

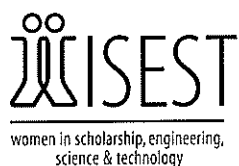
WISEST

women in scholarship, engineering, science & technology

Summer Research Program

2005 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 governmental 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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Vice-President (Research)
University of Alberta

WISEST Vice-Chair

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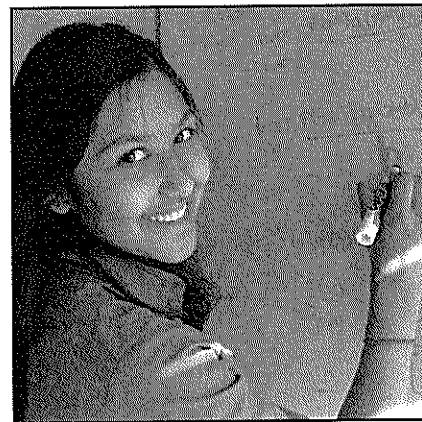
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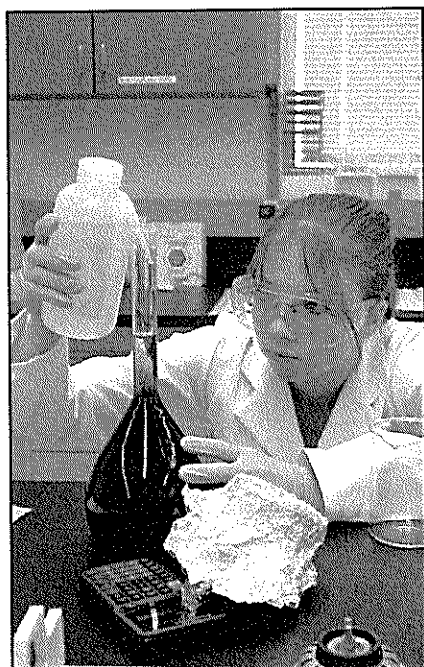
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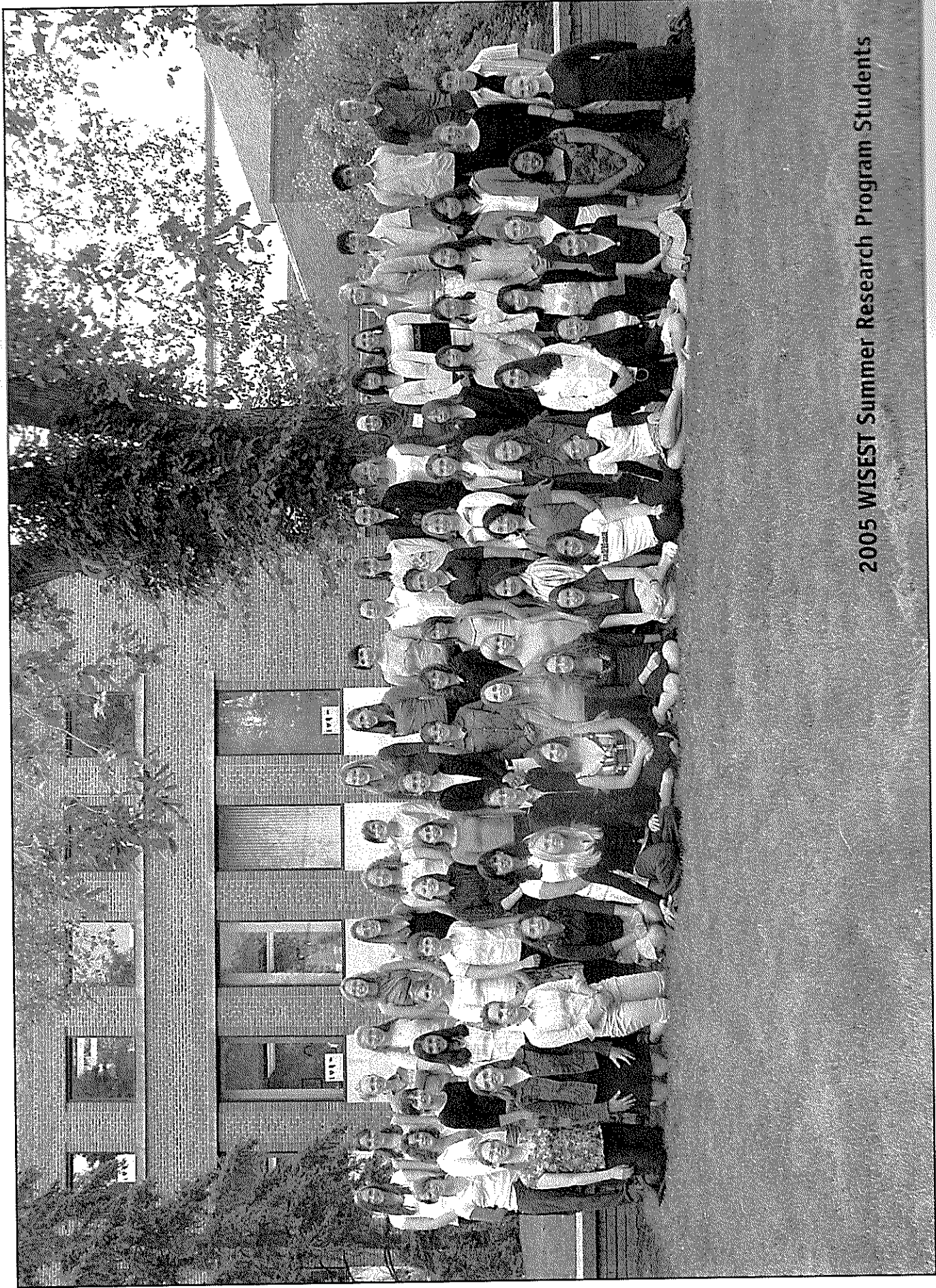
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WISEST SUMMER RESEARCH PROGRAM 2005

STUDENT REPORT BOOK





2005 WISEST Summer Research Program Students

WISEST Summer Research Program 2005

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Clockwise, from left: Gaylene Fasenko, Kim Williams, Grace Ennis, and Jenn Kelly

The Annual WISEST Summer Research Program

*By Dr. Gaylene Fasenko, Vice-Chair WISEST
& Grace Ennis, WISEST Coordinator*

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.

In the following pages you will read about the many experiences

that the students had working 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, the research career opportunities available, and they gained an introduction to academic and university life. The students also participated in a variety of weekly activities that are designed to supplement their work experience. The reports describe in their own words the six weeks of hard work, mistakes and triumphs, and the amazing discoveries both in and outside of the laboratory that are the valuable memories held by the students.

We recognize that its success is a reflection of the support of many, many people, including high school science teachers, faculty supervisors, research team members, and WISEST Partners and Contributors. Many, many thanks and words of sincere appreciation to all high school teachers who spark their students' interest in the Program, and to all research team members who mentored, guided and encouraged the WISEST students to explore their interests.

WISEST genuinely thanks the many local industries, philanthropic groups, the Provincial and Federal governments, and the University of Alberta for their financial support in the 2005 Summer Research Program. The students are paid an hourly rate 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. A detailed list of the WISEST Partners and Contributors is included in this book and on our web page www.wisest.ualberta.ca

WISEST
women in scholarship, engineering, science & technology



Kim Williams and Jenn Kelly

Who Do I Want To Be?

By Kim Williams and Jenn Kelly

We remember drawing WISEST Orientation signs on the sidewalk with chalk at six-thirty in the morning like it was yesterday. We remember being anxious as we waited to meet the seventy of you that we had already read so much about, yet had no idea what actual physical entities would arrive when we finally met you! We were nervous as you began to enter the solarium of the Engineering Teaching and Learning Complex, until one of you yelled out 'who loves perogies' and from that moment on, we knew everything was going to be okay. The adventure had truly begun.

This summer allowed you to ask yourself the question, as you get ready to enter your final year of high school, 'who do I want to be'- a question that both your student coordinators are currently asking themselves. Jenn, just finished her second degree and Kim was trying decide on what her second degree should be. Both were also venturing into a new dimension of life. This was a time of self discovery for all of us.

We got to watch you dive into the world of science. We got to see you make the leap- yes it was a leap- into research, into university life and into

completely new experiences. The young women of the program gained experience in science, engineering and technology and the four young men became involved in areas of research that were "unusual" for their gender, nursing and nutrition. Through this process we got to see you grow from nervous, soon to be grade twelve students, into confident scientists with increasing expertise in your area of scholarship, engineering, science and technology. You got to learn in many facets. You got to learn not only by being a part of a research team, but by participating in the many Wednesday Afternoon Activities and Social Activities that took place throughout the summer. The exposure that you have attained in the past six weeks is something that you will always remember. This summer is something that we will all always remember.

Students think back to those who have given you guidance, time, energy and provided you with insight- your role models, your supervisors, your families, your teachers and your friends. Without them, this program would be lost. Remember to respect their faith in you. Remember

those who have been our sponsors and contributors. Without their investment we could not exist. We could not bring you here on campus to learn and to grow. We need them. But, above all, remember what a wise University of Alberta President once said to you- listen to your heart- you have been given guidance, but it is your heart that will lead you in the right direction.

This year has also been a transitional time for WISEST. It is the end of a miraculous era, lead by an amazing women who is to us a leader, a role model, a hero and a friend. Dr. Margaret-Ann Armour is a woman who has truly put her heart and sole into this program. Even in retirement, she is still working towards increasing gender diversity in the sciences. Her legacy will be continued by our new Vice-Chair, Dr. Gaylene Fasenko, who, like Dr. Armour, will continue to pursue equality, for women and men in non-traditional roles within our society. We look forward to the new directions WISEST will grow into under the direction of Dr. Gaylene Fasenko. We know that many of you will be hesitant to leave the past behind as your final year in high school closes, but look forward to this new stage, to the future. This is a feeling that WISEST also shares with you.

"Life is not about the number of breaths you take, but about the moments that take your breath away." You have all taken our breath away with your ability to tackle problems as they arise, to handle difficult situations with your maturity, to ask intriguing scientific questions, to work so hard and to appreciate the opportunity that has been given to you. Your ability to trust and have faith in yourselves is inspirational. You are all so real, so full of life and of course, so fabulous. Thank you for not only growing yourselves, but for also helping us, your student coordinators, to grow with you as well.

Thank you everyone for such an amazing summer. Be passionate, be proud, just be!

WISEST Welcomes Dr. Gaylene Fasenko to the Vice-Chair Role

WISEST is very happy that Gaylene has accepted the leadership role of Vice-Chair, bringing her enthusiasm and commitment to the goals of WISEST. Gaylene has been involved as a supervisor in the WISEST Summer Research Program and with the WISEST university student-led group, UA-WiSE, from the time that she was first appointed as an assistant professor. As well as being the mother of a young daughter and a newborn son, Gaylene has been an Assistant Professor in Poultry Embryology and Chick Quality in the Department of Agricultural, Food & Nutritional Science at the University of Alberta since early 2002.



Dr. Indira Samarasekera and Gaylene Fasenko

Dr. Margaret-Ann Armour Retires as Vice-Chair WISEST

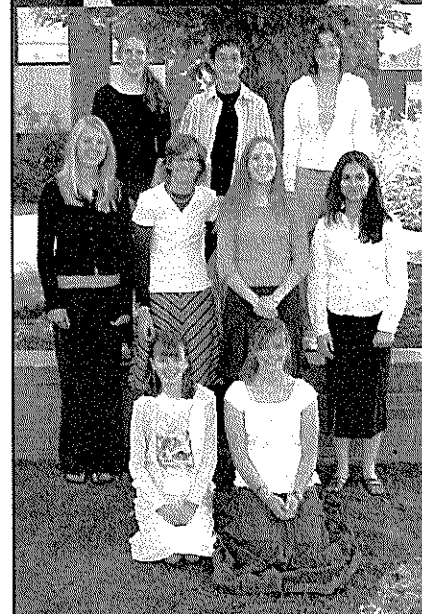
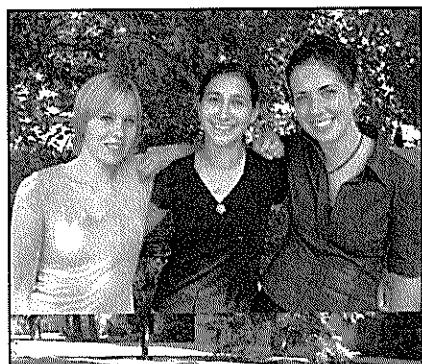
Margaret-Ann has been the driving force in the evolution of WISEST from the time of its creation in 1982 by Gordin Kaplan and she has received numerous accolades for her many contributions to the encouragement of women in science. She has recently retired as Vice-Chair WISEST and is now excited to continue on in a post-retirement role in the Faculty of Science, building on the initiatives of WISEST, initiatives designed to persuade members of the pool of women highly trained in science that they would like to work in academe, especially at the University of Alberta.



Photo Credit: Macleans

WISEST

Our Thanks to the 2005 WISEST Partners & 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 Research Council
Alberta Women's Science Network (AWSN)
Allard Foundation
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- Faculty of Agriculture, Forestry and Home Economics
- Faculty of Engineering
- Faculty of Medicine and Dentistry
- Faculty of Nursing
- Faculty of Science

Weyerhaeuser

Contributors

BPTEC-DNW Engineering Ltd.
Ms. Esther Ondrack
Lehigh Inland Cement Ltd.
New Paradigm Engineering Ltd.

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 \$2,000 per student. The money is used to pay the students an hourly wage, the costs 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.

Phone: (780) 492-1842

E-mail: wisest@ualberta.ca

Website: www.wisest.ualberta.ca



☐ **YES, we would like to become a Partner of the 2006 WISEST Summer Research Program.**

We will sponsor _____ student(s) at the \$2000 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:** _____

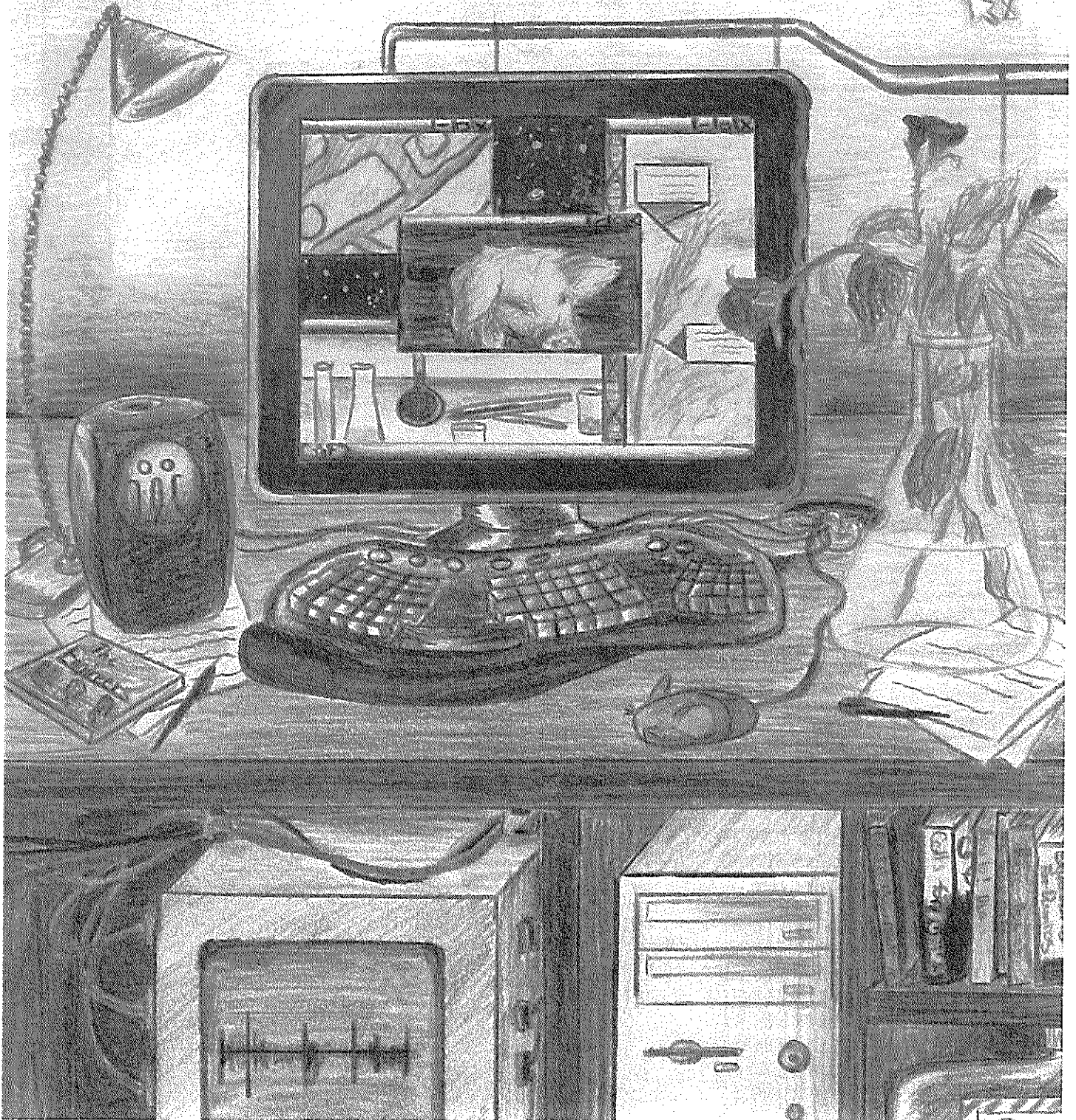
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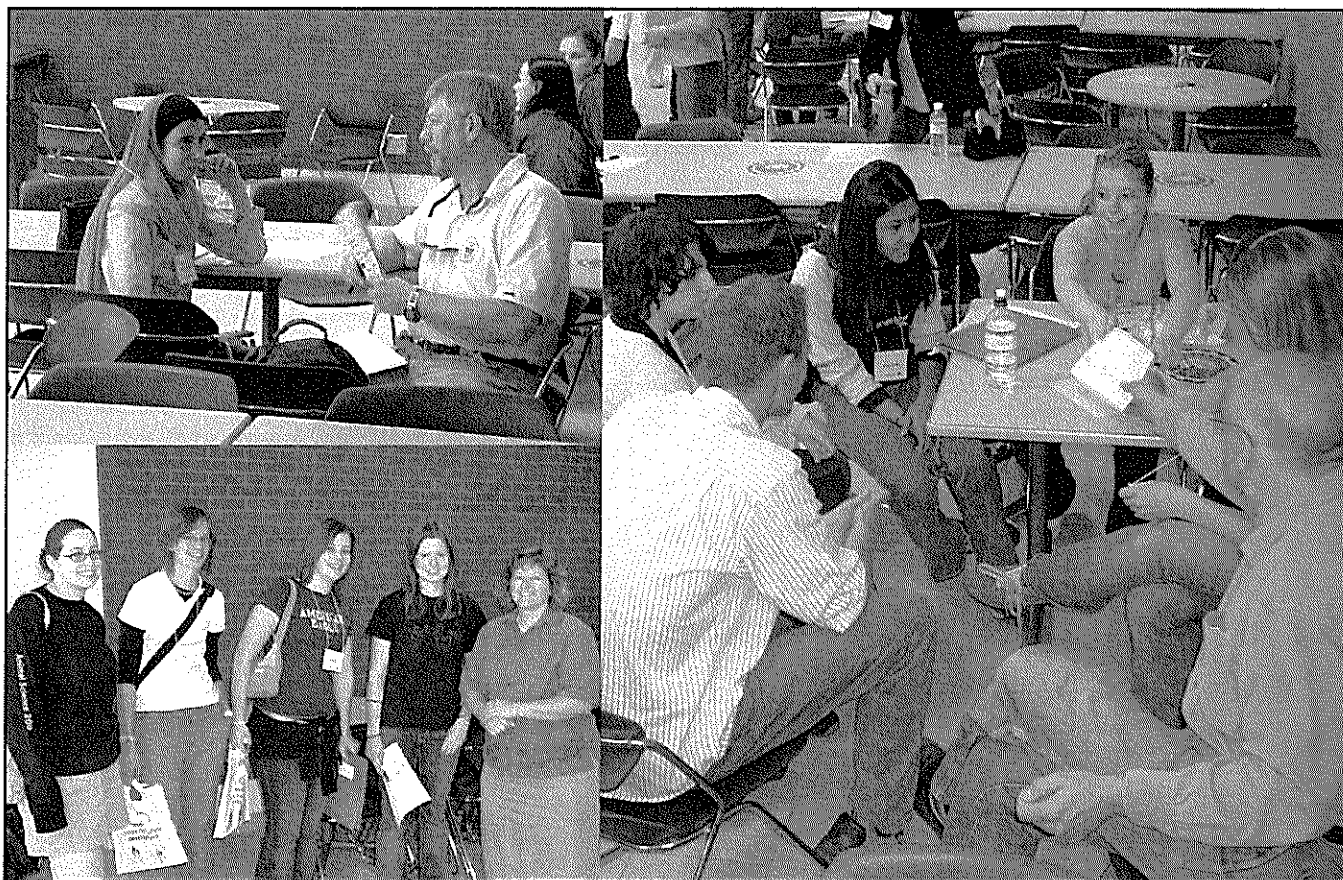
2005

women in scholarship, engineering,
science & technology

→ Student Reports

WISSEST





What A Day!

By Amanda Brewer

I remember how intimidated so many of us were by that day, by the fact that we were about to plunge into such foreign waters. We were faced with waking up and strutting into the Engineering, Teaching and Learning Complex, and meeting 69 other WISEST students, as well as Jenn, Kim, Grace, and the many other people involved in the coordination of WISEST. We were stuffed full of information all day long, things like WHMIS and safety procedures, not to mention the 70+ names we were learning!

Some of our first activities of the day were ice breakers set up by Jenn and Kim to, well, break the ice! We had to move around the room and talk to different people and start to get a feel of the other students that were involved in WISEST.

From there we had a great lunch, visited some more with our peers, then progressed to being introduced to the coordinators and the material we were going to learn that day.

One of the people I was very excited to see there, and to get a chance to talk to was Margaret Ann Armour, who helped establish WISEST. The reason I was so intrigued by this was because she was in my Chemistry 20 textbook for her work in chemistry research. Dr. Armour did the presentation on workplace safety and WHMIS. She did a wonderful job of explaining new concepts to us as well as giving us a quick review of some we had studied in school.

We even got to get a little bit of sun during the orientation; we were toured around campus by some students who have been going to

school at the U of A. That came in pretty handy, seeing as we had to find our way around campus by ourselves for the next six weeks!

The day ended with what, in my opinion, was the most exciting part... we got to meet our research teams. We had been given contact information, and some people had even gone to the lengths to have already met with the professor they would be working with. However, the majority of us were very anxious and curious to meet our team and see our labs.

Once orientation was over, and our brains had absorbed the information we had just been given, I think most of us were longing to get back on campus and start work the next day.

Off-Campus IBM Canada Workshops

Wednesday Afternoon Sessions By Alexandra Dosser

Our first off-campus Wednesday session was at IBM Canada. As we enjoyed some delicious cookies, we had the opportunity to learn about positions, mostly in the Information Technology sector, which would be open to someone with a science, engineering, or math degree. We also learned that there are many positions which need skills beyond a degree, such as good social skills for a position in Customer Relations. However, the best part of the day was meeting some fun, dynamic women who were all passionate about their careers and who encouraged us to follow our own professions in science and technology.

After some quick introductions, we participated in a role-playing exercise. In each group, we needed to choose

team managers, design teams, and time management professionals. The goal was to plan a web page, using a set budget and with limited time. We needed to consult the (rather picky) customer, to get their feedback and to verify that the design was what they had in mind. Groups needed to keep track of their timeline, as well as the budget, and everyone needed to collaborate to ensure a good finished product. Everything went smoothly, and groups had just finished their rough outlines when we hit our first dilemma. Suddenly we found ourselves pushed out of schedule when the "customer" told us about radical time and money cuts. This was the real challenge: to realize the same quality product with less resources, and without having to go back and

redo the work that had already been completed. We had to think on the spot and work quickly, but in the end all of the projects were completed on time. One group even finished early, and got a tour of the IBM building.

When all of the separate groups were back together, we discussed what we had learned. Foremost were teamwork and cooperation; nearly every group mentioned working together as being the most important part of any project. Other points were communication, time management, and compromise with the customer. At 4:30 we headed back to the University, with some new green pens in our backpacks and quite a bit more to think about than we had when we left. It was great to meet women who hold important positions in non-traditional fields, and to see the kinds of jobs we could have in the future.

Small Group Discussions

Wednesday Afternoon Sessions By Ariel Hendin

Throughout our WISEST experience, we had learned more about working in research and about the types of careers we wanted to pursue. However, halfway through the program many of us still had questions – what if we didn't know yet what we wanted to "do" as adults? How could we obtain the necessary education and experience to help us develop our careers? These questions and more were addressed one Wednesday afternoon, at a very valuable Small Group Discussions activity. The 70 WISEST



students were divided up into ten groups, each led by a moderator accompanied by five role models. All were women who had followed career paths which are still considered to be "unusual" for females – they worked in fields such as engineering, industry, and biochemistry, to name a few. After some brief icebreaker games, we settled down to glean some information about the working world from these knowledgeable women. After hearing about the varied positions which they held, they told us about their experiences in sometimes male-dominated fields and about the decisions they had made in terms of their education. The conversation flowed naturally as the role models were open and forthcoming in offering advice and information.

This session was invaluable to all of the WISEST students because



it provided an opportunity for us to meet women who worked in professions which many of us had considered, answered questions we may have had about developing our own careers, and inspired us. A common message that the role models stressed was to find your passion and work towards a career in that area; it was interesting to see the variety of fields about which these women were passionate. This was one of the best Wednesday afternoon sessions because of the information which we took away from it. Thank you to all of the role models and moderators who volunteered their time to help us find out more about our futures by telling us about theirs.

On-Campus Research Lab Tours

Wednesday Afternoon Sessions By Jennifer Huygen

As WISEST students, we often find ourselves cooped up in our individual labs and buildings for weeks on end, digesting the facts specific to our projects and faculties. That's one reason why everyone welcomes the Wednesday afternoon sessions, and in particular, the second last session that was held – the on-campus research lab tours. On Wednesday, August 3, the 70 WISEST participants split up into 11 groups and headed for different labs all over the U of A campus. These included tours in: biomedical engineering; medical microbiology and immunology; medical genetics; obstetrics, gynecology and physiology; mechanical engineering; agriculture, food and nutritional sciences; chemistry; chemical and materials engineering; genetics; electrical and computer engineering and obstetrics and gynecology. The activity provided us all with the opportunity to experience a lab setting other than the one we were working in. As they say, "variety is the spice of life", and that's why all the students rushed to sign up for a diverse tour that appealed to their interests.

The groups of five to seven students wandered off through the university to a specific meeting location, where we were introduced to our guides. They walked us through their labs and gave a detailed overview on their projects – which ranged from MRI research on brain chemistry to understanding disease-causing proteins. We had the opportunity to ask questions and to really see what goes on behind the scenes in established labs working on the newest technologies. Explanations on the equipment used and the methods employed were enlightening and interesting, plus the small group atmosphere encouraged a lot of discussion. The guides were very informative and gave us a great deal of access to their labs...access that we would not normally get!

So what did everyone think of their experience...?

Tour in Medical Microbiology and Immunology: "I found the on-campus lab tour to the lab of microbiology to be a fascinating, educational experience. I was able to learn about the research area of proteins and their implications in the industrial and pharmaceutical field."

– Amanda Leong

Tour in Chemistry: "It was fabulous. We took part and witnessed many mini-experiments and had a chance to visit the resident glass blower."

– Dani Wiebe

Tour in Chemical and Materials Engineering: "We got to see labs undergrad students use in engineering. We saw distillation systems used in industry and it was very enjoyable."

– Rachel Duncan

Tour in Agriculture, Food and Nutritional Sciences: "It was fun! We got a chance to visit many of the amazing greenhouses and learn about the various research projects."

– Kate Jefferson



Off-Campus Tour - Micralyne

Wednesday Afternoon Sessions By Anna Salim

I had heard of micro and nanotechnology before but the idea of technology on such a minuscule level sounded like fairytales to me. A trip to Micralyne made it real for me.

On August 10, the WISEST students got a chance to go to Micralyne, which is one of the leading companies in the field of Micro-electro-mechanical systems, or simply MEMS. On arriving there, we saw a presentation that answered some very basic questions about MEMS and what Micralyne does

We learnt that MEMS are extremely small devices that are only a few microns in dimensions. A micron is only one thousandth of a millimeter so they are fairly small. They are used in air bags sensors and optical switches and they are being developed for use in the field of medicine as well. Because MEMS are

so tiny, chemical reactions occur inside them at faster rates so drug testing that takes very long can be carried out in much shorter time periods. Also, MEMS devices could be installed inside human beings with reservoirs of medication inside so that when the device detects a low level of some chemical, it releases the drug by itself. We were also told how very small mirrors can be used to reflect light and transmit signals. The presentation also shed some light on the processes used to create MEMS such as micromachining and thin filming.

We also learnt about the history of Micralyne. Micralyne spun off from the University of Alberta and became an independent company in 1998. It manufactures MEMS devices for companies around the world and is one of the few companies providing this service.

After the presentation, we all divided into smaller groups and toured the Micralyne laboratories. Since the work is done on such an infinitesimal level that dust particles are monstrously large and can cause problems, most of the rooms are Class Ten Clean. This means that extreme precaution is taken to make sure dust particles do not enter the room. Fans rotate constantly to keep dust out and all the people that we saw working on our tour, through the windows, were decked in white from head to toe. They wore special suits, masks, and goggles. It looked like a scene right out of some sci-fi movie.

Afterwards, our tour guide, who was a female electrical engineer, answered the questions that we had, and everybody joined in refreshments.

All in all, it was an excellent WISEST activity and even though I would not say I have fallen in love with MEMS technology, it was very interesting to see science in the workplace.

Off-Campus Tour - Dow Chemical Canada

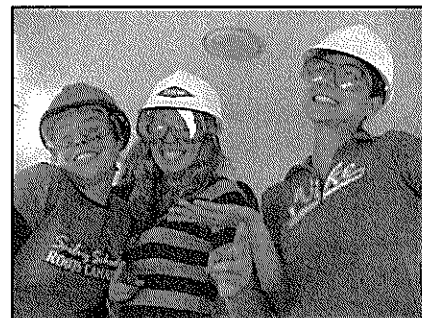
Wednesday Afternoon Sessions By April Boyko

As our summer began closing in, we were given the opportunity to see some research in action at a major corporation. We had the choice to tour either the Dow Chemical Plant in Fort Saskatchewan or Micralyne in downtown Edmonton.

The bus ride to Dow was filled with conversations between thirty-five girls, all eager to talk about the up coming celebration of research and their plans for the rest of the free summer. When we arrived, we were warmly greeted and escorted to a conference room. In a very informative session, we learnt about some of the different commodities Dow produces and how many of them we use in our day-to-day lives. We also learnt about several careers that were specific to their line of work, and the role that research takes in the company and how it is a vital key

for success. We were encouraged to contact Dow after the tour and sign up for one of their many educational programs to help us with our career decision-making.

On our way to the bus, we were given safety gear, which made for some very interesting photographs. Our tour guide, Dr. Mary Fairhurst, works in the Research and Development lab on site, and she was very willing to share her experience with all of us. Our bus made its way around the manufacturing site and we were shown how all of the different set-ups were connected together to provide the most efficient system possible. We were then given the privilege of touring the polyethylene plant. We were split into smaller groups to make the tours more personal. We were shown many different products are made out of polyethylene, and



we were each given a piece of the very cool plastic. To our surprise it stretched A LOT! On the back, some girls almost managed to stretch it from the back of the bus to the front! We proceeded on our tours and saw the control room, the end product from the plant that is shipped to the customers, and how it's tested for quality.

The tour was an awesome experience; it was a great way to bring some closure to the Summer Research Program. It gave us a much broader perspective on why research was so important in the real world, and gave a few of us an inkling of the possibility of returning one day for a much longer stay.

WISEST Final Event - Teachers' Day

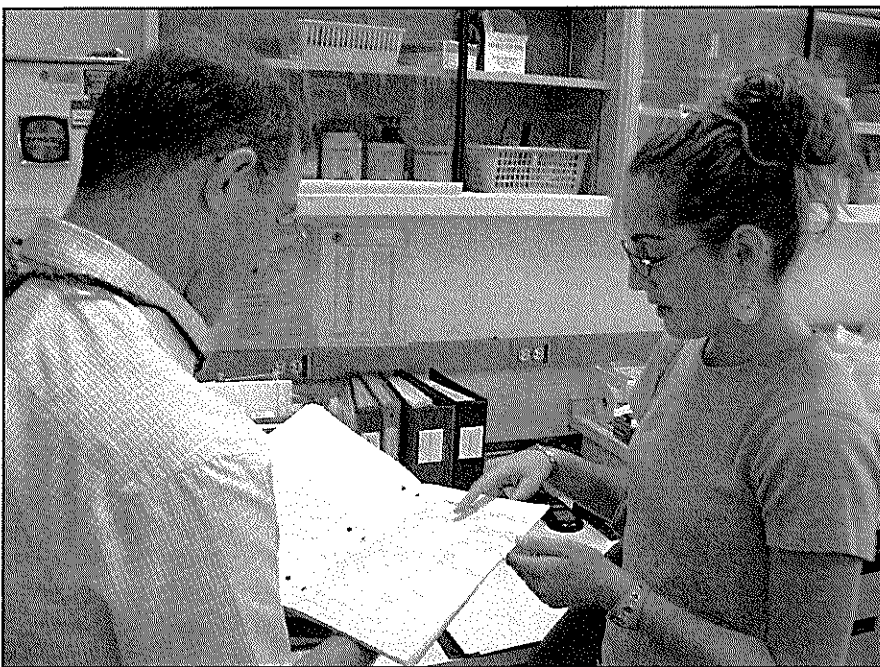
By Grace Ennis



High school teachers have an integral role in the success of the WISEST Summer Research Program. As a result of the encouragement they give to their students, and the supportive letters of reference required in the application process, WISEST has been able for the past twenty years to recruit the enthusiastic students who have the needed energy, curiosity and creativity to succeed in the WISEST Program.

WISEST invited high school science and math teachers on "Teachers' Day" to explore leading edge scientific and engineering research areas at the University of Alberta. Research areas included: Chemical Ecology and Entomology, Computing Science, Engineering, Soil Ecology, Synthetic Organic and Bioorganic Chemistry, Nanofabrication and Zoology.

Dr. Marjorie Wonham, Post-Doctoral Fellow in the Departments of Biological Science and Mathematical and Statistical Science spoke to the teachers about her research which combines math and biology to create mathematical models of biological invasions. After another round of tours to the various research areas, the teachers joined the WISEST students in their labs to get a first-hand look at the research experience.



Research Team Thank You

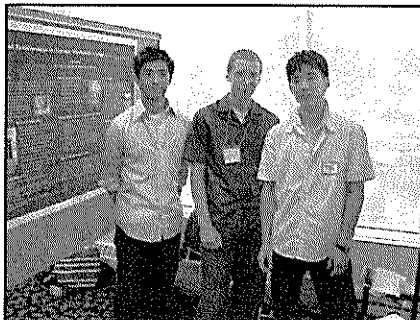
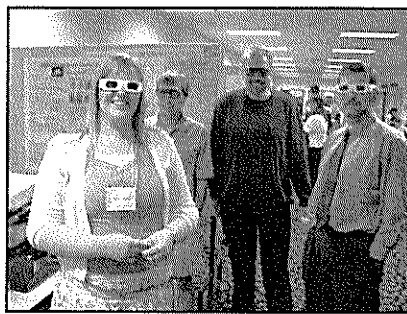
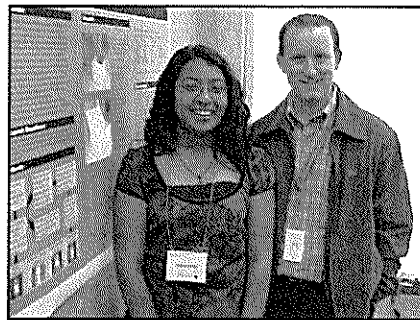
WISEST Celebrations By Dani Wiebe

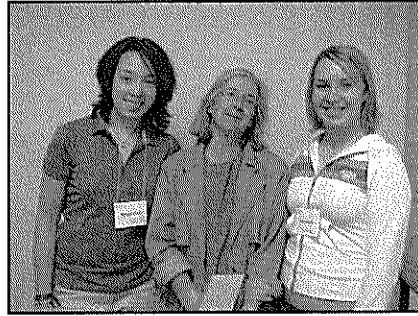
My Mentors, My Friends

The Research Team Thank You took place on the morning of August 12th. Everyone was dressed up and was anxious to show off their unique projects to family, friends, and co-workers. During the summer I had the amazing opportunity to work in a Computer Science lab with some exceptionally fabulous people; which brings me to the reason that I wrote this article in the first place. Our Research teams! Where would we be without them? None of this would be possible without the support, and dedication of each and every research team. This year, WISEST took on 70 students. 70 students! That

means that for every WISEST student, there was an awesome research team guiding them and teaching them every step of the way. You can really learn a lot about a specific area of research by looking at the people who work there. Through the past six weeks, I've had a chance to learn so much. When I was applying for WISEST, in an essay we had to discuss everything that we believed we would get out of this program. On a whim, I wrote down the stereotypical meet new people. In the past six weeks, I've had a chance to really get to know my research team. They are all really great people with such big hearts that were very kind and fun

to be around. They even had a joke or two to share. The truth is we owe so much to our research teams for giving each and every one of us the opportunity to learn, and to grow as individuals this summer. It's hard to express in words the gratitude that I know we all feel towards them. For me, the research teams aren't like my usual teachers in school, they are more like mentors, and friends. I know that I will take with me forever the lessons I've learned and the memories I've shared with these extraordinary people. I'd just like to say one last thank you to them, they made this experience even more wonderful than I ever could've imagined.





Celebration of Research

WISEST Celebrations By Emma Rapati

I will always remember the eve of the Celebration of Research when I sat and talked with my new found friends about the end of the program. But with this sad realization also came fond recollections of the past six weeks. Not only did we remember our past weeks and research, but looked forward to the future and keeping in touch with our friends.

The Celebration of Research did well in demonstrating each of these points. As we arrived and started to set up our posters we got a chance to learn about what everyone else had accomplished during the summer and we found out how much knowledge we had actually acquired in our own field. Though the topics of our posters ranged from computer programming to the medical sciences, from mathematics to agricultural research, they all had a lot of hard work put into them. We had been working in our different labs we learned different scientific procedures we could use later in life, and what

it is like to work on a research team and complete a project. All of this was on display, in our research posters, in how we presented them to our family, friends, sponsors, and those who were interested in what we were able to accomplish. Seeing all of the great work and research my peers had accomplished was definitely a highlight of the program for me.

The afternoon of celebration also included a small program of important and inspiring words dedicated to both these who organized, sponsored, and who took part. The first to speak, our Master of Ceremonies for the afternoon, was Gaylene Fasenko, the new Vice-Chair of WISEST. After welcoming all of the students, parents, and sponsors to a celebration of the past six weeks of research, she introduced two students representatives Westerly Luth and Annemarie Woytkiw who thanked our parents, sponsors, and research teams. They also had kind words for our great

coordinator and student organizers. Next to speak was Dr. Peter Hackett, President and CEO of Alberta Ingenuity. He had many inspiring words for us graduates of the WISEST program, speaking of the need for the ingenuity of the youth in the future. His words, 'enslave yourself to compass and chart, gain the freedom of the sea', were meant to inspire his audience to remember that advancements in society have all come from problem solving, research, and ingenuity and that those characteristics will always be needed in the future. I, at least, believe they worked. The final speaker was Dr. Indira Samarasekera, the new president of the University, and a woman well fit to close the program in her own right. With a B. Sc. of Honours and Masters Degree in Mechanical Engineering and a Ph. D. in Metallurgical Engineering, she spoke about her life choices and advised all to follow, not only your head, but your heart as well. She believes that if you follow your passions, you will find yourself not only happy, but successful as well. And so, with those final words of guidance and advice, we were given our final assignments; to use our knowledge and ingenuity to make a difference and to use out heart and passions to find our own way to do so.

Finally, in a day that seemed to just fly by, it was time to pack up and say our goodbyes. It seems funny sometimes, how in only six weeks, you can become such good friends with others by merely saying a few words and spending a bit of time with them. At the end of the day it was time to roll up our posters and head out. Promises were made to keeping touch and meet again, but after that there was nothing left to do but exit.

Work done and presentations made, it saddens me to think that our duty here is finished. With new people met, knowledge gained, and memories made that will last for all our lifetimes, the last thing on our list was the Calibration of Research. But it was definitely much more than that, a celebration not only of our research, but of the WISEST Summer Research Program, or new relationships and of our brighter futures.

Life In Residence

WISEST Student Experiences By Corinna Stevens

Living in residence is different than living at home. First of all personal privacy greatly decreases, depending I suppose on how private your family is, sleep deprivation is common and the food is definitely not your mother's cooking.

To help all future residents, whether in WISEST or university, we, the St Johners of WISEST 2005 have compiled a list of things to watch out for and to not be worried about.

Be aware that:

- The fire alarm may go off at two o'clock in the morning and yes you do have to evacuate and yes shoes are a good idea. Do not worry: you only have to stand outside in your pajamas for a few minutes.
- There are dumpsters in back alleys that need to be emptied. If you're lucky, you can enjoy a free wake-up call to the wonderful sound of garbage pick-up.
- There are no parents. Therefore go shopping whenever you please, stay up as late as you want, and it is your choice whether or not you shower, although for the sake of fellow residents, in particular your roommate, shower regularly, or use lots of deodorant.
- The majority of males do not know how to do laundry. It is the responsibility of knowledgeable females to ensure white shirts do not come out pink. However if you don't like him...
- Girls will be girls, so midnight hair make-over parties are not unusual. Take plenty of pictures and join in if applicable (i.e. you're a girl).
- Food prepared in the cafeteria is made in bulk and therefore cannot compete with Mom's cooking. Try not to compare. For those staying at St. John's Institute you will be pleased to know that the food is among the highest grade when compared to other residences.
- Your RA is there to help. They are a fountain of information and discounts at bulk prices. Take advantage of your replacement parent.



Now that you are prepared to live in residence, here's a little bit about our WISEST experience at St. John's Institute.

Located on Whyte Ave, a mere five to twenty minute walk (depending on lab location) to the University of Alberta, St. John's is an enjoyable place to spend your summer. People you know for six weeks feel like family and essentially that's what you become. From early morning Birthday wake-up calls to late night N64 tournaments, living in rez is like living in one big happy family with the RA at the head of the table.

We happened to have the most adorable RA, Selina. Her enthusiasm was contagious and we ended up with faces full of flour and noses gunked with Vaseline after her planned 'Relay Days' of games. We all drew names out of a hat and dressed up a fellow St. Johner for the occasion. Thanks to Selina we

also got reduced rates at the Water Park and K-Days. All a part of the Edmonton experience.

Residence formal involved a trip to Jubilations Dinner Theatre. The show and actors were amazing! The acting even carried over to the waiters and waitresses, who dressed and acted cowboy style! It was a great time to hang out with people you spent the last five weeks with. Of course, this brilliant night ended up with everyone getting very wet running home in the pouring rain. But it was worthwhile anyways.

Residence life is definitely another type of living, one worth living at least once. Part of growing up is learning to eat weird food and sharing a bathroom with twenty some odd other people. Privacy is overrated.

The consensus at the end of the summer is that staying at St. John's was worth every penny and missed night of sleep.

Life at Meanook Biological Research Station

WISEST Student Experiences By Alena Parkinson Edit. by Jenny Lau & Christina Buelow

Living at Meanook was awesome!! Three WISEST students were there this year – myself, Jenny Lau and Christina Buelow – and we all agreed that we loved living at Meanook.

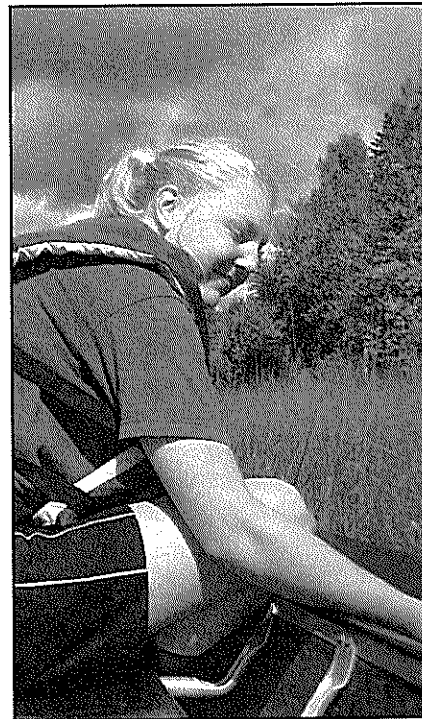
Meanook Biological Research station is 15 kilometers south of Athabasca. At first, I was afraid that I would get bored living off in the ‘middle of nowhere’. However, I had a lot more fun here than I would have at home, and it’s not really the middle of nowhere. Trees, plants and wildlife surround Meanook. It is gorgeous here.

The food here was terrific, though we didn’t have to cook. Our very own professional chef made dinner for us, and we ate the leftovers for lunch. Sometimes there would be cinnamon buns or pancakes for breakfast, and

other days we would eat cereal. After dinner, everyone helped clean up. We also had weekly duties – cleaning the washroom or organizing the recycling.

The WISEST students were included in everything that happened at Meanook, which was really nice. When we weren’t working, we watched TV or movies, did crosswords, read, played soccer or frisbee, went to lake or just hung out. There was no shortage of entertainment. Another great thing about Meanook was that we all had our own rooms, which gave us some privacy and a quiet place to relax and sleep.

We all really enjoyed staying at Meanook, and I know that I am going to miss it a lot when I leave.



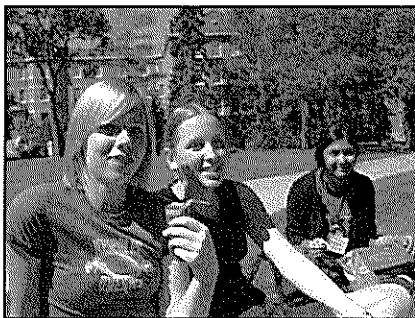
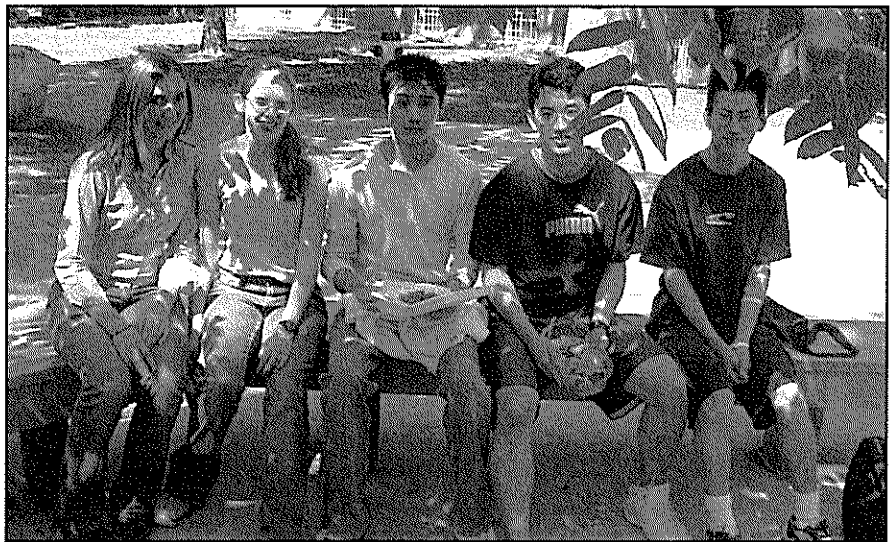
TGIF Lunches

WISEST Student Experiences By Shandi Connolly

Every Friday, all of the WISEST Summer Students were invited to bring lunches and eat together, either in Quad or inside CAB. This was one of the best features of the summer as it allowed us time to simply hang out and relax. Personally, I really looked forward to these every week because I knew most of my WISEST buddies would be there so we could visit. Also, Jenn and Kim would entertain us with stories about crazy professors and University experiences.

Most weeks we had visitors stop by. One week members of the Student's Union dropped by to wish us well and offer advice for University classes, social activities, and just life in general. Gaylene was also a frequent visitor and was once accompanied by her therapy trained dogs. They were so cute!

All in all, this was a great way to create relationships with our peers and student coordinators.



Ultimate Frisbee

WISEST Student Experiences

Ultimate Frisbee! Monday! Five in the QUAD! Be there! I can't count how many times I repeated that statement.

It all started with the social event planned by Jenn and Kim the second week of the program. A lot of people showed up, from both WISEST and HYRS and we all had a blast. Ultimate Frisbee is a sport that takes a lot of talent but if you can't throw or catch a Frisbee to save your life it's all right. People still pass to you, no matter how many times you miss or tell them not to. It's all for fun!

We played for over an hour that first time and decided we should do it every week. And so the tradition began.

Unfortunately, every Monday evening it rained. Few people, besides St. Johners, showed up and my personal opinion is that it's because when you live at in residence there's not a whole lot to do in the evening so you play Frisbee in the rain. Why not? It's much more fun that way. You slip and slide all over the place and get wet. I think that's fun. Mind you not everyone shares my opinion, hence the lack of attendance.

Back to Frisbee. We jumped, dived, collided, fell on our bums, tackled, in other words we really played. We had quite a few really good Frisbee players. Who would have thought? Mind you not everyone was good. I would like to take advantage of this opportunity to apologize to my teams. I warned you, I'm scared of the Frisbee.

By the end of the game we were ready to go home, tired and hungry.

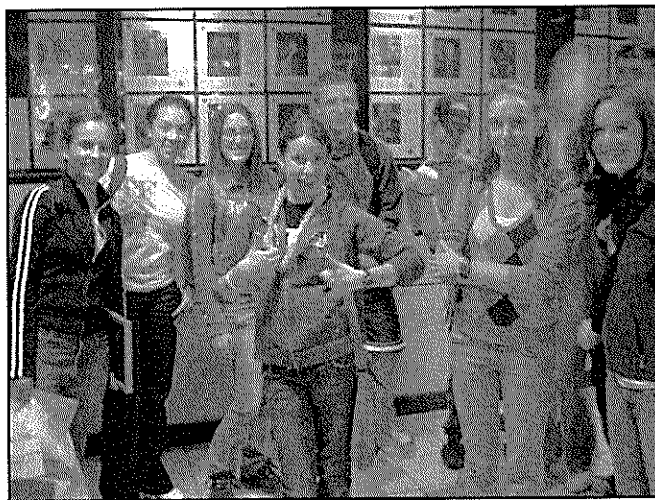
WISEST Social Activities



"Paper Scientists" at WISEST/HYRS Social



Residence Friends



Wrap-Up Party



SUMMER RESEARCH PROGRAM 2005 PRESENTS...

STUDENT
REPORTS

By: Jenny Lau

WISEST



KATE ALEXANDER - Laboratory Medicine and Pathology
WISEST Supervisor: Dr. Fiona Bamforth
Sponsor: Merck Frosst Canada Ltd.

When I first heard of my position in the WISEST program I was ecstatic. I had no idea of what to expect and was also a little apprehensive. I knew a little about the program but was not completely sure I wanted to live so far away from home. I knew that this would be an amazing experience, so I decided to accept the position offered to me. After the phone call that started it all I remember sitting in my room thinking about what those six weeks would be like. I had just gotten accepted in to the WISEST Summer Research Program! Something, which I had been planning since December. I was told I would be working in the Department of Laboratory Medicine and Pathology at the University Hospital. When I first heard the news I nearly fell off my chair with surprise, joy, and excitement.

In the Department of Laboratory Medicine and Pathology I was placed on the Human Metabolomics Research Project. I was placed in the care of Dr. Fiona Bamforth and her summer student Connie Cheung. The purpose of this project is to create a metabolic database. This database would allow technicians and researchers to find metabolic diseases faster and easier by comparing the patient's sample, of urine, blood, or serum, with the databases. The sample that my team is working on is urine. As part of this project I was to interview volunteers, aliquot the samples, and then later extract these samples. To start off I had very little knowledge of what my project meant or even what small metabolites were. But after reading several articles given, I quickly understood what this project was all about. The small metabolites that

the researchers would be looking for were things like amino acids, organic acids, sugars and steroids in urine. As volunteers would bring their samples into the lab, I would be lucky enough to aliquot each container of urine into 10 smaller vials so that they could be froze until they were needed again. I have been doing this for a while now and have become an expert in the art of pipetting. I have also been able to do three different extraction processes. These three methods were the SPE (Solid Phase Extraction), Methanol, and Acetonitrile methods. Each of these methods were quite lengthy in time.

I have now spent a total of 4 and a half weeks in the WISEST program and I can honestly say that these weeks in the program have flown by at the speed of sound. I can remember our first couple of days here seemed to drag by slower than imaginable. Looking back I have no idea where all our time has gone. One shopping trip to West Edmonton Mall here, another there, not to mention all those walks down Whyte Avenue to go shopping.

Luckily during this six-week duration I am lucky enough to have stayed at Residence with other WISEST and HYRS summer students. We soon became friends and shared most of our 'home' time together. We planned outings and activities together. Some of these outings included shopping trips to West Edmonton Mall, going to Shakespeare in the Park and Klondike Days.

My experience in the WISEST program has been outstanding and memorable. I have learned countless new and valuable skills that will stay with me for the rest of my life. I know that this program has helped me confirm my future in the science field. I have met many unforgettable people here. I believe this summer I have grown as person both in skills and in life experiences. I will always hold this summer and everything in it close to my heart.



PAMELA BELTER - Physics

WISEST Supervisor: Dr. Jan Jung and Dr. Kim Chow

Sponsor: Allard Foundation

A love of science. I believe that is what brought all seventy grade 11 students from far and wide to join in the WISEST Summer Research Program. I am no exception. When I received my acceptance call I will admit to being extremely overjoyed and proud. I would be spending my six weeks in a physics lab.

The bold title of our research was "The Characterization of Superconductors". As I learned, superconductors are special materials that when cooled to low temperatures display properties of zero resistance. This means that ideally an electrical current could flow forever within the material because there is nothing to stop or slow the flow. Currently these fantastic properties have only been observed below 138K (-135C) at the very warmest. This makes their practical uses limited as liquid

nitrogen (77K or -196C) or liquid helium (4K or -269C) are needed to constantly cool the material. Perhaps the most important use for superconductors would be in Magnetic Resonance Imaging (MRI) where they would be used to create a stronger magnetic field. This would allow for the faster collection of more detailed images.

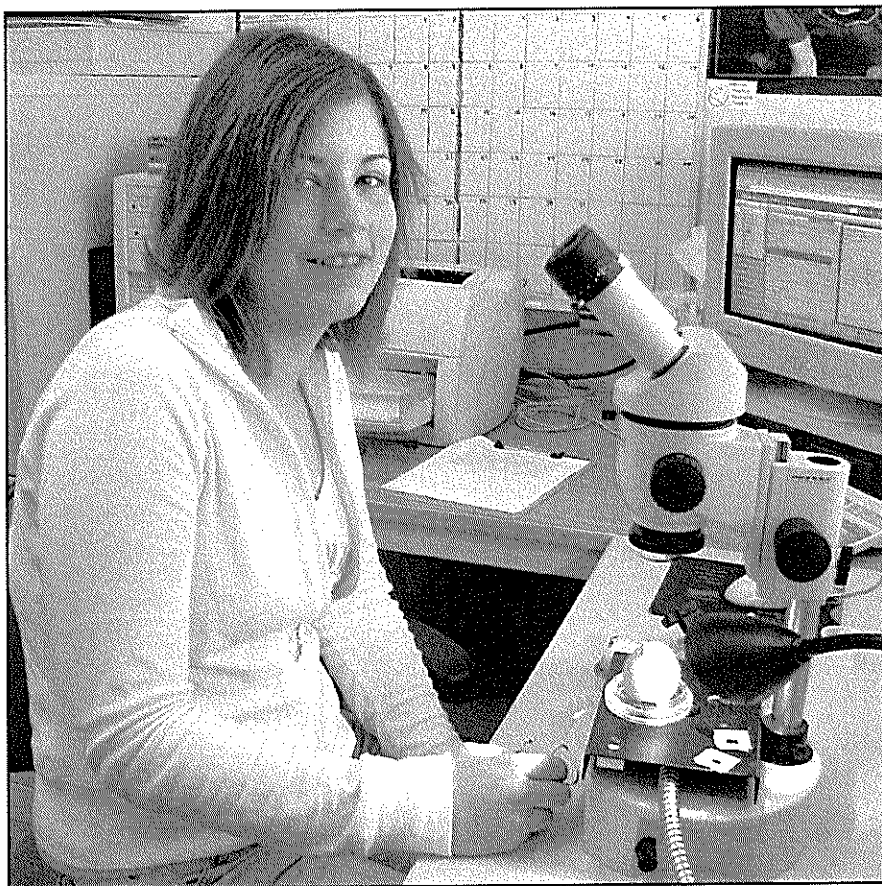
For the most part my WISEST lab partner and I simply observed what went on in all areas of the lab. A large variety of complex machines are used in the research. They look really cool, as one would imagine. But ironically I am quite thankful that I did not have the harrowing responsibility of having to run one by myself. The theories behind these expensive machines were not entirely comprehensible to me and I suppose is to be fully expected when you have no university

physics knowledge. It is after all, pretty complex stuff. Being able to watch was an experience in itself.

I didn't quite know exactly what to expect from a research setting. Although I will have to admit it turned out to be rather different. Everyone in the lab was extremely laid back and easy-going. Above all else, I discovered how long the process actually is. The most abundant, although not necessarily the easiest, lesson to be learned is that of patience. In order to complete one trial it must go through a number of stages. In the case of superconductors this usually means waiting while your sample cools or heats from some extremely low temperature (i.e. 80 Kelvin). Your results must also be tested again and again to confirm any conclusions that will later be made.

I have over the summer, come to discover a great deal about myself as well as science. I am thoroughly thankful for the chance to grow and dream. The people I have met are from all walks of life. From my supervisors and the grad students down to my lab partner Erin Faught and the other WISEST students; they are all amazing people. Getting to know them alone was enough of an experience. And I thought I was only here for the science! In terms of a summer job? I doubt you could find something more useful and satisfying for a high school student to take part in.

"A love of science. I believe that is what brought all seventy grade 11 students from far and wide to join in the WISEST Summer Research Program."



LISA BIDA - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Gaylene Fasenko
Sponsor: Alberta Innovation & Science

When I first arrived at WISEST, I did not know what to expect. I arrived at the university on the first day preparing myself for anything. I knew that I was working with Dr. Gaylene Fasenko in the department of Agricultural, Food, and Nutritional Science and that I would be working on a project dealing with eggshells. At the end of orientation I met the people I would get to know and become friends with by the end of the summer Erin, Katherine, and Kelsey

The first day at the farm was tedious as we spent most of the day reading research articles and papers; it was after that I prepared myself for a long summer. The next day offered more promise as we were helping out with farm chores, such as collecting and cleaning eggs, weighing chickens, weighing feed, preparing cages, and setting new chicks. By the end of the

first week, the summer was looking more interesting as we had already observed egg breakout, which is when eggs that do not hatch are cracked open to determine what day of incubation the embryos died. The next week we started to prepare for working on our project. We started collecting eggs and testing out the methods for our projects, but unfortunately our results were not consistent. We had to brainstorm different ideas that could change the outcome of the test, and after many trials and errors we finally found a consistent method. My project involved comparing eggshell characteristics such as weight of the yolk, shell and membranes, shell thickness, and pore counts (density) on the eggshells of two different genetic strains of broiler breeder chickens.

Once our methods were continuously successful, we collected a large quan-

tity of eggs from two different genetic strains and began the research. We first placed the eggs in various salt solutions to determine the specific gravity. The eggs that floated were removed and the ones that floated in the highest salt concentrations were the ones with the highest shell quality. I soon became proficient at cracking eggs open and removing the yolk, and membranes, a skill I was told would be handy in the kitchen. After the membranes were removed we dyed the eggs to determine the number of pores per cm^2 . After we counted the pores under a microscope, we measured the thickness of the shell. After all the components were removed and results recorded they were placed in an oven for four days to dry and were then re-weighed. My project also looked at how well air passes through an eggshell, for this some of the eggs were placed in a desiccant (a substance that absorbs moisture) and were weighed everyday. The drop in weight was recorded, and then the eggs were cracked open and the same procedure was completed on them. Alongside my project, I helped Kelsey, another WISEST student with hers. Her project consisted of incubating eggs for 6.5 days and then comparing the embryonic growth between the two different strains. Her project was similar to mine, as she also dyed her eggs, counted pores and measured shell thickness.

The program has shown me all about the many opportunities available. The Wednesday afternoon sessions allowed me to interact with other students, and also provided me with knowledge about what area I might plan to study, but also what it is like to be a woman and raise a family while still working in science. Working in the lab has also provided me with the understanding of what is involved and required in research. WISEST, was one of the most enriching experiences I have ever had and by far the best summer job anyone could ask for. Everyone involved with the program was extremely nice and influential. The people I worked with not only helped me learn about my project, but also taught me many other valuable life lessons and skills.



ANA-MARIA BOSONEA - Biology at Kings' University College
WISEST Supervisor: Dr. Sarah Richart and Dr. Heather Prior
Sponsor: Alberta Ingenuity

I have been spending the summer at The King's University College, working in the molecular biology and microbiology departments with two wonderful supervisors Dr. Prior and Dr. Richart along with an amazing undergraduate student, Christa Preuss.

My main project was to map the *pitx2a* gene from zebra fish using a radiation hybrid panel. The gene has already been mapped by two other researchers, who have gotten conflicting results as to the location of the gene on the genome, therefore I am mapping the gene to see if I can resolve this contradiction. The gene is a transcription factor (it turns on and off other genes, during organism development) and is responsible for left-right body symmetry and in the development of the anterior part of the eye. The eye of the zebra fish is similar to the human eye, hence to gain a better understanding of the human eye, zebra fish prove to be a

good model organism. They are easy to keep and breed, as well their embryos are transparent so you can observe the development of the embryo in detail without any dissections. Dr. Prior is specifically interested in cataract genetics. She studies various genes that play a role in lens development and maintenance. These genes include transcription factors, and various structural proteins. This area of research will eventually lead to a more in depth understanding of the mechanisms that allow for the development of glaucoma and cataracts and possible treatments.

The methods used to carry out my research were: creating specific primer pairs for *pitx2a*, DNA isolation, UV spectrophotometry, polymerase chain reaction (PCR), and gel electrophoresis. The first step was to design some primers that would amplify a significant part of the *pitx2a* gene, and I did this using the cDNA sequence and compared

it to the genomic sequence. I wanted to find the introns and exons in the gene and then select larger exons for which to design my primers. Next, Christa, Dr. Prior and I tried to isolate DNA from ground zebra fish tissue, using various published protocols. A UV spectrophotometer was used to calculate the DNA concentration of our isolated samples. The samples were then placed in a PCR machine, which controls the temperature, to allow for DNA denaturing, primer annealing, and extension, thus helping amplify the portion of DNA for which the primers were built. To check if the reaction was successful, a gel was run in an electrophoresis apparatus, which uses negative current to repulse the negatively charged DNA molecules. The smaller the molecule is the farther it travels. To be able to see the DNA, the gel is made with ethidium bromide, which intercalates between DNA base pairs, and fluoresces when placed in an ultraviolet lightbox. Once it is established that the primers do work, then the entire radiation hybrid panel (94 tubes containing different pieces of the zebra fish DNA, which have been irradiated and then incorporated within hamster cells) is tested. If the DNA in one of the panel's tubes gets amplified, it is a positive result, which means that the gene is located among the other genes found in that particular tube. The results are then electronically submitted and analyzed using a computer algorithm. When the project is complete, the result is a map with the relative location of the *pitx2a* gene in a linkage group (or chromosome).

Among other things, I have also been introduced to Dr. Richart's field of microbiology. I have done an endospore stain on a colony of bacteria; smeared, incubated, and made glycerol stocks of bacteria; performed a bacterial transformation (I introduced an ampicillin resistance gene); carried out a photosynthesis lab concerning the factors that affect the chloroplasts' light absorbance and electron transfer.

This has been a fun learning experience, for which I would like to thank Dr. Prior, Dr. Richart, Dr. Strom, Christa Preuss, Janna Huget and my family. As well, thank you to WISEST, The Alberta Ingenuity Fund, and The King's University College for this extraordinary opportunity to explore my interests in the science field and career options.



APRIL BOYKO - Civil and Environmental Engineering
WISEST Supervisor: Dr. Mohamed Gamal El-Din
Sponsor: Epsilon Chemicals Ltd.

A few years ago, I was given the opportunity to tour a lab at a Chemical Plant in Fort Saskatchewan. On that tour, I witnessed people who, I thought, were far too enthusiastic about their jobs, playing with potentially hazardous chemicals and extremely high tech. machines. I briefly considered a career as a researcher/scientist, but the thought of me being confined to a white room for the rest of my life with machines that were smarter than I happened to be, alongside chemicals that had the ability to level city blocks if accidentally mixed together, was not very promising. I am clumsy by nature, so for the good of the human race, I vowed NEVER to set foot in that kind of a lab again. Well, fate seemed to have a different plan for me. Surprisingly enough, I was accepted into the WISEST Summer Research program and ended up in a lab; thankfully it was not one with any sort of volatile chemicals.

I had the opportunity to work under Dr. Mohamed Gamal El-Din and one of his esteemed Grad students Maureen Nakonechny in the Department of Environmental Engineering. The research we worked on involved using ozone to disable Endocrine Disrupting Compounds (EDC's). The plan was to use solutions dilute like those found in the environment and treat them with an ozone solution to see how effective ozone degraded several of the chosen EDC's. Another WISEST student and I entered this program as Maureen was just beginning her research, so we experienced first hand the adversity of trying to get an entire experiment up and running smoothly, and maybe it was just because I was around, but things surely did not seem to go as planned. This turned out to be a mixed blessing, because it gave me plenty of time to do some background reading while Maureen worked out the kinks in her experiment.

I was shocked to find out how much information was available on EDC's, before this summer I had no idea they even existed! I found out that these compounds are present ubiquitously in our environment, and target the endocrine system, which is responsible for regulating growth and development, metabolism, mood, reproductive processes and sexual function within our bodies. The hormones secreted by the glands in the endocrine system, travel within the blood and bodily fluids until they reach their targeted organs, and then relay the appropriate message to the organ on which function it is required to carry out. The reason that EDC's are so harmful is that they have the ability to block the hormone receptors in cells and prevent the action of naturally occurring hormones. I found this unnerving, but took comfort in knowing that the research I was helping with could in fact stop or slow down the drastic effects of these compounds on living systems.

The one hormone that we began working with was estrone (E1), which is essential for the proper function of the human body. Estrone is often administered to people who have been diagnosed with hormone deficiencies, and is therefore prominent in the environment. This hormone is very insoluble in water and it took many attempts to finally obtain a solution that we could work with. Once we did finally create this solution, the very expensive Olis Rapid-Scanning Monochromator Unit decided it too needed a summer vacation, so it broke down and part of it went on a trip all the way down to Georgia.

Although this summer was a bit frustrating at times because of the glitches we needed to work out, it was something I would do again in a heartbeat if I had the chance. I learnt a great deal about research and realized that it can be fun if you find something your passionate about. I also learnt a lot about myself and all of the opportunities that are open to me and other people after we graduate from high school. I am extremely thankful to Epsilon Chemicals who sponsored my position and allowed me to participate in the program, Dr. El-Din and Maureen who graciously put up with me through the summer, all of the WISEST people who made this happen, and all the other wonderful people on campus who made this summer a remarkable experience!



AMANDA BREWER - Computing Science
WISEST Supervisor: Dr. Rich Sutton
Sponsor: Alberta Research Council

I chose to enter into the WISEST program because I wanted to experience a new field that I did not know very much about. I was very excited to hear that I had been placed into the Computer Science department, however I was also very intimidated by it. I had no idea what I was getting myself into, or what I would be working on. By accepting this opportunity, my summer has turned out to be one of the most interesting events of my adolescent life.

I am working in a branch of Computer Science called Machine Learning, and the lab that I am working in is part of an array of people researching Reinforcement Learning and Artificial Intelligence (RLAI). After being thrown into this environment of programming and algorithms, meetings and presentations, new people and new words, I had to try and get a grasp of what was going on around me, meanwhile having information

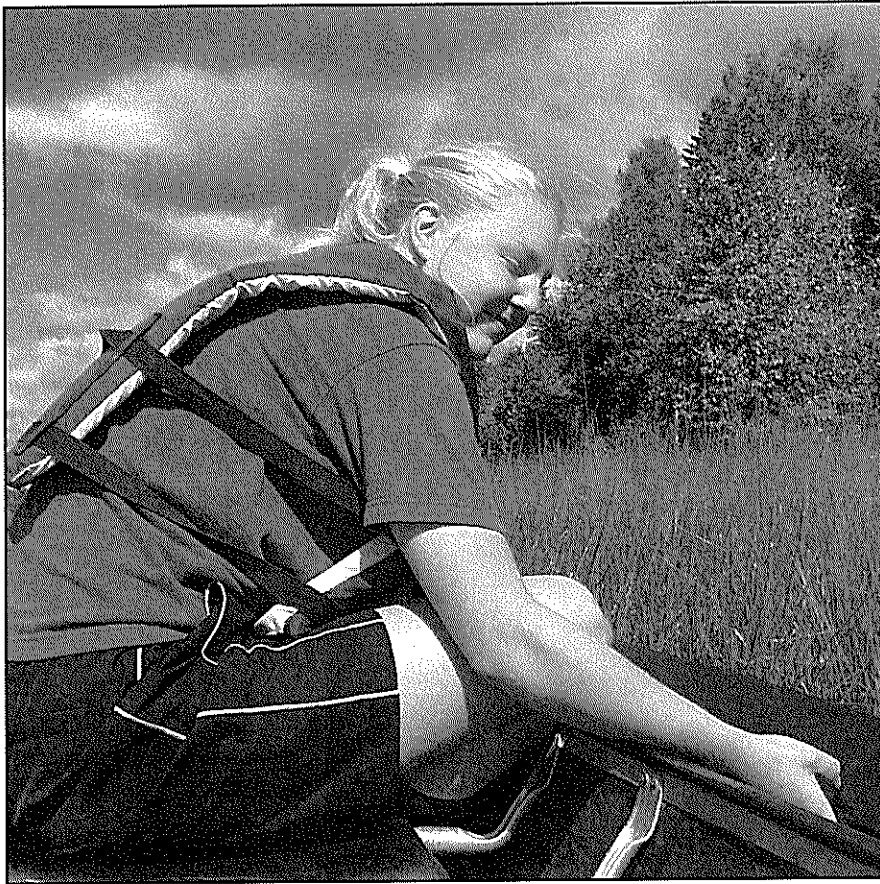
like "Gaussian Processes" pelting my brain. The first week consisted of a lot of new information, and learning what exactly RLAI is. Contrary to popular belief, it is not creepy robots trying to take over the world, that is simply the Hollywood version. AI applies to such a vast range of concepts, from playing a game against a computer to teaching an agent to discover and learn things from experiences and teach them to make their own decisions.

My project for the summer involves the programming aspect of the RLAI world. I was asked to design and program a "dashboard widget" for Macintosh computers. If you have never used a Mac, then those words probably mean nothing. A dashboard is a way to view some small applications at a glance. These applications are called widgets; they can be almost anything, calculators, translators, calendars, even small games like minesweeper. The

widget I am creating is one to display meeting dates and times, so the user is aware of the meetings they need to attend and can get there on time. The widget will display meetings under the categories you choose, and you can also decide how many it can display at a time, making your meetings more organized. The widget will have a link to an "Open Pages" website that has all the meetings' dates, times, presenters, locations, and links to the agenda of the meeting. Open pages is a collaborative research tool being developed by some of the people in my lab. I am hoping that this new widget is not just a summer project for me, but will become a useful tool for Mac users in the near future.

Coming to WISEST was not all about the science and computers aspect of things for me, a large part of why this summer was so amazing, was because of the people and experiences at St. John's Institute. Getting to have a feel for what life in residence is like, learning how to combat the discrepancies between roommates, and just plain having fun. There were so many awesome people in residence to share the misery of being away from home with, that most of the time we plain forgot we were supposed to be sharing misery! There are so many memories and new friends that helped make my summer unforgettable, like nightly "tea time" rituals, the sushi night, UP!, the relay days, trips on the LRT, and games of Egyptian War!

Thank you to my sponsors, the Alberta Research Council, and the WISEST coordinators for making this summer possible. Thank you to the "Margaret-Ann Armour Fund for Rural WISEST Students" for helping me financially this summer and to my research team for being so helpful and making my job memorable and well...fun (the "meeting", going to taste of Edmonton, the parade, sliding off a chair, even picture day was comical). Thank you Anna, for being my de-bugging scapegoat...it is ALL YOUR FAULT! Thank you to Dr. Rich Sutton for allowing me to join his research team, and lastly thank you to all the friends I met in rez, it was an awesome summer.



CHRISTINA BUELOW - Biological Sciences

WISEST Supervisor: Dr. Bill Tonn

Sponsor: Alberta Innovation & Science

The past six weeks have truly been an amazing experience. I entered the WISEST Summer Research Program not knowing what it would fully entail; however it has by far exceeded any of my expectations. I was placed at the Meanook Biological Research Station, which is situated on a National Wildlife Area. When applying for the WISEST Program I made working at Meanook my first choice, therefore I was thrilled that I ended up there.

While at Meanook I worked under the supervision of Deborah Silver (a graduate student) in the Department of Biological Sciences. We conducted field research on the effects of predatory presence on the life history of Fathead minnows. Field research definitely suited my interests because it meant that I got to be outside all day! Almost everyday we went out into the field to monitor different

features of the Fathead minnow's life history. I worked on two projects throughout the summer, and both pertained mainly to Fathead minnow reproduction. However, even though they were similar, the projects approached the topic in different ways. Deborah Silver's experiment monitored the life history of natural populations of Fathead minnows in nearby lakes. This involved canoeing on the lakes and checking nestboards, setting minnow traps for samples, and conducting bird surveys. The three lakes were chosen because of the characteristics of their fish populations. All three of the lakes have Fathead minnow populations, however not all of the lakes have Northern Pike (the main fish predator of Fathead minnows). We were looking to see if occupying different habitats could result in life history differences among Fathead minnow populations.

I also worked on Dr. Emily Herdman and Taylor Smith's experiment. Their experiment used a pond-enclosure approach. They brought Fathead minnows in from the three lakes, and kept them in separate manmade ponds. We introduced "pike water" and tap water into specific tanks on a daily basis. ("Pike water" has pike scent and pheromones that the minnows recognize. Tap water was used as a control.) Since some of the minnows have been exposed to pike before and some haven't, we were able to monitor their reproductive behavior accordingly. The data obtained from this will show us if the minnows have developed phenotypic differences as a result of having occupied different lake environments.

One of the main reasons I wanted to participate in this Program is because I thought it might help me decide what field of study I want to pursue in University. I am glad to say that, after this summer, I know that I want to study biological science and I hope to eventually conduct my own field research. I found that I shared a lot of interests with all of the field researchers at the station; I finally felt like I fit in somewhere!

I have learned so much by participating in the WISEST Summer Research Program. Not only have I learned a lot about field research, I am amazed at how much I have learned about University life. The Wednesday Afternoon Sessions at the University really opened my eyes as to what University life is all about. I also gained lots of valuable information from the University students that I worked with on a daily basis. I found that my fellow workers were always happy to answer my questions about University; from what it's like to live in residence to what classes are like. They also gave me lots of great advice, all of which I will never forget.

Living and working at the Meanook Biological Research Station was an awesome way for me to spend the summer. I'm sure that working in a lab at the University would have been equally rewarding; however I wouldn't trade my experience for anyone else's.



SARAH CARPENTIER - Civil and Environmental Engineering
WISEST Supervisor: Dr. Tim Joseph
Sponsor: Suncor Energy Foundation

Hi, my name is Sarah Carpentier. I'm from Will Sinclair/ West Central High School in Rocky Mountain House- a small community located about 90 km. west of Red Deer. This summer I had the privilege of being accepted to participate in the WISEST Summer Research Program. I had the opportunity to work in a mining engineering lab, under the direction of Dr. Tim Joseph. I have to admit that previous to this summer, I wasn't aware that mining engineering even existed. Now, thanks to the WISEST Summer Research Program I have been able to see what an important and exciting area of engineering it is.

My lab partner, Emma Heydari, and I were given two projects to complete in the six week program. The first focused on mining truck tire deformation as affected by load. This project had us painting

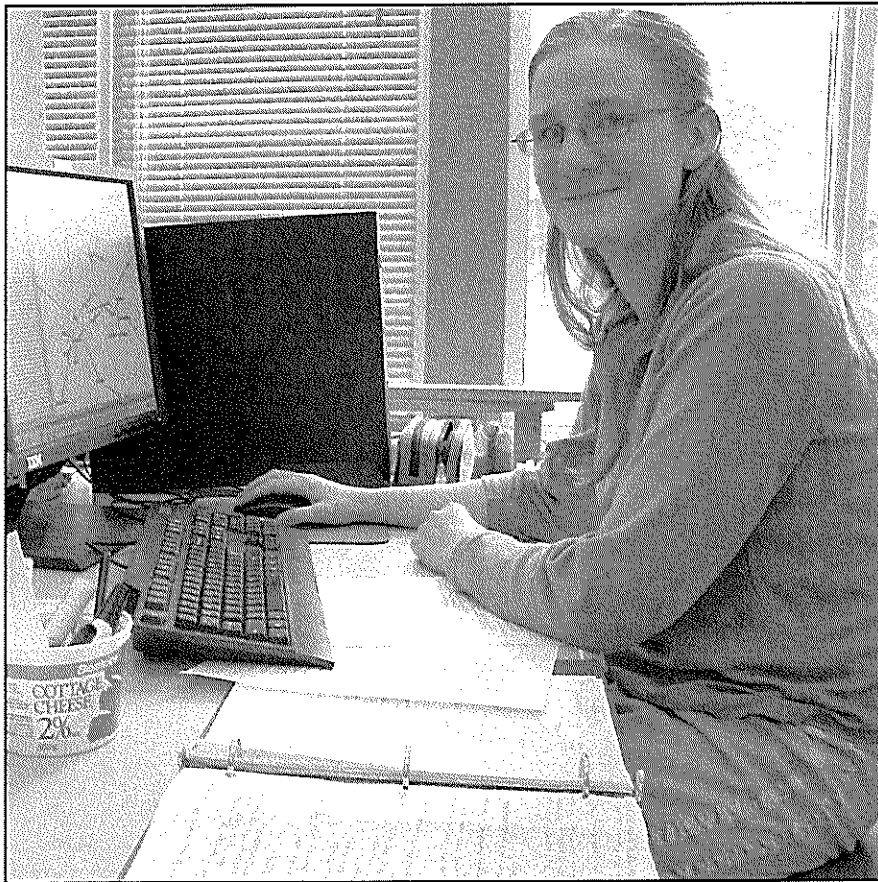
different tires and applying various pressures to leave a "footprint". We took measurements, graphed data, and analyzed these footprints- over 100 of them- to look for any patterns present. The second project dealt with the efficiency of the dipper (bucket) portion of an ultra-class mining shovel. This project required us to build a two meter long model of a shovel- winch, pulley, one ton of sand and all- to measure forces present. Some of our time was spent working on the computer with data analysis but as you may conclude, we primarily worked in the lab- hammering, drilling and shoveling- to conduct our experiments. We also had the opportunity to visit the local High Vale mine as well as the oil sands in Fort McMurray to see mining equipment in operation. While there, we had the opportunity to meet

engineers working in industry and talk to them about their jobs.

I really enjoy math and the sciences and was looking towards a career in that area, but had no idea what was available. I applied to the WISEST program with the motive of seeing what careers were available in the math and science field. The program helped me to do just that. Engineering is definitely not just sitting behind a desk all day with a protractor and calculator, as I once believed. It's a very broad area with many amazing opportunities. Wednesday afternoon activities also allowed me to meet with women working in other areas of math and science and talk to them about their career. WISEST definitely satisfied my original motive by showing me just how vast the area of math and science is.

For me, work was just one aspect of the WISEST program. The chance to experience living in a city away from home and having fun was another. Coming from a town of only 6000 people, there were many adjustments to be made. Prior to the program I had never ridden a city bus, nor had I ever cooked for myself for more than two consecutive days. Neither of these points hold true now. I can now manage to catch the bus and arrive at my destination successfully... most of the time. Emma and I were also able to take in the "Premier's Klondike Day's Pancake Breakfast" as well as making weekly treks to the nearest Second Cup. The WISEST program allowed me to experience city life in preparation for what I might encounter when I leave home to attend university.

The WISEST program was a great experience. It introduced me to areas of science and careers that I previously didn't know existed. It also associated me with people who are very passionate about such careers. It will definitely be a valuable aid when planning for my own career and post-secondary education.



MEGAN CHARTRAND - Computing Science
WISEST Supervisor: Dr. Eleni Stroulia
Sponsor: Alberta Human Resources & Employment

Programming. What an ambiguous term. When I first heard it was how I'd be spending my precious summer I immediately shivered imagined an old man sitting in front of a monitor with his fingers flashing across the keyboard rapidly; silent and alone except for his loyal companion, the computer. I cringed, banished this stereotype and decided to postpone judgment until a later, more educated date and then share my conclusions with you.

My experience with the WISEST research program has been enriching and immensely valuable. The Computing Science faculty welcomed me enthusiastically and I felt slightly ashamed. MSN was (and still is) a foreign language to me, I didn't use e-mail, I can't (emphasize the can't) play any computer games and lastly, I've never programmed. I use

the home PC as a word processor, the Internet as an encyclopedia and the monitor as a punch bag (I'm sure many of you can relate to my frustration). My last six weeks have, however, taught me the error of my ways. I can now write while and for loops, use regular expressions, write basic code in java and html, call on and write objects and classes and bombard you with techie terms that will make me sound smart (hah!). Oh yeah, and tell you what a topic map is.

The concept of a Topic map is actually quite straight forward. My entire project this summer was based on it and I feel therefore obliged to enlighten you. It is essentially a graphical representation of relationships between topics or ideas depicted in the shape of a web. Topics either lead to resources

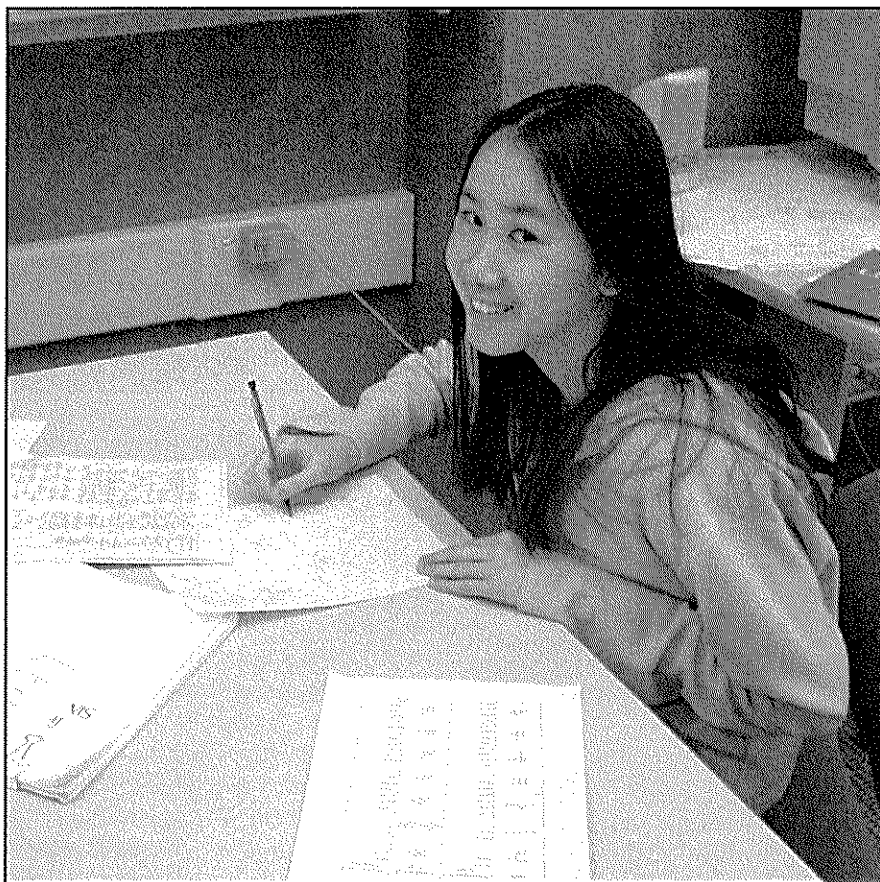
or other topics through links. These maps index information in a way that is easy to navigate and practical. They are valuable learning tools that provide a visual representation that encourages critical thinking and emphasizes the relationships rather than the facts.

My team has been building a program that can create, display and navigate XML topic maps in a user friendly way (not a first but an interesting initiative nevertheless) called the EduNugget. It can also "crawl" through websites to create a graphical representation of the links and facilitate surfing. This program was well on its way before I came along but by no means finished. I put in my two cents by helping build a search tool, a history list, and a rank button. I also made a web site through html code to test it and wrote two programs that interact with the user to create topic maps from scratch. This summer I was paid to learn and thoroughly enjoyed it!

I would like to thank Alberta Human Resources & Employment for sponsoring me, Eleni Stroulia for welcoming me into her lab and, most of all, Cleo Espiritu for leading me through the learning process with patience and insight.

Today I can confidently write that programming is an occupation for an independent, innovative and motivated soul. One needs to be original and open minded, always thinking outside of the box. There are wonderful people and brilliant ideas all around the Information Technology world. It is the way of the future and has been for many years.

"My experience with the WISEST research program has been enriching and immensely valuable."



ANGELA CHU - Computing Science
WISEST Supervisor: Dr. Lorna Stewart
Sponsor: Canadian Information Processing Society

For the past six weeks, I had the opportunity to participate in the WISEST Summer Research Program, under the direction of Dr. Lorna Stewart. Working in the Algorithmics Lab in the Department of Computing of Science, my main areas of research concerned the concepts of graph theory, which is the study of graphs

Opposite to what one would assume, the graphs studied in my research are part of a branch of mathematics known as Discrete Mathematics and are not the typical graphs used to plot and organize data. Graphs are objects depicted as a set of vertices (dots) joined by edges (lines), which are often used as models to solve real life situations and problems. With a variety of applications, graphs are used in fields such as radio networking, cartography, the airline industry, computing science, as well as others. A problem-solving tool for real world situations, graphs can be divided into specific classes based on their properties. By discovering all the properties of a class of graphs, any problem that can

be represented by that type of graph can be easily solved, as properties that concern the graph will also relate to the situation. Despite working in the university's Computing Science Centre, a large amount of my research project involved mathematics, but used computers to help solve problems that it would be impossible to compute manually.

My research involved a class of graphs known as permutation graphs, which are graphs that can be formed using permutations, or sets of numbers arranged in various orders. Every permutation graph has at least one corresponding permutation. Another aspect of my research involved the concept of a module, which is a subset of the vertices of a graph that has a specific property. My project was to determine which permutation graphs do not have a module and to form conjectures and theorems based on my observations.

To become familiar with the material and later find a relationship, I looked through a complete list of graphs with one to six

vertices, which included approximately 150 graphs. I had to sort through the graphs to determine which graphs were permutation graphs, which graphs had modules, and finally which graphs were prime permutation graphs (permutation graphs without any modules).

After finding all the prime permutation graphs and their permutations, I used a computer program called LaTeX to organize the graphs and their permutations into a table. LaTeX is similar to a word processor program, except that one needs to write command codes to direct where LaTeX will position the text on the page. Since I had to draw graphs on the computer, I also had to learn another program called OmniGraffle, which allowed me to draw the graphs directly onto the screen and later import the graph files into LaTeX.

To further increase my observations I later looked at all the permutations of prime permutation graphs with a larger number of vertices. Because manually identifying prime permutation graphs and their permutations for graphs with seven vertices and beyond would take extremely large amounts of time, as one would have to check millions of graphs, I was able to use a program written by someone on my research team, which could identify all the prime permutation graphs for graphs in a matter of minutes or hours, depending on the size of the graphs. Taking the data generated by the program, I was also able to use LaTeX and make tables that displayed the information.

Using all the information I collected during the weeks and a combination of mathematical and programming skills, I was able to make some observations and inferences concerning prime permutation graphs, as well as graphs in general. Through the research process, I gained valuable knowledge and experience that I will surely take with me in my future endeavors. In addition to researching, I enjoyed WISEST's "Wednesday Afternoon Sessions" that included tours to IBM Canada and the Dow Chemical Company, as well as discussions with other women in science and advisors on potential careers in the science industry. Through the WISEST Program, I was able to experience what it is like to be in a research lab environment, as well as have a preview into life at the university. I also had the opportunity to look into possible careers which are non-traditional for women, and plan ahead for my future. Thank-you to the sponsors and the members of my research team for your generosity and support. You have truly made the summer an unforgettable experience.



EMILY CLIFF - Biological Sciences
WISEST Supervisor: Dr. Cindy Paszkowski
Sponsor: Alberta Innovation & Science

This summer I was assigned to work in the Department of Biological Sciences with Dr. Cindy Paszkowski, who researches the ecology and behaviour of birds, amphibians and freshwater fish. Most of my time was spent doing work for Suzanne Earle, a graduate student who is studying the diet of Double-Crested Cormorants in the Lac La Biche area of Alberta. Suzanne is researching which species cormorants consume, where they focus their foraging efforts, and at what trophic level they are. She studied cormorant diet by conventional diet analysis, which involves the study of boli, or regurgitation samples, and by stable isotope analysis. I worked on preparing samples for stable isotope analysis from organisms that had been collected last summer in various basins of Lac La Biche, Missawawi Lake, Antoine Lake

and Beaver Lake. My job included extracting dorsal tissue from large fish like Northern Pike and small fish like Iowa Darter, and liver and breast tissue from cormorants. I also washed feathers and cut them, and washed and weighed invertebrates such as leeches, bloodworms and dragonflies. Once the material had been dried in the freeze dryer, I weighed it again and crushed it into a fine powder. I was then able to weigh out one milligram of each powder into small tin capsules. Some of the powder had been prepared people other than myself, and included cormorant egg albumin, clams, and snails. The samples will be sent to a lab for analysis, to find the ratios of ^{15}N to ^{14}N and of ^{12}C to ^{13}C . These ratios, when compared with those of other species in the food web, help to reveal the trophic position of each

species and the source of energy. As well, I entered data about each sample into the computer, including the mass, the location and date it was collected, and the date it was processed. I also entered data from observations from last summer. Observers stationed near cormorant colonies such as High Island and Portage Lake had recorded the number of birds, time, and direction of flight of each group of birds that flew into or out of the colony.

I spent some time working on a different project as well. I helped Julie, an undergraduate student, with a project for a course she was taking. For that project, I looked at cross sections of toad toes under a microscope and counted the number of lines of arrested growth (LAG) in the bone for each. The number of LAGs corresponds to the age of each toad. The toad toes had cut between the second and third distal phalanges, and then Julie had prepared microscope slides of cross sections eight micrometers thick of the toe. Julie will compare the age of the toads with their size to find a growth rate. She will then compare the growth rate, longevity, age distribution, and size distribution of male and female toads and of toads from different lakes in Alberta. This information will be useful in formulating management plans for the toads.

"My job included extracting dorsal tissue from large fish like Northern Pike and small fish like Iowa Darter, and liver and breast tissue from cormorants."



SHANDI CONNOLLY - Obstetrics and Gynecology
WISEST Supervisor: Dr. Denise Hemmings
Sponsor: Faculty of Medicine & Dentistry

When I saw WISEST on the caller display almost three months ago, I nearly jumped out of my socks. I simply stared at the phone for what seemed like forever before my brother kindly reminded me what to do with a ringing phone. I knew that WISEST would be making their decisions that week and I was so nervous. I tell you very truthfully that most of what they told me that about my summer project said passed right through me. In fact, I had to call back the next day to clarify all the details because all that went through my mind that night was, "Oh my goodness! I did it! I got in!" By the time summer 'holidays' finally showed up at the end of June I was ecstatic! At orientation just being there overwhelmed me; I was so honored to be considered apart of this amazing group of people.

So for six weeks I worked in the Department of Obstetrics and Gynecology within the Heritage Medical Research Centre. I am truly blessed to be able

to pursue a research project within medicine, as that is what I plan to make my career. All my life I have dreamed of becoming a pediatrician. I love children and really want to make my contribution to society by hopefully making a difference in the life of a child. I think that I will be able to understand and relate to children because I know what it feels like to be the screaming child in the doctor's office. So Perinatal was the perfect place for me to be this summer.

When I met Dr. Denise Hemmings in June (we decided to meet before the program started in order for me to get some background material) I was, if possible, even more excited. She is such a remarkable person. It was incredible to think that I would be spending my summer with such an intelligent woman. After introductions I was bombarded with information on a disease called preeclampsia that would become my summer project. Dr. Hemmings informed me that preeclampsia is

a disease that occurs during pregnancy and causes high blood pressure. The condition can be fatal to the mother and the only known cure is to deliver the baby. However, the ailment can develop as early as the sixth month of pregnancy so the baby can be delivered up to three months early. The scary thing is no one knows the cause of preeclampsia.

Dr. Hemmings is just beginning her research so I was able to see the beginning steps of her work. I even managed to read through some of her grant. This was interesting because I was able to see the thought process behind her hypothesis. Her proposal is that preeclampsia is caused by a Herpes virus called cytomegalovirus (CMV). CMV is a type of Herpes virus that can hide within cells of the body; in fact, in a healthy individual the effects are asymptomatic, meaning very minimal, if any. Also, about fifty percent of people living within urban areas are CMV positive but probably do not know it. Researchers have already discovered that CMV can be reactivated during pregnancy. It is Dr. Hemmings' belief that when CMV is reactivated in susceptible women, it causes the high blood pressure of preeclampsia.

Throughout the program I have done a lot of cell culture work, growing up cells, splitting them and infecting them with CMV. We have also used Western Analysis to identify proteins; it works almost like DNA fingerprinting only for protein not DNA, and protein assays where you find out how much protein is in a particular sample. My favourite part of research is cell scraping. We would kill the infected cells and basically scrape them from the bottom of the cell plate. This is what we had to do in order to prepare for a protein assay or a western.

The WISEST Summer Research program has been an amazing environment for me this summer. Not only did I get to work in a lab and learn hands on about research, I also got to meet a lot of interesting people my age who share some of my interests. Of course, this is pretty intimidating at first, but I have made a lot of really good friends at the University this summer. I cannot wait to get back to school to tell all the new grade elevens about this program and to encourage them to participate next year because it is so worth it. I only wish grade twelve graduates were eligible to apply again!

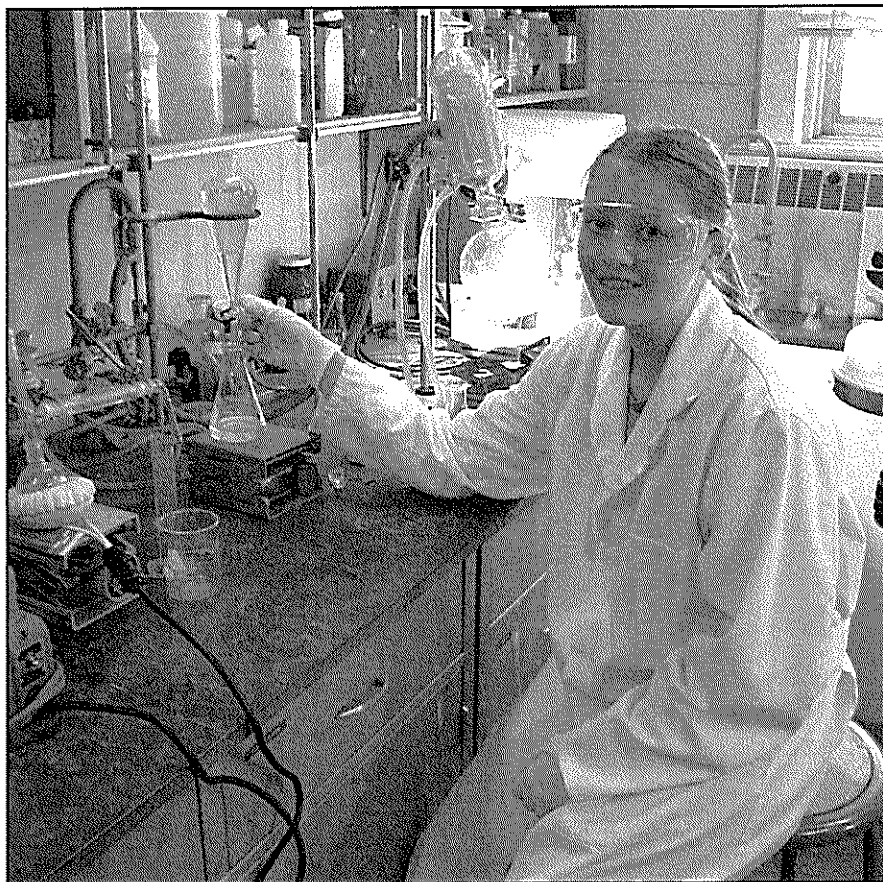


ALEXANDRA DOSSER - Mechanical Engineering
WISEST Supervisor: Dr. Walied Moussa
Sponsor: Faculty of Engineering

The first thing that comes to mind when I think about WISEST is my acceptance phone call. I was so excited that the whole time I was talking on the phone I was jumping around the house, grinning like an idiot and gesturing excitedly to anyone that would pay attention. Although I knew how unlikely it was, I pictured myself in a lab coat, gleefully rubbing my hands at the success of my latest experiment. Needless to say, that was not what I ended up doing this summer. The most important thing I learned from WISEST is that research is not all in the lab. There is a lot of work which goes on behind the scenes as well, and a lot of work also goes into spreading new knowledge around and putting it into a context that everyone can understand. That's where my project came in. Unfortunately, I was not participating directly in a research assignment. Instead I was working with Flash MX 2004, a web design and animation program, similar to those I use at my high school. In the lab, I was animating a MEMS device that

will be used in connection with scoliosis surgery. MEMS stands for micro-electro-mechanical systems. The first week, I spent my time learning how to use Flash, and doing some of my own background research, trying to come to some kind of understanding of what micro-electro-mechanical systems are, and why they are important. I learned that they are similar to integrated circuits, but they are better, because they have the capability to actively affect their environment. They are tiny, in the micro scale, and are excellent because they can be so easily bulk manufactured at low cost. They are used for a huge variety of things, including actuators and sensors. A good example of a MEMS device is an airbag accelerometer. I also looked up things like finite element analysis, piezoelectricity, Von Mises stress, and shear and normal loads, to get a very general idea of what MEMS are about. After that, I felt that I could start on the actual animation. I was working on ways to show the MEMS device "in action". It

had to be interesting and interactive, easy to understand, but still with plenty of scientific elements for those with a background in the systems. My part was to do the simple animations and general information; the more complex data was left for other members of the lab to fill in later. I needed to learn about MEMS, scoliosis, and Flash, which is a professional web design program. There are several components of a Flash animation: the most important are storyboards, symbols, buttons, tweens, and actionscript. All of these can be simple, or they can be really complex. To learn the specifics of the program, I read Internet tutorials, and books that I checked out of the library. Sometimes it was trial and error, and several times I used the basics that I knew to create my own way of doing something. I had to do several revisions, but by the fifth week I was finished. Having a good background knowledge of computer graphics gave me time to concentrate on other parts of the program as well, like the Wednesday afternoon sessions, and learning about the University of Alberta. The Friday group lunches and the various after-work events were always fun. They gave us the opportunity to socialize and make some friends among the other WISEST students, and the group discussions even gave me an idea of some courses I might like to take in University. However it is important to remember that WISEST is a job. And as with any job, there can and will be dull moments, anxious waiting, and long days when it would feel great to just be at home "vegging out". Experiments sometimes don't come out as planned, and more likely than not will create more questions. But research is about finding the answers, even if it takes time, and you get a real sense of accomplishment from handing in a project that will help make a difference to the group. And if at the end of the six weeks, you end up thinking something like "At least now I know that this career isn't for me," that's alright too. The important thing is that each student takes something with them when the program is over, be it scientific knowledge, work experience, or good friends. We all now know what kinds of jobs are available, we have had a glimpse into the "real world" of work and University, and we have an idea of what to expect. When I think about WISEST, I will remember group lunches, Fabulous Prizes, my surprise birthday party, touring the Atrium, eating out with the rest of the lab, and, most importantly, getting to meet dedicated people every single day.



RACHEL DUNCAN - Chemistry
WISEST Supervisor: Dr. Margaret-Ann Armour
Sponsor: Epsilon Chemicals Ltd.

Being one of the few chosen to experience research during this summer, it encouraged me to take my science classes more seriously. As I found real interest in these classes, I began to anticipate the ways in which the WISEST Summer Research Program would affect my future decisions when planning for a career.

I was placed under the supervision of Dr. Margaret-Ann Armour and Dr. Willie Hunter in the Department of Chemistry where I began to learn about their work in organic chemistry. At school there is little emphasis placed on organic chemistry, making me only slightly unprepared for this field of work. Both Dr. Armour and Dr. Hunter advised myself and the other WISEST student (also Rachel) who worked in the same lab, in learning many of the techniques used in organic chemistry labs.

The first week of work began with

Rachel and I taking on the challenge of completing an organic chemistry lab which was designed for university students. Stretching the proposed length of time of six hours of class work to an entire week, we learned through our mistakes and mastered many of the techniques, which we would use for the rest of the summer. Being able to complete this task successfully, it prepared both of us in the work we would do individually, taking on different areas of research.

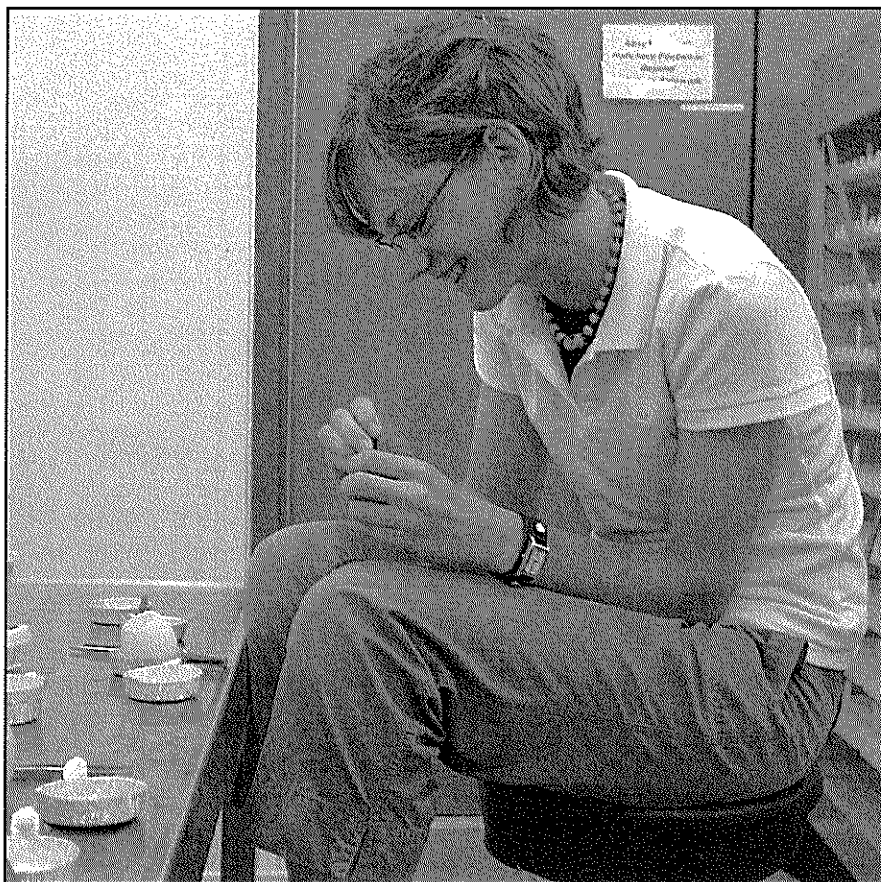
As my research project, I took on the challenge of searching for a way to make 2-4 dinitrophenylhydrazine, a chemical used to identify aldehydes and ketones, into products which would be easier to dispose of. Students of the University of Alberta continue to use this compound in their laboratories and presently send their wastes out of the university to be incinerated. I was to find a

process that required materials which were convenient and easy to obtain for researchers to destroy this compound. By using bleach (5.25% chlorine) stirred with the compound in water, the solution was left for 2h, 4h, 6h and 24h and then was tested for new products. Each time I followed the detailed procedures with minor or extensive changes, I learned about the building and destruction of compounds. Separating the products through Thin Layer Chromatography and Gas Chromatography I perfected these skills with many repetitive actions. Through many tests of trial and error, discussions and lessons at the chalkboard, and the knowledge of my supervisors, I developed the confidence to try breaking down the compound 2-4, dinitrophenylhydrazine.

My experience as a WISEST student allowed me to pursue a field, Chemistry, which I was interested in through school. During the summer I gained knowledge on how ideas are challenged and research is completed. Instead of having all of the answers set out in front of me, I had to search for what results could come from my actions. Trying to break down this compound established the difficulties that researchers have when results do not follow theories and predictions. Learning cannot be rushed at the convenience of the timelines that I set out but grows as I challenge ideas and results.

The WISEST Summer Research Program showed me the vast possibilities that there are in research, not only in Chemistry but in all areas of science. This opportunity has broadened my view on the prospect of working in a science related field and building on my knowledge learned during this summer job.

“...I began to anticipate the ways in which the WISEST Summer Research Program would affect my future decisions when planning for a career.”



KELSEY EVANIEW - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Gaylene Fasenko
Sponsor: Alberta Innovation & Science

My first summer job, I thought, would entail washing dishes, babysitting, or flipping burgers. However, I applied to WISEST and was accepted in the program, thus saving my clothes from the perpetual smell of grease. The experiences I had during the six-week program were extremely unique, not to mention absolutely amazing.

I, along with another participant of the WISEST program, was selected to work at the Poultry Research Center at the University Farm. The first day I arrived there, any preconceived notion I might have had was thrown firmly out the window. There were no stern looking scientists in white lab coats, nor did any chicken tried to peck my eyes out. There were rubber boots and coveralls, chickens that were more scared of me than I was of them (and I was terrified), fuzzy chicks that were much cuter than I expected, a water

fight and few trips for ice cream (for scientific purposes only, of course!)

My project was to determine if genetic strain influenced early embryonic growth and yolk utilization. I was very excited to start working on this project but I was also somewhat nervous; I knew nothing about chicken embryology. To my relief, within my first few hours at the farm, I was in a computer lab researching and reading background information. Although I found the next few days tedious as I continued to read research papers, I learned a lot of useful and important background information that pertained to my project. To determine if genetic strain influenced early embryonic growth and yolk utilization, we looked at several characteristics that could illustrate a difference between the two genetic strains; embryo weight,

shell weight, eggshell thickness, and shell pore numbers were measured. After weighing and numbering the eggs initially, they were placed in an incubated for 6.5 days. After this time had elapsed, the eggs were cracked open and the embryo and membrane removed from each egg before the numbers of pores were counted.

When I applied to the WISEST program in April, I thought it would be, at the very least, something to do over summer vacation. I figured working in a research laboratory would break the monotony of summer vacation nicely. I didn't know that the six weeks I spent as a research assistant would give me some of the most interesting and informative moments I've had this summer. My research team and I, in addition to working on my project, shared many laughter-filled moments throughout my six weeks with them.

Working off campus, I was unsure of how many other participants of the WISEST program I would meet. But, because of the Wednesday afternoon sessions, I was able to interact with the other students and become friends with many of them. The Wednesday sessions also provided me with knowledge beyond that which I learned in a laboratory. I discovered what I could do with a science or engineering degree and how to balance family with career, to name a few of the things I learned.

Overall, participating in the WISEST program was one of the best things I've ever done. The six weeks I spent at the University Farm were extremely enjoyable and flew by surprisingly fast. I learned a great deal of information pertaining to lab procedure and researching, but, more importantly, I had an awesome time doing it.

"The experiences I had during the six-week program were extremely unique, not to mention absolutely amazing."



NICOLE EYOLFSON - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Stephen Strelkov
Sponsor: Faculty of Agriculture, Forestry & Home Economics

When I was filling out my application for the WISEST program I wasn't sure if this was what I really wanted to do with my summer. I knew WISEST would be a great opportunity but I had no idea how much fun it would end up being.

The first day of the program seemed so overwhelming. So many names to remember, campus seemed like a maze, and everyone had such high expectations. After some adjusting and getting lost on campus at least ten times, WISEST gave me the chance to meet some amazing new people and learn invaluable information about university life and what it is like to work in a lab.

I ended up being placed in Dr. Stephen Strelkov's plant pathology lab researching clubroot on canola. Clubroot is a soil-borne disease new

to Alberta that affects plants in the crucifer family. The disease causes the plant's roots to swell inevitably making the plant to stunted and prone to wilting. Clubroot reduces crop yield and remains in a field for at least 18 years so its effects can be detrimental.

In the lab I performed experiments such as DNA extraction, gel electrophoresis, pH tests, bioassays, isolations, and inoculations. Of course there was some monotonous work such as sifting and grinding dirt as well as washing plant roots. Usually working in the Agriculture and Forestry building was great as there were green houses to visit and growth cabinets to monitor. My main project involved a bioassay where I took soil samples from a field that was infected with clubroot. I then planted canola in the soil to see if

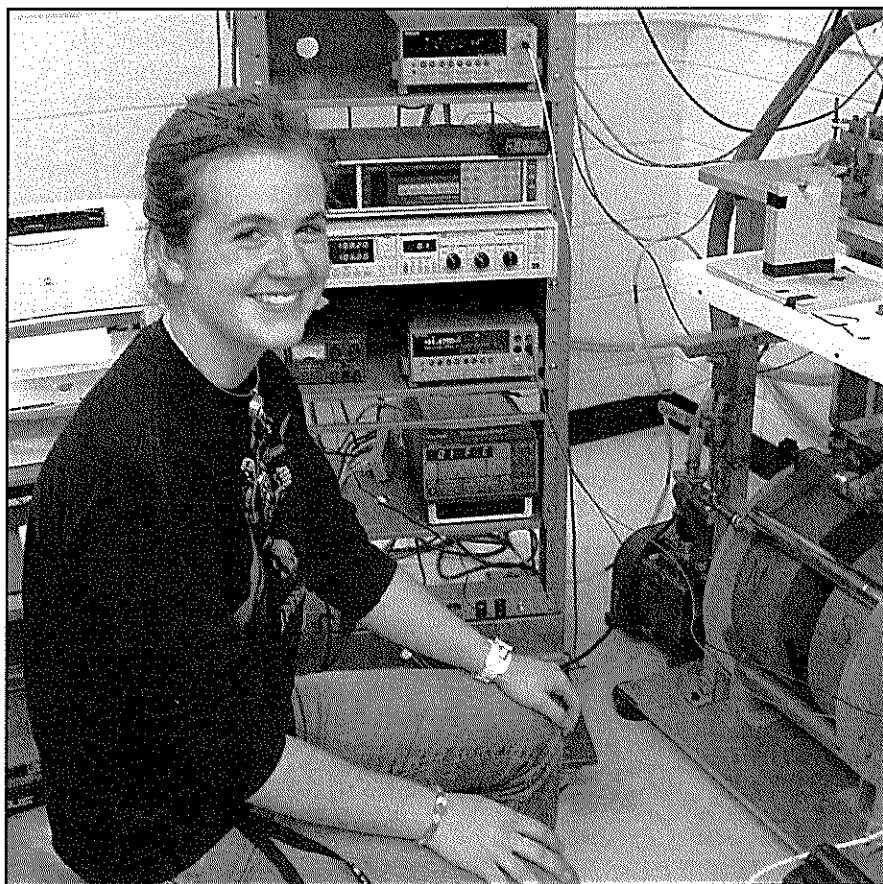
the severity would vary from one area of the field to the next. The results ended up being surprising as we found that the clubroot was more severe than expected and that it had spread across a river that ran through the field. Another interesting thing that I had the opportunity to do in my lab was inoculating the plants. This is where we purposefully infected seedlings with the clubroot pathogen. This work was necessary in order to test out different treatments in hopes of finding a cure for the disease.

WISEST isn't all about work in the lab but a lot about meeting people and forming life long friendships. I had the opportunity to live in St. John's residence which transformed my summer job into the best science camp ever. Residence was a blast. We went shopping, had movie nights, and took way to many pictures. Other outings included going to the waterpark, rez formal, rock climbing, relay games in costumes, and the Harry Potter party. Going "home" to residence every night after work gave me something to look forward to all day long.

Wednesday afternoon sessions and evening activities were enjoyable and also gave us a chance to get to know a few more of the 70 WISEST students. The Wednesday sessions exposed me to completely different areas of research than what my individual project consisted of. The sessions showed just how many opportunities there are for young people entering university and beginning a career. I was exposed to several interesting fields that had been unknown to me before and I now have a better idea of the education path I want to take. There were always words of advice as everyone seemed so willing to help and to pass on the lessons they'd learned when going through school themselves.

To accomplish great things, we must not only act, but also dream; not only plan, but also believe.

- Anatole France



ERIN FAUGHT - Physics

WISEST Supervisor: Dr. Jan Jung and Dr. Kim Chow

Sponsor: Faculty of Science

My name is Erin Faught, and the WISEST program graciously accepted me this summer into their program to participate in a research project in the Physics department. My personal research project was Colossal Magnetoresistance in Manganites; which at first obviously sounded intimidating, but I have learned extensively about over the six-week work period. This essentially means that at a certain applied magnetic field, certain metals or compounds, in my project, specifically a compound containing an oxygen and magnesium family, will have a "colossal" (sometimes thousands of times) drop in resistance allowing an electric current to flow very efficiently. This is a minor component to the overall project of superconductors; a substance with zero resistance and amazing technological applications. Having joined the project with what turned out to be absolutely

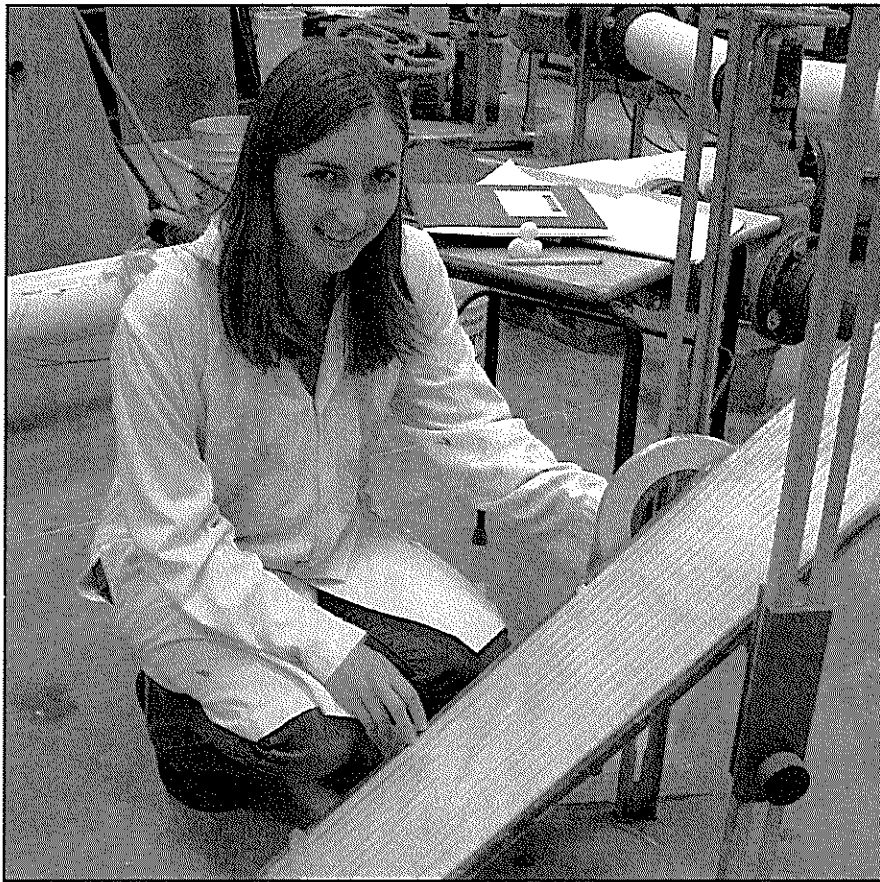
zero pre-existing knowledge on the subject, I am still shocked to realize how much I actually learned through this experience. It is an incredibly complex subject, and frankly there's only so much I can learn not having taken many quantum physics or university math courses in the past. I am sure my knowledge hardly scratches the surface of what there is to know, but I have learned all and beyond everything that is really necessary for any 16-year-old girl.

My first few days in the lab were pretty nerve-racking; trying desperately to always be helping wherever I could and trying to absorb a lot more information than I really was capable of. I was bombarded with more complicated and intellectual terms in my first few days than I have throughout the expanse of my entire education; not to say that the staff and research team were not patient and supportive, because

they were just that. My partner, Pam, and I were treated very kindly and the entire team proved genial and helpful, especially the undergraduate student we spent most of our time with, Mehmet Egilmez. We eventually came to the realization that we were not expected to understand every single concept immediately after being introduced to it and that the program was simply to introduce us to the research and lab environment and to become a little more knowledgeable in the subjects we were most interested in. Once we became a little more relaxed and realized we didn't always have to be doing something groundbreaking, the lab became more enjoyable and the laid-back environment was definitely a desirable feature for a summer job. Though we couldn't be directly involved in the majority of the processes, Pam and I observed many very technical experiments and learned the implications of our obtained results. Physics is definitely a science of patience and every process is a long waiting game, but the time was filled up with pleasant conversation with Mehmet, who is just awesome and pretty much the greatest cook and hospitable person ever, and Pam, who turned out to be a sensational person and the best lab partner I could have asked for.

With the WISEST experience also comes many fantastic activities, people and, of course, fabulous prizes. I met many people who I hope to remain friends with in the future, and our two student coordinators, Kim and Jenn, being not much older than ourselves, were very easy to get along with and extremely helpful. I have also learned a lot about potential life choices through campus tours, visits to business locations and information sessions, and spent a lot of time just hanging out with 69 other people that are just like me.

WISEST proved to me that having a passion for science, while geeky, isn't a flaw in the least. I got to know so many amazing women and men in this program that are as passionate as I am and have inspired me to pursue what I love despite any obstacle or barrier. I plan to do just that cause, frankly... science rocks. And since we're all apparently really wise, we can do pretty much do whatever we want.



JACLYN FEDORUS - Civil and Environmental Engineering
WISEST Supervisor: Dr. David Zhu
Sponsor: Faculty of Engineering

Once upon a time there was a young girl that attended the DiscoverE! science camp at the University of Alberta during the summer. As she grew older, her interest in science grew also. It grew so much in fact that when she heard of the WISEST Program she was quick to apply. Her excitement was so great that when she received the phone call confirming her participation in the program, she whooped for joy.

Her acceptance at WISEST placed her in the Department of Civil and Environmental Engineering under the supervision of Dr. David Zhu. Her, and another WISEST student Jessica Poon, were to aid Dr. Zhu and his students in their water resources research. The water resources team was fantastic. Instead of having the students simply focus on one lab the team made sure that they got to see the many

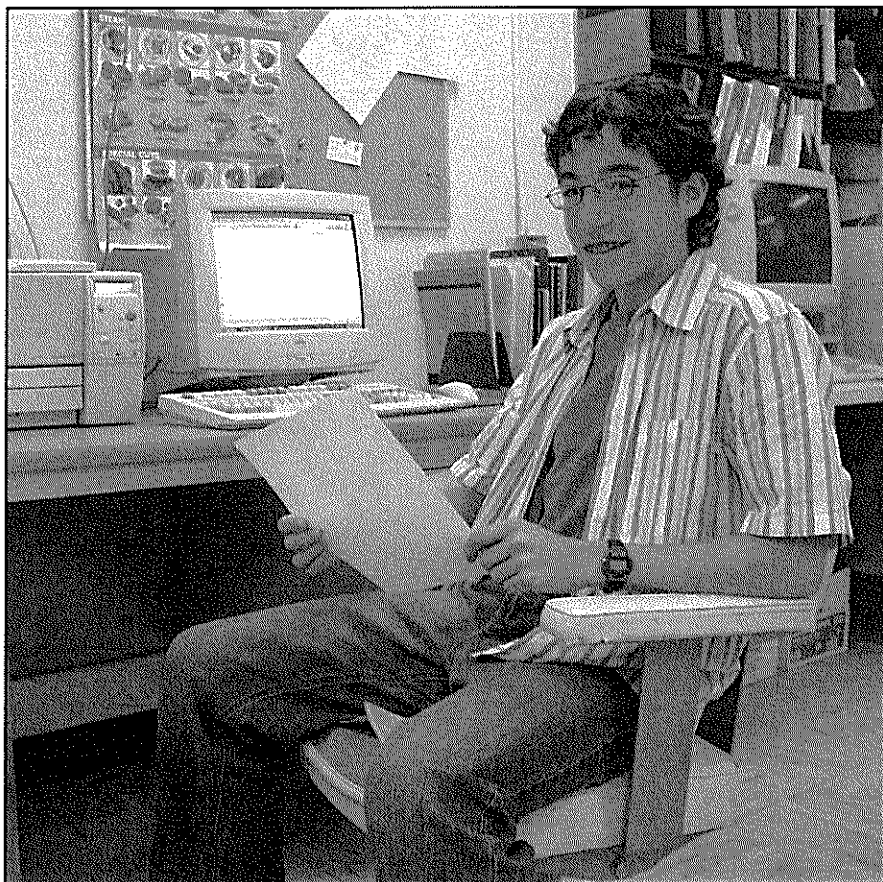
different experiments that were going on in the Blench Hydraulics Lab in the basement of the new NREF Building.

The first of these experiments dealt with the Rat Creek Combined Sewer Overflow Structure and aimed to look at the amount of sewage dispersed into the North Saskatchewan River during times of heavy rainfall. The experiment, though still in its infancy, provided the students with a chance to see the experimental setup and the process through which kinks are removed and the experimental trial is developed. The second of the experiments looked at selective withdrawal using a temperature control curtain. In layman's terms, salt and freshwater were used to mimic the mixing of hot and cold water when water is removed from a dam reservoir. To view the mixing process, the salt water was dyed and

both waters had special particles mixed in. A laser was then used to facilitate the viewing and visual recording of the mixing process. The experiment allowed the students to see what type of research is possible with the higher technology of such things as lasers. The final experiment that the students were exposed to was a fundamental study that looked at the velocity profile within a sewer junction and aimed to corroborate the findings of a related study. Using an Acoustic Doppler Velocimeter the x,y and z velocity components were measured and recorded electronically in the effort of being able to analyze the manhole. This time, the experiment opened the students' eyes to the necessity of quality city planning, right down to the sewer system. All studies were experimental, that is they relied on physical models to simulate the real life conditions, yet computational studies were also done to verify the data collected and from this, the young students got to see the many possibilities that engineering software presents.

Aside from learning from the experiments a great deal was also learnt from the graduate students in water resources. They were kind, friendly and always ready to explain an unknown concept. Their help in understanding the foreign ideas of fluid mechanics was invaluable and they always made sure the work environment had an element of fun.

Overall, the young girl had a great summer. She got to experience many new things, from the other WISEST students with whom she shared an office (Emma Heydari and Sarah Carpentier) to the engineering ideas she learned about. She found the WISEST Program to be an extremely valuable experience as it provided much knowledge concerning her future post-secondary and professional career; and who knows, she just might live happily ever after because of it.



HENRIQUE FERNANDES - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Wendy Wismer
Sponsor: Alberta Innovation & Science

When I first heard about the WISEST Summer Research Program, I thought that it was a great opportunity to get a job and also learn about working in a lab. I applied for the program and was soon informed that I had been placed into the department of Agricultural, Food, and Nutritional Sciences, and that I would be working under the supervision of Dr. Wendy Wismer, but mainly with two grad students, Theresa Lirette and Tristin Brisbois.

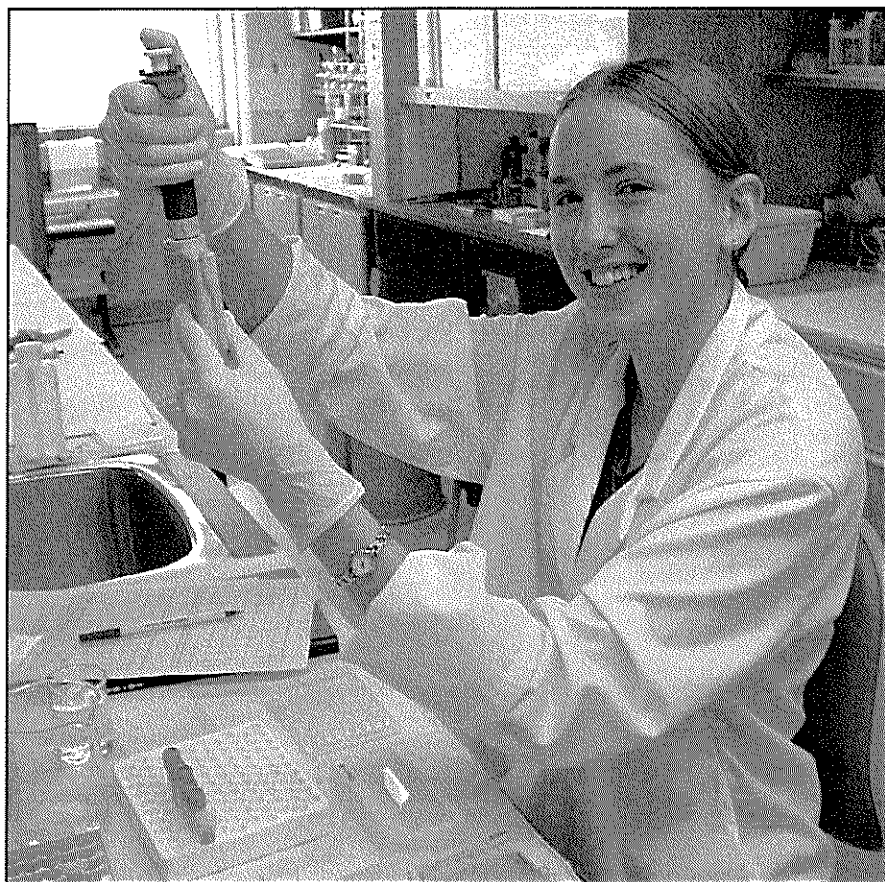
For the majority of my time during the WISEST program I worked on validating a food preference checklist that had at first been developed in the United Kingdom. To validate the checklist we had to do lots of surveys asking people to fill out questionnaires on their hunger level, food preferences, and also to fill out the checklist. We asked all

participants to return in a week's time to fill out a second, similar, questionnaire so that we could compare their answers and check for consistency. The grad students I worked with were trying to validate the checklist in a general population before asking cancer patients to fill out a similar one. A cancer patient's sense of smell and taste is often weakened or lost as the cancer progresses or as a result of treatment. As a result, they tend to eat less, and due to their lower calorific intake they lose weight and sometimes even begin to suffer from anorexia. It is therefore important to take the foods that cancer patients like and eat, and develop similar food products that contain a greater amount of calories in order to compensate for their decrease in food consumption.

Another project that I worked on

involved the chemical and consumer analysis of different types of canola oil. The oils were extracted using different methods. Currently canola oil is extracted from the seed using hexane, and although this is a cheap and relatively effective method, hexane always manages to leak into the environment and cause damage. A new form of extracting the canola oil, using super critical carbon dioxide is less harmful to the environment and if actually more efficient at extracting the oil from the seed. The conventional form of oil currently available on the market is quite refined and that is why it has such a clear color. The canola oil extracted with the super critical CO₂ is less refined and thus has a darker color due to the greater amount of plant sterols in the oil. Plant sterols may reduce cholesterol and may also be effective at lowering the risk of heart disease. To determine if the average consumer would buy this healthier form of canola oil even though its appearance is quite different that what people are used too, we did surveys asking those who were interested in participating if they would buy the new form of oil before and after learning about its nutritional content and how it is processed. Although many people did not like the darkness of the new oil, many also stated that they would buy the oil even though it might cost more. I also worked in a chemistry lab to obtain some information on the content of the different types of canola oil. By separating the unsaponifiable matter, which includes the plant sterols, one can then test to see what sterols are in the oil and in what amounts.

The WISEST program, however, does not only involve work. Every Wednesday I participated in different activities ranging from off campus tours to small group discussions with scientists and engineers already established in their field. WISEST has been a great experience that provided me with a lot more than just a summer job.



JACLYN FINK - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Spencer Proctor
Sponsor: Alberta Innovation & Science

Science. Knowledge. Opportunity. These describe only a fraction of what the WISEST Summer Research Program has given to me. Throughout this amazing summer, I have had the opportunity to work in a research lab, meet many other girls with a passion for science, participate in great activities coordinated by WISEST and generally, expand my horizons.

I applied for the WISEST program because of the unique opportunity being accepted would mean to me. It would allow me to see what working in a research lab is like and help me explore the options I have in going into the sciences.

I was placed in the Department of Agriculture, Food and Nutritional Science under Dr. Spencer Proctor. Dr. Proctor's lab group works to better understand the link between nutrition and dietary-related diseases,

including Diabetes, Cardiovascular Disease, and Obesity. I worked with Angela Harestad, running assays on rat plasma. The lab has both lean and obese rats that they use in their research. We would test the rat plasma for cholesterol, triglyceride, HDL and LDL levels. As well, we made a lot of rat food!

Near the end of the program, Angela and I and a few others in the lab had our own blood samples taken. I dragged my brother along in the name of research. They took 14 tubes of blood! I'm sure my brother was not impressed! Angela and I tested the plasma from these blood samples, as we did for the rats. Basically, my individual project is on whether or not cholesterol levels are similar between family members.

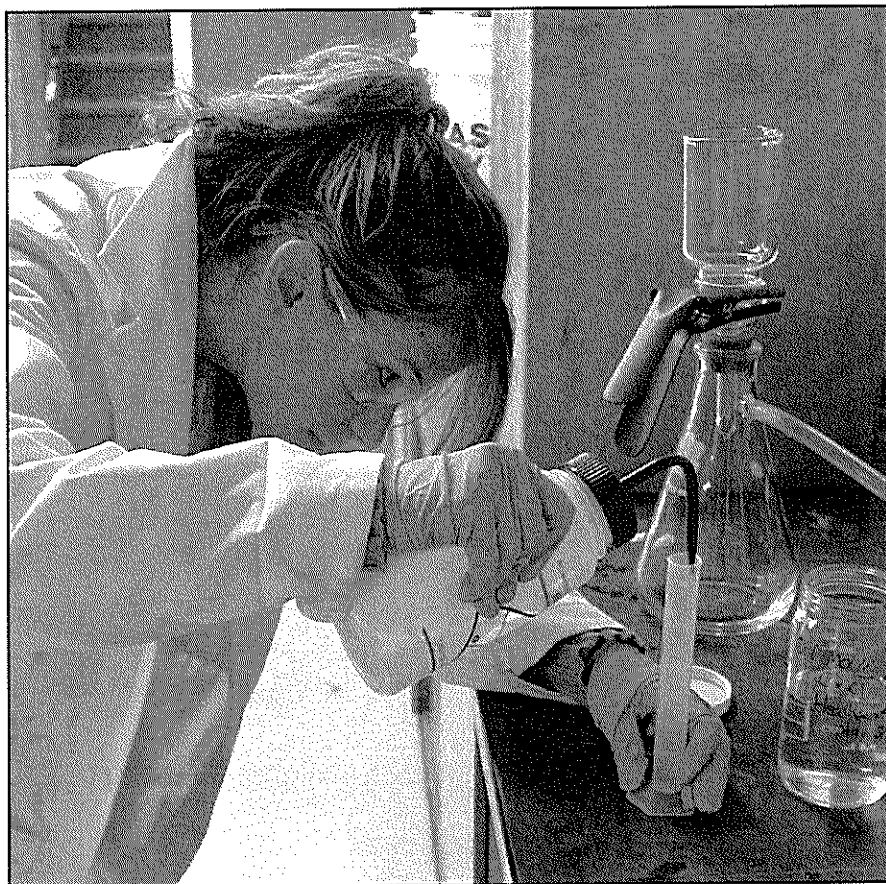
WISEST was not just work. Far from it! Many fun and educational activities

were planned for the program. We started off the summer with a pizza party and scavenger hunt. It was such a blast! Every Wednesday, educational activities were planned. One of my favorite activities was the small group discussion. We were able to sit in a room and talk about anything and everything with women working in science or engineering. It was a great way to not only see what is out there but to hear first hand what working in the field of science is like.

I am entering Grade 12 in September. It is very stressful to realize that I have to start applying for universities so soon! From the Wednesday activities and working in a lab, I have discovered much about myself and my goals in life. The WISEST program has strengthened my passion for science. Although I am still not sure which path I want to take directly, I feel more confident about starting out in science. I have come to realize that most professionals have not ended up where they are today by taking a straight line towards a specific goal. I am very much a planner and organizer, but talking to those in the field has given me more confidence about taking a year of general science, or deciding upon a specific program and seeing where that will take me. It is totally okay, and very common, to change your mind!

Being able to be a part of the University of Alberta was another bonus of this summer. When I first arrived in Edmonton I was in awe of the size of the campus. I thought for sure that I would never be able to find my way to work! I now know my way around pretty well. The U of A has such a beautiful campus. I love the atmosphere here and can't wait to attend this university in the fall of 2006.

I have made so many friendships and learned so much about the field of science this summer. I would not trade in this experience for anything. If I had to sum up my experience, and the knowledge that I have learned during the WISEST program, I would say: The world of science is full of endless opportunities. The sky's the limit!



JENNIFER FISKE - Chemical and Materials Engineering
WISEST Supervisor: Dr. Tom Etsell
Sponsor: Syncrude Canada Ltd.

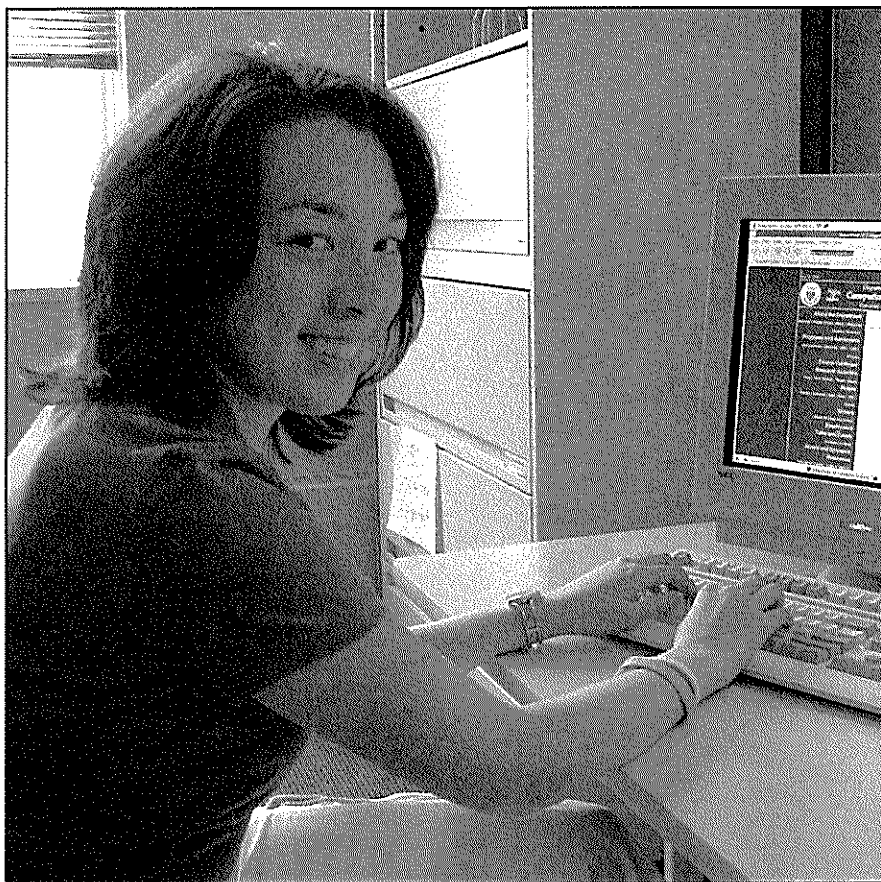
Ever since I can remember I have had a passion for learning. Originally this passion took the form of seeking out new and exciting words to use in my everyday speech and gradually morphed into eagerly attempting to read and write. It was as I progressed through school, however, that I found my interests in learning to be particularly honed on Math and Science. I loved to problem solve and experiment and jumped at the opportunity to take advanced Math and enriched Science classes in junior high. My love for these subjects only grew upon entering high school, ready to dive into Biology, Chemistry and Physics. Chemistry, in particular, allowed me to see a future in the Sciences. Therefore, when I heard about the WISEST Summer Research Program I was absolutely thrilled. This program embodied everything I was looking for: a summer job, an amazing learning experience, and an insight into university life.

For the six-week duration of this program I was placed in the Faculty of Chemical and Materials Engineering. Heather Kaminsky, the grad student I had the pleasure of working for, is involved in characterization of oil sands tailings. I found the oil sands very interesting but did not know very much about them and was eager to learn more. I was aware, of course, that the oil sands were a booming business in Alberta but to what extent I was somewhat blind. Oil in Alberta provides thousands of jobs and millions of dollars in royalties for the government. In 2002-2003 alone the oil sands provided 183 million dollars for the province. There are three major oil sands deposits in Alberta: one near Peace River, Athabasca and Cold Lake. The largest of these deposits is the one located at Athabasca, which contains approximately three quarters of Alberta's Oil Sand's Reserves and are incredibly rich in both bitumen content

and valuable minerals.

However, though the oil sands are a valuable resource vital to Alberta's economy they still pose many important problems to the environment. Each barrel of product requires 1 cubic meter (~2 tons) of oil sands. For each ton of oil sand mined approximately 3.6 tons of tailings are produced. Although some of this is eventually recovered as recycle water or beach sands, ultimately, each cubic meter of ore removed for the sands produce about 0.4 cubic meters of mature fine tailings. In 2002 approximately 216 cubic meters of tailings were being produced per day, therefore as of 2002 approximately 400 million cubic meters of tailings were being stored in tailings ponds at Syncrude and Suncor. These tailings settle to about 30wt% solids in active ponds and up to 50wt% solids in inactive ponds and are therefore uncooperative in efforts to recover water or land from them. Furthermore, the close proximity of the tailings ponds to the Athabasca river mandates that the ponds be monitored for decades after mind closure to ensure no contamination occurs. This is a major environmental hazard. Understanding the contents of the oil sands tailings is a vital step in finding a way in which to deal with the waste product.

This is why the work that Heather, and countless others, do is so very important. They attempt to discover what minerals and clays are present within the tailings in order to understand their properties. This would lead to the development of more effective techniques for separating valuable minerals as well as water and sand out of the tailings so that the immense volume of waste product could decrease dramatically. Also, if the valuable minerals within the tailings (such as Zr, Ti, and Fe) could be effectively separated many economic offshoots would be produced. I find the implications of this work incredibly interesting and am hugely grateful for being given the opportunity to learn as much as I have this summer. This experience will be one I carry with me for the rest of my life and that will help guide me in my future. A HUGE thank you to WISEST, Syncrude, and Heather Kaminsky!



MORGAN GWIN - Computing Science
WISEST Supervisor: Dr. Carol Smith
Sponsor: Edmonton Glenora Rotary Club

I first heard about the WISEST Summer Research Program (WSRP) through a friend of mine who had gone through it a couple years ago. I've been wanting to participate for a long time, so when I got the phone call I was ecstatic. I had hoped to be working in the Engineering or Chemistry, but they informed me that I'd be working in the Faculty of Computer Science. I like using computers, but this was definitely not my first choice. In fact, I didn't even know that degrees in Computer Science existed. I remembered what I had been told many times: "The WSRP is all about the experience. Even if you don't like your area or research topic, you'll have the experience, and you'll have a better idea of what you do or don't like." With this in mind, I decided not to switch. The worst that could happen is that I'd dislike my job for 6 weeks, but I'd still be learning new programming

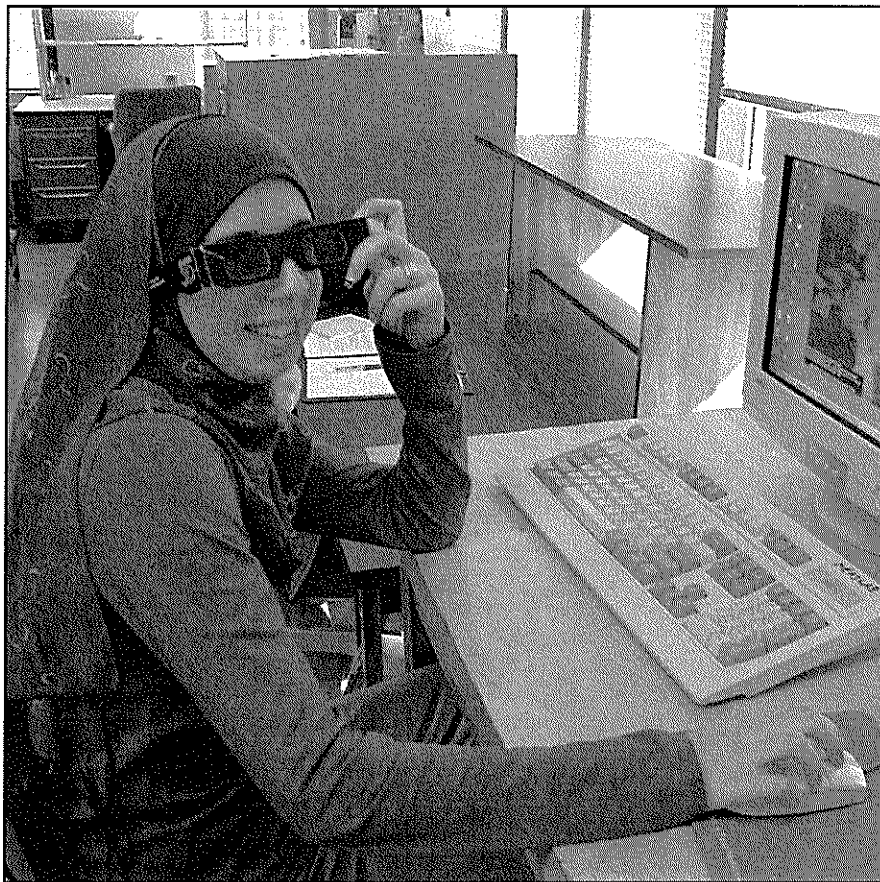
languages and get better at using a computer, which couldn't hurt since almost every job requires computer skills.

For the six-week duration of the WSRP I spent my time working with the Systems Support Group (SSG) of the Computer Science faculty at the University of Alberta. I was partnered with Dael Jarvie, another WISEST student. Under the supervision and guidance of Carol Smith, head of the SSG, and undergrad student Laura Watson, we were able to create two permanent web pages that will be hosted on the University's web page. Our projects were centered in web-based coding, and thus we needed to learn several different coding languages. First, we learned HTML (to hard code information), CSS (to change the appearance and styles on our page), and PHP (to create forms and write functions) to create a practice

web page, and then we applied what we had learned to our first project. Our project was to re-do the Donations and Sponsors Wall, and we were given a list of over 100 names. We wrote PHP scripts that would order the names alphabetically by last name and then place each name into a separate cell in a table. We then formatted the table cells with CSS to look like plaques on a wall, and added links to jump to each letter group of names.

Our final project was to create an RSS feed that will be used by the SSG to keep the faculty and students updated on system (computer/server) outages. To make this page we learned the basics of a MySQL database, as well as XML, XSL, RSS, and XPath. We combined all of these scripting languages together to create a self-updating RSS feed, a working database to which you can add, modify, and delete "notices". We also created a search page that enables you to, among other things, find recurring problems in the system or target computers that seem to break down often. Our RSS feed will be up and running soon on the University's website, and it is exciting to think that this will be useful to many people in the future, and that what we did for six weeks will be used daily instead of sitting on a shelf in a library.

Though I probably won't end up with a degree in Computer Science, I greatly enjoyed my time spent working with my team on campus. I've met a lot of other girls who share my interest in science and math, and the experience has been great. The coding languages that I've learned and the problem solving skills that I've gained will hopefully be useful in designing web pages for various tournaments at my school. Even though my project wasn't the lab research like I had expected, it was still interesting. We were constantly changing the appearance of the web pages and adding new options to allow the pages to be more functional, so it was much more interesting than what I had thought doing a project for Computer Science would be. The program was definitely worthwhile, and I would recommend it to anyone who is interested in math, engineering, science or technology.



WAFAA HAJAR - Mechanical Engineering
WISEST Supervisor: Dr. Lorenz Sigurdson
Sponsor: Human Resources & Skills Development Canada

I have always enjoyed my math and science classes and believed that I would pursue a career in Engineering. Then I reached high school and realized that there are different streams of Engineering and I have to choose one. My physics teacher suggested WISEST as the perfect opportunity to find out more about Engineering.

On my application I indicated that I was interested in Engineering. As a result I was placed in the department of Mechanical Engineering in the Virtual Fluid Dynamics Lab under the supervision of Dr. Lorenz W. Sigurdson. In my lab water tunnels were everywhere and I have to admit that it was strange. The members of the lab helped overcome this oddness.

I was introduced to my project two days later. I knew it was about 3D but Dr. Sigurdson told me more about

stereoscopy which was the area of my project. I researched stereoscopy, and got to know this interesting subject in details. I did not know anything about stereo from before, but in a couple of days, I learned enough to carry out my research. Stereoscopy is the seeing of objects in three dimensions and could be done in many ways. One can use the side by side technique, make an anaglyph, use shutter glasses or buy an expensive Sharp LCD screen to view an object in three dimensions.

I was to choose a method of viewing stereo and thought that the anaglyph was the most affordable way with no effort to put in to in order to achieve the desired effect. An anaglyph is a motion or still picture consisting of two somewhat different images of the same subject in different colors that are superimposed on each other, generating a three-dimensional effect when viewed through two

correspondingly colored filters.

To make an anaglyph, a picture of the object is taken, the camera would move horizontally a distance of 6.5 cm which is the distance between the eyes, and then another picture of the same object is taken. These two images are then changed to blue and red colors on a computer and placed on one another. When viewed through anaglyph glasses, the 3-D effect could be seen coming through.

I began my project by making some anaglyphs and experimenting with it. I realized that depending on where I stand, the anaglyph was different. It either got better or worst. Based on my information, I informed my supervisor that I will be working on determining the best position to view an anaglyph. Dr. Sigurdson went through some details and we agreed on a procedure that I followed in order to achieve the goal of my project. Before that we gave my project the name of "Determining an Optimum Ratio For 3-D Images"

To determine this "optimum image displacement / distance away from anaglyph" I used a tripod where I would stand at a certain distance away from the computer screen and use two images of the same cloud formation to create an anaglyph. I displaced the two superimposed images until the desired effect was produced. I measured the distance that these images were displaced and made a chart. I kept changing the distance away from the computer screen and used anaglyphs to determine the displacement. After obtaining a large amount of data, an optimum ratio was determined.

My findings can be very helpful in labs where an image needs to be available to analyze an experiment conducted months before. This was my project, and although time was a little short, this was the best summer I have ever had. The graduate students in my lab were supporting and Dr. Sigurdson was patient and a great mentor. After spending six weeks in the department of Mechanical Engineering, I think I know which stream of Engineering I will study and that would be Mechanical Engineering. This decision would not have been made without WISEST and Mrs. Malayko.



ANGELA HARESTAD - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Spencer Proctor
Sponsor: Suncor Energy Foundation

When I first heard of the WISEST Summer Research Program I had high hopes, but they were nothing compared to the experiences I have actually had here.

Besides the research and lab work—the most obvious benefit of the program, I have learned immensely from the WISEST Wednesday afternoon sessions, working on the university campus, exploring the city, and living in residence. What I least expected from the program, however, was the level of personal involvement issued by the WISEST/residence coordinators and lab supervisors.

Not only did I learn immensely from these people, but I made some strong friendships with them.

I have been working with Dr. Proctor in the area of agriculture, health and nutritional sciences doing research on

cardiovascular disease and obesity.

Using the JCR:La rat (because of its similar metabolic behavior to humans) we are testing how different controlled diets (such as medica 16 or high fish oil diets) affect the rats' weight and CVD's. Our interpretation of the effectiveness of each diet is derived from the results of several different assays run on the rat plasma. The different assays include tests for cholesterol, high density lipoprotein (good cholesterol), low density lipoprotein (bad cholesterol), triglycerides, glucose and protein.

Besides running assays on the rat plasma, we were privileged with the opportunity to test our own blood. Nearly everyone in our lab participated and Jaclyn (a fellow WISEST student) and I were able to find some very interesting results.

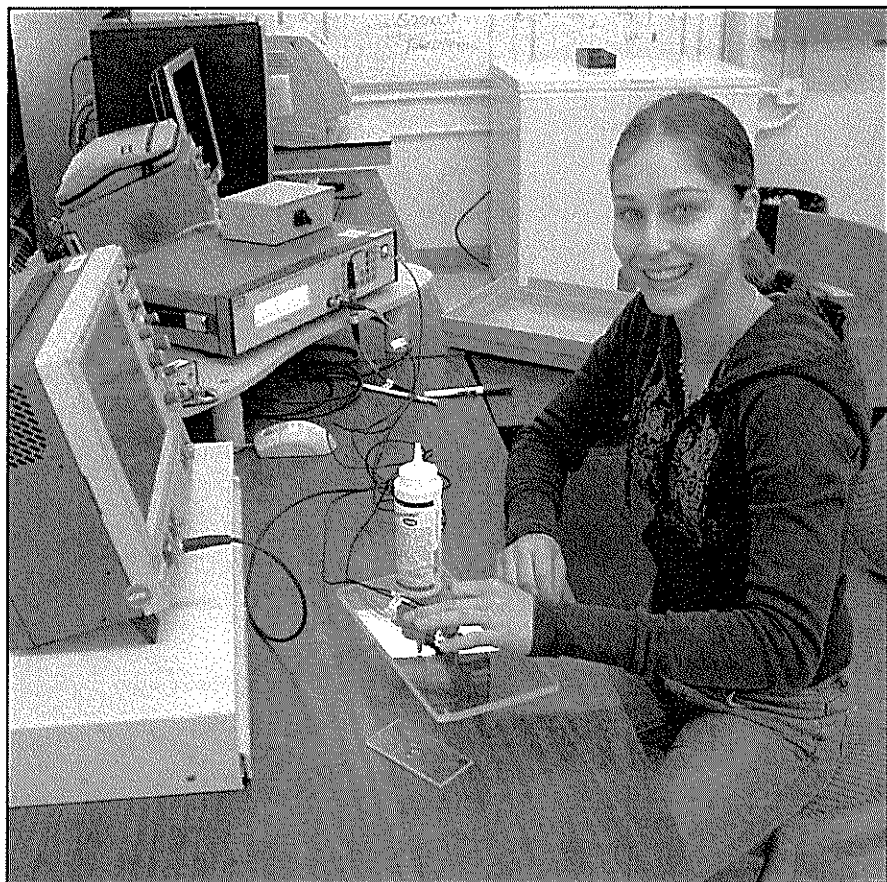
The research I have done over the six weeks has made for a very exciting summer job, to say the least.

Other appealing components of the program were the WISEST educational and social events. My advice to anyone planning to join the program is to prepare to ask and learn lots about university and occupational choices. There are many opportunities during the Wednesday afternoon sessions to speak personally with women and men in numerous different fields. Personally, I have learned a lot from it. I also had fun with ultimate frisbee and Friday lunches.

Residence has also been great. Everyone has become so close to each other that we're almost like family now. Living at St. John's has eliminated any doubts I once had about living in residence during university. In the short six weeks that I have been here we have had many memorable times. These include our costume party at Horlac Park, the rez formal at Jubilations, Klondike Days, our mass visit to the water park, playing soccer and ultimate frisbee, Shakespeare in the Park, and my all time favorite night of home-perms, hair cuts and hair dye. Of course none of this would have been possible without our wonderful residence coordinator, Selina, who was just like the rest of us when it came to hanging out and having fun. I won't go into detail but you can take my word when I say staying in rez has been a lot of fun.

I knew participating in the WISEST Summer Research Program was going to be an amazing educational experience, but I never thought it would end up being the best summer of my life.

"Not only did I learn immensely from these people, but I made some strong friendships with them."



ARIEL HENDIN - Radiology and Diagnostic Imaging
WISEST Supervisor: Dr. Lawrence Le
Sponsor: AWSN

Upon receiving a call in May to let me know that I had been accepted into the WISEST Summer Program, I was very excited to hear the news. I had high hopes for a great experience, and the last six weeks have not disappointed. I was placed in the laboratory of Dr. Lawrence Le, in the Department of Radiology and Diagnostic Imaging. Dr. Le and his research team are studying the potential use of ultrasound in diagnosing osteoporosis, a project involving a lot of physics and computer analysis. While my interests lie primarily in chemistry and biology, I was looking forward to learning new skills and exploring physics concepts in the lab. I was a little shocked when I first walked into the lab and saw, not test tubes and chemicals as I had expected, but computers and one other strange instrument (an

oscilloscope, which I would soon use)! However, I quickly found out that this laboratory would not be at all like what I had expected or previously encountered in science class; in fact, this summer would be a different experience altogether.

The first major experiment that I would perform involved using the oscilloscope, a device which measures a potential difference and graphs this as voltage versus time elapsed on a computer screen. In the lab, the oscilloscope is used in conjunction with piezoelectric crystals – when electricity strikes the crystals, they will change the energy into ultrasonic waves to be emitted into a medium; then, when the waves have returned, they will be transformed again into electricity and picked up by the oscilloscope. For Dr. Le and his research team, the purpose

of this procedure is to measure the velocity of ultrasonic waves through bone, but I was to do the same using pieces of acrylic resin. In order to complete this experiment, I needed to become more proficient at using a computer for new functions. I learned how to enter code to make graphs and manage data using MATLAB, an engineering software program with which I would experience successive bouts of frustration and delight as the programs I had created finally worked! The bulk of my work in the lab consisted of writing up a lab report of the experiment which I had performed, a long endeavor which would teach me how to write a scientific paper suitable for submission to be published. While this skill wasn't the most exciting to acquire, I know that it will be invaluable to me in the future.

Another great asset which the WISEST program provided was the knowledge of life in a research lab and about opportunities for careers in science. Before this summer, I had been unsure of what particular area of study I wanted to pursue in university, since almost everything to do with science and math had interested me, but the program has helped me narrow my focus and become more certain of the direction I want to take.

Dr. Le thoughtfully managed to arrange tours of the radiology department of the University Hospital and the MRI research centre, both of which I enjoyed immensely. These tours, in addition to the interesting Wednesday afternoon sessions spent together with the other WISEST students, were the highlights of my experience.

Although my time in the lab wasn't always exciting or fast-paced, this was minor in comparison with all that I gained this summer. I will come away from my six weeks with WISEST possessing more insight into research science, having made valuable friends and contacts for the future, and with even more passion to pursue a career in science.



EMMA HEYDARI - Civil and Environmental Engineering
WISEST Supervisor: Dr. Tim Joseph
Sponsor: Suncor Energy Foundation

When I was first informed that I would be participating in the 2005 WISEST Summer Research Program, I was thrilled at my luck – the good fortune that had landed me the summer job of a lifetime. At the same time, however, panic-stricken thoughts of my inadequacy, getting lost on the university campus, and having a supervisor that closely-resembled Hitler were also enough to terrify me in the weeks leading up to the start of the program. In hindsight, after spending six weeks with some of the most welcoming and passionate people I have ever met (including my supervisor), I realize that I was only right to think I was lucky.

Throughout the past six weeks, I worked closely with Dr. Tim Joseph in the department of Mining Engineering. My partner, Sarah Carpentier, and I were given two projects to work on. The first project investigated how the shape of tires used for mining machinery is

affected by the weight of the equipment they support. Specifically, we were given the task of determining the relationship between the force exerted by a load and the area of the resulting imprint left by the tire on the ground. We also investigated how this relationship was affected by the internal pressure of the tire and the type of tire. With Tim's guidance, we designed and carried out the experiment, which involved carrying out more than 100 tests on two test tires, and then analyzed the results.

The second project involved finding the optimum cutting angle for an ultra-class mining shovel at which point lifting dirt with the shovel would be most efficient. We had a small model of the dipper; however, the rest of the frame had to be built, which included a handle to attach to the model shovel, a rigid support for the handle, a system with which the bucket could be raised and force could be measured, and a box out of which

the sand could be scooped. Using the distance stretched by a simple spring as a measure of the force exerted on the bucket by the sand and resisting forces, Sarah and I were able to design the frame, run trials on the dipper, and analyze the data. Having had no experience with construction and the exciting world of power tools, this aspect of the program provided me with many memorable experiences. Furthermore, although I am still a bit wary of the drills and electric saws, I have learned to use them without fearing for my life.

Sarah and I were also able to see the real tires and the dipper we work with on a much larger scale when we were taken to High Vale, a coal mine situated just outside of Edmonton. It was pretty neat to see all of the machinery 'in action' as they lifted and moved tonnes of dirt with relative ease. In our last week, we will also be visiting Fort McMurray, the major site of most of Alberta's oilsands operations.

The WISEST experience has been both fulfilling and hilarious. Some of my greatest memories were created in the lab of the Engineering building, singing along with Sarah to "Fishin' in the Dark" as we built the frame for the dipper or tested the tires. I have learned a lot from my supervisor, Tim. As well as being one of the friendliest people I have had the pleasure of working with, he is also extremely passionate about his work – a living example of how rewarding it could be to pursue a career that truly interests me. Furthermore, I have learned a lot about the field of engineering. WISEST has broken any preconceived notions I had of the department of Mining Engineering, which I previously envisioned involving a lot of digging. Working in the lab has exposed me to a research environment – how much work goes into designing a method to resolve a problem and the challenge and fun of producing original work.

Being a part of the WISEST Summer Research Program has made this summer one of the most fulfilling for me. The WISEST program has been invaluable in helping me to see what my interests are and what career potential I have. It is a program I seriously recommend for anybody looking to try something new, fresh, and challenging.



RACHEL HOLINATY - Chemistry

WISEST Supervisor: Dr. Margaret-Ann Armour

Sponsor: Petro-Canada Community Investment Fund

I never imagined I would be selected into a program such as WISEST. I heard of the program through a family friend who happened to be on campus at the time. I wasn't sure that I would even qualify let alone be among the few "chosen ones" to participate. I'm from the small town of Marshall, Saskatchewan, a mere ten minutes from Lloydminster, AB/SK. Opportunities like this rarely fall into the hands of a small town girl, so I thought why not? It sure would not hurt to apply... and I am so glad that I did.

The six weeks I spent on campus at the U of A was one of the most remarkable experiences of my life. I worked in the Chemistry Department under Dr. Margaret-Ann Armour, closely supervised by Dr. Willie Hunter. My first research project (yes there was more than one) was to work

alongside Rachel (another WISEST student, yes with the same name), and try to separate a compound that consisted of three different materials; one an acid, one a base, and one a neutral substance. Through this project we were to obtain techniques valuable for the success of our main projects. After we did this experiment a few times (we messed up a few!) we were each given our own project to dwell on for the remaining five weeks. Well, mine consisted of a comparison between Sorbitec, a commercial absorbent used for chemical spills, and HAZCHEM Spill Mix, a "homemade" absorbent designed to do the same thing. This experiment that was supposed to last me a couple weeks only lasted about a week, so needless to say I was about to embark on yet another project.

The second project was to identify

unknown substances in order to insure that proper treatment and disposal could take place so that the chemical would not harm the environment. Well, Dr. Armour found me some really tricky unknowns that can (and will) last me a long time. The samples consisted of less than a gram, which made things a challenge right off the top. They definitely challenged all my knowledge on chemistry, logic, and problem solving. The frequent visits to the chalkboard as well as the endless supply of books kept my mind buzzing with new information. It was very neat to be working in the same lab as another WISEST student and being able to learn a little bit about her project as well as my own. It was comforting to know that struggles existed on her side as well as mine! I believe that it was this companionship that saved my mind from the insanity that I may have succumbed to from an overload of scientific information.

To be working alongside professors on campus was absolutely mind boggling. Here we had access to knowledge that takes many years to learn... and all we had to do was ask a question in order to get a personalized lecture. Not many people get that opportunity. The WISEST Summer Research Program has allowed me to take a closer look at what I want to do with the rest of my life and more of an idea of a path to get myself going in that direction. To talk to an average high school student, you may find that many are little bit uneasy about leaving home and attending university. For me, after this experience, I feel more than ever that this is something that I can do and feel confident in doing it. Even just being on campus has had such an impact on the expectations and worries that I had associated with university. I have discovered that you truly can do what ever you want... all you have to do is go for it.



JANNA HUGERT - Chemistry at Kings' University College
WISEST Supervisor: Dr. Grace Strom and Dr. Peter Mahaffy
Sponsor: GlaxoSmithKline

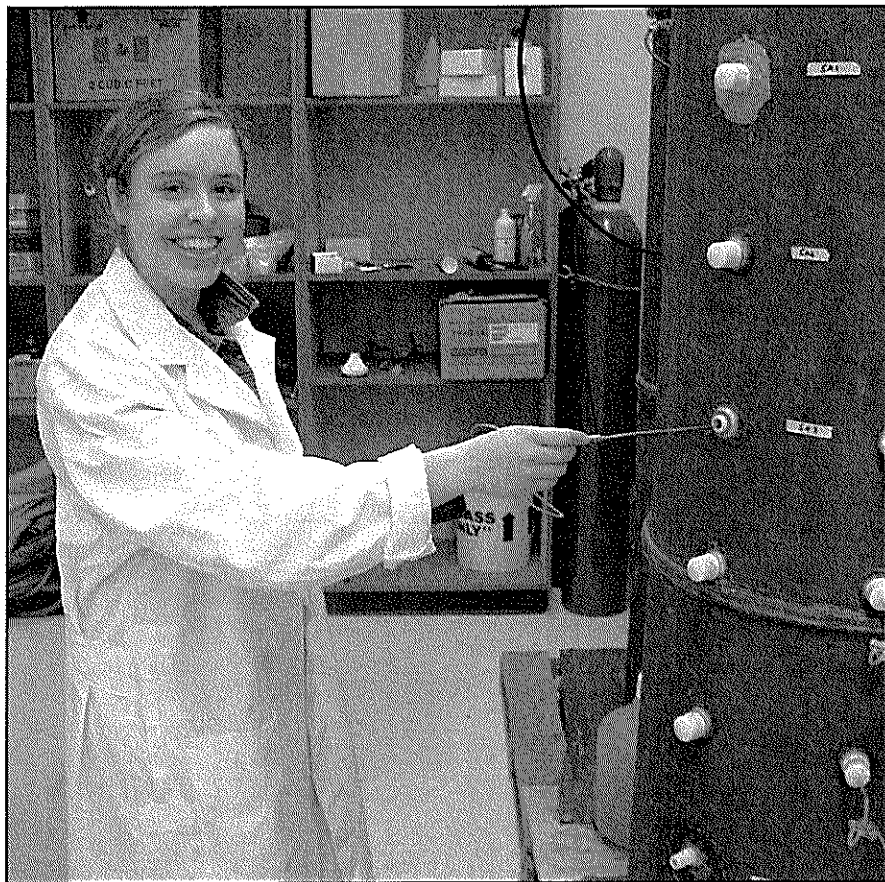
My lab experience was like no other experience I have ever encountered. The lab in which I worked in had four people working in it, and the different projects kept me on my toes, synthesis one-day and culturing bacteria the next. The majority of my time was spent with Naomi Jackson, an undergraduate and a great person. The main goal of my summer was split into two parts. The first in which I would help see if a compound in garlic called Allicin would kill the American foulbrood disease - *Paenibacillus larvae* subsp. *larvae* - which is an infectious brood disease. It is the most widespread and destructive of the brood diseases, afflicting queen, drone, and worker larvae. Only the spore stage is infectious to honey bees. So the journey began, testing protocol on other bacteria such as

escherichia coli, *bacillus subtilis*, and *staphylococcus aureus*. The ability of allicin and garlic extract to inhibit bacteria was tested using Thin-Layer Chromatography (TLC) and inoculating agar with the bacteria and pouring the agar over the TLC plates and let the bacteria grow in an incubator. When the allicin and garlic did succeed in killing *escherichia coli*, *bacillus subtilis*, and *staphylococcus aureus* we moved on to grow then kill *Paenibacillus*. Which in turn had its own problems, a couple of attempts to grow the bacteria in broth later, we found the secret to success - a special agar/broth (Mueller Hinton) and an incubator with 5 % CO₂ and we were on our way. With our fresh garlic and purified allicin using flash chromatography (a rapid form of preparative column chromatography based on optimised pre-packed

columns through which is pumped solvent at a high flow rate to purify organic compounds), we set out to kill our bacteria. Along with the regular developed TLC plates we also prepared minimum inhibitory plates (MIC). Inoculated agar poured on the TLC plates in petri-dishes, and then they were incubated for 66 hours, when done we sprayed the agar with a dye - INT to visualise bacterial growth. And we were successful! Now comes the testing of the allicin on actual bee larvae.

The second aspect of my research involved testing out labs written by Naomi for labs next year, in which I looked at the proteolytic enzyme that prevents the setting of gelatin. For an example have you ever tried to make Jell-O with pineapples or kiwi, that is what I tried to counter act with garlic. So when the garlic is mixed with the papain, allicin reacts to fill the active site. The result is papain being deactivated. To reactivate the papain glutathione was added, reacting with papain's active site to restore it. I also tested this same theory on filmstrips, since film has an emulsion layer. In the future this labs will be used in classroom settings, as well new experiments will branch off testing other products with gelatin. These experiments will help to contribute to bringing biology and chemistry together.

This experience has really opened my mind to new adventures and seeing what science is really like and how it effects us everyday outside of a high school setting. I can hardly wait one more year to immerse myself in this other world which has so much to offer and so many choices. WISEST really helped me to narrow down my choices and helped me discover something that I can see myself doing in the near future. This has not been an ordinary summer job but an extraordinary experience, and I am sincerely grateful for this opportunity I had. Thank you so much to my family, friends, and teachers for supporting me and getting me to where I am today. I would also like to thank GlaxoSmithKline for sponsoring me.



JENNIFER HUYGEN - Civil and Environmental Engineering
WISEST Supervisor: Dr. Daryl McCartney
Sponsor: Alberta Human Resources & Employment

"The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' but 'That's funny...'"

Isaac Asimov

To learn is to satisfy a continuously inquiring mind. In short, I suppose that is the reason why I decided to embark on this quest of knowledge known as the WISEST Summer Research Program. I can now attest that this six week endeavour into university life was indeed an invaluable learning experience. From a high school lab with beakers and oversized eye goggles to a real research setting with ovens and drill presses is something students our age don't often get the exposure to. Being able to learn and work in real labs at the University of Alberta is the opportunity WISEST has provided for us, and what an opportunity it was!

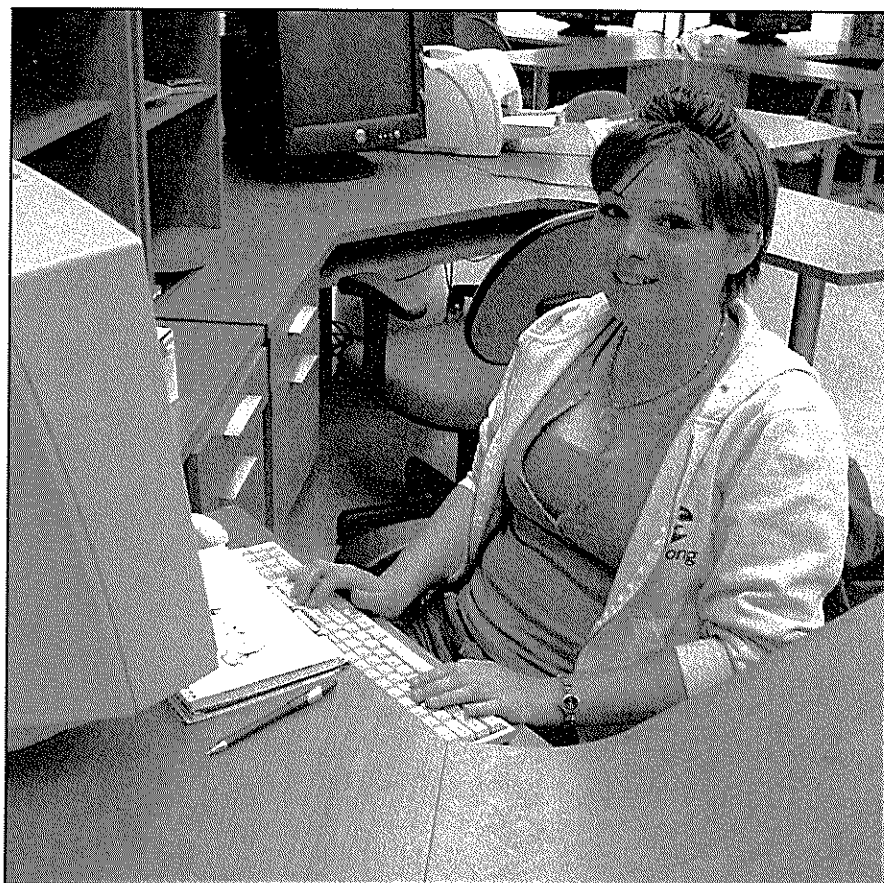
For the six weeks of the Summer Research Program, I was placed in the Department of Civil and Environmental Engineering under the supervision of Dr. Daryl McCartney and grad student Julianne Ruck. My project essentially had to do with "treating methane in a landfill cover". Being a great deal confused with what that meant at first, I soon discovered it revolved around an experiment already set up in the depths of the NREF building. Two sample landfill covers had been built inside two reactors, and my job was to take gas samples and temperature readings from ports drilled into the side of each reactor. The purpose of this experiment is to maximize the oxidation of methane gas, a by-product of biodegradation within the landfill, in the landfill cover. This is achieved through the use of organisms called methanotrophic bacteria, which are located in the covers and function at

different rates according to the materials in the landfill cover. Ultimately, by oxidizing methane emissions, it is hoped that the greenhouse effect can be lessened. What an impact on the planet, especially considering the rapid expansion of landfills all over the globe as the future draws nearer and the human population increases exponentially!

One of the most important lessons I learned through working as an environmental engineer was not a scientific law, but a different sort of law. Murphy once stated that "anything that can go wrong will". Research opened my eyes to this, as it was not the smooth process that I had at first envisioned it to be. However, it was from this that I took the most away. In working to fix the problems we encountered, and develop creative yet feasible solutions, we were able to exercise our minds and our hands. This is something that we will have to do more frequently as we grow up, enter the working world, and become more independent.

WISEST was also a great deal more than strictly scientific research. I met a lot of new people, whether it was through the TGIF lunches or Wednesday afternoon sessions, where we could all share our stories. It was also a wonderful foray into university life, as we constantly explored the campus and slowly but surely deciphered the many acronyms. This was another important reason why I opted to do WISEST – the insight into university. As one of those students still on the fence as to what I would like to do as a career, it was great to experience the sciences and specifically engineering at the U of A. I know that my decisions about future studies and career paths can now be answered with a lot more knowledge behind them.

I would like to thank the members of my research team, including Julianne Ruck, Andrew Philopoulos and Dantlin Su. They all made me feel very welcome, especially in those first few nerve-racking days, and continued to answer my "stupid" questions in the following weeks. I would also like to thank Dr. McCartney for taking me on, and of course everyone at WISEST for putting on such a wonderful program.



EMILY JAGER - Mechanical Engineering
WISEST Supervisor: Dr. Walied Moussa
Sponsor: NSERC-PromoScience

The stereotypical little girl grows up wearing poofy pink dresses, and of course, has a Barbie Doll within arms reach. I squeezed into the dress when I had to and I passed up the Barbie Dolls for my true passion - SCIENCE.

I preferred running around the farm inspecting bugs and playing with my cousin's Creepy Crawlers set (at one point I wanted to be an entomologist); carrying out the experiments I found on the back cover of "The Magic School Bus" books (Ms. Fizzle was my idol); listening to my older brothers talk about their adventures in science class (like they really knew what they were doing!); and watching Bill Nye, "The Science Guy!" at school.

When I first heard about the WISEST program I was very excited. Six weeks of nothing but science! I applied (of course!) and when I learned I had been accepted, I was literally bouncing off walls. It was an incredible opportunity!

The first week I was caught up in a whirlwind of activity. I met Dr. Moussa, the

head of the MEMS/NEMS lab (I will explain later!); my direct supervisor, Nicole; and the rest of the people in the lab, twelve in total. Dr. Moussa gave me a brief description of my project but told me Nicole would be giving me a more in depth description. My project was to create all of the needed web page graphics and animations for a member of the lab, Anita. The programs I would be using were Flash MX 2004, a graphic design program with animation characteristics and Fireworks, an editing program. I could also use any resources on the internet that could possibly help me out along the way (thank-you GIFworks!).

I am working in the MEMS/NEMS simulation lab. MEMS is an acronym for micro-electro-mechanical systems and NEMS is nano-electro-mechanical systems. Though the two are very similar, NEMS are devices on the nanoscale while MEMS are devices on the microscale. All in all, they are both the integration of mechanical elements on a common silicon substrate through microfabrication technology. In

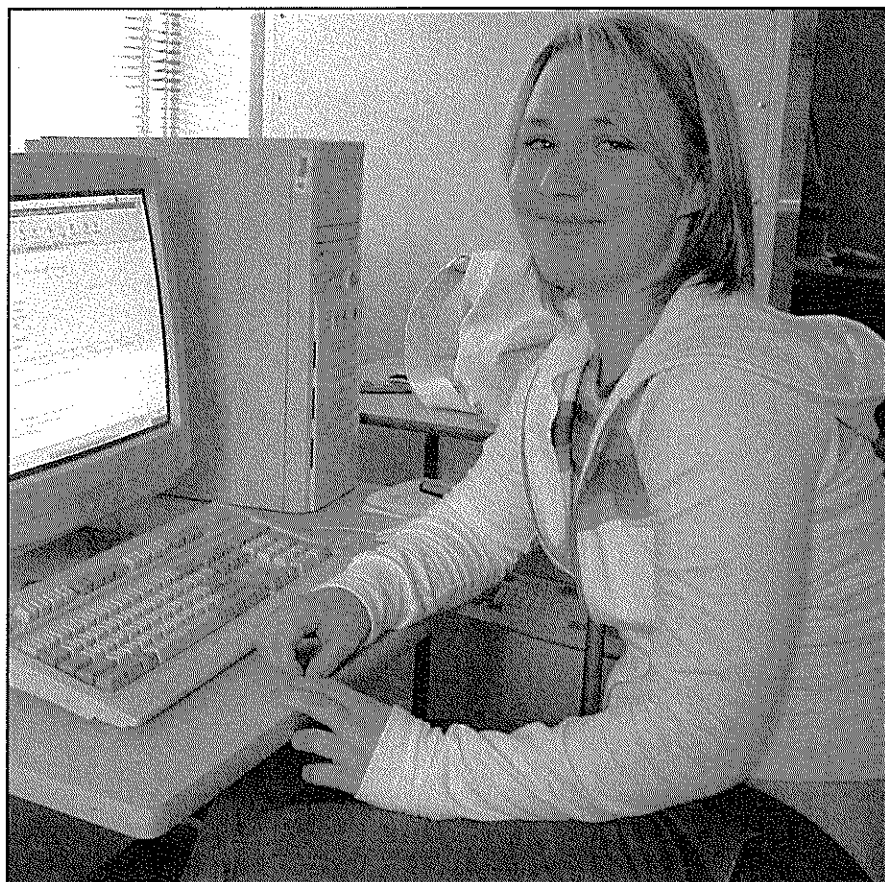
plain English, it is the process by which an object is made functional by layering patterned layers of various material on a silicon base. The process is very similar to building with Lego and is commonly used for making microscopic devices. Some common MEMS devices include inkjet printer heads and airbag accelerometers, which is the gauge that causes air bags to deploy. A common NEMS device is the tip of a scanning probe microscope. The tip is used to locate the position of individual atoms. A piezoelectric tube is used to do the actual scanning.

Anita's project is a MEMS device. Her project is the feasibility study of an osseointegration monitoring device, with specific attention to the femoral bone after a total hip arthroplasty (THA). Arthroplasty is the complete replacement of a joint. Osseointegration is when bone fuses directly with the titanium that is replacing the joint. Anita's device is an in vivo placement (inside of the organism) as opposed to an in vitro setting (inside of a lab) that most other osseointegration devices have as settings.

Creating the animations for the website was a challenge. I did not have very much experience with a computer, let alone an animation program. I was told very little about Anita's project due to copyright and intellectual property issues. I used Flash (painstakingly!) to create my animations and Fireworks to edit them. Nicole designed the graphic of the person for me on a program called Rhinoceros. The highlight of my webpage is the home videos I made of my Mom "hurting" her hip. I used them to show how hip injuries happen and how the injury will lead to THAs. This in turn will lead to an implantation of an osseointegration monitoring device.

My time spent in the lab has been an invaluable experience I would not trade for anything. The people in the lab helped me immensely to understand the gimmicks of the computer, right up to this report where they helped me fine tune my knowledge of MEMS/NEMS devices. Thank-you to everyone in the lab for welcoming me and making me feel like part of the team!

My time spent in the WISEST summer research program has given me a rich and tantalizing peak at everyday science. Even though my work was in a computer lab, I still had the opportunity to tour other labs and get a basic understanding of their purpose. When my turn comes to attend university, I will have the benefit of being familiar with the campus and all it offers. And I now know I do want to continue my education in science because it ROCKS!



DAEL JARVIE - Computing Science
WISEST Supervisor: Dr. Carol Smith
Sponsor: CN

On my first day of work for the system support group of the Computer Science Department, I was fairly anxious. Seeing as I am not a very computer orientated person, the fact that I would be working with computers for six weeks did little to calm my nerves. Eventually the gentle whir of the computer didn't make me cringe and my project over the summer became very rewarding.

During the six weeks I worked with an undergrad of the U of A named Laura Watson and a fellow WISEST student named Morgan Gwin. I also worked with Carol Smith, our principal investigator. Our goal over the six weeks was to create an RSS feed that was to display current machine outages for the system support group to keep track of; we were also going to create a more current web page to display the sponsors of the Computer

Science department. In order to do this we were required to work for about a week on a number of tutorials to familiarize ourselves with the tools we would be using to create these different projects. We learned about the uses of HTML, CSS, PHP, XML, XSL, and RSS and when to apply each in the course of the project.

In the making of each website, we were required to write code--sometimes pages of it--for our computers to execute. Our HTML code was responsible for providing the structure of the page and used designated commands programmed into the code. This told the computer what to print out and in what order. The CSS code was responsible for telling the computer how the page should look (color, borders, etc.). PHP scripting was the type of code we used the most. PHP can be used

to save immense amount of time because it enables you to print out many things with the least amount of typing. The drawback to this programming language is that it is unforgiving; the simplest error can cause your site to fail and provide you with quite a bit of debugging to do. XML and XSL are similar to that of HTML and CSS except that there are no designated commands to provide and the language is far less confusing. Lastly, RSS was our main focus during the project. It is used to share data among users by printing out headlines, links and a brief description of the issues put forth. Our RSS feed allowed different users in the System Support Group to post computer outages and keep everyone in the group up-to-date on which computers were working and which have been repaired.

In the end, our week of tutorials paid off and we were able to produce two functional web sites that would aid the System Support Group in their work. Our project wasn't necessarily a research project but what was accomplished held importance. During my six weeks in the lab I gained a better understanding of computers as well as life at the university; both concepts were a mystery until I became involved in the program. I was also able to meet some great new people, both during WISEST activities and living at the St. John's Institute.

The WISEST program has opened my eyes in a great many ways. I am now better acquainted with university life, I have a broader view of the career choices available to me, and I have gained the experience of living away from home. The program has been very rewarding and I am grateful that I was able to experience it!

"The WISEST program has opened my eyes in a great many ways."



KATE JEFFERSON - Mathematical and Statistical Sciences
WISEST Supervisor: Mr. Tom Holloway
Sponsor: NSERC-PromoScience

What can I say, my experience here at WISEST can only be described as one thing: AMAZING!

When I found out I would be working in the Department of Mathematics and Statistical Sciences, I was excited to know that I would be spending my summer doing something that I love, math! I felt very lucky to have the opportunity take part in such an incredible program over the summer.

Coming from Yellowknife, NT, I stayed at St. Johns Institute during my stay in the city. Staying at residence was an experience all in itself! I met many amazing people from around the province and made several new friends. I would like to thank Selina for doing a GREAT job of being our residence coordinator! Residence was always a fun place to be, from the very first day when we all met outside on the grass, to the last night

when we all said our sad goodbyes to each other. I'll never forget all of the amazing experiences! From the costume relay races to Klondike days to midnight teatimes and rez formal, it was all a blast! I'm sure that everyone would agree that we all became very close over the six weeks. All of us in residence shared many great experiences together which will remain with me for years to come. I'll miss you guys!

Six long weeks ago, I arrived at the University of Alberta campus feeling excited to begin my summer adventure. The vast university campus was beautiful, although I did get lost a couple times. The campus tours and the scavenger hunt helped me learn my way around, and luckily I had my trusty map so that I could find my way to work the first day!

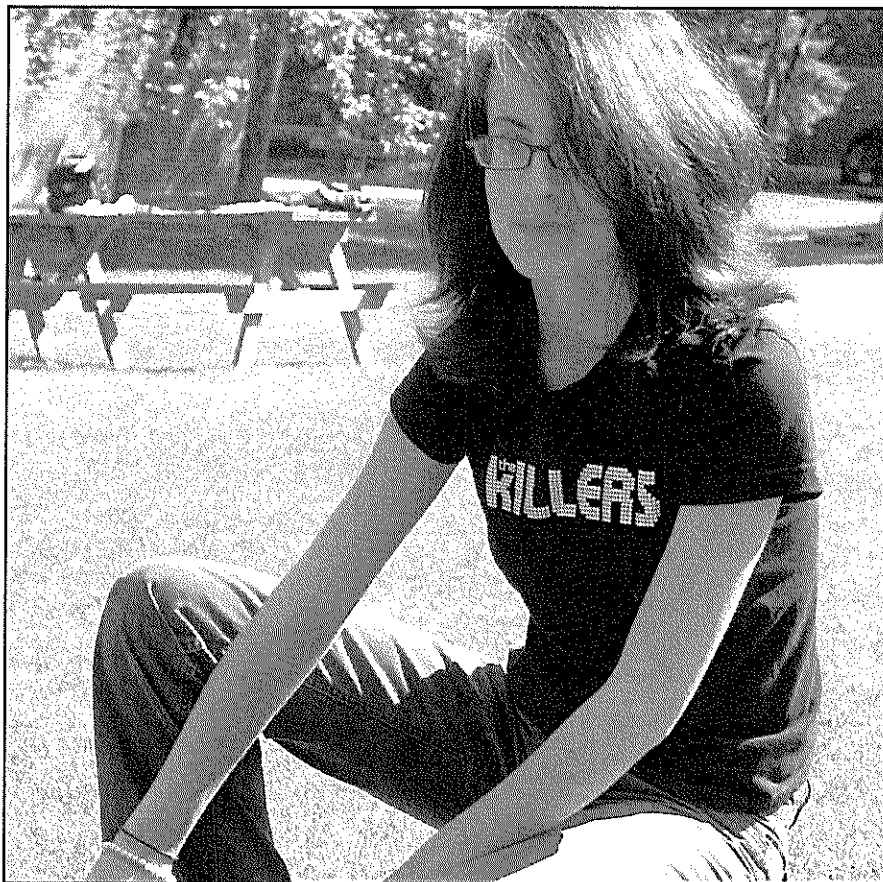
My typical work day was very busy.

I was lucky to have the privilege of working with Tom Holloway over the summer, as well as three other WISEST girls in the department of mathematics. The four of us attended a university class every morning from Monday to Thursday. The class, Math260: Puzzles and Games in Recreational Mathematics, was a great way to give us all a taste of what university is really like. Not only was it fun, but it allowed me to open my eyes to a new world of mathematics that was unknown to me. I often saw classmates outside of class and they were great at helping me with anything I had problems with.

After class, I would head upstairs and continue my work. I usually spent some time working on what we were assigned in class and I also spent a lot of time expanding on the lessons that I was taught in class that day. I read and explored the ideas in many fascinating books and articles and I researched and analyzed various games and puzzles. Tom was great at providing an almost unlimited supply of resources for me to use. Occasionally I would be fortunate enough to get the opportunity to meet with grad students in the department. They inspired me with their advice, experience, and their extensive knowledge in mathematics.

Not to say my summer was all about mathematics. Wednesday sessions and other activities soon became the highlights of my weeks. Ultimate Frisbee and Friday lunches allowed me to meet new people, have fun, and make new friends. The Wednesday sessions were all great! I loved the chance to learn from others and to explore all of the options that will be available to me in the future.

In conclusion, my summer here at WISEST has been an all-out adventure. It has allowed me to learn about career options and familiarize myself with the stunning University of Alberta campus while meeting great new people. I have learned more about myself than I could have imagined, and I have not only gained work experience, but I have gained life experience. For me, this has definitely been a dream come true.



SUZANNE JOYAL - Mechanical Engineering
WISEST Supervisor: Mr. Mark Ackerman
Sponsor: Human Resources & Skills Development Canada

My name is Suzanne Joyal, and I attend Archbishop MacDonald High School in Edmonton. I learned about the WISEST summer research program from my teachers, and was advised to apply. It sounded like a great idea since I could get research lab experience while in high school, familiarize myself with the University campus and atmosphere, as well as explore possible paths I could take in the future. I am proud to support the WISEST goal of introducing young men and women to non-traditional fields of research.

I am doing my WISEST research in the Department of Mechanical Engineering, and I am enjoying it very much! I am working with lawn sprinklers to determine the most efficient methods for them to protect property and structures from forest fires. It is hypothesized that

two millimeters of rain distributed on and around structures which are threatened by forest fires is enough to ward off the flames. Previously, home owners would water their property excessively; this would protect from fire, but there would still be flood damage. I performed experiments to determine the time length that sprinklers should run to offer sufficient protection. Since the throw distance, pressure, and orifice size differ with each individual sprinkler, I am also designing a small tool for the public to determine the appropriate time to water their property for protection.

I appreciate that my project has an application to the world, and contributes to helping people. I've always enjoyed the methodology of science, but now that I can put my knowledge into practice, I am even

more drawn to a career in this area.

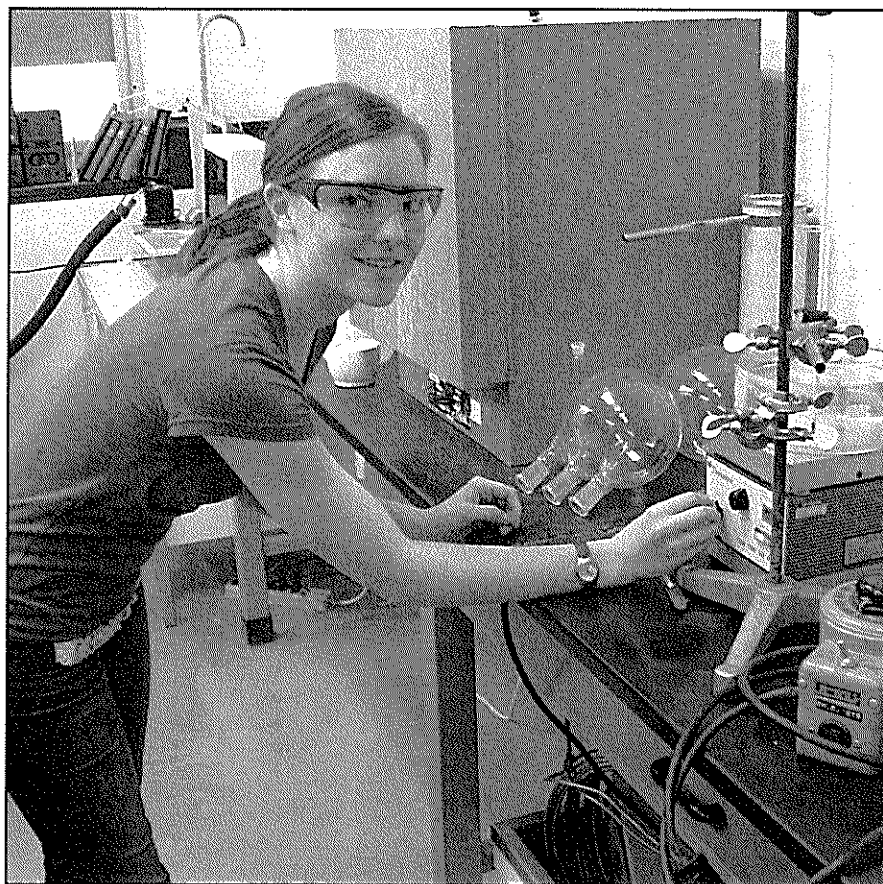
Everyone is very welcoming here at the U of A, and they help make this unique experience that much better! I've learned a great deal from the lab members I've worked with; not only about the different aspects of mechanical engineering, but expectations in University as well. They have all been excellent mentors, and I appreciate the time they have donated to helping me.

The WISEST activities helped me get a better idea of what I want to do with my academic future and possible careers. The group discussions were particularly helpful in showing different fields of study and paths open to take. Women already in science, engineering, and technology took time to chat and answer questions about their experiences in University as well as choosing careers. The lab visit and trip to IBM gives a first-hand example of present jobs available.

WISEST is a wonderful program, and I have met so many new people who share the same interests I do – science for sure! This has opened my eyes to all the possibilities available for me to explore. The number of fields that the sciences branch off into offer a diverse selection of future options. I am sure to find a field for which I am passionate, and want to continue exploring. Right now, engineering seems to be a good area for me, but that's just the beginning of the choices.

I am very glad to have participated in WISEST. I've learned a great deal already and I'm sure this will prove to be a valuable experience in the future as well. I hope everybody enjoyed it as much as I did!

"I appreciate that my project has an application to the world, and contributes to helping people."



JAYLA KNELLER - Chemical and Materials Engineering
WISEST Supervisor: Dr. U. Sundararaj
Sponsor: Edmonton Glenora Rotary Club

When I first attended the WISEST Summer Research Program on July 4, 2005, I knew I wanted a career in science. I did not know, however, that there are so many different areas of science to choose from! Overwhelmed and worried I had chosen an area of science I wouldn't like; I pressed on through orientation and then met my lab supervisor. He took me to the lab I would be working in and immediately one of my worries was ended. I knew I would enjoy the area of science I had chosen.

For the past few weeks, I have been working under the supervision of Huaping Li, a graduate student working with Dr. Sundararaj's research team. We have been working on visualizing drops of fluids (like Newtonian and Boger fluids) breaking up in different liquids. We started by looking at how the drops break up

into a Newtonian fluid matrix, but could not get the result we had read about in so many research papers. Finally, we realized we needed a surfactant. How come none of the research papers mentioned what a big difference a surfactant makes? Our focus then shifted to researching the effects of surfactants on drop breakup.

Because of the need to control lighting in this experiment, a curtain was installed in a corner of our lab. We then had to squish all of our equipment into that corner: the Couette device, the Couette device controls, a TV and VCR, a computer, and special equipment used to collect data. My job was to focus the two cameras pointing at the Couette cell on the tiny drop. This crucial task required a lot of attention – because the drop is constantly moving, the

cameras need to constantly be re-focused!

The other part of the WISEST Summer Research Program is to be exposed to new and different areas of science, engineering, and technology, and to get to know other WISEST students. There were many fun activities to take part in, like a scavenger hunt around the University of Alberta campus, Ultimate Frisbee, and Wednesday afternoon activities that helped us interact and share experiences with other students who love science. The student coordinators, Kim and Jenn, did a great job organizing all these activities and also made sure we were comfortable and well informed about our many projects and lab experiences.

The WISEST Summer Research Program taught me first of all, that research in a University lab is not at all what you expect from experiences in the high school lab setting: no one is there to tell you what to do and how to do it, and you don't already know the outcome of the experiment. (It is much more interesting to discover the results for yourself!) I've also acquired some skills like patience, precision, and problem-solving, that I can now apply to other aspects of my life. I am also much more confident about the University of Alberta campus and have discovered so many interesting things about the university. During the program we were also exposed to many different career choices and how to start moving toward them. I've met so many great new people and some role models to look up to. Although I still don't know what I want to do when I get to university, I have definitely been exposed to more choices than I thought existed and it truly is a great feeling to have so many opportunities and choices to look forward to. It was such a privilege to be able to participate in the program, and I'm sure I've learned more this summer than I have in all of grade 11. The WISEST Summer Research Program is one of the most unique and enriching experiences students have the opportunity to take part in and for that, I am very thankful I had the chance to experience it.



JULIA KRAMER - Mechanical Engineering
 WISEST Supervisor: **Dr. Alidad Amirfazli**
 Sponsor: **Dow Chemical Canada Inc.**

The WISEST Summer Research Program has been a very exciting and unforgettable experience. Getting the opportunity to work in a university research lab with knowledgeable mentors has been a privilege. Not only did I learn many new things about science, I was also able to meet many people who are involved in different areas of science that I was not even aware of. WISEST has given me invaluable work experience in a university environment, where I hope to find myself in the future. Also, it has opened my eyes to the range of possibilities that exist for women in science, engineering, and technology in post secondary studies. I love the sciences and WISEST was an excellent way for me to explore them during the summer!

Along with the exposure to interesting areas of science, the

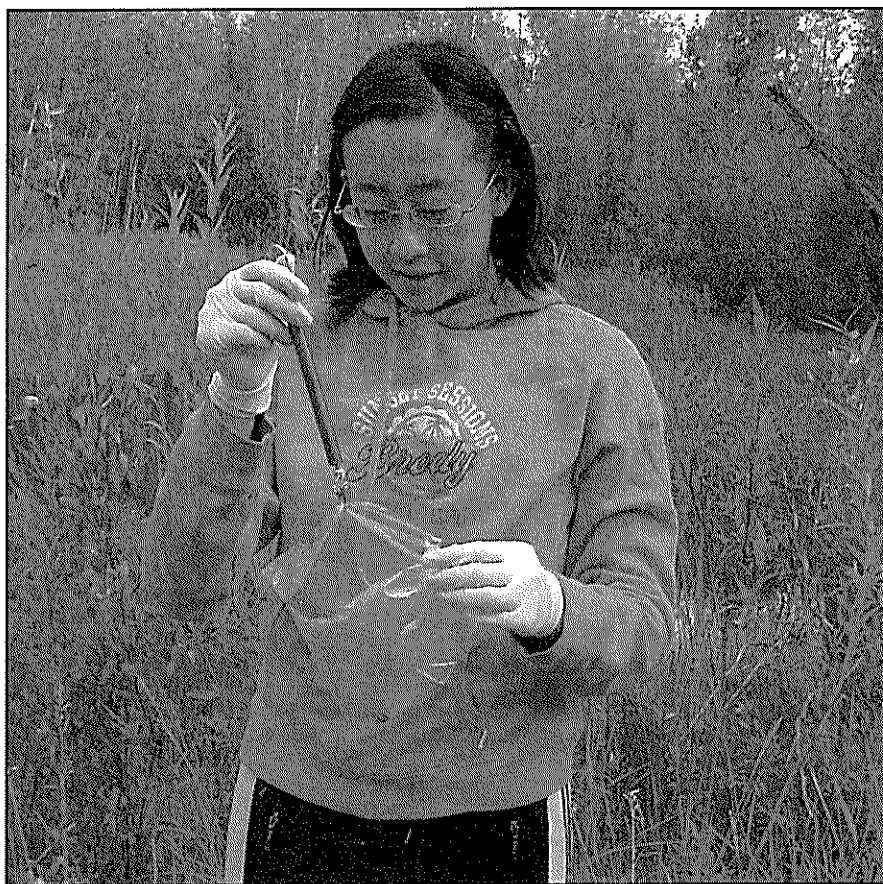
WISEST program balances the summer with fun social events where students are able to meet other students who share common interests and goals. I met many girls, and some boys, who were equally as fascinated by the sciences as I am, making the summer even more enjoyable. I found the tours particularly interesting because they showed us the different areas of science and technology that women are working in, and they gave us a better understanding of what it takes to get the skills required for your 'dream job'.

I am working in the Mechanical Engineering Department, under the supervision of Doctor Alidad Amirfazli. With the help of Dr. Amirfazli and Mr. Mohammed Shadnam, I am learning about surface instrumentation and analysis. Essentially, my project is the reproduction of two experiments

involving molecular gradients, the first, done by Bo Liedberg and Pentti Tengvall, and the second, done by Manoj Chaudhury and George Whitesides. The goal of these experiments is to create a molecular gradient across the surface of a substrate. To test the gradients a small drop of water is placed on the surface. If the gradient creates a hydrophobic and hydrophilic area on opposite ends of the surface, the drop will, ideally, move from the hydrophobic end to the hydrophilic one.

Throughout my WISEST experience I have learnt many different things about research and science in general. I discovered that there are many facets to science that high school students are not aware of, that there are an infinite number of positions for women in science, that the percentage of women in male-dominated sciences is a number that is forever growing, and that the thrill of finding the results you wanted is worth the effort that went into getting them. I found that one must manage their time correctly to ensure that all of their goals are achieved and that you must prioritize your jobs to make sure the most important ones get done. But I think the most important thing that I learned in my summer job at WISEST is that you have to be patient with science research. You won't always get the right results the first time, but if you can learn from previous attempts, then your next try will be that much closer to finding success.

"WISEST has given me invaluable work experience in a university environment, where I hope to find myself in the future."



JENNY LAU - Biological Sciences
WISEST Supervisor: Dr. Susan Hannon
Sponsor: Edmonton Glenora Rotary Club

During my grade eleven year, my biology teacher persistently informed her students about the benefits of applying to a summer research program like WISEST. Despite a strong fear of rejection, because of her avocations, I applied to the program. After waiting a torturous month, in the middle of May, I received a phone call from the University of Alberta to be informed that WISEST had accepted me as a participant. As I sat dazed, listening to them tell me about the projects I would be working on, a single thought kept surfacing in my mind- I'm moving away for six weeks.

From the phone call, I learned that I and another student, Alena Parkinson, would be stationed at the Meanook Biological Research Station rather than the University of Alberta. At the station we would not only help the managers with various projects, but we would also eat and sleep there! I had never been

away from my family for such a long period of time... sure I was scared, but I was also thrilled.

I am now in the last week of the program and it has proven to be as thrilling as I expected. From the very first day I arrived at Meanook, the station's inhabitants have worked hard to make my stay as educational and exciting as possible. For example, on the very first day, Alena and I were allowed to participate in a university class's fieldtrip at Narrow Lake. As we floated on the lake, the professor demonstrated the devices and techniques used by scientists to measure the properties of a lake. The following days, we were introduced to our own projects: METS and RANA.

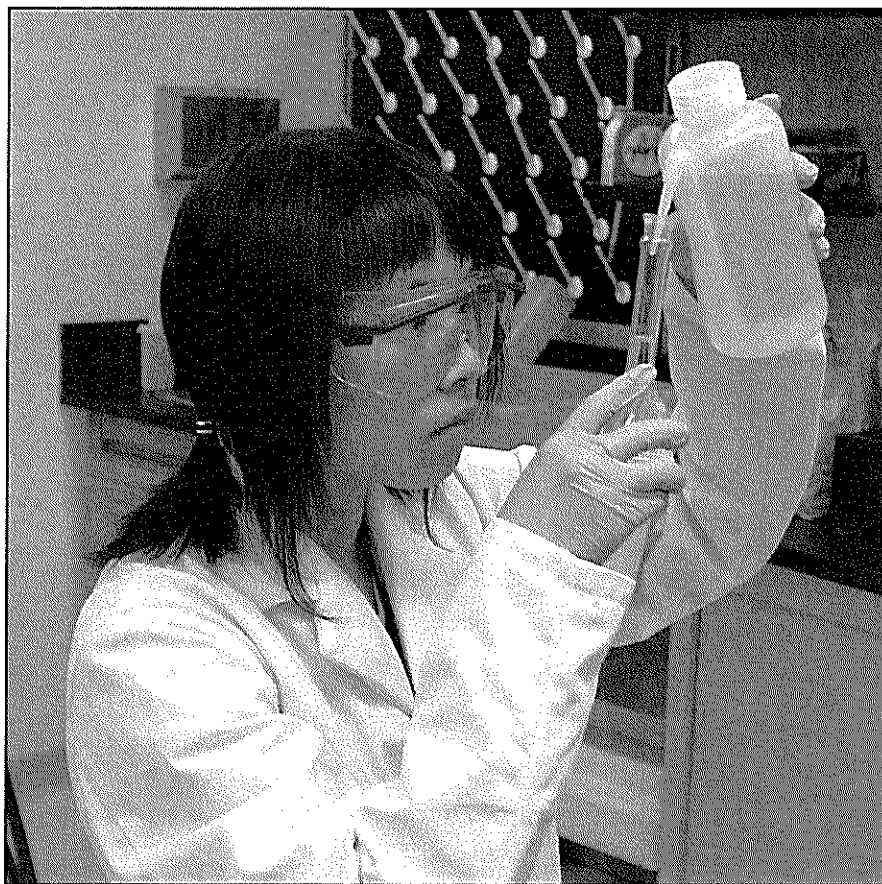
METS is a new addition to the biological research station. It is a weather station with the latest meteorological equipment designed to precisely gather data like precipitation, temperature and barometric pressure. Like all systems,

however, the data had to be sorted and organized into interpretable form. With the use of Microsoft Excel, I prepared and placed the data on the Meanook server to allow access for other researchers. In addition, I am completing two supplementary analyses of the data. The first is determining if harnessing wind power to produce electrical energy would be feasible in the Athabasca region. To determine its feasibility, I analyzed wind speed and direction from the start of the year to July; and compared the results to the requirements needed by a windmill to harness the winds. The second analysis correlates with the RANA project.

RANA is an ongoing project of the Alberta government that focuses on determining the population numbers of amphibians. Every morning of the past six weeks, Alena and I hiked to a pond where we have set up traps inside and outside of a fence enclosing the area. The theory behind the traps is that as the amphibians leave the pond, they will fall into a trap on the inside of the fence. When they want to return to the pond, they will fall into an outside trap. The trapped amphibians are then measured for their length and weight, their species are identified and all abnormalities are recorded. Using the RANA results and the METS information, I am investigating if the number and movement of the amphibians are directly affected by the weather.

Besides working with our projects, we were also given the chance to observe and aid other researchers stationed at Meanook. The "birders", for example, showed us the techniques used to catch the redstarts (a type of bird) and their chicks, and how to band them with identification tags. Another main project we participated in was the study of fathead minnows and the effects of the presence of predation on the life history of minnows. Like the birders, we aided their identification process; but instead of using bands, we injected acrylic paint into the minnows.

My six weeks in Meanook has exposed me to many of the different aspects of research - from gathering data out in the fields to working in the lab to determine the turbidity of water samples. WISEST has truly been a life-changing experience that I will never forget.



AMANDA LEONG - Civil and Environmental Engineering
WISEST Supervisor: Dr. Mohamed Gamal El-Din
Sponsor: Human Resources & Skills Development Canada

The WISEST program provides students with the opportunity to enrich their learning experience with work in science laboratories on the University of Alberta campus. As a participant in WISEST, I have discovered that the program is both unique and enriching. Working in a University environment gave me the chance to explore an area of science that I was truly interested in: Environmental Engineering. In my first lab, I worked on a project to discover the effect of ozone on endocrine disrupting compounds (EDCs) in waste water treatment. Endocrine disrupting compounds mimic hormones; during vital stages of development, these chemicals can cause serious and permanent damage on the body. By working in this lab, I have come to realise the process required to develop and run a scientific investigation. The

second lab involved using artificial neural networks to try to predict the ground ozone level concentration for the following day. So far, ozone level concentration measurement techniques are capable of predicting ozone concentrations at real time.

On top of the research experience given to students, there are Wednesday afternoon sessions where students learn how to choose a career path, discover other fields of research, visit IBM, and go on lab tours. During the IBM tour, WISEST students were exposed to the field of information technology by playing roles in a simulated situation. This situation required students to work together as a group to design a web page for a client. Small group discussions on one Wednesday afternoon proved to be very useful, for WISEST students met women of different career fields

to learn how they liked their jobs and how they decided to work in their particular field of expertise.

Back at Saint John's Residence, students from both the WISEST and HYRS program who were from out of town lived together for six auspicious weeks. Students here participated in the many activities that Edmonton had to offer like Klondike days, Shakespeare in the Park, West Edmonton mall and Heritage Days. Life at Rez changed from day to day, depending on whatever there was to do. The first week at Rez proved to be interesting, as all of us were learning how to get our lives together without anyone to drive us around! Eventually, we adapted to the situation and started on a journey to making life-long friends. Shakespeare in the Park proved to be an interesting experience, and one that I personally will never forget. The play was Romeo and Juliet - and when the show started, the crowd was immediately taken aback by modern-day dressed characters speaking in Shakespearean. West Edmonton mall was probably our constant source of amusement (they definitely made way too much money from us), with their ample supply of food, clothes and games! At Heritage Days, we were exposed to the many countries of the world and their cultures.

All in all, the WISEST experience is definitely something that has been life-changing and eye-opening. Living at Residence, participating in Wednesday Afternoon sessions and working in a University lab is a rare opportunity that I have had the amazing opportunity to participate in.

"Working in a University environment gave me the chance to explore an area of science that I was truly interested in"



LING LING - Cell Biology
 WISEST Supervisor: **Dr. Andrew Simmonds**
 Sponsor: **AWSN**

I spent my WISEST summer in Dr. Andrew Simmonds lab in the department of cell biology; supervising me directly was a graduate student, Nima Najand. My project involved testing a method to visualize RNA using malachite green. This was done by first cutting the plasmids I needed with a restriction enzyme and then inserting the malachite green aptamer into the cut plasmid through the process of ligation. Then, the ligated plasmid was transformed into bacteria; after picking several colonies from the bacterial plates, the plasmid containing bacteria were grown overnight to be amplified and then the plasmid was purified out of the bacteria. The samples were then screened using polymerase chain reaction for the inserted malachite green aptamer. Once the presence of malachite green aptamer insert was

detected in a sample, the plasmids were used to transcribe RNA. A gel electrophoresis was run to verify the success of the RNA transcription. Finally, malachite was added to the RNA to bind with its aptamer, so that when a specific wavelength of light was shone onto the RNA, it would glow (because of the malachite green attached to it).

Throughout my time in the lab, I learned that science requires ample amounts of patience; many reactions take several hours to complete. When my ligations didn't work for 3 weeks, I learned that science doesn't always happen the way that you expect it to. Overcoming the problems with the ligation reaction took lots of patience as well, but eventually, it did work. However, through all the tribulations of my project, I still found working in the lab a great experience. Being

in the lab has opened my eyes a lot to the field of research, a lot of work goes into it, but you never know what to expect to come out of it.

The people that I met in my lab were absolutely amazing. They are all incredibly dedicated to their work and to making my time in the lab a fun one. Nima was especially accommodating and I learned most of the procedures needed in my project from him. The most memorable time in the lab was when we made ice cream using liquid nitrogen, and perhaps also the times that I enjoyed success in my experiments.

Even though in the end, my project did not work the way I planned, spending 6 weeks in the lab has been a rewarding and memorable experience.

"Being in the lab has opened my eyes a lot to the field of research, a lot of work goes into it, but you never know what to expect to come out of it."

"People who work in the research field have an exciting career where it never 'gets old' because one is constantly close to discovering something completely new."



WESTERLY LUTH - Biological Sciences

WISEST Supervisor: Dr. Maya Evenden

Sponsor: Human Resources & Skills Development Canada

Darn you little frozen ash leaf cone roller (ALCR) larva and eggs! How dare you exist in such large numbers for Anna and I to count and measure? I've gone crossed eyed staring into this microscope for hours on end collecting data to study into the preference of egg-laying sites and times for female ALCRs and more detail about the larval stage of the ALCR lifecycle!

Oh well...At least Maya, Christina, Alex and Brad (who are the most incredible lab team in existence ever!) have stuff for us to do when we can't look at a microscope anymore. The lab Anna and I were assigned to was amazing. The people were so quirky and interesting and nice; they were the epitome of lab teams. And Anna was amazing too, my experience at WISEST was definitely enhanced by having someone else to share the

dirty work and the successes with.

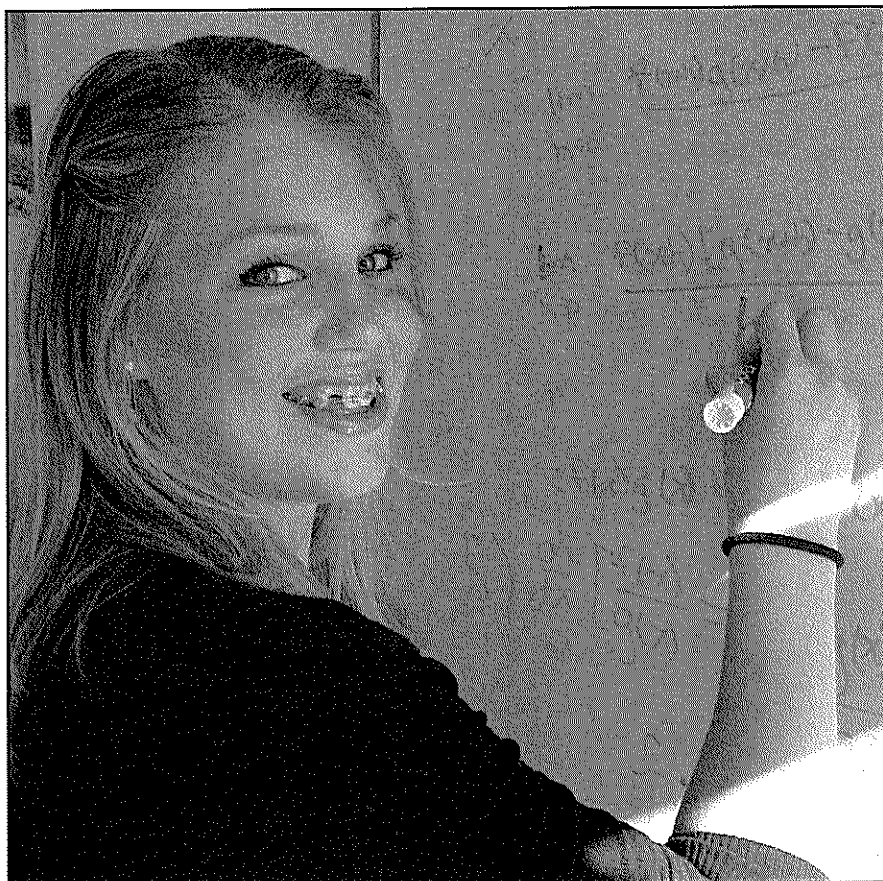
There were several moth species being researched in our chemical ecology lab: Oblique banded leaf rollers (OBLR), Large Aspen Tortrix (LAT), Forest tent caterpillar moths (FTC) and the aforementioned ALCR. We had jobs that involved all of them. Learning how to run a lab dependant on the survival and reproductive happiness of moths was completely different than all of the high school "labs" I've ever done. I spent an memorable day south of Edmonton doing fieldwork cutting down ash trees and bagging samples to analyze later and looking for egg masses to inject some genetic diversity to the lab colonies of moths. We spent hours making moth food for the different species of moth eggs to grow on, then transfer the larva that hatched out of those eggs into clean containers with paintbrushes.

Then we had to identify the gender of the OBLR pupa and put them into the colony where they would emerge and live happy little lives and then die. Fridays were field days where we zipped around Edmonton collecting traps with wild ALCR that were attracted by pheromones placed in the traps and stuck there by never-drying rubber cement. This is about as far from your average science class or lab as you can get without leaving the planet.

Wednesday activities done with the most excellent and really cool WISEST kids that exposed us to new, innovative ways to look at university, future careers and life were always an event to look forward to. There was a careful and well-planned mix of informative (like the presentation by Career and Placement Services) and fun (like the tour of IBM where we pulled together to make WebPages designs in about 40 minutes) so that we had an enlightening and memorable summer. Kim and Jen were amazing Student Coordinators and Grace was superior at making sure we had the best time we possibly could!

This was my very first job ever and I have so much to tell my friends when I get back to school. I can't believe the summer is nearly over and I won't be in a lab everyday. Until then, where are you my little ALCR?

"There was a careful and well-planned mix of informative and fun (like the tour of IBM where we pulled together to make WebPages designs in about 40 minutes) so that we had an enlightening and memorable summer."



BETHANY LYONS - Mathematical and Statistical Sciences
WISEST Supervisor: Dr. Wieslaw Krawcewicz
Sponsor: Human Resources & Skills Development Canada

When I first started the WISEST program I was told that I would be working in the department of mathematical and statistical sciences. Since the WISEST program is all about "hands-on" research, I really had no idea what to expect from this department. On the first day, the four of us in the math department were invited to join one of Tom Holloway's summer courses. Presumably, I was completely freaked out that I would fail miserably, especially since I haven't even taken math 30 pure yet. As it turns out, it was a games theory class that we were all able to understand, and in fact, we were even able to help some of the other students in the class! This class really helped me to further develop my problem solving abilities and taught me how to think logically.

By the second week, my supervisor,

Dr. Wieslaw Krawcewicz, was teaching calculus to myself and my partner, Anna Salim. We learnt both theoretical proofs and applications regarding backward induction, limits, differentiation, logarithms, summations and integration all in a period of about four weeks. One thing that I really appreciated about this was that he would always show us how to prove it, where as in high school, they simply give you formula and tell you to trust that Einstein and Newton don't make mistakes. Dr. Krawcewicz really pushed us to the max, making us learn such complicated material and doing so many problems over such a short period of time. It wasn't easy, but it was totally worth getting up at 6:00 because I now know what to expect in university, which will make the transition from high school a whole

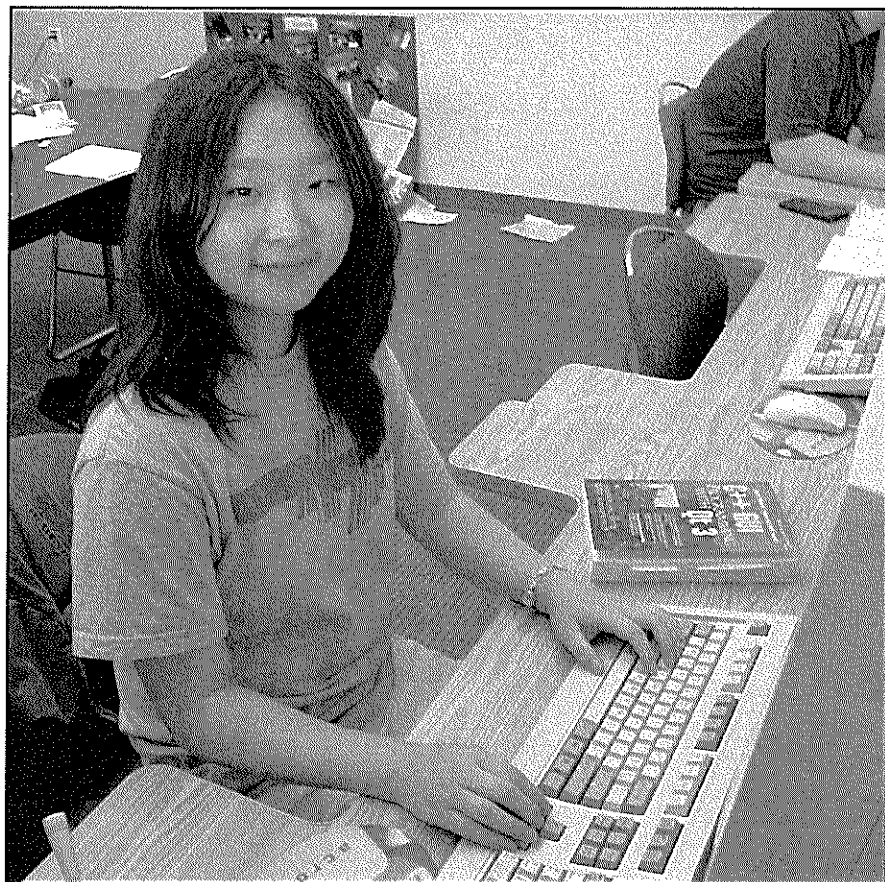
lot easier.

Dr. Krawcewicz also taught us how to use Tex and Maple 9.5 software and it was using this software that we were able to realize our projects. This is a huge advantage to me as it will save me from having to learn it later on.

I have always enjoyed math, however I was never sure that there would be any point to pursuing a career in the math department, but then I learned that there are many practical applications. In certain situations, we must first establish an equation and then solve it. For example, it is by using differential equations that we are able to calculate at what moment a rocket must take off so as to hit the moon, or what size a guitar string must be in order to produce any certain frequency, or what is the minimal time necessary for a chemical reaction to occur. Mathematics is in fact the practical science behind all of the others

One of my favourite aspects of this program was the Wednesday afternoon sessions. I enjoyed going to IBM and learning about careers in technology, talking with women about their experience in science and engineering, and touring the medical genetics lab. The WISEST program has been such a great learning experience; I learnt about so many different careers that I wasn't aware existed, such as a topologist or an actuary, and I finally understand what a Bachelor's degree, Master's degree, PhD, and post-doctoral are. Because of WISEST, I feel so much more prepared for University and to face the world of science!

I would like to thank Dr. Krawcewicz for so willingly donating his time, Human Resources and Skills Development Canada, and Grace Ennis, Jenn Kelly, and Kim Williams for giving me with the best summer job ever!



RACHEL MA - Computing Science

WISEST Supervisor: Dr. Michael Buro

Sponsor: Human Resources & Skills Development Canada

Life is a continuous journey of learning and the six weeks I spent in the WISEST program was one of the most rewarding times I had in my life so far.

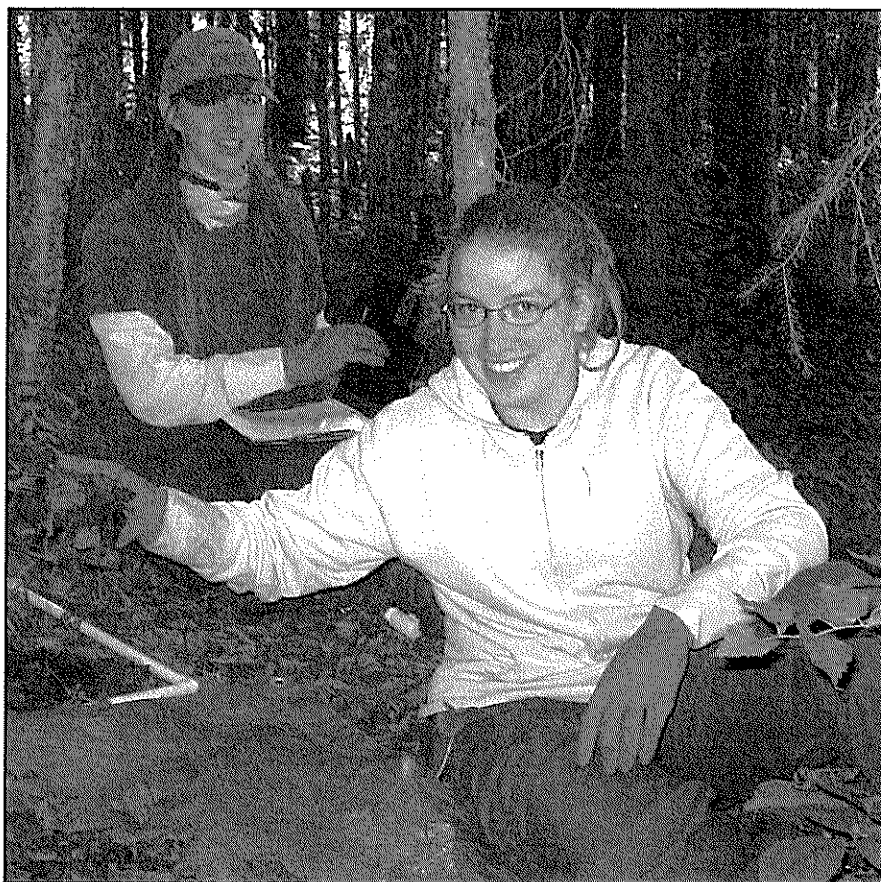
Starting out as a computer ignorant, yet amazed by the astounding ability of computers, I entered the Computer Science Department to work with Dr. Michael Buro in the Artificial Intelligence (AI) Lab. At first afraid, because I was lacking all the technical knowledge for any useful work, I began my six weeks journey in the AI Lab. Not much to my relief, I soon found out that I had to learn how to operate Linux (and the years of experience with Windows suddenly turned out to be of no use at all), how to code in C++, and how to design with Qt Designer. Three scarily thick books and on-line tutorials kept me company for about two weeks,

but then I got tired of reading and demanded to start a project. That is when the challenge, but also the reward, crept into my experience. Using Qt Designer, which is a program that allows one to design Dialogs and Main Windows with the easy method of click and drop, I created a Graphical User Interface for the map editor that Dr. Buro's research team wanted to use in creating maps for Real-Time-Strategy games. Although there were tricky problems like resizing, it was fun to play around with buttons and combo boxes. However, once I finished playing, coding was not far away neither. I had to implement the menu--meaning that I had to enter codes, that tells the computer to save or to exit when the user clicks on the menu. A frustrating time, but with the help of a Qt book, I managed to a satisfactory degree.

My second assignment was to write a code that calculates the fairness of a map. Again with the help of a C++ book and my second supervisor Lenore Brown I wrote a small program that just did what I wanted. Although, this did not happen immediately without errors. First the program did not want to compile and then it did only partially what I wanted. However, two especially helpful people in my lab looked at my program and the problems did not stick around for long (thank you Markian and Adi). The feeling of writing my first program that also worked was indescribable rewarding.

Beside the lessons in the lab, WISEST also offered us a wide range of other valuable learning opportunities outside the lab. It turns out, Wednesday became my favorite day of the week. Through the Wednesday activities new insights and ideas were pouring in all the time: the wide range of career opportunity in an IT firm, the unlimited options for graduates with a science degree, the wisdoms and advices of women with science degrees, just to name a few.

Looking back, the frustration and doubt are nothing compared to the progress I have made in my life through the program (Look out coding, I am aiming to become an expert in C++!). I do not know how much I have contributed to the research team, but I know that the research team and WISEST contributed much to my education and character development. All the lessons I have learned here are too much to write down without my report exceeding the 650 word limit, but just wait a few years and I will prove to anyone that WISEST was one of the most valuable and irreplaceable experience in my career. I want to take this opportunity to thank WISEST, Alberta Human Resources and Employment, Dr. Buro and his research team, Markian and Adi (sorry guys, I don't know your last names) for the opportunity and help, I appreciate it very much.



NAOMI MAHAFFY - Biological Sciences

WISEST Supervisor: Dr. Erin Bayne

Sponsor: Weyerhaeuser

When I came to the university for my first day of work in the WISEST program, I expected it to be very similar to other summer jobs, except with an emphasis on learning more about science. As a result, I couldn't have been more surprised to find myself camping in the forest and digging for worms only three days later. My experience in WISEST turned out to be much more than just a typical summer job.

I was placed in the biological sciences department under Dr. Bayne, and ended up doing most of my work for Erin Cameron, a grad student who is doing research on the invasion of earthworms in the boreal forest. Earthworms are an invasive species and are not native to this area, so the purpose of our research was to determine how they are getting there. To do this, we had to travel to

various lakes and dig for worms near boat launches, roads, quad trails, and other locations that would give clues as to whether the introduction and spreading of worms is due to fishers, traffic, quads, or other human activities.

Life in the field was a very new and exciting experience for me. My research group consisted of Erin, three undergrads, another WISEST student, and myself. The six of us went on two trips into the field: one for 12 days and another for 8. We would get up early every morning, have breakfast, and then head out to do some transects (50m lines along which we had to look in six 50cm squares and under six logs for worms and cocoons). At each lake, we had to do a transect at the boat launch and two transects across the lake, along with transects next to and far

away from a road and a seismic line. In the evenings, we took the worms that we had collected in the forest, cleaned them, and killed them in ethanol. Our days were long, but I had a lot of fun and really enjoyed getting to know the people I was working with. They helped me to learn how to identify plants, use a compass and GPS, and lots of other remarkable things that I never knew before. Field work turned out to be a lot of fun and a great learning experience that I will never forget.

After our second trip, Erin helped Joanna (the other WISEST student in my group) and I to learn how to identify species of earthworms by examining them under the microscope. Determining the species of the various worms that we had collected in the forest allowed us to find out which areas appeared to have more types of earthworms than others. Worm identification was actually really interesting to learn, and was exciting because it is something that very few people know how to do.

Despite being out in the field for much of the program, I was also able to attend some of the WISEST activities, which were great ways to meet other people with interests in science and learn more about different areas of research. I enjoyed seeing all the scientific equipment when I got to take a tour of the chemistry labs on campus, and was excited to get a chance to see glassblowers, find my way around the university, and get to know other WISEST participants.

The WISEST program was an amazing experience that allowed me to learn a lot about an area of science that I knew very little about. It helped me to gain first-hand experience in scientific research and opened my eyes to career opportunities in areas that I never even knew existed. It was truly a unique experience that was far more interesting and exciting than any summer job. After all, when asked what they did this summer, how many other grade 11 students can honestly say that they've been busy digging worms?



KRISTY MARSHALL - Laboratory Medicine and Pathology
WISEST Supervisor: Dr. George Cembrowski
Sponsor: Human Resources & Skills Development Canada

My name is Kristy Marshall and this year I was given the opportunity to be a part of the WISEST program. Coming from Hinton, Alberta, (a three-hour drive from the university campus), I was also given a taste of what residence life is all about and how much fun living in the city could be. When I applied for the program, I was pretty sure that I wanted to be a pharmacist, but I wanted to look further into the field before having to make any major decisions. The WISEST organization matched me to a project that entailed most of my interests and revolved loosely around my idea of becoming a pharmacist.

For the summer, I worked on a project titled "Quantifying Pharmacologically Active Substances in Chinese Herbal Medicine." My project was based on an article written by Weng F. Huang, PhD, Kuo-Ching Wen, PhD, and

Mei-Ling Hsiao, Mph that was titled "Adulteration by Synthetic Therapeutic Substances of Traditional Chinese Medicines in Taiwan". I worked in the department of medicine and pathology at the University of Alberta Hospital where I analyzed Chinese Herbal Medicines for pharmacologically beneficial substances, as well as any harmful active substances, present in the medication. Using a Gas Chromatography Mass Spectrometer (GCMS) and an UV Spectrophotometer, I researched the breakdown of twenty-four Chinese medicines purchased from random shops at China Town in Edmonton.

I was pretty sure my results would be clean since I only had time for a couple dozen tests, but I was quite shocked at what I found. Present in a drug called "Hong She Tablets" was a compound called strychnine.

Strychnine is commonly used as a rat poison and is extremely fatal to humans. It can cause one to experience simultaneous muscle contractions and convulsions ultimately leading to death within 10-20 minutes of consumption. Another medication, titled Zhong Gan Ling, contained the substance Methampyrone (Dipyrone) which has been illegal in California since 2002 due to its dangerous side effects. It is used as an anti-inflammatory as well as painkiller, but has been banned as a prescription drug. My project was very interesting. It was great to get a chance to work with machines that many students don't get to touch until their third or fourth year of university.

My favorite part of the WISEST experience was getting to live in the St. John's Residence during my six-week stay. There was never a dull moment whether we were going to Klondike Days, or switching each other's beds around putting the box spring on the top and the soft mattress on the bottom. Everyone was so much fun to live with and the food was great.

Although I still haven't figured out for sure if I want to become a pharmacist, I had an amazing time and would do it all over again if I had the chance. The WISEST program gave me the opportunity to learn a lot, make some connections, hear some really good advice, figure out what I'm interested in, and more importantly, what I'm not interested in. I made some good friends and had an educational and super fun summer!

"The WISEST organization matched me to a project that entailed most of my interests..."



LAURA MARTZ - Neuroscience
WISEST Supervisor: Dr. Clayton Dickson
Sponsor: Human Resources & Skills Development Canada

When I first heard about WISEST, my first thought was "Do I really want to spend almost my entire summer working while my friends all relax and do nothing?". However the appeal of the program soon overcame this. I would get to spend the summer not only earning money, but also learning so many new and exciting things. So I wrote my essay, got my teacher references, filled out the application, sent it in and then waited. About a month later I received the program saying I was in. I would be working in a lab that was studying the difference between sleep and anesthetic patterns in the brains of rats. Now I couldn't wait for summer to come. Not only was I going to be working on research during the summer but I was also going to get to work on a project that dealt with neuroscience, something that has interested me for a long time.

Not long after that call, school ended and it was time for me to start work. At first I felt I was a little in over my head as there was so much I felt I did not know that I needed to know. That didn't last long though. Soon I was able to understand what I was to do for the duration of six weeks and was able to actually complete this work. With the lab of my lab members, I worked on a project trying to see if there was a correlation between the cycles a rat's brain went through while anesthetized and the core body temperature of the rat. Before I had come to the lab, a special "Jill pack" had been invented which would aid me in my project by insulating the rat to change its core temperature. Then after temperature and brain activity recordings were taken, I would analysis them to see if there was correlation. After I had completed a

few experiments, I was shown how to do this. It took a bit of computer knowledge and a lot of trial and error, but soon we had come up with a method of analyzing the information I had collected. All signs were pointing towards some kind of correlation between the rat's brain activity while urethane anesthetized and it's core body temperature. We completed more experiments with similar results but the six weeks were soon over, and my time at the lab ended. While I left them with my findings to ponder and continue researching, I knew that I was definitely glad that I had chose to be a part of WISEST.

WISEST not only gave me the chance to experience being a part of a research lab, something which I will definitely do again, but it also allowed me to see all the wonderful, unique option that are out there to choose as a career. I have learnt more then I ever thought possible when I first printed off my application. WISEST definitely was worth giving up sleeping in for six weeks.

"WISEST not only gave me the chance to experience being a part of a research lab, something which I will definitely do again, but it also allowed me to see all the wonderful, unique options that are out there to choose as a career."

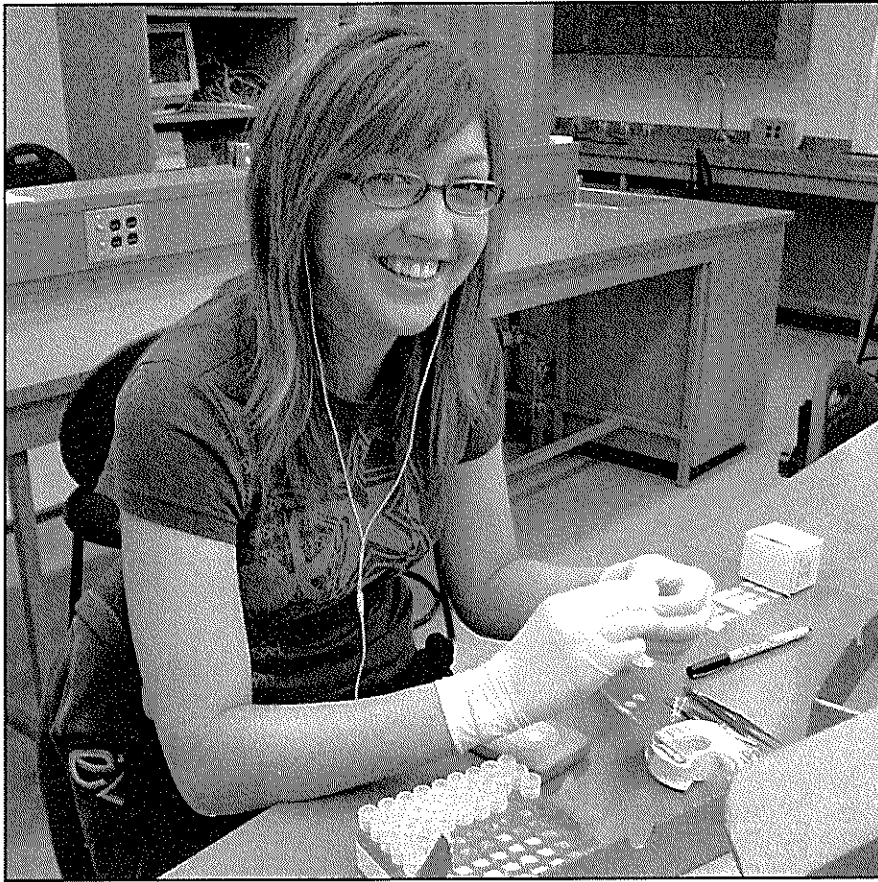


EMILY MELCHER - Biological Sciences
WISEST Supervisor: Dr. Heather Proctor
Sponsor: Elk Island Public Schools Partners in Education

I applied for WISEST because it sounded like a fun and interesting way to spend my summer. Then summer came and I was more or less nervous about coming to the university and slightly upset that I wouldn't be able to have much "summer" at all. That attitude lasted until I actually got into my lab and heard what I was to be doing. The atmosphere was very casual so I didn't feel uneasy or anxious for long. My project dealt with marine biology, namely the growth rate of clams. In the experiment, there were 12 bricks, loaded with bio-balls (balls that promote and support life) were deposited in the ocean near Robber's Passage. Nine of the bricks were covered with one of three different

mesh sizes, three were left uncovered to act as a control. After one month samples were taken from each of the bricks and then taken again after six months. The hypothesis was that the bivalves (two shells) under the finer mesh would have grown to be larger compared to the other samples because the fine mesh would have prevented access to many of their predators. This experiment was just a chapter for one of my supervisor's PhD. I had a small role in this study and was simply required to measure the length and width of the bivalves that were sampled, easy enough...or so I thought. Little did I know at the time that I would barely be able to see the clams let alone measure them, and that there were over 620

of them! It sounds like it would be boring, but really, all the clams are different in size and color and most were actually interesting to look at. Measuring them wasn't easy. It wasn't a ruler and paper situation. I had to use a microscope and insert a special eyepiece into it with a ruler on it. I also had to convert all the units of measurement to satisfy the magnifications. If I ever got bored of measuring clams I had many other tasks to do such as searching for tardigrades. It's surprising how much you don't know about the world around you. I never knew animals such as tardigrades even existed, yet there I was searching through moss samples to pipette them into a special dish, then later prepare them to slides. All in all I've been quite busy working in my lab. So busy I don't even miss the "summer" I'm not having. I've met many new friends through the WISEST Wednesday afternoon activities, social events with the HYRS students, and TGIF lunches on Friday. It's really quite remarkable hearing about the experiences the other students are having and hearing all about the projects they are working on. I really got to know my way around campus, (that is to say I know where all the science and math related buildings are located...and the buildings with food!) so being an aspiring University of Alberta student I'm sure I'll feel a lot more confident and composed when time comes for me to find all my classes, heavens knows that was my biggest worry for high school. I'm really glad I got to take part in the WISEST program and I will no doubt have a lot of information to share with classmates in the future.



JACQUI NEILSON - Biological Sciences
WISEST Supervisor: Dr. Andrew Derocher
Sponsor: Human Resources & Skills Development Canada

Instead of working at home on the farm all summer, as I usually do, I was excited to spend my time in the WISEST Summer Research Program. I knew it would be a great opportunity for me, but I did not expect the enormous amount of learning that would come; about the projects I worked on, other women in non-traditional fields, the U of A, and most importantly, about myself.

I was one of the few people who worked with another WISEST student. Heather Nelson was my partner, and together we assisted two graduate students in the Biological Sciences department with their projects.

The majority of our time was spent on Seth Cherry's project for his master's degree. Seth is using a stable isotope approach to determine the diet composition of polar bears in the Beaufort Sea. A ratio between different

isotopes of carbon and nitrogen in a tissue creates an isotopic signature. By comparing the isotopic signatures of a polar bear to the isotopic signatures of all potential prey items, using a simple mathematical equation, one can determine the relative diet composition of that polar bear. Heather and I aided in the tissue sample preparation aspect of the project. All of the various tissues, including fat, hair, claw, muscle and blood, had to be sub-sampled, rinsed several times, air dried and/or freeze dried and ground or cut up before Seth could weigh it. And with nearly 1000 samples to work with, we never ran out of things to do. Though the tasks seemed endless at times, we still made it through with our sanity intact.

When we weren't assisting Seth, Heather and I carried out similar tasks for Mark Edward's PhD project. He is

also using stable isotope analysis to determine feeding ecology, but of grizzly bears in the Mackenzie Delta. Since the grizzlies of this area consume a wide variety of food, including a terrestrial, herbaceous, and possibly marine aspect, it is important to know not only what the bears eat, but also to identify seasonal changes in their diet. To do this, Mark will be sectioning the grizzly bears' hair and claw into 3-5 mm pieces in order to trace at what points the grizzly bears' eating habits change. Another question to be answered is how much marine protein contributes to grizzly bear diet, if at all. Neither of the two projects has received any results at this point, but Heather and I are eager to hear from Mark and Seth when conclusions are eventually made.

The WISEST program was more than just a job. Each week, all of the 70 WISEST students gathered for activities. My favorite of these was the small group discussions. I learned a lot from speaking directly to women in non-traditional fields. It was interesting to hear their experiences and the career paths they took, even if the path was not what they had originally planned for themselves. The women also gave us plenty of general advice about university that I know will help me in the future. Just as I had hoped when I joined this program, I became very familiar with campus. I can now easily find my way around, which will benefit me later on if I attend the U of A.

While I did come to understand how crucial research is to the world, I also learned that it is not an area that I would wish to pursue. Since I just spent my summer in a research program, some may assume that I wasted my time, but in reality, I have moved one step forward towards my future. By realizing what I don't enjoy and eliminating those options, I am closer to discovering my true passion.

I am extremely grateful for the opportunity I had to be part of the WISEST program. With all of the valuable knowledge and experience I have gained from it, I feel that I am better prepared to make the right decisions in the future. Thank you WISEST for a summer I will never forget.



HEATHER NELSON - Biological Sciences
WISEST Supervisor: Dr. Andrew Derocher
Sponsor: Human Resources & Skills Development Canada

Thomas Edison once said, "Opportunity comes dressed in overalls and disguised as work." This was certainly the case in the WISEST Summer Research Program.

Like all WISEST students, I had some apprehensions regarding ditching all other summer pleasures to come work at the U of A. However, feeling I was meant to attend, I decided to embrace the opportunity.

In accordance with my love of animals, I was placed in the department of Biological Sciences. Under the guidance of grad students Seth Cherry and Mark Edwards, my lab partner (Jacqui Neilson) and I were introduced and familiarized with the fascinating world of research. Primarily we worked on Seth's project. Seth is using stable isotope analysis to determine the diet composition

of polar bears in the Beaufort Sea. By tracing stable isotopes, such as carbon and nitrogen, from prey species to bear tissues, one can determine what the bears are eating. Seth is hoping that his project will provide useful data that can be used to monitor polar bear diet as global warming may affect available prey.

We also worked with Mark who is studying the grizzly bears of the Mackenzie Delta. In both projects, Jacqui and I primarily worked on preparing tissue samples for testing. It would take far too long to tell of everything we experienced, but for a general idea of how we spent our time, I will mention that some of our duties included sub-sampling blood, cleaning claws, and cutting hair.

I think the most brilliant thing about this program is its hands-on learning.

For example, one could spend hours describing polar bear hair to a student.

Another student could be given a couple of hundred samples to prepare. Who will have a better understanding of what polar bear hair is like? The answer, of course, is the student who spent time examining and working with the hair.

I was that student. As geeky as it sounds to non-animal lovers, I am proud to say I know what polar bear hair looks like, feels like, and smells like.

As an out-of-towner, the WISEST Summer Research Program was infinitely more than a summer job. Rather, it was an entire life away from home and familiarity. During the summer, I made my home in St.. John's residence which was an amazing adventure in itself, but certainly not without its challenges!

As a small town girl, it was a lot of fun to experience city life at its best.

I enjoyed taking in such attractions as West Edmonton Mall, the Shakespeare Festival, and the World Master's Games. Among other aspects of dorm life, I appreciated meeting some amazing people and making many marvelous memories.

The WISEST Summer Research Program was definitely a once-in-a-lifetime opportunity which I truly appreciate. I learned so much and had many great times. Thank you to everyone who made it possible!

"The WISEST Summer Research Program was definitely a once-in-a-lifetime opportunity which I truly appreciate."



KIM OSBORNE - Earth and Atmospheric Sciences
WISEST Supervisor: Dr. Scott Chang
Sponsor: Petro-Canada Community Investment Program

I saw a lot of dirt this summer. When I applied to WISEST, I listed Renewable Resources as my first placement choice, not knowing exactly what the department did, or what my part in it would be. It attracted me because it seemed like the research involved lots of field work which means being outdoors, and this was a big benefit to me. The project I got assigned to is being carried out by a graduate student, Daniel Saurette; it involves research into the use of hybrid poplar plantations as carbon sinks, which would help reduce the amount of carbon dioxide in the atmosphere. This has a practical application in industry as a "carbon credit", allowing companies higher emissions without higher fines in exchange for plantations which would theoretically absorb the additional CO₂. The goal of the investigation is to find out how much carbon is absorbed by different

poplar plantations as they mature.

My first day after orientation turned out to be a bit of a shocker; I left to go to Dan's sites at the Alberta-Pacific Forest Industries mill near Boyle, Alberta and learned so much just on the way there. My first week was an immersion in the world of science and data collection. I learned how to operate a Licor-6400 Infrared Gas Analyzer for measuring soil respiration and used Hutchinson chambers to collect gas samples for measuring soil respiration. We also took soil samples and measured trees in each of six land conversion trials. While we were working at Al-Pac, I got to stay at Meanook Biological Research Station (MBRS) near Athabasca, Alberta. There I met and quickly made friends with three other WISEST students working there for the summer. I was quickly adopted as part of the

Meanook "family" and had a lot of fun playing games like soccer and Cranium in the evenings.

My second week in the program was likewise very busy: I was in Fort McMurray working on a project for my lab's principle investigator, Dr. Scott Chang. Every day we took a helicopter in to one of the two field sites, as there was no road access and only a turf landing strip at one. Once there, I was responsible for setting up water collection in each of five plots at both sites; this consisted of stapling piping to a tree and caulking it to collect stem flow, and setting up rainfall collectors near the bases of various trees. Other members of the team set up dataloggers (CR10X) to measure soil temperature and moisture, and dug pits to take soil samples and to bury instruments for the datalogger.

Once we finished all the field work however, there was a lot of lab work to be done and it isn't nearly as much fun as field work. I spent a lot of my first week in the lab sieving all the soil samples we'd taken both at Boyle and Fort McMurray. My second week in the lab, I learned how to use a Gas Chromatograph (GC) to analyze the gas samples we'd taken in the field. This is a large machine that uses three different processes to measure different gases: Thermal Conductivity measures CO₂, Flame Ionization measures CH₄, and Electron Capture measures N₂O. It then sends the information to a computer which analyses and graphs the data, making it very easy to find the concentration of different gases.

All in all, this summer I learned a lot. I got to run many different and often expensive electronics; a far cry from high school laboratory equipment. I also learned that research involves a lot of "hurry up and wait." Many samples take a bit of time to set up, and while the sample may take a few hours to run, the electronics are completely automated and require no supervision. Altogether, I wouldn't trade this summer for anything; I made friends, learned about student life and a woman's role in science, and gave myself the chance to explore the fascinating world of science.



ALENA PARKINSON - Biological Sciences

WISEST Supervisor: Dr. Susan Hannon

Sponsor: Alberta Innovation & Science

The WISEST program is definitely the best job I've ever had. OK, so I don't have much experience, but it was better than baby-sitting for another summer. I've known about the WISEST Summer Research Program since I was in junior high, so I was really excited when I was accepted.

WISEST turned out to be a lot more than just a summer job. I learnt more than I thought it was possible to learn in six weeks and by the time I wrote this report, I wished that there could be another six weeks of WISEST.

I worked at Meanook Biological Research Station, which is 15 kilometers south of Athabasca and 1½ hours north of Edmonton. It was interesting to live at the same place I worked. I got to know a lot of the researchers and other workers really well, and I had a lot of fun. Since it

is a bit of a drive, I worked for 10 days and then got 4 days off. The 10 day stretches sound long, but they flew by.

I was assigned to the station, not to a research team, so I got to do a lot of different things. The research project I worked on, RANA (researching amphibian numbers in Alberta) is run by the provincial government. I worked with another WISEST student, Jenny Lau, and our job was to trap frogs and take data. There is a pond at Meanook especially for RANA since the project has been going on there for several years. We checked the traps for frogs every morning. When we got them, we measured and weighed them. We also took some weather data.

A second project that we worked on was starting a herbarium. This

basically involved collecting plants, pressing them and trying to figure out what they were. After that, we displayed them in photo albums. Meanook had a plant survey done and there are over 200 different species of plants on the property. Though we had trouble identifying all the plants we collected, we had a lot of fun making daisy crowns.

Besides working on RANA and collecting plants, I helped out at the station. Jenny and I got to help plan field trips, go on trips to town and to the dump. One day we got to go to Fort McMurray. We also helped fix things and learnt how to drive quads. Our lesson in backing up trailers was a true adventure! We also worked in the lab a bit, if there was extra work to be done or bottles to be washed. Did you know that you have to rinse bottles 7 times in distilled, de-ionized (extremely pure) water after you take them out of an acid bath?

I also had fun at the Wednesday afternoon session I was able to attend. They really did expose me to a lot of different aspects of science and the many different careers someone interested in science can choose from. I also learnt what I'm not interested in. For example, I like to work with a lot of different people so I was told that engineering might not be the best choice for me. I also received a lot of advice about surviving in university. I used to be really scared of going to university (mainly of failing university, actually) but now I am looking forward to it. I also feel better about not knowing exactly what I want to do, because many of the role models and other people I met through WISEST didn't know when they started university either. They just sort of found their way.

Overall, the WISEST Summer Research Program had been fantastic experience for me. I would encourage anyone interested in science to get the necessary marks in grade 11 and apply for the program. It may seem like a lot of work – studying, filling applications, and actually working seven hours a day for six weeks, but it's worth all the effort!



JESSICA POON - Civil and Environmental Engineering
WISEST Supervisor: Dr. David Zhu
Sponsor: Human Resources & Skills Development Canada

Wow, I must first say that the past few weeks have gone by so quickly. It has been four weeks already and I wish there were more weeks left to spend with the WISEST Summer Research Program. Without knowing what to expect when I first walked in, now I walk out an experience to remember.

During this time, I have been working in Civil and Environmental Engineering, more specifically the Water Resources Department. NREF, the building which I worked in, is really new and I spent a great deal of my time down the in the Blench Hydraulics Lab (which is one of Canada's largest hydraulics labs!). I have had the opportunity to participate in three experiments: Rat Creek CSO structure, sewer flow at junctions and selective withdrawal using a temperature control curtain.

The Rat Creek and sewer junction labs were both very appealing and dealt with sewer flow but I was mostly involved with the selective withdrawal experiment this summer. This project dealt with water within dam reservoirs and the concern that the output water of this dam needs to be a specific temperature in order for fish to survive in the water downstream of the dam. Using a control curtain (a barrier-like wall that separates the reservoir into two), the water temperature can be controlled in a less expensive manner than using a temperature control device (TCD). In order to see the effectiveness of this control curtain, experiments have been done on a scale model. Instead of using hot and cold water, fresh and salt water were used because they behave very similarly to hot and cold water and can be easily set up to use.

The salt water (cold water) was dyed so that it could be more easily seen when compared to the fresh water (hot water). One of the objectives of this experiment was to observe the phenomena of hot and cold water mix. Using a laser and special particles in the water, the mixing was clearly observed and recorded. There were interesting waves at the interface of the fresh and salt water and the mixing was very detailed under the laser lighting. The knowledge gained by watching the phenomena could also be applied to other things such as hot and cold air.

Besides having a great educational experience, I have also met a lot of great people. I love the relaxed and casual atmosphere at the university. Though people are "easy going", they definitely know when it is time to buckle down and work. I found this aspect of the university community to be very interesting. Everyone is really nice and open to sharing knowledge. Most people that you approach for help will explain everything until you understand. Under the supervision of Dr. David Zhu and his students, I had several great mentors and role models to follow after. Also, I have really enjoyed spending my time with other WISEST students whom I have gotten the chance to know. Because of WISEST, I now have a leading advantage in choosing a career and heading in the right direction. Being able to work hands on in a lab and having the chance to temporarily become an engineer at the age of sixteen really makes me feel confident about entering university and eventually the work world. I really value this experience and wish that everyone was able to participate in such a great program. It has been an awesome summer and I know that my future has changed because of the research program, thank you WISEST!



EMILIE RAINVILLE - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Habibur Rahman
Sponsor: Syncrude Canada Ltd.

You've probably already heard this a hundred times, but WISEST is an amazing program. When I learned of my acceptance at the end of May I was totally stoked. Six weeks of working in a lab parent free? Paradise. I had such high expectations coming into the program and yet it has exceeded every one.

For the past six weeks I have been finding polymorphisms between winter and spring canola. Polymorphisms are genetic difference between adult populations of the same species. Therefore by finding alleles where polymorphisms occur you can discover differences between the winter and spring varieties of canola and whether or not some winter breeds share characteristics with the spring lines and vice versa. I have learnt how to extract DNA from flash frozen plant samples, and how to quantify it to

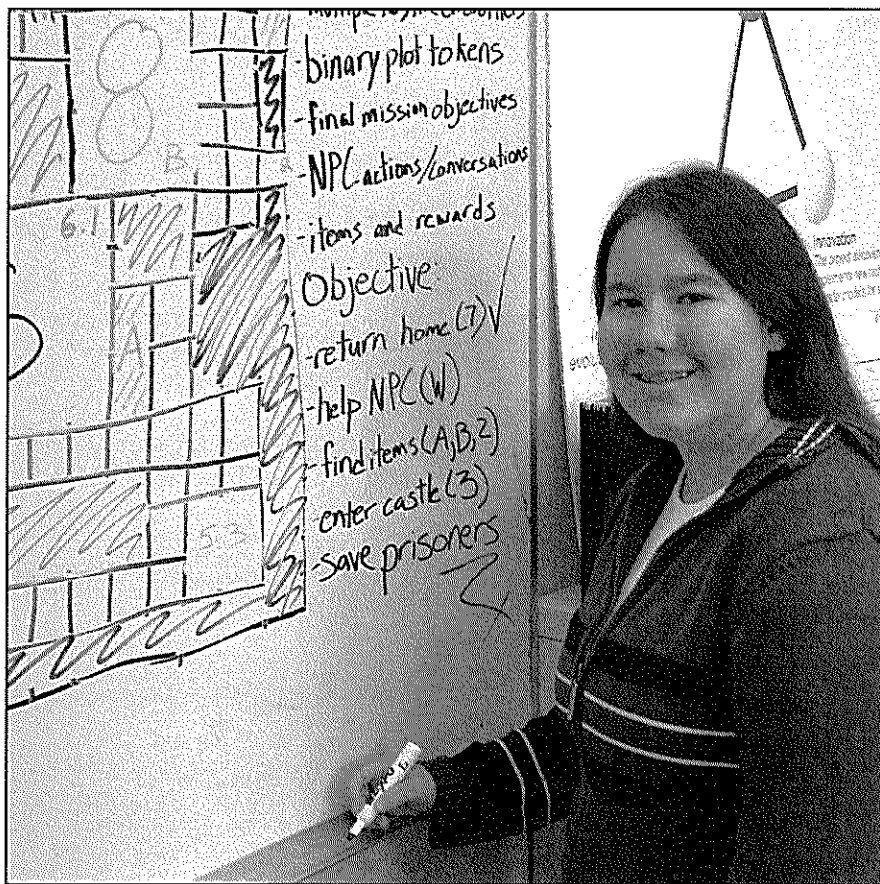
tell me how much DNA I have per micro liter. From there and mainly for the past five weeks I have been doing polymerase chain reactions or PCR, and polyacrylamide gels. Using certain primers that are specific for a particular section of DNA, PCR will amplify the selected allele and its base pairs to allow you to check for polymorphisms. From here you run the samples through a polyacrylamide gel, a type of gel electrophoresis. For this you create a thin layer of gel incased between two glass sheets and hook it up to an electrophoresis machine. After adding the amplified DNA samples to the top, the machine will run an electric current through the gel which will carry the samples downward and allow a laser to read their positions and the distance at which they pass through. The machine then feeds back to the computer

which gives you a constantly updated picture of what the laser is encountering. Polymorphisms will come out at different distances and may be slightly different in size and shape. As I stated above, by detecting polymorphisms we can compare and contrast winter and spring lines of canola. This allows us to see which ones share characteristics and can be used for later manipulation and testing. Unfortunately like all lab work, it's a labor of trial and error, as not every allele contains a polymorphism. While I believe that the skills and knowledge I have gained should most definitely help me out later in life, I think it's been the learning and the experience that has been most rewarding and I have loved every minute of it. Well except loading tip-boxes...but that's all!

Being from Fort McMurray, I stayed at St. John's residence during my time here in Edmonton, and it has been a blast. Staying at rez really made my summer amazing. All the people staying there became really close and there was always someone willing to do something with you. 'Something' included going to Klondike Days, going to the water park, going rock climbing and having Rez Relay Days in costume. Rez gave me something to look forward to at the end of your day and supper is usually awesome.

I have made some amazing friendships and have probably never laughed so hard in my life.

WISEST has provided us with so many opportunities and activities; from our hands-on lab jobs, to ultimate Frisbee Mondays and on campus lab tours. I've learned so much and gained such an incredible experience. It was defiantly worth it many times over and I am so glad I could be a part of such an amazing program.



EMMA RAPATI - Computing Science
 WISEST Supervisor: **Dr. Jonathan Schaeffer**
 Sponsor: **Process Solutions Canada**

After being accepted into the WISEST Summer Research Program, I was a little unsure about the kind of research I would be doing in the Dept. of Computing Science. It seems I should not have been worried, my work in the dept. as well as participation in this program has been an extraordinary experience.

I was assigned to Dr. Jonathan Schaeffer and his research team to help evaluate and test new course material for the fall semester. The course is designed to give non-computing science students the knowledge and programs needed to create their own computer module or game. To do this, they have designed a program called ScriptEase, which allows anyone to script or program an action without using computer languages. My job was to familiarize myself with the software and use it

to complete all of the coursework and assignments, which included making my own module.

When I found out that I would be spending the summer working with computer games in a second year university course I was very excited. First, because I like working with computers and the different applications they have; secondly, because it is a great opportunity for me, coming from a small village where I would not have the opportunity to get much experience with research. I have loved these past six weeks, working and living in the university area.

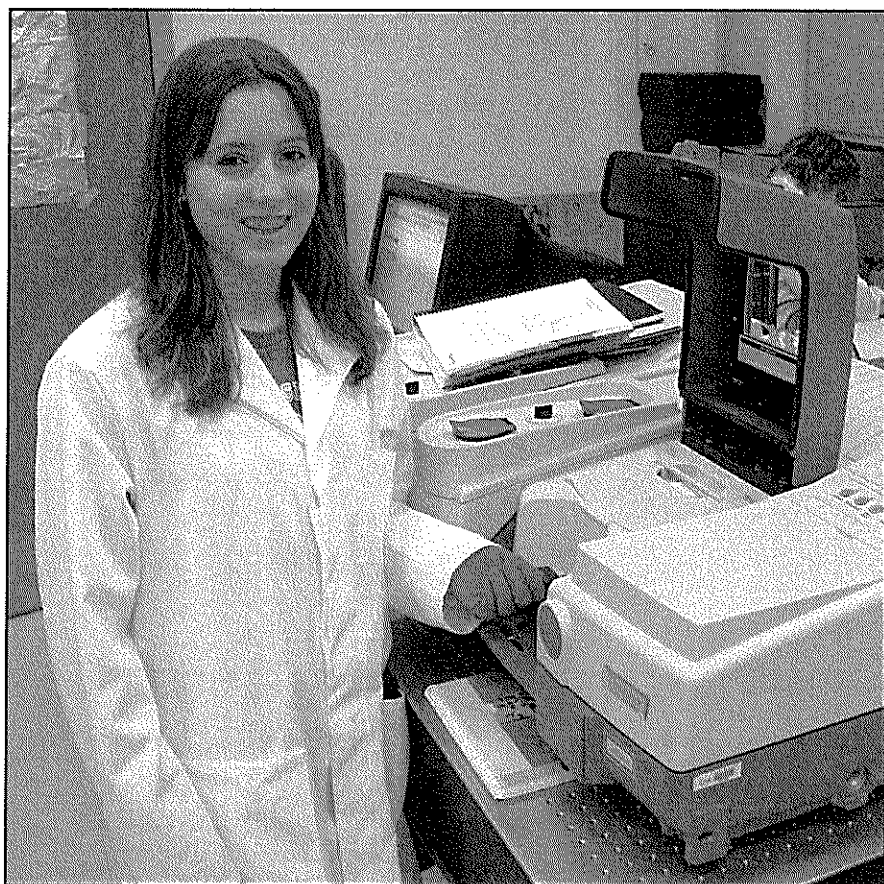
Apart from work, the WISEST Summer Research Program also included many other great activities. With all of the Wednesday afternoon sessions, Friday lunches, and other various activities,

there was never a dull moment during the program. My favorite, though not really a part of the program, was simply having lunch each day with the other students in the program. Though hesitant at first, I soon found a great group with whom I could relax and eat lunch with every day. Whether sharing stories about our mornings in the lab, our weekends, or talking about nothing in particular, lunches were some of my favorite and most memorable times during the past six weeks.

Throughout this program I have learned a lot. Not only have I learned a great deal about the university and life after high school, but I have also learned a lot about myself. I have learned about different aspects of university life, and which parts I am specifically looking forward to. I have learned about the many distinct and general scientific careers, and have started to decide if I would like to pursue them as my own. I have learned more about the different paths life may take, and which ones may best suit my future expectations. In the six weeks I have spent in this program, I have learned much more about life than, I believe, any other single event I have participated in.

And so, to conclude this final assignment, I would like to thank the many people who made this amazing experience come true. First my teachers, without whom I would not have the knowledge that enabled me to get in to WISEST, nor would I have heard about the program. Secondly, the WISEST coordinators, sponsors and everyone involved who have helped put on this great program. And finally I would like to thank the research team who allowed me into their circle for six weeks. I had a great time working with them and hope that I have helped them, even if only in the slightest way.

I must now finish, and would like to close with a heartfelt thank you and final wish for the success of my fellow students in their future endeavors.



MEGAN ROSS - Chemical and Materials Engineering
WISEST Supervisor: Dr. Zhenghe Xu
Sponsor: NSERC-PromoScience

This summer I was given an amazing opportunity through the WISEST Summer Research Program to work in and learn more about the options that university holds for me. When filling out the application, I was not entirely sure what sort of education I wished to pursue at post-secondary. I was considering a variety of options such as medicine, neuroscience, engineering and even law. After working for six weeks in a chemical engineering lab I was able to see what happens in this field and meet, be inspired by and learn from people in this field. During the six weeks I have developed a strong interest in chemical engineering and think it is very likely that this is a path I would pursue in university.

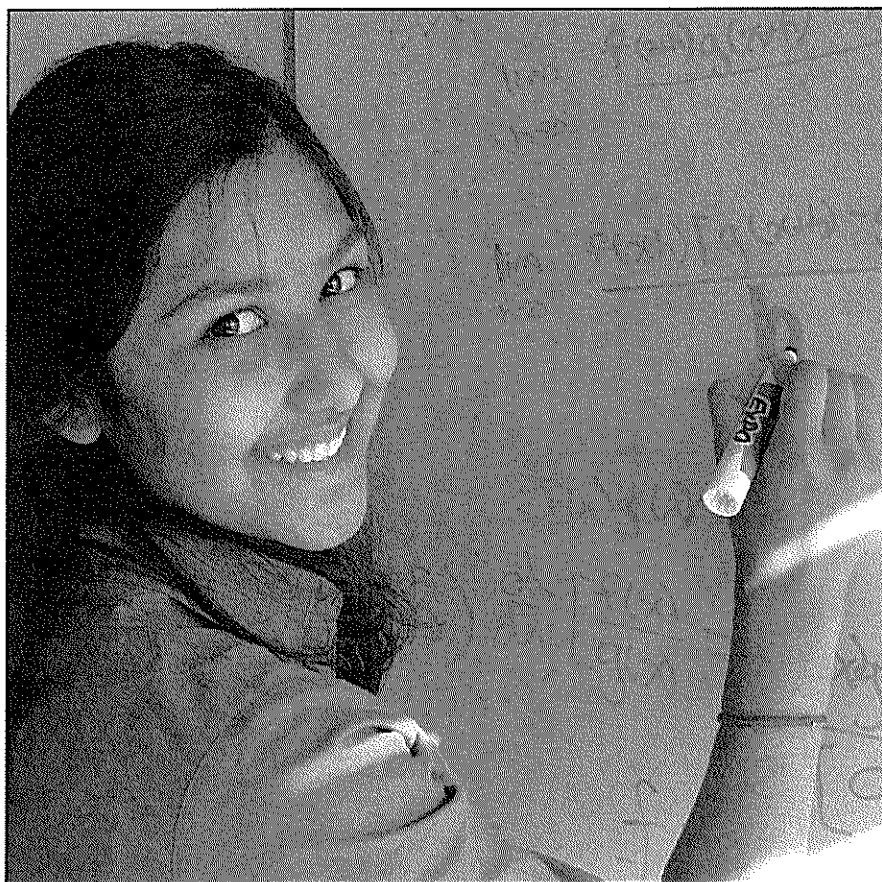
During my six weeks, I was positioned in Chemical and Materials Engineering under the supervision of Dr. Y.

Maham but I worked directly for Martina Rusnacik. I worked as her assistant on her research project on the use of propylamine, butylamine, and benzenethiol as coatings to nanopowder copper to inhibit agglomeration. The copper powder is used by the industrial company Umicore for electronics applications but the drying process results in unwanted particle agglomeration in Umicore's reactors. Through our research, we coated the powder with the three chemicals and operated various tests on them to see the effectiveness of our coatings.

This summer, I was able to use and observe equipment I had only ever read about in science textbooks before such as a Scanning Electron Microscope (SEM), and an X-Ray Photoelectron Spectrometer, (XPS). The scanning electron microscope allowed us to see highly detailed

images of the copper particles and that with the coatings, there was less agglomeration. The XPS showed us that our coating did work by showing the presence of electrons from elements in the coatings. I was able to learn how to read the XPS graphs and label the peaks which was a very interesting experience. Reading about how the XPS worked was very interesting and gave me a head start for some of the topics covered in Chemistry 30 which I will take next year. I learned how to use the Infrared Spectrometry Machine to analyze our samples. I liked this machine immensely as I was able to use it independently and run scans completely on my own which gave me a great sense of accomplishment. I was also able to observe the use of a Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC) machine which was very interesting and also gave me a head start for the calorimetry unit in Chemistry 30.

Over this summer, I feel I have gained valuable experience and knowledge by working in a field I am now highly interested in. Not only did I learn much about chemical engineering but I also learned about the university campus and everything that goes on there. Now longer am I afraid to come to university because I already feel like I know my way around and have a sense of what university like is like. I was able to meet new interesting people my age who share similar interests and I've had the chance to meet and learn from various role models in engineering and science fields. Although this experience had its tough parts, like long days and smelly chemicals, overall I feel I have gained a new sense of independence and understanding of what I want to take in university. The WISEST Summer Research Program gave me the unique experience to earn money doing work I find incredibly interesting and the program has helped me make decisions about my future. I hope that the WISEST program can continue to benefit the future generations of young women interested in science and engineering as it has for me.



ANNA SALIM - Mathematical and Statistical Sciences
WISEST Supervisor: Dr. Wieslaw Krawcewicz
Sponsor: Alberta Human Resources & Employment

It was a sweltering summer day in July when two beautiful damsels entered a dark and mysterious chamber on the second floor of the CAB building. Inside, secret revolutionaries – cloaked in black – were holding a clandestine meeting. They used a secret code to communicate amongst themselves, which the girls could not decipher. Very confused, they left the meeting. They decided to seek the help of one wise man called Dr. K – for no one could pronounce his name – to help them learn the secret cipher. They went to him for lessons everyday, they studied hard and crammed the knowledge he gave them eagerly into their minds. After several hours of grueling study sessions, they finally learnt the secret code: the ancient and noble study of calculus.

Spending my summer in the Math Department has been a revelation

for me. I have learnt that any math I ever learnt through all the years of school is only a baby step. The real math begins after calculus. I realized that soon after the first day, when my fellow WISEST student Bethany and I attended a third-year math course that Dr. Wieslaw Krawcewicz, our supervisor, was teaching. Therefore, we decided to learn calculus. Through the weeks, I tried to understand limits, fell in love with derivatives, hated integrals and tried to get the general idea of calculus. And if I came across any incomprehensible ideas, graduate students and professors around the department were really helpful.

In addition to learning Calculus, I also attended a math course called Games and Puzzles in Recreational Mathematics with the three other "Math Girls". In the course, we learnt interesting new games, and then solved

them, meaning that we analyzed them using Mathematics. Even though it sounds very grand to have attended a university Math course, it really was a very easy and fun course.

Apart from this, I learnt to use Mathematics software Maple 9.5 and LaTeX. At first typing in LaTeX seemed like a lot of work but it was easy to use once I became familiar with it.

In addition to these things, I listened to Graduate students speak to us about various topics in Mathematics such as Induction, saw a Ph.D. student prepare for her defense (which made me realize how little I know of Math), and got to meet people in the Math Department and see what mathematicians actually do.

I must remember to mention though, that without Bethany I would have died of frustration. She explained Calculus to me when my mind refused to comprehend any more. We ate Ice cream together and went for rides in the elevator to take a break from work.

However, I was not just able to see the world of Mathematics, but through the Wednesday afternoon activities I also got to know about other careers in science and engineering. It was very inspiring to talk to female engineers and go on lab tours. I got to go on the Mechanical Engineering lab tour. Our tour guide showed us the wind tunnel and even let us sit in it while high-speed wind ran through it. The experience was nothing short of incredible.

The WISEST crew also had an awesome time at the Quad where we met each Friday to eat lunch and chitchat.

When I return the keys to our little office at the end of this week, I will be very sad. The six weeks will have passed too soon. But I will leave with fond memories. I would like to thank my sponsor Alberta Human Resources and Employment for giving me a chance to mingle with mathematicians. I am also very grateful to Dr. Krawcewicz for teaching us and giving us knowledge. In his own words, "The best knowledge is free knowledge". I can say earnestly that I had the best summer job receiving free knowledge.



SHILPA SHAJI - Laboratory Medicine and Pathology
WISEST Supervisor: Dr. Jason Acker
Sponsor: Human Resources & Skills Development Canada

Hello! My name is Shilpa Shaji. I am from Holy Trinity Catholic High School. I heard about this program through my Chemistry teacher, Mrs. Myers. I received a call on my birthday from Jenn saying that I was accepted for the program. I was thrilled! I never expected to be selected. She told me that I was under Dr. Acker in the Laboratory of Medicine and Pathology. I received a package, which gave me instructions as to what I should do prior to the start of the program. The first thought that crossed my mind was how humongous the campus was. Our first day was Orientation. There were 70 students for the program this year. Our coordinators, Jenn and Kim, organized a bunch of games in order for us to get to know the other students. We were given a safety session and lunch was provided by

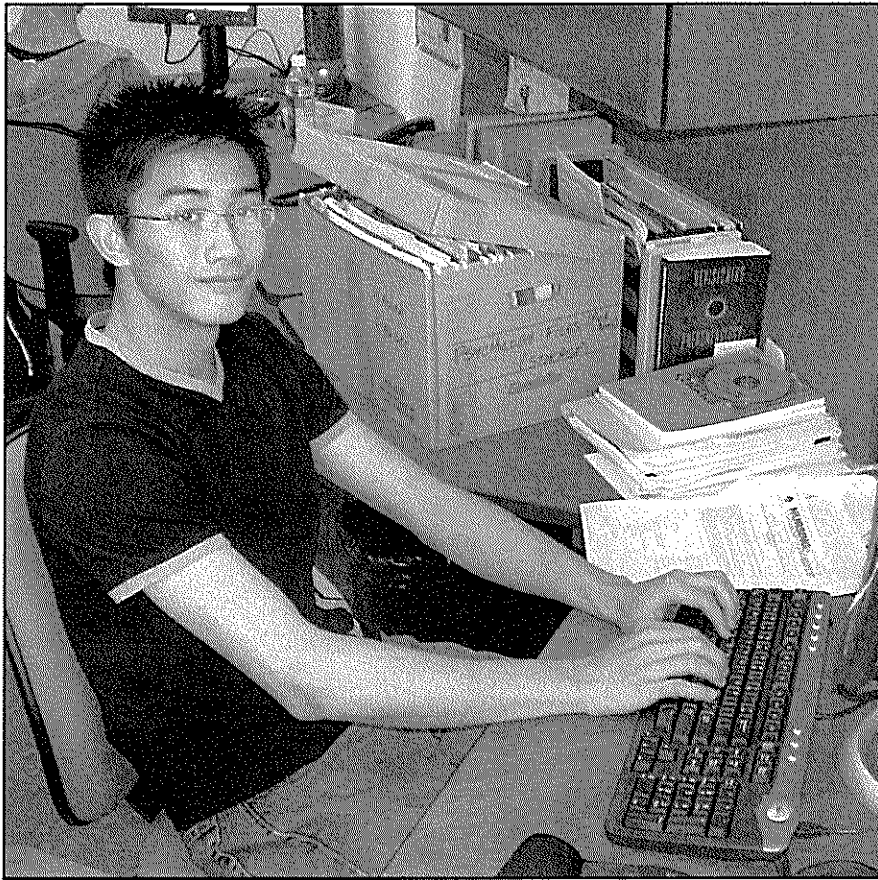
WISEST. At the end of the day, we got to meet our Principal Investigator.

My principal investigator was Dr. Jason Acker. He was very friendly and immediately made me feel comfortable. He told me that he also had a HYRS student this summer. His name was Charles. We were going to work at the CBS (Canadian Blood Services). He took us to the lab. We met his Research Assistant, Ioana Croteau. Dr. Acker gave us a tour of the lab we would be working in. He asked us what we expected out of this program to which I replied that I wanted to be inspired even more. We had two projects we could choose from. One was to create a model of a new shipping box that they were planning on implementing. The other was to compare the quality of preserving red blood cells using SAG-M as compared to using AS-3. We

had time to choose between the two. During our first we were given a lot to read. Ioana went through safety instructions. She gave us another tour of the laboratory. We acquainted ourselves with Kristy and Jayme, two summer students, Jelena and Kirby, PhD students and Vick. We were shown how to pipette. After the end of the week, we picked our projects. I chose to build a model for the new shipping box. Ioana gave me a report to read written by engineering students on the project. Ioana took us on a tour on the main floor where the donors come in to donate blood. We got to watch the donors on the apheresis machines. It was interesting to learn how the machine worked.

We also got a tour on the second floor. We were shown how blood was spun and separated into different bags. My project was very simple. I was already given dimensions for my model. I made the box first. Then, I got RBC bags, apheresis plasma bags and pooled platelets bags to work with. I had to fill them with the appropriate volumes of fake blood (water). I had to fit in a certain amount of bags in the bags. I had to play around with the original dimensions of the model. Our WISEST group met every Wednesday in two different places based on which group we were in (either the Catalytic Converters or the Free Radicals). We met with women from different fields of science. We had a party with the HYRS group. We also had a scavenger hunt. My group won first place! We met every Monday evening to play Ultimate Frisbee. We also met every Friday at Tim Hortons (in the CAB) for lunch. I made some very good friends like Jayla and Suzanne. I also watched fish embryos hatch (part of Jayme's project). It was the coolest thing I have ever done.

This six week program is an experience that I will never forget. I had a blast. In the beginning, I told Dr. Acker that my goal was to be inspired and I've achieved it.



ALAN SO - Nursing
WISEST Supervisor: Dr. Wendy Austin
Sponsor: Faculty of Nursing

My experience as part of the WISEST Summer Research Program was extremely eventful and interesting. On the first day of orientation I was able to meet many fellow WISEST peers, while getting acquainted with Kim and Jen, the two WISEST coordinators. From then after I was escorted to the Faculty of Extension building where WISEST student, Daniel Wong, HYRS student, Matthew Lee, and I took part in the Dr. Wendy Austin's Relational Ethics research of .

Under the guidance of Dr. Wendy Austin, Ms. Erika Goble and other members of the research team I participated in the three research projects: *Supporting Relationships Between Family Members/ Friends and the Healthcare Team in Traditional Continuing Care Settings*, *Called to Oppressive Acts: Mental Health Practitioners' Experience of Moral*

Distress and Ethical Relationships in Forensic Psychiatric Setting.

Supporting Relationships Between Family Members/ Friends and the Healthcare Team in Traditional Continuing Care Settings is a project that deals with the ethical issues that can arise between a continuing care patient's family & friends and the healthcare nurses in a Continuing Care Facility. The objective of this research project is to investigate two components of relational ethics, engagement and mutual respect, in a continuing care facility, and to identify difficulties faced by both parties thus being able to conclude with recommendations for enhancements and further research. This research would be performed through the methodology of *Participatory Action Research (PAR)*; a method of research that

obtains data usually through focus groups from relevant characters and institutions surrounding the issue, the information obtained would then be analyzed in order to propose changes and improvements. The final outcomes of the research will be used to create awareness of the nature of relationships in traditional long term care facilities, to promote healthy family/friend-staff relationships through *Action Plans* and to create a more collaborative environment at traditional long term care sites through the use of Participatory Action Research (PAR).

Ethical relationships in Forensic Psychiatric Setting is a project that investigates the nature and issues of relationships between mental health practitioners and patients in a forensic setting. Many factors like the criminal background of the patient or the mental illness of the patient can hinder a healthy patient-practitioner relationship. Mental Health Practitioners in a forensic setting must act as a physician to the patient while also retaining the role of an investigator in the face of law. This project would also utilize a Hermeneutic Phenomenological method of research. The information acquired will contribute to developing knowledge of ethical practices and awareness within forensic settings.

From these six weeks of research experience I learned many new things. I had the opportunity to take part in qualitative research, got extremely familiar with campus and most of all met many new people. Overall I greatly enjoyed this six-week experience and I strongly recommend the WISEST Summer Research Program to anyone interested in a field of study that is non-traditional to their gender.



NATHAN SPERBER - Nursing
WISEST Supervisor: Dr. Joe Noon
Sponsor: Faculty of Nursing

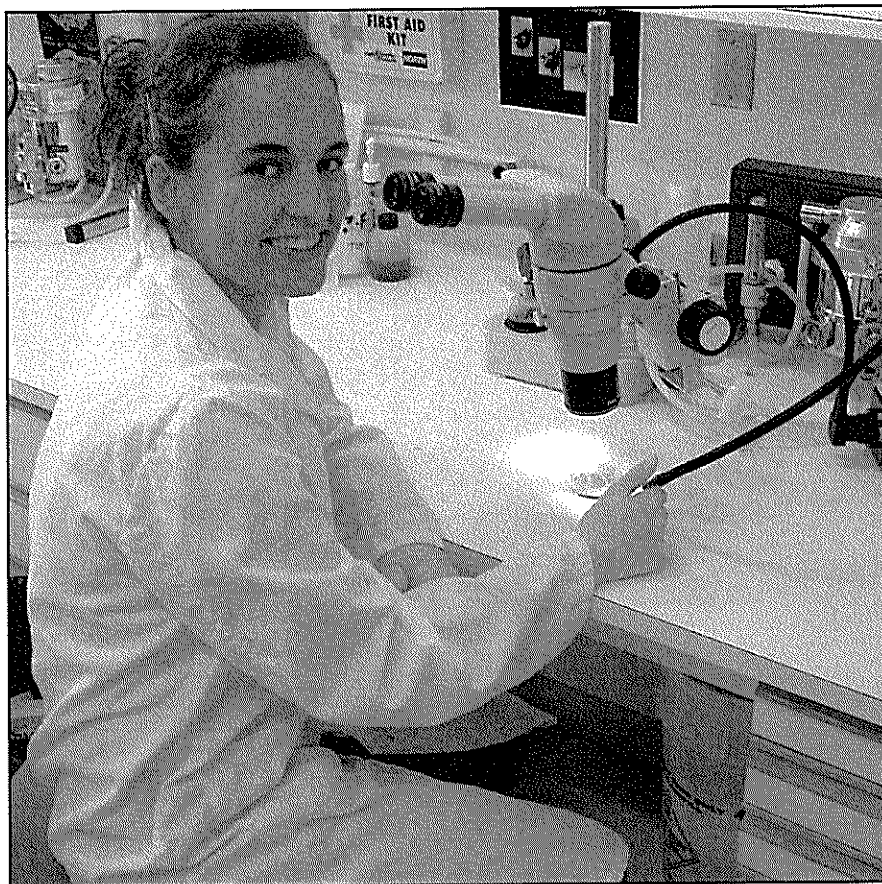
My position was sponsored by the Faculty of Nursing, and I was assigned to work as a research assistant for Dr. Joe Noon. Our research focuses on arterial "stiffness" as a risk factor for cardiovascular disease; its correlation with two different gene polymorphisms; and variations in risk between different ethnic populations. I really enjoyed this study. The entire project was clinical, so there was a lot of interaction with many different people. We conducted a variety of tests, and there are a few things that make our study unique. In the past, arterial stiffness could only be calculated invasively and with large amounts of equipment. Our system is totally portable and allows for large amounts of patients to be studied in a much smaller timeframe than was previously possible. Additionally, our tests are almost all totally non-invasive. The only pain comes from

taking a small blood sample for genetic analysis. The ease of the testing makes it suitable for use in the elderly population or for people with pain sensitivity. We used the SphygmoCor System to perform pulse wave analysis (PWA) and pulse wave velocity (PWV) tests. Applanation tonometry is the principle behind both of these tests. Applanation tonometry is a relatively new technique, whereby the operator depresses an artery with a high frequency ultrasound device called a tonometer. The pulsatile blood flow passing underneath the tonometer provides us with a pulse wave reading on our computer screen. In pulse wave analysis, the software converts the peripheral (radial) pulse wave to a corresponding central waveform, providing data on central haemodynamic measurements. Using both peripheral and central data, the degree of arterial compliance

can be calculated. To calculate pulse wave velocity, we used both applanation tonometry and a 3-lead electrocardiograph (ECG). The software is able to calculate the frequency of the T-wave in an ECG over time, and gates the T-wave to the pulse wave reading from two separate sites on the patient. We used the radial and carotid artery as base points for our study, by entering the distance between them the software was able to calculate the velocity of blood through the arteries.

I was lucky enough to join Dr. Noon right at the start of this phase of the study. Since I joined right at the beginning, I have been able to see and experience most aspects of a clinical study, not only the testing, but also the administrative tasks, the recruitment, the correspondence with companies halfway across the world in an attempt to get equipment, and the constant scheduling, re-scheduling, and re-re-scheduling of volunteers as they find out they don't have as much free time as they think. The best part of working in the Faculty of Nursing was the study itself. Everyday we got to interact with new volunteers and I was able to conduct most aspects of the testing. I learned the technique of applanation tonometry, and gained valuable lab experience with various other forms of clinical technology. I also worked extensively with our post-test data, preparing it for analysis, and then conducting the analysis itself.

Now, as a male WISEST student, I feel that there are a few things I need to clarify. First, yes, I am aware that WISEST is an acronym for Women in Scholarship, Engineering, Science, and Technology, and no I am not a woman. While the name of the program is gender-specific (I guess they don't like the sound of PISEST), the program is actually open to students of both genders. There are few male students in WISEST though, but you won't find me complaining. I mean, where else would a guy spend most of his summer with 66 girls and only 3 other guys? Overall, I have a hard time trying to imagine a better way that I could have spent my summer. I learned many new things, made lots of friends, and experienced some great new things!



LAURA STANTON - Surgery
WISEST Supervisor: Dr. James Shapiro
Sponsor: Alberta Heritage Foundation for Medical Research

By the second day in the WISEST program, I knew that I was going to have a more than memorable summer.

Beginning with a full-day orientation and safety session, all 70 of us WISEST students (66 fellow females and only four males) arrived in the engineering building, anxious and eager to get started. Thankfully, we were greeted by friendly coordinators, and were not left alone to sit in a room of awkward silence. Right up until the introduction presentations, we played icebreaker games and got to know those who would be our colleagues for the majority of the summer. Even the two hour mandatory safety session was interesting, thanks to the enlightening Dr. Margaret Ann Armour!

But it was the second day that work technically began. My placement was in the department of surgery, working in the field of diabetes research under principal investigator Dr. James Shapiro.

Essentially, Dr. Shapiro had a key role in developing one of the most technologically advanced diabetes treatment methods, the "Edmonton Protocol". By transplanting the insulin producing islet cells from donor pancreases to the recipient, insulin independence has been achieved in human patients. However, the protocol is far from perfect. First of all, to perform one transplant, several donor pancreases are required to harvest enough islet cells (at least two per transplants). Secondly, post-transplant, recipients are required to take several anti-rejection medications. These are some of the reasons why diabetes research continues, although the "Edmonton Protocol" is a major breakthrough in the field.

Within the first morning of my job, I had already been suited up (gown, hair net, mask, and gloves) to watch an islet transplant surgery be performed on a rat! Coming from the world of Biology

20 dissections and diagrams, it had been the first time I had seen a real, live animal surgery performed. I would soon discover that working with mice, and observing many different procedures, would be in some way a part of every day at the lab.

Although much of my time is spent watching various surgeries, isolations, and even helping out occasionally (by removing kidneys, livers and spleens from mice), my WISEST program project is called "immunohistochemistry". With the direct guidance of my supervisor, Juliet Emamaullee, for two thirds of the program I have been staining microscope slides for analysis. In essence, immunohistochemistry is a way to detect insulin and islet cells in a tissue sample, as well as cell death (apoptosis). There are many different methods to stain slides, but for my projects I used three main methods: light phase, fluorescence and TUNEL. Slides stained by light phase immunohistochemistry can be compared to those "vintage", random slides used in junior high science to teach students microscope skills. Visibly dyed purple to the naked eye, under the microscope one can tell where the insulin is located as it is stained a reddish-brown colour. The other two methods are more complicated, often requiring more steps, but stain in fluorescence (and can be viewed accordingly with a fluorescence microscope).

The WISEST program has been a fantastic way to spend the summer, possibly the best summer job I could've had. Having exposure to University level research students, doctors, and the facilities they work in has been an excellent way to learn, first hand, how research happens. In alphabetical order, I would like to thank everyone that helped me out (practically every day) this summer in the Anderson and Shapiro labs: Carl, Colin, Colleen, Haide, Jen, Rena, Shaheed, Tracy, Wayne, and Will. Most of all, I would like to thank my principal investigator, Dr. Shapiro, and my wonderful supervisor, Juliet. I have learned so much from everyone (especially that its okay to go for a two hour lunch while your primary antibody is incubating back in the lab!), and I wouldn't rather spend the summer working with any other research team, on any other project. Diabetes research has a very positive future!



KELSEY STEPHENSON - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. John Feddes
Sponsor: Faculty of Agriculture, Forestry & Home Economics

My name is Kelsey Stephenson, and I'm a grade 11 student from Jasper Place High school here in Edmonton. As part of my summer in WISEST, I was allowed to help calibrate sensors in the Swine Research and Technology center on the U of A farm. I was fortunate enough to work with Kelly Lund and Dr. John Feddes, my supervisors, and with Katrin Haechler. The overall goal of the project was to determine which kind of housing system was best for gestating sows. There is a lot of discussion involving what kind of standards should be put in place. Free access and group housing, or stalls?

They used a variety of methods, including analysis of cortisol levels, and a comparison of activities and time allotment to help determine the overall health of the animals in the study, which is ongoing. This is where

the sensors we were working on came in. They are still being worked on so they will provide the most accurate data possible, but the hope is that eventually they will be able to tell if a sow is in or out of a stall, lying or standing, and whereabouts in the stall this is happening, instead of relying on human observers.

Working where I was gave me a huge range of opportunities. Not only was I introduced to the range of research going on in the swine barn, but I was able to see the rest of the goings on. I saw the boars, and the newborn piglets born to a few of the sows attached to Kelly's project. I was also given a taste of the office environment, since I worked out of the Neil Crawford center, as well as seeing how the equipment was put together. I even helped solder together sensors, and wire the

circuit boxes. I was introduced to the concept of biosecurity, and I was able to use a pen solderer to solder the diodes of the sensors, at the University which I have never used before and found fascinating.

Being able to do everything I have experienced this summer was an enormous privilege. To be welcomed into a lab and to be able to see what is happening, to be able to contribute, was a pleasure. I was able to meet some wonderful people in and out of the program, and I was able to see what really happens in the world outside the classroom. I was given valuable insight into what jobs are out there, and learned a great deal about myself in the process. I have a better idea of what the university is about (I also won't get lost on my first day!) and can make full use of everything it has to offer. This summer in WISEST has been truly amazing.

"I was able to meet some wonderful people in and out of the program, and I was able to see what really happens in the world outside the classroom."



CORINNA STEVENS - Renewable Resources

WISEST Supervisor: Dr. Sylvie Quideau

Sponsor: Syncrude Canada Ltd.

There are some things in life that you never forget. WISEST is one of those experiences.

When I got the call saying that I was accepted to WISEST I was told I would be working under Dr. Sylvie Quideau in the Earth Sciences Building. The local newspaper even had a short article about the program and explained that I was working in the Department of Renewable Resources dealing with soil samples. Little did I know that I would be working with samples from the oil sands reclamation projects in my hometown of Fort McMurray. Lucky for me no field-work on my behalf was required.

Jokes were made about how I was working in dirt all summer. I was even called 'dirt girl' for a while at residence: made it hard for people to forget my name. Soil isn't the most

glamorous research department and school friends found it amusing that I was playing in dirt all summer. Soil! Not dirt, soil! There is a difference!!

I was first given a small project that included finding the pH of soils from different sites in Fort McMurray. I learn many new skills but more importantly confidence. Yes I messed up, and even broke things (don't tell), but doesn't everyone?

By the second week I started my main project. It included physical characteristics of soil, which, believe it or not, includes more than just dust verses mud, and the affects different soils have on nutrient cycling, specifically nitrogen, phosphorus, and calcium. There was a lot of weighing of soil and doing dishes, which I now believe is one of the most important tasks in a lab. There is nothing

more annoying than trying to do an experiment with dirty glassware. I was very fortunate, however to avoid root-picking and sieving soil for the most part. Not all lab work is exhilarating and exciting but the results are worth it.

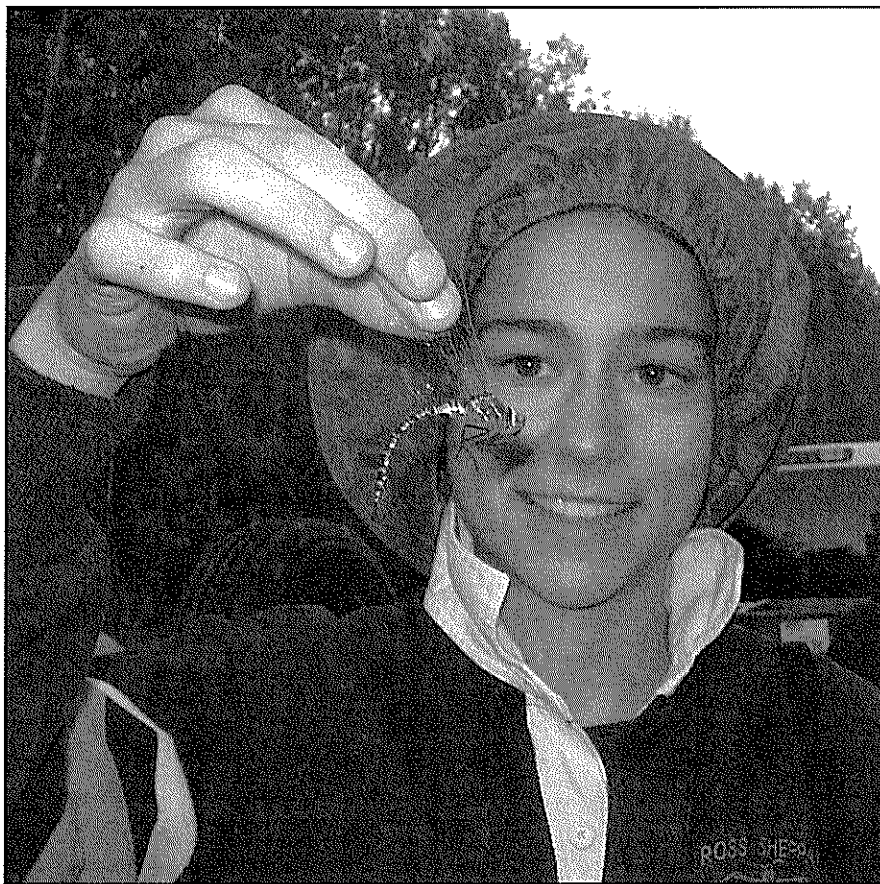
I don't think WISEST would have been the same experience if I wasn't living at St. John's. Residence definitely made the summer complete. It's amazing how well you get to know people when you live with them. You have common annoyances such as the garbage truck that empties the dumpster in the back alley every morning between six and seven o'clock and the two am fire alarm. The memories will last a lifetime: Shakespeare in the rain, midnight hair make-over, most of the group getting on the LRT while two of us miss it. It's pretty hard not to make friends. The only aspect of residence life that draws me home is the food: there's nothing like your mother's cooking

And to all those out there who believe that working in university labs will not bring you into contact with good-looking guys, I'm happy to say you're wrong.

So overall WISEST was a rewarding experience. Getting to know the university campus and labs, not to mention the Edmonton transit system (which can be trying at times) will benefit me when it comes to my own university experience.

Think about this, how many people can say they worked for the University of Alberta while in high school? I'm thankful to say, I can.

"I learned many new skills, but more importantly, confidence."



JOANNA TRISCOTT - Biological Sciences

WISEST Supervisor: Dr. Erin Bayne

Sponsor: Alberta Environment

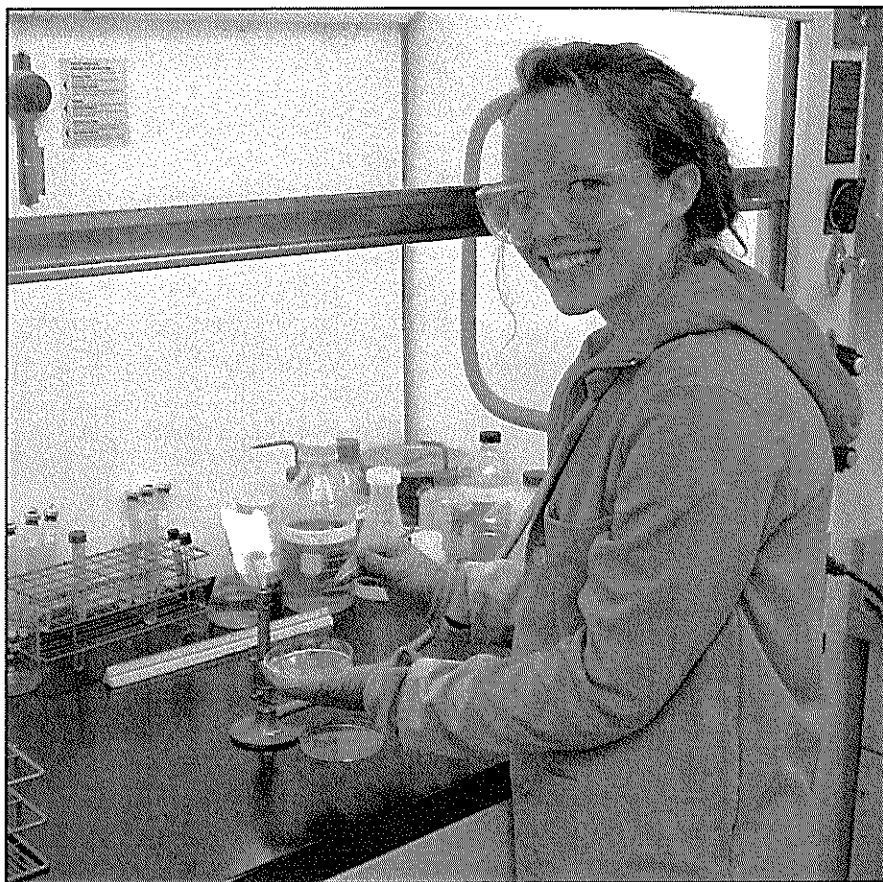
Through my participation with the WISEST Summer Research Program I have been granted a valuable opportunity to unearth the benefits of what the faculties of science and engineering have to offer. Under my supervisor Dr. Erin Bayne I held a position in the department of biological sciences while working with graduate student Erin Cameron. Our aim was to examine the distribution of invasive species of earthworms within Alberta's boreal forests. Surprisingly enough, earthworms are not native to Alberta and it is predicted that their spread and initial introduction is resultant of human activity.

As my position entailed living in the field by camping along various lakes, I was immersed within the hands-on life of a field worker. The main objective was to collect earthworm

specimens from various locations such as: boat launches, roadsides, seismic lines, lakesides and forest interiors. In addition, we were able to determine whether or not the species were present at these sites by not only identifying the mature worms, but both juvenile and cocoon life phases. This further enabled plausible estimates on population densities. Although my position was slightly unorthodox, it proved to be immensely beneficial as I acquired a diverse number of practical skills. Thanks to the mentorship of my team these abilities range from plant identification to boat rescue, along with a substantial amount of digging. Navigational tools such as compasses, handheld GPS and GIS programs were necessities to the expeditions, and I learned to value the application of technology in even the most remote

forms of biological study. However, I had not initially considered that—just like in a laboratory—fieldwork requires specific precautions that must be taken to ensure consistent variable control. For example, that type of habitat the area we sampled from is required to remain generally constant. Deciduous (or leafy tree) forests usually Aspen dominated or mixed-wood were the research teams' habitat of choice as the soil conditions of coniferous dominated locations were hypothesized to be too acidic for ideal earthworm habitation. To overcome this, we used tools like the GIS program to locate potential test sites by providing data on the habitat type of the desired areas. Conflicting structures like roadways also had to be considered for our results to remain valid and the team would often find our problem solving skills put to the test when conditions did not remain ideal. The proper location of sample able sites would at times occupy as much time as data gathering itself. However, the great thing about my field research project was that we were always on the move and it was never dull for a moment. I was able to expand my research horizons on what felt like a summer long camping trip!

Although my specific project kept me out of town for the majority of July, I made sure not to miss out on too many of the group activities offered by the WISEST program. Thanks to these informative sessions I can now honestly claim I have a general idea of how to find my way around the university campus. I could never even imagine how many directions a single branch of science or engineering could diversify into. WISEST has shown me that every corner of the world of science and technology is bursting with many different fields and ideas each being as unique as the individuals who study them. And, as WISEST enabled me to meet so many new people, I cannot help but be impressed by the broad spectrum of potential Alberta has to offer. I for one never would have thought I could discover so much when I choose to spend my summer digging for worms.



KAITLYN WALL - Earth and Atmospheric Sciences
WISEST Supervisor: Dr. Kurt Konhauser
Sponsor: Human Resources & Skills Development Canada

This summer I worked in the Earth and Atmospheric Sciences Building for Dr. Kurt Konhauser and his research team Stefan Lalonde and Larry Amskold. I participated in an experiment that analyzed the growth of bacteria in the presence of different metals at different concentrations. During the research I learned laboratory procedures and how to use specific laboratory equipment.

Besides the lab experience, I participated in group events with other WISEST students that helped build team skills and toured various work environments in the field of science, engineering and medicine. I enjoyed meeting other like-minded people from other parts of Alberta. I am sure that some of the people I met will continue to be my friends throughout my university life.

WISEST provided me with an opportunity to know University of Alberta and the city of Edmonton and experience independent living. Coming from a small farming village in northern Alberta, these skills will help me be successful in my university career.

I enjoyed working with Dr. Kurt Konhauser, Stefan Lalonde and Larry Amskold. I admire their commitment to their work and I am thankful for their patience. I am pleased that I was placed in this lab. Finally, I would like to thank my sponsor, Human Resources and Skills Development Canada. Without their financial support none of this would have been possible.

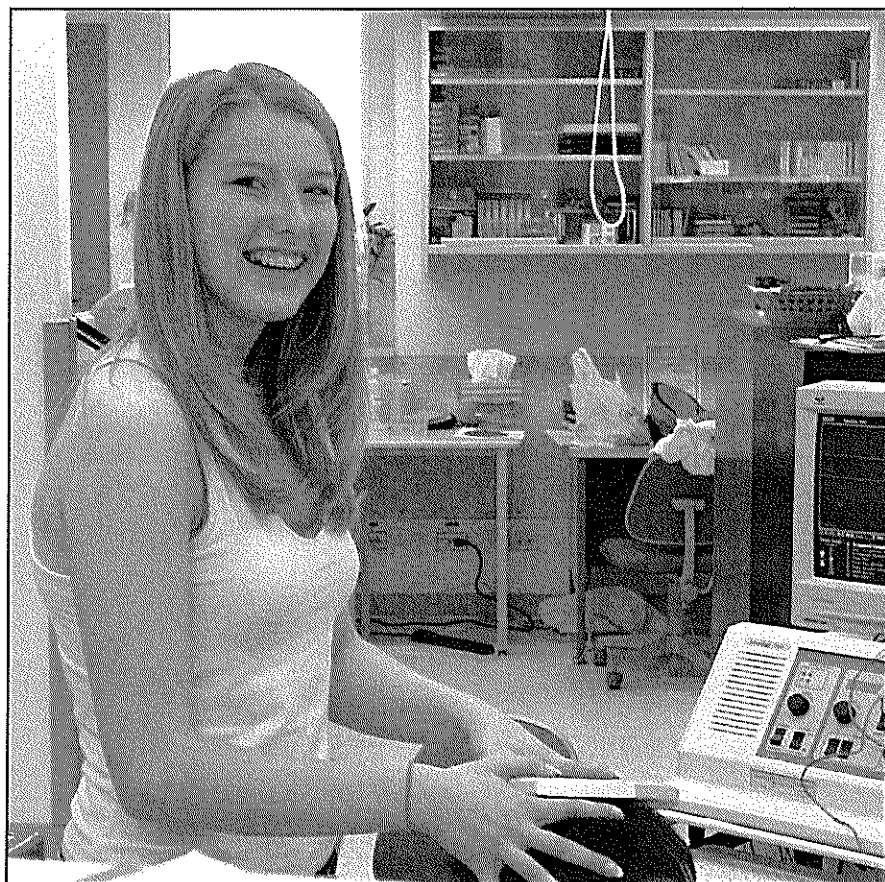
The WISEST Summer Research Program is a hands-on research experience for Grade 11 high school students who are making decisions about their fields of study and career paths. The students (both young women and men) work for six weeks in the summer as a member of a research group at the University of Alberta, within disciplines less traditional for their gender. For young women these areas include engineering, science, and technology. For young men, it includes the areas of nursing, human ecology and nutrition.

To qualify as an applicant to the Program, students must have an 85% average in the Grade 11 math and science courses, strong recommendations from teachers and an essay on an assigned topic. Application forms and information about the Program is sent at the end of January to the science department of each high school in north-central Alberta. Detailed information, as well as application forms, can also be found on the WISEST web site:

www.wisest.ualberta.ca

The WISEST students who participated in the summer of 2005 are also excellent resources for more information about the WISEST Summer Research Program.

WISEST
 women in scholarship, engineering, science & technology



ASHLEY WATSON - Neuroscience
WISEST Supervisor: Dr. Ming Chan
Sponsor: Human Resources & Skills Development Canada

I had an extremely difficult decision to make this summer: whether to go to Quebec to work for six weeks or to be involved in the WISEST summer research program. I was told I would be working with young children in Quebec or working in neuroscience at the University. I have always had a passion for the sciences, especially biology, and when WISEST said I would be working in the biology field it was just too good of an opportunity to pass up. I have not had second thoughts about my decision. I have had an amazing time this summer working at the University. I have met several great people and learned many new and interesting things. The lab I was placed in was amazing; I will never forget my 2005 summer.

I was placed in Dr. Ming Chan's lab in the field of neuroscience. It is a human lab dealing with finding more

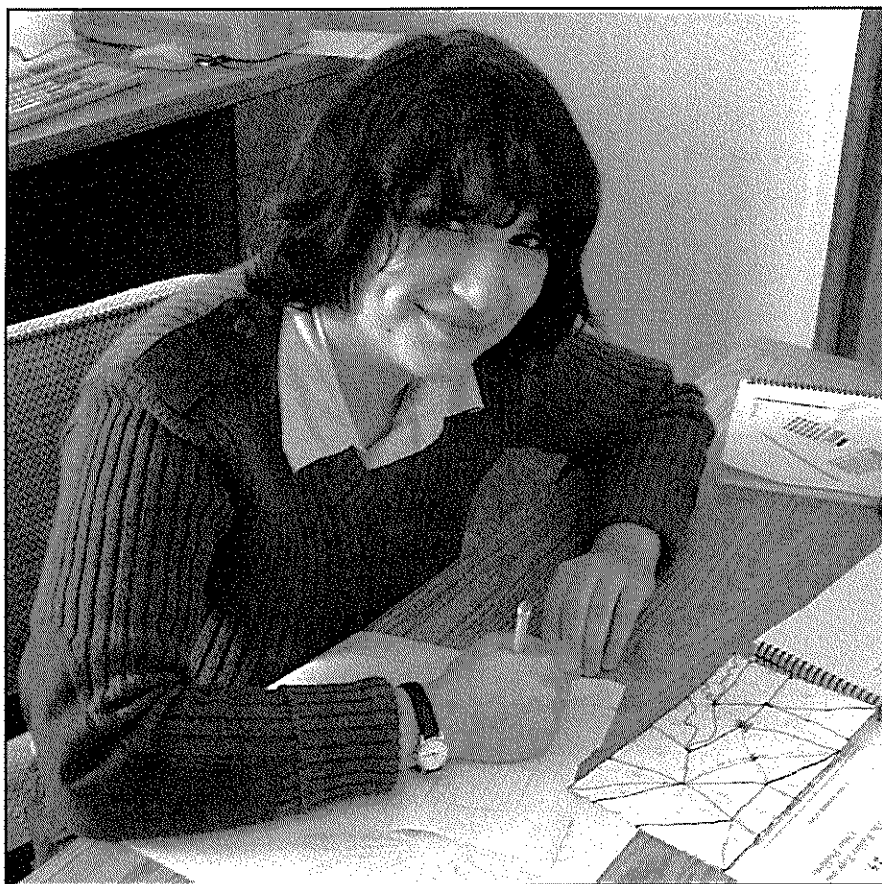
sensitive ways of detecting Amyotrophic Lateral Sclerosis (ALS) or Lou Gehrig's disease in humans. ALS is a selective killing of motor neurons which initiates a progressive paralysis in mid-life. It occurs in 2-3 people per every 100 000 and is usually fatal within 1-5 years of onset. People experience progressive muscle weakness, atrophy, and spasticity. So far only one drug, Riluzole, has been approved for use in ALS. Hopefully this will soon change.

In the lab we magnetically stimulated the motor cortex in the brain and recorded the motor evoked potential, MEP, on a computer program. Next we electrically conditioned the motor cortex for 10 minutes and finally we magnetically stimulated the brain again and recorded the changes. We used single and paired pulse when magnetically stimulating the motor

cortex. We did this on a number of normal controls, including ourselves, and also on a few ALS patients. We saw suppression and a return to baseline in single pulse, and no huge change in paired pulse in experiments with controlled subjects. Our data was not sufficient on ALS patients to view a trend. This is a three year study and I hope my work this summer has some impact on the final findings.

The WISEST program itself was amazing. Jenn and Kim, the coordinators, were easily approachable and always knew what to say to make us laugh. They put so much time and effort into the program and it showed. From making our nerdy science team names to talking with us about our labs, they made the experience enjoyable. All the planned activities were very worthwhile. From the first day scavenger hunt and pizza party to the closing farewell, everyone had a great time. The Wednesday afternoon sessions were amazing experiences as well. We had the chance to role-play a position in the Information Technology career field, talk with many talented women, visit other labs on campus and even tour a research facility off of campus. I had the chance to talk to many remarkable women and get a better insight into career options.

I entered this program already knowing that I wanted to pursue a career in medicine. Now, after working in research and talking to many women from different fields, I have a better understanding of what I will have to do to make my dream a reality. This program was wonderful and I would definitely recommend it to any grade 11 student interested in the sciences. Not only did I gain valuable lab knowledge, I had the chance to become familiar with the University campus and talk to university students. The students were able to calm some of my fears about university and tell me the best way about going through course selection. My lab members were not only members of the lab but also my friends. I had a great summer and I would do it all over in a heartbeat.



STEPHANIE WICHUK - Mathematical and Statistical Sciences
WISEST Supervisor: Mr. Tom Holloway
Sponsor: Alberta Education

Six weeks ago, I would have sworn that I was the only person in the entire world who enjoyed working with numbers and equations as much as I do. I almost felt as though I had some sort of disorder, or perhaps I was missing the important "math-hating gene" that everyone around me seemed to have.

Whenever I told anyone my favourite subject was Math, and that I wanted to go into it in University, all I got were cringes, blank stares, and the occasional laugh. "Why would you put yourself through that?" they'd say.

To be honest, I wasn't quite sure why. There was something about Mathematics that intrigued me, and I knew that I wanted it to be an integral part of my life—forever. My problem was that I didn't know how I was going to go about accomplishing that. I needed someone to relate to—someone who shared my love of this field, and who could perhaps give me some ideas as to

what I could possibly do with it. But I really didn't know if anyone like this even existed!

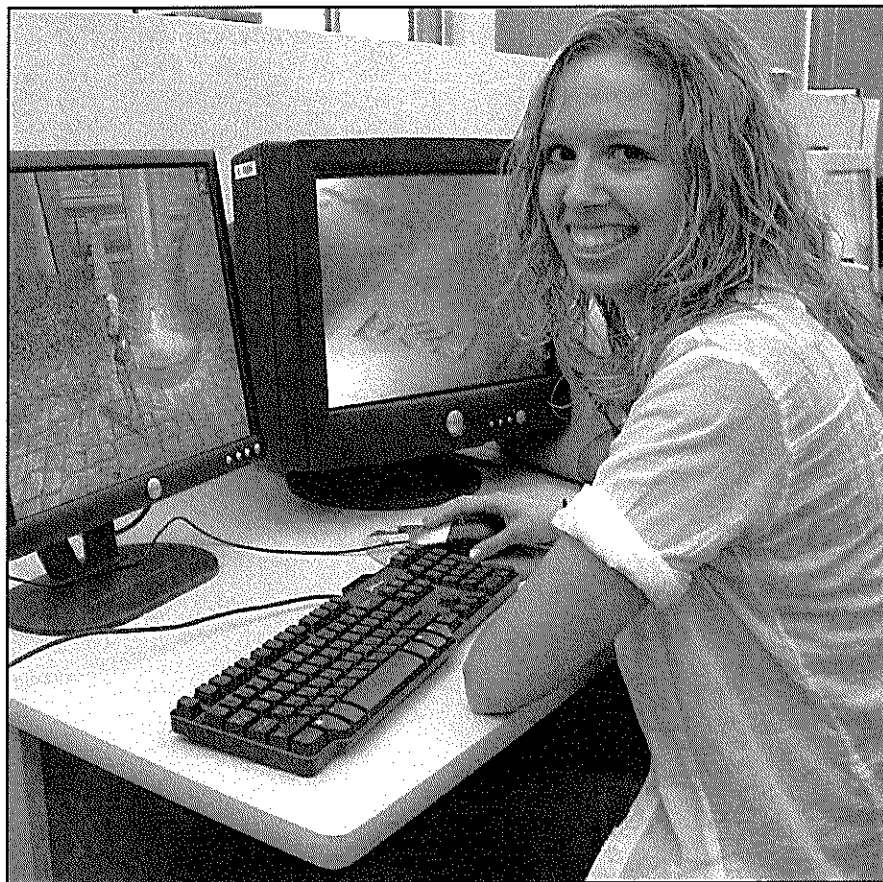
The WISEST Summer Research Program was the perfect solution to this problem. When they called to tell me I was accepted, I was told that I would be working with Tom Holloway, a grad student working towards his Ph.D. in Mathematics. Finally, I would get to meet someone who was obviously very interested in this area! I was ecstatic.

When Orientation Day finally came around, I discovered that I wasn't just going to meet one person who loved Math. Almost immediately, I was introduced to three other WISEST students who had also been placed in the department of Mathematical and Statistical Sciences. And of course, each of them was just as intrigued by the subject as I was—possibly even more! I began to realize that I wasn't alone, after all.

After a day of familiarizing ourselves with the U of A campus, getting to know all 70 of the other WISEST students and the WISEST staff, and meeting with our Supervisors, it was time to start work. My supervisor, Tom, was very interested in the area of Game Theory—something I was not at all familiar with. Luckily, he was teaching a morning class called MATH 260- Puzzles and Games in Recreational Mathematics. For the next 6 weeks, Kate (the other WISEST student working under Tom) and I attended this class each morning so we could better understand the topic.

After the first class, Kate and I were shown our office on the fourth floor of the Central Academic Building. This is where we would spend most of our time for the next several weeks. Every day after attending MATH 260, we went to our office to further analyze specific puzzles and games on our own. Tom also arranged several meetings for us with other grad students in the Math Department. This gave us the chance to talk to people who were interested in other areas of Mathematics, such as topology and abstract algebra. They talked with us about their experiences, and helped give us some ideas of what a Math degree could be used for. These meetings were extremely helpful and definitely boosted my interest in research.

My six weeks here flew by so fast. It seems like just yesterday I was meeting everyone for the first time. And already it's over! All in all, participating the WISEST program really gave me a new perspective not only on Mathematics, but also on myself. Because of WISEST, I was able to work in exciting areas that I previously did not even know existed. Furthermore, I have met so many others who are just as interested in this field as I am, and I now realize that there is nothing weird about liking numbers and equations! I would like to thank everyone who worked so hard to make my time at WISEST so wonderful, including the coordinators of the program, my supervisor, the grad students in the Math Department who met with me, and, above all, Alberta Education for sponsoring my position here. It was definitely a one of a kind experience that will have changed my life forever.



DANIELLE WIEBE - Computing Science
WISEST Supervisor: Dr. Duane Szafron
Sponsor: Human Resources & Skills Development Canada

With a burst of dazzling red light, Nevequellien Amarius casts Flame Strike and destroys the evil sorcerer, Marcus Irellius. All is now well; she has saved the quaint town of Sardenia. No, it isn't some strange dream, brought on by late night snacking and sleep deprivation, it's just one aspect of my summer internship in the Department of Computer Science here at the University of Alberta.

At the beginning of the six week internship, I knew very little about my research area and even less about computers. I was pushed forward by the prospect of "learning something new" and "gaining valuable work experience." The sign on the door reads: "Software Systems Research," but now, I realize that it means so much more. I work with the computer game "Neverwinter Nights" by Bioware, Aurora Toolset, as well as a program called "ScriptEase," which was

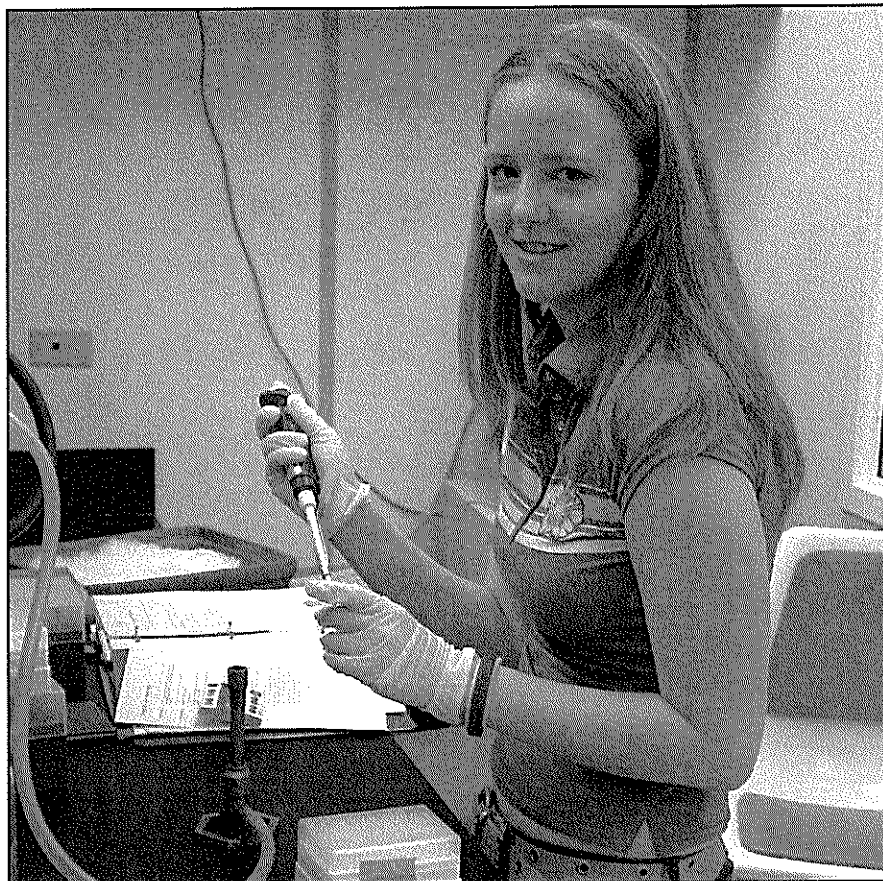
developed by a group of individuals at the University. It's a scripting software which allows a person with very little computer experience (such as myself) to create intricate scripts customized for almost every scenario imaginable. These easy to use scripts can be used to program a module in the game. There are a wide variety of choices, from sitting on a chair, to creating interlocutor behaviours between two Non-Player Characters (NPC's).

Playing computer games for six weeks would have been a really sweet way to spend my summer, but I had the chance to do even more with the help of my supervisor, Dr. Duane Szafron, and the PhD student in my lab, Maria Cutumisu. One of my projects was to redesign the tutorial for ScriptEase. Originally, acting as the PC, you had to save your grandmother from the evil forces that had taken over the castle. The new version is now based

on the Prelude of the Neverwinter Nights. Instead of making it into the Academy for training when the call for heroes is placed, the PC doesn't make it, and as a result is forced to return home. Once home, they must endure criticism by fellow town's folk, and discover the source behind the strange behaviours witnessed in the local farm animals. With this particular project, it was amazing to realize how in-depth a programmer must go to script even the smallest of items, and then retrace their steps to type the tutorial out. It allowed my imagination to run wild, but it also gave me a taste of what it was like to script behaviours, the beginning of my next project.

The Neverwinter Nights game is amazing, although the pregenerated scripts have their limits. That's where Maria comes in. Working intricately with the designer builder in ScriptEase, she has been teaching me to create advanced scripts. My second project was to create ambient behaviours for all the NPC's in the prelude. This was not an easy task. Together, we created many new scripts which could be used for either general purposes, or specialized to fit the specific character. From spellcasters to bystanders, I manipulated them all. I never fathomed the ability of a few codes, and was awed at the result that I could produce. It's really an amazing feeling to see something that you scripted/created, working exactly as it should. It makes everything more than worth it.

WISEST truly is an amazing program. I've learned so much not only about computers, but also about University in general. The Wednesday afternoon sessions allowed me to view the whole spectre of career possibilities, which all begin with an education in the sciences or engineering. (Or computer science). Friday lunches are a nice, casual way of getting together with my fellow WISEST friends and to just talk about the extraordinary opportunities we each have experienced in our diverse labs. I've met so many new people with great aspirations; I just know they're going places in life. As for myself, WISEST is a stepping stone; paving the path for women in science, engineering, and technology.



LAUREN WILSON - Cell Biology
WISEST Supervisor: Dr. Sabina Isgandarova
Sponsor: Human Resources & Skills Development Canada

As WISEST Orientation ended on July 4th, I became increasingly nervous over what the next six weeks might hold. Working in a university lab for the summer was an incredible opportunity, I knew, one that very few individuals have the chance to experience. While I felt extremely fortunate to have been granted this opportunity, I became exceedingly apprehensive as the day wore on and the time when I was to meet my supervisor drew closer. What if I managed to completely ruin my project or worse hers? I had no idea what went on in a cell biology lab that studied yeast cells.

By the end of my first week at the university I found that all my fears had been for naught. Everyone in my lab was very welcoming, working extremely hard to make sure that I felt comfortable in my

new environment. My supervisor, Dr. Sabina Isgandarova, was unbelievably patient and wonderful at explaining procedures and experiments. I knew that the remainder of my summer would be a challenging experience, but a very rewarding one as well.

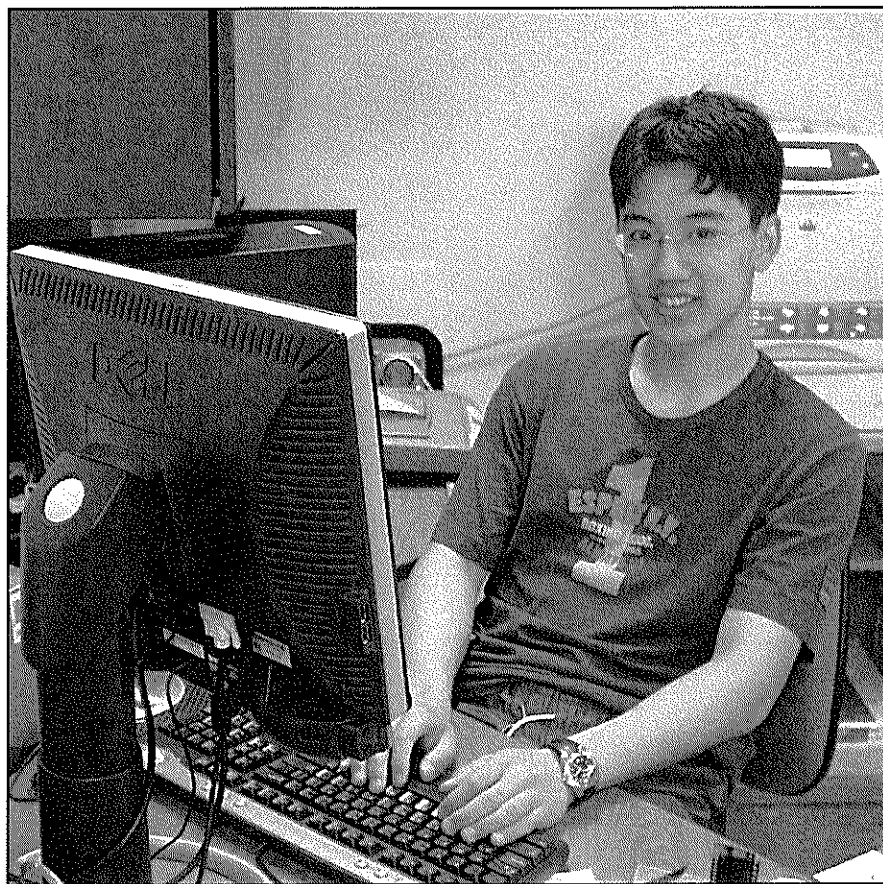
For the following six weeks I investigated an actin binding protein called Sac 6 in yeast cells, and its role in membrane fusion. Through this project I learned how to isolate various cell components such as vacuoles and cytoplasm and measure the effectiveness of membrane fusion through in vitro vacuole membrane fusion assays. Additionally, I learned how to manipulate yeast DNA by removing specific genes, cloning protein expressing genes, and causing *E. coli* bacteria to mass produce required proteins. I am amazed at the amount of knowledge I have gained,

along with technical skills required for working in a lab.

The aspect of WISEST that makes this amazing program so unique is the amount of knowledge students gain from hands on experience within the lab. The knowledge that I gained allowed me to gain confidence in within the lab and caused me to understand not only how experiments were conducted but, more importantly, why. The WISEST program also does a fantastic job at partnering students with projects that are linked closely to the grade eleven science curriculum. Going into the program I was not at all confident that my knowledge from Biology and Chemistry 20 would be significant or even be used in a university lab. I was shocked to find out not only how much information that was discussed in the classroom could be applied in a lab setting, but also how I could apply what I learned when I return to school.

I am delighted that I was given the opportunity to expand my knowledge and skills in such an inviting atmosphere for six weeks this summer. Working in a university lab and being at the university as a whole has been such a tremendously valuable experience, one which would not have been possible without WISEST or the support of Dr. Gary Eitzen's lab. Thank you for a fantastic summer.

"I am delighted that I was given the opportunity to expand my knowledge and skills in such an inviting atmosphere..."



DANIEL WONG - Nursing
WISEST Supervisor: Dr. Wendy Austin
Sponsor: Faculty of Nursing

Throughout the past six weeks, I have been assigned to an internship in the Faculty of Nursing under Dr. Wendy Austin along with a HYRS student, Matthew Lee, and another WISEST student, Alan So.

This year, rather than specializing on a specific project, I was assigned to work with all the projects that were currently in progress. These included:

Ethical Relationships in Forensic Psychiatric Setting

In this particular investigation, the research team is studying the specific relationships health care practitioners have with patients in forensic psychiatric settings. There are many complicated, ethical issues which derive from these situations such as involuntary treatment, appeal for parole, etc. Factors that fuel these dilemmas include the nature of the

patient's criminal background and particular disadvantages resulting from the patient's mental illness. The practitioner must always be alert of the patient's underlying motives, acting according to the security of the society while at the same time, maintaining a balance between "helping" and "investigating".

Called to Oppressive Acts: Mental Health Practitioners' Experience of Moral Distress

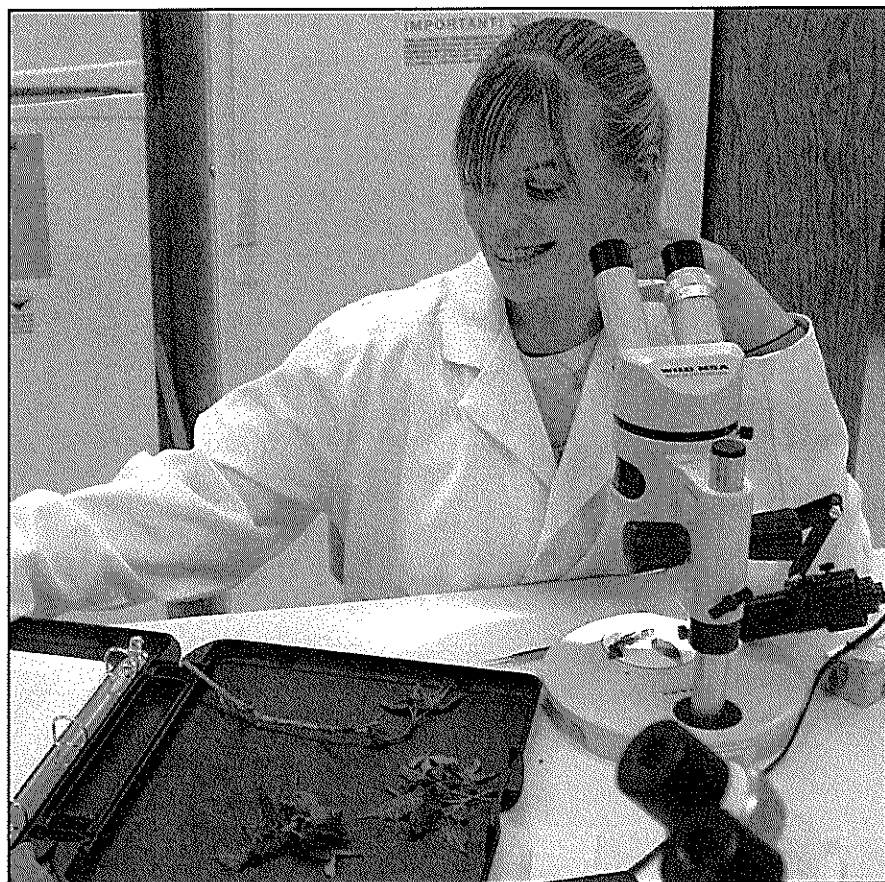
Moral distress is something that many professionals experience at one time or another within the course of their careers. This condition is defined as the distress that a person receives as a result of a conflict between his morals and inner conscience with the demands of his profession, authorities or certain standards. Often times, mental health practitioners will have

to make decisions which do "the least harm" yet, in one way or another, these actions are still oppressive towards the patient. Examples of such include restraining a patient, involuntary commitment, isolation, etc. This project aims at informing/raising awareness of moral distress towards practitioners, pointing out that he/she is not the only person experiencing it and, perhaps, to suggest advice for dealing with it.

Supporting Relationships Between Family Members/ Friends and the Healthcare Team in Traditional Continuing Care Settings

This study was designed to examine the nature of relationships between a continuing care resident's family/ friends and the healthcare staff working at the facility. It is important to investigate these relationships in order to further improve them and identify common problems that these people face. Because residents will probably live in the facility for a relatively long period of time (thus the term "long-term care facility"), it is extremely important for the healthcare team and family/ friends to have good relations so that they can work together towards improving the quality of life of the resident. These improvements will be facilitated through extended knowledge of continuing care relationships, a plan to enhance these relationships and a development of a "collaborative climate" in the institution. Aspects that will be dealt with include engagement, mutual respect and supporting/ hindering factors within the surroundings.

Although this particular style of research was not something that I had originally planned in a future profession, it has certainly been a learning experience and it proves to be a department worth considering. From learning BIG words to stumbling over directions around campus, my past six weeks have certainly been well spent.



ANNEMARIE WOYTKIW - Biological Sciences
WISEST Supervisor: Dr. Maya Evenden
Sponsor: Alberta Innovation & Science

My summer's over and somehow I'm supposed to sum up the last six weeks of my life into approximately 550 words. I have had so many amazing opportunities, learned so much, and met so many people that I don't know if I can. Six weeks ago I arrived on the University of Alberta campus for the first time, from my tiny rural town. I met the Women in Scholarship, Engineering, Science, and Technology (WISEST) coordinators, who've done a great job this summer getting everyone started and settled in, and keeping up with us and making sure everything's going well and that our experience with WISEST is the best possible.

I was placed in Maya Evenden's chemical ecology lab, working with insects, right where I'd hoped I would be. Maya and her research team, Christina, Brad and Aleks, are study-

ing several species of moths that are considered pests and working on studying their phenology and patterns and then developing deterrents, specifically ones that would involve the use of pheromones. Myself and another WISEST student in the lab, Wes, worked mostly with a moth new to the Edmonton, Alberta area commonly called the Ash Leaf Cone Roller. The life cycle of this moth leaves ash leaves damaged and trees looking rather unhealthy. However they are a species that very little is known about so the summer project for us WISEST students was focused on the phenology of this species.

Wes and I had many duties in the lab but one of the main ones was to go through weekly clippings from ash trees from southwest Edmonton. We put tens of thousands of leaves under the microscope and recorded every

detail of every egg and larvae. While this sounds repetitive, it was hardly boring. I can't count the number of rambling monologues we broke out into while chasing frozen larvae through the microscope.

Microscope work may have been our main job but there were so many other things we did, and almost always it turned into some adventure. We collected rolls containing larvae from outside so that they could be used to test pheromones later. Twice a week we'd go through thousands of cups (no exaggeration, I counted) to rescue the moths that had emerged from their rolls. There were always moths to be chased moths down after. We went out several times with Maya or Aleks to visit our sites in southwest Edmonton checking traps, and take clippings. This never failed to be entertaining. We always got strange looks and never hesitated to wave. I had the opportunity to go to sites in the area of Buck Creek to spend a day collecting branches and hunting for the infamous egg masses of the Large Aspen Tortrix. Once we even made diet for the larvae and were lucky enough to have the blender not explode mush everywhere.

Out of the lab I've had other wonderful experiences too. I've visited IBM and Micralyne. I've learned about jobs I didn't even know existed. I've talked with women from all walks of life who've come from Texas to Toronto. I've been amazed, and inspired.

The WISEST program was one of the best things I've ever decided to participate in. I've gained knowledge and skills that I couldn't possibly have gotten in high school. I've met great people, made some wonderful friends. I had a summer job that will look awesome on my resume. I know that it has been far more fun than flipping burgers all summer. I'd like to thank my family, teachers, lab team, and coordinators, the University of Alberta and Alberta Science and Innovation who sponsored my position for this amazing experience. I can hardly believe it's over but it has been by far one of the best and most worthwhile summers I've ever had.



MARYAM YAZDANSHENAS - Agriculture, Food and Nutritional Sciences
WISEST Supervisor: Dr. Rhonda Bell
Sponsor: Alberta Innovation & Science

For me, my experience in the WISEST program started on that sunny afternoon in May when I received the much awaited phone call informing me on my acceptance into the WISEST program. I was thrilled to have been accepted and I remember running around school the next day, telling all my teachers; they were so proud and excited for me.

The first day of work finally arrived and I was eager to get started. Once I learnt about where I was to be working and the specifics of my project, I realized that this would be an interesting, fun, and educational summer.

Throughout this summer I have been working in the department of agricultural, food and nutritional sciences. My supervisor, Dr. Rhonda Bell, does research involving diabetes. Previously, a study was done in which preg-

nant rat mothers were exposed to an environment of low oxygen (hypoxia) for the final days of the gestation period. This was done to determine the effects on the number of β -cells in the pancreas that produce insulin. This model is used to approximate the effect in humans, when the placenta is inefficient at delivering nutrients, such as oxygen, during the last stages of gestation, causing premature delivery. Cells from the pancreas of the rat offspring were sectioned, and embedded on slides. My task was to stain the sections using an insulin staining protocol requiring the use of anti-insulin antibodies, used to identify the insulin producing β -cells of the pancreas. DAB (3,3-diaminobenzidine) was used to stain the β -cells brown and Hematoxylin was used as a counter stain, staining the remaining cells blue. I observed the cells under

the microscope and took pictures of the sections. Then, I learnt to use the Metamorph computer program, which allowed me to determine the ratio of the total number of cells to the number of β -cells. The figures were then compared with the control group to see whether a hypoxic environment had any effect on the number of β -cells in the pancreas.

I learnt numerous things during this six-week program. I learnt a lot about my specific project area; for example diabetes, the causes, effects, and symptoms of it, and the pancreas. I also had a chance to attend many research seminars in the faculty where I learnt about the current research that others are doing in this field. I am sure that I will be able to surprise and impress my teachers in the upcoming year with all my knowledge about this particular area.

The most important thing for me was that I was able to get hands on experience on research. I learnt what characteristics one must have in order to be able to pursue a career in research and now I can work on building and improving those characteristics. After this program my interest in a career in research increased greatly. I am now confident that research will be my number one career choice.

I have met amazing people throughout this summer who gave me a lot of helpful advice. I became very accustomed to a university setting and I can now find my way around the University campus. This will greatly assist me when I come to the university in the near future. I also had a chance to learn about career choices and the variety of careers in science. This program widened my view of all the different opportunities available to me after high school. It gave me the confidence that I needed to embark on the new chapter of my life after high school. I feel now that I am ready for university and that I even have a head start. Thank you to Dr. Rhonda Bell, Joan Turchinsky, Abha Hoedl and all the WISEST coordinators and sponsors for allowing me to participate in this amazing program.



JASMINE YUE - Biological Sciences

WISEST Supervisor: Dr. Declan Ali

Sponsor: Alberta Human Resources & Employment

My first impression of WISEST was like a girls' camp but in a lab. I thought that I had to work in a lab 24/7 wearing the fashionable lab coats and glasses, with no one to talk to because everyone would be busy working on their own projects. I was wrong!

The first week of this program was going very efficiently and smoothly although I got lost at campus a couple times. WISEST planned activities which made science and engineering more fascinating to explore for different students including me. WISEST also initiated the action to increase the representation of women in all fields of scholarships and strengthen science by increasing gender diversity with different variety of choices.

Throughout the six weeks of this

program, I worked in the zoology lab at the Biological Science Building. The under grad and grad students were there to facilitate me mainly on the first-hand projects as well as introducing me to the academic and university life. At first I thought that the protocol I was working from was a bit repetitive, but later on I realized that it was worth it at the end. Our lab was to identify PKC zeta and gamma throughout a week of development of zebrafish. This fish's function is still unknown to us, but as we learn more about it we have proven some earlier articles wrong about this zebrafish. For example, we have discovered that the zebrafishes' Rohon-Bead cells are still present in their early weeks of development; as to early article they have stated that they 'die off' in the first week of development.

The reason I applied for this program was the curiosity of the increasing amount of women that work in a non-tradition field today. The number of women that applied for science and engineering has been rising and so I decided to see what made these women changed their minds in joining these faculties. I wanted to fully promote and advocate the participation of women particularly in science, engineering, trades and technology. Having the opportunity to be able to carry out a large role at such a young age encouraged me to take on this challenge and strive further into my future career.

I noticed that I have developed key skills such as teamwork, communication, and lab techniques. I got to see what it was like to be at the University of Alberta campus and their labs. With the help from WISEST, they offered me on a hands-on research experience at the Universities of Alberta learning about the non-traditional occupations for women and the exciting jobs they do in their fields. The WISEST Summer Research Program provided me with the opportunity to gain first hand knowledge and to experience what it is like to work in a research laboratory. For the six weeks in July and August, I have been working on a research project. It has helped broaden my awareness of career opportunities and also expand my knowledge of the different ways and flexibility of courses to get to my future occupation.

"The WISEST Summer Research Program provided me with the opportunity to gain first hand knowledge and to experience what it is like to work in a research laboratory."

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