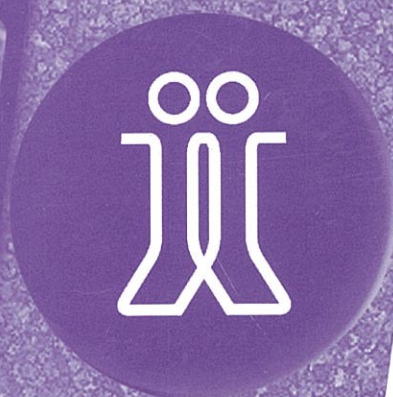
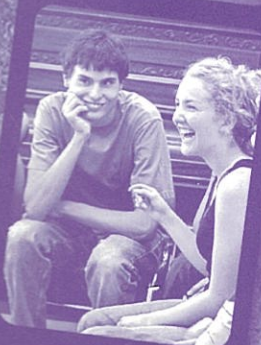


WISEST

women in scholarship, engineering, science & technology

WISEST Summer
Research Program
2006



STUDENT
REPORTS



WISEST AT THE UNIVERSITY OF ALBERTA

Women in Scholarship, Engineering, Science and Technology

WISEST is a University of Alberta-based organization whose vision is to strengthen science by increasing gender diversity and to enhance choices in science, engineering, scholarship and technology for women of all ages. Our programs foster collaboration and communication with partners in industry, in academia and education, and in government and non-governmental organizations in the community.

WISEST was founded in 1982 with a mandate to investigate the reasons why few young women are choosing careers in the sciences and engineering, to take action to alter the situation, and to work to increase the percentage of women in decision-making roles in all fields of scholarship.

The purpose of WISEST is to initiate action to increase the representation of women in all fields of scholarship. The studies and actions of WISEST are concentrated in the under-represented decision-making fields of science, engineering and technology.

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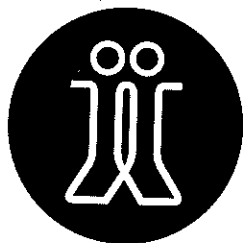
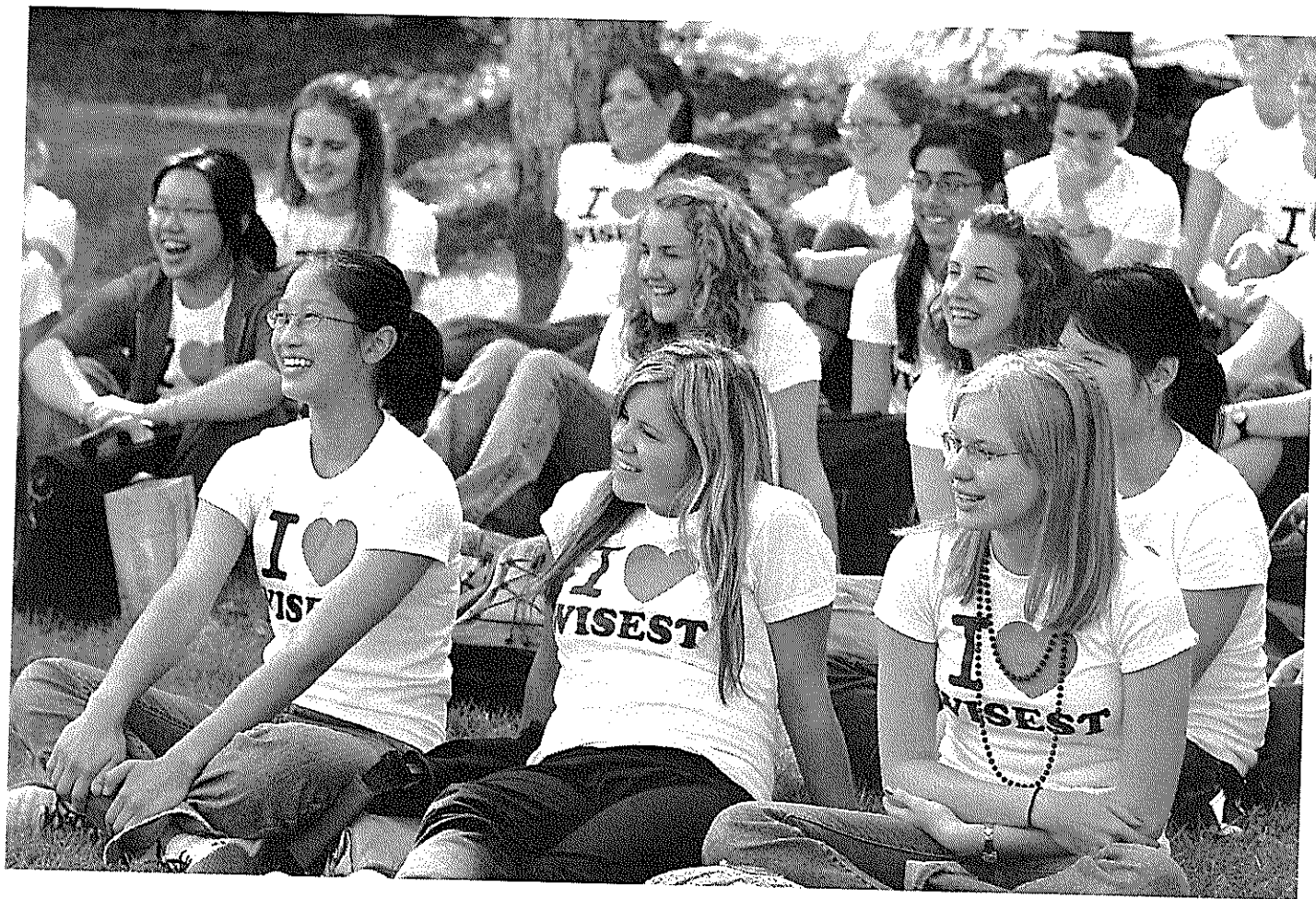
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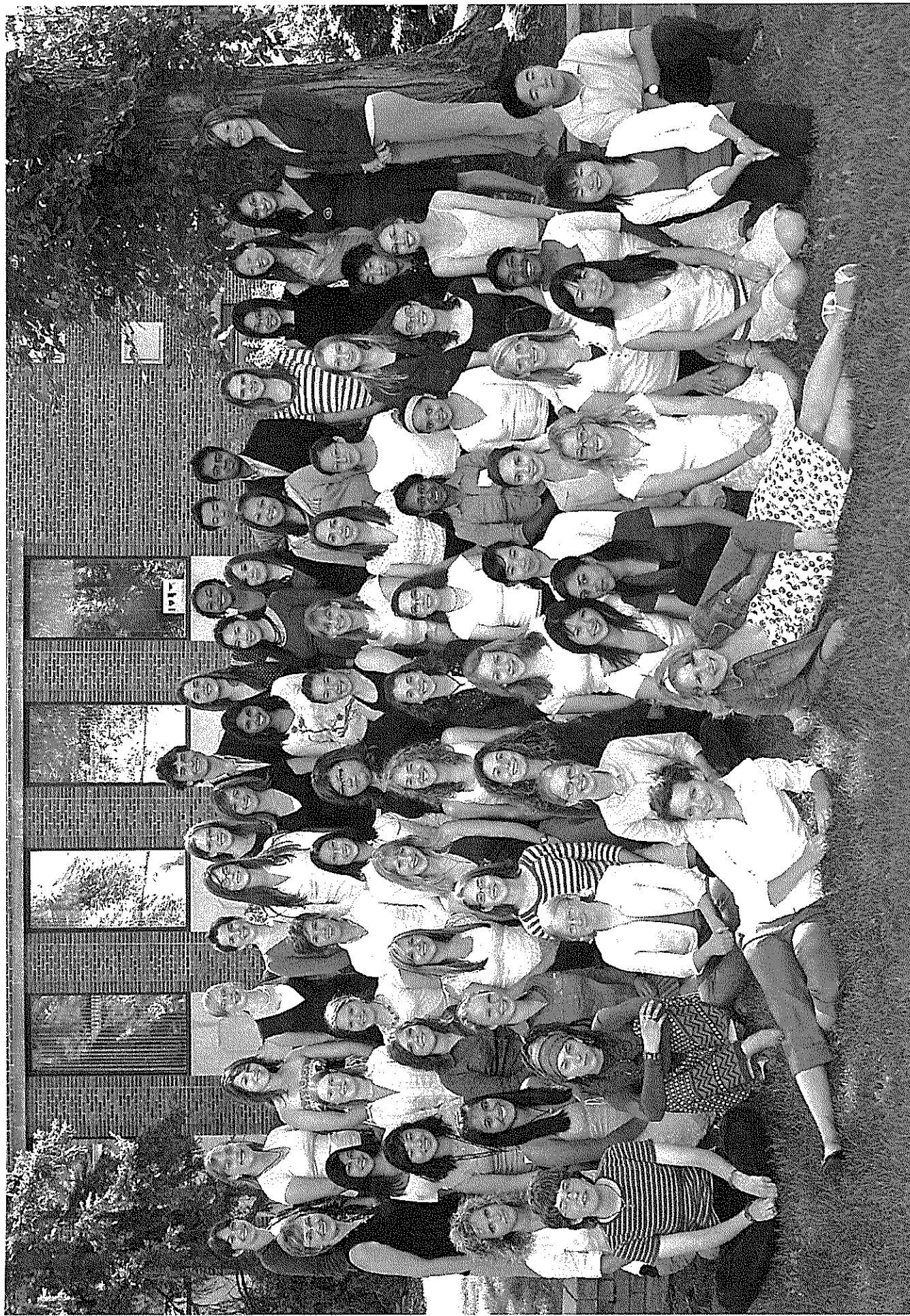
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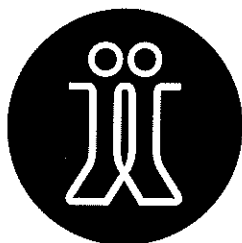
STUDENT REPORT BOOK





2006 WISEST SUMMER RESEARCH PROGRAM STUDENTS





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ANNUAL WISEST SUMMER RESEARCH PROGRAM

WRITTEN BY Dr. Gaylene Fasenko, Vice-Chair WISEST and Grace Ennis,
WISEST Coordinator.



FROM LEFT TO RIGHT Grace Ennis, Tiffany Ladoski, Selina Gyawali and Gaylene Fasenko

IN EARLY 1982, while attending a seminar on microprocessors, Dr. Gordin Kaplan (then the University of Alberta Vice-President, Research) noted that there was only one woman among the 150 people present. This triggered the creation of a new group to promote participation of women in the non-traditional careers – Women in Scholarship, Engineering, Science and Technology (WISEST). The primary job of this group, said Dr. Kaplan, is to try to understand why women are under-represented in the hard sciences and engineering, and then do something about it. Since women are still markedly under-represented in decision-making roles in the sciences and engineering, WISEST has concentrated its efforts to date on these fields. WISEST began by investigating why relatively few young women choose and remain in careers in the sciences and engineering and then initiated several on-going programs to change the situation.

One of the first major initiatives was the WISEST Summer Research Program, a valuable six-week research experience at the University of Alberta for high school students who are making decisions about their future fields of study and career paths. Students (both young women and men) who have completed grade 11 spend six weeks working as a member of a research group within disciplines less traditional to their gender. For young women, these areas include engineering, science, and technology, and for young men, the areas of nursing, nutrition and human ecology.

The WISEST students have written personal reflections about the experiences they had in the Program and in the research laboratories under the supervision of their scientist mentors and fellow research team members. They learned first-hand about cutting-edge research, the techniques and types of research being conducted and the research career opportunities

available, and they gained an introduction to academic and university life. A variety of formal weekly activities gave the students even more information about non-traditional areas of study. The student reports describe in their own words the six weeks of learning, hard work, mistakes and triumphs, and the amazing discoveries both in and outside of the lab.

The success of the WISEST Summer Research Program is due to the support of many, many people, including high school science teachers, faculty supervisors, and research team members. We offer our thanks and words of sincere appreciation to all high school teachers who sparked their students' interest in the Program, and to all university people who mentored, guided and encouraged the WISEST students to explore their interests.

WISEST would also like to acknowledge the financial support given by many local industries, philanthropic groups, the Provincial and Federal governments, and the University of Alberta. As Partners and Contributors, their sponsorship allowed WISEST to pay the students an hourly wage and give them a variety of resources and experiences. Each sponsorship allowed WISEST to recruit one more student to participate and gain valuable life experience from the Program. A detailed listing of the WISEST Partners and Contributors is included in this book and on our web page www.wisest.ualberta.ca

The WISEST students have now returned to their final year of high school to share with classmates and teachers their increased awareness of the research careers that are so vital to Alberta's future as a knowledge-based centre. We wish the WISEST students all the best in their future endeavours.

WISEST
women in scholarship, engineering, science & technology

A PICTURE IS WORTH 1000 WORDS

STUDENT COORDINATOR REPORT

WRITTEN BY Tiffany Ladoski



A PICTURE IS WORTH 1000 WORDS.

It is a difficult task to try and summarize what a summer with WISEST is all about from the perspective of a WISEST Student Coordinator. I've been trying to think of so many different ways to describe what Grace, Selina, and I went through to bring you all here to the University of Alberta and send you off to work in a lab that several months ago sounded so foreign to you. On the surface, this summer was about introducing 65 exceptional young students to the world of research in areas nontraditional to their gender. This summer was about learning how to work in a research lab alongside professors, graduate students, doctorate and post-doctorate students, technicians, and many others who every day come together to uncover new and exciting discoveries about ourselves and about our world. This is not what is difficult to express in words however; what is difficult to express is the overall feeling of community that

was developed among the participants of the WISEST Summer Research Program 2006. When I think of this, I cannot help but smile to myself as I recall all of the beautiful photos that we have to remember the summer by. You cannot help but see the excitement, determination, and respect that was felt by all while you browse through the WISEST Photo Gallery. The pictures show better than any words that WISEST is really about incredible people and incredible experiences, not just learning how to operate expensive lab equipment.

I can say with confidence that working as the WISEST Student Coordinator this summer was the most challenging job I have ever had. There are so many diverse tasks that must be completed in order to operate a program such as this. Before this summer I had thought that I was a detail-oriented person, but I can honestly tell you that I had no idea that I was capable of that level of organization! But I think that's the beauty of the WISEST Program- in one

way or another (or many) it pushes you in a way that few other experiences can. It challenges you and makes you stronger than you could have expected. And that was just me, I didn't even work in a lab...

Above all, I learned that it is the people who make this program what it is. It is YOU, the 65 bright inspiring students, who make this program what it is. From going through student applications, to meeting with supervisors, to matching students and labs, to organizing all those events, to being your guide and being your friend, I was so proud to be your WISEST Student Coordinator. I said from the first day that I saw the ad for the WISEST Student Coordinator position that this job seemed very different and very special from the other types of jobs that my peers were taking on in the summer. This job was never boring and the tasks were constantly changing. Every day there were new obstacles that were thrown onto the "to-do lists" but there was never a day that I didn't smile.

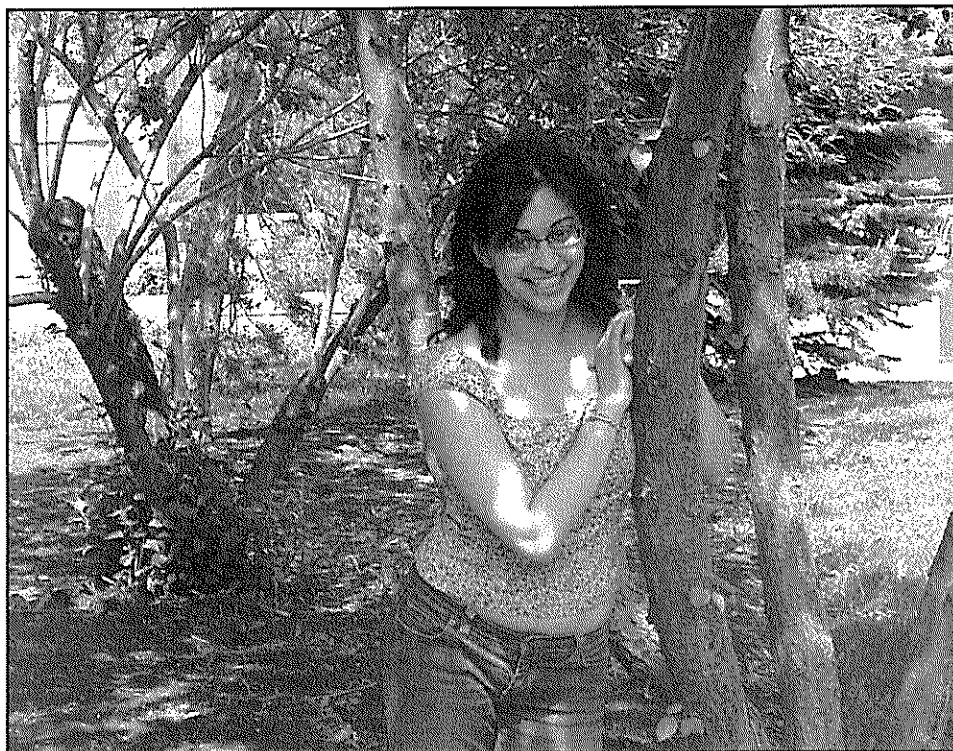
I will always look back on this summer with such fondness for each and every one of you. There were definite times of difficulty and trial for everyone, including the coordinators, but that did nothing but make way for growth and maturity. Please be strong and work to break down barriers and build up dreams. I have complete confidence in every one of you and I thank you for your enthusiasm this summer.

I "HEART" WISEST!

WHAT DOES IT TAKE?

STUDENT COORDINATOR REPORT

WRITTEN BY Selina Gyawali



WHAT DOES IT TAKE to have an amazing summer? To learn about yourself, and all that you can do in the wonderful world of science? Well, we thought it took a lot of things, such as WISEST Coordinators, supportive Supervisors, lots of paperwork, and a couple of broken beakers among other things...but when Tiffany and I were planning out your summer, we forgot about one vital ingredient – Watermelon! Just joking (although it definitely added to the success). We needed more than that, and more than you as 'students'. We needed your passion. We needed that energy, the dedication and determination, and not to mention competitive spirit (that turned a friendly game of 'Name that Tune' into a full out battle).

It didn't surprise me that you possessed drive and passion. We knew that you were exceptional from the get-go. Reading over your applications, and talking to you over the phone gave us a very clear and wonderful picture of the enthusiasm you had for life. What

did surprise me is how you could mold that passion towards any challenge you faced. You all were truly fantastic in how well you adapted to being placed in situations most students don't find themselves in 2nd or 3rd year of University.

I feel as though whatever I gave to the WISEST Summer Research Program, you gave me back 1000 fold. You proved that it's not only possible for people to be involved in areas of gender non traditional research, but to excel in them. I saw you grow from unsure, somewhat frantic teenagers, into mature, thinking and analytical scientists. Take a look back at the pictures from the beginning of summer, and compare them the ones at the end. If you look closely, you will notice a difference. This difference is confidence, which is just radiating from you.

So I want to thank you all. For giving me wonderful visuals to laugh about, like you chugging ketchup and mustard

from Dixie Cups. For getting a bouquet of watermelon coloured balloons, and enough candy to make my tummy hurt. For being a breath of fresh air in a sometimes stuffy world. For being determined to learn from every opportunity provided. Hopefully as you go on in life, you'll realize that (and maybe you already have) not everything you learned in WISEST is academic, and you will apply it as you go on in life. Take with you the patience and support of your Research Group, eager to share their knowledge and watch you learn. Take with you the friendships formed with people you would never have otherwise met. Take with you the wisdom and advice of the many Role Models who invest a part of themselves into the WISEST program, because they believe in people like you. And most of all, whenever you don't believe you can do something, take with you the immense pride I felt, (and saw in the eyes of your family, friends and Research Team), when we were amazed by your knowledge and poise at the Celebration of Research. You were all fantastic!!!

I think a lot of you came into this Program hoping it would help you decide what you want to 'be when you grow up'. I hope the WISEST Summer Research Program helped you answer that, but more importantly made you realize just how many things people such as yourself can be one day. Please please please never limit yourself to anything. Keep exploring. I wish all the luck in the world to you, no matter what path you choose. You are all more than capable of achieving those dreams!

OUR THANKS TO THE 2006 PARTNERS AND CONTRIBUTORS...



Partners

- Alberta Heritage Foundation for Medical Research
- Alberta Human Resources and Employment (Summer Temporary Employment Program)
- Alberta Ingenuity Fund
- Alberta Ministry of Education
- Alberta Ministry of Environment
- Alberta Ministry of Innovation and Science
- Alberta Women's Science Network
- Allard Foundation
- Canadian Information Processing Society
- Canadian National Railways
- Dow Chemical Canada Inc., Western Canada Division
- Edmonton Glenora Rotary Club
- Epsilon Chemicals Ltd.
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 - Faculty of Medicine and Dentistry
 - Faculty of Nursing
 - Faculty of Science
 - Centre for Math, Science, Technology Education
 - Department of Civil and Environmental Engineering
- Weyerhaeuser

Contributors

- Ms. Esther Ondrack
- Lehigh Inland Cement Ltd.
- New Paradigm Engineering Ltd.
- Alberta Research Council

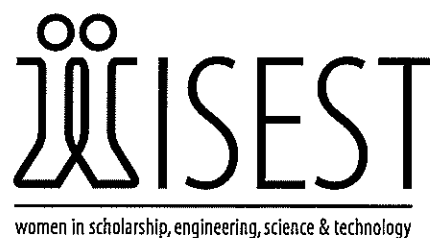
PARTNERSHIP WITH WISEST...

- The WISEST Summer Research Program students are paid an hourly wage for their six weeks of work and the number of students who can be accommodated depends on the number of sponsorships available to pay the students.
- Several local industries, philanthropic groups, Deans of Faculties and Chairs of Departments at the University of Alberta, and the Provincial and Federal governments sponsor students.
- Sponsorships are \$2500 per student. The money is used to pay the students an hourly wage, the cost of special activities such as field trips, group discussions, and poster sessions, and for administrative costs.
- An endowment fund helps to support rural students who stay in an Edmonton residence complex during their participation in the Program.
- Receipts for income tax deductions are issued for all contributions.
- Please contact us at the WISEST office for further information about any of our initiatives.

Telephone: 780.492.1842

E-mail: wisest@ualberta.ca

Website: www.wisest.ualberta.ca



☐ Yes, we would like to become a Partner of the 2007 WISEST Summer Research Program.

We will sponsor _____ student(s) at the \$2500 per student.

☐ Yes, we would like to become a Contributor to WISEST.

We wish to contribute to:

- ☐ WISEST Summer Research Program
- ☐ SET Conference for high school girls
- ☐ Choices Conference for Grade 6 girls
- ☐ UA-WiSE (University of Alberta Women in Science and Engineering)
- ☐ Margaret-Ann Armour Endowment Fund for Rural Students
- ☐ We would appreciate further information. Please contact us.



Please return form to:
 WISEST
 295 CAB
 University of Alberta
 Edmonton, Alberta T6G 2G1

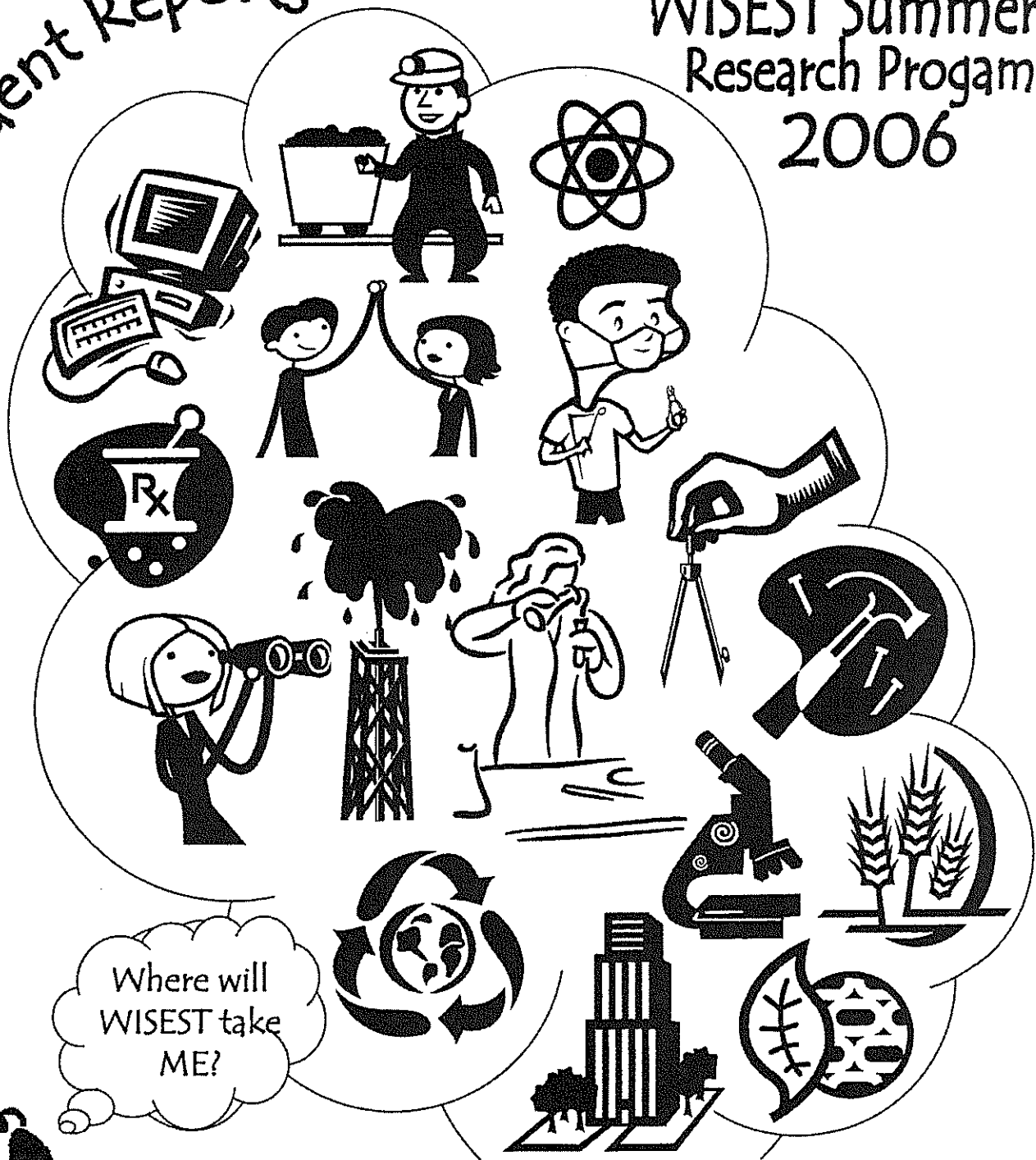
Company Name: _____

Contact Person: _____

Address: _____ Phone: _____

Fax: _____ Email: _____

WISEST Summer Research Program 2006



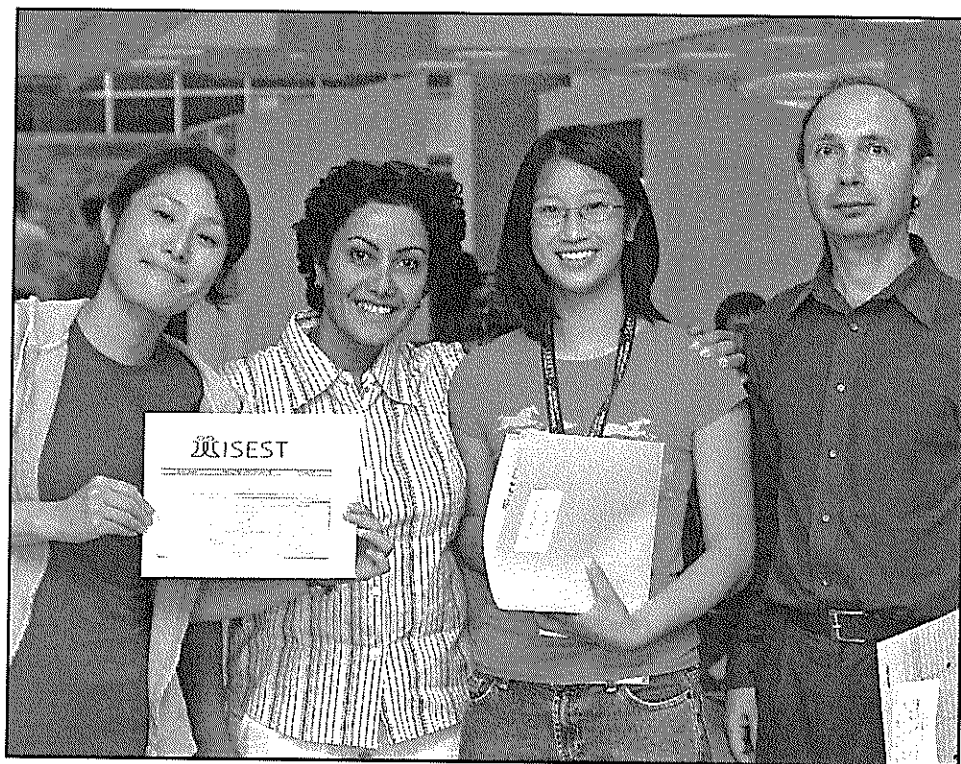
ÄISEST

women in scholarship, engineering, science & technology



ORIENTATION TO WISEST SUMMER RESEARCH PROGRAM

WRITTEN BY Daniel Fok



IT SEEMS LIKE JUST YESTERDAY

that we ventured onto the university campus, preparing ourselves for the best six weeks at the WISEST Summer Research Program. I remember the faces of the 64 other students, all filled with excitement and an eagerness to start their summer at WISEST. Walking into the tropically decorated solarium at the Engineering Teaching and Learning Complex (ETLC), we were warmly welcomed by Tiffany, Selina, Grace, and Gaylene, along with many others involved with the program. After a brief introduction to the program, we were ready to begin the first day of WISEST.

The day started off with a round of ice breaker activities to introduce all the students to each other, because it just might get a little tense when there are over 65 other people you don't know in the room. From there, we had a tour of the campus grounds with students from the University of Alberta, which proved to be extremely useful throughout the six weeks.

After the tour, we settled down to a fabulous lunch courtesy of WISEST, and began conversing with our newly acquainted friends. Having eaten our fill, we journeyed to a room where we began our safety training. Presentations about WHMIS and biohazardous materials introduced us to the many hazards that might be lurking within our labs and how to take the necessary precautions when handling them.

We proceeded with another round of icebreaker activities in Quad, where we also met Dr. Margaret Ann Armour, who has recently been inducted to the Order of Canada for her work with WISEST. However, our activities were cut short because it was time to meet our principle investigators that we would be spending the next six weeks with!

I remember how anxious everyone was, wondering who would be called up next to meet their supervisor, until they say your name and you leap from the chair with a sudden joy in your heart. Upon meeting our supervisors, we were taken

to the research lab where we would be working in for the summer, and met up with other members of the research teams. Although it is quite intimidating for high school students to be working in a university lab, all of us took on the initiative of trying to do our best and getting the most out of our experience during this time.

Although the first day of WISEST has been completed, many of us went to sleep with the anticipation of waking up the next day and starting our summer in our research labs.



'WELCOME TO WISEST' BBQ

WRITTEN BY Kimberley Alcorn



WELCOME TO WISEST BBQ

– Friday, July 7/06

As noon rolled around, more and more students gathered in Quad to prepare themselves for an afternoon of food, games, and socializing. Before we could do any of that, we had to overcome the tricky part: how were all of us (approximately 55 students) going to get from the U of A campus to the farm? Bus it of course! So everyone, including our coordinators, Tiffany and Selina, trudged off to the bus stations to catch the number 6 bus (going south). Because we hadn't rented a bus, we had to try and fit everyone onto the regular scheduled ETS bus. Impossible you say? We thought not! Thanks to an absolutely wonderful bus driver, every single one of us squished (yes... we squished) on the bus (sorry to all the regular people taking the bus). Ahh... but there was a catch you see. Our bus ride cost more than just \$2.00. To thank the bus driver for his generosity, we sang the bus driver song! So as our voices sang out, "The wheels

on the bus..." we WISEST students/coordinators headed towards fun!

Once we arrived, the fumes of the BBQ greeted us; so we all lined up to gather our food and prepare for the activities. Before we could start though, we were split into eight groups and had to think of names. What were the products of our imagination? Well... here's the list: 1) A+ 2) Radioactive Destructionatoresses 3) Team 3.1415927 4) Zoltan 5) Blue Steel (that was my team!) 6) Team Banana 7) Pirates of the Seven Seas 8) Ladies and Theo. Who would get the most points? Who would win the grand prize?

First on our list of activities: 'Name that Tune.' After many hours of downloading songs on her iPod the night before, Selina had a compilation of the new & old, rock & pop, and many others. Let the games begin! With tunes such as 'Wannabe' by the Spice Girls and 'TNT' by ACDC, all the teams fought it out for the top score. By the end of the third round, there was a distinct

battle between the Radioactive Destructionatoresses and Blue Steel. Would the Destructionatoresses fulfill their name and beat Blue Steel? Or would Blue Steel stare down the Destructionatoresses?

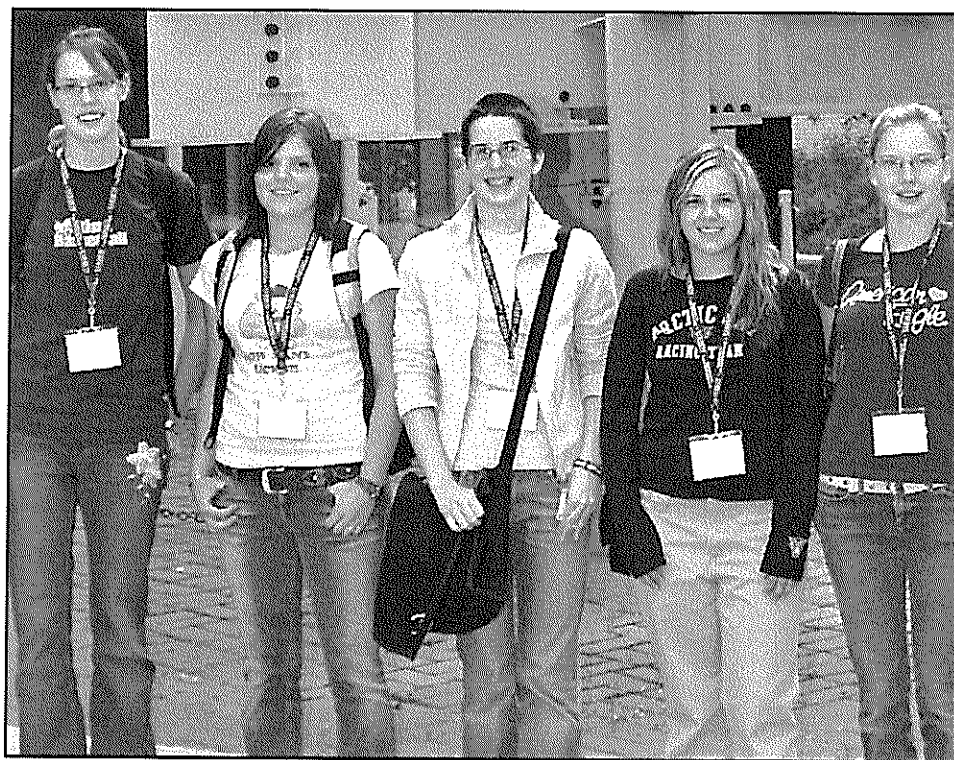
After 'Name that Tune,' the two teams were tied. The next activity would decide all. Which game had all the power? Which one could give some of the other teams their comeback? Cheradinary! Charades and Pictionary would be the deciding activity. Because we were running out of time, we played a few intense rounds. Phrases, actions, and movies were all being performed by actors/actresses or being drawn by artists.

Three hours of fun later, we had a winning team. Which team you may ask? None other than...BLUE STEEL! And the grand prize? Candy! Many laughs and good times were shared that day, and I can personally say that I'll never forget it.



RESEARCH IN ACTION INDUSTRY TOURS (ISOTECHNIKA INC.)

WRITTEN BY Veronica Haring



"ISOTECHNIKA INC. is an international biopharmaceutical company dedicated to the discovery, development and commercialization of novel immunosuppressive therapeutics for the treatment of autoimmune diseases and for use in the prevention of organ rejection in transplantation."

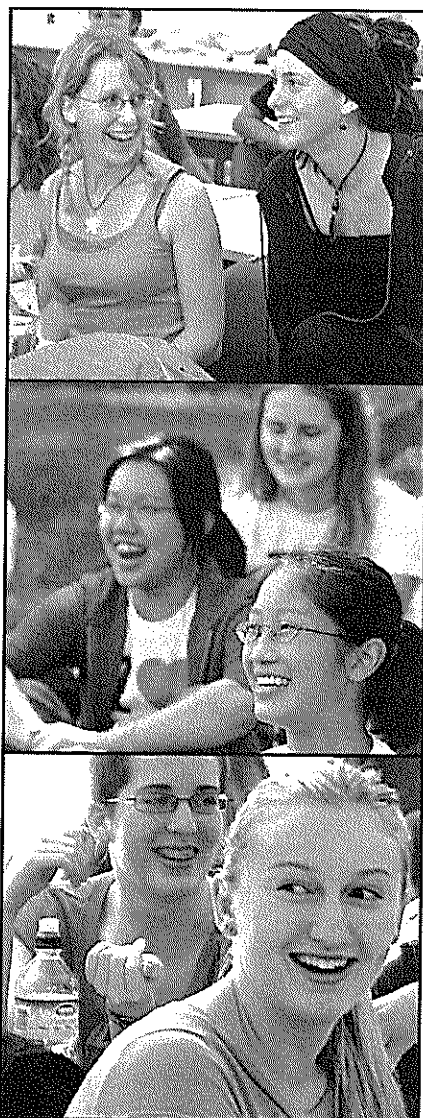
When I first read this on the Isoteknika website I had to read it a few times before I actually understood what it was talking about. Isoteknika is a company that develops drugs that suppress the immune system. Like I did, you may be wondering, why would anyone want to suppress their immune system? Doesn't your immune system protect your body from sickness? I mulled these thoughts over in my mind until it was time for the tour. Dr. Robert Foster, the founder, answered my questions. He explained that there are two cases in which an immunosuppressant is used. When someone undergoes an organ transplant, their immune system automatically attacks the "foreign" organ. Another case when these drugs

are used is when the immune system overreacts and starts to attack healthy cells in the body. An example of this is psoriasis. Isoteknika has developed a drug that helps to cure psoriasis.

After the founder told us what Isoteknika is all about, we were taken on a tour of the facility. When I first walked in, all I saw was desks, cubicles, and paperwork. I wondered if the lab research was done here or somewhere else. The guide took us through two very secure looking doors and showed us the labs that they work in. Our guide explained to us that they have several different types of labs. Some are used for creating the drugs, some for data analysis, and some for the development of drugs to be tested on tissue samples. We were also briefed on the process of testing the drugs they develop. Stage one involves testing the drug in small doses on healthy volunteers. This stage shows if the drug will interact with human tissue as predicted. Stage two involves testing the drug on a larger group of ill patients to see if the desired

effects are achieved. The third stage involves more testing to prove that this drug is better than the ones developed before it. The tour guide also showed us some of the equipment and technology that they use on a day to day basis.

The tour of Isoteknika was an opportunity for me to see a different side of science and engineering. I learned a lot about the roles that an engineer plays in and out of a pharmaceutical company. The tour of Isoteknika was interesting and well worth the time.



RESEARCH IN ACTION INDUSTRY TOURS (MICRALYNE INC.)

WRITTEN BY Patricia Skagan-Emokpae

I HAD AN ADVANTAGE over most of the other WISEST Students as we stepped through the big glass doors at Micralyne. Most had no idea what MEMS or nanotechnology were and weren't sure what to expect. I on the other hand had a plethora of knowledge gained through hours of reading in my lab on just these subjects. I was pretty excited, and I was not disappointed.

On July 12, WISEST students got the opportunity to take a tour of Micralyne Inc., a world leader in the development and manufacture of microelectromechanical systems (MEMS). An informative session gave us an overview of MEMS and insight into what Micralyne does on a daily basis.

We learnt that MEMS are miniature machines manufactured on the scale of microns. To get an idea of just how small that is, there are 1000 microns in one millimetre. MEMS are used in many applications such as optical switches, pressure sensors in cars, and print heads. Micralyne even made a print head that is used to print Time Magazine. Now that's impressive!

MEMS technology is especially promising in that it makes smaller, faster, and more cost-effective industrial components. Micralyne currently makes MEMS components for the communication, energy, life sciences, and transportation industries among others. Micralyne meets with clients to determine the design of specific components that the client wants. They then manufacture trial models of the components and test them to see if they meet up with the customer's requirements. If not, the design is changed. This continues until the device meets the needs of the buyer.

We also learnt about the history of Micralyne. It was originally founded in 1982 as part of the University of Alberta, but it became an independent company in 1998 and moved to the

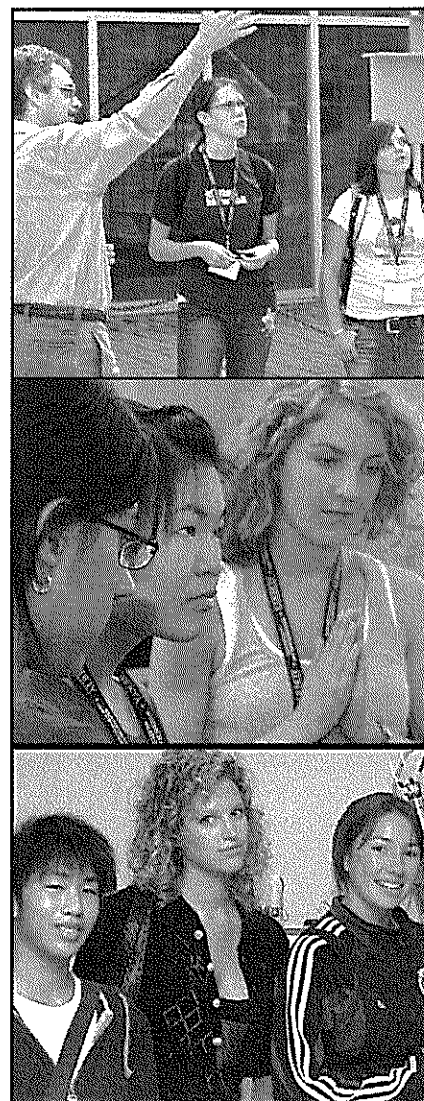
Edmonton Research Park. The company has rapidly expanded recent years and has grown exponentially in size. It is a state-of-the-art facility that is now being renovated to be double the current size.

After the presentation we were split into small groups and taken on tours of the laboratories. We looked through the windows that provide a view of each room. Because manufacturing is done on such a small scale, even the tiniest speck of dust can badly skew results. Therefore, most of the rooms were Class 10 Clean Rooms. This means that the environment is controlled so that there are only ten particles of dust per cubic foot. This is quite amazing since a normal room has millions of dust particles per cubic foot. Large fans keep the laboratories pressurized so that air goes out instead of in when someone opens a door. Employees wear "bunny suits" which cover them in white from head to toe.

Our tour guide also explained MEMS manufacturing techniques such as lithography and etching. The process begins with a disk which gets a photoresist placed on top. Light is passed through a mask to expose only certain parts of the photoresist. The parts exposed to light will later undergo a chemical reaction and the desired pattern will be metallized. Special rooms which are lit only by yellow wavelengths are used to ensure that the wrong parts of the photoresist are not exposed to light. When the correct design is finished the disk is cut into the desired chip sizes through a process called dicing.

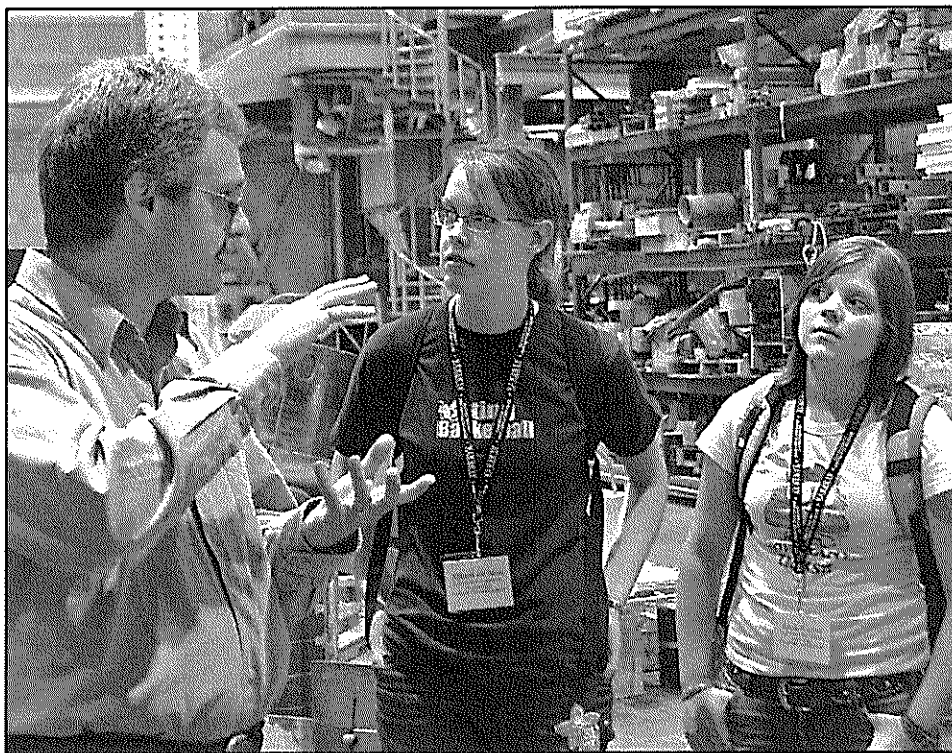
After the tour, everyone returned to the conference room for refreshments. We got to ask questions and listen to the engineers talk about their more interesting projects, such as a sensor which can detect viruses in the air in order to prevent biological terrorist attacks on airports.

It was a very interesting tour and I thoroughly enjoyed it. It helped me understand manufacturing processes that I had read about and it was very interesting to see what a scientific workplace is like.



ON-CAMPUS RESEARCH LAB TOURS

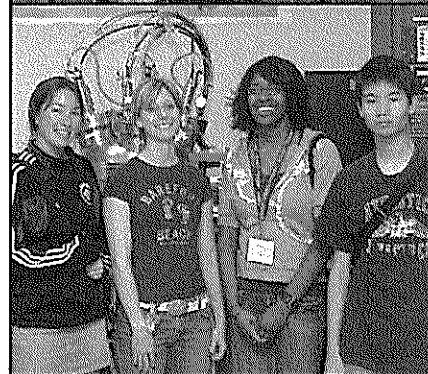
WRITTEN BY Tamara Bain



WALKING THROUGH the University of Alberta buildings, it isn't difficult to be overcome with a sense of surprise at the size of the campus. So many offices and labs, floors and basements - what could possibly be going on in all these buildings? Fortunately, our WISEST coordinators had at least a partial answer to that question.

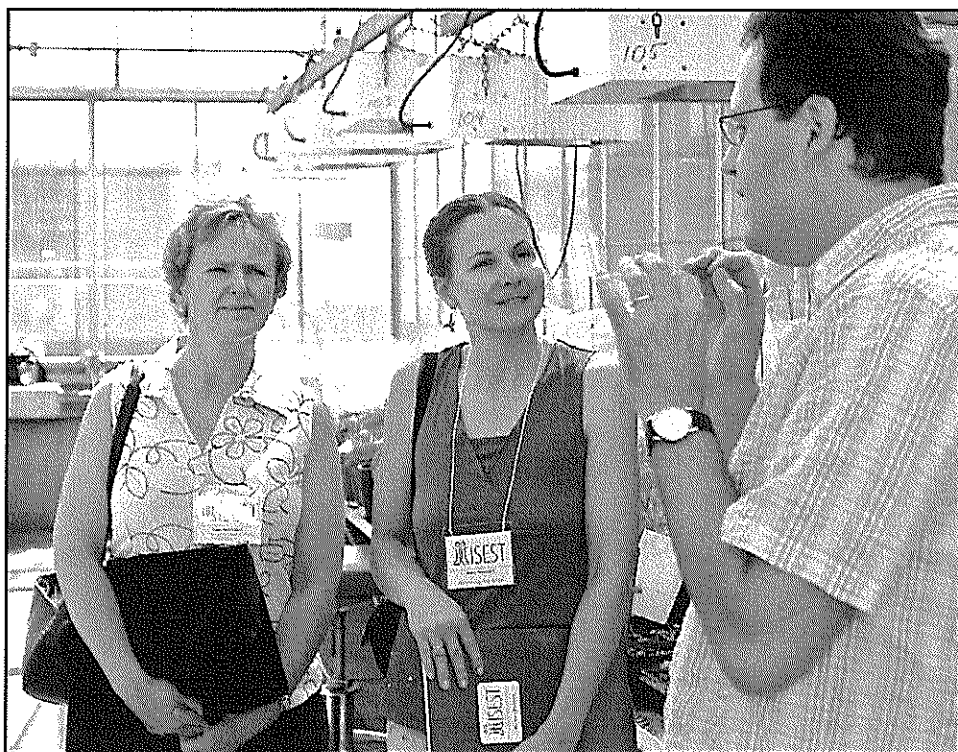
On-campus tours provided us, as WISEST students, with an opportunity for greater knowledge of the campus research community. We divided into ten separate tours in the areas of Biomedical Engineering, Obstetrics & Gynecology, Biochemistry, Agriculture/Forestry, Chemical/Materials Engineering, Mechanical Engineering, Electrical and Computing Engineering, Nanotechnology, Civil/Environmental Engineering, and Biological Sciences and proceeded to take the university by storm. Placed in the nanotechnology, four other WISEST students and I had the privilege of attending a very informative tour of the Nanofab Labs.

Led by our very knowledgeable guide, we viewed the rooms in which perfectly round silicone discs were etched with patterns exponentially smaller than a human hair. It is a world of miniatures, one where a single particle, sloughed off human skin, or floating menacingly through the air was enough to wreck months of work by settling on top of a microscopic design. With this in mind, work is preformed in "clean rooms" where the particles per square foot measure on average, no higher than ten. (In normal air there are millions of particles per square foot.) The researchers within the labs were characterized by their head-to-toe bunny suits, which were necessary, we learned, in order to keep the air virtually free of particles. The clean room of the Nanofab provided an extreme example of lab cleanliness and attention to detail.



These tours allowed us to further diversify our knowledge of the careers available in science, engineering and technology. It provided us with information on the continuously expanding world of science and the cutting edge technologies that are being utilized right here in Edmonton.

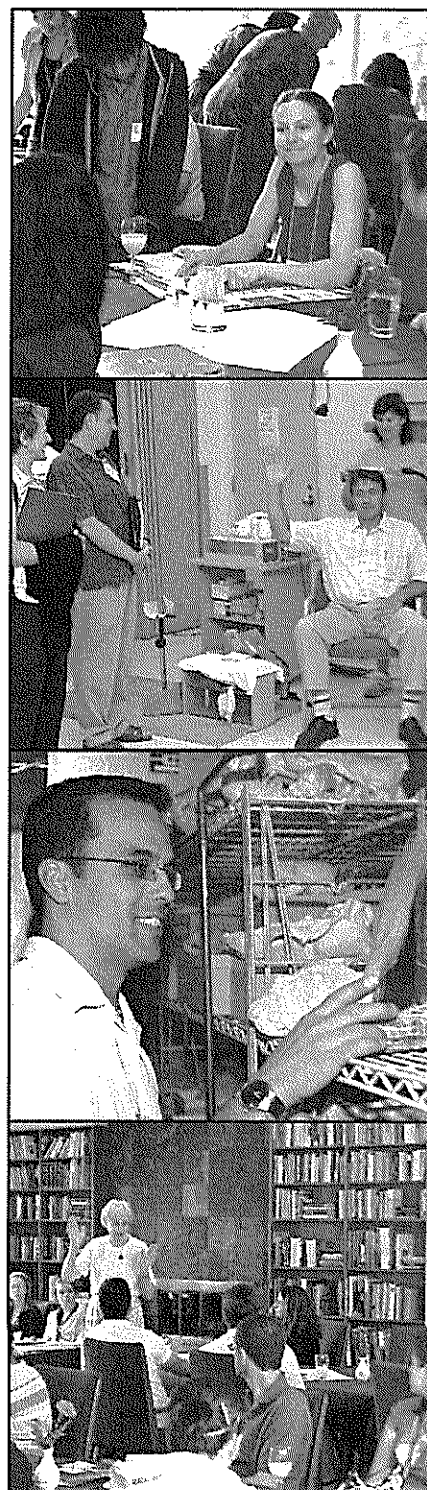
WISEST TEACHERS' DAY



SCIENCE AND MATHEMATIC

teachers from north-central Alberta high schools explored leading edge scientific and engineering research areas at the University of Alberta on the annual WISEST Teachers' Day. Students invited their teachers to visit the research lab so that they could see first-hand the project that the students were contributing to. The day also featured research lab tours that demonstrated exciting areas of research. Professors and graduate students showcased their research work, and the teachers gained information that could be taken back to the classroom in the fall. One piece of information was from Dr. Stephen Strelkov, Assistant Professor, Dept. Agricultural, Food & Nutritional Science, who encouraged the teachers to promote agriculture as an area that has many job opportunities and a high need for students.

There were also presentations by dynamic women in science who spoke of the value of research, its application to everyday situations, and the need for more women to pursue careers in science, engineering and technology. Guest speakers included Dr. Gaylene Fasenko, Vice-Chair WISEST, Dr. Margaret-Ann Armour, Associate Dean (Diversity) Faculty of Science and Dr. Suzanne Kresta, Professor Dept. Chemical and Materials Engineering.



REAL-LIFE RESEARCH POSTERS AT THE POULTRY SCIENCE ASSOCIATION CONFERENCE

WRITTEN BY Sarah Hamill

UNTIL WE ENTERED the WISEST program, most of us didn't even know what a research poster was, so the prospect of having to create our own was pretty daunting at first. Having never seen a research poster before, I was looking forward to going on the poster tour on Tuesday, July 18 and seeing exactly what it was we were expected to create. Besides, we got an hour off work to do so!

Before the tour began, we went to NREF to listen to Dr. Mary Beck, the former president of the Poultry Science Association, who was visiting from the United States for the Poultry Science

Association Conference. She told us about her experiences as one of the few women in her area of study and the challenges she faced throughout her academic career working in a male-dominated field. She also told us about her job as the president of the Poultry Science Association. It was very inspiring to hear how she overcame obstacles throughout her career to get where she is today.

After Dr. Beck's talk, we headed over to the solarium in ETLC to look at the posters on display for the conference. As it was lunchtime, we had the place almost to ourselves to wander the aisles

and learn what made good and not-so-good posters. Dr. Gaylene Fasenko and her grad students led us around and gave us tips on creating easy to read, informative, and interesting research posters. We learned the importance of color, leaving space, and spellchecking. It was really good to be able to see for ourselves the difference colors make, or how too many patterns can make a poster hard to read, instead of just being told what to do and what not to do without understanding why. All in all, it was a very interesting and educational tour.

Pictures from the "Poster Training Session and Really Really Really Ridiculously Fun Relay Days"



RESEARCH POSTER TRAINING SESSION & REALLY REALLY REALLY RIDICULOUSLY FUN RELAY DAYS

WRITTEN BY Christina Wolinski



THROUGHOUT the WISEST program, there were numerous activities organized for us. The Wednesday afternoon sessions were always interesting and informative. We had toured campus research labs, as well as large research corporations such as Isotechnika, a biopharmaceutical company, and Micralyne, a manufacturer of microfabricated products. On a much smaller scale, we also had the chance to attend small group discussions and went to a poster session in order to gain some insight as to what was expected of us on the Celebration of Research.

The poster training session on July 26th was another of these Wednesday activities, and it was a great opportunity to learn more about making a research poster. We were escorted into a computer lab in the business building and given many tips and techniques for making the poster, as well as general information about PowerPoint and about the size and cost of printing a poster. We also had the chance to play

around with a research poster template, courtesy of the WISEST coordinators.

As well as the Wednesday afternoon activities, a number of social events were organized, such as the Welcome Barbeque and the Fabulous Freebie Friday lunches. Really Really Really Ridiculously Fun Relay Days was one of these. According to Selina and Tiffany – two of our WISEST coordinators – this was the event of the summer. It was held in QUAD after the poster training session on July 26th.

The week before Relay Days, all the WISEST students who wanted to wear a costume on Relay Days put their names into a box, and then we drew names in order to determine who would be the victim of the Vera Wang inside all of us (muhahahahaha). We had some very promising outfits on Relay Days – potential runway material – courtesy of whatever neighbourhood Value Village and Salvation Army we could find!

The WISEST students were split up into eight teams, and we picked ridiculous team names and jokingly provoked the other teams so that we got all riled up and competitive. The relays could be described as nothing except really really really ridiculously fun! In one of them, each person on your team had to run to the opposite end of QUAD, stick their face into a bowl of pink water and fish out a candy with their mouth, and then do the same thing in a bowl of flour, except this time to find a marshmallow! It was absolutely hilarious to see so many people trying to wipe the disgusting and grainy flour off their white faces after they had run back to join their team!

In the Hot Dog Relay, each team chose four people to run this relay – one had to run to the other side and drink a Dixie cup full of ketchup, the second had to drink a Dixie cup of relish, the third had a Dixie cup of mustard, and the fourth had to carefully make their way back across the field carrying an egg between their knees. Let me tell you, it sounds a lot easier to drink a cup of mustard than it actually is!

Relay Days was a total blast, a great time to meet a few new faces and run around wearing ridiculous costumes and getting dirty! Thanks to the coordinators, it was a Relay Days full of outrageous relays and outrageous fun!



SMALL GROUP DISCUSSIONS

WRITTEN BY Andrea Bui



THOUGH WE were given the resources to explore the worlds of Science, Engineering and Technology on our own, the WISEST Summer Research Program also gave us the opportunity to meet experienced men and women in these fields. We talked to a wide variety of role models ranging from students in the midst of pursuing careers to successful leaders in their areas of study.

For Small Group Discussion, the 65 of us split up into groups with 4 to 5 role models in each. Moderators guided us into getting more comfortable and sharing a little bit about ourselves. These women shared their amazing stories from being nervous teenagers like us to becoming confident members of society. We found out about some of our differences and our many similarities in interests and values. The personal atmosphere of the Small Group Discussions allowed us to ask many questions and listen to very thorough explanations. We talked about life and study and how to keep both important

aspects in perspective. Conversation flowed from making difficult choices to enjoying university and work life. We discussed the importance of the journey towards a career goal and how every single moment ought to be cherished. They also talked to us about the reality of some preconceived notions, but still encouraged us to experience things for ourselves.

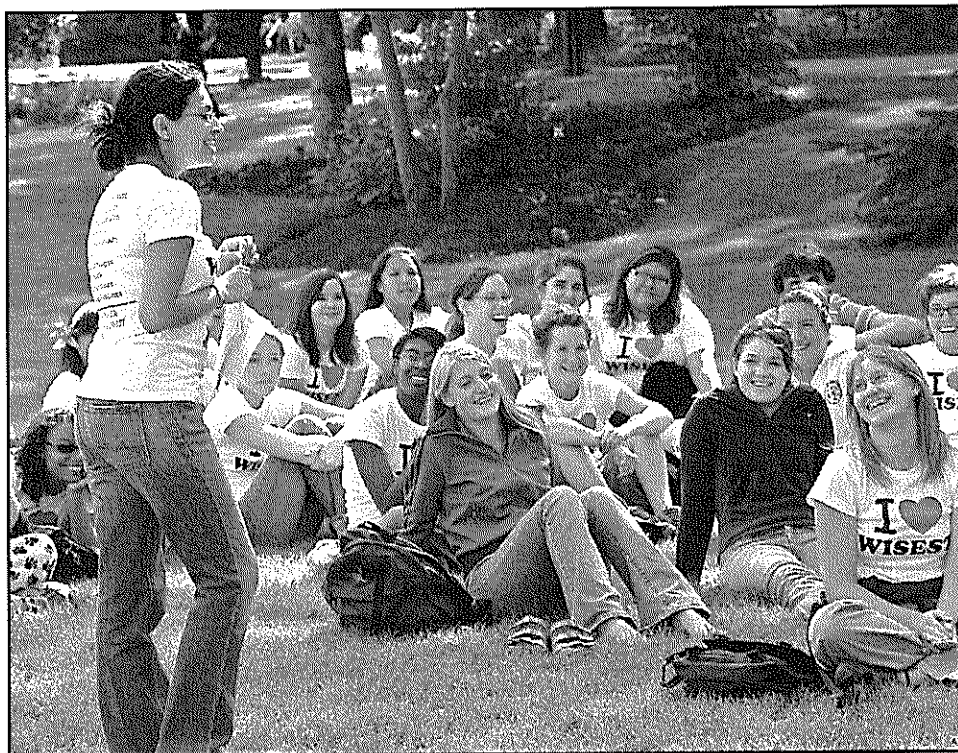
To some surprise, most all of the role models ended up in a career that they currently love but that was completely different from what their initial intentions were. We learned that it is okay not to know yet where we are heading and it is okay to follow our passion as our interests change or we discover new ones. There is time to figure out what is best for us. If we keep our eyes open, there will be many possibilities to choose from. Strive for your dreams no matter what stereotypes or challenges come your way.



Meeting these people who have achieved so much, some in uncommon fields, was completely inspiring. They are real people who have struggled through real obstacles and have had real accomplishments. Thank you to all the moderators and role models who volunteered to come out and help us absorb so much wisdom and advice into our eager young minds.

A DAY IN THE LIFE OF A UNIVERSITY STUDENT

WRITTEN BY Allison De Man



I HAVE ALWAYS wondered what being a University Student is like. Is it constant studying and extremely hard work, day in and day out? Or is it full of parties and fun events like we see in the movies? The opportunity to learn about life as a university student is an important goal for the WISEST summer research program.

Going to university gives you the opportunity to continue and enhance your education before going out into the working world. However university doesn't come without temptations. Fun daily events and the freedom of choice given to a university student can make focusing on studies hard. Students have to learn to prioritize and not to procrastinate; something that is easier said than done. Students, who vow to spend their whole time at university studying, find themselves bored with lots of free time. They tend to get involved in spontaneous activities, leaving studying for later. We learned that it is better to get involved in the university; whether that is in clubs

or volunteering, any form of extra-curricular activities. These activities do book up your schedule but they make it easier for you to map out your week and schedule in the times for studying that work for you. University is full of freedom, no one is going to be reminding you to do your homework, or tell you to study for the test the next day. It is up to the student to decide and realize what is going to work for them, to accomplish their dreams and goals.

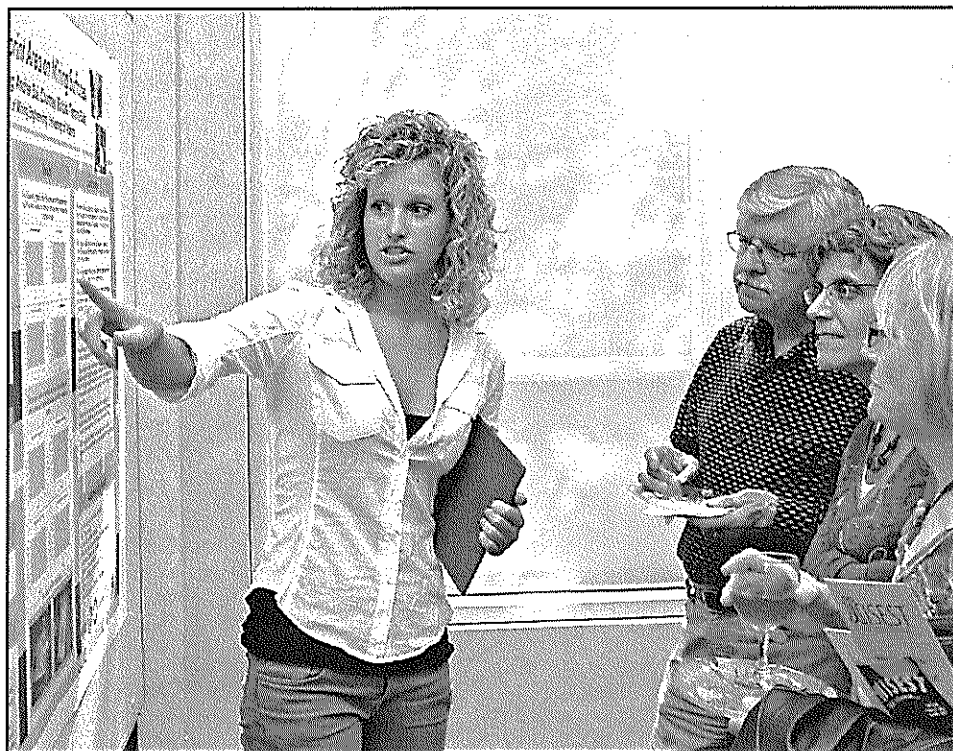
We were also fortunate enough to be given some helpful advice about jobs and scholarships. No matter what field of study we chose, experience is always important. If you find the opportunity to get a job that is related to your field of study, it might be in your best interest to try it out. By working at a job that is related to your field of study, it can increase your interest in certain aspects of work, and even make you realize what jobs you do not want to be doing in your future. Also we learned that there are many scholarships available and all you need to do is apply. If you think that the scholarship applies to you, it probably does. Many people don't think that their GPA is high enough or that their extra-curricular activities are not important enough for the scholarship. These individuals only find out later, that not many people applied and that they could have gotten the scholarship. Many scholarships go unclaimed and it is important to look for them and to keep applying.

University is another scoop of ice-cream on our cone of life. Some people may decide to avoid it, others may just taste it, and some might just eat the whole thing. What we decide to make of our university experience is up to us. We need to set ourselves goals and keep up with the study habits that we know work for us. University will be what we decide to make it. With freedom, responsibility and goals, we will hopefully end up where we want to be.



RESEARCH TEAM THANK YOU

WRITTEN BY Jenny Thompson



HONORED GUESTS, LADIES AND GENTLEMEN WISEST SCHOLARS:

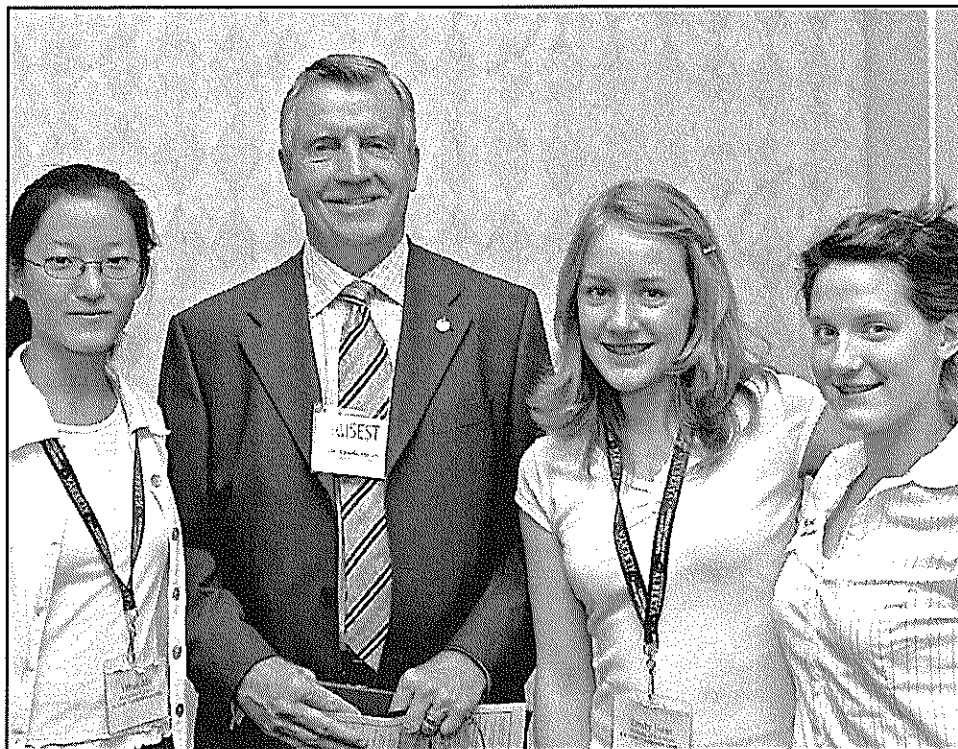
Today marks the culmination of six weeks of sheer fun yes, of learning and growing as students who enjoy science. We each came with anticipation, fear and excitement about being chosen as a Wisest scholar. What would we do, how would we relate to our peers and supervisors? Would it be worth our while, giving up six weeks of our summer holidays? The answer is a resounding Yes! On behalf of all the Wisest students I want to say thank you. First to the research teams who took the time to plan meaningful activities for us, who challenged us to go beyond what we know, to learn and discover new things in science, engineering and technology. We discovered a wide range of research possibilities, from isolating titanium minerals in oil sands tailings, to improving your golf swing! I want to say that we value your expertise and your patience as we fumbled our way through some days and activities. Thank you for giving us this wonderful

experience to see the world in new and different ways and above all to have a greater sense of purpose as many of us have started to make choices that will no doubt take us into exciting careers. You were available to answer our questions, to introduce us to others who have been successful in their respective fields and you encouraged us to think in ways that went beyond our immediate aspirations. Your skillful mentorship of us has already, and will continue to produce great returns. Thank you for encouraging and challenging us to go for the gold every day. Above all thanks for teaching us how to be good research scientists. To look, and look again, to be honest about our findings and results. You were patient with us when we broke equipment or spilled things, (which I think some of us did almost everyday! Whoops! I don't think I was supposed to say that!). You took us as where we were and led us to new heights. Thanks, it's been a great view!

I want to say thank you to the University of Alberta without which we would not have had this world class facility in which to conduct our research. You provided the resources, equipment and staff to give our curiosity wings. Thank you for allowing your top researchers to share their projects and passion with us. You trusted our ability to use our time and imagination wisely. You knew that we would excel given the opportunity and I know that you will not be disappointed. Your support has meant the world to us. Not only did you allow us to work closely with some brilliant researchers, but you also let us tour fantastic laboratories, enabling us to see a wide variety of facilities. My view of science has expanded tremendously. I consider myself very fortunate to have been chosen to be a WISEST Scholar, and I know that I speak for all my peers. So on behalf of all the WISEST students of 2006, Thank you.

CELEBRATION OF RESEARCH

WRITTEN BY Catherine Zoleta



IT IS ALWAYS HARD TO START

at the end, knowing that the following events will become only memories and fragments of a past reality. The past six weeks of WISEST were already tucked into a corner of our minds and as we all stepped into Lister Hall that fateful August morning, we knew that this day was going to be something equally as special.

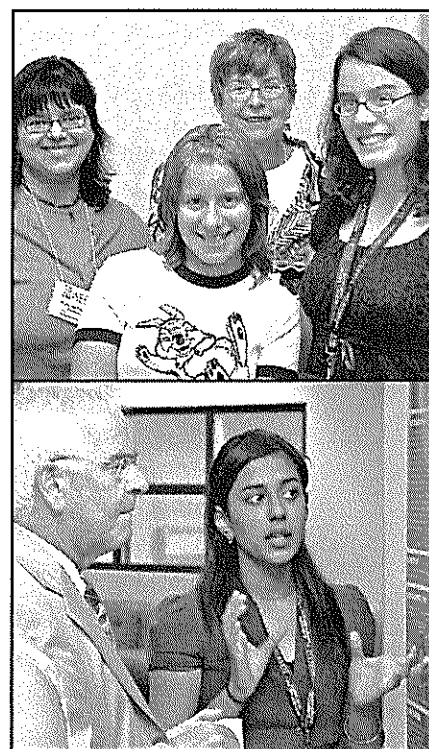
Going to WISEST, we never really knew what we were going to accomplish, but as we were given the opportunity to look at each other's poster, we were able to see that each person had accomplished far more than they ever set out to do. Even though the summer brought us individual knowledge through our own field, we still had something to learn from each other. Whether it was working with chickens or playing with computer games, there was never a dull topic. As we continued to display our posters to our research teams, sponsors, family and friends, we were all able to spread our love of science and proudly display

all the hard work we had done over the summer.

The Celebration of Research would not have been complete if it weren't for the variety of speakers that graced the stage that day. In a very informal but heartfelt announcement-turned-speech, Tiffany and Selina started the day with a truckload of memories. Next was one of our own peers, Jenny Thompson, who presented a speech to thank all the research teams, sponsors and contributors that made WISEST possible. She was able to encompass the genuine sincerity of all sixty-five WISEST students, which is a lot harder than it sounds. Dr. Gaylene Fasenko, the Vice-Chair of WISEST spoke of the program and in her tradition, left us with some inspiring quotes. To finish the day was a very special speaker, the Honourable Lillian Dyck, Senator, to speak about her life and provide her own pieces of advice. Her story was one that sparked interest among many of the people who listened to her that day, due to the fact that she was

able to mix many genres of work, from science to politics, through the years. In a way, the chronicle of her life was a Cinderella story, inspiring all of us that no matter where you are from you can achieve anything, transform your life, and reach unexpected destinations. She taught us that mistakes are part of life and sometimes they define who we will become.

With her words still echoing through our minds, we pulled out the pins and rolled up our posters, knowing very well that all good things must come to an end. So in a whirlwind of emotions and memories, laughter and tears, we said our goodbyes and headed out the door. Even though we may not see it, with each lesson learnt and each friendship gained, we emerged from Lister Hall changed, different from the person who came six weeks before and different from the person we thought we would be. Though it is the final chapter of our WISEST experience, it is with this end that we start a new beginning.



LIFE AT ST. JOHN'S RESIDENCE

WRITTEN BY Katie Heine



12 WISEST STUDENTS + 1 excellent RA + 6 weeks in residence together = 1 amazing summer!

We all met the day before WISEST orientation, and our first evening together was spent trying to remember everyone's names, grabbing a bite to eat and then heading off to sleep in the 33°C weather. We weren't sure how it would go – could we really share a bathroom for six weeks, eat food that wasn't made by mom and live with eleven other girls that we'd never met before? The answer – most definitely. It turned out that remembering names was no problem at all after the first couple of days, and with everything we had in common (and different!) our summer would be one of the best ever.

St. John's, which soon became "home" to those of us in rez, is located on Whyte Ave, so getting to the university for work and other activities was only a 10 to 20 minute walk (depending on where your lab was). It also meant that we were near a grocery store (perfect for

ice cream cravings in the hot weather) as well as all the other great places that Whyte Ave has to offer. It was great to experience residence life before actually heading off to university, and with the food being above expectations and the rooms not as small as we thought they'd be, all of us were glad we'd chosen to stay there.

Megan, our RA, was absolutely wonderful. Whether planning activities or just hanging out with us, she was always there if you needed her. We did lots of different things – shopping at West Ed (and therefore learning how to use the bus and LRT systems), going to Shakespeare in the Park or the Eskimos football game, walking down Whyte Ave and getting ice cream at the Marble Slab or just watching TV in rez made evenings and weekends lots of fun.

We were never short of entertainment. Whether having karate nights, Scrubs-a-thons or House-a-thons, going to Hawrelak Park to throw a Frisbee around or watching movies while sitting

on those infamous couches, we were always having fun. We weren't the only group in residence either. People ranging from Ukrainian language students to "randoms" were there as well, always making it an interesting place to be.

It was easy to spend time with the other students – doors were always left open so you could pop into each others' rooms and see if people were up to doing something. By the end of the six weeks, your fellow students were definitely your family in rez, and it was sad to realize that we wouldn't be able to write on each other's message boards or run in the rain anymore. However, it was great to know that we'd made some wonderful new friends, and many of us would be seeing each other at university in Edmonton in a year.

Our consensus? Rez was worth every dollar spent and late night/early morning had, and was definitely a highlight of our summer.

WISEST RESIDENT ADVISOR

WRITTEN BY Megan Wagner



IT'S FUNNY THAT when talking to friends about their jobs for the summer (landscaping, construction, retail, working in a lab) I would happily get to tell them that my job was to hang out with a group of teenagers.

First off, I would like to thank Grace, Tiffany, and Selina for giving me the opportunity to be the Resident Advisor for 13 WISEST summer students over 6 weeks, making for 1 amazing summer.

Secondly, I would like to thank my girls (a.k.a. the students) for making my time at St. John's Institute so much fun. I admit that at first I was a little nervous about the position of RA. I wondered if you would like me, if you would enjoy the activities I had planned, and more importantly, would you form friendships with the other students. I needn't have bothered worrying because I now realize that I couldn't have asked for a better group of girls. Each of you are kind, intelligent, mature, talented, and so very unique.

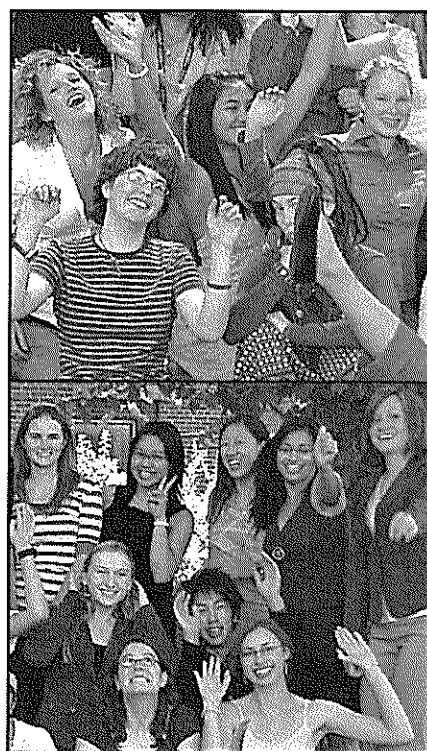
Some of the best times I had this summer were spent just sitting around watching hours of *Scrubs* or *House*, walking on Whyte Ave and spotting the 'Listen' graffiti, and hearing of your exploits at beach volleyball, Summer Games, and stories from back home. The Eskimos game we attended was the first football game I had ever been to, and seeing some of you paint your faces (and then struggle to get the face paint off) was probably the highlight of the night. I will remember the 80's party and how we donned our tights and pastel coloured clothes, and then headed to Safeway for junk food and mocktail supplies. I will also remember how everyone attacked the free pop and nachos at the baseball game (not to mention also winning the 50/50), and how the few of us who went to Fort Edmonton Park lucked out and got a free steak dinner. However, the best part of rez life was witnessing the many friendships that blossomed.

I hope that each of you has learned something from me, and I think that

you all are more independent after staying in Edmonton. I definitely learned a lot from you all: how to play ping-pong, karate (though I struggled with the kata), and that I suck at badminton and pool.

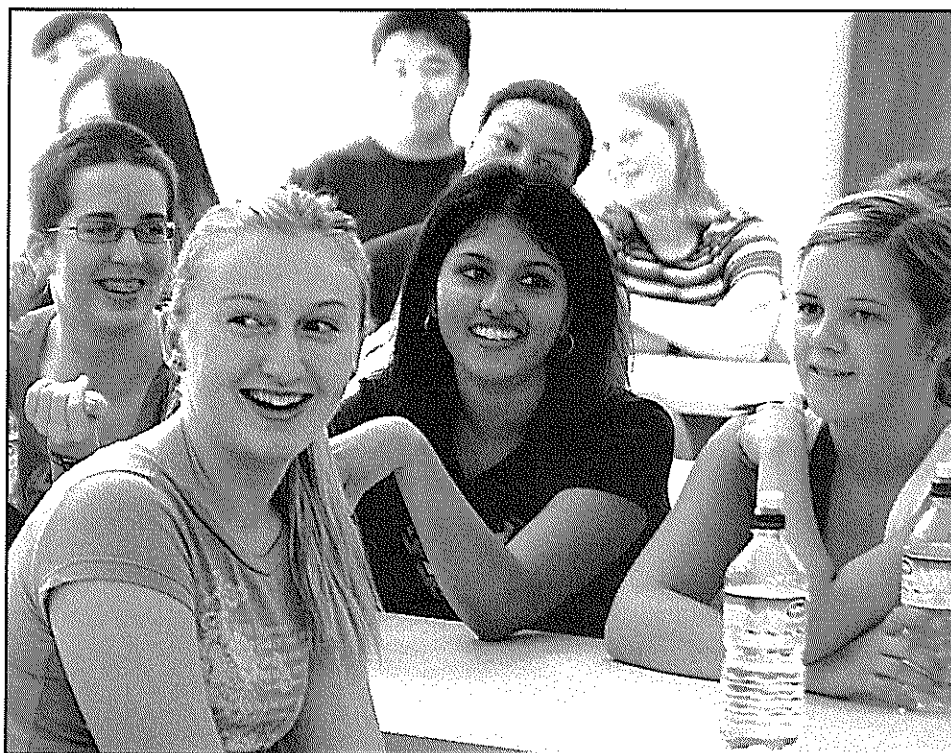
I can hardly believe that it has been six weeks since I first welcomed you all to Rez and I am really sad to see this summer coming to an end. You should all be proud of what you have accomplished during these past weeks. I have made some great friends and I hope you take away some lasting memories. We'll have to keep in touch, so anytime you want to update me on your life, or will be coming to Edmonton, send me an e-mail. For those of you attending the U of A in 2007, we will have to organize a reunion so that everyone can catch up.

I wish you all the best of luck in Grade 12. Study hard for your diplomas, and have a blast at grad. Hope to see you around campus come Fall 2007!



FABULOUS FREEBIE FRIDAY LUNCHES

WRITTEN BY Tammy Wong



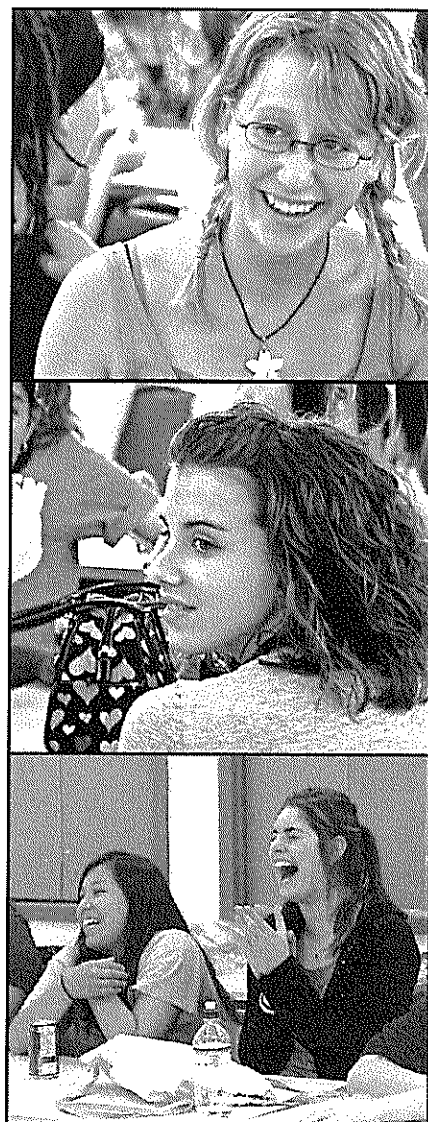
AS GLOBAL WARMING continued to create a major problem in the world, there was nothing that could stop the 2006 WISEST crowd from getting together! Regardless of the intensity of the sun's rays or the dreadful rainfalls, almost all 65 students were found gathered eagerly in a monstrous pile on the grounds of quad every Friday. There is a possibility that it was the free prizes which lured us all in, but I did notice the excitement on everyone's face when Selina or Tiffany introduced the prizes! We were probably the loudest and most entertaining group to be found in quad; everyone else on campus seemed to envy the fun we had! I must not forget the HYRS students who were invited to join us – these Friday lunches were designed for the WISEST students to become well-acquainted with students from our sister program! Imagine 85 teenagers sitting on the grass in the middle of quad... Although we were a hysterical group, we enjoyed every moment of it! What's better than a handful of nerds?! Ha-ha!

I believe I speak on behalf of everyone when I say that the Fabulous Freebie Fridays were a ton of fun. It gave us the opportunity to see our friends or even make new ones! After numerous conversations with unfamiliar faces, I realized that many of us were connected in some way! Whether she was a "friend of a friend of mine" or had attended a program I used to be in, the intricacies of networking seemed to reveal itself! The WISEST program is in fact an ongoing networking process. It is events such as these which enable us to develop stronger friendships with amazing people we may associate with in the future. Today's society calls for a workforce that will inevitably require young and enthusiastic individuals such as – WISEST students!

My favorite part of the Fabulous Freebie Friday Lunches was the stories that we all shared with each other. Everyone would constantly be discussing the interesting events which took place at their labs. The most memorable story I can recall was when my friend told

me about a fire alarm that went off in her building due to toxic fumes in the air! The volume of our voices would gradually increase as the noon hour passed. We became more and more excited to be with our friends and telling them absolutely everything that had happened!

"Our Fabulous Freebie Fridays were definitely a highlight of each week!"





KIMBERLEY ALCORN Civil and Environmental Engineering
WISEST SUPERVISOR Dr. Faye Hicks
SPONSOR Dept. Civil & Environmental Engineering



MY STORY began in the month of February. One day when I was exiting my Chem. class, my teacher stopped me and said, "I think you'd like this." I was handed a poster that advertised the WISEST Summer Research Program. Until this year, I had never heard of WISEST, so I knew this would be an adventure. I grabbed an application and started filling it out. There were times when I would change my mind and not want to hand in the application, but in the end, I put all the papers in an envelope and sent it to the U of A.

Towards the end of April, my teacher frequently asked me whether or not I had been accepted into the program. It wasn't until the last Friday of that month that I could say yes! I was sitting at home working on homework after school (I know... only nerds work on homework on Fridays), when the phone started ringing. Being the only one home, I picked it up, expecting it to be my sister's boyfriend. Hahahaha. I was absolutely wrong! When I picked up the phone, I heard a person ask,

"Hi, is Kimberley Alcorn there?" When I answered, "Speaking," I had no idea what I was getting myself into. After about five minutes of furiously jotting down notes, my summer plans were set: I was going to be working for WISEST. I was placed in the Department of Civil and Environmental Engineering, which is what I was hoping for, and I would be working for Dr. Faye Hicks with Karen Dow as my supervisor.

The fact that I made it into the WISEST program didn't hit me until the night before. That's when I got scared. I didn't know what Karen was going to be like. I was also positive that I wouldn't know any of the other students. So as I got into bed that night, my mind kept going a mile a minute.

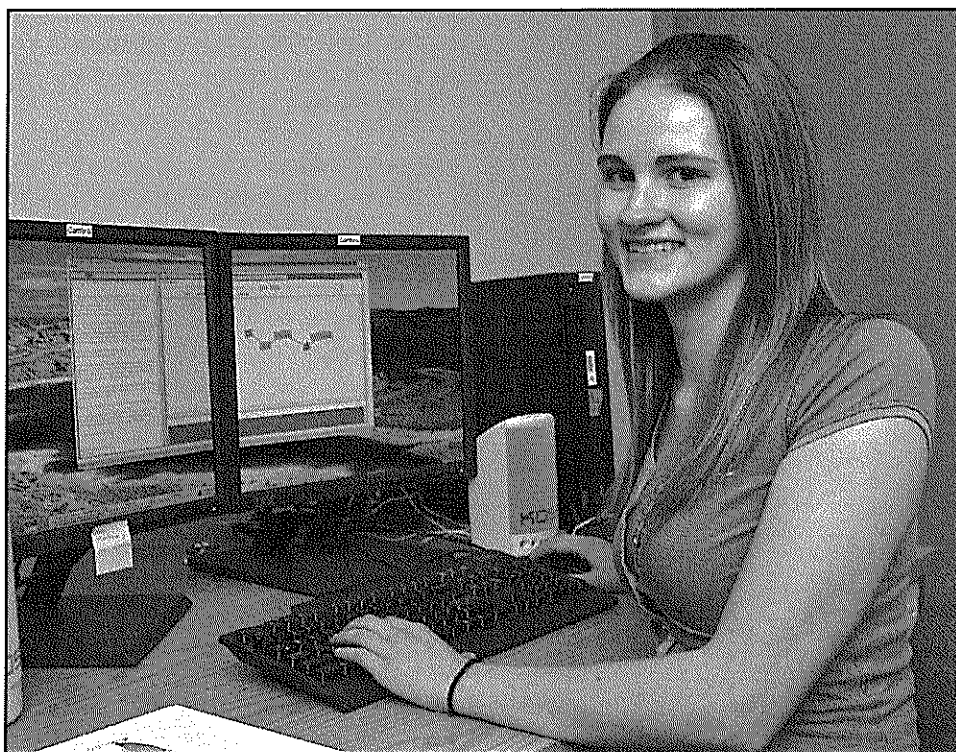
As I entered the Solarium of ETLC, I immediately struck up a conversation with a couple of the other students. It was so exciting to know that these people had come from all across Alberta and that we shared a common goal. After the day of orientation, I finally

met my supervisor and checked out my lab. There was so much information to process that day, and I couldn't wait to start the next.

Over these past couple of weeks I have been working in the Blench Hydraulics Lab (L2-001 NREF). Because Karen's project is just in the baby stage, I have been doing preliminary tests to set up the base for the experiment. The main project is going to be calculating the stability of an ice block on a river. By knowing the stability, we can help predict the severity of ice jams on rivers. But before we can start testing that out, we need to test out our flume (a rectangular glass box filled with water and pumps on either end). That's what I'm doing! I get to see how the flume is working and how fast the water is traveling in different areas. Just last week, we found that the water moves slower against the right walls of the flume than the left: even though they're supposed to be the same!

It's weird to think that I've already been on this job for the past five weeks. What with chemical fires (you'll have to look it up to find out what happened), malfunctions of equipment, and a lot of tests, time flew! I only have a week left in this journey. Even when it's done though, I will forever be grateful to my Chem. teacher who thought I might like this. I'll also be thankful to myself for not chickening out and not handing in the application. The WISEST Summer Research Program is and will be one of my most memorable adventures. Thank you WISEST!

JANICE ANNETT Computing Science
 WISEST SUPERVISOR Dr. Eleni Stroulia
 SPONSOR Canadian Information Processing Society



WHEN THE PHONE rang at my house and Selina offered me a position with the Department of Computing Science as a student in the WISEST Summer Research Program, I was ecstatic. The teachers at my school had such good things to say about this program so the offer presented to me was an easy one to accept. I was excited, but nervous to get started. I was amazed to find out that I would be working on the AnnokiBlooms project under the direction and supervision of Dr. Eleni Stroulia.

Since blogs and wiki pages are becoming ever so popular in today's computing world, an interactive application called AnnokiBlooms was developed which applies the same principals that blogs and wiki pages use to operate. The purpose of this program it to use Annoki pages, which are like wiki pages, to create an interactive learning application, enabling students to improve their comprehension skills, with the help of graphic organizers. My job for the summer, was to improve

upon this already existing application by creating a color scheme dialog box, UML diagram, teacher panel and help panel to make the program more accessible to the client.

At the beginning of my six-week period, I was introduced to a new operating system called Linux, that I had never used before. It was quite different to adjust to at first, but then I got very familiar with it. I also had access to a dual monitor computer. That was very cool! My exceptional working environment was enhanced by the fact that I worked along side very helpful graduate and undergraduate students. I also attended the Computing Science Lunch and Learn on Mondays, where the WISEST students and high school interns got together and were able to do such things as survey video games and also had university professors give us their insight into mathematical thinking.

I worked in my lab from Monday to Friday but it got even better because

the WISEST coordinators planned "ridiculously" fun days for all the WISEST students. Not only did I get to go off campus and visit such places as Micralyne, where people who work there wear "bunny suits" and "funny looking slippers," but I also went on a tour of a university engineering lab! It was especially exciting when women who actually work in male dominated jobs mentored us on university life and life after university.

My experience with the WISEST program was nothing but a positive one. I have gained so much knowledge about Computing Science within the six weeks, that I am quite amazed. My fears of the university and university life have been erased. To me, the university seems like the size of my high school now! The Computing Science building, where I was stationed had many "males" working there and I felt comfortable to be one of the few females willing to work in male dominated field. This experience broadened my horizons into a whole new world; the computing science world. I thoroughly enjoyed my placement, as I was able to see the results of my hard work, with the click of a button! To anyone who is thinking of applying for the WISEST summer research program, I would advise them to do it in a heart beat! I have never had a more uplifting experience and as a plus, I got paid! There are only good things to say about the WISEST program and as a bonus, the people who are involved in WISEST are some of the nicest people I have ever met! I would just like to say thank you to WISEST, I definitely had an incredible summer!

"W+I+S+E+S+T = One Amazing Summer"

PATRICIA ARANETA Biological Sciences

WISEST SUPERVISOR Dr. Cindy Pazkowski

SPONSOR Alberta Human Resources and Employment - STEP



MY EXPERIENCE at WISEST has been great, and the summer was well spent. I knew that many bright and talented students had wanted this job, and I almost couldn't believe my luck when I got the call! When I first found out about this program, I had my doubts. Did I really want to work full time for six weeks of my precious summer vacation?

All these thoughts faded on orientation day. Our student coordinators did a fantastic job of welcoming everyone and setting up activities for the day. I got to meet a lot of students with similar interests as mine, and I was surprised at how many of them were from out of Edmonton. I also found out more about the activities we would be doing during the six weeks, and was excited to discover that it wasn't lab work all day, everyday. Seriously, how many people get paid to go to a barbeque?

Then there was my lab, in which my experience was a positive one. It wasn't really a lab with fancy and expensive

equipment; in fact, it was the zoology museum. Not many people had keys to the museum, and I felt lucky to be able to look at the bottled fish and snakes whenever I pleased. I was assigned to work for Dr. Cindy Paszkowski, in the zoology department of biological sciences. Her research involves the ecology of amphibians, birds, and freshwater fish. More directly, I helped with Arthur Whiting's project, who is a graduate student working to get his PhD. His research project is a study of larval ecology; more specifically, the diets of the Boreal Chorus Frog and the Wood Frog. In general, the diet of these species is poorly known. His research will help other gain a better understanding of exactly what factors in the tadpole's habitat affects its growth and chances of survival.

This three year study began in 2005. This summer was the ending of the second year, and all the samples have been collected. My job was to prepare samples for stable isotope analysis; a process that gives the ratio of heavy

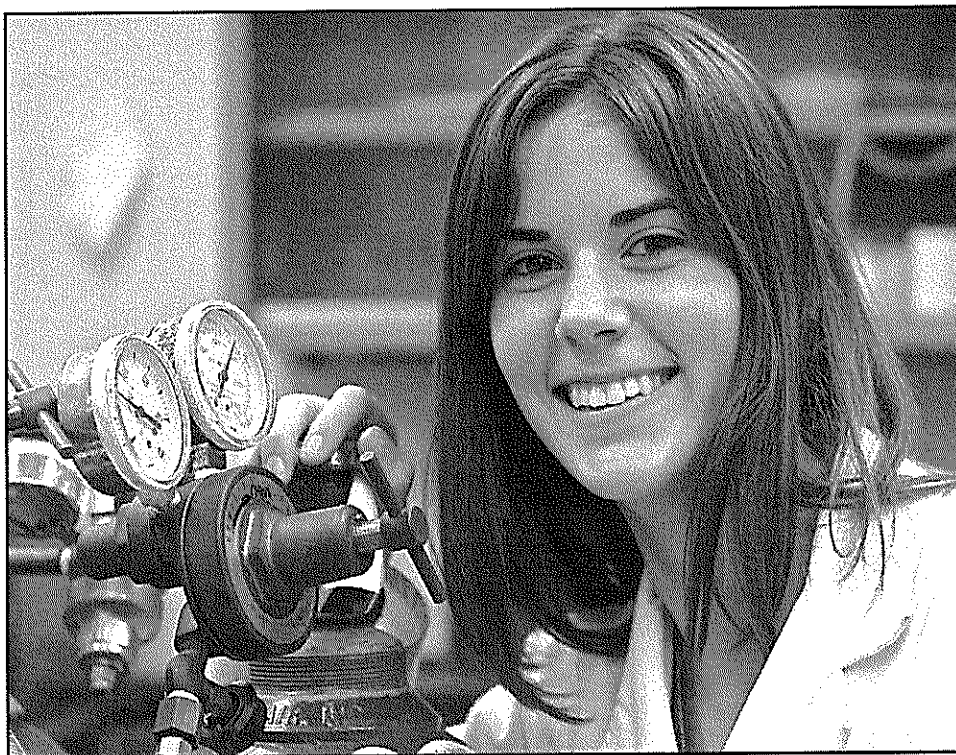
carbon to light carbon and heavy nitrogen to light nitrogen. The carbon ratio in an organism will be similar to that of what it eats, so carbon ratio tells you what the organism has eaten. Nitrogen ratio, on the other hand, increases as you move up the food chain – hence the nitrogen ratio reveals the trophic position of the organism.

Some of the samples I came across included frogs, tadpoles, various invertebrates, and vegetation from the pond. I had to grind each sample, usually with a mortar and pestle – while making sure that I don't contaminate them! Once the sample is ground, it had to be weighed to about one milligram, and placed in a tiny tin capsule. These were then sent off for analysis.

Although I usually worked in the lab, I enjoyed the few occasions on which Arthur took me with him to Elk Island National Park for some fieldwork. The samples he collected were from ponds in and around the park. Even though I was working, it sure didn't feel like it. The people I worked with were great, and I was never bored around them. I'll never forget the time my workmate got her foot stuck in the mud! But fun and games aside, they were all willing to help me out with anything I needed, or answer my abundance of questions. I felt very privileged to be able to work with such people.

WISEST has been an awesome experience for me. The six weeks went by very quickly, and I was sad to leave. I enjoyed all the activities, the discussions, but most of all, the people. I'm glad that I was able to share this experience with the wonderful people I worked with and the other WISEST students.

SHELBY BABKIRK Chemical and Materials Engineering
WISEST SUPERVISOR Dr. Jingli Luo
SPONSOR Syncrude Canada Ltd.



AS SOON AS I heard about the WISEST Summer Research Program, I knew that I had to go. For all my life I have loved science and math, and I just thought this would be the perfect way to express it! When I finally heard that I got in, I was ecstatic! I would finally be able to show other people what I love to do. I have gained so much knowledge about what being an engineer would be like when I'm older, and I think that it was the best experience that I could have had.

I was placed in the Department of Chemical and Materials Engineering under Dr. Jingli Lou. In her labs, they are working towards developing fuel cells, so that they run the most efficiently possible. I had the great pleasure of working with Jinxia Li this summer trying to develop alternate electrolytes that would work better in solid oxide fuel cells. We would make different electrolytes that we thought would work the best, and then test their impedance in an electrochemical work station.

Working with all the different machines was probably the coolest part of the summer. One of my favorites was the Scanning Electron Microscope (SEM). Some of the pellets that we had made we would take to the room with the SEM and have them looked at. We could magnify them very greatly, so we could even see the crystals that were joined together to make up the pellets. We could also make sure that only what we wanted was in the pellet, and that it hadn't been contaminated along the way.

Even though we were working really hard in the labs, there were still a few chances where WISEST put on some great educational activities for us. One of my favorites was the small group discussions. We got to talk to older women who had made it in the science world. They explained to us what they were doing and the troubles that they faced on the way. Another fun activity that we did was the Relay Days with costumes. I felt that this was a great way to get to know even more of the

people that were in the program with me. It was also a way for us to show our creative sides (the costumes). I know that I had a blast this day and I'm positive that everyone else did too.

Being from Fort McMurray, I had the wonderful experience of being able to stay in St. John's residence. This probably made the summer that much more fun. All of the people that are staying in residence became really close and I have made some great friendships! The best part about it is that there is always someone who will do something with you, no matter what it is. We went mini golfing, to the festivals that were happening, to West Edmonton Mall, and much more. Residence has provided me with the opportunity to see what it is like to live on my own, since I will be doing it in only one year. I have made some amazing friendships with many of the girls there and I know that they will last a long time.

WISEST has provided me with many opportunities that I feel have greatly strengthened my knowledge. I had great experiences working in the lab and seeing what life after high school at the University of Alberta would be like. The program has made me learn a lot about myself, and that science really is something that I would like to pursue as a life career. I am so glad that I was part of this program because it was an amazing experience and a great way to spend the summer!

I would like to say thank-you to everyone who has helped me along the way this summer. Everyone truly made this a summer that I will never forget. Thank-you

TAMARA BAIN Civil and Environmental Engineering
 WISEST SUPERVISOR Dr. Tim Joseph
 SPONSOR Suncor Energy Foundation



SUMMER... a time for sun tanning, staying up until 4 am, and...learning? When my very cool biology teacher suggested I apply for the WISEST Summer Research Program I was slightly concerned. Work? During the Summer? Seriously? However, as far as summer jobs go, an internship in a university science lab ranks not too shabby. I applied, was accepted, and to my own amazement pried myself out of bed to join the ranks of a total of 65 WISEST Summer students.

My Assignment was daunting – Mining Engineering. What exactly is mining engineering? Well, my first impression was decidedly wrong. Urbanite that I am, I associated the word mine as synonymous to dirt, dust, and dark little holes in the ground. It's amazing how narrow one's perception can be regardless of education. My supervisor, Dr. Tim Joseph, with his undeniable passion for mining engineering, shattered my preconceived notions by demonstrating how diverse the field truly is. "Let's go shopping." He

announced during my first week. My ears perked, shopping? And that's exactly what we did. In fact me and my team of fabulous colleagues (and fellow WISEST students), Andrea Bui, Veronica Haring, and Courtney Maltais went shopping several times during the summer for various materials for our joint research projects. We went shoe shopping as well – for some stylishly fashionable steel toed sneakers (a mining must).

My group's projects were equally stylish. We worked on three research projects as an independent foursome of student researchers. The first was mathematical, by building a model, our goal was to develop a formula to determine the volume of a load carried by a mining truck. The volume of a load on the ground forms a simple cone. However, when placed in a mining truck the cone is manipulated by the downwards slant of the truck body, the outwards slant of the truck's sides, as well as the vertical torque of the truck's sides. The shape is incredibly difficult to picture hence,

we approached the problem by building a model of a truck body and a model of the truck's load. Then we cut the truck's load into calculable pieces and devised a generic formula. Lots of Styrofoam was involved, LOTS, but there were only minimal Styrofoam related injuries during the process.

Tires. Yes, our second project involved measuring the force needed to move a tire up various inclines, on various materials, when subjected to various weights as well as the area of the tire tread left under each said condition. My group was lucky to have the talented Ms. Haring, who has actually taken construction, as part of our team so building a our test ramp was actually cake. The tests were messy, thanks to coal, gravel, and sand, but produced fairly concise results. It's rewarding to take on a research project, develop a procedure, and end up with usable data. It's a basic look at how science in our world moves forward.

Oh, the third project. Oh my gosh the third project! Ahhh! Is it done yet? Haha just kidding - but only slightly. My group's third project, involving how air flow is influenced by varying mine asperities, was completed surprisingly quickly near the end of the WISEST Summer program. Independent research, though exciting, can frustratingly be subjected time restrictions.

The WISEST Summer Research Program was an experience, a trip out one's average high school grind, and a look into the seemingly infinite futures available. The people, the knowledge, the opportunity - It was undoubtedly worthwhile, even if it is hard to tan inside the university's NREF building.

STEPHANIE BALE Chemistry
WISEST SUPERVISOR Dr. Jillian Buriak
SPONSOR Alberta Ingenuity Fund



THERE WILL ALWAYS be great moments in your life that you look back on and think "Wow, how did I ever do that!?" This summer is one of them. It is only six weeks after I was placed in the Chemistry department and even though my lab is right across the hall from where I am now I still really can't believe that I am doing this.

What I am doing is research with Dr. Jillian Buriak's group on nanoparticles and the stability of gold nanoparticles in simulated blood plasma. When I first had the phone call from the WISEST coordinators I wondered how on Earth I was ever going to be able to help my Grad student, Yuan Gao, with his work. Well six weeks later after he has corrected many of my mistakes and fished out several lost stirring rods from the waste container, I believe that I have tackled the research question. Two things that I have learned from working in a laboratory are; one, mistakes, breakthroughs, and luck are all important somewhere at the end of the road, and two, research has no end

of the road. I first thought that it would be difficult coming into a lab where research is ongoing and everyone else knows what they are doing. This was not the case. The Buriak researchers are really remarkable people and in a week I found my routine at the University. This had everything to do with how comfortable and easy they were as people.

I spent the first weeks of the summer at the University making nanoparticles of different sizes and shapes. We prepared rods, triangles, spheres, and cubes. Of course all of this material was not visible to the naked eye but from SEM (scanning electron microscope) session to the next, I found that my

cubed became squarer and rods more regular. This I am told is a very good thing. Yuan's project is to study how nanoparticles interact with blood (which I think is really exciting because of all the opportunities this opens in medicine). He needed to start with nanoparticles that were all consistent so that we could visibly see changes in the nanoparticles when in the plasma. After the nanoparticles were prepared we incubated them in simulated blood plasma, and he will continue to study how they react to the plasma after I leave at the end of summer. I really like how the work that I did is not simply a small project that had a beginning and an end, but rather an effort made by many individuals to reach greater understanding of the physical world. That is science.

When we go into University we must choose between Art and the Sciences. These are seen as the poles of education. I have discovered that it is important to have a balance of as much as you can in your life. Balance your academics and your creative nature. They do not have to be separate. The WISEST program was many things to me. It was an exposure to university, a way to become involved in scientific research, and an introduction to really the most amazing people. I still might not be able to believe that I was able to have this experience, but the truth will always be that I did. If little things in life can affect the person that you grow into, then experiences like WISEST shape you.

If little things in life can affect the person that you grow into, then experiences like WISEST shape you.

KATHERINE BARKWELL Biological Sciences

WISEST SUPERVISOR Dr. Bill Tonn

SPONSOR Alberta Ingenuity Fund



CLICHÉ THOUGH it may be, it must be said that this summer has flown by incredibly fast. The six weeks passed by in a whirlwind of activities, fieldwork, dissections and gill net repairs. And yet the first day of the program feels like it happened ages ago.

The first morning was full of uncertainties. I had no idea what to expect regarding my placement, as I was one of the three girls stationed at the Meanook Biological Research Station. My worries were appeased as Laura, Esther and I met the friendly staff from Meanook, along with our Principal Investigators; we were then taken on a brief tour of the Biological Sciences building. The three of us learned a bit about the projects we would be helping with. We then headed out to the station, got a brief tour and then unpacked in our rooms.

We started bright and early the next day. I had found out yesterday that I was helping with a project on fathead minnows. That morning and every

morning after that, my team – Deborah Silver, my supervisor and Heather Currie, a first-year student at the University of Alberta – and I began at 8:30 a.m. by feeding the fish in the large tanks beside our garage, then scooping out the dead ones. Afterwards we made our way to the research ponds, where we counted the minnow eggs on the nestboards, using clear plastic grids, which we clamped over the nests, and mechanical counters. This was very time-consuming at first, as there were eighty-eight nestboards in total – eleven in each pond half, with a total of four ponds – and there were around three to nine nests per pond. As the summer progressed, the minnows' spawning slowed down a great deal, as it is temperature-dependent.

We went to the lakes twice per week, usually on Wednesday and Thursday, to check the nestboards and to catch samples of fish for dissection. We used a canoe on Sara Lake and a Zodiac on Duck and Armstrong Lakes. As Deborah's project was concerned with

the effect of predators on the life history of the minnows, she had chosen the lakes based on whether or not pike were present. One of the lakes contained pike, one did not and one was known to have had pike within the last three years. The project was attempting to determine if the differences in the populations of minnows from the three lakes was due to genetics or to phenotypic plasticity.

I also spent a lot of time learning to dissect the minnows, along with Heather and Zetan Du, another first-year University of Alberta student and a member of Team Fathead. We practiced removing the two tiny otoliths from the heads of the minnows and then mounting them on glass microscope slides, using thermoplastic cement. We also practiced removing and weighing the gonads from the female fish, then placing them in labeled tubes for future examination. The team also worked on repairing the gill nets, which are used to survey the types of fish in a lake.

I am very grateful to have had the opportunity to enroll in WISEST. Meanook was a great place to stay – even though it isn't exactly close to Edmonton, the atmosphere was warm and friendly and we had an excellent cook. I have learned many useful skills, and have learned more about myself. I made some good friends and have acquired some good memories. And although this too is a cliché, I have to say I had an unforgettable summer.

LAVANYA BATHINI Biological Sciences

WISEST SUPERVISOR Dr. Suzanne Bayley

SPONSOR Lehigh Inland Cement Ltd. / Human Resources Development
Canada - Summer Career Placements Program



EEEWWWW.....BUGS!?!

In my short six weeks in the WISEST program, I have learned a great deal about the various areas of research in Science and Engineering. However, the plethora of information that I have learned about the University of Alberta fails to compare to the knowledge I gained about myself and the relationships I established with phenomenal people.

I suppose I never really minded insects. When I first received a call from Tiffany letting me know that I was accepted into the WISEST program, I was absolutely thrilled! Then when she told me that I was going to be placed in an insect lab, all I could think of were little slimy critters with six legs crawling all over me. I was horrified. However, it was this initial feeling of disgust and fear that allowed me to appreciate my experience in the lab that much more. Never in a million years did I think I would be saying these words but....I think I like bugs. It's come to the point

where I can identify an aquatic insect down to the species just by looking at it...it's kind of scary!

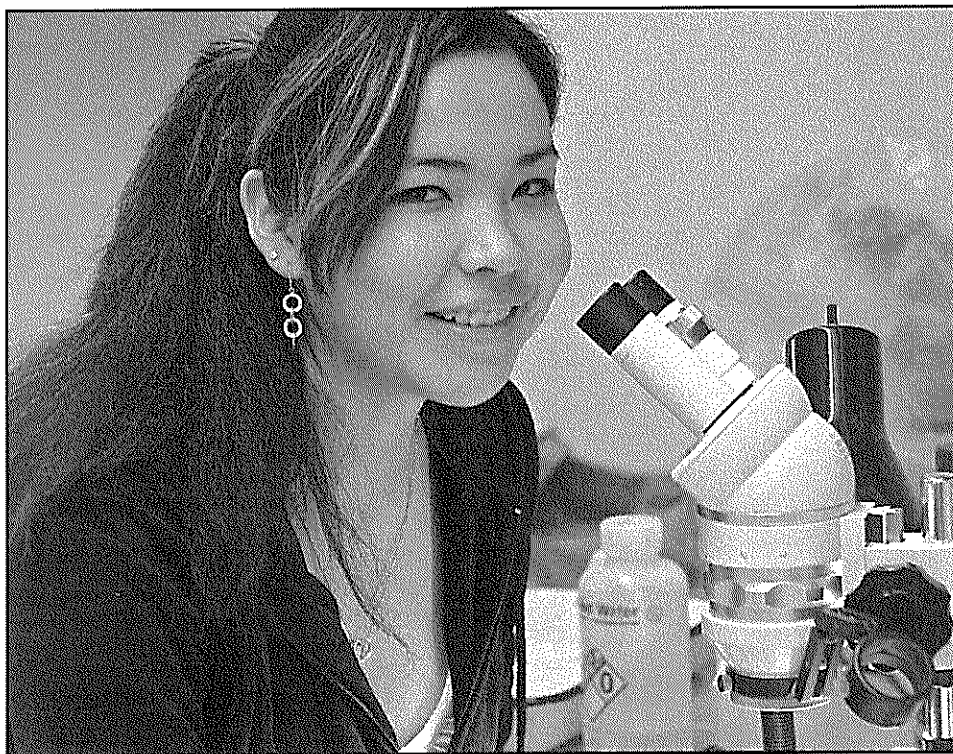
I will never forget my first day of work. My supervisor, Danielle Cobbaert, introduced me to everyone in the lab and told me a bit about herself. After chatting for a while, she showed me my lab bench and the microscope that I would work with for the next six weeks. My main task was to measure insects under a microscope and record their body lengths on a spreadsheet. She explained that these lengths would later be used to calculate the biomass of the insects in the ponds that she studied. Although the job did not appear to be particularly interesting, it seemed simple enough and I began working

away at the samples I was given. Before I knew it, I was fascinated with the insects I was measuring. When looking at the specimens under the microscope, I admired the intricacy of their anatomy and my hand-eye coordination improved dramatically as I constantly unfurled samples with tweezers and a probe. I went the entire day not knowing that all of the clocks in the Biological Sciences building had been set back one hour. I still recall the moment I said bye to my supervisor at 4:30 after a hard day of work (when technically it was 3:30) and the priceless look of confusion on her face. It was moments like this that truly made me appreciate the WISEST program.

Another amazing part of my experience at WISEST was meeting incredible individuals. I was so fortunate to share my summer job experience with Raven Beardy. I learned so much about Nunavut from her and she never ceased to amaze me with interesting facts about her life. Perhaps the most valuable time I spent in the lab was the time I spent with my supervisor. It was through her dedication and mentorship that I was able to thoroughly enjoy my time in the lab. It was her friendliness and warm spirit that made me feel welcome and apart of the research team. From her I learned the importance of having passion for your research. Without love for your work, making advancements in research is impossible. This experience has truly opened my eyes and made me realize that regardless of what I choose to pursue in life, dedication and perseverance are vital for success.

I learned the importance of having passion for your research. Without love for your work, making advancements in research is impossible.

RAVEN BEARDY Biological Sciences
WISEST SUPERVISOR Dr. Suzanne Bayley
SPONSOR NSERC - PromoScience



THE PAST SIX WEEKS have been full of some of the most unique and exciting experiences than I could have ever imagined..... the opportunity to learn more about careers in science and research, the opportunity to participate in an actual research project, the opportunity to experience university life first hand in a large centre away from home, the opportunity to meet new friends and role models, and the list goes on!

I was assigned to the Department of Biological Sciences under Danielle Cobbaert, my awesome supervisor, who is doing her doctoral research into the abiotic and biotic factors affecting the shallow water wetlands in northern Alberta. She has taught me so much about the biodiversity of wetlands, ponds and shallow lakes.

Danielle's research centers on the study of how Alberta's aquatic ecosystems are being subjected to cultural eutrophication, caused by increased amounts of phosphorous and nitrogen

as a result of population growth, agricultural and industrial development and climate change. These high levels can lead to excessive growth of algae and the decrease of oxygen available to the wetland ecosystems thereby threatening the biodiversity.

I worked alongside Danielle and her team, both in the laboratory setting and in the field. As much of Danielle's research involves aquatic insects and their role as indicators of water quality in shallow lakes, much of my work in the laboratory involved measuring insects under the microscope and entering this data into the computer. Other duties included those necessary to keep the lab working more efficiently for the research team members, such as washing bottles.

I also had the opportunity to participate in field work with Carly Greenway, Danielle and her assistant. I traveled with them to two field camps, a total of ten days and nights, to collect insect and vertebrate samples from

experimental enclosures in various shallow lakes north of Edmonton. It is in these situations that one experiences the real world of research.....the planning, the process, the logistics, the successes, the frustrations, and the weather!!! I will never forget watching Danielle, with a twenty kilogram pack on her back, dragging a kayak through the bush, after days of rain, with a smile on her face!

We made many trips into the bush, dragging equipment and supplies for sample collection. I learned how to set minnow traps, separating our samples into bags of vegetation and cups of preserved insects.

I learned how to take water samples to measure biomass in the lakes. These readings give information as to the concentration of aquatic life in the lakes on a scale of one to five. They are related to the presence of predators and macrophytes (aquatic weeds) in clear-water conditions, where readings are higher on the biomass scale, or the presence of phytoplankton (algae) in turbid-water conditions, where readings are lower.

In closing, I want to say how grateful I am to have had the chance to attend the WISEST program. Thank you so much to Danielle Cobbaert, my supervisor, for her support and encouragement. She is a real example of someone who is following her passion, and it was a privilege to work alongside her and such a dedicated team, including Lavanya Bathini, my lab partner!

Thanks also to the staff in the WISEST office who provided such amazing administrative support, to the residence supervisor, to my sponsors at NSERC and to my teachers in Cambridge Bay. You have all played an important part in making this a summer to remember, one in which I have learned so much about the many exciting opportunities available in science and in life.

LAURA BECKER Biological Sciences

WISEST SUPERVISOR Dr. Cindy Pazkowski

SPONSOR Ms. Esther Ondrack / Human Resources Development Canada
- Summer Career Placements Program



MY FABULOUS six weeks with Wisest, started with so much excitement I questioned whether or not my experience could possibly include everything I hoped. I was told that I would be heading up to Meanook Biological Research Station, a small but family-like environment. I translated that to 10 days of camping, followed by 4 days of fun with my friends back in Cold Lake. After the orientation we met Kirsten Fazakas, and Dr. Cindy Paszkowski (two of my supervisors), and prepared to meet Brandon (a graduate student) and Christine (The lab Technician) to head to Meanook.

Once we arrived we were given a quick tour of new home and shown to our rooms. I couldn't have been more pleasantly surprised; Meanook was going to be more than bearable it had all the amenities I was used to back home. Internet, board games, magazines, Playstation and even home cooked meals by the chef Patje, were only a couple of the ways we enjoyed ourselves while we weren't hard at work.

My supervisor was Arthur Whiting, although he didn't live out at Meanook he had no trouble finding me enough work to keep my days busy. Each day I helped Esther complete Rana and then headed for my three transects that I created on the banks of two neighboring ponds. Just before lunch I would walk the fences to collect adult frogs that were no longer part of Arthur's project and then it was time for leftovers, sandwiches or whatever you could find for lunch. After lunch I headed for the cattle troughs which were being used to enclose two types of tadpoles, I measured each tadpole and removed

any mature frogs from the project area. To finish my day I re-walked each of my transects and entered any data I had collected.

Near the end of July Arthur's project was winding down, and I was offered the opportunity to work out at Elk Island with Connie (another PhD student of Dr. Paszkowski's). I quickly accepted the invitation and worked tracking radio collared toads, and helping with smaller accompanying projects from Aug 5th to Aug 9th. When I returned it was time for another exciting Wednesday afternoon session and then four days off, wrapping up my time in the program.

I was blown away at the diversity of research and individuals I was able to work with. The work that I got to be apart of was well explained and interesting, I could never imagined how much I enjoyed working with amphibians. Apart from the day to day work, were the exceptional researchers I was lucky to have been placed alongside, they were welcoming and very knowledgeable; always ready to answer all of my never ending questions. During my stay at Meanook I got to work with two other Wisest students; Katherine and Esther. Both of these young ladies were not only hard working and dedicated but very fun, good-humored girls. We all had a lot of fun getting to know each other in the "Wisest Clubhouse" (or computer lab), watching re-runs and telling our stories over Nutella and grapefruits.

I was blown away at the diversity of research and individuals I was able to work with. The work that I got to be apart of was well explained and interesting,

PARVEEN BRAR Chemistry

WISEST SUPERVISOR Dr. Charles Lucy

SPONSOR GlaxoSmithKline



JULY 5, 2006. Sixty-five grade eleven students gathered in the ETLC Solarium, not knowing that the next six weeks of their lives would be a whirlwind of new experiences, friendships and knowledge.

When I first found out about my position in WISEST, I was ecstatic. It seemed like the chance of a lifetime, and it was. I was placed in the Department of Chemistry, working in the division of Analytical Chemistry using capillary electrophoresis. My principal investigator was Dr. Charles Lucy, and my supervisor was Amy MacDonald.

Capillary electrophoresis (CE) is a separation technique in which you apply high voltages to separate different compounds. Essentially, Dr. Lucy and Amy had been working on developing different capillary coatings that would result in more efficient separations and would reduce adsorption of proteins. My project involved testing these coatings to separate different pharmaceutical drugs. Traditionally these drugs have

been separated on a bare capillary, using low pH and high buffer concentrations. These high concentrations can mask any broadening of the peaks that may be occurring. Coating the capillary tends to reduce broadening and therefore results in more efficient separations. The coating that I experimented with was POE stearate with DODAB. The coatings give the capillary a neutral surface which prevents the drugs from sticking to the surface of the capillary, when then reduced the broadening of the peaks. Since the peaks are sharper more drugs could be efficiently separated in one sample. This could be especially beneficial in areas such as forensic analysis, where a large number of drugs are usually analyzed in one small sample.

I began my experience by reading different papers and reviewing basic chemistry skills such as: preparing solutions, pipetting, using the pH meter, and of course learned how to operate the CE instrument, since it was going to be a major part of my life for the next six

weeks. At first it was rather overwhelming, I felt as if I did not know enough to be working in such a lab. The papers I had to read seemed to be beyond my understanding. I only ever seemed to understand portions of the paper. However, I soon learned that I was not expected to know everything and that those papers were just for my general understanding and that it was perfectly okay to ask questions. Eventually pipetting solutions and analyzing graphs became apart of everyday life, as did capillary electrophoresis.

Taking part in the WISEST Summer Research Program has been an unforgettable experience. Not only have I learned an immense amount about chemistry and working in a laboratory, I have also been able to see what university is like and gain a sense of familiarity with the campus and people. Outside of the lab, the activities planned by our coordinators were just as enlightening. The diverse Wednesday afternoon sessions allowed us to gain knowledge about many different aspects about not only university, but life as well. From the truly inspirational Small Group Discussions to the off-campus tours to Isotechnika and Micralyne, everything was immensely interesting and useful.

As a result of the WISEST Summer Research Program, I have been able to gain insight about different areas of study that I would have probably overlooked otherwise. The program has allowed me to break many stereotypes and make my own opinions about different fields. WISEST has allowed me to open even more doors for myself and set myself up for a career that I will thoroughly enjoy.

I would like to sincerely thank GlaxoSmithKline for sponsoring me, WISEST for giving me this opportunity, and the Lucy group, especially Dr. Charles Lucy and my wonderful supervisor Amy for always helping me along. I have learned so much in the past few weeks and will always cherish this experience.

CHELSEY BRIGHT Agricultural, Food and Nutritional Science
 WISEST SUPERVISOR Dr. Doug Korver
 SPONSOR Faculty of Agriculture, Forestry and Home Economics



MY SUMMER at the University of Alberta Farm was pretty fun. I worked with a very intelligent young woman by the name of Raven Kirschenman and enjoyed working with chickens on her research project at the Metabolic Unit on the University of Alberta Farm over the six weeks of the summer. It defiantly beats working at Superstore for the summer ringing through groceries the entire day.

I will give you an introduction to what exactly I've been up to these past weeks. The first experiment involves 16 birds/strain (commercial and random from 1957) and 8 birds were injected with lipidopolysaccharide (LPS) which is a bacterial component from the cell wall of bacteria. When the birds are injected by this bacterial component their innate immune system is triggered and they start trying to fight the disease. We monitor the birds hourly by taking rectal temperature and measuring body weight. We expect our results to show that the random birds will have a higher fever, this a stronger innate immune

system compared to the commercial birds because the commercial birds are selected for growth and use all of their proteins to increase body mass instead of using proteins for their immune system.

The second experiment includes a specific diet that has different amounts of lysine (amino acid) that is fed to 8 birds, 4/strain. Then we complete the oxidation by giving the birds a specific amino acid (phenylalanine) that we will be able to detect in their breath. When we detect the phenylalanine then we can also see if there is lysine present.

I also recently got to take blood and after Raven spun the blood samples I separated the blood plasma from the red blood cells. On the same day I took rectal temperatures of the birds. Both were interesting, however I don't think I would like to do this daily!

I did work in the lab at the Agriculture and Forestry Building looking at feed samples that contained phosphorus.

I worked with Jordana who is a lab technician and works under my private investigator, Dr. Doug Korver. It was interesting to learn the different lab techniques used when completing a lab. For example, using a pipet, sticking the samples in an oven and ashing them so they could be analyzed in an easier manner and also having to be very precise when working with the sample, because one mistake means doing the entire lab over again.

I also worked at the Poultry Research Centre helping a grad student dissect birds and take bone and blood samples. I enjoyed this the most because I like taking book knowledge and applying it to hands on experiments. When learning about the digestive, circulatory and respiratory systems in a human I could apply this knowledge also to a chicken. My supervisor opened up a chicken and we looked at all the different parts. Also at the poultry centre, I helped an undergrad student collect and wash eggs for Dr. Doug Korver's experiment in determining the digestibility of phosphorous in diet form.

All of the research that I took part in, was in the end going to help industry determine the best tasting chicken in the least amount of time with the least amount of cost, so it can benefit Albertan farmers, businesses and agriculture in general.

If I weren't included in any of this research I wouldn't have known what research was going to be like. I would have eventually found out in my first or second year university, but now I have a better grasp on my future. All in all it was a great experience, I enjoyed you two, all the different girls, my supervisor and other people on the farm, also residence at St. Johns was really fun.

ANDREA BUI Civil and Environmental Engineering

WISEST SUPERVISOR Dr. Tim Joseph

SPONSOR Epsilon Chemicals Ltd. / Human Resources Development
Canada - Summer Career Placements Program



WOW. I can't believe how quickly the past six weeks have flown by. This summer was full of exciting discoveries and amazing experiences.

This year, 60 girls and 5 boys in the WISEST Summer Research Program (WSRP) were scattered across the University of Alberta campus, and even locations beyond, to participate in research from areas of Science, Engineering and Technology. I had the fortune of sharing my summer with three other WISEST Student Researchers: Tamara Bain, Veronica Haring, and Courtney Maltais. On this mini research team, I worked in the Department of Civil and Environmental Engineering, specifically in Mining Engineering. Under the supervision of Dr. Tim Joseph, and our technician, Robert Anusic, we were kept busy on four unique projects.

Our first project involved calculating the load volume of material carried by a mining truck body. We wanted to create a generic formula that could

easily be used in the field for any truck size. The approach included drawing millions of sketches with furrowed brows, repeatedly cutting up cardboard, and perhaps most chaotic, sawing and filing away at Styrofoam. In the end, we perfected our craftsmanship and built a model on which our math was based. The second project concerned changes in tire footprint as a truck traveled over a variety of mining surfaces and on different inclines, while subject to changing loads. We built an adjustable ramp and tested a set of miniature wheels over sand, gravel and coal. Our third project dealt with the safety situation in underground mines. To simulate real conditions, we coated the inside of pipes with various mining materials. We then individually connected the pipes to an axial flow fan and evaluated the airflow using a vane anemometer. Our last project was a data analysis research project that involved observing and seeking trends in the changes in volume and position of a load sitting atop a moving truck body. This project was connected to the

first because it considered the reality of an imperfect pile of material while the first was designed for the optimum cone volume shape.

My summer was not all spent at the office or down in the lab, though. Our wonderful WISEST Student Coordinators, Selina Gyawali and Tiffany Ladoski, organized many opportunities for all the WISEST Students to gather and get to know each other. There were also incredible Wednesday Afternoon Activities when we got to explore the diversity of research through its applications in academics and industry.

Coming into the WSRP, I was very curious about what life at the University and research on campus was really like. I think this Program has offered me so much information and opened my eyes wide to the endless amount of possibilities out there. I learned a lot about myself and about the options available to students just like me. One of the most important things I feel I've learned is that research merges fields of study together. It can bring people from all over campus in different departments, even from across the globe, together, for a common goal. It is absolutely amazing. I am so grateful for having been given the chance to catch an early glimpse of this world of larger-than-life research.

On our very first day, Dr. Andrew Greenshaw, Associate Vice-President of Research at the U of A, told us to look around, look at the people sitting beside us. One day they will be great. One day we will all be great. I won't forget this feeling of being surrounded by brilliant people who have all worked so hard to get to where they are and will continue to work hard to get to where they wish to be. The WISEST Summer Research Program has introduced me to this rich environment and I have only become more curious and excited to be a part of it. Thank you so much!

EMILY BUSS Biological Sciences

WISEST SUPERVISOR Dr. Erin Bayne

SPONSOR Faculty of Science / Human Resources Development Canada
- Summer Career Placements Program



WHEN I WAS selected to participate in the WISEST program this summer I was very excited, and a little nervous about what my summer work might be. Looking back now, it seems silly, as the time has flown by and I've learned so much and had so much fun.

I was assigned to work in the Department of Biological Sciences under the supervision of Dr. Erin Bayne. I spent most of my time working for Erin Cameron who is a grad student studying earthworms in the boreal forests of northern Alberta. Earthworms are an invasive species because they are not native to the area, and have a potentially negative effect on the environment because they remove leaf litter from the forest floor. Erin's research is aimed at determining how the worms are getting to an area they are not native to. Since her previous work had indicated the worms had been brought to the area by traffic, our focus was the comparison of worm presence and population alongside old and new roads.

To gather information, Erin and three research assistants travel to northern Alberta to take samples at a number of roads, which have been aged with the use of air photos. Two other WISEST students and myself went along for two of their trips to the field. Our first trip was ten days long, where most of our time was spent at Lesser Slave Lake assisting in completing two grids, one at an old road and the other at a newer road. A grid is a sample area of untouched land which is 500m X 500m. The sampling starts a few metres from the road where we would dig out a 25cm X 25cm square of soil (a plot) after recording the immediate environment every 50 m for 500 m. Then we dug a plot every 50 m behind each of the initial plots along the road until we had covered the 500m in both directions. All together each grid consisted of 121 plots, where we would collect all of the worms we found as well as recording whether there were cocoons present or not. After we had finished our work we had to kill all of the worms that we had collected so

that they could be aged and have their species determined, since there are a number of different earthworm species. For the last few days and the entire second trip which involved several sites in northern Alberta, we did transects, which are six plots ten metres apart. At transects we also looked under a log at every plot. Worms are sometimes rare in the plots when the soil is dry, but are almost always present under the logs where it is cool and moist.

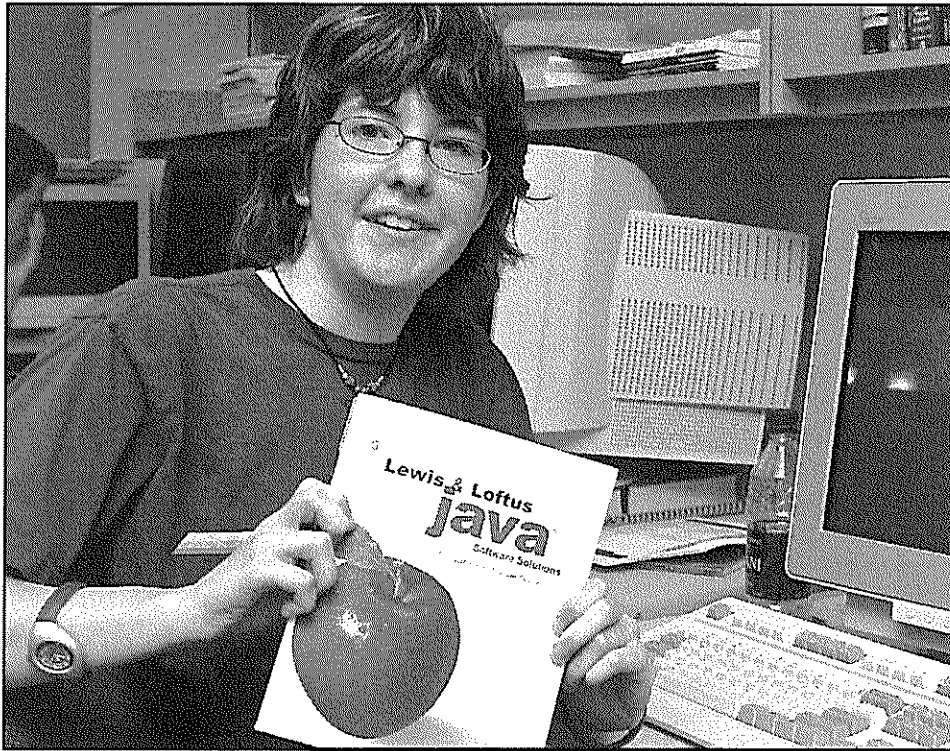
Being out in the field was not only a lot of fun, but we were able to learn a number of skills such as using a GPS system, navigating with a compass, and even changing a flat tire on the crew truck. The researchers we worked with were very willing to share their University experiences with us, and were a great bunch to work with.

The final portion of our WISEST summer program we were assigned a project working for Dr. Lisa Mahon. We are reviewing air photos to look at changes in habitat over time. This information will be used in correlation with bird populations over the same time period to determine the relationship between habitat changes and population changes.

Although we were away in the field quite a bit, my two WISEST partners and myself were still able to attend most of the Wednesday afternoon sessions and social events. These were a great opportunity to learn more about the University of Alberta, meet a lot of individuals with similar interests and goals, and explore the University campus.

I really appreciate the opportunities I had this summer with the WISEST program, and would like to thank all of the coordinators and supporters of this rewarding program.

STEPHIE CADEK Computing Science
WISEST SUPERVISOR Dr. Duane Szafron
SPONSOR Alberta Human Resources and Employment - STEP



THIS SUMMER I got accepted into the WISEST Summer Research Program. My six weeks working at the University have been amazing. It is my first job but I think I will always remember it as one of my favourites. I loved the project I was working on and learned a lot while I was there. I worked under Dr. Duane Szafron in software engineering, which is a part of computing science. It was an amazing experience for me and has helped me decide what I might want to do in the future.

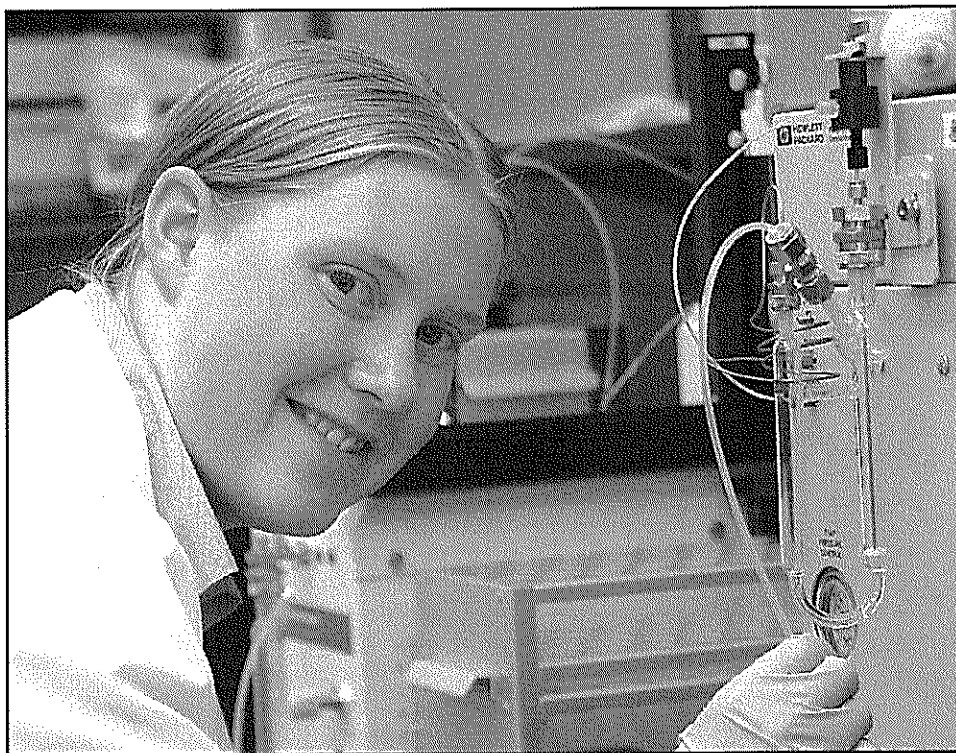
The project I was working on involved making scripting in game design easier for people who don't understand programming. The team I was working with had developed a program, which would write the code for you, called ScriptEase. The particular game that this program was designed for is called Neverwinter Nights. The goal of the project was to prove that their program could replace manual scripting and to create a module, or set of levels, that showed off their program. My part of the project was to help my supervisor,

Maria Cutumisu, make using behaviors easier. Behaviors are the way the non-player characters (NPCs) interact with the game and the player. I made default choices for the behaviors, so that they could be used faster, and I also made two of my own modules to test all of the pre-existing behaviors. A swell, I created some of my own behaviors that better expressed the types of actions used in interactive stories. Some examples of behaviors I created are a Sitter behavior, causes a character to sit on a chair for a while and then walk around, and an NPC conversation behavior which causes two or more NPCs to simulate a conversation.

The WISEST program was a wonderful experience for me, but work was only one part of the program. We went on many diverse tours of the campus and off-campus facilities, and got to speak with people who have careers in different fields from our own. The WISEST program will become a life-long memory and will assist me in planning my post secondary education.

The WISEST program will become a life-long memory and will assist me in planning my post secondary education.

SADIE CAMPBELL Civil and Environmental Engineering
 WISEST SUPERVISOR Dr. Kevin Biggar
 SPONSOR Alberta Innovation and Science



FLIPPING BURGERS, mopping floors, cutting grass what more can a grade 11 student hope for as a summer job. How about working on, ground breaking (literally) research, in a University of Alberta laboratory. Well thanks to WISEST that is exactly what I have been doing for the past 6 weeks.

Before I came here I did not know what engineers did or that there were so many different disciplines. I worked in geotechnical engineering, for Dr. Biggar. Geotechnical engineering is a discipline of civil and environmental engineering that deals with soil, rock and underground water. I was assigned to help on two research projects;

My first task was to calibrate the thermistors. A thermistor is a very accurate temperature sensor, which exhibits a large change in resistance proportional to a small change in temperature. The thermistors I was working with are going to be placed in the Mackenzie Delta and used to monitor the ground temperature at

depth ranging from 0.5 m to 5m. They will be used to monitor and assess abandoned well sites for possible leaks which might pollute the surrounding environment. To calibrate them I had to first sort and label and bundle the different lengths, because Dr. Biggar wanted to know if the length affected the thermistors resistance. I was to do a four point calibration, which means I had to measure the resistance of each thermistor, a total of 55, at four temperatures. For the temperatures of -20, -10, and 0 degrees Celsius I placed them in a constant temperature bath filled with glycol. The fourth temperature was room temperature, 19.1 degrees Celsius. Once I had all the resistances recorded I graphed the curves and applied lines of best fit.

The second research I aided in was Dr. Ania Ulrich's soil analysis of Suncor's south tailings pond. Suncor is planning to expand their oil sands operation, and in doing so will produce more waste water from their refinery processes so they have to build an out-of-pit tailings

pond. The problem is the site where they are building the pond has the potential to leak and contaminate the Athabasca River, and surrounding ground water. It was my job to create a baseline data set for the soil samples taken from this area. The data set had to include soil moisture content, pH, and conductivity. To find the moisture content I had to place samples, of the samples in the oven, recorded the mass of water evaporated off, and then divide that by the mass of dry soil. Conductivity and pH were found by first saturating the samples, creating pastes, centrifuging them, then placing the probes into the liquid extract, and recording the values.

Of course this program is not just about work, it is also about having fun, experiencing a broad range of science related fields, and learning about other people. I would like to thank all the incredible WISEST coordinators for setting up all the really really really ridiculously fun and educational events.

Since I live in Breton, I had to stay, or I should say I was lucky enough to stay in residence. The first time I step through the doors I knew I had walked into a home away from home. It was a blast; I met so many wonderful people and have had the chance to experience some of Edmonton's premier events. Even when there was nothing happening in the big city we entertained ourselves with an 80's dance, cards, and sidewalk chalk. Thanks to our resident advisor Megan.

This amazing program has broadened my horizons, given me some direction, and I have learned so much invaluable information my mind feels like a saturated paste. I have also met many great, wise, and remarkable people who I'll never forget. On the first day, at orientation I thought this summer is going to be unforgettable, and it was.

OKSANA DACKO Biological Sciences

WISEST SUPERVISOR Dr. John Locke

SPONSOR Faculty of Science / Human Resources Development Canada
- Summer Career Placements Programs



NOTHING SAYS summer is coming near like the sight of millions of hungry mosquitoes. When most people think about summer, the bugs are the most unappealing aspect of the holidays. In my case, seeing bugs, fruit flies in particular meant the beginning of an amazing summer vacation. It all started when I decided to apply for the WISEST program in March. Little did I know that a couple of months later I would get the call to find out that I was accepted. I remember that day very well.... the coordinators giving me vital information and me not even thinking of what they are saying. I was just writing what came into my ear onto paper.

On September 5th I came to the University, and for the first time actually entered through a campus door. After orientation had flown by, I met with Dr. John Locke.

My work for the next six weeks involved studying gene expression in fruit flies. Though most people would grab repellent or shoo flies away, I

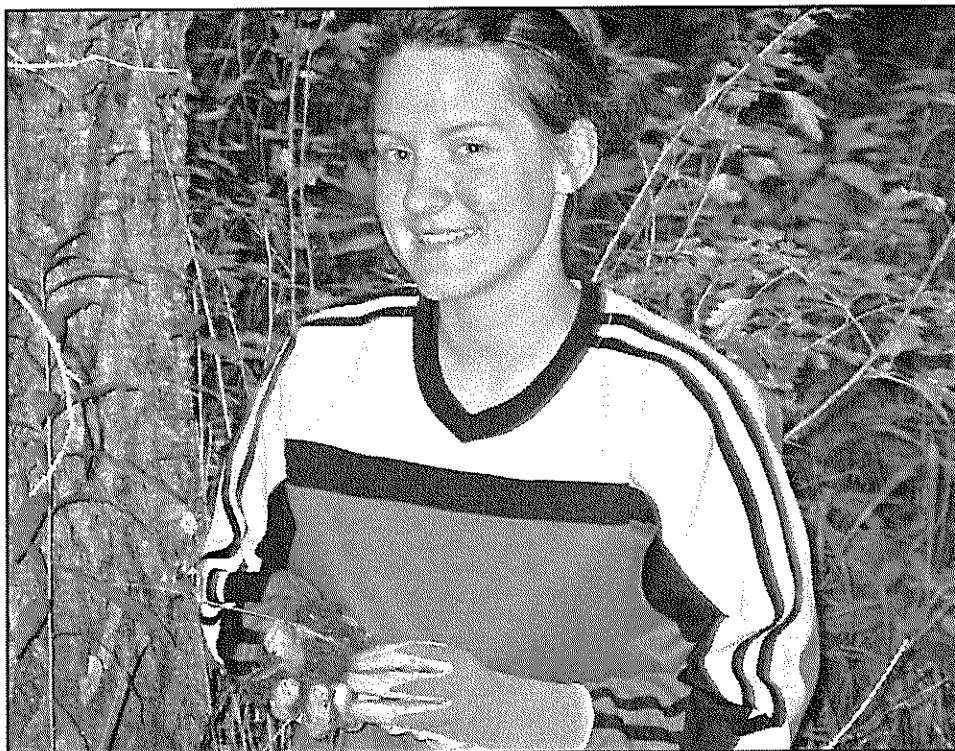
was collecting them in order to do my research. However, unlike many of the other WISEST students, I worked on three projects rather than one major one. I did most of my work alongside Scott Hanna, but there were many others who assisted me, like Dr. John Locke.

My three projects included taking a closer look at the white gene, doing a complementation test and testing a new method for measuring eye pigment. In my first project, I studied the regulation of the white gene. I looked at the fly eye to see if a suppressor on a particular gene was truly a suppressor and made the fly eye redder. My second project involved doing a complementation test. In this test, I crossed flies with a known mutation to ones where there was an unknown mutation. By looking at the offspring we could tell whether the mutation was in the same gene as the known mutation or not. In my last project I used a spectrophotometer to determine if it is necessary to isolate the head from the fly body

when studying eye pigment. The spectrophotometer measures how much light the pigment in the fly absorbs. My projects involved very basic research and many further studies can be done from them. Though my projects seem like they do not directly affect the general population, they do. The regulation of genes, like I studied in my first project is an important part in development of all organisms. It also plays a major role in cancer.

While working on these projects throughout the summer I was able to gain more than just results. Not only did my pipetting skills drastically improve, I also learned other lab skills. Anaesthetizing fruit flies and mixing small or large amounts of chemicals were fun experiences. However, the thing that I gained the most was knowledge. It was through WISEST that I got to discover more about the programs at the University and what it is like going there. I have learnt many lessons that many people don't learn until later on. Managing time, keeping things organized, and keeping your mind open are just a few of the many life skills I obtained. WISEST is truly the experience of a lifetime where you learn more than you could ever plan for. The six weeks I spent in the program really did fly by, and it didn't even feel like a job. Overall, I got everything I hoped to get out of the program and more. I met new people with whom I share the love for science and math, I got to learn about the University and women's role in the scientific fields, and most importantly I had a blast during my summer! Thank you WISEST!

ALYSSA DE LEON Biological Sciences
WISEST SUPERVISOR Dr. Erin Bayne
SPONSOR Alberta Women's Science Network



MY WORMING SUMMER.

When I signed up for the WISEST summer research program, I thought I would be spending my days learning Bill Nye type science experiments or writing lab reports like in my Chemistry class at school. Was I ever wrong! I was placed in the Biological Sciences department, along with two other WISEST students, under the supervision of Dr. Erin Bayne. The project he had planned for us was to work with Erin Cameron, a grad student working on her master's degree.

For the past three years, Erin C. has been leading a research project involving invasive earthworms and how they have spread across Alberta's boreal forest. Erin has been studying different ways she thinks the invasive species have been brought to the province. She has tested around docks, to see if they were brought in as bait, and has also done research to see if migratory birds brought them.

The final leg of the research was to see if the worms were being brought in during the construction of roads. Erin has dated numerous roads in the boreal forest of Alberta. We (the research team) then go out to these sites all over Alberta and set up either a grid or a road transect.

A grid is a section of untouched forest, 500m square that borders a road, either new or old. We measure out a grid of 50m squares, which creates eleven rows of eleven sampling plots. At each of these stations we classify the area using the surrounding vegetation, and then dig out a 25 by 25cm plot. We then sort through the soil and bottle and label any earthworms we find.

A road transect is quite similar to a grid. We measure out 50m, parallel to the road. We dig out 6 plots, the first is 50cm by 50cm, and the other five are 25cm by 25cm. We sift through the dirt and bottle the worms. We also find six fallen logs that are touching the ground for at least a meter, and we classify

them by decay class etc. We dig out the soil underneath the logs, and bottle worms.

After a grid or a road transect, we kill the worms and preserve them in ethanol, so that they can be identified and counted later on.

The other two WISEST students, Emily, Yihan and I, went up to the field twice. The first time for ten days, the second for eight. We worked with Erin Cameron and three other grad students, Jesika, Nataka, and Taryn. The six of us sampled around Lesser Slave Lake, as well as further north. We stayed in campsites near our sampling sites.

I had a wicked time working with the other girls. Tenting together for ten days at a time gave us the chance to get to know each other really well, and to build friendships with everyone on the project. It was great to hang out with grad students not much older than us and to ask them questions about their University experience. Not to mention talking all night and cooking up ridiculous concoctions for supper. We had some good laughs, and made a lot of awesome memories.

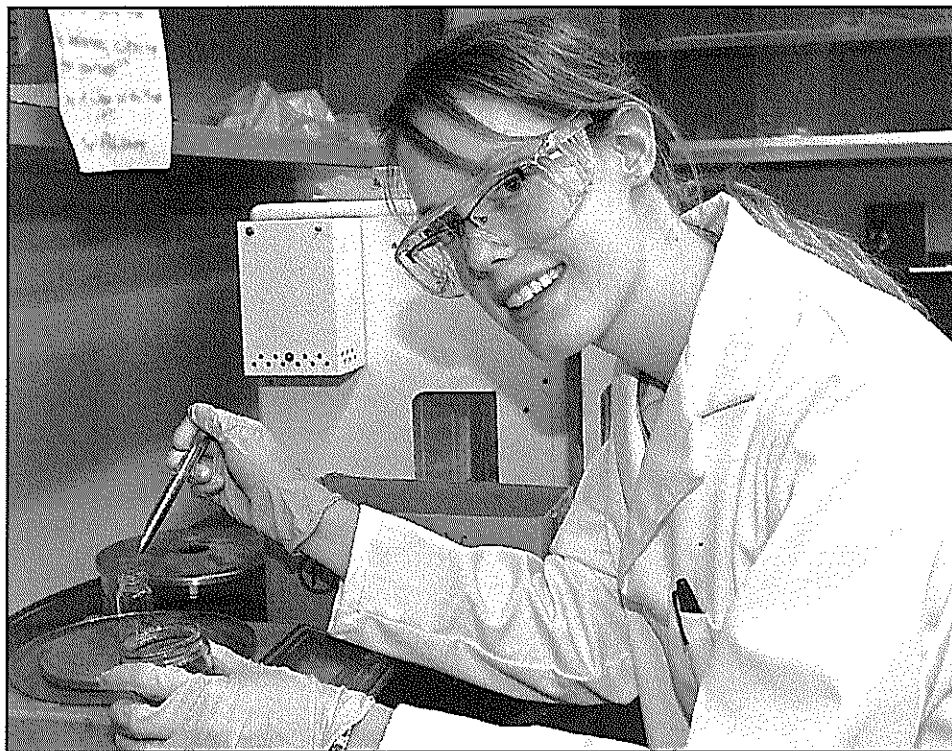
I would like to thank the research team I worked with, as well as Erin Cameron and Dr. Bayne. I would also like to thank Dr. Springer and the Alberta Women's Science Network for sponsoring me and giving me the chance to participate in the program.

WISEST was a blast, and really opened my eyes to the opportunities women have in science.

ALLISON DE MAN Chemical and Materials Engineering

WISEST SUPERVISOR Dr. Tom Etsell

SPONSOR Alberta Research Council / Alberta Human Resources and
Employment - STEP



WHEN I WAS FIRST informed about the WISEST Summer Research Program, I immediately had doubts; I could not understand why someone would want to spend their whole summer working in a lab! However, I wanted to be certain with my decision, so I decided to look in more depth at the WISEST program. I found that the more I learned about the WISEST Summer Research Program, the more interesting it became. I have always been interested in math and science, but I did not know if that was the direction that I wanted to head after I graduated. The WISEST Summer Research Program sounded like an excellent opportunity to learn about the different options that are available to me in my future. It was then that I decided to apply.

When I received the phone call that I had been accepted into the WISEST program, I almost couldn't breathe. I knew that my summer was going to be one of those amazing things that you always remembered. As I was

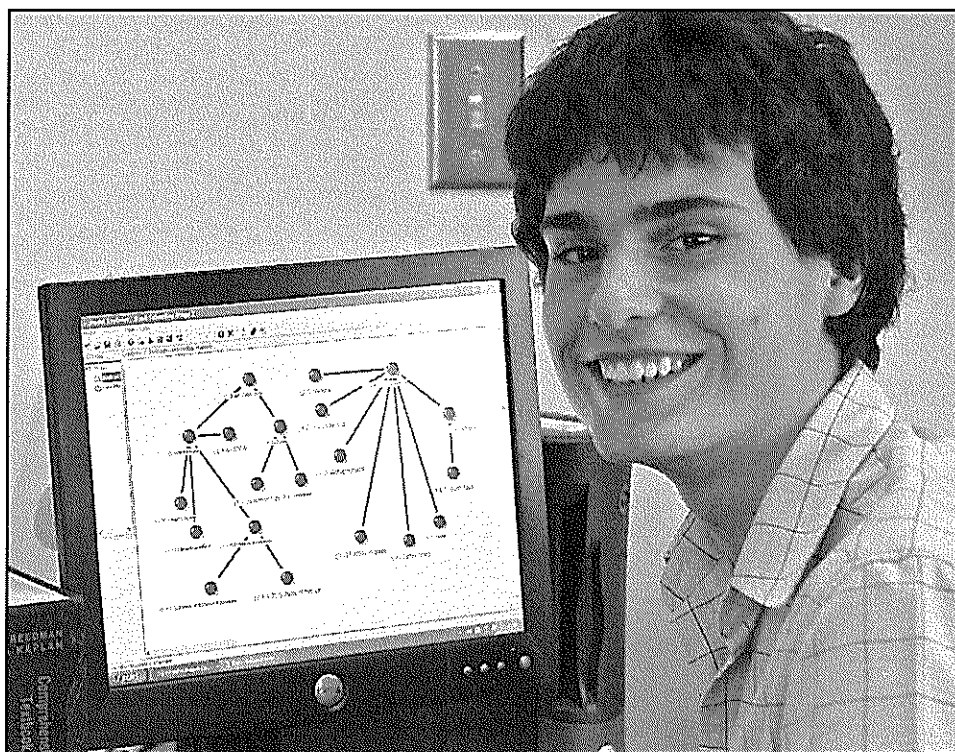
informed about all the exciting events that my summer would entitle, I knew that my decision to be involved in the WISEST Summer Research Program had been the right choice. I had been placed into the Department of Chemical and Materials Engineering, under the supervision of Heather Kaminsky, who is apart of Dr. Tom Etsell's research team. Heather is working on characterizing oil sands. We are trying to find out which elements are present in different samples, and how they react with the other elements present. I was fortunate enough to have another WISEST student, Jenny Thompson, who was working along side me for the six week program.

There are three major oil sands deposits in Alberta. These deposits contain great amounts of bitumen as well as valuable minerals. In Alberta especially, oil sands are valuable to the economy, but they are also harmful to the environment. For every barrel of bitumen produced there are approximately 7 3/4 barrels of waste produced. Finding information

about middlings, froth, and tailings, some of the waste produced from oil sands ore, is vital to researching ways to reuse or disposing of this waste. Understanding the contents of the oil sands tailings, middlings and froth, is important in finding a solution to deal with these products. Many valuable minerals are found in the middlings, froth and tailings, and if we can find away to separate them out, they could be beneficial to our economy. The research that I was involved in was exciting as well as informative. I really enjoyed that one goal of my research was to help the environment as well as the economy. I know that the research that Dr. Tom Etsell and his research team are investigating is going to produce a lot of results that will eventually help oil companies manage these products. Working in a lab was interesting and very helpful to me, as I gained knowledge and skills, that I know I will be using in the future.

I really enjoyed my summer in the WISEST Summer Research Program. I learned a lot about university life, and the different career paths that interest me. I also met a lot of amazing people, with similar interests to me. It was exciting to be able to talk to others that shared the same passion for science that I had, even if that meant arguing on the LRT about how to enhance our separation methods. The clarity and the tiny bit of confidence that I have about going to university, made my whole summer even more worth while. Without the WISEST Summer Research Program, I know that I'd still be wondering not only what engineering is, but what university is. I feel armed and ready to face my last year of high school, and excited for where ever my future may lead me. Thank you Heather Kaminsky for showing me the different options available to me, and for always answering my many questions, I really appreciated it.

THEO DI CASTRI Nursing
WISEST SUPERVISOR Dr. Wendy Austin
SPONSOR Faculty of Nursing



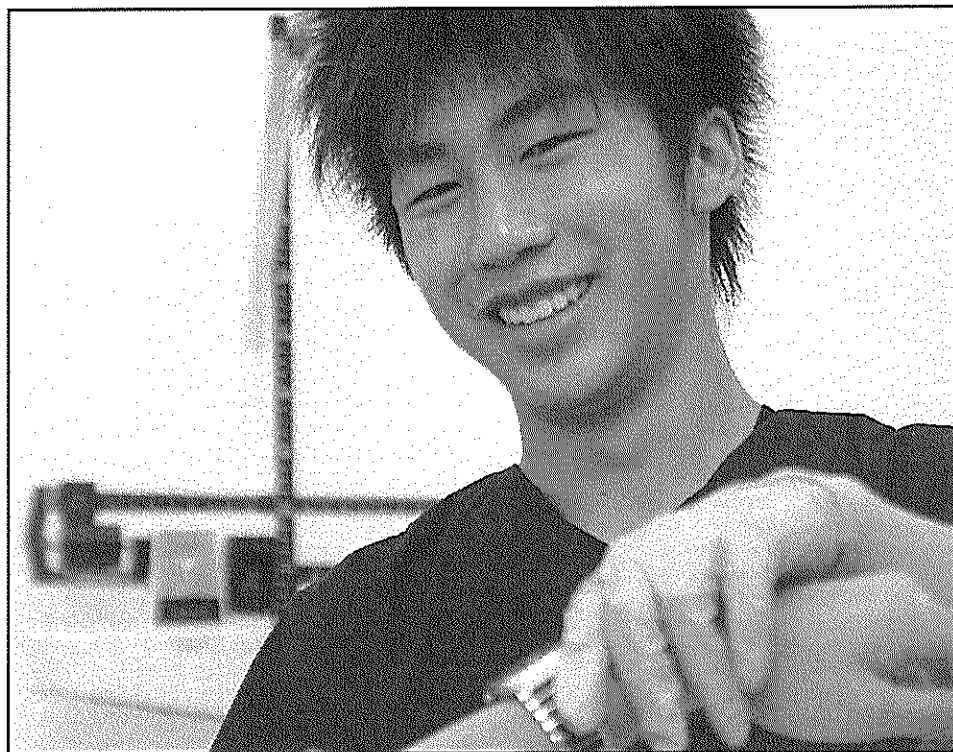
ONCE UPON A TIME there was a guy who wanted an interesting summer job. He remembered hearing about the WISEST program at his school and decided to apply. When he heard that he was accepted he was very glad, however, due to highly preconceived notions instilled by a ruthless stereotyping society, he became very skeptical when he was informed that he would be working in the faculty of Nursing. Going in with such an attitude, the young lad was extremely surprised when he discovered the true nature of his work. It seemed he could not be doing anything more different from his constructed view of nursing as being solely bedside care. Working in the very interdisciplinary "lab" of Dr. Wendy Austin, and accompanied by two other high school students (one from the HYRS program and one from the WISEST program), he set off on a stimulating quest to discover the complex world of ethics in the healthcare system. His first couple weeks were spent getting familiarized with the general principles of ethics

and their philosophical implications, requiring much reading, documentary/film viewing and most importantly, discussion. Such practice was enriched by the presence of the many perspectives brought to the table by the multifaceted team of researchers; social anthropologist, physician, nurse and philosopher were all able to contribute to the process, giving our student a very broad and well-rounded understanding of the subject area. Upon better grasping the concepts inherent to the study of ethics, the boy was able to begin work on a specific research project, choosing to focus on ethical relationships in the forensic psychiatric setting. As the approach to the project in question was a that of a hermeneutic phenomenological one, his work involved reading over numerous transcripts of interviews conducted with healthcare practitioners in the forensic psychiatric domain, and extracting anecdotes or examples of specific lived experiences for subsequent analysis. After reducing the transcripts to these essential passages, his work shifted

towards to picking out underlying themes and coding the pertinent extracts accordingly in order to facilitate the phenomenological analysis to follow. Casual discussions and the evaluation of different sources dealing with ethical issues (i.e. documentaries, films, newspapers) continued well beyond the first weeks and proved to be a thought provoking support to the research throughout the working process. When it was all said and done, the hero of our story felt as if he had learned many a lesson. Though he did not find any hidden passion for the field of nursing, he came away with a much broader understanding of what the field can encompass and huge appreciation for those who dedicate themselves to working in the area. He also felt as if he had a better grasp on many of the complex issues present in our health care and legal systems. All in all, he had no regrets about participating in the program, and if anything was thankful that we got over his initial misgivings, allowing for a completely new experience which completely fulfilled his desire for an interesting summer job. Not only did he get paid to experience work in a completely unique, unfamiliar and stimulating setting, he also met 60 lovely and intelligent young ladies. Thus, there is a moral to this story: as much as the WISEST program can allow someone to get experience in a field you know and love, it is an equally great chance to try something completely out of ones comfort zone. Previous stereotypes will surely crumble, and an amazing summer work experience is a guarantee.

The end.

DANIEL FOK Nursing
WISEST SUPERVISOR Dr. Joe Noon
SPONSOR Faculty of Nursing



THE SUMMER AT WISEST was truly an experience of a lifetime. From touring the campus research facilities to fun social activities, and most importantly, working in a research lab, this program offered many unforgettable memories and the experience to prepare us for our future endeavours.

I was very fortunate to be placed in Dr. Noon's research team along with Tim Trischuk, a graduate student in the Faculty of Nursing. The research was to address arterial stiffening, which is an independent risk factor for cardiovascular disease, between different ethnic groups. Dr. Noon's first phase of the study involved assessment of arterial compliance of people of African descent living in Trinidad and Tobago. Our current study focussed on Caucasians of both genders in Canada. The method of measuring arterial stiffness is applanation tonometry, where a small ultrasound sensor rests on the radial artery and compresses it to generate a pulse waveform on the computer. It is then transferred into

an aortic pressure waveform with the software, SphygmoCor Cardiovascular Management Systems. SphygmoCor records central augmentation index (AIx) and pulse wave velocity (m/s) using applanation tonometry to allow for an indirect method of measuring the stiffness of the arteries, determining cardiovascular health. For pulse wave velocity, we attach a 3-lead electrocardiograph (ECG), and measure the pulse flow from the carotid to the radial artery. The advantage of using this system is that it is a non-invasive procedure, allowing for many clinical applications, as well, being portable, it can monitor progress of recovering patients or the elderly at home. Central augmentation index and pulse wave velocity are the main factors being investigated in this study for cardiovascular health, however, in our research we also test for the lipid profile and fasting glucose of our volunteers. This is done with the Cholestech LDX machine which analyzes a 35 µl sample of blood taken from the finger. The machine uses cartridges

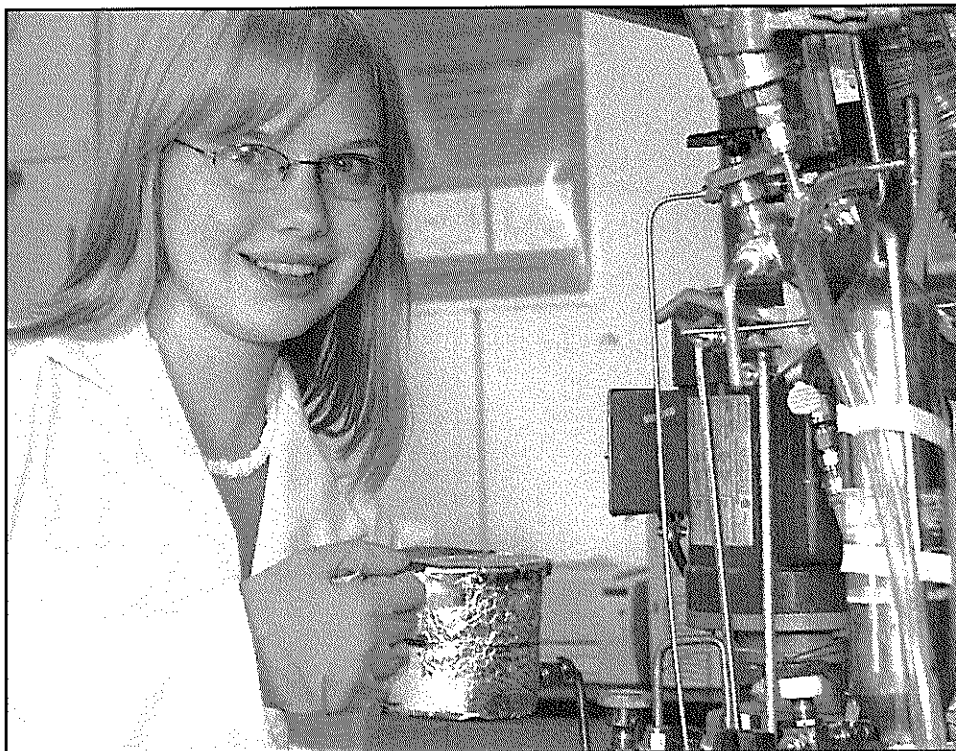
and analyzes the sample within five minutes, allowing for real-time results for the participants. As well, we would take venous blood samples (3 ml) for a genetic analysis of polymorphic genes which have been suggested to be linked with hypertension. By addressing the differences in arterial health in different ethnic groups, better treatment protocols can be implemented to allow for better healthcare for people afflicted with cardiovascular disease or at risk of acquiring one.

Analysis of the data from the lab reminded me of the need for clear concise procedures, and clear labelling of the data tables, because future researchers will need to continue with the data, and it can be confusing and frustrating to them if the data is not presented in a simple format that is easy to understand. In performing the analysis of the data, I learned to accurately record the data in a usable format so that others can repeat the same analysis for reproducibility.

Being part of this clinical research has been a great learning experience. Although we were performing the same procedures every day with each new volunteer, it was different each day because of the interaction with each of them is a new, unique, inviting experience. Communication became a key aspect when speaking with the participants to explain clearly what we would be testing without making them anxious. As well, to be part of this on-going study I was able to witness the complications of gathering volunteers, as well as scheduling them and giving them appropriate instructions prior to participating in our study.

Overall, this experience has been a major stepping stone for my future goals and aspirations. Through WISEST I have made so many new friends, learned so much about university and research, and gained experience that will be beneficial in the future.

JASMINE FOSTER Chemical and Materials Engineering
WISEST SUPERVISOR Dr. John Shaw
SPONSOR Alberta Innovation and Science



HI, MY NAME is Jasmine Foster, and I am from Vegreville Alberta, a small community located about 1 hour east of Edmonton. Coming from a small town, such as Vegreville, I have never really had any opportunities to pursue my love of math and science that is until the WISEST Summer Research Program came along. The WISEST Program gave me the opportunity to work in a real lab and get hands on experience doing cutting edge research. During this six week program I was fortunate enough to be accepted into the field of Chemical and Materials Engineering under the department of Dr. John Shaw. Honestly before this summer if you had asked me anything about what a Chemical or Materials Engineer does, I would not have been able to tell you, however getting the chance to work in this amazing lab with all these new and interesting people has really enlightened me.

In the Thermodynamics Lab here at the U of A, I got the opportunity to work on a project with an exchange student, Valentine Deneux, from France. Valentine and I worked together to try and find a way to transport ABVB (Athabasca Bitumen Vacuum Bottoms) in liquid form. Our project consisted of us mixing low percent and high percent mixtures of ABVB with different types of alkanes (mainly decane and dodecane). From there we would heat our solutions to see how they react under different temperatures and pressures. The reaction of the solutions could be seen in two different manners. One: you could see the increase in the volume of our solutions visually (we would tape off the original height of our solution to better be able to view the increase), then we would monitor our solutions for about a week at a constant temperature, to see how they would change and react. We could calculate our reaction by photographing our solutions. From our photographs we took the area under the tape and by using its pixels we could calculate the amount that the

volume increased in millimetres. This calculation had to be done daily to be able to see the solutions gradual change. Two: we could test our solutions in the density meter, using the numbers that the machine gave us helped us to determine the change in our mixtures. The density meter would give us a number, "T", and from there we would calculate the density, "d", and mass fraction of our sample at the specific temperature. By using these two methods we came more familiar with the way that ABVB reacts, expands, and transforms, and thus we came closer to finding a way to transporting ABVB in liquid form!

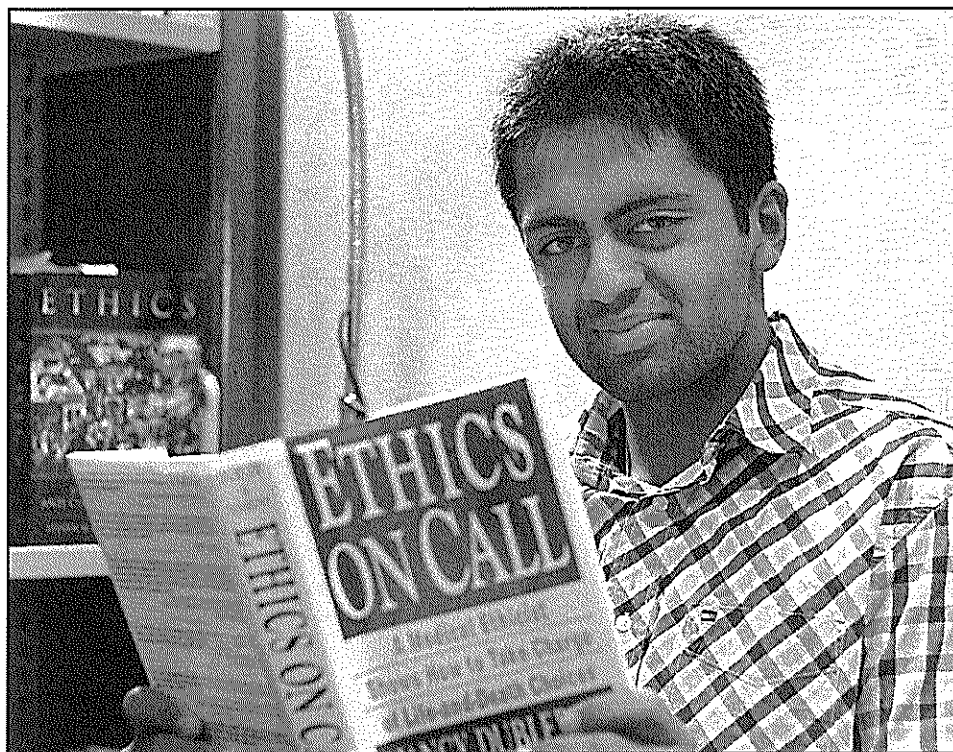
Now I know what you're thinking.... BORING!!! But it wasn't, not even the slightest bit! The WISEST Program wasn't only enlightening and educational, it was also very fun. Every Wednesday all us WISEST students would get together to do exciting, motivating and educational activities. One Wednesday we got the chance to tour off campus labs, the next on campus labs. One week we got the opportunity to have small group discussions with various role models, another we got to spend 'A Day in the Life of a University Student'. However out of all the activities there was one that really stood out... Really Really Ridiculously Fun Relay Days, slightly less educational and motivating, but it was incredibly exciting, and very enjoyable! Overall my summer was not only extremely educational; it was also a lot of fun!

The WISEST Summer Research Program is an incredible program and exceptionally exciting, for anyone with the opportunity to experience all that this program has to offer I suggest you grab it and run. The WISEST Program was one of the most amazing experiences in my life and I wouldn't have given it up for anything!

ANKUR GOEL Nursing

WISEST SUPERVISOR Dr. Wendy Austin

SPONSOR Human Resources Development Canada - Summer Career Placements Program



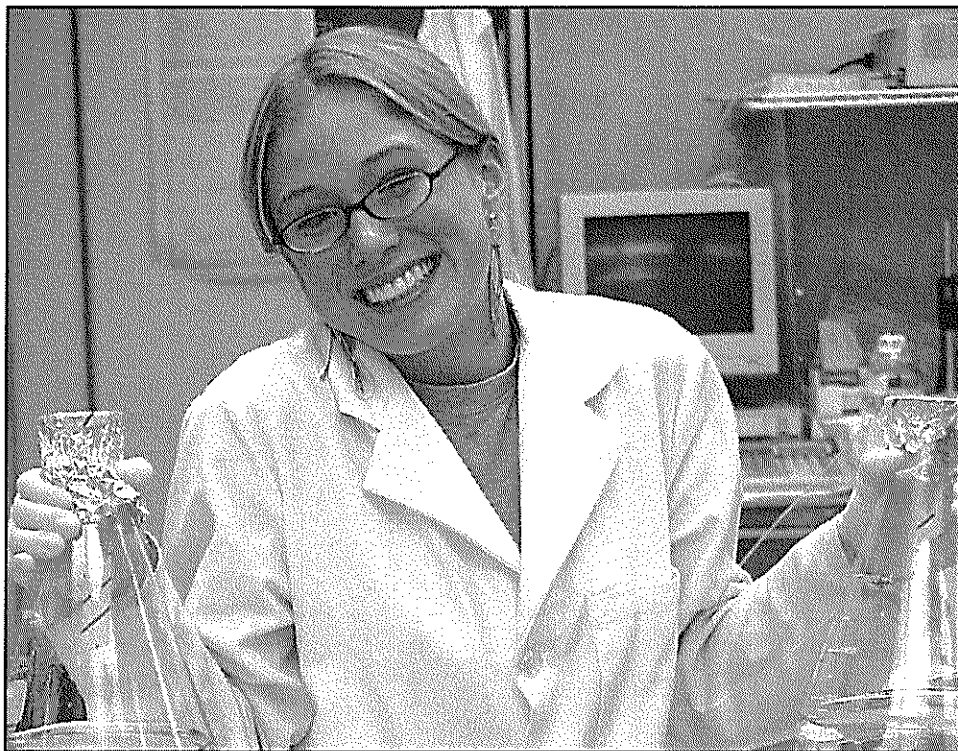
WHEN I GOT ACCEPTED into the WISEST program and was told that I would be working at the Faculty of Nursing, I was expecting to do clinical research or patient care or administration at the hospital. However, the reality was far different from my initial belief. Nurses do a lot more than just patient care and hospital administration. Many nurses have a PhD degree which allows them research about ethical issues and moral dilemmas surrounding their profession. For the summer, I was working in an ethics lab at the Faculty of Nursing located at the University Extension Center under Dr. Wendy Austin and Erika Goble. The lab that I worked in is a qualitative research lab. It has group discussion room, a few computers and some private cabins for a few other people that work under Dr. Austin. I was also working with two other summer research students, one from the HYRS program and the other was also from the WISEST program. Initially, I was learning about ethics and moral dilemmas to help me understand the

concepts so that eventually I could help contribute to an ongoing project. For the first few weeks, I watched a few movies in my lab that had some glaring ethical issues and dilemmas. As a group, we would discuss the themes and some of the major issues in the movie and then we would try to decide what the morally correct decision would be. We had group meetings to discuss the nature of qualitative research, core components of relational ethics, and the four principles of bioethics. During the six weeks, we did go on several tours to discuss ethical issues in different environments and to see the help available for practitioners being unable to cope with stressors in their environment. First we went around the

University campus asking professionals how they dealt with issues in their work environment. Afterwards, we went on a daytrip to the Misericordia hospital to visualize the duties of the nurses and to see the different wards and areas. Lastly we went to the Edmonton Institution, which is a maximum security prison, to explore issues in the prison setting. During my time working in the lab, I worked on the literature review of two projects; the burnout project, and the moral distress in the Paediatric Intensive Care Unit project. The literature review will be used in the proposal to send to organizations to fund for the research. For the burnout project, I compiled a set of articles published in journals either online or in books, and then used relevant points from them to form a summary of the relevance of burnout. The PICU project is a lot larger in magnitude than the burnout project so the literature review was not completely finished by the time I had to stop working on it, but enough information was obtained to help formulate a summary of relevant points for the proposal. The activities organized by the WISEST coordinators were really interesting, educational, and useful. The small group discussions were the most useful because they helped create an image of what university life is like. Also, the tours of the labs and the Micralyne tour were also interesting because of the presentation of interesting machinery and methods used in micro-technology. Overall, WISEST was a wonderful opportunity and an excellent experience well worth the six weeks of summer.

WISEST was a wonderful opportunity and an excellent experience well worth the six weeks of summer.

CHANTALLE GRANT Biochemistry
WISEST SUPERVISOR Dr. Charles Holmes
SPONSOR Alberta Women's Science Network



SINCE THAT FATEFUL day in May when my caller ID first read "WISEST" until the final Celebration of Research on August 15, 2005, it feels like my life has been on fast forward. My time here at WISEST has sped by more quickly than I could have ever imagined.

Though the first few days were nerve-racking, my supervisor and co-workers helped to make this step outside of my box (my Sherwood Park bubble) to the great big university campus a little bit less intimidating. I am so thankful for their welcoming and easy-going ways, for the first week my job at WISEST consisted mostly of reading papers, getting lost on campus, and attempting complete an experiment that would yield a straight line graph. (However, that straight line graph always seemed to come out a whole lot more squiggly than straight line.)

I was placed in a lab in the department of biochemistry where I have been studying toxins known as microcystins

that are produced by certain strains of cyanobacteria (or blue-green algae). Microcystins are tumor promoters involved with the promotion of liver cancer and inhibitors of an enzyme known as protein phosphatase-1 (or PP-1). The task set before me was to create a standard curve graph that showed the percent activity of the PP-1 in the presence of five different concentrations of microcystin. Once I had created a truly straight line standard curve, then could I take water samples containing an unknown concentration of microcystin, find what percent activity of PP-1 they inhibited, and plot it onto the graph to determine the concentration of microcystin in that water sample.

While initially I thought this task would be simple enough, I soon learned that not only did this involve creating a near-perfect standard curve each time I would test for the unknowns, but my instructions were like a fiddly and complex recipe (and I have never been much of a chef). I made countless

mistakes in my first few weeks on the job, including pipetting errors, forgetting to add certain chemicals to some of the mixtures, and vortexing the wrong solutions. Then there were the times when the enzymes would simply "go bad" and I would be left trying to reason what went wrong. I continued to make a few mistakes in the next few weeks I was in the lab, and I even continued to make mistakes up until my final days here.

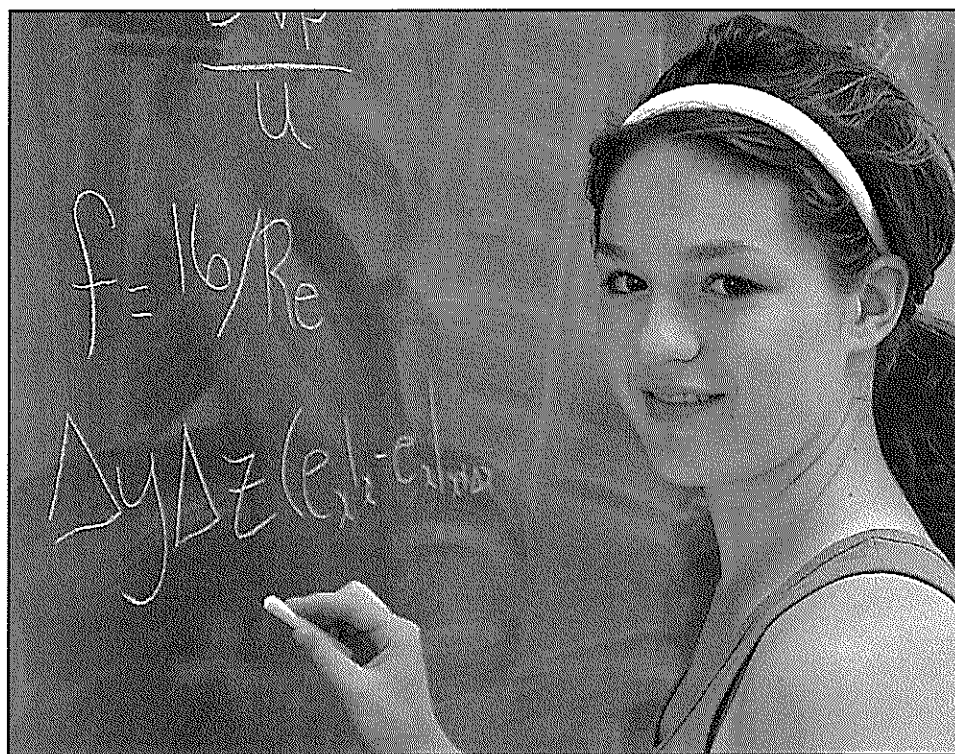
But throughout the entire ordeal I have learned more than I would have thought possible. One of the most important things my perfectionist self had to learn to deal with over this summer was to accept my occasional failures (and trust me, there were a lot of failures). Though difficult at times, I cannot stress how much this wisdom will benefit me in the future. I also learned a great deal about science and biochemistry in general: from the theory behind my work regarding microcystins and protein phosphatases, to how to use the different technologies in the lab (including four centrifuges), to why research discoveries take so long. I had a blast getting dressed up in some outlandish costumes, getting flour stuck all over my face in a ridiculous relay, and developing my skills at foosball. More importantly, I made some amazing new friends.

The list of things that I have gained from WISEST could go on and on. I am so grateful to the WISEST program (including our two beautiful student coordinators, Tiffany and Selina; and Grace and Gaylene). I am grateful also for my incredibly patient supervisor Tamara (who put up with all my questions, stupid or not), for Dr. Charles Holmes for welcoming me into his lab, and for all the fantastic friends I made who have all contributed to make this summer one that I will cherish forever.

BRITTANY HAGMAN Chemical and Materials Engineering

WISEST SUPERVISOR Dr. Carolina Diaz-Guano

SPONSOR Alberta Innovation and Science



HI, MY NAME IS Brittany Hagman, and I am from Mayerthorpe, Alberta, a small community located North-West of Edmonton. Growing up, like most young girls I had lots of cute little dresses, and Barbie dolls (naturally). However, unlike most other girls, my dresses were rarely ever worn, and my collection of Barbie's were left in near mint condition when I was done with them... my science kit and microscope set, on the other hand, were a very different story.

I was really excited when I first heard about the WISEST Summer Research Program. I thought it would be such a cool way to meet so many other people who share the same passion as myself, science. I also thought it would be a really cool way for me to gain some hands on experience at the University of Alberta as a researcher. So, needless to say, when I found out that I was accepted I was thrilled.

For the duration of the six week program, I was placed into the Department of Chemical and Materials Engineering. I was working with Dr. Carolina Diaz-Guano, my principal investigator, as well as two undergraduate students, Breanne Landry and Kent Qin. Together, we were working to construct different meshes and computer applications. These applications and meshes will be used for modeling and visualizing patient-specific cardiovascular blood flow and hemodynamics (blood flow patterns that exist within arteries and veins). These models will pose a great advantage over current models, such as 3D printouts, as they will be able to accurately model not only the heart and arteries, but also the movement and blood flow.

My first few weeks here in the summer research program were fairly busy ones. After meeting the different people that I was to be working with, I was eager to get a start on my project. However, before I could get started helping on the project, I had to learn an

engineering solver program, MATLAB. I wanted to get started on the actual project as soon as possible, so I was working hard going through all of the different online MATLAB tutorials. The tutorials gave me a general idea of how to perform some fairly common tasks using the program. After I completed the tutorials, I was given my first bit of work. I was to create an m-file (a MATLAB application), which would solve for a fluids Reynolds number, as well as the fluids pressure drop when it travels through a pipe. When I was finished, I had to create another m-file that would read and visualize a data file, which contains all of the node points and information from the mesh of the Aorta. Currently, I am working to extend the second m-file so that it will read more information from the data file, and create graphs of the different elements (one element has 10 data points) contained in the file.

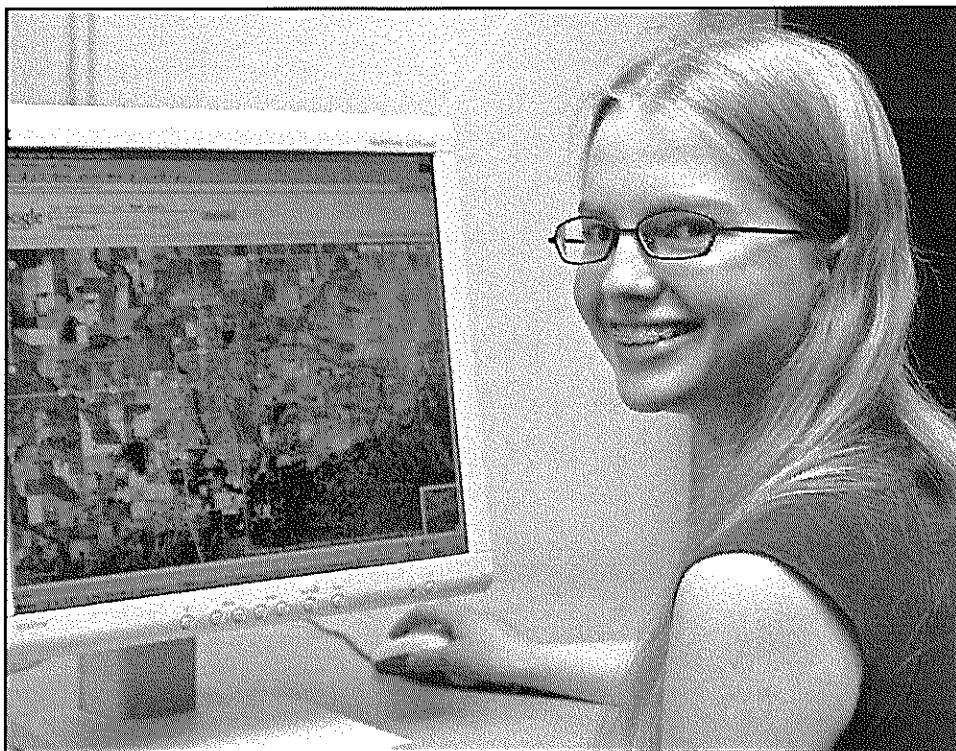
Taking part in this program has opened my eyes in so many ways. I have come to realize that there are so many different possibilities as to the programs that I can take when I attend the University of Alberta, as well as what I am able to do with the degree that I get. I must admit that when I got here, I thought that I would be wearing a lab coat and safety goggles, while mixing different chemicals together. I did not think that working in Chemical and Materials Engineering would include working on a computer, as my project did.

My summer at the WISEST program was definitely well spent. I gained so much experience and knowledge of the campus, and being an aspiring University of Alberta student I'm sure I'll feel a lot more confident when time comes for me to find all my classes. I also made so many new friends which also made this experience more than worth while. I would like to finish by thanking WISEST for the awesome opportunity that I have been given!!!

SARAH HAMILL Earth and Atmospheric Sciences

WISEST SUPERVISOR Dr. Theresa Garvin

SPONSOR Faculty of Science / Human Resources Development Canada
- Summer Career Placements Program



SIX WEEKS AGO, I arrived at the university with an armload of maps, excited but a bit nervous for my first day of work at the university. I found where we were supposed to meet (with the help of a handy map posted on campus to tell me what direction I was wandering), found my nametag, and sat down to wait... But instead of getting right to work, we played some icebreakers, got a much-needed tour of campus, and had a crash course in WHMIS and BioSafety. Then we met our supervisors. Dr. Theresa Garvin took my lab-mate, Samantha, and I to our office in Tory building, thankfully showing us how to get there from the bus station.

To my surprise, we weren't working in a science lab. When I thought of scientific research, I always pictured people in white lab coats mixing chemicals and testing samples. Little did I know that there's another type of science research. What we were doing was qualitative research instead of quantitative research. Instead of mixing chemicals and getting results

like "yields 12 grams of precipitate" or "turns green and bubbles", we were analyzing newspaper articles and interview transcripts, and our results were much more subjective. This was interesting to me- I've always been interested in psychology and sociology, and as I don't know whether I'm going into sciences or not after high school, it was neat to learn that earth science can involve social science as well.

Working in the Department of Earth and Atmospheric Sciences, Samantha and I were involved in research looking at peoples' perceptions of sour gas across Alberta and how it is affected by media coverage of sour gas issues. Sour gas is natural gas containing toxic hydrogen sulphide, which can cause anything from a headache to death, depending on the concentration and length of exposure. Long term effects of sour gas aren't known for sure, complicating the issues surrounding it.

After a lot of background reading, we each started on our own mini-projects

on sour gas. I analyzed focus group interviews with people in communities around Alberta, some of which had sour gas wells nearby and others of which did not. I focused on what affected the extent to which people would trust information sources to provide them with truthful information on sour gas. I found several common themes emerge within the interviews. For example, the farther away a source of information was from the recipient of the information, the less likely it was that the information would be trusted. So, local sources of information would be more likely to be trusted than provincial sources of information, for example. Also, I found that many people seemed to separate the oil and gas company as a whole from the local plant or workers, and would often have quite different levels of trust in them.

In addition to our work in our (computer) lab, we also went on several "field trips". Every Wednesday, all the WISEST students would meet in CAB for announcements and then head out for various activities on or off campus. Other than getting completely lost in Bio Sci and going on the wrong lab tour (I'm not sure how we managed that...), these events were a lot of fun and very interesting. We also met every Friday for lunch either in QUAD or in CAB (when it was rainy) to chat, share stories about our week, and enter to win some nifty prizes.

I've had a really good experience this summer. Though it was boring sometimes (what job isn't?), I learned a lot of really interesting things I never would have learned if I hadn't been a part of the WISEST program, and, overall, I enjoyed my time here greatly. And, I don't need any maps to find my way around campus any more! (At least, most of the time...). Thanks to Dr. Garvin, Selina, Tiffany, Grace Ennis, Dr. Fasenko, and everybody else who helped with this year's WISEST program!

VERONICA HARING Civil and Environmental Engineering

WISEST SUPERVISOR Dr. Tim Joseph

SPONSOR Faculty of Engineering



WHEN WISEST CALLED and told me that I was accepted for the research program, I thought it was just my friend playing a joke on me. However as I listened, I realized that I had actually been accepted, and I dropped the phone! I was told that I would be in the department of mining engineering with three other students, under the direction of Dr. Tim Joseph. After I hung up, I thought about mining engineering. All that came to mind was some old professor teaching me about holes deep in the ground. To put it bluntly, I wasn't too enthusiastic about spending my whole summer digging holes. Boy did I sure change my mind.

At orientation, I met Andrea Bui, Tamara Bain, and Courtney Maltais; the three girls that I would be spending my whole summer with. Upon meeting Tim, my whole outlook on mining changed. The first words out of his mouth when he met us were, "We need to go shopping!" Of course he was referring to shopping for steel-toed boots and supplies for our experiments, but we

were still going shopping. On our first outing, Tim really explained to us what mining engineers do. I found out that this profession involves a lot more than just digging holes. On the first day, Tim explained the four projects that we would be collectively working on over the next six weeks.

The body of a mining truck has many angles in it, which makes calculating the volume of the amount material that will fit inside of it quite difficult. Our first project was to create a model of this cone shape out of Styrofoam. Our lab became insanely messy as we spent a lot of our time gluing, cutting, and re-gluing Styrofoam. At the end of

the day, I'd leave work covered in blue particles! Our second project dealt with how mining truck tires interact with varying ground types at different angles with multiple loads. Relying on what I had learned in construction, I built an adjustable ramp that we used to run this experiment. The third project was fairly simple. It entailed calculating airflow for varying wall roughness in underground mines. For the last project, we analyzed a data record that Tim had collected from a mine site.

During the second week, Tim took us to a mine up near Wabamun where we saw all of the HUGE machinery used on a mine site. We also got to see a coal blast which was really neat. We spent a lot of our time working on the four projects, but we did spend some time at the fabulous events that WISEST organized for us. The first was a welcome back BBQ that was hosted at the poultry farm. Another was Relay days where everyone got very messy, but we all had a good time. Every Friday at lunch we went to QUAD to eat with the other WISEST students, as well as some students from HYRS. On Wednesday afternoons, we had tours and small group discussions. The tours were really cool because it gave me a chance to see what engineers do on a day to day basis. In the discussions, I was able to talk to women who were engineers and scientists.

Mrs. Frizzle sums up the WISEST experience in her 7 famous words. "Take chances, make mistakes, and get messy"!

The tours were really cool because it gave me a chance to see what engineers do on a day to day basis. In the discussions, I was able to talk to women who were engineers and scientists.

KATIE HEINE Earth and Atmospheric Sciences
WISEST SUPERVISOR Dr. Arturo Sanchez
SPONSOR NSERC - PromoScience



WHEN SELINA CALLED me one afternoon in late May, I didn't know what to say when she told me I had been given a position working in the Department of Earth and Atmospheric Sciences at the U of A for the summer. I was speechless! It was such an amazing opportunity to work in a university setting without even having graduated from high school yet.

On the first day of work, I felt like a kid on the first day of Kindergarten. Taking everything in while moving around campus and into the lab was a challenge, and at the end of the first day my main concern was finding my way back to the building my lab was in the following day. However, I managed to find my way back, and then my summer research experience began.

My project was to help my supervisor with research regarding invasive plants in Elk Island National Park. The data we collected is to be used by the park to help control the growth and spread of invasive plants, as well as by my

supervisor for her PhD thesis. I was lucky enough to have another WISEST student in the lab with me, so we were able to work on the project together. To prepare for going out to Elk Island we compiled an invasive plant database, made maps of Elk Island and learned to use the equipment we'd be working with in the field. For example, we practiced using the spectrometer, an instrument that measures leaf reflectance, as well as the GPS system. When we went out to Elk Island, we stayed in one of the houses used by research students and spent the days going around the park collecting plant samples. In the evening we measured the reflectance of the leaves using the spectrometer we had practiced with at the university. We also prepared samples of each of the plants for chlorophyll analysis that will be completed in the lab back at the university.

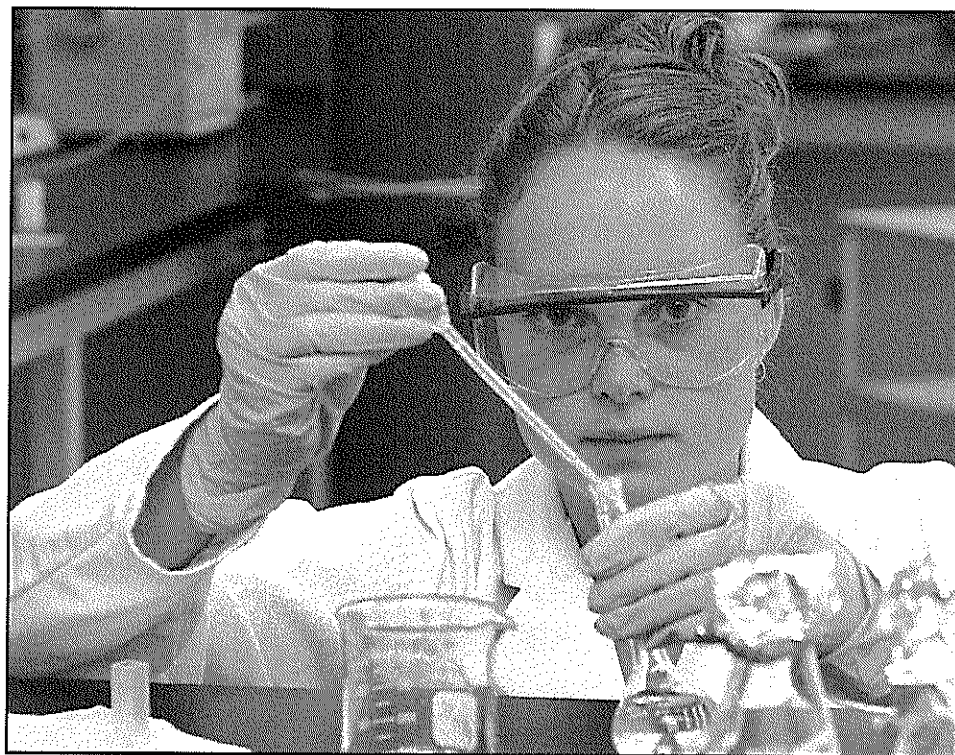
I was fortunate to work on not one but two projects this summer. A couple of days into the work placement, my supervisor introduced us to another

grad student in the department, Carlos. Carlos had his own project in the university greenhouses – he was carrying out a six-month experiment to determine the effect of CO₂ on plant growth. He had two chambers in the greenhouses – one had normal CO₂ concentrations while the other had double normal CO₂ concentrations. The chamber with the elevated carbon dioxide levels represented global warming conditions. In the two chambers he had different species of plants and lianas imported from Panama. Each week, we'd go to the greenhouses and measure both the reflectance of the plants' leaves and the height of the plants from both chambers. This information was then put into computer documents, and at the end of his experiment, the final information will be compared to the information we recorded at the beginning of the experiment. Carlos's project will help to show how global warming will affect tropical forests in the world.

Not everything in the program was about work though. Tiffany and Selina arranged so many fun activities – whether going to Isotechnika or learning, during a lab tour, about neuron regeneration and repair after spinal cord injury, the learning opportunities were endless. Things like the WISEST BBQ and relay days gave us the chance to see the other WISEST participants while having a fun time as well.

Finally, I'd like to thank all the students in residence, as well as our amazing RA Megan for a wonderful summer. I will always remember 80s night, shopping, Scrubs, and everything else that we did – and of course making so many new friends. I can't wait to see you guys again!

SARAH HOFFORTH Civil and Environmental Engineering
WISEST SUPERVISOR Dr. Mohamed Gamal El-Din
SPONSOR Petro-Canada Community Investment Program



TODAY commences the beginning of the end of an extraordinary experience. There is only one week left. I would like to take this moment to thank all who have contributed to the establishment of WISEST and the creation of this wondrous opportunity for youth around the nation. To give you a proper introduction my name is Sarah Kathleen Hofforth. I live in Rocky Mountain House, Alberta and like the rest of the WISEST students in the program I am going into my final year of High School.

What is WISEST? WISEST is Women in Scholarship, Engineering, Science and Technology. Ok, what does that mean? It means that young ladies who are in there grade eleven year have a once in a life time opportunity to experience the sciences and what it means to work and study in the scientific community. There is no promise that by coming to WISEST your paradigm will completely shift and you will discover the career of your dreams; however I do promise that you will leave a changed person.

I personally was lucky enough to have a chance to stay in residence during the duration of the program and I would recommend to all who have the opportunity to do so to cease it. WISEST incorporates not only work but also a social aspect that is just as vital to the over all experience. Capital X, 80's Night and Karate are just a few examples of what we did in residence. Plus, every Wednesday afternoon during work activities were planed outside of our labs, from tours to really, really, really ridiculously fun relay races. They were informative, stimulating and a good time to relax and talk to one another about each other's research projects.

Now what does our work involve you ask? Besides getting paid to stick our

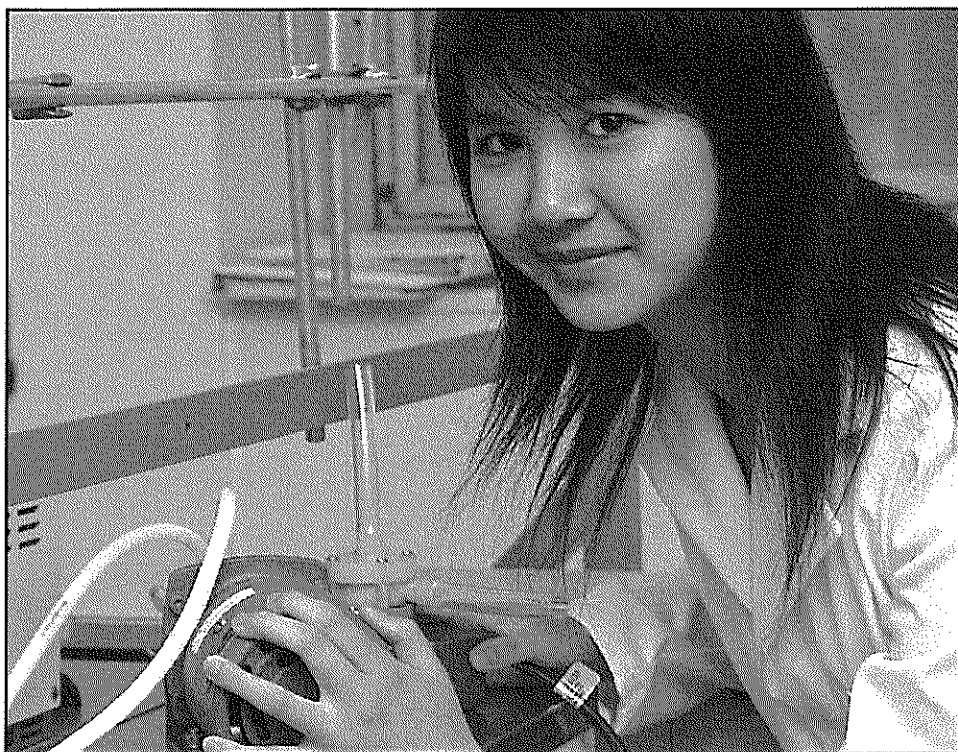
faces in candy water and then dig marshmallows out of a bowl of flour with our teeth (really, really, really ridiculously fun relay races), we actually do do work. It varies from supervisor to supervisor but I, along with another WISEST student Alicia, worked in a laboratory under Dr M. Gamal El-Din in the Department of Civil and Environmental Engineering. Our project involved the removal of endocrine disrupting chemicals, specifically estrogens, from our wastewater system. I will elaborate.

Excreted from our body, estrogens travel into our wastewater systems but are not completely broken down by traditional treatment methods. This causes continuous emissions exposure to aquatic life in the surrounding environment and sequentially can trigger severe ecological damage. In order to combat this problem our project focused on a way to breakdown estrogens found in our wastewater that can be implemented into wastewater treatment plants. We hoped to achieve this through the use of advanced oxidation processes which utilized ozone, UV photolysis and hydrogen peroxide.

Over all the WISEST Summer Research Program has been a wonderful, stupendous and outrageous experience. It isn't all fun and games (although there is a lot of that), and if you enjoy science and math this is definitely a place for you. The people you meet and the friends you make will impact your life and transform the way you see the world. For some the change might be drastic and for others it might be small but no matter what, you will walk out a slightly better person for it.

The people you meet and the friends you make will impact your life and transform the way you see the world.

JADA HONG Chemical and Materials Engineering
WISEST SUPERVISOR Dr. Steve Kuznicki
SPONSOR Merck Frosst Canada Ltd.



I AM ASTONISHED how swiftly August approached; the time of the year where everyone must bid farewell to summer and anticipate for the arrival of autumn. It seems like only yesterday I was scrounging for stamps to mail my application on time. And now, here I am, sharing my reflection on the most unforgettable summer.

If anyone was to ask me if I remember my first day-- I remember. The dial of my alarm clock read 5:29a.m.before its annoying bell gave a treacherous warning that I was well on my way to miss my bus. After dashing out the door, missing my stop, and fumbling towards the engineering building, I finally found a set of automatic doors containing a pair of girls wearing "I heart WISEST" t-shirts behind them. As exhausted as I was, I smiled at the door, while the feeling of pride swept up against the apples of my cheeks. That is, coming from Spruce Grove, I had never ridden the Edmonton Transit before. However, I entered the room with the word S-H-Y carved all

over my face, like a squeaky black marker, unwillingly pressed against the blackboards. But thankfully, the "I heart WISEST" girls, who turned out to be our coordinators, organized many ice breakers for all the students to get to know one another right away.

For six weeks, I conducted research in the department of Chemical and Materials engineering, working with sucrose and converting it into invert sugars like fructose and glucose (in shorter terms: making sugar sweeter).As I learnt, sucrose crystallizes and spoils easily, so instead fructose and glucose are used for baked goods and candy. Thus, the objective of my lab was not only to invert sucrose, but also to test the lab that would be used to teach undergraduate courses about kinetics of

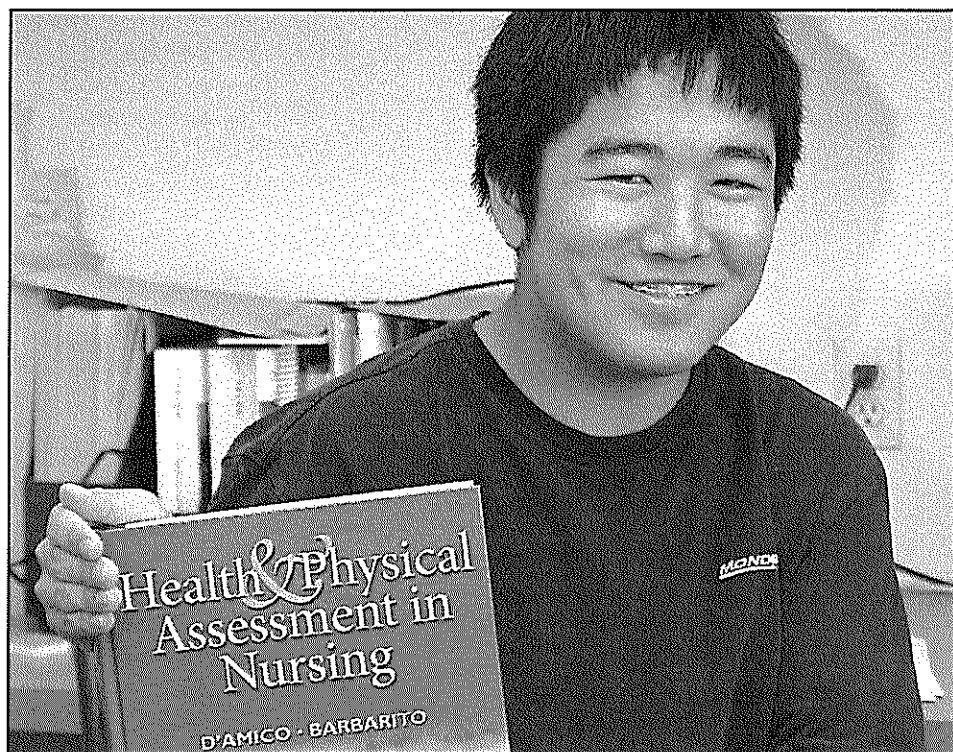
sugar. First of all, invertase, the enzyme used to break down the sucrose had to be immobilized onto a substance that would not affect its activity. To do this, I captured the enzyme into alginate beads and polarized it in calcium chloride solution. Then, I tested the difference between my newly developed encapsulated invertase against the free enzyme in the polarimeter, a machine that rotated in different directions depending on the type of sugar. The second part of my lab was to change the experiment to try and precipitate the enzyme onto alumina because alginate is time consuming and has a short shelf-life. We tried many different methods, but unfortunately, all of them didn't work out.

Apart from work, I also went on many interactive tours that gave me a taste of what it was like to be in different departments of science. Before this program, I had no idea what to expect in a university campus setting, nor did I know what kind of courses were available. But after getting a hands-on-feel of laboratory work and getting to talk to other students on campus, I learnt useful lab techniques, about different fields of studies and basically what it was like to be in university.

Lastly, it has been amazing to laugh, share, and cry with sixty-four fabulous individuals. Each one of us possessed different personalities, came from diverse backgrounds, and had different ambitions; but no matter how much we differed from each other, we truly bonded when we discovered all the possibilities that lie ahead. These memories we created together will be cherished forever and I wish the best of luck to every one of them.

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ROBERT HUI Nursing
WISEST SUPERVISOR Dr. Lynn Skillen
SPONSOR Faculty of Nursing



MY EXPERIENCE as part of the WISEST Summer Research Program was really fun and interesting. Following the first-day orientation in which I was acquainted with both the WISEST coordinators, Selina and Tiffany, as well as the other WISEST students, I was not escorted to the Faculty of Extension building where I would be working, but instead to HUB mall, where my supervisor, Dr. Lynn Skillen worked out minor orientation details with me. Once I was acquainted with my actual workplace in the Extension building the following day, I joined into the main project with which I would be working on.

The first and main research project that I participated in was a module for Promoting Personal Safety of Nursing Students in Community Health under the guidance of the Dr. Lynn Skillen and Mrs. Helen Purnell. The second research project that I participated in was a study to examine the facilitators and barriers to optimum outcomes in older adults with heart failure from

rural areas (AHFMR Rural CHF Project) under Dr. Alexander Clark.

Promoting Personal Safety of Nursing Students in Community Health is a project that deals with the personal safety of nursing students in community health or high risk community areas. The objective of this project is to create a learning module for first-year nursing students to better prepare them for a home visit scenario and possible problems that may or may not be encountered during it. I joined into the project after the first review was done by a group of students. During this time, I was involved in adding to general scenario and media revisions to the module with other members of the research team. The other collaborators I worked with included Dr. Lynn Skillen, Ms. Helen Purnell, and Wendy Caplan. In addition to giving input for improvements, I was also responsible for virtually re-creating the module in a program called Quandary®, which is a web maze creator. Originally, it was hoped that additions could be

made to the original module that was in place already, but the vast amount of additions complemented with the inability of Quandary to effectively add them resulted in the decision to remake the module of a period of days. The module was then subject to an Expert Review by several Faculty members and students. Analysis of the responses showed that the module still required some minor tweaks and fixes to make it completely ready to use as a learning tool, which will be the end use of this module.

The second project, a study to examine the facilitators and barriers to optimum outcomes in older adults with heart failure from rural areas is a project that deals with understanding the factors influencing the management of congestive heart failure (CHF) by older adults, their unpaid caregivers and health care professionals in rural parts of Northern Alberta. My part in this project was helping to update literary searches on the reference materials as well as creating a webpage outline draft that will eventually help to create the final website for the study following its completion.

From these six weeks of research experience, I have learned several new things. I have had the opportunity to conduct an expert review, become really familiar with the U of A campus and meet many new people. I really enjoyed this experience and I would definitely recommend the WISEST summer research program to anyone who is interested in taking part in research.

JESSICA IMPPOLA Earth and Atmospheric Science

WISEST SUPERVISOR Dr. Murray Gingras

SPONSOR Faculty of Science / Human Resources Development Canada
- Summer Career Placements Program



THE WISEST PROGRAM was something I never even imagined doing, or thought I would be accepted into. It has been an eye opening experience, one that has let me explore my interest in the sciences. The WISEST program helped to broaden my awareness of the multitude of options available for women in science today. This program has helped to shed light on my path to university. It showed me what sparked my interests, but also what I wasn't interested in.

My placement in this program far exceeded my expectations. As a student I was prepared to work in a lab filled with test tubes, beakers, and hot plates; rather, I was equipped with hiking boots, a tape measure, and a surveyors lens in the rushing waters of the Pembina River. My days were spent in the lab of life. I was partnered with a team of wonderful geologists in the Department of Earth and Atmospheric Sciences, all of which opened my eyes to natural things like the river, sediment and even rocks. My

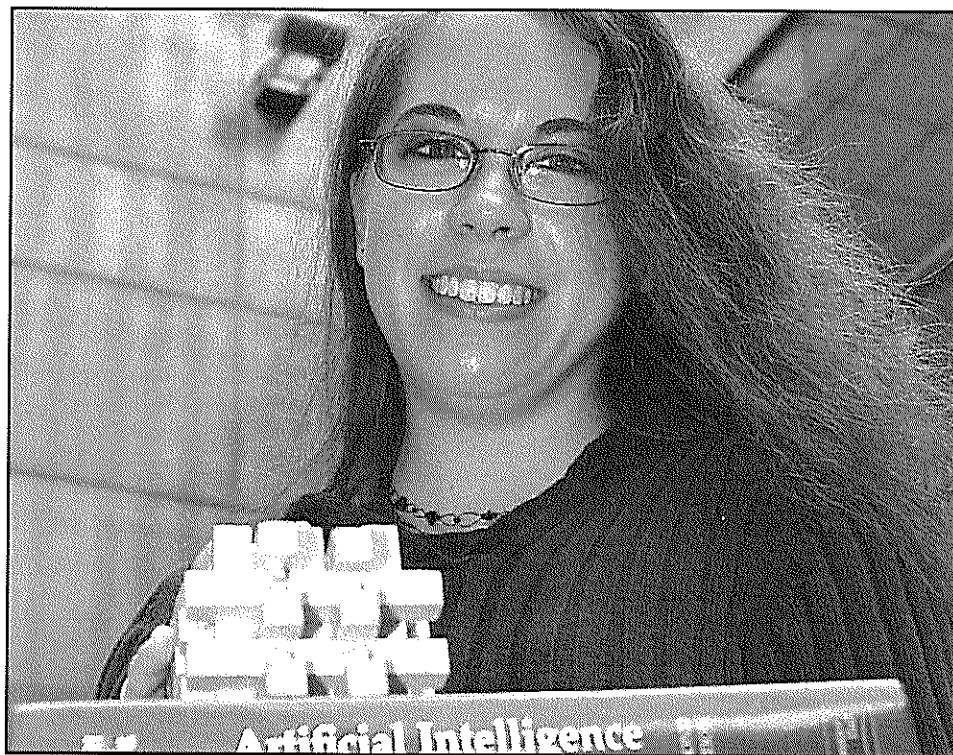
particular research project involved characterizing sediment and animal distribution on a typical meander as well as linking sediment distribution to hydraulic processes along the meander. Picture this, it's thirty degrees in mid July and you are submerged in the rushing waters of the river searching for unionid bivalves. What are these you may ask? Well it's a scientific name for clams. These unionids are part of the vast variety of wildlife contained in this beautiful river gorge that I got to explore. Once the samples were all collected we returned to the Advanced Sediment Lab, to analyze and prove our hypotheses correct. This is where the learning truly began. The first two weeks of my placement were spent reading up on certain concepts like point bars, cut banks, and sedimentary deposit patterns, as well as researching my field location, the Pembina River. I went from thinking sand was just sand to understanding that there are actually different grain sizes, which serve to tell geologists how fast the river is moving on certain parts of a meander.

This summer of learning was not just spent on our research projects in labs, but also on learning about other departments and various career opportunities on and off campus. On a weekly basis the wonderful WISEST coordinators, Selina and Tiffany, would set up a Wednesday afternoon activity for all 65 of us to enjoy. These afternoons involved various activities such as having the chance to go to the Isotechnika lab, for a chance to get an idea of the kind of research that goes on in the real world. More activities such as, on campus research lab tours, small group discussions, and a day in the life of a university student, occupied our Wednesday afternoon activities. In my opinion the most interesting activity of the afternoon sessions were the relays. In this event everyone bought wacky costumes, were split into teams, and took part in the most fun and disgusting relays. At one point we had to gulp down mustard, ketchup, relish, or a raw egg. Yummy!!! If anything it proved to be a bonding experience. Besides the Wednesday afternoon sessions, there were Fabulous Freebie Friday Lunches where we were able to hang out with our Student Coordinators at lunch and all the other WISEST applicants. It gave me the opportunity to meet new people, make new friends, and share interesting experiences with each other. Overall the WISEST program in general has been a positive experience that has opened my eyes to opportunity. I would like to thank the WISEST program and its sponsors, as well as my supervisors, Dr. Murray Gingras, Jesse, Sarah, and Maureen, for breathing life into my future possibilities.

JACQUELINE JEAN Computing Science

WISEST SUPERVISOR Dr. Rich Sutton

SPONSOR Epsilon Chemicals Ltd. / Human Resources Development
Canada - Summer Career Placements Program



WHEN I FIRST HEARD that I was going to be working in a Computing Science research lab I was very excited. Ever since I first used computers before Elementary School I've loved what I could do with them and since I found out you could work on them for a job I've wondered if that would be the job for me. WISEST seemed like the perfect chance to see what people in Computing Science really researched and I am very glad I participated.

My research lab was the RLAI (Reinforcement Learning and Artificial Intelligence) lab. I worked for my principal investigator Dr. Richard Sutton and I worked with my supervisor Adam White as well as many other people in the lab. Stepping into the lab for the first time I felt a little intimidated by all the people and computers but I quickly found my place and forgot all my doubts. My first job in the lab was to make an open source web page that would be understandable by High School students, telling about the RLAI lab, their research, other related labs

research and reinforcement learning in general. I learned so much just from that one job! I came into the lab with just a fuzzy idea that artificial intelligence makes computers learn and think like humans. When I did the web page I learned that there are loads of different aspects of artificial intelligence with reinforcement learning being just one aspect with very important contributions to the overall goal of eventual fully autonomous artificial intelligence.

Reinforcement learning is about learning through interaction with an environment rather than from outright teaching of an action. More specifically, a learning agent chooses actions while interacting with the world to maximize its reward. With this learned, I started on my second job of the summer. I was to help promote awareness in the global reinforcement learning community of the agent and environment online program library my lab was setting up. This is where they could place their programs for universal use and equal

testing purposes. I reviewed hundreds of papers written by many research groups looking for interesting programs and was I amazed! There's so much interesting research going on all the time and the research is working toward how to make computers learn better, faster and more efficiently. The time I was there just flew by because every day I was presented with new interesting research and very intriguing ideas for programs that learn. I had so much fun learning what was out there and helping my lab. My lab members were some of the funniest, nicest and knowledgeable people I have ever met. They helped make this experience what it was, one of the best summers I've had.

The WISEST team had so many interesting tours and activities planned, that the time at the program just seemed to slip through your fingers like a hand full of sand. There were off campus and on campus tours that really brought home that science studies at the University are very diverse and there are literally thousands and thousands of paths to take. The social events were a fun way to end a day and brought all the students together to share their experiences and lab stories so that we all learned a little something about research in many different areas.

I really enjoyed learning what I have about reinforcement learning, not to mention learning about science at the University, research labs and University life in general. It was a wonderful experience and if I could sign up for it again I would.

ALANA KORNELSEN Agricultural, Food and Nutritional Science

WISEST SUPERVISOR Dr. Dean Spaner

SPONSOR Faculty of Agriculture, Forestry and Home Economics / Human
Resources Development Canada - Summer Career Placements Program



MY NAME IS Alana Kornelsen, and this summer I was given the opportunity to participate in the WISEST Summer Research Program. When I applied, I knew that I was interested in a career in science, but I wasn't sure in which area. I asked to work in agriculture because it is a field that we don't learn about in high school and I thought that it would be interesting to work on something different.

I worked for six weeks with Dr. Dean Spaner's grad student, Alison Nelson, on the University Farm at the Plant Research Station. She is in the cereals group and is investigating how intercropping (planting several crops together) affects the weed control, quality of wheat, and mycorrhizal colonization of the crops in organic and conventional fields. Along with two summer students, Carla and Brian, I helped Alison to collect data on her crops. Some of this data included height measurements of the crops, soil samples and biomass samples. The biomass samples are taken by using a

sickle to cut 50cm out of two rows of crops. Because of the intercropping, we sorted the separate crops into bags, as well as the weeds. The bags are then put into giant ovens to dry the samples before we weigh them. The biomass samples can be used to compare the percentage of weeds compared to crops, which is useful for investigating weed control. This information is especially useful for organic farmers who do not use herbicides to control their weeds. We found that barley is the most competitive plant to intercrop against weeds.

Alison also has plots near Camrose, so one week we drove out each day to take samples. The soil samples were much easier to take out there because the farmer who owns the field tills it all the time because he grows organically and needs to reduce the number of weeds. Since we did field work almost every day, I learned to identify many the different crops, as well as some common weeds. While Alison was away at her plots in Lethbridge, I worked with Todd, another grad student. He is part of the wheat-breeding program. My team was very friendly and relaxed and the summer was a lot of fun. When it was hot, we sometimes went to Dairy Queen for ice cream.

The Wednesday afternoon activities were a great way to meet the other WISEST students and make friends. The WISEST coordinators, Selina and Tiffany, worked hard to make the activities a lot of fun. We did a variety of activities including visiting Micralyne, where we got a tour of the microfab and the other facilities. I also had a tour of some of the labs in NREF, including the hydraulics lab. The barbeque at the beginning was very fun. We played games and had the chance to talk to other students who are interested in science.

The WISEST Summer Research Program gave me the opportunity to work with researchers and experience life at the university. I couldn't have asked for a more interesting summer job with such a great group of people. I am also grateful for the support of WISEST and my sponsors who make it possible to offer such a program.

The WISEST Summer Research Program gave me the opportunity to work with researchers and experience life at the university.

REBECCA KOS Chemistry
WISEST SUPERVISOR Dr. John Green
SPONSOR Epsilon Chemicals Ltd.



WHEN I FIRST found out I was accepted into the WISEST Summer Research Program I was excited, nervous, and curious all at the same time. Excited at having the opportunity to be a part of an amazing program and learn about what my future could be; nervous that I wouldn't be able to handle "lab life"; and curious about what my summer research experience would hold. True, I enjoyed science classes at school and have watched my older siblings make their way through university, but I had little idea about what being immersed in university life and research would be like. My expectations were met and surpassed, as I journeyed through my unforgettable and irreplaceable experience with WISEST.

For my six weeks of research I was placed in the Department of Chemistry as part of Dr. John-Bruce Green's research group. Under the supervision of Shiao-Yin Wu, and with the help of Vaninder Sidhu, an undergraduate student, I would complete a project

involving the use of Atomic Force Microscopy (AFM).

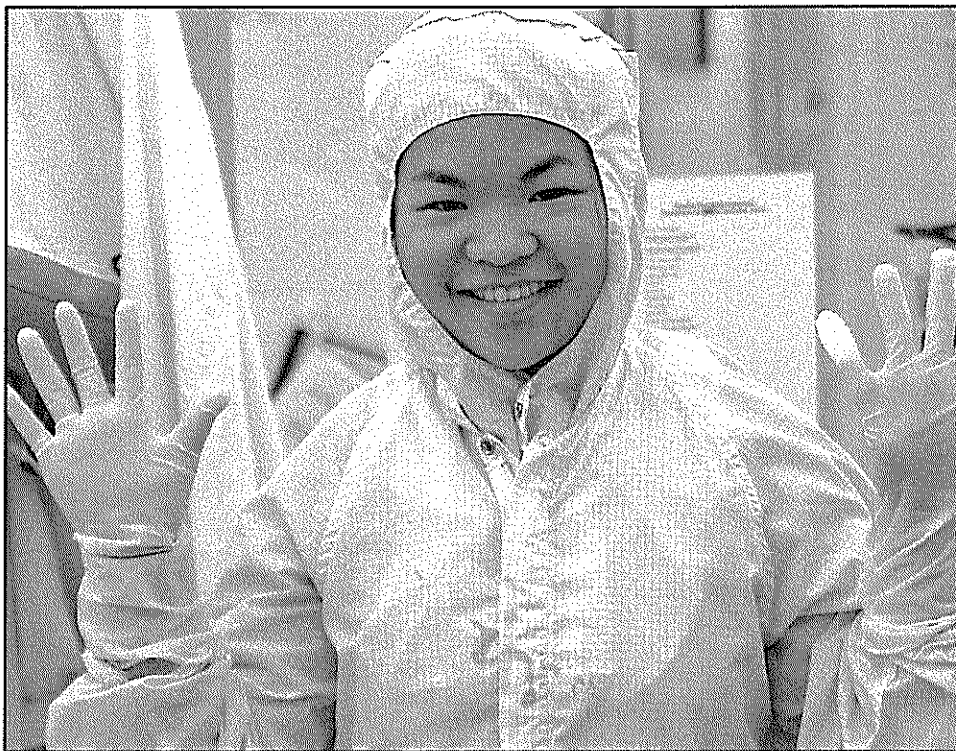
My project involved developing a new AFM technique that has never been used before. First, I was to modify polystyrene microspheres, commonly referred to as beads, with DNA and complimentary DNA. Following this grueling filtering process, I modified a cantilever and cover slip with PDMS (a polymer), and then immobilized beads onto the cantilever and cover slip. Once these steps were taken it was time to use the AFM. With the help of my lab group we made adhesion force measurements between DNA and its complimentary strands. If the bead on bead technique works, then the adhesion between DNA and complimentary strands will be greater than that between DNA and non complimentary strands. This project will help with future endeavors with AFM as it allows for several chemistries to be present and tested as opposed to the usual one chemistry.

My experience with WISEST has been incredible. I expected to learn a little about research and the university, but I have come to learn much more. From basic lab skills, to the acronyms of buildings and their location on campus, to how to use equipment I'd only read about in my school textbooks, my summer with WISEST has provided me with knowledge that will help me not only in high school but university and beyond. I was able to work with technologies and learn about techniques some university students never hear about, never mind high school students. The things I have learned will be an asset to me in future endeavors.

Not only did WISEST provide me with laboratory skills, but also with new ideas about my future. Prior to WISEST my options were: science, engineering, or arts. Now the possibilities seem endless. Through off and on campus tours and small group discussions, I have been exposed to careers I never knew existed. This knowledge will undoubtedly help me as I approach graduation from high school and I am thankful that WISEST has provided me with the opportunities to gain this knowledge.

As the "rest of my life" quickly approaches I have no regrets about my six weeks at WISEST. The knowledge and experience I have gained is worth all the pipette use my fingers had to endure. With this summer behind me, I am ready to forge ahead into university life and possibly a life of research to follow.

CHEN (TINA) LIANG Electrical and Computer Engineering
WISEST SUPERVISOR Dr. Ken Westra
SPONSOR Suncor Energy Foundation



WHEN I LEARNED THAT I would be working at the Nanofabrication Lab, I was ecstatic. I couldn't wait to explore the fascinating world of micro and nanotechnology, a field of research that I knew so little about.

When I first arrived at the facility directed by Dr. Ken Westra, I knew this was an amazing environment to be a part of. The air in the majority of the facility is constantly filtered to keep the number of particles and dust in the air minimal. There was a room full of grand, expensive machines. The most captivating part of the lab was the "clean room" where people wore white head-to-toe suits called "bunny suits". It was an extraordinary sight to take in. I quickly learned that the lab's super cleanliness is essential in preventing dust and other particles from settling on the tiny (micrometer and nanometer) sized projects that people are working on.

For these six weeks, I was lucky to be able to work under the patient guidance

of my supervisor, Kristy Beinert. Our main project involved etching extremely small patterns onto a thin, round piece of ultra pure silicon (4 inches in diameter) called a wafer to produce a microfluidics device. Microfluidics deals with the behavior and control of microliter and nanoliter (extremely small) volumes of fluids. One of the main applications of this type of device is to conduct biological tests using very little amounts of DNA or blood samples on one small chip. Our main goal for our device was to control the movement of a small water droplet without any external power sources. The main force that prevents small amounts of water from flowing freely is its tendency to adhere to surfaces. We planned on overcoming this force by creating a roughness gradient on a hydrophobic silicon surface through pattern etching. Based on water droplet contact angles on the differently textured surfaces, we predicted that a water droplet would travel from the "rougher" region of the surface to the "smoother" region. The scale of our device is so small that we

could not see the features of the pattern without a microscope. A piece of human hair is twenty times the thickness of the lines on our pattern!

The fabrication of our device required us to work in the clean room with "bunny suits" for the majority of our time. We learned the techniques of photolithography, which was done in room lit with yellow light. We also worked with a large machine called a Deep Reactive Ion Etch (DRIE) system, which used plasma, an ionized gas to etch silicon. It was amazing to see the colored plasma light up the chamber in the machine! My favorite machine to operate was the Scanning Electron Microscope (SEM). I couldn't believe that the objects in the clear crisp images that I was seeing were actually only micrometers in size: the size of a single dust particle!

Time flew by in the WISEST program. I learned so much about not only Nanotechnology, but also other fields of research through the various tours to other on-campus labs and industrial labs. I was truly inspired by the women with amazing science careers in our small group discussions. I met so many other students in the program with the same interests in science as me. I'll never forget the amazing program coordinators and the fantastic people I got to know in my lab, including my supervisor.

Being part of the WISEST program has truly been one of the most valuable experiences of my life. Through my work in the NanoFab, I have developed a new love and appreciation for an area of science and engineering that I knew so little about before.

JAN THERESE LLAGAS Agricultural, Food and Nutritional Science

WISEST SUPERVISOR Dr. Nat Kav

SPONSOR Edmonton Glenora Rotary Club



WHEN I RECEIVED the phone call for my acceptance to the WISEST Summer Research Program, I was incredibly shocked but thrilled at the same time. I thought the call was just to thank me for applying for the program and not to notify me whether I was denied or approved the application.

For the WISEST six-week program, I was assigned in the Department of Agriculture to work with Dr. Nat Kav and his research team. I was informed that my project would involve screening transgenic canola lines for tolerance to different environmental stresses. At that moment, I was absolutely clueless about my project.

My very first day at the U of A was quite an adventure. I have not been there before but I did not think that it was big enough for me to get lost. I WAS TOTALLY WRONG! Although I had a map in hand, it took me quite a while to get to the WISEST Orientation venue (ETLC). During the orientation, I got the chance to meet the other

WISEST students for the first time. This year, there were 65 of us from all over Alberta. We were introduced to the 2006 WISEST Student Coordinators, Tiffany and Selina, WISEST Coordinator, Grace Ennis and the Vice-Chair of WISEST, Dr. Gaylene Fasenko. In the morning, we played a number of icebreakers and games to get to know each other. We were also given a tour of the campus, which I think would be very useful for me. Later on in the day, we were provided a WHMIS Safety Information Session and we also met our Principal Investigator.

The following day, Kelley, a graduate student, gave me a tour of the lab and introduced me to the rest of Dr. Kav's research team. When I found out that another summer student, Govind, was also working in the same team, it gave me a huge feeling of relief. It was very pleasant to know that I'm not the only non-grad student working in that lab. I felt quite overwhelmed for the first few days because I did not know exactly what to do while everyone else was busy

with their own experiments. About a week after, the details of my project was explained to me. My project involved testing Canola and transgenic lines of *Arabidopsis thaliana* (model plant) for their tolerance to aluminium and nickel stresses. My project was not at all hard work. However, it was quite tedious in some aspects. I had to grow Canola and *A. thaliana* seeds in Petri dishes in the presence of either an $AlCl_3$ or $NiSO_4$ solution of different concentrations. The seeds were then placed under fluorescent light at $22^\circ C$ to germinate. I also did observations daily on the germination of the seeds. I then took pictures of the seeds and collected the tissues after eight days for Canola and 15 days for *A. thaliana*. After protein extraction of the tissues was performed, one- and two-dimensional electrophoresis were conducted on some samples to analyze differences in protein. The time I spent in the lab was truly productive. My research team always had something to do for me which was nice because I got to learn more things aside from the project that I was doing. They were also very patient with me and were always willing to help whenever I was unsure of what to do.

The WISEST group met every Wednesday afternoons for a tour session or discussions. On Fridays, we also ate lunch together over at Quad and prizes were drawn at the end of each lunch hour.

Overall, the six weeks of summer I spent for the WISEST program was priceless. I was able to become acquainted with the U of A campus, met and talked to numerous inspirational people, gained lab skills, and learned a lot about myself. I think this experience will definitely influence my career options and will be something that I will always look back on.

YIHAN MA Biological Sciences
WISEST SUPERVISOR Dr. Erin Bayne
SPONSOR Edmonton Glenora Rotary Club



CONDUCTING SCIENTIFIC research might not sound like the ideal summer vacation for a sixteen year old since the stereotypically portrayed teenager enjoys less mentally strained activities such as swimming and shopping during hot weather. However, I had an amazing summer being part of the WISEST program this year.

I had the opportunity to work with Dr. Erin Bayne's research group in the Biological Sciences Department. I mainly worked with his student Erin Cameron in the field to collect data for her project.

I started the project by going into the boreal forests around Slave Lake in Northern Alberta. I was taught the different ways of navigating through the forests such as the basic operation of the GPS and the compass. Then the real work began. The main purpose of the project was to understand the abundance of worm population, how they spread, and how different factors affect them. The species of worms in

the boreal forests are all originally from Europe and one of the theories as to how they reached North America is due to traffic since roads were built in the forests for logging industries. The age of the road and the amount of traffic on it might affect the number of worms around that area. A large amount of time was consumed on digging through leaf litter and sorting through soil to look for worms. How appealing, you might think, but it has more to it than meets the eye. I learned the methods of determining the places we would dig at, which involves the laying out of grids and the use of quads of different sizes. As it turned out, the vegetation, moisture of soil, temperature, and many other factors all affect the worm population. Thus I learned how to identify different plants and trees, how to determine the amount of moisture in the soil, and how to preserve the worm samples for further research and gene identification. I also learned interesting facts about the reproduction of worms and the formation of the cocoon. My second trip involved more

driving because we mainly worked on road transects to determine the amount of worms close to the roads. We drove all the way up to Manning, where it's freezing in the morning despite the fact that it's August.

The project I was involved with was a little different since it is mainly fieldwork and requires camping. It made the experience more interesting and exciting since all the luxuries of home are stripped away and I had to live with strangers for 10 days at a time, whom by the end of the 5th day felt like family because the people were all incredibly nice and funny. The friendships developed are something I'll always remember.

Other than the fieldtrips I worked in the Air Photo Library to find roads of different ages. I learned how to locate an area by the Legal Land Description, how to read and understand the different types of maps and how to locate roads from maps to air photos. It is very interesting to look at the changes that occurred in a place in the different years, which can be very drastic.

The wonderful coordinators for the WISEST program made sure that we wouldn't get bored by organizing enriching yet fun events such as lab tours and Friday lunch meetings. These gatherings allowed me to meet many cool friends.

This summer has been a blast and an experience I will never forget. It has given me the opportunity of doing actual research with people who gave advice and shared experience, which enlightened me on what university life was like. I also had an incredibly good time at the events mingling with people who had common interests in science as I did. It really is a summer to remember.

COURTNEY MALTAIS Civil and Environmental Engineering
WISEST SUPERVISOR Dr. Tim Joseph
SPONSOR NSERC - PromoScience



WHEN I FIRST RECEIVED the call from Tiffany and Selina informing me that they wanted me to be part of the WISEST program, I could barely contain my excitement. For about 20 minutes after the phone call I bounced around my kitchen.

Of course, soon after the call, doubt began to set in. What if I didn't like my lab partners, what if I wasn't smart enough to be a part of this program, what if...you get the idea. The night before our first day I was terrified; and I was scrambling all over my house trying to figure out what to wear to orientation. Orientation passed by in a blur until the end of the day when I got to meet the three other WISEST girls: Tamara Bain, Veronica Haring and Andrea Bui, our lab technician Robert Anusic and, our supervisor: Dr. Tim Joseph.

The next day we met with Tim to get a few scant outlines of the projects that he would like us to complete over the course of the summer and to learn a little bit about the field of mining

engineering. There were four basic projects. In project one, Tim wanted us to build the back of a mining truck, cut a Styrofoam block into a cone and figure out a formula to calculate the volume of material that the truck body holds. The second project was an extension of project one, where we would take data that Tim had previously collected and analyse it. The third project was a ventilation project that would help mining companies to know how much airflow is needed for underground mines, dependent upon the wall surfaces. The last project was with a truck wheel where we would measure the footprint area and force, against the angle of incline, material and load placed on the wheel.

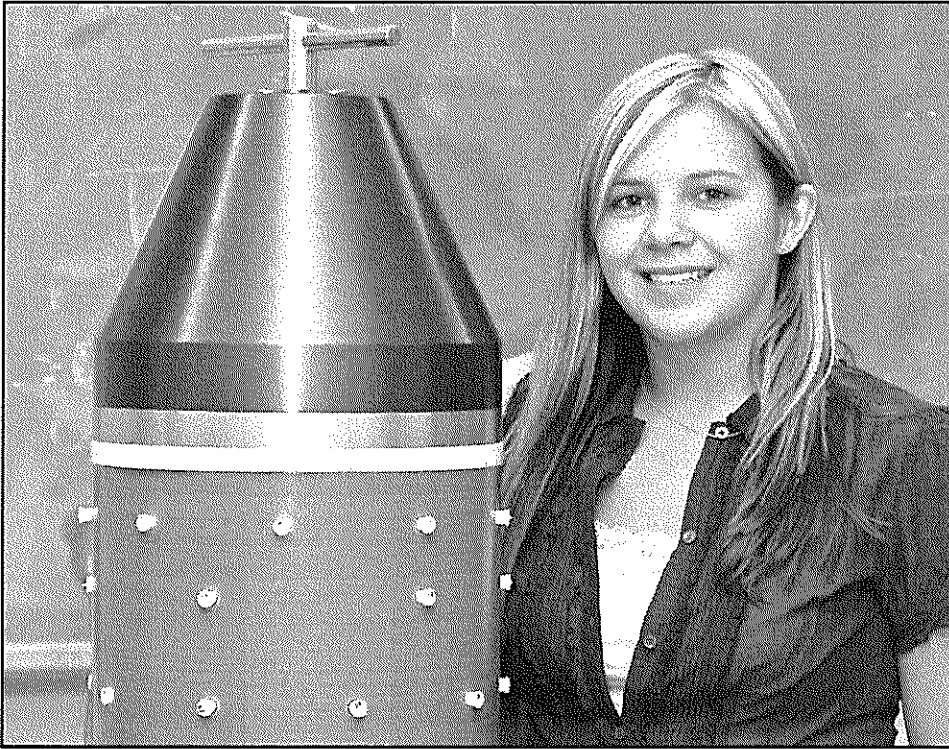
The next few weeks were spent tearing our hair out while getting covered in Styrofoam dust. Many days were spent up in our office doing numerous drawings and calculations. Many days were also spent down in the lab, cutting up Styrofoam, building the ramp for project four and cutting more Styrofoam. There were also a couple shopping days, looking for materials that we needed for the projects and one day where Tim and Robert took us to a mine site about an hour out of the city. Towards the end of the summer we (okay basically just I) began freaking out as the work seemed much more than we could finish with the time we had left. There were a few days when I am sure that Kasmira Pawa, who worked in our office, thought that the four of us were crazy. Some days we worked so hard that by the end of it we couldn't do anything else but just sit and giggle.

The work all paid off. We finished our projects on the second of August. Now we just had the all-important research posters to complete. Of course later that day one of our two computers just had to crash. We were just grateful that the computer that crashed didn't have any poster work on it.

WISEST was an unbelievably valuable experience. Some days I just wanted to stay home and sleep in, but I persevered and on August the fifteenth I will be proudly standing with my colleagues ready to present my summer.

Some days we worked so hard that by the end of it we couldn't do anything else but just sit and giggle.

MEGHAN MICHAELCHUK Mechanical Engineering
WISEST SUPERVISOR Mr. Mark Ackerman
SPONSOR Alberta Education



MANY PEOPLE have asked what my summer at WISEST has meant to me, thinking that I could reply with one concrete, definitive answer. However, my summer with WISEST has been more than a wealth of knowledge, or an amazing summer job; it has been a life altering experience. WISEST is like a family; it nurtures you and allows you to grow to be strong and independent. Sure you may fall down and make mistakes, but WISEST is there to support you and pick you back up off the ground. Before I was accepted into the long family line of WISEST, I wasn't sure what I would do with my life after high school. There are so many options that one could pursue. However, with the experience and knowledge that the WISEST program has shared, I have developed a sense of understanding the science, engineering, and technology world, and take comfort in the knowledge that I have acquired.

This summer I was fortunate enough to be accepted into the department of Mechanical Engineering, under the

research team of Mark Ackerman. I had the opportunity to work not only with Mark, but with many others in his lab, including Steve, my supervisor. I was fortunate this summer, as I had the privilege of working in not one, but two university labs. My lab on campus, located in the Mechanical Engineering building, consisted of a small room full of computers and people. Then, my more compelling lab, the Flash Fire Lab, was where we would conduct the flash fire testing. It is located in a building called MEANU (Mechanical Engineering and Noise Unit), situated off campus on 34th street. This lab was very exciting and a learning experience each day. At first, the lab practice was a little overwhelming, with many complex graphs, spreadsheets and figures to grasp. I had to become familiar with data analyses, pressure traces, and heat fluxes. However so, my time was not all that confusing once I began to understand the results, and how they were all associated with each other. Overall, my time in Mark's lab was a rewarding and pleasant experience,

and I would do it all over again in a heartbeat.

What have I been doing this summer? The answer to that is a combination of many things, all associated with the fire research lab and mannequins who happen to be named Harry and Sally. My projects involved with Harry were very plentiful. One of my more abundant tasks was to conduct flash fire tests on Harry in the fire lab, in order to try and establish any variations in heat flux and supply pressure. The purpose of this testing was to see what factors were associated with the inability of our mannequin to absorb enough energy from the flames. The quantity of absorbed energy associated with each burn is a direct result of heat flux and energy transfer. The average heat flux of a burn is determined by the amount of energy transferred over a given period of time. As a result of this testing, my new understanding of the Burn Room and its measures helped me to create a new, revised operations manual for the many procedures in the Flash Fire Lab. Also, I was involved in the design and production of a spacer. This spacer had to have certain dimensions, and had to fit in a small space, making it, at times, a frustrating occurrence. Overall, my time with Harry and Sally has been an interesting and rewarding experience. I am able to complete many tasks involved with the maintenance, upkeep and proper testing of the mannequins. Furthermore, I express gratitude for the hands on experience and the first hand knowledge that I have learned this summer; an opportunity that would not have been possible without Alberta Education, and their generous offerings of sponsoring my position. I am eager to continue my exploration of engineering, science, and technology!

KASANDRA MIGWI Electrical and Computer Engineering

WISEST SUPERVISOR Dr. Ken Westra

SPONSOR NSERC - PromoScience



MY NAME IS Kasandra Migwi and I am from Rae-Edzo, Northwest Territories. It is a little town of 3,000 people an hour out of Yellowknife. When I first heard of the WISEST program, I was in grade 10. I wanted to apply right away, but I had to have my grade 11 sciences and math. I challenged myself by taking it in all at once. I was at the top of my classes. I doubted that I would not get accepted. But I ending up applying and guess what. I got accepted.

Coming from out of Alberta, I stayed at the St. John's Institute. Now that was another experience itself. I met people from all over Alberta and made some great friends. Our residence coordinator, Megan, was able to relate to us in many ways. We all had a great time at the Capital ex, the Cracker Cats game, the Water Park, and going shopping. Nothing like creating memories that will last a lifetime.

I knew so little about my project, and had very little knowledge about

nanotechnology. I did not know what I was getting myself into. But I kept thinking, "learning something new", and "Gaining some valuable work experience". I was pretty surprised when I arrived because I thought it was all about computers and microscopes. This was a whole new world to me.

I had the privilege to work with a graduated student, Kristy Brinert and another WISEST student, Tina Laing. In the Department of Electrical and Computer Engineering. Our project was to test out the STS system because it was newly equipped. The whole point of the project was to test out the system, so it can go public to

the outside community. We were to make test wafers in order to test out the system. Make new recipes on the system to make the angles of the posts on the wafers just right on 90 degrees. We were able to do so on some of the wafers, but some were damaged. This all may seem like gibberish, but I have a small part of a bigger project here.

It was awesome that Tiffany and Selina plan this whole summer for us and I would like thank them for that. The Wednesday Afternoons, Fabulous Freebie Fridays, Relay days, and the tours. The Wednesdays afternoon really helped me because I was so unsure what I wanted to take after I graduate. I have many choices but I choose to go right to university and take on engineering.

The WISEST program is an amazing program. I am glad that I became part of the memories and events this year of 2006. Not only is the program amazing, but the university as well.

I would like to thank Grace, Tiffany, and Selina. They are all great people. Thank them for giving me this opportunity to join them at this program. Thank them because I have many stories to share with my community and my school. Thank them for making this happen. Masi Cho.

The WISEST program is an amazing program. I am glad that I became part of the memories and events this year of 2006. Not only is the program amazing, but the university as well.

CARRIE MILLAR Chemical and Materials Engineering
WISEST SUPERVISOR Dr. Steve Kuznicki
SPONSOR Suncor Energy Foundation



I APPLIED TO the WISEST program to expand my knowledge and experience in the sciences. In addition, I hoped to explore university life and get a feel for what classes and labs could be like. As I was unsure of which field I wished to study in university, I also wanted to see if science was a good fit for me. Throughout the six weeks of the program, I achieved these goals and had a great time with all the WISEST students.

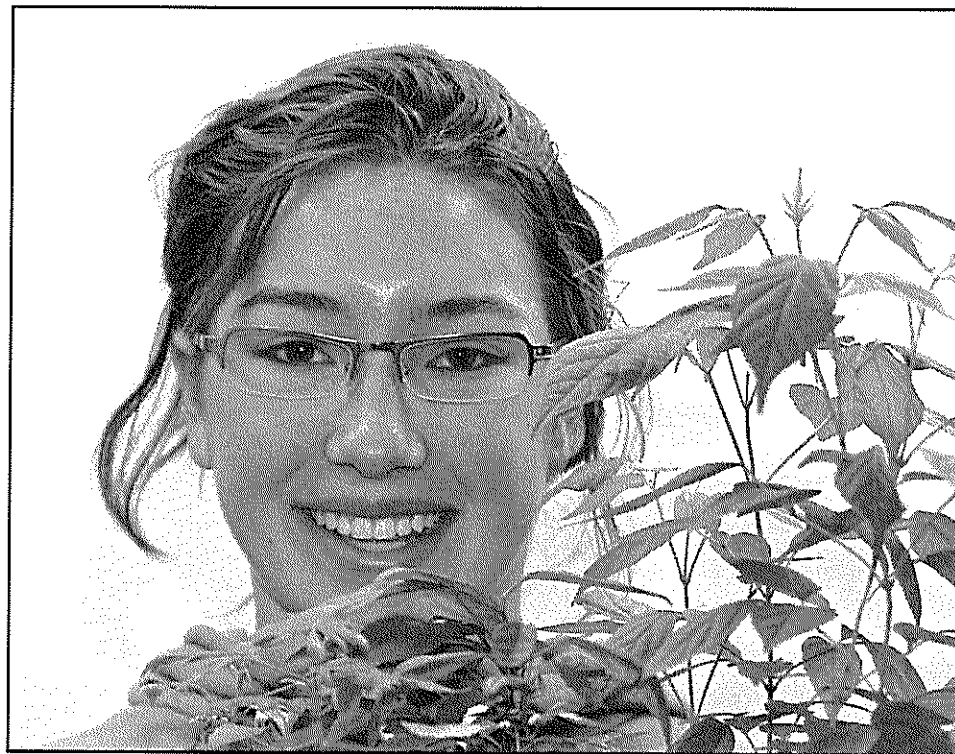
I was placed in the department of Chemical and Materials Engineering under the supervision of Andree Koenig. I had the opportunity to be a part of a unique and ambitious project aimed at the fractionation of asphaltenes. Asphaltenes are precipitates from bitumen that are surrounded by debate. The composition of asphaltenes and the size of the molecule are unknown, so the properties of the substance are arguable. My principle investigator, Dr. Steve Kuznicki, believes that if asphaltenes can be separated into different fractions, these fractions

could be analyzed to discover the composition of a whole asphaltene. My part in the research originated as a feasibility study to see if any separation could be achieved by using different combinations of packings and solvents in a glass column. Then, to everyone's surprise, we stumbled upon a working combination within the first couple of weeks. Sea sand and a solution of 2:1 hexane and toluene separated the asphaltene sample into orange and several shades of yellow. This was much different than the original black colour of any previous asphaltene samples. I was able to enjoy the excitement of discovery with my research team. My job then became much more focused on the analysis of the samples we had collected. I used interesting equipment such as a spectrometer that analyzed the UV visible and invisible spectrums present in a sample. The research I participated in this summer was surrounded by so much enthusiasm from my supervisor, principle investigator, and others in the field of oil research that the project

will continue this year and hopefully be key in uncovering the composition of asphaltenes.

Outside the lab, I was able to go on tours of labs on and off campus. These were very interesting and allowed me and the other WISEST students to see many diverse areas of science. There were also many social events put on by our wonderful student coordinators. The WISEST barbecue and the unforgettable Relay Days were highlights of the summer. The university experience was also very valuable. After a few days of confusion, I was able to navigate the campus and find my way around the engineering buildings. Coming from a very small town, I was glad to be able to learn the university area and how to take a city bus, which I had never really done before this summer. I now feel much more prepared for university and it is less intimidating. For me, the most valuable part of the summer was the friendships and connections I made. I met many students in WISEST with whom I shared similar interests and who also plan to attend the University of Alberta. I look forward to knowing people on campus. I also met many engineering grad and undergrad students who always answered any questions I had about their work or what it is like to be in engineering. My supervisor, principle investigator, and other professors I met were all very friendly and helpful. I would gladly take any of their classes. Having participated in the WISEST program, I am looking forward to returning to the university.

MALLORY NAULT Earth and Atmospheric Sciences
WISEST SUPERVISOR Dr. Arturo Sanchez
SPONSOR NSERC - PromoScience



WHEN I FIRST saw WISEST on the caller display at home I had actually missed the phone call as I was coming home from a soccer game. I remember flipping through the list of callers and being shocked absolutely speechless when I saw the name on the display. After a few seconds it clicked in my head that WISEST had actually called me and I started jumping up and down and grinning like an idiot and scaring my family. When I finally calmed down enough to call back I had to work extra hard to listen to what was being said and not just yell excited gibberish into the phone. Needless to say I spent the next few weeks telling anyone who would listen all about my acceptance and the project I would be working on.

My six weeks was to be spent in the Earth and Atmospheric Sciences department with my supervisor Sandra Correa. My project was with invasive plants in Elk Island Park and also in learning about Satellite Imagery. I was also excited to learn that I would be aiding another researcher in his

project with plant growth. My fellow research partner and WISEST student Katie Heine and I would be observing the effects of CO₂ on the rate of plant growth. I immensely enjoyed this portion of my experience, as we were able to see the greenhouses in Biological Sciences as well as observe the chambers where this experiment would take place. Even more interesting was that the plants had come all the way from Panama and to be given the privilege to work with them was a huge honor. We were trusted to take care of the plants and given the task

of taking the reflectance of the leaves with a Spectrometer and making sure they were watered and measured. Throughout my time here I have learned that certain portions of science take ample amount of patience as working with the Spectrometer can take hours. There were over 400 leaves in each chamber that the reflectance had to be taken for!

One of my favorite parts of the WISEST experience was my Research in Action Industry Tour at Isotechnika. It was informative and interesting and also gave me a good insight into the steps involved in producing Immunosuppressive drugs. It also opened my eyes to the potentials of working for these companies that I originally thought only existed in the places like the United States. The fact that there is one right in my backyard provides huge incentives to find the right career for me.

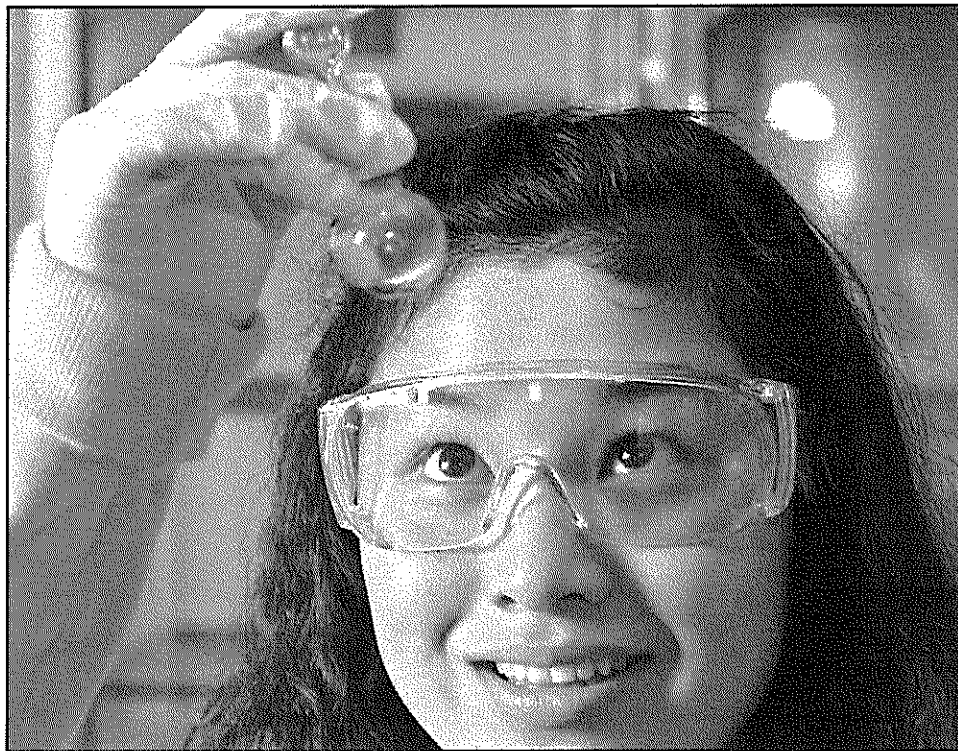
WISEST has been able to provide unique options for a career in science that I never thought possible. It has helped me to figure out what aspects of science I am interested in and also which aspects I am not. I certainly look forward to when I can be a student here at the University of Alberta and use my newly gained knowledge of the campus.

WISEST has been able to provide unique options for a career in science that I never thought possible.

SISI PAN Chemistry

WISEST SUPERVISOR Dr. Glen Loppnow

SPONSOR Allard Foundation / Human Resources Development Canada
- Summer Career Placements Program



A POPULAR PHRASE STATES:

"You learn something new everyday."

My experience in the WISEST Summer Research Program has rendered this an understatement! This program offered both the chance to glimpse at potential professions and to satisfy a personal curiosity. With minimal previous laboratory experience, I had a romanticized perception of research. My father is a research scientist; I almost assumed he mixes random chemicals, fated to change the face of science with luck. WISEST served as a reality check.

I received the opportunity to collaborate with Dr. G. Loppnow and his research team in the Department of Chemistry. In general, his group investigates DNA damage and repair. I first met them during a weekly meeting, where one member updates the others with his/her progress, maintaining coherence within the group. I understood a statement or two throughout the entire presentation. Good grades at an academic high school did nothing to prevent a sense of intimidation.

Christine Pinnock, a graduate student, was my direct supervisor. Her project involves investigating the properties of silicon and gold nanoparticles to improve molecular beacons for detecting DNA damage, using methods such as absorption, emission, infrared, and nuclear magnetic resonance spectroscopy. Molecular beacons are hairpin shaped molecules with an internally quenched fluorophore whose fluorescence is restored when they bind to a target nucleic acid.

The silicon nanoparticles were functionalized through photochemistry with citronellal, 3,7-dimethyl-6-octenal, to prevent uncontrolled aggregation. In order to serve as an effective fluorophore, their emission should remain relatively constant. I performed an aging experiment by taking UV-Vis and emission spectra of p-Terphenyl, an organic dye, as a standard and the functionalized nanoparticles over time. Although I did not acquire enough values to formulate a concrete conclusion, I was able to calculate the quantum yield of the nanoparticles to be 0.0089.

The quenching efficiency of gold exceeds that of DABCYL, currently a popular quencher, for various organic dyes, but our results were contradictory. The logistics of my film experiment has to be improved. Further research also includes functionalizing silicon nanoparticles by refluxing, finding a mechanism for attaching the nanoparticles to oligonucleotides probes, and ultimately testing the molecular beacon with DNA.

Despite my lack of scientific breakthroughs this summer, I am now aware that research progress is arduous, involving mistakes, reading, improvements, and infinite details. It appears spectroscopy and chemistry fascinate me less than physiology and biology. I also realized that stepping out of my comfort zone can be rewarding. I enjoyed receiving respect both in and outside my lab. For instance, the spectrofluorimeter was often in great demand, and my request to use it was no less urgent than that of any graduate student or post-doc.

Equally important as intellectual stimulation are the people I met this summer. I love meeting students who are not only extremely fun but also concerned with their education. The WISEST social activities were a blast, but having lunch, going out, and befriending a great group of WISEST students was better. Interacting with individuals who are at different stages in their education has allowed me to explore career choices and gain mentors. Dr. Loppnow's research team made me feel completely welcome and in the end, the people made my experience worthwhile.

Although an overwhelming wealth of scientific knowledge exists, even more questions need to be answered. Research essentially has the potential to 'make a difference', an exciting notion. Scientific progress will continue as long as individuals are permitted to explore their curiosity. I want to thank those involved with the WISEST Summer Research Program immensely for just that!

KASMIRA PAWA Civil and Environmental Engineering
WISEST SUPERVISOR Dr. Derek Martin
SPONSOR Canadian National Railways



WOW, it's hard to believe that six weeks have already gone by! I know, you're probably thinking that six weeks is a long time, and this summer must have been a drag, and that's kind of what I thought it would be like at the beginning. Who can honestly say they want to spend six weeks out of their summer working?

The summer research program can hardly be called work though; between all of the activities and get-togethers organized, there is definitely enough variety to keep everybody happy. The student coordinators work so hard to make everything fun, and come up with crazy ideas for things to do together as a group. You meet so many new people, and they are all people with the same interests as you, so you have a lot in common with pretty much everybody.

Even the 'working' part of it isn't bad; you get to work in a job that makes you think and WISEST works hard to put you in a position that coincides with your interests. Something else

that was a big thing for me is the fact that your work has a purpose, and that you are working to improve or discover something important. It makes the whole experience that much more rewarding as you feel like there is definitely a point to what you are doing, and that what you are working on is actually significant.

The research team I worked on was sponsored by Canadian Railway companies, and served to analyze various ground hazards around tracks to avoid accidents and find more effective locations for future lines. The university recently bought a LiDAR instrument, a tool useful for scanning landslides and rock faces to monitor movement of potential hazards. The technology is very similar to radar, sending out thin beams of light which are reflected from the surface back to the unit. I had the opportunity to work with the ground based LiDAR unit, the ILRIS-3D, and learned to perform scans and compare them using various computer programs.

I was assigned the task of finding the error of the instrument, so that users would know the accuracy of their results. My supervisor worked very closely with me and, with her help, I was able to perform scans around my building. We would scan the exact same area twice, then overlay the scans and compare them. Theoretically, the scans should be identical (have an error of 0), but experimentally they contained small discrepancies. Generating an error report calculated the mean error, and we compared the mean error values between various scans to conclude that the error is not constant (as we originally thought) but rather it increases as the area of the scan increases, or as the point spacing is increased.

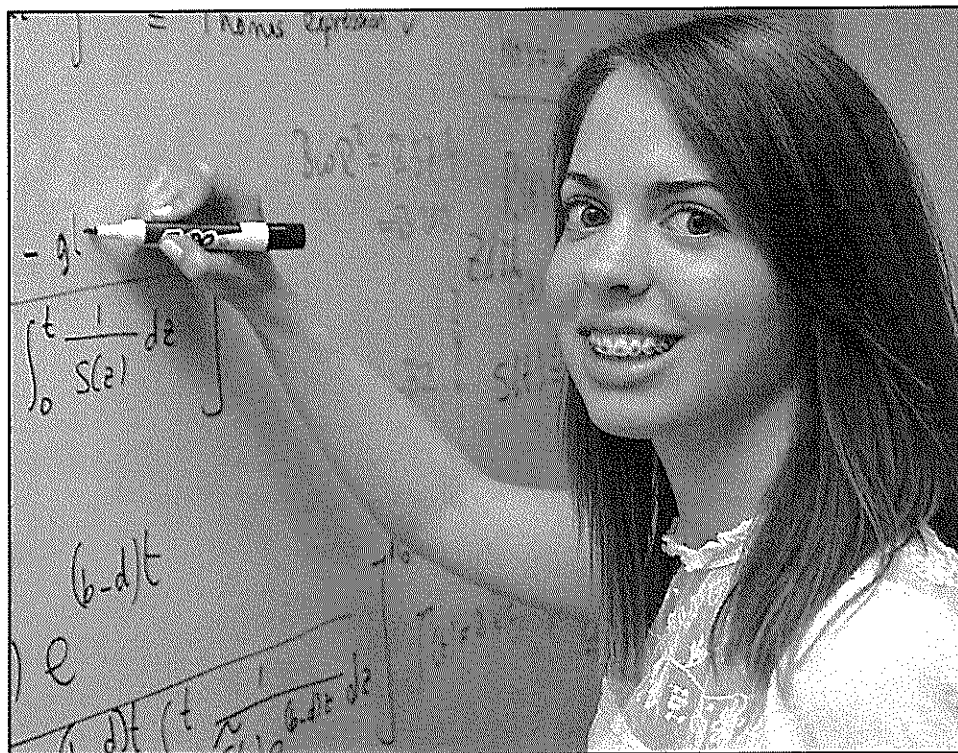
During the LiDAR Training I attended I also got the opportunity to talk with a Master's student about what grad school is like, and different university options. Talking with someone still fresh from the experience is really rewarding as they remember what it is like to try and find the right school and the right path (some of them are still working on it), and they are happy to give you advice. We talked about different schools that are known for their engineering programs, and I left thinking about universities that I had never even looked at before.

I love math and physics, and Civil Engineering is a field that I have been considering entering. Through the summer research program I got a better idea about what a Civil Engineering degree can actually be applied to, and I gained a first hand look at many different career options. It was a great experience, and definitely helped me answer a lot of questions. At the same time, though, it brings up a lot of new ones; you are introduced to lots of new careers that you've never even heard of before. And the bonus on top of everything else: you're getting paid as you're finding out all of these new-fangled options! And honestly, who doesn't love getting paid?

RACHEL PEREDERY Mathematical and Statistical Sciences

WISEST SUPERVISOR Dr. Gerda De Vries

SPONSOR Centre for Math, Science, Technology Education



WHEN I FOUND OUT that I would actually be getting to spend this summer at the University of Alberta, I was thrilled, although not many of my friends at home in Calgary shared in my enthusiasm. "You're spending the summer at University, so basically you're doing school?!" To me, this was looking more and more like it could be one of the most interesting summers of my life. You see, I seriously love math and science, and here was a chance for me to meet lots of other girls my age who do as well. That alone was one of the things I was looking most forward to.

On the first morning I was honestly kind of overwhelmed; there were so many people. I quickly found a group to talk to and they ended up being the people I knew most by the end of the program. That afternoon when I met my professor, Gerda, and supervisor, Drew, I could tell right away that I would enjoy working with them. By the end of the orientation day I was completely exhausted; I don't think I've ever tried

to remember so many names, or learn so many new things in one day like that before.

My main project was about getting more biology-related questions into the high school math curriculum. As most people who have gone through Math 30 could attest to, pretty much the current extent of these types of questions is dealing with bacteria multiplying in a Petri dish, so almost no interest is involved. After going through higher-level math textbooks I was surprised to learn about all the ways math and biology are interrelated. I mean, there are so many really cool things in biology that can be demonstrated through math equations; some of it is so unexpected too, like the progression of a hangover! I started to realize that if some of these questions could be integrated into high school math, then maybe more people would get excited about math the way I do. I also created my own computer simulation to measure and model drug levels in the body when a person is taking regular dosages. The

drugs I chose to use in the simulation were not only the more common ones like Tylenol, but also drugs used for abuse like Nicotine and Vicodin. This is quite a bit harder than it might sound, because I really hadn't done too much with computer programming prior to this summer. But the people I worked with were really nice, and always helpful, so it turned out pretty well.

This program definitely wasn't all about work though; I could tell that after going to the WISEST get-to-know-each-other BBQ. The Wednesday afternoon activities became the highlights of my week, because they gave me opportunities to learn about what's going on in science in areas other than my department. My favourite of these activities was the Small Group Discussions with women who were succeeding in science related careers and schooling. I found that talking to them about how they got to where they are, and even things like rethinking what it is they wanted to be when they graduated helped me out a lot. Also, it has been so neat to talk to some of the girls and find out where they are headed, and the ways they plan on getting there; and I have even come across some who have aspirations very similar to mine.

All in all, this program has been one of the most valuable experiences I have had. It has also helped to prepare me for entering University next fall; it doesn't seem nearly as intimidating as it used to. I am so glad I learned that it's actually common for people to switch their paths throughout university in order to discover what they really want to do. I want to say thank-you to everyone who I worked with and who helped me in the lab, and to all the coordinators who allowed me to come here, and also a huge thank-you to CMASTE for sponsoring me!

KATRINA PONICH Biological Sciences
WISEST SUPERVISOR Dr. Michael Deyholos
SPONSOR Edmonton Glenora Rotary Club



WHEN I FIRST APPLIED for the WISEST Scholarship, I can't actually say that I thought I would get in. The application process was rushed, due to lack of preparation on my part. I found myself a couple of days before the deadline, rushing to complete my essay among my many other school assignments. I packaged my completed application and prepared to give it to my mom so she could mail it the next day on her way to work. The next morning during my second block I withdrew my English essay on the Use of the Tragic Hero in Shakespearean Literature from my binder, only to find that my English essay had been replaced by my WISEST essay. I quickly came to the conclusion that my WISEST application contained my English essay; needless to say my teacher was quite impressed. I was able to get a hold of my mom before she mailed the essay and I was able to return my WISEST essay to its rightful home. I had not even been accepted to the programs and WISEST had already taught me the valuable lesson of organization!

I had visualized receiving my acceptance phone call countless times. How I would be intelligent, confident and suave, but I forgot the rather important detail of caller ID, which I did not have. When I received the phone call that confirmed my acceptance into the program, I had no time to collect myself, and what followed surely put doubt into the mind of my coordinator, Selina. I couldn't stop laughing, I was so excited that I honestly couldn't properly answer the simplest questions she had, attempting to confirm my participation.

I was so enthusiastic about the possibilities the summer possessed, the people I would meet, and all that I would learn. The WISEST Summer Research Program was the ultimate tool in preparation for a future at post secondary. In the lab I was treated as any other undergraduate student, much to my surprise. As long as the work I was assigned was completed properly, I could monitor myself and my own progress. It was so refreshing to

be in an environment where you were entrusted a task where you would be able to perform and excel.

I worked in Dr. Deyholos Biological Science Lab under the supervision of Ryan McKenzie. My project focused on detecting mutations in the fiber development of the flax plants and gaining knowledge about different genes that could be of use to farmers and producers. Although this project was in the early stages of development, some of the results of the mutated flax plants were quite promising. It will take time for the mutations to segregate within the family lines so that researchers can be positive that mutations are due to the genes and not environmental factors. At first I didn't believe that research on flax would be all that valuable to the world, that was until I heard about the world from my great uncle's point of view. This small town farmer has spent his entire life farming in the Macoun area of Saskatchewan, he has never retired. When I told him about all of the ongoing research on flax, I know I made his day. He was extremely happy that the research quota he has always had to pay was actually being reinvested in his life's work. This WISEST experience has demonstrated how all lifestyles are intertwined, who would of thought that an interest in flax could take one from the farm to the lab?

This experience has been invaluable. I have been immersed in the rich multicultural campus, learned how to work as part of a team, and gained an even greater love for science. Its amazing how in only six weeks, I have had my eyes opened to the possibilities for the future, and how bright it will be.

JILL SAUNDERS Mechanical Engineering

WISEST SUPERVISOR Dr. Jason Carey

SPONSOR Faculty of Engineering / Human Resources Development
Canada - Summer Career Placements Program



I DIDN'T REALLY KNOW what to expect coming into WISEST. It was a bit daunting to spend six weeks with complete strangers, doing work I knew nothing about in a city I'd never lived in. However, it turned out to not only be a great experience, but also really fun.

I spent the summer in the Department of Mechanical Engineering. Our lab has a lot of biomedical engineering going on in it too, which was great because that's an area I'm really interested in. We had about five smaller projects going on at once, but our main project concerned finding the pressure distribution patterns across the hands during a (good) golf swing. To do this, we had to outfit a pair of golf gloves with pressure sensors. Thus my project turned into a fair bit of arts and crafts, because we had to rip open the golf gloves, glue the sensors in (with two different types of glue, because almost nothing will stick to the darn things) sew it back together and then sew the rest of the sensor to the gloves (so that it was as out of the way as possible). Because

the sensors are only accurate for about a dozen swings, we also had to repeat this process to get any feasible results. The gloves were then attached to arm cuffs and wires, and we would get a professional golfer was to take some good swings. This plan was good in theory. If there is one thing I learned this summer, it's that if anything can go wrong, it will. For example, we had a professional golfer (because our golf skills weren't exactly up to par), a fresh pair of gloves ready to go, and a date set that we would haul all our equipment to the golf course. This is summer, and golf pros are very busy, so we were glad one was able to slot us out a time. The day rolls around, and it rains. We would still have gone (since when is a golfer afraid of a little rain?)

except we remembered that electric equipment and water don't mix. For some reason, really busy golf pros don't like being cancelled on, and we got the old 'Don't call us, we'll call you.'

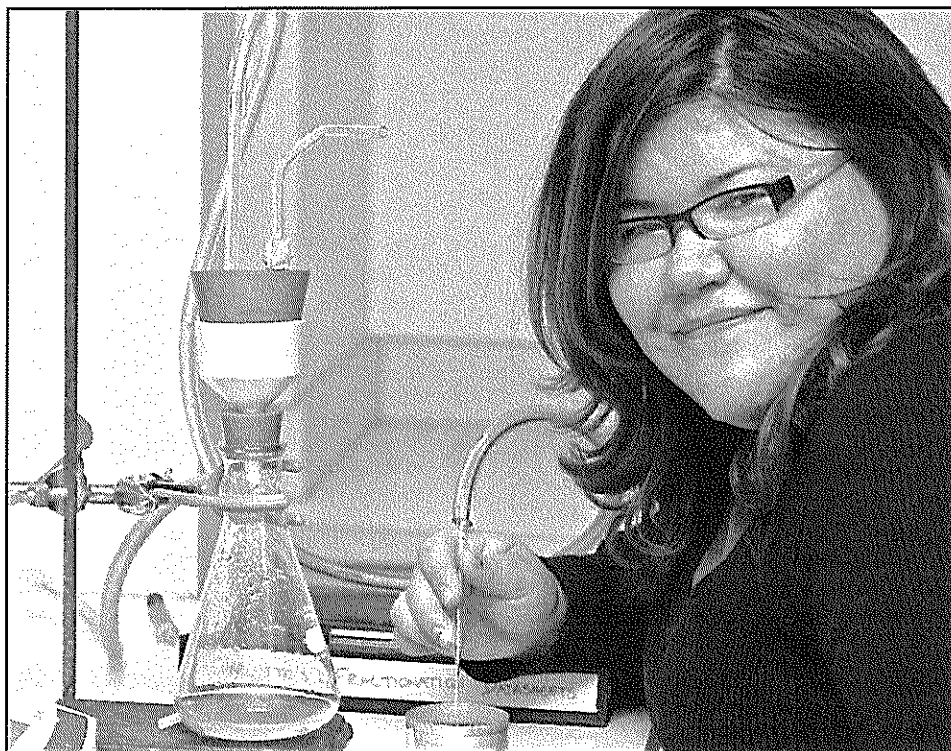
Another thing I've learned is patience. I found out that research can make you wait a long time. I mean a REALLY long time. In our lab I have watched perfectly sane people build voodoo dolls out of coconuts (and name them 'Pepe') while waiting endlessly for supplies or results. This has made me a little wary of doing research in the future. However, despite what my supervisors may think, they haven't scared me away from research for good.

Before this summer I had no clue what life in a research lab was all about or what career opportunities were available in science. The group events were very helpful in this regard (especially the Small Group Discussions). My supervisor was really great too, and she not only arranged a lot of tours of labs (during some slower periods in our work) but also took me to a seminar on biomedical engineering and the careers available through it, which is what I was the most curious to find out.

I am really glad that I got the chance to participate in the WISEST program, because now I have an idea of where I want to go in science. Although my time in the lab wasn't always exciting or fast paced, it was invaluable because I now have new ideas about science and a better understanding of what I want to do with my life.

I am really glad that I got the chance to participate in the WISEST program, because now I have an idea of where I want to go in science.

KATRINA SINGER Renewable Resources
WISEST SUPERVISOR Dr. Sylvie Quideau
SPONSOR NSERC - PromoScience



HI. MY NAME IS Katrina Singer. I am eighteen years old and am from Frog Lake, a small reservation located one hour north of Lloydminster. I completed my grade 11 at Amiskwaciy Academy here in Edmonton, Alberta and am planning to go back again to "finish up".

My journey to WISEST began with my chemistry teacher Mrs. McGinnis. She had introduced me to the idea of WISEST program and told me that I should apply. In the beginning honestly I was very reluctant. I had a complete lack of confidence in my abilities. I continually bombarded myself with questions like, "What if I am not as smart as the other girls?" And, "What if I'm stuck doing something I hate?" The application date had passed and I had missed my opportunity, until my teacher did something about it. Mrs. McGinnis believed in me so much that she decided to call in and tell them about my situation. They told her that I could still get in if I wanted to, and that it wasn't too late for me. I had

gotten another chance, and I knew what I had to do. I mailed in my application forms, and essay to the WISEST office and about a week later got a call back from Tiffany with the news that I was accepted! I was so surprised and delighted that I had made it. I hadn't really believed that I would make it, and would like to thank Mrs. McGinnis for taking a chance for me.

For the duration of this six week program I was placed in Dr. Sylvie Quideau's lab in the Department of Renewable Resources. My research project was a part of a larger project conducted by Suzanne Card for Ducks Unlimited Canada. With the presence of industrial development and agricultural production, wetlands of the Prairie Pothole Region have been drained and

plowed over. Reclamation efforts are being made to return these wetlands back to their previous states. This project was focused on determining soil characteristics and its changes associated with various slope positions in riparian areas. This research I had helped with will contribute to future research conducted by Ducks Unlimited Canada. It will be used as part of a database of background information available for future restoration activities.

The day I was sieving for ages I remembered telling myself, that there were so many steps to figuring out so little about the soil and how complex even the simplest things can be. Analyzing this and that...takes a lot of time, but in the end it is worth it.

Throughout this program I've had the opportunity to learn so many new and exciting things. Things I had never even known to remotely exist that I will hopefully remember forever! I've gotten the chance to be exposed to the possibilities out there available to me and how I could attain them. Well this program has been a blast, and I don't plan on forgetting it anytime soon. I will take back home with me so many wonderful memories ...like washing beakers, just kidding. For real though many memories of all the great times I've had at WISEST. My learning experience throughout this program will influence my future greatly. The friends I've made have impacted my life, and I am so happy to have met them. I would like to thank everyone apart of WISEST and everyone remotely associated with this program. Note to self...dirt is not soil. Soil is soil! There is a big difference!

My learning experience throughout this program will influence my future greatly.

ESTHER SINN Biological Sciences
WISEST SUPERVISOR Dr. Susan Hannon
SPONSOR Dow Chemical



TIME SURE FLIES when you're having fun! At the beginning of the summer it seemed like six weeks was going to be a long time, but now I am looking back on memories that I will definitely value. I was so excited to start the WISEST Summer Research Program, and now that the end is in sight, I feel that I have gained great experience.

I was thrilled to be accepted into the program and placed in the Department of Biological Sciences. I definitely got the chance to use both of my main interests, Biology and Chemistry, in the projects I was given. I was placed at Meanook Biological Research Station, south of Athabasca. The projects I had at Meanook were RANA (Researching Amphibian Numbers in Alberta), a water quality project, and a vegetation survey.

RANA is an ongoing research project designed to study the productivity of the amphibian populations. The frogs were guided into traps set around one of the ponds in Meanook by a plastic fence

that surrounds the pond. Once the frogs were caught it was my job to check the traps and record the measurements of the frogs we caught. I then organized the data. This project definitely gave me an insight into population biology. I learned what a population research project might entail, plus I got to catch frogs as part of my job. How else would you rather spend your summer?

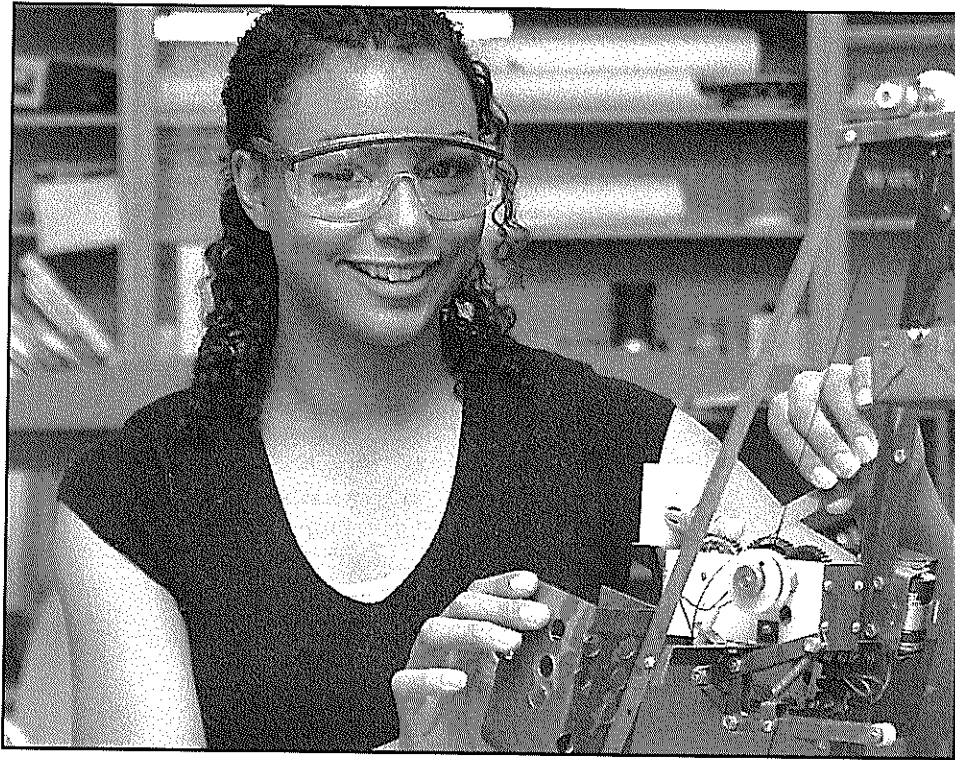
The water quality project was the major project I worked on for the time I was in Meanook. My supervisors, Kirsten Fazakas and Christine Deputat, set the parameters for the project but gave me a lot of freedom in designing and interpreting the data. I took samples from two lakes in the Athabasca region, Narrow Lake and Baptiste Lake. I then analyzed them with the intent of comparing the data I would get with the data that had been collected in the past. This involved some research into the history of the lakes I studied and gave me an idea of how to process the data I collected. It was in this project that my chemistry

interests were indulged. Within the first twenty-four hours of obtaining the samples, they needed to be analyzed for pH and alkalinity, turbidity, and conductivity as well as filtered and poured for Nitrogen measurements, Phosphorus measurements and cation and anion measurements. I learned how to use various instruments such as the Spectrophotometer (measuring Phosphorus), the Technicon Auto Analyzer (measuring Nitrogen), and the Ion Chromatograph (measuring anions and cations). Spending all this time in the lab also resulted in me learning about making standards and how researching data in a lab is different than the labs we do at school. It was neat to compare my lab experience in the WISEST program to the lab experiences I have at school.

The vegetation survey gave me a chance to experience fieldwork, literally. We set up three transects in a field and identified and counted the plants (including the grasses) inside the transects to get an idea of the diversity of the field. We then took soil samples and tested them for moisture content and pH.

My time at Meanook and in the WISEST program was not only about the research projects. Other highlights included Wednesday afternoon sessions. Even though the students at Meanook couldn't make it for all the sessions, the ones I attended were helpful and interesting. The WISEST Summer Research Program wouldn't exist without the incredible community that was created among the students in the program. Katherine Barkwell and Laura Becker, the other students at Meanook, soon became my good friends. When we came in for the sessions, all the students were friendly and willing to accept anyone. My summer in the WISEST program has allowed me to experience science at a higher level and it has truly been an amazing summer I will never forget.

PATRICIA SKAGEN-EMOKPAE Mechanical Engineering
WISEST SUPERVISOR Dr. Walied Moussa
SPONSOR Process Solutions Canada



I COULD HARDLY BELIEVE it when I got the call from Tiffany, a WISEST coordinator, telling me that I had been accepted to be a part of the WISEST Summer Research Program. She said I would be working with the simulation and fabrication of MEMS devices in the brand new National Institute of Nanotechnology (NINT). I was beyond excited. Nanotechnology. That cutting-edge buzz word that was being thrown around in the media. I was going to get to work with something profound and new. I imagined that I would be running simulations and using a scanning electron microscope (SEM) and be working on some breakthrough project that would change the world as we know it. Of course, that's not quite how things turned out, but was still an amazing experience.

I was placed under the supervision of Dr. Walied Moussa and worked with one of his graduate students, Mohamed El Gowini in the Department of Mechanical Engineering. Micro and nanotechnology or even engineering for

that matter are not discussed in high school so I was slightly unprepared for this field of work.

The first week began with me reviewing books, journals, the internet, and any other source that I could find in order to familiarize myself with microelectromechanical systems or MEMS. Some of the concepts were difficult to understand because research papers are worded using scientific language and the authors expect you to have some background knowledge. I got through it, though and eventually I felt that I had a firm grasp on MEMS.

I helped Mohamed El Gowini or Gowini, as everyone calls him, with his project which involves making a sensor for hip transplants. In a cementless hip replacement, the implant must fuse with the patient's bone through a process known as osseointegration. This prevents the implant from moving around and causing damage to the bone. Doctors monitor the healing progress and look for problems which

may require revision surgery. Currently, there is no universal method for assessing osseointegration. Information for monitoring and diagnosis are obtained through X-Ray imaging and patient self assessment. It is difficult to obtain quantitative information about the state of osseointegration and damage is difficult to detect in the early stages. This is where a sensor would come in. The sensor would be wireless so that a doctor could just look up the patient's condition on his computer. This would make diagnosis and treatment quicker and more efficient. I mainly helped Gowini by doing literature review in order to find sensor parameters which would be most suitable for his sensor. It was a very interesting project and I enjoyed learning about different sensors and simulations.

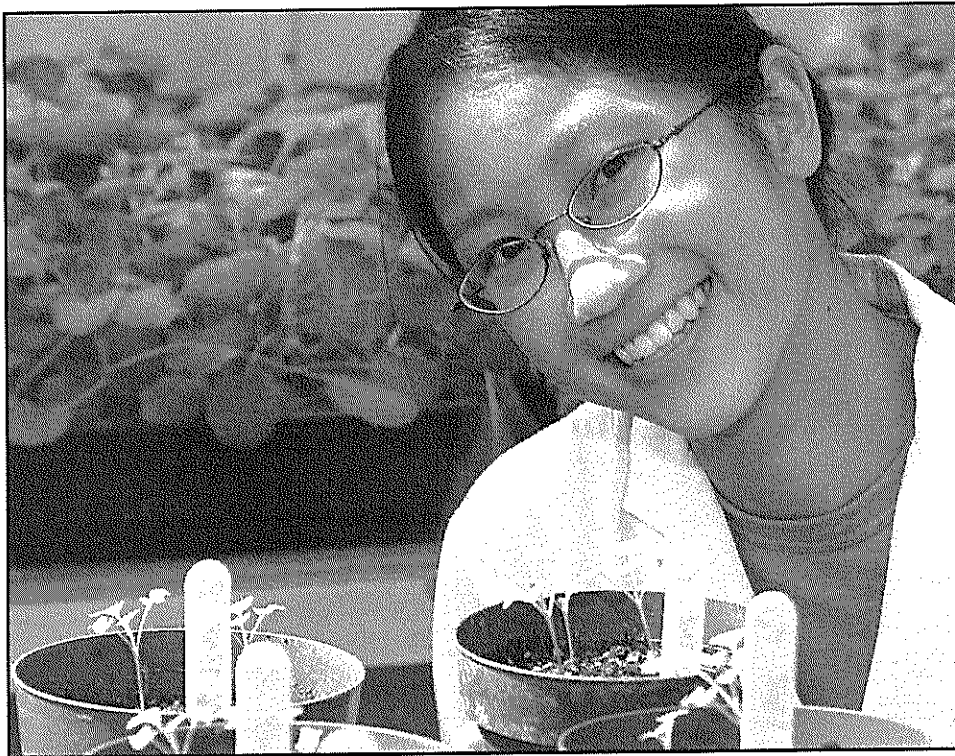
So many of the things I got out of the WISEST Summer Research Program weren't the things I learned in my lab. In fact, I would say that most of the benefits I got weren't from dealing with my project specifically but from the entire experience. Being here on campus and going on various tours really made me aware of the different career paths available. The program made me much more focused on figuring out what I want to do with my life and helped me figure out what I want to accomplish during my time at university.

Tiffany and Selina, two of the WISEST coordinators, were easy to talk to if I had any questions, and that was a very important part of what made the experience great. Tiffany even made arrangements so that I could go and view and SEM like I'd always wanted. I would highly recommend this experience to anyone who is interested in a career non-traditional to their gender and who wants to explore the options available to them. It's a great opportunity to learn about what University life is like and experience a typical lab job. It was a lot of fun and I will never forget my time here.

MARTINA SUNG Agricultural, Food and Nutritional Science

WISEST SUPERVISOR Dr. Stephen Strelkov

SPONSOR Faculty of Agriculture, Forestry and Home Economics / Human Resources Development Canada - Summer Career Placements Program



THE FIRST DAY at orientation seemed so overwhelming; so many people to meet, places to find (I must have gotten lost at least a dozen times) and things to see. WISEST gave me the opportunity to meet some really interesting people, get acquainted with the university campus and to see what working in a lab was really like.

When I first learned that I was going to spend my summer in a plant pathology lab, I was a slightly wary because I knew little about agriculture, especially plants. Luckily, the lab I was in was always willing to help me and answer all of my questions. Who knew that plants could be more interesting than the ones my mom makes me eat?

I was placed in Dr. Stephen Stelkov's plant pathology lab where they are researching clubroot on canola. Clubroot, it turns out, is a serious soil-borne disease of crucifers such as canola and cabbage. This disease causes the roots to enlarge or swell abnormally, forming club-shaped galls.

These clubs make it difficult for the roots to take up water and nutrients from the soil, causing the plants to wilt or even die. Relatively new to Alberta, clubroot can be detrimental to the oilseed crop industry as clubroot spores can survive in the soil for up to 20 years.

In the lab, I helped with various experimental procedures such as inoculations (where you purposely infect a plant with a disease), bioassays, extracting protein from roots, and testing other plants, specifically trees, for other diseases. Although I spent the majority of my time in the lab, I did get some field experience (literally pulling weeds!) at the University Farm. I also helped fill multiple trays with Metro-Mix soil and helped drain contaminated water from plant trays.

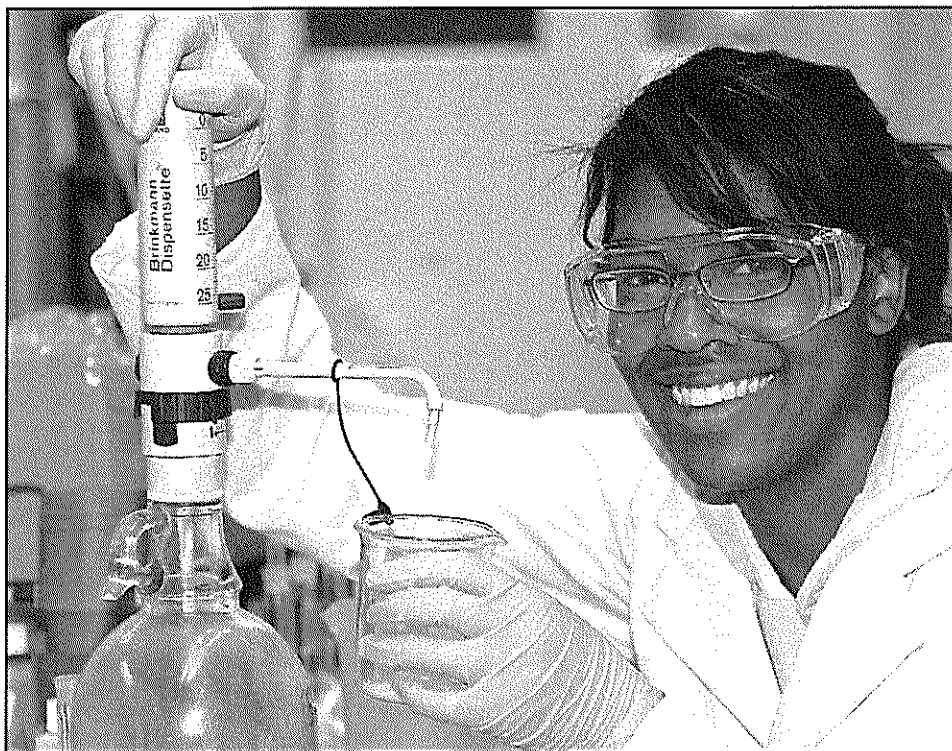
One of my main projects was to characterize one population of the clubroot pathogen in Alberta based on the two differentials of Williams (1966) and the ECD set (Buczacki et. al.,

1975). We made two different inoculums from two sources (source SACAN 03-1 and from Field #64). 12 seedlings from 13 different host species were then infected with the 2 sources by dipping the roots into the inoculums. The inoculated seedlings were then planted in Metro-Mix soil and the plants were grown in growth cabinets for 4 weeks. After, the roots were washed and examined for gall formations and rated on a 0 to 3 scale where 0 = no clubbing and 3 = severe clubbing. We discovered that the two sources were alike as the hosts had similar reactions to the inoculums and had similar levels of gall formations. This suggested that the clubroot pathogens from both sources originated from the same population.

For my second project, soil from Manitoba was tested for the clubroot pathogen using a bioassay method. To do this, we mixed the soil with Metro-Mix in a 1:2 ratio into which we planted 6 different, susceptible host species. Plants were grown under constant conditions for 5 weeks in a growth cabinet. The roots were then washed and examined for gall formations and rated on a 0 to 3 scale. We discovered that out of 142 plants, only 6 were found to be infected with clubroot, which suggested that the Manitoba soil was infested but the spore concentration was too low to infect a higher percentage of the plants.

Although there was some monotonous work involved such as washing beakers and pulling weeds, my lab experience was truly a memorable one. WISEST was definitely not all work. We had some great social activities where we were able to mingle and meet other WISEST students and sometimes get down and dirty (i.e. Relay Days). We also had the opportunity to meet interesting people from different fields such as engineering, science and technology through lab tours and group discussions. On the whole, WISEST was a fantastic experience and one that I would do all over again.

JENNY THOMPSON Chemical and Materials Engineering
WISEST SUPERVISOR Dr. Tom Etsell
SPONSOR Syncrude Canada Ltd.



WHEN I APPLIED to the WISEST Program I knew this summer would be different. In which way, I still was very unsure.

To be honest, I was surprised when I first got the phone call from Tiffany saying that I had been selected to be in the WISEST program. It's not that I didn't think I would qualify or that I would be considered, it's just that after all my last minute rushing to send off my application forms the reality of it all hit me; I had been accepted to the WISEST program!

Despite all of my excitement and enthusiasm to be going into this research program, I really only had a vague idea of what I would be doing this summer. In a way it was a lot like my attitude toward research itself I suppose, it sounds fun and exciting, but what is it really? Fortunately, I wasn't the only one with this outlook. It seemed that all of the other WISEST students felt the same way! Then I remembered that's why we were here.

Orientation day was when I first discovered a lot of things that would be useful to know over the next six weeks. Not only did I get a better understanding of the purpose and structure of the WISEST program but I also realized that making friends here would be incredibly easy and a lot of fun. Near the end of this "enlightening" day I was introduced to my principal investigator, Dr. Tom Etsell, my supervisor, Heather Kaminsky, and the other WISEST student that would be sharing a lab with me, Allison DeMan. Just from meeting these people I could tell I was going to have a great summer!

As Heather explained to Allison and I about the project she was working on, attempting to recover and characterize heavy-density minerals from the various streams of oil sands tailings, her vigor for the project was evident. She gave us an overview of what we would be helping her to do over the summer, which included performing density separations using a new product called LST Heavy Liquid, and searching for

specific characteristics of various minerals. Now I was even more pumped for my summer, as I knew that I would be helping to reach a larger goal.

From the second day, our first day of work really, I began to bond with both Heather and Allison. Immediately they were co-workers, but very quickly they became a lot more, friends.

Over the course of the summer we were allowed to see and use a variety of techniques in our research, which kept it interesting, and kept us on our toes. We helped Heather with Scanning Electron Microscopy (SEM) analysis, and we got a first hand look at micro-X-ray Diffraction (micro-XRD) analysis. The best part about this is that we were looking at the minerals that we had separated! It was exciting because seeing these other aspects of the research reminded us that we were part of a bigger research project and that we weren't just separating sand for kicks!

The WISEST program was more than I had ever imagined, and I know that my supervisor Heather Kaminsky had a hand in that. Heather went out of her way to bring in friends of hers that were involved in some of the careers that we thought might be interesting. She would set an hour out of that day to allow us to chat with them and get some better ideas about that field. For that I am so grateful. It really enabled me to see how many different avenues there are in the academic world, and it helped me to narrow down my options a lot.

Even though I usually see the summer as a time to slack off with friends, this summer was certainly the most productive summer of my life; it was incredible in a lot of different ways.

JANTINA TOXOPEUS Biological Sciences
WISEST SUPERVISOR Dr. Andrew Waskiewicz
SPONSOR Alberta Innovation and Science



WOMEN IN SCHOLARSHIP,

Engineering, Science, and Technology or WISEST was formed to encourage women to go into the more unconventional areas at the time. Many years later, it's still putting us into "unconventional" fields, although things have changed. It's no longer a problem of getting girls into science, but keeping them in science – though graduate studies and into faculty. It makes more sense because coming into the program I thought the whole principle was to encourage women to go into science. It didn't make complete sense to me because no one ever told me I couldn't do something because I was female, especially science; but a shortage of women professors is something is more understandable than what I originally thought of the program's goals.

But enough about that. This report is all about my experience as a WISEST student, and that's what it was. Working in a lab was an amazing experience, particularly my lab. I had the opportunity to do a wide range

of things, working the first week with Principal Investigator Andrew Waskiewicz and then switching to working with PhD student Patricia Gongal.

With Andrew, I worked on cloning particular sequences into vectors for use later on in the lab. We did a polymerase chain reaction (PCR) to replicate a genetic sequence, which we then recombined into a vector. We put that into competent cells and created bacteria plates from that. I also got the opportunity to sequence the gene I was looking at, which is finding the order of all the nucleotides.

Working with Patricia was an entirely different direction of lab work. We did things a little more tangible results-wise. Those things were various in situ hybridizations, which I got to photograph. We looked at the effect of the gene *tgif* on various other genes' expressions; the reason being that mutations in *tgif* are known to cause holoprosencephaly (HPE), a defect in

which the forebrain fails to divide into two hemispheres. This was the project I decided to do my poster on.

On the subject of posters, I thought one of the parts of WISEST that made it very research-like was that we had to make posters and present them. This aspect was actually one of the most enjoyable projects I've ever done – partly because I felt more important for doing it, but there were other reasons too. It was a way for me to take a look back at my work and see how it all tied together. It was also a nice challenge to make something that would be viewed by a whole range of people from family members to faculty. And, of course, I got to have fun playing with graphics.

Besides working in the lab, our pair of WISEST coordinators, Selina and Tiffany, had a variety of activities planned for us. We always had our Wednesday afternoons, which involved tours of other companies, on-campus tours of other labs, small group discussions with women in science role models, and a useful session on how to make a poster. The most enjoyable ones in my opinion were the on-campus tours because I got a feel for another type of lab, and the small group discussions because they were very informative.

The planned activities were great and usually very helpful and educational, but I think I learned the most this summer mainly from working in a lab with five graduate students who were all very friendly and accommodating to this grade eleven student. Besides learning all the new skills from doing lab work (and getting to use the most amazing technology), I increased my knowledge in great bounds about university, graduate studies, and research in general. It was one of the most enlightening summers I've ever had, and I cannot express my appreciation of the WISEST program and its sponsors enough. It's certainly an experience I will not forget in my years to come.

DANELLE TROFIMUK Cell Biology

WISEST SUPERVISOR Dr. Gary Eitzen

SPONSOR Faculty of Medicine and Dentistry / Human Resources
Development Canada - Summer Career Placements Program



WORKING AS A research assistant in a cell biology research lab...Well, I didn't really know what that meant but I was told I would get to look at cells so I figured it would be pretty rad. And, I hoped, maybe I would finally get to find out what "research" even is. It seems everyone at the University is always talking about research, but they always seem kind of confused when I ask what it is. During my six weeks at the University this summer I did, in fact, get to look at cells, and I did, finally, get an answer to my question. But I did a lot more than just that...

On my first 'real day' at work, I went up to my lab on the fifth floor of the Medical Sciences building to discover the department was gone on a golf tournament, and only the lab technician, Kelly, was around. (I began to wonder even more just what 'research' entailed). She was very easygoing and welcoming and I immediately felt comfortable, and as she showed me some basic lab techniques my anxiousness that I was

going to break everything subsided considerably. The next day, the Eitzen lab was in full swing again. The lab studies yeast cell vacuole membranes and looks at proteins involved in membrane fusion. I was investigating two actin-binding proteins in particular, CRN1 and ABP1 to find out if they are involved in membrane fusion. My supervisor, Dr. Sabina Isgandarova, tried to give me a wide scope of the lab and what goes on there, so she introduced a variety of experiments to me that are used in investigating proteins and membrane fusion. I did microscopy, (which was the "hey, cool, cells!" part,) by vacuole staining, vacuole metabolic function assays, electrophoresis, (which I was excited about, I had heard of that from Biology class!) immunoblotting, vacuole isolation assays, and in vitro vacuole membrane fusion assays, never

mind all the little things in between (...such as pipetting, preparing solutions, analyzing data...more pipetting...) I was quite surprised at how much of the high school biology and chemistry curriculum can be directly transferred to a university lab! (I was also quite glad that I had paid attention in these courses...) I enjoyed doing the experiments, looking at the results, and being a part of the research. I gained experience and learned many lab skills that I am certain will be great assets and can be applied in my future in science at university, as well as being helpful to the rest of high school sciences. But not only the technical skills will I be able to take with me, but also the experience of working with others; hearing different opinions, sharing mine, and working together. These skills will be beneficial to me in all areas of life.

I am glad that I had the opportunity to see and be a part of many different facets of research. I realized that getting the idea, looking up previous research, doing experiments, making mistakes, re-doing them, doing different experiments, something's contaminated, re-doing them...it's all part of it. I now have the utmost respect for those who work in research; the patience and passion they have in their work is admirable, and I was fortunate to have the opportunity to participate.

The WISEST summer research program was an invaluable asset to my future and to me as a person. It was challenging, informative, interesting, and stimulating, and I am glad to have been involved.

(...plus, I even had my name on the lab door. :)

I am glad that I had the opportunity to see and be a part of many different facets of research.

NICOLE TYMCHAK Biological Sciences

WISEST SUPERVISOR Dr. Maya Evenden

SPONSOR Weyerhaeuser



WHEN I APPLIED FOR the WISEST Summer Research Program, I figured I wouldn't be accepted so I didn't become overly excited about it. I knew that there were many other people out there who were better than me and I wasn't sure I would meet the requirements. Then one day Selina called me, and her heavenly little voice delivered the good news! She made it all sound so exciting! Coming from my rural town, I had no worries about city-life on my own. My only concern was being away from my friends and my parents for six weeks, but I really didn't miss them since I was always busy. Let me tell you though, the six weeks go by way too fast. You meet plenty of amazing people to make new memories with. I highly recommend life in residence!

Enough about how great the program is, let me explain why. I was placed into the department of entomology (to clarify, that means I would be studying insects), which was interesting to me since I already had a bit of a

background in this from a forensics course I took in grade 11. So I arrived at my lab the first day, and I had mixed feelings about it. Brad, Joelle, and Christina seemed super nice and appeared to have a lot of fun together but I also thought that they liked their insects a little too much. They had this small competition with each other over whose moths/caterpillars were the cutest. I thought they were crazy. Moths aren't cute! However, after watching my forest tent caterpillars grow from the tiny little larvae to the adult moths they are now, I developed a sense of pride kind of like parenthood I guess. Now I fully understand the roots behind their competition. I developed a sort of passion for the critters, as bizarre as that may sound. It makes sense to me!

In our lab, most of the work centers around four different moth pests and finding ways to control them. Maya and Christina work with large aspen tortrix (LAT), Amanda and Chris work with diamondback moths (DBM), Joelle works with ash leaf cone rollers (ALCR),

and Brad and I work with forest tent caterpillars (FTC). I have been involved with all of their projects to some extent, but my specific project deals with the effect of population density on forest tent caterpillar. From the time the project started I spent hours nurturing my caterpillars (I had some from Rocky Mountain House/Drayton Valley which is a low density area, and some from Wabasca which is high density). I kept their containers clean and replenished their supply of artificial diet when needed. I watched as they grew. It was amazing how large they were becoming. They started pupation about three weeks after I arrived. I then had to weigh the pupae and discover the sex of each, and now they are emerging as moths. It has been easy for me to see the effects that population density has on FTC from each area by looking at factors such as number of eggs/egg mass, mass of pupae, and wing area. When I wasn't working with FTC, I would mainly help Joelle sort through leaf rolls to see if the ALCR had emerged. I also went to the field a few times with Amanda to check her DBM traps. The field was a nice change from the lab, plus we stopped for milkshakes so that was a bonus!

The whole WISEST program has been an amazing experience. There wasn't one thing that I disliked. It was well organized and the planned activities were so much fun, even if I will never look at relish the same way again. Thanks to everyone (the WISEST coordinators, Weyerhaeuser, the other WISEST students, and all the kind folk in my lab) for making this the best summer I've had.

KELLY VANSEVENANDT Agricultural, Food and Nutritional Sciences

WISEST SUPERVISOR Dr. Rhonda Bell

SPONSOR Alberta Women's Science Network



I NEVER WOULD have thought that a summer job could consist of anything more interesting than flipping burgers or stocking shelves, but this year I discovered I was wrong. I applied to the WISEST program and was told about a month later that I was selected to be a part of this amazing experience.

I was placed in a lab in the Agricultural, Food, and Nutritional Science building, where I assisted Dr. Rhonda Bell in her studies. She works on diabetes research, which means she also studies one of the root causes – the growing obesity epidemic. I arrived during a crucial part of a research where we had to harvest tissues from rats for an experiment monitoring the effects of fructose intake during childhood on adulthood obesity. I helped with the surgeries, the cleansing and sterilization of equipment, and the recording of various tissue weights. After the critical part of that experiment was completed, I was able to turn my attention onto my own portion of a different experiment.

The majority of my project consisted of monitoring the effects of fructose on the size of fat cells in rats. I was responsible for staining slides so that we could see them better under a microscope. I researched different staining techniques online and was able to discover a method that was effective and easy to do (hematoxylin and eosin staining). After staining the tissues and fixing them with cover slips, I brought them to the Cross Cancer Institute for analysis. I used a microscope with a camera attached to take pictures of the cells in the tissues. After I sorted the pictures and burned them onto CDs, I used the program "Metamorph" to record the size and number of individual fat cells in each area and calculate the average fat cell size. I then gave my results to Dr. Rhonda Bell.

That was just at my routine work. The WISEST program has more to offer than just a fun and educational job. Every Wednesday at around two forty-five we would leave work early and go

on a trip to explore other realms of science than our job placement. One of my favorites was the Research lab tour. I chose a "microchip tour", and saw how scientists developed new ways of shrinking current technologies and creating new super sensitive technologies.

Another favorite part of this experience was the Fabulous Freebie Friday lunches. Everyone in the WISEST program got together and spent a wonderful time getting to know each other. I made a lot of new friends. Everyone had more or less the same interests, but we were all in different labs, so there was an endless supply of things to talk about.

At the end of the program, we were asked to create a poster explaining our supervisor's experiment and what our contribution was. It took a long time, but after hours of work I was finally able to pull it off. I didn't know that I was able to create something that looked so professional! It was a great way to piece together information and connect my little part of the experiment to the lab's contribution to humanity.

This WISEST program was an excellent experience for me. I enjoyed being able to explore the University Campus during my lunch hour. I plan to go to the U of A after I'm done high school and this was a great way to get to know my way around. I entered the program hoping to discover more information about a career in research and I learned a lot about what it actually takes to work in a lab. Thanks to this program, I have narrowed down my career options to a few select career paths. Thank you WISEST!

ALICIA VARGHESE Civil and Environmental Engineering
WISEST SUPERVISOR Dr. Mohamed Gamal El-Din
SPONSOR Alberta Environment



WHEN I FIRST LEARNED of my acceptance into the WISEST summer research program, I was not sure what to expect. I thought that I would be stuck in a lab all day by myself doing experiments. This was not the case at all. WISEST has been a wonderful experience. It has been fun, interesting, and I have learned so much. Practical experience is something that cannot be taught through reading a textbook or listening to a lecture. I have found that hands-on experience is the most effective way of learning. Working in the labs has taught me much more than just studying some of the equipment and their uses in class. Seeing many aspects of the experiments first hand has put many things I have already learned into a new perspective. This program has been designed for anyone who possesses a love for science and learning.

I was placed in the department of Environmental Engineering under Dr. Mohamed Gamal El-Din. I was lucky because I got to work with another

WISEST student, Sarah, as well. It was nice to have someone my age to work with- though, do not get me wrong, I liked working with the rest of my research team as well. Our project consisted of finding an efficient way to break down estrogen hormones found in wastewater using combinations of UV, ozone, and hydrogen peroxide. These hormones are not completely removed by traditional methods of wastewater treatment and therefore enter the aquatic ecosystem. Due to the hormones present in their habitat, the fish experience sexual abnormalities and skewed gender ratios.

The individuals that I have met during my six week stay at the University were not only the ones working in my lab, but also the other WISEST students and coordinators. The people who I worked with are experts in their field. They are passionate about their research and want to share the enthusiasm and knowledge that they possess with their students. They have shown me what research is really like at the University.

It is not just time spent reading articles, but working in the labs and conducting various experiments as well.

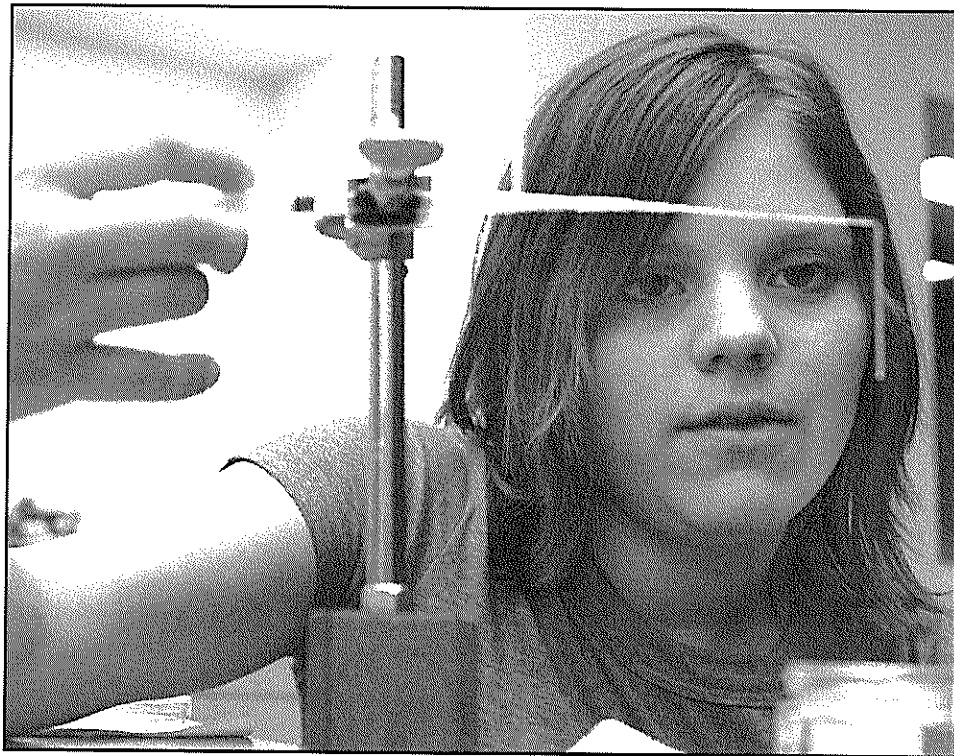
When I first started the program I was not really sure what I wanted to take in University. Through the different tours and activities I participated in at the University I was able to find out more about the opportunities available to me and allowed me to close off some options that were not what I had expected or heard about. Talking with experts in their field of work showed me what some of the jobs were really about. My involvement in WISEST has given me a feel for what it would be like to work/study in the fields of science and engineering. This experience has also helped me narrow down the types of engineering I would like to study in the future and it narrowed down other careers pertaining to the field of science. Working at the University has also made become more familiar with the campus and how it operates. This will make the first few weeks at the University easier to handle and a lot less confusing when I begin to attend school here.

This has truly been a unique experience. The knowledge and skills that I have gained through this program will not only help me in my chosen career as an engineer, but in everyday life as well. Working with others my age who were also in the WISEST program has allowed me to gain life long friendships. This program has been an exceptional environment to work and learn in and will be part of many memories that I will remember and share for years to come. I would like to thank my sponsors, research team, teachers, and WISEST coordinators for giving me the opportunity to take part in this program.

KAYLA WIEBEN Electrical And Computer Engineering

WISEST SUPERVISOR Dr. J.N. McMullin

SPONSOR New Paradigm Engineering Ltd. / Human Resources
Development Canada - Summer Career Placements Program



LAST YEAR I went to the SET program that WISEST holds every year. It was there I decided I wanted to be an engineer and also there I learned about the summer research program. I live in Fairview, a town in northern Alberta about 6 hours away so it hasn't been easy being away from friends and family, but it definitely has been a worthwhile experience.

I worked in the department of computer and electrical engineering, working on microfluidics and lab-on-a-chip technology. Basically we passed micro litres of fluid through tiny channels. To do this we either used pressure or electrokinetic flow. Lasers hooked up to computers detected signals from fluorescent micro particles in the channel. From that we could calculate velocity and many other things. The future of lab-on-a-chip is to become a small, portable diagnostic tool that could be used on the field or right in a doctor's office. Results would come a lot quicker too, almost instant. Of course it's still developing and probably

won't be seen for 5 years, but in 5 years I can say I was a part of that.

Like I said being away from home has been hard. I really missed my family and friends back home. At WISEST I made many new friends that shared the same interests in sciences and math as I do. They made me feel more at home and homesick a lot less. They also were tons of fun, especially at relay days and the welcome barbeque. There's a group of about 10 of us that ate lunch together everyday right outside Tim Hortons. We talk about our labs and pretty much anything that comes to our minds. It's nice to know how other people's labs are going and what they

are doing. Many of them, including me, are planning to attend the University of Alberta in a year or two so I already know people who will be here. I won't have to worry about being alone. I am leaving here with I know at least a few emails and hopefully will stay in touch with my lunch buddies and maybe we can have lunch again someday.

I stayed with relatives and biked 20 minutes to work every day, up hill here and down hill back. They were gone a lot of the time and I had to buy groceries and make my own meals so I got a pretty good feel for what it's like to live on my own. Now maybe it won't be quite so scary next year. Plus I already know a bit of the university's humongous campus, so maybe I won't get quite as lost.

Before the summer research program I didn't really know what type of engineer I wanted to be, if I actually did for sure want to be one. This experience confirmed that I definitely do want to go into engineering, what type is still pretty foggy. There are so many specializations within specializations it's really hard to decide. The small group discussions we had one Wednesday were really helpful in learning more about different career opportunities and the education needed to get there.

Overall this has been a wonderful experience and summer. I learned things, I made friends and I had fun. What more could you want in a summer?

At WISEST I made many new friends that shared the same interests in sciences and math as I do.

CHRISTINA WOLINSKI Chemistry
WISEST SUPERVISOR Dr. Charles Wong
SPONSOR Alberta Innovation and Science



When I first got the call to tell me I was accepted into the WISEST Summer Research Program, I was thrilled, and could hardly wait the month or so before I began my new job (my first job, I might add). I didn't know much about it, except that I would be working in the Chemistry Department under the direction of Dr. Charles Wong and his graduate students, working with pollutants in soil samples and sediment. I have to say, this was the first time I had ever been so excited to work with dirt (although the truth is that I was working with more environmental samples than just dirt, I just didn't know it then!).

My first few days on the job, I was flooded with information. I got a general sense of what my research group was working on, although I didn't quite understand most of it until I had worked in the lab for over a week. Basically, over the six weeks in which I would spend working in WISEST, I would be assisting with a number of various projects in the lab,

all having the greater goal of finding out the environmental fates and impacts of environmental pollutants such as PCBs (polychlorinated biphenyls, which were banned in the 1970s due to their adverse health effects) and pharmaceuticals on the environment.

The goal of most of the projects I was working on was to extract either PCBs or pharmaceuticals from whatever sample we were looking at, whether this sample be blended up fish from Lac La Biche (not a pleasant-smelling experience!) or water samples from the North Saskatchewan. This was done through a number of different processes, which usually involved a lot of filtration, adding solvent, evaporating solvent, and more filtering, until the sample could be put in a small 1.5-mL sampler bottle, which could then be run on either the liquid or gas chromatograph (these would separate the compounds and PCBs present in the sampler bottles, and tell us their levels). A recovery standard was also added to the samples, which we used to determine

what actual amount of the PCBs were being recovered by determining what percentage of the recovery standard was actually determined by the chromatograph, compared with the initial amount we added.

The six weeks that I spent in the WISEST program were incredible. It wasn't just the time I spent in the lab that was valuable. It was the time I spent getting lost on campus and having to learn how to read my campus map (note to self: maps do NOT work when holding upside down!). It was the lunch hours spent with the other WISEST students working in the Chemistry Department, sitting outside in the sun or posing for ridiculous photographs in our matching WISEST shirts in the CAB building. It was meeting nearly 64 other WISEST students, all with the same drive and determination (and competitiveness, as we learned at Really Really Really Ridiculously Fun Relay Days!).

To be honest, I don't think we ever really realized just how many options there are after high school. We're starting to realize that the opportunities are endless - we just have to dare to dream, and have enough faith in ourselves to stick it out, even when things don't go right all of the time.

This summer has been incredible - I've learned a lot, and I'll never forget the summer I spent at WISEST with such amazing people.

TAMMY WONG Neuroscience
 WISEST SUPERVISOR Dr. Ming Chan
 SPONSOR Alberta Innovation and Science



AS HIGH SCHOOL STUDENTS, it is not often that one will have the opportunity to work in a university lab or even visit the university campus on a daily basis. The WISEST Summer Research Program was a chance to the world of science and technology and it guaranteed a summer full of new learning experiences, allowing me to acquire first-hand knowledge in the field of neurophysiology. WISEST enabled me to capture a sense of the day-to-day routine of research in a laboratory setting. I have always been intrigued by what health sciences can offer and this program enabled me to finalize my career plans.

Being a part of Dr. Ming Chan's lab in the Division of Physical Medicine and Rehabilitation / Centre of Neuroscience has taught me the fundamentals of what scientific research is all about. The setting of a high school lab pales in comparison to that of a university lab. I learned how the equipment worked and how to properly conduct the experiments. I witnessed a sense of

teamwork prevalent in many research labs. I noticed that each member plays a crucial part in the experimental process. I realized that without my fellow "colleagues" and lab partners, I could not have accomplished the task myself – especially in the collection of data.

My experiment involved the use of a repetitive transcranial magnetic stimulation (rTMS) machine, a device which sends a magnetic pulse to stimulate the upper motor neurons, eliciting a motor response as indicated by a muscle contraction and an evoked action potential. It has been noted that this device may be used a potential therapeutic device for patients with amyotrophic lateral sclerosis. The purpose of my experiment was to investigate the effects of rTMS on motor cortical excitability in healthy patients. Focus was placed on the primary motor cortex, which determines the actions of the intrinsic hand muscles; more specifically, the first dorsal interosseous and extensor digitorum

communis muscles. Along with an electromyographic (EMG) machine that is used to record the motor evoked potentials created by the muscles after each pulse, several computer programs, such as LabView, AxoScope, and Matlab were used to analyze the data. Although 6 weeks is inevitably a very constricted time period for such a project, the experiments I have conducted will be useful in that it is the ground work for implementing new protocols in the future.

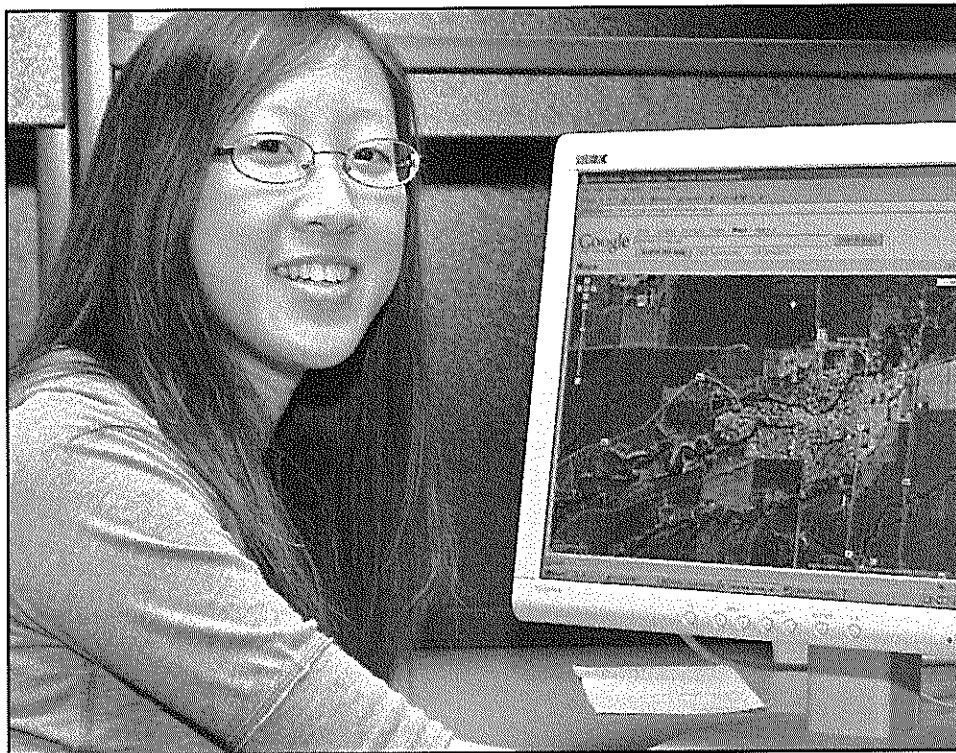
As a sub-specialist in neuromuscular diseases, Dr. Chan is also a clinician to patients at the Glenrose Rehabilitation Hospital and I had the opportunity to observe his role working in the EMG lab. EMG is used in the diagnosis of patients who have or may have neuromuscular diseases, such as ALS, myoclonus, long-term depression, or dystonia. One may have the impression that participating in such a specialized area of medicine would be tedious; however there are several aspects to be aware of – even during the experiment! Interacting with patients was enjoyable as I got to witness what I usually saw at the lab put into society. I would like to sincerely thank all of my lab members, sponsors, teachers, and especially, Dr. Ming Chan for making this possible.

In addition to meeting new friends and distinguished scientific researchers I may interact with in the future, I have familiarized myself with the university campus and become aware of what the University of Alberta has to offer. I have broadened my perception of the vast opportunities available in today's world. I will treasure these past 6 weeks, being one of the most educational summer experiences with many valuable memories!

SAMANTHA WONG Earth and Atmospheric Sciences

WISEST SUPERVISOR Dr. Theresa Garvin

SPONSOR Alberta Innovation and Science



PARTICIPATING in the WISEST Summer Research Program has been a fun-filled learning experience thus far and I can't believe that five weeks has already gone by! The WISEST Summer Research Program has proven to be more than just a summer job; it has been an experience that I will always remember for the rest of my life.

I first heard of this opportunity from my grade eleven biology teacher. The benefits of the program attracted my attention, and despite my fear of rejection, I decided to apply. When I received a phone call a few months later informing me of my acceptance into the WISEST Summer Research program, I was ecstatic. I was told that I would be working in the Earth and Atmospheric Sciences department, contributing to the research of Dr. Theresa Garvin. Before this phone call, I had never heard of the Earth and Atmospheric Sciences department before and I didn't know very much about qualitative data analysis. Originally, I had thought that I would

be working in a lab mixing chemicals or examining insects. However, I was very excited and this opportunity has proven to be such a rewarding experience. Dr. Theresa Garvin's research focuses on the interactions between technology, government and the public. This summer, my first project in the WISEST Summer Research Program was to help develop a website for the Community, Health and Environment Research lab, which was the lab I was working in. It will feature general information about the lab, the research that is being done or that has been completed and biographies of the individuals working in the lab. In addition, I have been analyzing newspaper articles in the Edmonton Journal and the Calgary Herald from the year 1999. Many of these articles were written by the Canadian Press, a multimedia news agency, and the Edmonton Journal, a local newspaper. Using software called NVivo 7.0, I spent the summer looking at the different ways the two news agencies portrayed Wiebo Ludwig and his campaign against sour gas. I

had found it very interesting and I had learnt a lot from this experience.

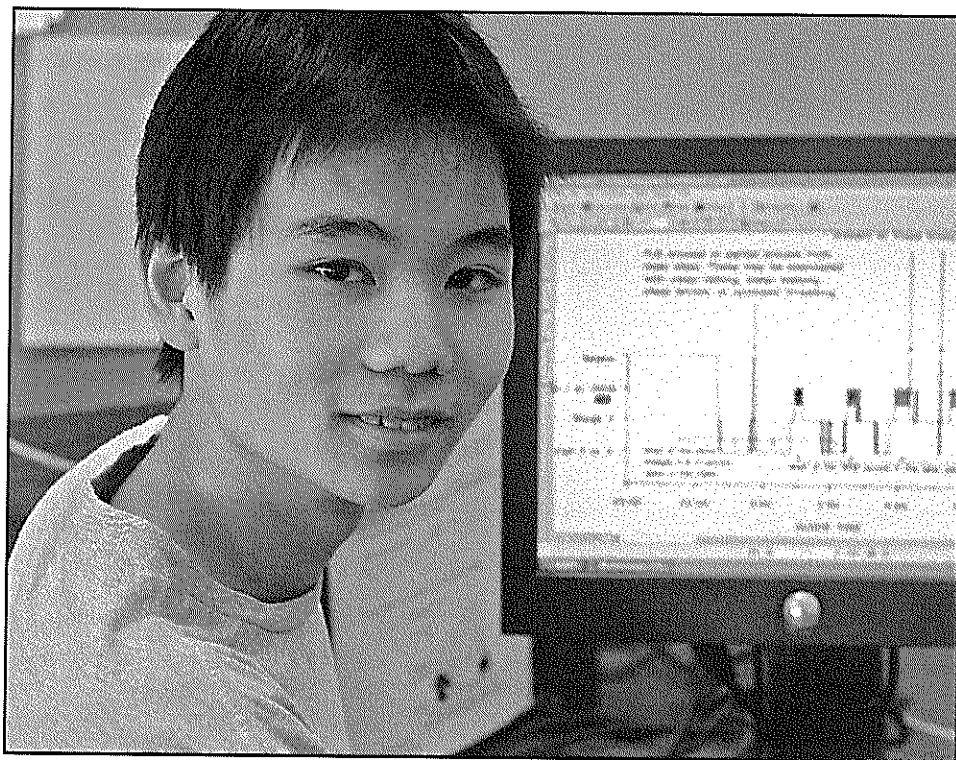
In addition to getting the opportunity to work at a University of Alberta research lab, I had the chance to participate in the social activities and the Wednesday afternoon sessions held by WISEST. There were three main social activities: the WISEST Welcome Barbeque, the Poster Tour, and the Really Really Really Ridiculously Fun Relay Tours. Each of these events was a great opportunity to meet people from all over Alberta that have a similar interest as me for science. The Wednesday Afternoon sessions, which included a Micralyne or Isotechnika tour, Research lab tours and small group discussions, were a great chance to see some innovative research happening both at the University of Alberta and in industry. As well, though the "A day in the life of a university student" session and the small group discussions, I now have a feel of what it was like to go to university and to pursue a career that is non-traditional for my gender.

This WISEST Summer Research program was a great way for me to spend my summer. However, without the help of various people, I would not have had the amazing time that I have had. I would like to thank my sponsor, the Alberta Ministry of Innovation and Science. I would also like to thank Dr. Theresa Garvin for allowing me to work in the lab and teaching me so much about research. As well, I would like to thank WISEST for putting on such an amazing program.

MICHAEL WOO Nursing

WISEST SUPERVISOR Drs. Karin Olson and Kris Martin McDonald

SPONSOR Alberta Heritage Foundation for Medical Research



WOW. This summer certainly was amazing. There were many surprises, lots of new discoveries, and also many activities to keep me occupied.

To give you some background info, I was placed into the Faculty of Nursing under Dr. Karin Olson and Dr. Kristine Martin-McDonald. During the month of July, I worked for Dr. Karin Olson at the extension building, and then in August I went over to the Clinical Sciences Building to work for Dr. Kristine Martin-McDonald.

At Dr. Karin Olson's workplace, I pulled up research or review articles from internet databases on sleep deprivation in adolescents and also adults to a lesser extent. This all was tied into Dr. Olson's project because she is doing research on fatigue in cancer patients and is trying to develop an instrument to measure it. Dr. Olson hopes to be able to help cancer patients with fatigue by assessing them properly. Also, I was in charge of making a tools table on instruments that measure sleepiness.

However, I wasn't just researching articles on the computer the whole time. I also had some field trips to the sleep lab at the Edmonton General Hospital to fortify my knowledge of sleep. There, the people carry out polysomnography by hooking some wires to people and letting them go to sleep in rooms in that section of the hospital and then recording the brain waves as they sleep. In the morning, the technicians analyze the data and determine whether the patients have a sleeping disorder. I also toured the Cross Cancer Institute and saw where people were treated and cared for, and where the researchers do lab work.

The people in my workplace here were very friendly. We even had cake on my birthday, and they all gave me a signed card. They were very willing to answer my questions and sometimes even asked me for help.

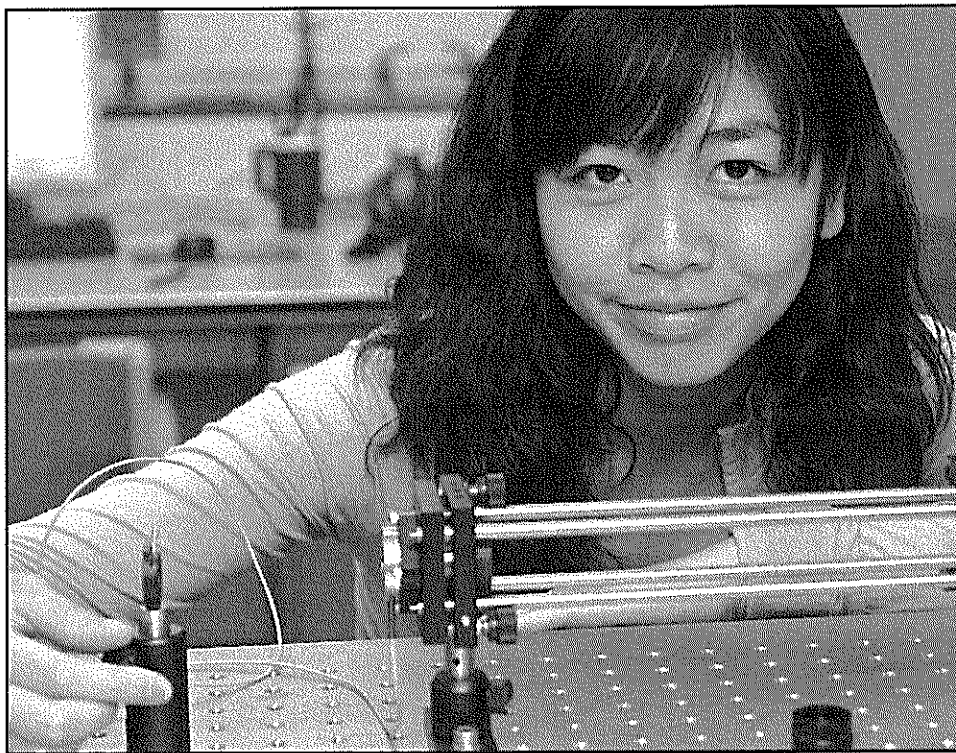
In August I moved to Dr. Martin-McDonald's office to work. She is interested in renal dialysis and kidney

disease, especially in indigenous people. I read some papers on resilience and check the transcribing of two interviews. I also attended a conference on indigenous people called Healing our Spirit Worldwide. My professor did two presentations in the conference. One was on resilience, and she presented a story of an aboriginal from Australia. The other was about kidney disease in aboriginals in Australia. It was the first time I've ever gone to a conference and I was a bit nervous at first, but gradually got more and more comfortable and started to enjoy myself as I listened to the presenters speak about their fascinating work and views on various matters.

The work conditions here were very good. My boss is very caring of her workers. My professor would insist on me taking a lunch break. Sometimes she would even have to remind me it was time for lunch. The workload was never too much, and there was constant encouragement for doing a good job. It really made me feel welcome there. I felt very happy working under Dr. Martin-McDonald.

WISEST wasn't all work and no play though. There were plenty of activities and tours that really made my summer interesting and exciting, such as the research lab tours and the Friday Lunches. I also met new friends and saw old classmates. This was a positive experience for me and the few problems I encountered only served to make me grow, not hinder me. I had my doubts at first, but now I realize I was just worrying about nothing. WISEST is certainly the best program any grade 11 student can consider joining.

ASHLEY YAN Chemistry
WISEST SUPERVISOR Dr. Yunjie Xu
SPONSOR Alberta Innovation and Science



I WOULD HAVE TO SAY WISEST has been exceptional. I knew I wanted to apply for the program ever since four summers ago when my sister was a participant. I went to her celebration of research, saw her poster and her lab, and realized the knowledge she was able to gain from the experience was tremendous.

Four years later and here I am, having been given the opportunity of a lifetime. When Selina told me I would be working in the Chemistry Department, studying chiral molecules using delicate mid-infrared lasers, I was excited, but nervous. I was not too sure what to expect. I also knew expectations would be high and I did not want to disappoint.

For the first few days of working in the lab, I was unsure of myself, slightly overwhelmed by the equipment and techniques being used, and completely in awe of the intelligent, accomplished postdoctoral, grad, and summer students working alongside

me. However, as the days continued, I began to become comfortable and more confident with the procedures of our research. With the help of my amazing supervisor, Zheng, I began to understand the reasoning behind what we were trying to accomplish.

We were studying chiral molecules using spectroscopic instruments. For my part, I was using a lead salt diode laser spectrometer to collect high-resolution spectra for the propylene oxide (PO) monomer in the mid-infrared region. Noble gases—specifically neon, argon, and helium—served as carrier gases in the experiment, as they are non-reactive and exist as atoms. By calibrating the collected spectra, we could look at the C-H stretching region of PO and find its rotational constants. Analyzing the monomer spectrum of a chiral molecule such as PO would help us to better understand its properties and therefore its abilities to interact with other molecules. The long-term goal was to study chiral discrimination and recognition, but studying the

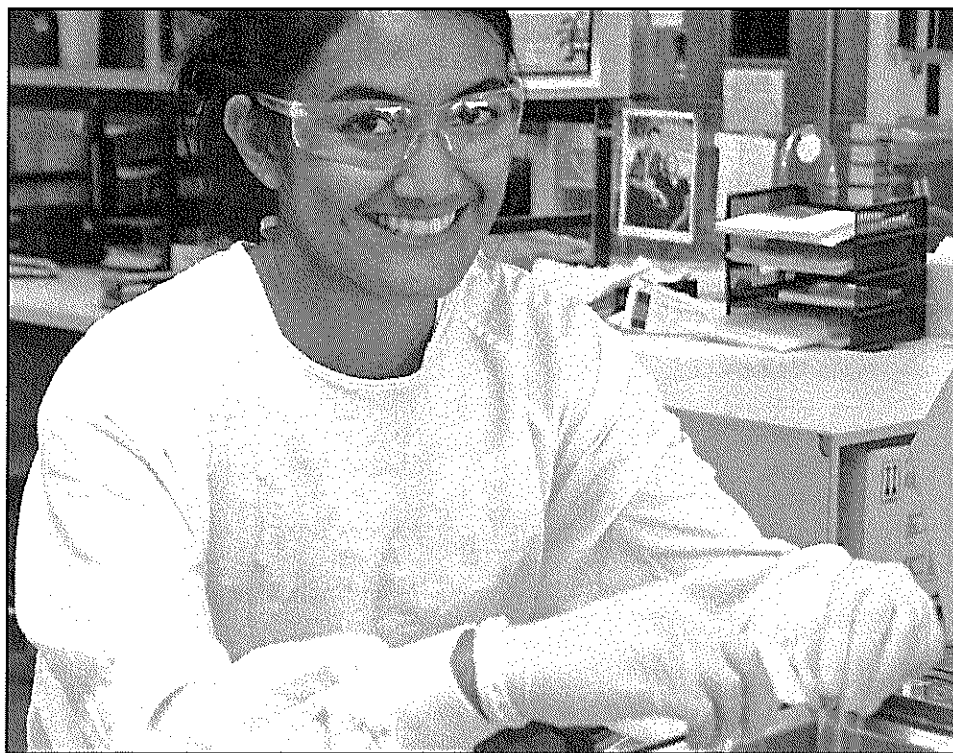
individual monomer spectra was an essential step in reaching this goal.

My experience in the lab was different—in a good way—from what I had imagined it would be. I had pictured myself working in front of a lab counter, using pipettes, volumetric flasks, and microscopes, but I now know how to handle liquid nitrogen, how to align and adjust optics to guide a laser beam, how to work a lead salt diode laser spectrometer, how to collect spectra using a LabView program, and so much more. I was able to visit the machine shop, the glass shop, and the electronic shop, all of which I did not know even existed within the Chemistry Department itself. I learned about the inner workings of a university research lab, experimenting with ideas and coping with the failures or successes of implementing new devices. Many trials and errors later, I now realize that much thought, determination, and patience is needed to run a research experiment. I have so much respect and admiration for researchers in general, because of the time and consideration that goes into developing ideas and coming up with new ways to improve results.

More importantly, I am very glad to have participated in WISEST. Not only was I able to have hands-on experience in a university lab in the presence of incredible researchers, but also I met some truly wonderful people, participated in research I never even knew existed, and was able to become familiar with a section of the University of Alberta campus.

A huge thank you should go out to the WISEST coordinators, Grace, Selina, and Tiffany for organizing all of the awesome events, and to Dr. Yunjie Xu, Zheng, and the rest of the research team with whom I had the pleasure of working. I am so grateful to have been a part of this experience. Thanks for making my grade 11 summer one to remember!

CATHY ZOLETA Laboratory Medicine and Pathology
WISEST SUPERVISOR Dr. Fiona Bamforth
SPONSOR Alberta Human Resources and Employment - STEP



THE MAGIC SCHOOL BUS. That's what I wrote about in my WISEST application essay, that and Oreos. Seriously. I had no idea what the people at the University were looking for, for all I knew they were probably looking for those crazy geniuses that you see on TV like "Smart Guy", definitely not me. So, with the utmost pessimism and doubt I applied to WISEST; they weren't going to pick me anyway, so why did I need to try to impress them with what little vocabulary I possessed, right? Wrong. Turns out WISEST had a very high tolerance of Ms. Frizzle and Mr. Christie, otherwise I would not be writing about my WISEST experience.

What was my WISEST experience you might ask? Firstly, I was put into the Department of Laboratory Medicine and Pathology at the University Hospital. There I was placed under the tutelage of Dr. Fiona (and her crazy staff) to continue an individual project based on white blood cells and their enzymes. Arylsulfatase A (ASA) is a specific enzyme in white blood cells (WBC) that

when deficient, causes a rare disease called Metachromatic Leukodystrophy. This disease changes the growth of the myelin sheath surrounding nerve fibers and causes a toxic buildup of fats in the body. ASA has been a very difficult enzyme to study and analyze due to the presence of other enzymes, and my project was to find a suitable procedure to properly measure its activity and inhibit all other enzymes. In other words, make one up. At first I was very apprehensive, I mean think about it, why would anyone in their right mind allow me to operate very expensive machinery, let alone measure enzymes.

First, I had to collect blood samples and create a single pool, and then continued to incubate, spin and wash the cells until there was only a single pellet of WBC. My assay (experiment) included homogenizing my WBC cell pellet in a sonicator and then, through a series of water bath incubations, and the addition of standard solutions I was able to calculate enzyme concentration and protein concentration by using

an UV/Vis spectrophotometer, standard graphs, and good ol' math. Along with the regular assays I was to perform, I was required to measure the sensitivity of the enzyme when diluted with a standard solution in graduated samples. I was also given the task of performing an assay on a specific cell line that was had no ASA enzymes present but still contained other WBC enzymes. This assay would help me determine whether the assay I had developed inhibits other enzyme activity and solely measures ASA.

Now my six weeks at WISEST did not just concentrate on the meticulous lab work and research, it also involved meeting new people and experiencing a world outside of a small town. I was able to see what it was really like to work as a lab technician, walk through a city hospital like I actually worked there and see a real working environment outside of the research community. Between wandering the halls of the hospital and my lab I was also fortunate enough to wander the halls of Residence.

There are not enough words to describe that old building on Whyte Ave. From the noisy Ukrainians, creepy "Randoms", Eskimos, Cracker Cats, West Ed., 80's night, House-athons, and bonding over Zach Braff, there was never a dull moment at 'home'.

WISEST opened up so many doors for me. Because of this program, I have expanded my ideas on science, gained new skills, and met many memorable people. At first, I believed that science was the foundation of this program, when in fact it is so much more. Sure, there were mistakes, sure, I wanted to smash some pipettes, but that's how I learned; and as Ms. Frizzle always says, "Take chances, make mistakes!" I'm glad I did.

PS PLEASE DON'T CHANGE ANYTHING!!!!!!!!!!!!!! I like it the way it is I'll cry ... you don't want me to cry do you?



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