must be bent to the right shape during surgery and precision can be difficult to achieve. However, with a virtually repaired pelvis, custom plates can be 3D printed, thereby possibly reducing the duration of surgery and risk to the patient.

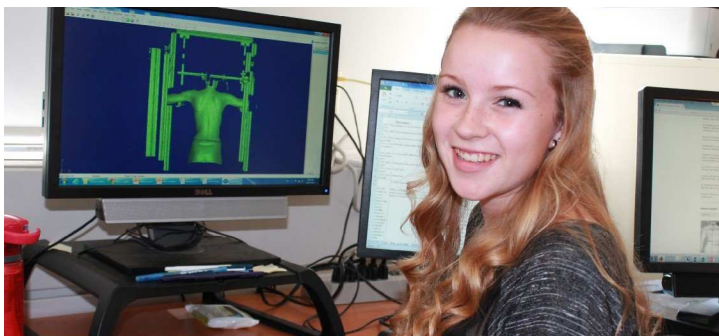
I worked with programs like Mimics, Geomagic, and SolidWorks to isolate the pelvis from CT scans of the pelvis and surrounding bones, created a 3D model, and then processed it to make it more realistic and so that it was compatible with SolidWorks for repair. Prior to my beginning the program, none of the pelvic scans in the lab had been virtually repaired before, but over the course of weeks, my fellow WISEST student and I managed to develop a method of repair, applying it to three pelvic scans. Throughout this procedure, I was also introduced to many different types of software used in engineering, and came away with a basic understanding of each of them.

The progress I achieved both in the lab and personally far exceeded my expectations, and was constantly supplemented by activities organized by WISEST as well. WISEST gave us the opportunity to meet professionals in a variety of fields through the Networking Fair, where I was able to interact with people in areas of study I was interested in and was even introduced to fields I had never considered before. WISEST also held Lunch 'n' Learns where we learned important skills like report writing, research poster design, and effective research presentation.

I entered the program not sure of what career I wanted to pursue and after the program, I still don't know, simply because I've been introduced to so many new and exciting paths. The sheer variety of careers I've been able to witness in these few short weeks has been astounding and I have more ideas than ever before about where my studies can take me.

The experience I've gained through working, navigating campus and meeting new people every single day during the Summer Research Program has been amazing and I've emerged from it with not only a wealth of new information, but also new connections to both WISEST students and university faculty. This opportunity could not have taken place without Dr. Duke and her research team whom I worked with this summer, Alberta Innovates Health Solutions, who sponsored my research, and of course the WISEST team, for creating such a unique opportunity. This has been a memorable summer where I've learned skills and made friends I will have for a long time to come.

Sheri Schmidt



Supervisor:
Dr. Eric Parent

Department:
Physical Therapy

Sponsor:
**Royal Glenora
Rotary**

I heard about the WISEST Summer Research Program through my teachers and I knew it was something I wanted to partake in. I applied to this program because I have a strong passion for science and I wanted to explore career options. Once I was accepted, I was a little nervous for what might come next; I feared that I may be put into a field that I disliked, but thankfully, that was not the case. Every minute of the WISEST program I enjoyed, from working in my lab to the lunch and learns hosted by WISEST. This opportunity allowed me to expand my knowledge through hands on experiences. Going into the program, I expected to enjoy myself and learn more about careers and sciences; I was able to do all of this and much more.

After what felt like years of waiting for the phone call from WISEST, I was told that I would be working in the Department of Physical Therapy and was ecstatic. I have an interest in human anatomy and this was right up my alley. Knowing that I'd be working with a physical therapist, I assumed I would be working a lot with patients, however, I worked more on the computer. The lab I was working in was researching Adolescent Idiopathic Scoliosis (AIS). I was under the supervision of Dr. Eric Parent and shared the lab with Emily, a fellow WISEST student.

The goal of Dr. Parent's research was to determine if surface topography could detect changes over a one year period in vertebral rotation in patients with AIS. My job in this lab was measuring over 400 patient's vertebrae and measuring a few patients using surface topography. I also was able to attend meetings with other researchers who are interested in scoliosis and see actual patients with scoliosis. Every day during this program I learned something new. I learnt anatomy of the back and abdominal region, how to use different software on the computer, analyze data, and how to present my findings.

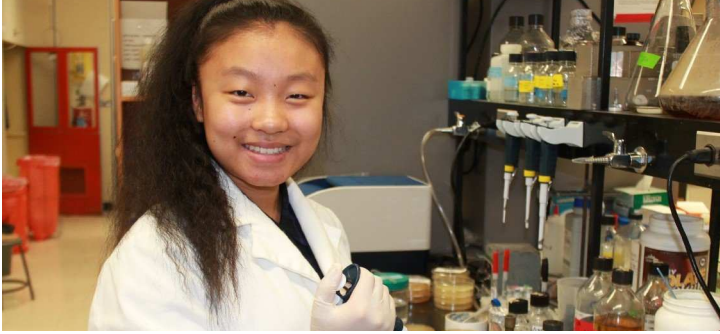
Not only was I able to obtain knowledge within my lab, I had the opportunity to learn at professional seminars and Lunch & Learns that were put on by the WISEST coordinators. At these events I had the chance to talk to former WISEST students, U of A students, and professionals in STEM careers. The most valuable session in my opinion was the U of A Q&A. At this Lunch & Learn, I was able to ask multiple questions to current students at the university. I found this really helpful because I was able to hear what university life is really like, not just the rumors. Looking into my future, I know I will be able to use everything I learned from this program. I will be more prepared for university and whatever may follow that. I want to thank WISEST for offering such a wonderful opportunity to me. I also want to thank Dr. Parent and his lab mates for allowing me to assist in their research and Royal Glenora Rotary for being my personal sponsor. Without the support of everyone mentioned, I would not have been able to experience this amazing summer.

Sarah Song

Supervisor:
Dr. David Stuart

Department:
Biochemistry

Sponsor:
Faculty of Science



The world is governed by a ruthlessly infinite amount of possibilities, a magnificent place where individuals often get lost and tangled up in its complexity. It is a constant strain trying to keep pace – still, ground is easily lost. Finding myself battling relentless uncertainty about the future has become a pastime of mine, perpetuated by a deep-seeded desire to learn. When I had initially discovered the WISEST Summer Research Program, I was delighted at the possibility to mitigate these confusions and to discover where my passions lie in science. WISEST was an unparalleled experience that never failed to humble me throughout the six weeks, quenching a thirst I didn't know I had.

This summer, I had the privilege of working in Dr. David Stuart's lab in the Department of Biochemistry. Initially, I was intimidated by this field simply as I was completely clueless as to what it even was! The research in our lab was focused on synthesizing the fatty alcohols hexadecanol and octadecanol, which are widely used in the pharmaceuticals industry. They are currently sourced from palm oil, which has led to extensive deforestation in Southeast Asia and a grave loss in biodiversity. As a result, we aim to genetically engineer a model strain of yeast for a greener source of fatty alcohol production. Within this project, I was designated to task of creating an acetyl-CoA overexpression strain, a precursor to fatty alcohol synthesis.

Admittedly, I was hopelessly lost the first few days in the lab. Everything, from trying to decipher the research papers to gathering materials needed for my experiments far transcended my amateur high school experiences. Regardless, members of the lab fostered a friendly and welcoming environment, always willing to help ease my transition. Frustration for producing negative results despite following protocols precisely, and uninterrupted patience in waiting for strains to incubate and grow were times of adversity; however, one moment of success made everything worthwhile. Research is rarely simple; it's often beyond our control.

Participating in WISEST aided in my self-discovery. Although it would have been enough indulging in the lab experience, WISEST was a fully immersible program that left a lasting impression on me. One of the most notable Professional Development seminars we attended was the networking fair. Each role model present had a different philosophy and definition of success, which is what ultimately made them successful. I was equally surprised to learn that like me, they were figuring themselves out and struggling to find their purpose.

The significance of participating in the WISEST Summer Research Program for me was shrinking the world down to a more workable size. The six-week period was a short amount of time, but it was remarkable how much we were able to accomplish both with others and within ourselves. Through the valuable eye-opening experiences I had, the unforgettable relationships I developed, and the transferrable life skills I acquired, WISEST built a solid framework that will promote my success in university and beyond. I am incredibly grateful to everyone who made this experience truly unique. Thank you to Canada Summer Jobs and the Faculty of Science for their generous sponsorship in this endeavor; thank you to my research team for invariably supporting me in an unfamiliar setting; thank you to the WISEST team for assembling an exceptional program founded on great beliefs and values. I can only hope that I have given a small part to this program, as it has given so much to me.

Alana Tollenaar



Supervisor:
Dr. Kajsa Duke

Department:
**Mechanical
Engineering**

Sponsor:
**Alberta Innovates
Health Solutions**

It's hard to say whether these six weeks felt really short or really long. Time seems to have flown by. However, when I look back, I realize just how much we actually did and it seems like the beginning of July was ages ago. Throughout the WISEST Summer Research Program (WSRP), we were bombarded with information from both our labs and the other sessions and activities we were involved in. But I clearly remember one thing in particular that Dr. Margaret Ann Armour said to us on the day of orientation: "I hope your experience this summer is transformative." And transformative it was.

I completed my research in Dr. Kajsa Duke's biomedical lab in the Department of Mechanical Engineering. Ultimately, the long-term objective of this research project is to utilize virtual models of fractured pelvises in order to create custom support plates for the fractures prior to patients' surgeries, thereby improving the current processes of plating and fixation that occur during surgeries. Using a computer software called SolidWorks, my role within this project was to realign three-dimensional models of fractured pelvises. There were many challenges I faced throughout this process and while it was frustrating, it made every success even sweeter.

While the research aspect of the program was very enlightening, I got the most out of the additional sessions, seminars, and tours WISEST had arranged for us. Most notably, the industry tour to Gilead Pharmaceutical, the U of A Q&A, and the Networking Fair. At these particular sessions, I got the chance to speak with people that are pursuing the kinds of careers that I could see myself in. It was extremely valuable to have the chance to talk to these people and learn about how they got to where they are now and what their positions encompass.

When I applied for the WSRP, I thought I had a pretty good idea of what I wanted to pursue in post-secondary; I saw the program as a great opportunity to affirm my beliefs that I would like to go into engineering. Throughout my experiences this summer, I learned a lot about myself and what I am interested in and realized I should keep all of my options open as there are endless possibilities for where a career in science or engineering could take me. All of my experiences prior to and during the program have come together this summer and shaped the perceptions I have about myself, my career path, research, and also just university as a whole. The WISEST Summer Research Program has certainly pointed me in the right direction for the future and given me many skills and connections I can use to succeed throughout my career.

I would like to thank Alberta Innovates Health Solutions for sponsoring my participation in the program, my Principal Investigator, Dr. Kajsa Duke, my supervisor, Morgan Redmond, my lab partner, Tehzeeb Sayed, and the WISEST team, Rhea Kachroo and Angela Wilson. Without the support of all of these individuals, my summer would not have been the same.

Julia Tran

Supervisor:
Dr. Irena Buka

Department:
Pediatrics

Sponsor:
**Faculty of
Medicine and
Dentistry**



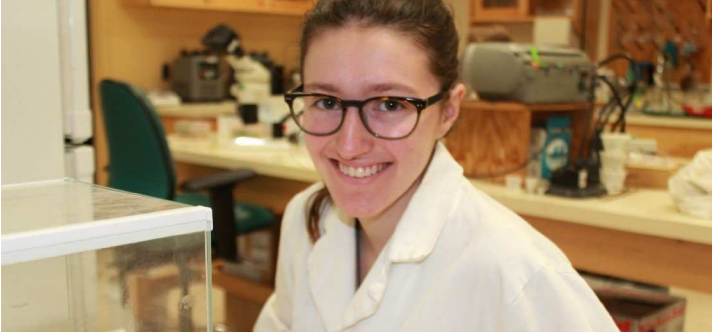
Despite my lack of real life experience as an adult, I can genuinely say that the WISEST Summer Research Program has been a life-changing experience for me. It is quite remarkable that after just six weeks, I can look back to see how much I've developed in such a short amount of time. Something very special about this opportunity was the fact that it was given to me, a rural student who attends a school of 300 students from Kindergarten to Grade 12. Living in a small community proved its challenges, and as a result, I had come to somewhat doubt in my ability to succeed in advanced science. I had applied to WISEST in order to harness and develop my skills because I wanted to become an innovative and contributing member in science. I was just majorly uncertain of my capability as a female with a rural difference.

This summer, I had the privilege of working in the Children's Environmental Health Clinic (ChEHC) under Dr. Irena Buka and Lesley Brennan. The ChEHC contributes clinical, research, and educational efforts to identify and analyze environmental health concerns of children and provides recommendations. Their ultimate goal is to optimize children's environmental conditions in the best interests of their health. The goal of my project was to gather relevant, available information about carbon monoxide (CO) poisoning in children in order to provide an educational resource for families. Though well known, CO is often overlooked despite severe consequences to exposure. Often, symptoms are non-specific leading to a notable amount of misdiagnoses by health professionals. The significance of studying children's health can be expressed by a favourite quote of Dr. Buka's: "Children are not just tiny adults." The quote refers to a child's development during growth that is susceptible to factors that could harm such crucial processes. Consequently, the need for encouraging awareness in this topic was made clear, and I was happy to be able to contribute my efforts towards something of great concern.

WISEST changed everything for me by organizing the Professional Development Seminars, Lunch'n' Learns, and off-campus tour. Lesley Brennan and Dr. Buka were also extremely kind and arranged multiple meetings and tours of different labs, medical fields and health professionals. One of my favourite activities was the industry tour of Gilead Sciences, Inc. It was impressive to see a university spin-off become a full-fledged company that incorporates research in order to provide for the needs of people. The incredible role models I met this summer have shown me the endless possibilities available. There is a great difference between someone telling you there are many options and when you see them for yourself. I believe WISEST has entirely captured this goal, and I am very grateful to them and ChEHC both. I have come to find diversity as essential to science, and it is an aspect I can utilize to my advantage with my rural and female perspective. I've finally learnt to stop limiting myself.

I would like to sincerely thank Dr. Buka, Lesley Brennan, ChEHC and WISEST for fuelling my passion for science by helping me to believe in my own potential. WISEST has surprised me with its interactive and effective program that has allowed me to evolve in the world of research. I am grateful for having this chance to meet and make great friends, for the fun, and the introduction to university life. I would like to thank the Faculty of Medicine and Dentistry as well as Canada Summer Jobs for their generous sponsorship that gave me this incredible opportunity. This has been a really important and invaluable life experience for me.

Ciara Verstraete



***Supervisor:
Dr. Maya Evenden***

***Department:
Biological Sciences***

***Sponsor:
Faculty of Science***

I have always had an endless supply of curiosity. Wondering at the world around me and needing to know the why and the how to everything I encounter. I have a love of discovery and science has always been an outlet for this insatiable curiosity of mine. The only problem with being as easily fascinated by everything and anything as I am leaves you at a blank when it comes to deciding what you are truly meant for. I had registered for the Summer Research Program hoping that this would be the experience that would not only provide me with much needed experience in science but with a little spark of passion for something that I can pursue later on during my post-secondary endeavours.

I had the privilege to be placed in an Entomology lab in Biological Sciences under the supervision of Dr. Maya Evenden. In the lab, I had the incredible opportunity to get to work hands on with the true armyworm (*Pseudaletia*). My project involved studying their ovipositioning habits to better inform farmers on how they should rotate their crops to minimize the damage caused by these local pests.

In the lab everyone was very encouraging and excited about their work. Someone was always available to help me with my project, give me advice and answer my questions. Not once did I ever feel out of place. I hope to one day work with some of the people in my lab again as I have come to very seriously ponder to possibility of entering the field of entomology. Bugs are the future and I want to be a part of the scientific research that involves what could very well be the most important group of living organisms on earth.

This program proved to be the experience of a lifetime. I cannot remember being as enthralled with my surroundings and drinking in every moment. I have come across friends that I hope to keep for years and learnt a multitude of new things. Who would of thought that I could one day say that I can dissect a caterpillar and retrieve its silk sacs, sex noctuides while pupae and recognize the sound of a male pine beetles chirp?

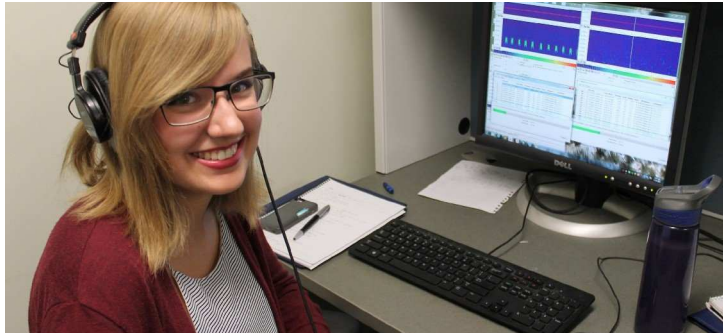
I would love to thank everyone that helped to make this experience as incredible for me as it was. Thank you to everyone in the Evenden lab for being so kind and patient with me. You were all so wonderful to work alongside. Thank you to Summer Jobs Canada and to the Faculty of Science for generously sponsoring my research here. I would also love to thank Brittany Prokop for being the most incredible denmother and friend to all of us in residence.

Kayla Warkentin

Supervisor:
Dr. Erin Bayne

Department:
Biology

Sponsor:
Faculty of Science



For as long as I can remember, I have been interested in the physical sciences, astronomy in particular. Thus, having expressed this in my application, I was surprised and mildly disappointed to learn that I was to be working in a lab studying birdsong. However, this experience has been far more educational and applicable to my life than I had originally imagined, and I know that I will be better prepared for a future career because of it. There were so many learning opportunities outside of the lab as well, all of which were interesting and beneficial. Not only do I now feel more confident in pursuing the career I want, I have also gained invaluable work experience, interpersonal skills, and a renewed passion for science.

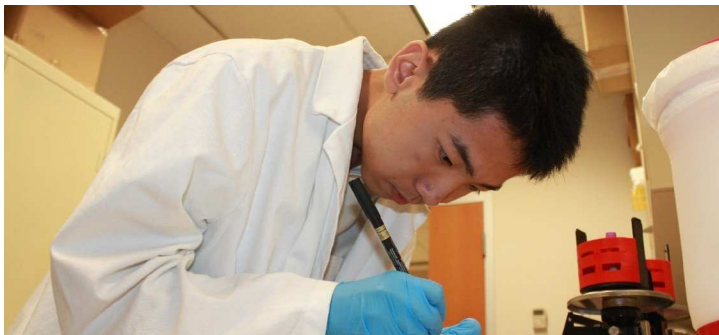
I spent the summer in the lab of Dr. Erin Bayne, in the Biological Sciences Department. It took some time for me to become comfortable with the various technical aspects of the work my lab entailed. Most of what I did involved sitting at a computer and becoming familiar with the programs that would allow me to conduct my research. Once I began to better understand these programs however, I found myself thoroughly enjoying much of the work. The research that I was able to be a part of involved building a computer recognizer that could pick out owl vocalizations from other noises present in the recordings taken by the lab. Once I had built such a recognizer for the northern saw-whet owl, I was able to run it against recordings and figure out where the owls could be found. I did this by determining the location of the recording device and verifying that there actually was an owl present. I then put that information into a Geographic Information System (GIS) and was able to create a habitat model. This model provides information about where northern saw-whet owls are likely to be found, and allows people to have a better understanding of the negative effects of deforestation.

Mapping the locations of these owls and determining the importance of my findings was a very fun and informative experience. Although I barely scratched the surface of statistical analysis and GIS functions, I still learned a good deal about both. I discovered that of eleven different types of habitat, northern saw-whet owls prefer broadleaf and coniferous forests to other land types such as shrub land or forests containing a mixture of trees. Also, the lab now has another functional recognizer to use for future research, so I contributed in that way as well.

I have learned so much from conducting this research, and not just in regards to owls. I feel significantly more comfortable using a computer now, and have been able to drastically improve my social skills as a result of working closely with the people in my lab and meeting the other WISEST students. I have met so many amazing people during these six weeks, and in this way I have definitely exceeded my expectations for the program.

Overall, my experience with the WISEST program has been extremely beneficial. Thank you to Canada Summer Jobs and the Dean of the Faculty of Science, Dr. Jonathan Schaeffer, for sponsoring me and allowing me to be a part of this program. I would also like to thank the researchers I was working with, as they took time out of their schedules to help me complete my project. I am so grateful for this amazing opportunity, as it helped me develop the confidence to pursue a career in science, and allowed me to enjoy myself while doing it.

Kai Zhang



Supervisor:
Dr. Rhona Bell

Department:
**Agriculture, Food,
and Nutritional
Science**

Sponsor:
Faculty of Nursing

Life is made up of the choices we make, ranging from generic trivialities to extreme life altering ones. Perhaps one of the best choices of my life was to step out of my comfort zone and apply for the WISEST summer research program. I chose to try something out of the ordinary so that I could expand my world view. Subsequently I delved into the world of scientific research where it both met and exceeded my expectations.

Initially my expectations were small, where I only hoped to see a general process of how research is conducted. However, upon working closely with the lab group, I became integrated with the study. We were researching the effect of eating different types of pulses, which consist of legumes such as dried beans or dried peas, on cholesterol levels. My primary focus was to smoothly assist the study on a day-to-day basis. This included creating blood draw kits, taking the blood to the lab for analysis, labelling micro tubes, entering data from participant questionnaires and sorting filing cabinets. I was even able to sit down with a participant during one of their routine visits to see the sheer effort that was put into obtaining data. This opportunity exceeded my expectations of what research was like as I realized the amount of work put into acquiring accurate data. I learned that working with participants can often be confusing, thus keen judgement must be applied on a regular basis to maintain consistency. My expectations were fulfilled and exceeded as I gained new insights into research with hands on experience.

My WISEST sessions were a vital component to not only make my summer research enjoyable, but also successful. Through the professional development seminars, I learned various things from acclaimed speakers such as time management and academic opportunities from Dr. Clark, the associate dean of nursing. I also gained new insights into making research posters visually appealing. Yet these few examples would not do justice to the multiple lessons that I had in this six week period. Perhaps the most significant session for me was effective oral presentations. The speakers were engaging, but nonetheless impactful with their eloquent speeches. I was greatly influenced by their ability to attract the audience, as such, this session has changed the way I now make my presentations. I hope to take this new found knowledge and apply it not only to my high school presentations, but beyond as well. As the speakers stated, effectively presenting your ideas is an essential skill for work. I will be able to use this session in my lab group meetings as well as when I am presenting my poster. Thus these sessions were not only invaluable to my success in the summer research program, but to my personal skill set as well.

Yet none of these insights into scientific research or presentations would be possible without my sponsors. I would like to extend a heartfelt thank you to the Faculty of Nursing and the Edmonton Chapter Beta Sigma Phi for allowing me to work, grow and succeed this summer. I would also like to thank Dr. Bell's lab group for all of their help and effort in teaching me about research as well as going above and beyond so that I would have an enjoyable experience working here. I am honoured to have worked with such an outstanding team. Lastly I would like to thank Dr. Bell for providing me guidance throughout my time in the research program by acting as my mentor. This summer has just been my beginning to a boundless career in science.



