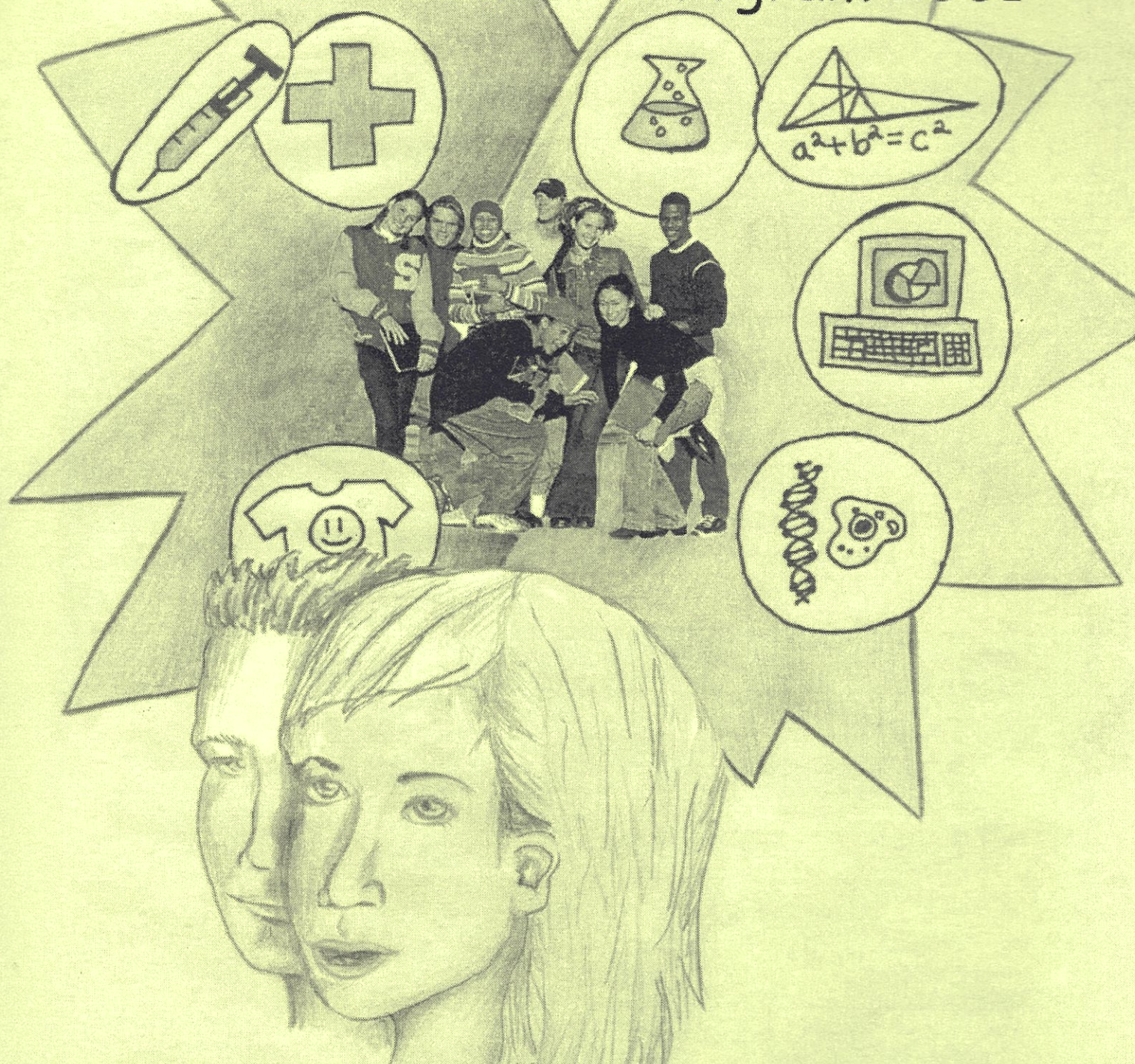


WISEST

Summer Research Program 2001



WISEST Student Reports

Women in Scholarship Engineering Science and Technology

WISEST Summer Research Program

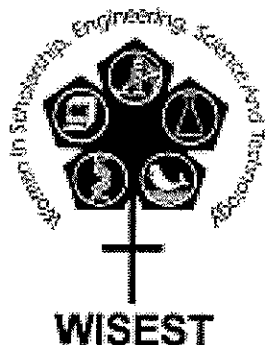
Student Report Book 2001



"My WISEST experience was an invaluable experience, which allowed me to learn about many areas of science, make friends, and have a great summer! (WISEST student)"

"WISEST stimulates enthusiasm and excitement around exploration and discovery. In these two areas of science what they do is so important. It is important to make sure that all Canadians and especially young people have an equal chance to participate in these disciplines and find careers in these fields."

(Honourable Anne McLellan, Minister of Justice and Attorney General of Canada)



PHOTOGRAPHY by:

Kirsten Merle
Haley Cleary
Adam Rankin

COVER DESIGN by:

Kelly Hearn





WISEST Coordinators: Kirsten Merle, Grace Ennis and Haley Cleary (from left to right)

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 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 developed initiatives to encourage young women to consider careers in these non-traditional fields. It is also determining ways to keep young women in the professional science track, to stay in the pool of future decision-makers.

One of the first major initiatives of WISEST is the WISEST Summer Research Program. It has evolved over the last 17 years into a Program that provides a valuable research experience to high school students, both young women and men, who are making decisions about their future field of study and career paths. In the Program, students who have completed grade 11 spend six weeks working as a member of a research group at the University of Alberta. The girls work in the fields of engineering, science, agriculture and the health sciences, and the boys work in the fields of human ecology and nursing. The students are assigned to projects that correspond as closely as possible with the interests that they have expressed.

Within this Student Report Booklet you will read about the many experiences that the students had working in the research laboratories at the University of Alberta, and about the variety of activities WISEST has designed to supplement their work experience. The students met as a group for formal activities on Wednesday afternoons, and for informal activities such as Tuesday Bag Lunches and social activities throughout the week.

The WISEST Program wrapped up its 17th year with the annual Open House Tea. The students made research posters reflecting the nature and purpose of their research work and presented them to hundreds of special guests: the students' family members and teachers, their research team members and faculty supervisors, alumni of previous WISEST Program years, and Program sponsorship officials. The special guest speaker was the Honourable Anne McLellan, Minister of Justice and Attorney General of Canada.

Each year the success of the WISEST Program is a reflection of the support of many, many people: high school science teachers, faculty supervisors, research team members, and WISEST Partners and Contributors. We are dependent on the teachers in the many Alberta high schools to share the information about the WISEST Research Program and to encourage their students to apply. With each application, the teachers submit detailed letters of reference to illustrate the applicant's interest and passion for science or engineering. WISEST thanks the many teachers who have encouraged their students to pursue this opportunity.

University of Alberta faculty members continue to strongly endorse the WISEST Research Program by participating as supervisors of the students. The faculty members welcomed the students into their research teams to either to join the team in an on-going research project, or to work on research projects specifically designed for the students. Many thanks to the faculty and research team members who taught and encouraged the Program students.

The total number of students who can participate in the Program changes from year to year, depending on the funding that WISEST can procure. The funds allow us to pay the students at a minimum wage for their work, and to cover the overhead costs to run the Program. WISEST wishes to acknowledge and genuinely thank the several local industries, philanthropic groups, Deans of Faculties at the University of Alberta, and the Provincial and Federal governments for their financial support in the 2001 Summer Research Program. A detailed list of the WISEST Partners and Contributors is included in the Student Report Booklet and on our web page www.chem.ualberta.ca/~wisest.

The WISEST Student Coordinators, Kirsten Merle and Haley Cleary, created positive and rewarding WISEST experiences for the students. Linda Bui was our outstanding Resident Advisor to the young women who were living in St. John's Institute, a residence close to the University of Alberta campus. Many thanks to Kirsten, Haley and Linda for ensuring that the WISEST Program was successful for everyone involved.

We enjoyed getting to know all of the young women and men who participated this year, and we wish them well in their future studies and career paths. Perhaps they too will have an opportunity one day to share their WISEST experience with a younger soul.

Best wishes from

Dr. Margaret-Ann Armour (Vice-Chair, WISEST) and Grace Ennis (WISEST Coordinator)

The WISEST Summer Yet

(sorry for the cheesy title...)

I didn't really know what to expect when I started work as one of the WISEST Student Coordinators. Looking back on the last four months, I had a truly incredible experience that was so much more than just a summer job.

The first two months were spent planning, and I learned a lot about organization, shortcuts for folding thousands of newsletters/letters, and how to sign my name in under two seconds. Kirsten (my partner in crime) and I formed the dynamic duo of H & K, and brought our strange senses of humour to our work, spawning such zany activities as the WISEST Lack of Yield Games, complete with 12-legged race. One of the most exciting things was at the end of May when we got to call all the students and offer them positions with the Program. After two days of phone calls my throat was a little sore, but I couldn't wait to put faces to the names we'd become familiar with. I finally got a chance to meet the 46 amazing WISEST students on the first day, and it was quite a shock to see everyone in one place (such a large group!). It took me a little while before I could remember everyone's name; as we got to know each other it became easier. As the summer unfolded, the planning skills of H & K were put to the test as our events actually began to happen. One of my favourite Wednesday sessions was the trip to C-FER, mostly because I had no idea what engineers in industry actually did. I always looked forward to Terrific Tuesday Lunches with H & K, and hearing how everyone was getting on in their labs. It was quite amazing to see all that we had planned finally taking place, and successfully at that! I had some wonderful WISEST experiences outside of the scheduled activities such as ice cream testing, K-Days, and the party at St. John's. I was glad to be able to interact with the students outside of work, and I know I've made many new friends. I hope to see everyone at the U of A next year! For me, this has been a summer of coloured dots, Mr. Sketch markers, finding "volunteers" for articles, playing with the digital camera, learning html code, photocopying MANY handouts, mailing letters, finding my way through the engineering building, and the wonderful Research Poster Presentation and Open House Tea — the perfect way to end the Program! Obviously, Kirsten and I didn't do all this by ourselves, and I want to thank Grace especially for all the support, guidance, and tips she gave us! You made this Program so successful. Also thanks to Tara for advice and lending a hand in our activities. This has truly been an incredible summer. Thank you and cheers to everyone involved!

Haley Clearly

WISEST Student Coordinator



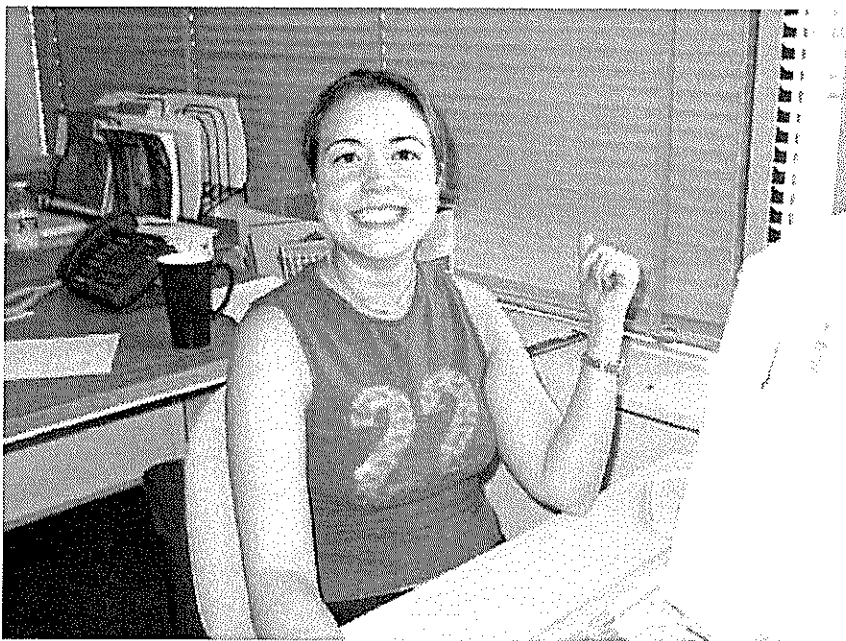
“Wahoo!! I’ve been offered a position as Student Coordinator for the WISEST Summer Research Program and I accepted it!!! What a great way to spend a summer. I’m going to be...wait a minute...what **WILL** I be doing? Umm, coordinating, I guess.” This is what was going through my mind at the end of April. I knew that I had a summer job, but what it would entail, I couldn’t exactly say.

I arrived early Tuesday morning on my first day of work...ready to take on the world. Okay, maybe not the world, but at least anything that was thrown my way. And how did I spend my first few days? Well, I used the knowledge that I had gained through my first three years of Materials Engineering at the U of A ... to stuff envelopes. I was quickly faced with many other things that needed to be accomplished so the Program would run smoothly.

I spent my days organizing events, writing letters, planning different activities, writing more letters and did I mention organizing? But besides spending time in the office, Haley and I had the chance to get out of the office too. Every Tuesday we would meet the students for “Lunch With H & K!” This was a great way to keep in touch with the students on a regular basis and hear “Stories from the Labs”. We also visited the labs that the students were working in. This gave us the opportunity to see how the students were spending their day in the lab and make sure that everything was running well. We also had the chance to visit the students in their lab when we took pictures of them for the Report Booklet. Besides spending time with the students during working hours, we all participated in Social Activities outside of work. I got to show off my bowling skills at Red’s and my scientific knowledge at the Space and Science Centre. But the activity that the students enjoyed the most, as well as myself, was going to Shakespeare in the Park. At the beginning of the six weeks when the students arrived, I honestly didn’t think that I would be able to remember every student’s name. But I surprised myself by having them ALL learned by the third week.

I had a wonderful time with the students, but there are three other people who made my days enjoyable. First, there was Grace, the WISEST Coordinator: “Grace, there is a pile of papers on my desk...when you get a chance to look at them.” Tara, the Student Coordinator for the HYRS Program: “Tara, how did you do this last year?” And last, but not least, Haley, the other Student Coordinator for WISEST: “Haley, did you take my pen?”

The Program would not have been so superb a workplace if not for the great students, Supervisors and Dr. Armour. Then there are the people whom I saw EVERYDAY. Grace, Tara and Haley, I have to give you a big THANK-YOU for making my day so enjoyable, even if I didn’t have a working toilet or telephone line in my house.



Kirsten Kae Merle
WISEST Student Coordinator

Partnerships with WISEST

- " The WISEST Summer Research Program students are paid an honourarium 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 honourarium, 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.

- " Please contact us at the WISEST office for further information about any of our initiatives.

Become a Partner

We wish to sponsor students in the WISEST Summer Research Program at \$2000 each.

We wish to contribute \$_____ to:

- | | |
|--|---|
| ☐ WISEST general funds | ☐ WISEST Summer Research Program |
| ☐ SET for high school girls | ☐ UAWiSE for University of Alberta Women |
| ☐ Choices for Grade 6 girls | ☐ in Science and Engineering |
| ☐ We would appreciate further information | |
| ☐ Other | |

Receipts for income tax deductions will be issued for all contributions.

Company Name: _____

Contact Person: _____

Address: _____

Phone: _____ Fax: _____ E-Mail: _____

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

Many Thanks to the WISEST Summer Research Program

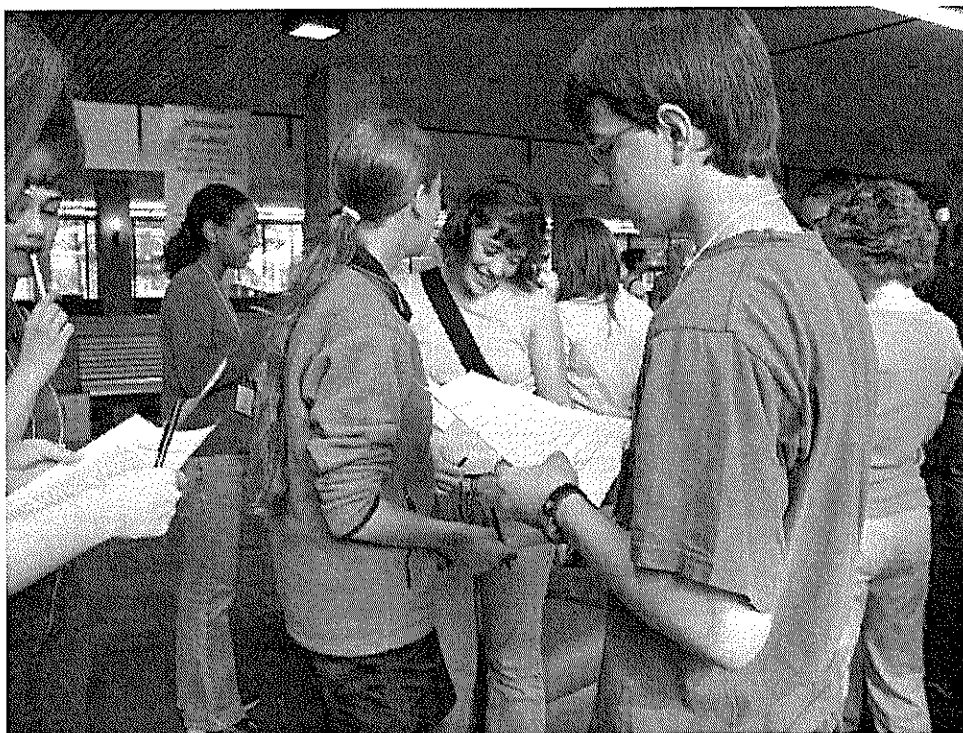
2001 Partners:

Alberta Heritage Foundation for Medical Research
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Opening Session



By Yanna Stivar

Summer was already here and school was out. But this wasn't just any summer vacation, at least not for forty-six grade eleven students from Alberta. For these students participated in the 2001 WISEST Summer Research Program, which provided them with an inside look into the fields of science, engineering, and technology.

It all started on the morning of July 5th in CAB, where we all congregated eagerly anticipating what was to become our own WISEST experience. We were introduced to the dynamic duo of Haley Cleary and Kirsten Kae Merle, two of the WISEST coordinators, who up until now have been the mysterious voices that we talked to on the telephone. Also, we got to find out some interesting tidbits about each other, such as who will be working with insects (Ewww!).

We were then welcomed by Grace Ennis who is the other WISEST coordinator. She introduced to us two special guests, Helen M. Madill Ph.D. and Margaret Ann Armour Ph.D., both of who had to offer some inspiring comments.

Dr. Armour gave us a seminar on good laboratory practices. We learned not to mimic the laboratory practices of Danger Drew, but to behave more like his partner Safety Sue. After the briefing, we applied what we learned to several situations. We all became Safety Sues.

Then came the big moment. We met with our supervisors and were taken to the labs that we were going to be working in for most of the summer. Who knew what the next few weeks would entail...

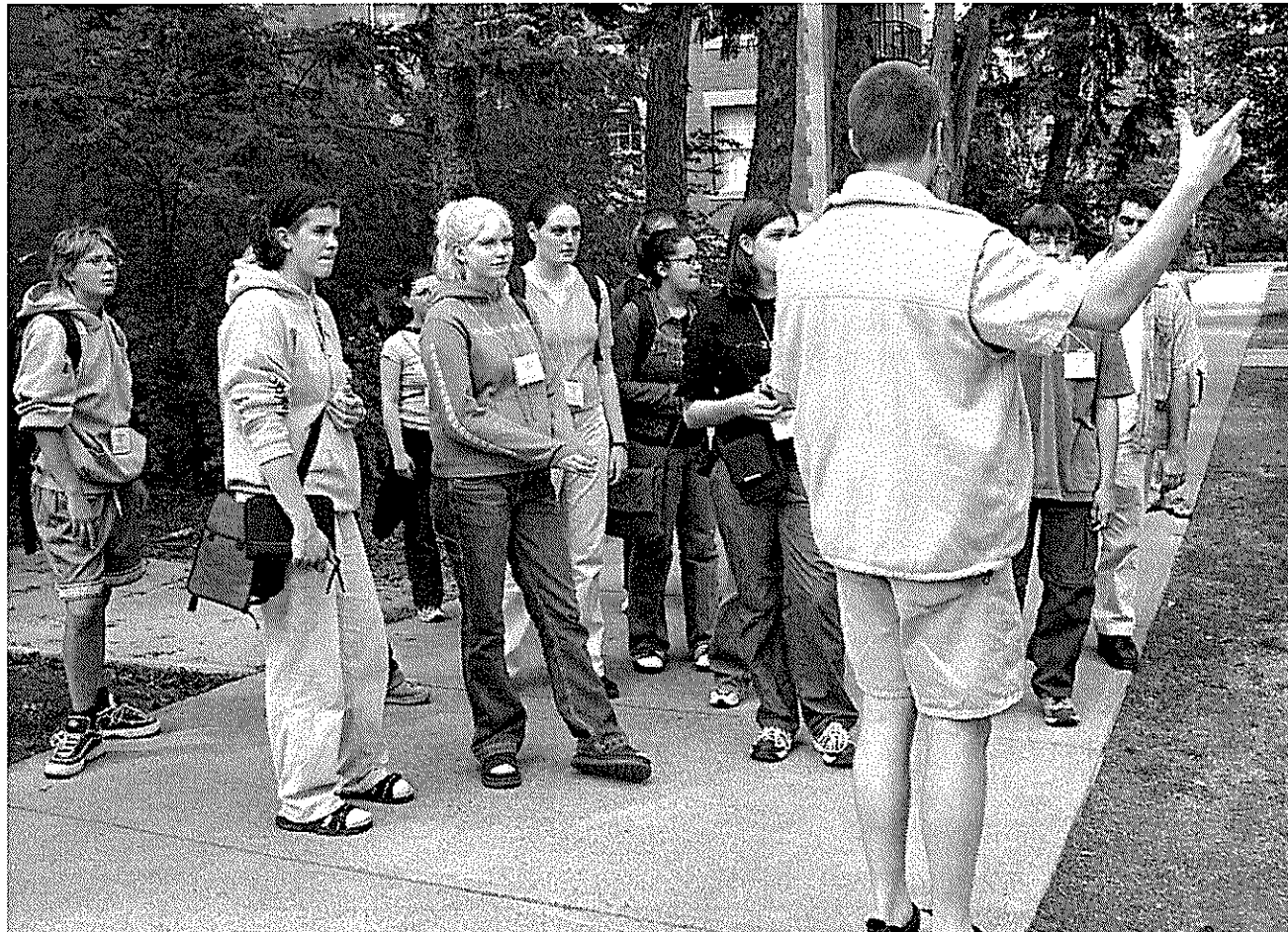
The WISEST Campus Tour

By Natalie Nowicki

The WISEST campus tour was a total confidence builder. Before the tour, moving around on campus was limited to travelling in small groups, trying to figure out the way to the physics courtyard.

Then came the tour. Our guide, dressed smartly in his yellow University of Alberta fleece vest, took us all over the Engineering and Science area of campus. He showed us many buildings and landmarks such as the Rock outside of HUB, a popular WISEST meeting place, and SUB and CAB. We also went through the Mechanical Engineering building, Chemistry East and West, and the V-Wing, to name a few. It was nice to see where many of my fellow WISEST students spent most of their days, and where some of my classes will be in a few years. Finally, after the tour, I began to carry a map of campus in my head, albeit a small one.

After the campus tour, I became more aware of where I was going and more confident in my travels around campus. Although the tour did not cover each nook and cranny of campus, it certainly gave an overview of well-frequented areas. The thought of meeting in Chemistry East 3-25 no longer seems unsettling.



Small Group Discussions

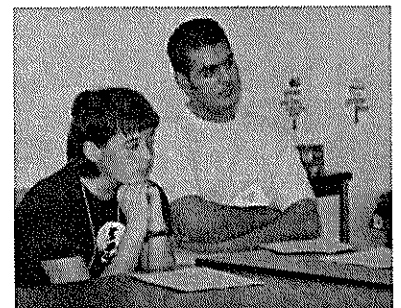
By Charlene Sinclair

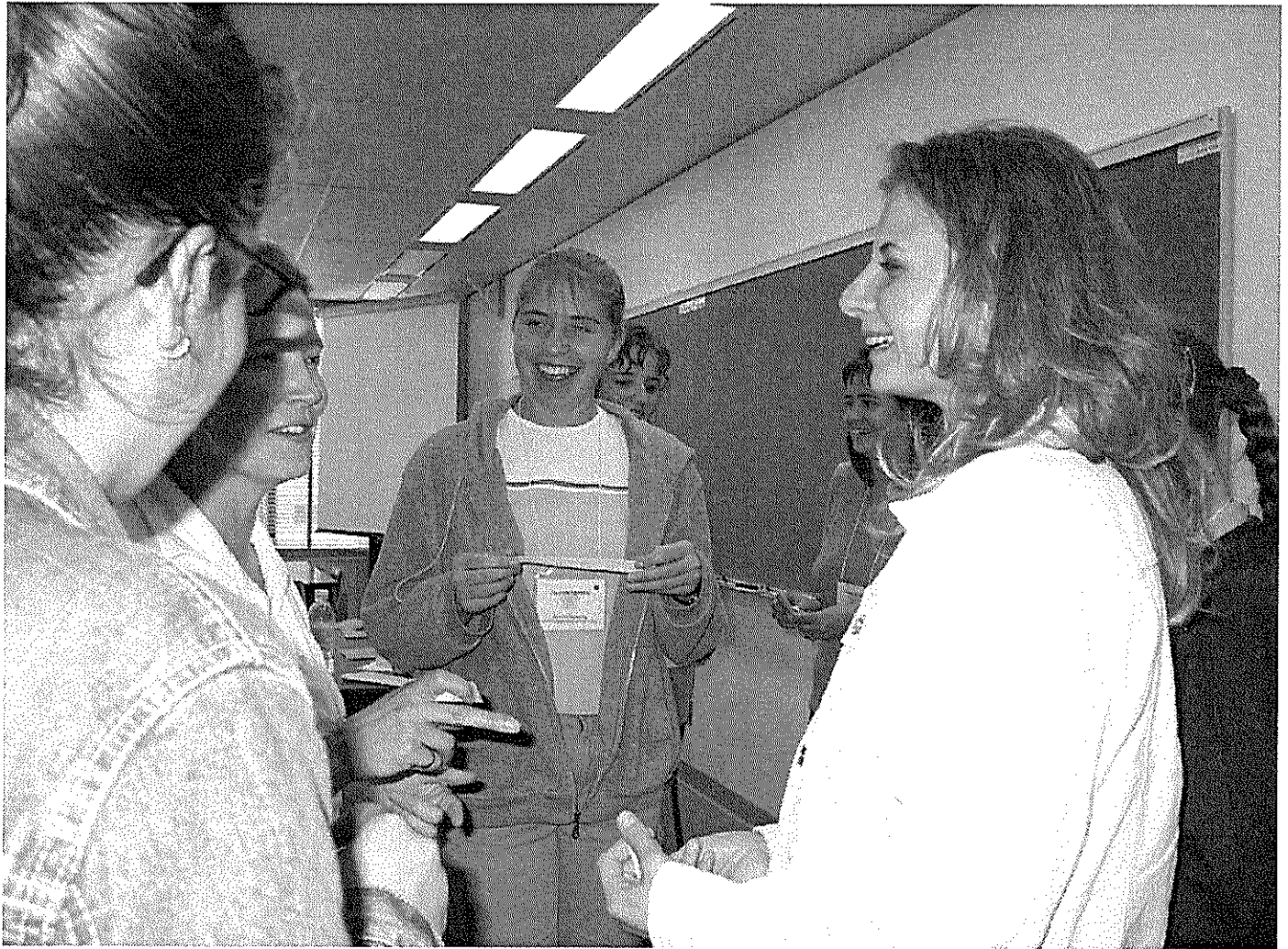
On July 18 all of the students in the WISEST Summer Research Program were able to participate in discussions with women in non-traditional careers. Many women from a wide variety of careers and ages volunteered to be role models for us students. We talked about things such as job opportunities, co-op programs, and University life.

The first thing I noticed when I looked at the list of role models was that there were almost as many of them as there were of us. I was pleased to see that so many people would volunteer to be a part of something so small scale, but vitally important to the WISEST Summer Research Program. The diversity was great too. There were several students from the University of Alberta, some women who worked for huge companies, and a U of A professor or two volunteering as role models. They had many interesting things to say and were able to field our questions easily.

Our discussion was done on several different topics. We started off by introducing ourselves, and carried on from there. Several of the role models had mentioned a co-op program when they described their careers, and we naturally started by discussing that. For those of you who don't know what that is, a co-op program is (usually) an engineering program in which you go to school for a certain amount of time, then work in a related job for an amount of time. This rotates until you have completed the program. The women who had taken the co-op program highly recommended it. They said that it really helped to have experience in the field they were studying before graduating because it was easier to find a job after graduation and they made money to pay for their tuition while taking the courses they needed. The most entertaining thing we talked about was life at University. Every one of the role models agreed that University was one of the most stressful times in their life, but they also agreed that there were ways to reduce that stress. One was to play practical jokes, such as suspending a car from the rafters of a building or "crucifying" somebody. They also encouraged us to participate in all the activities provided by or put on by the University. These things somewhat helped to relieve the tension brought on by a big assignment or test coming up. Although stress was a big part of their lives, most of the role models agreed that University was one of the best times of their life and that we shouldn't take our time there for granted.

The small group discussions were interesting and informative, and helped us to see possibly a little more clearly what we wanted to do in the future.





The off-Campus Tour: The Center For Engineering Research

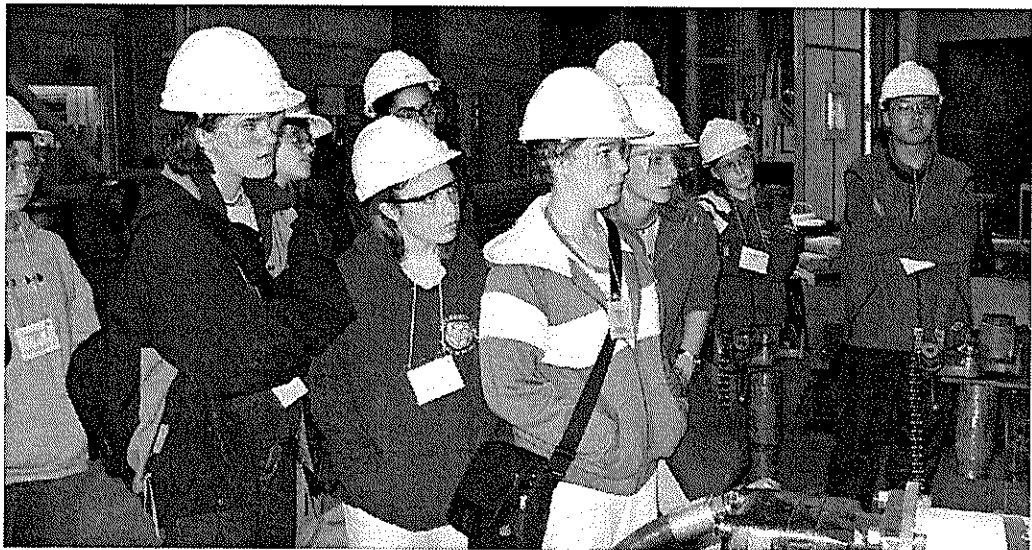
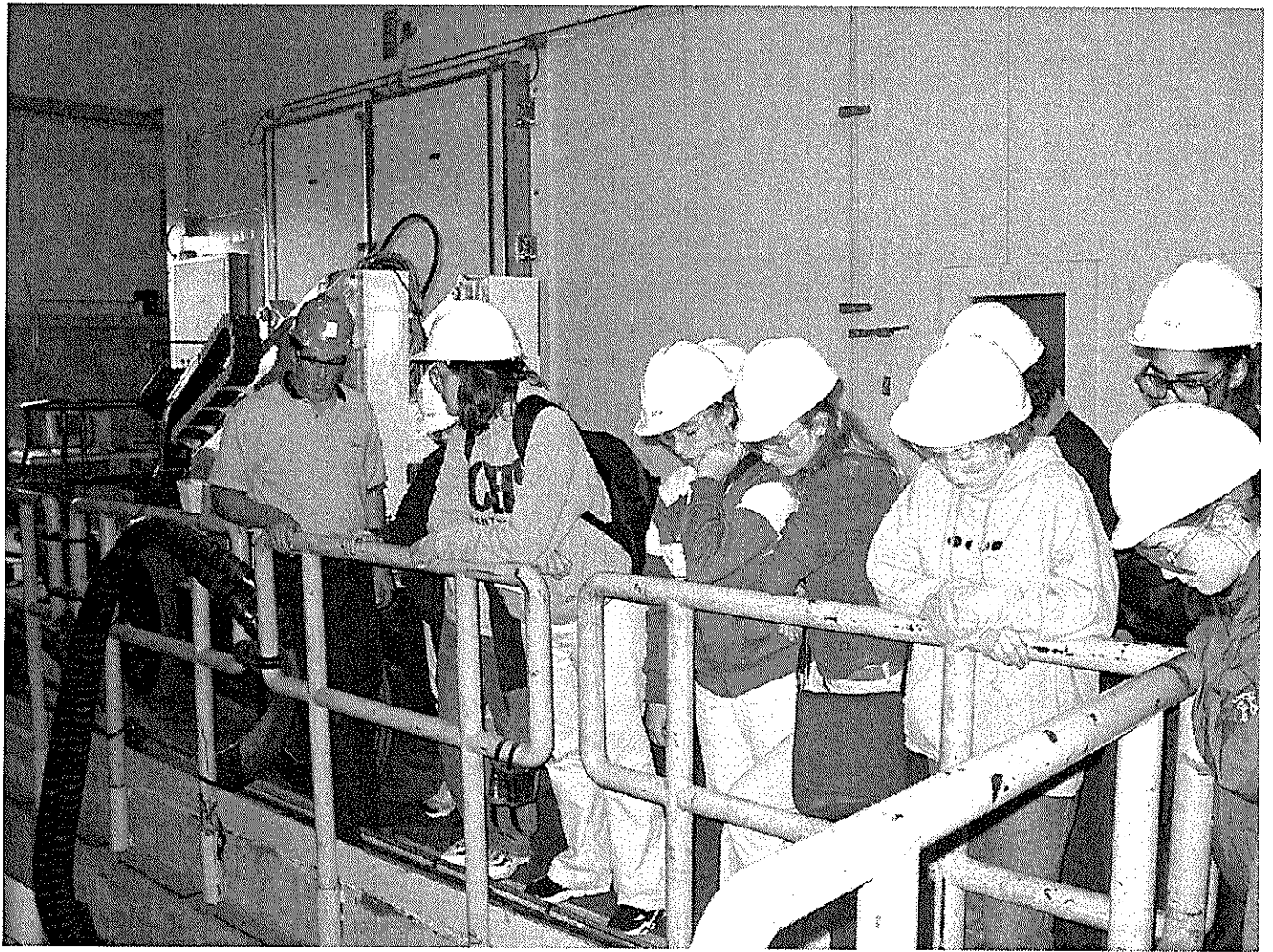


For the off-campus research facility tour, we went to the Center For Engineering Research (C-FER). We were split into groups and each group was given a presentation about C-FER and then taken on a tour around the research facility. At C-FER, a lot of work is done on pipelines used in the oil and gas fields. During the tour, we were shown all sorts of really interesting machines that they use to test pipes, like the Deep Well Simulator, the Tubular Testing System and the Universal Testing System. The Deep Well Simulator is used to test oil and gas field equipment in conditions similar to those encountered in the field. The Universal Testing system can simulate natural disasters, like earthquakes. My personal favorite was the Extreme Climate Chamber, which they use to test pipes and machinery at temperatures down to -60°C . As well, the other really cool thing was the Special Environments Facility, where they can do tests that involve toxic, flammable or explosive chemicals. One of the neatest things was a piece of steel that had come from an undersea oil pipeline that they had been testing. The researchers at C-FER had used their machines to bend the pipe to almost a 90-degree angle, and the pipe had snapped when they tried to straighten it again.

All and all, the coolest thing about the tour was learning about what engineers can actually do as a job. After all, "engineer" is a pretty vague term and it helps to have some idea of what sort of jobs are available to engineers. Another cool thing was learning that a Canadian facility was considered to be on the leading edge of research. Go Canada!

We finished up the tour with a picnic. Actually, since it was raining, we had pizza and pop in Athabasca Hall, but it was still lots of fun.

By Kristina Boates



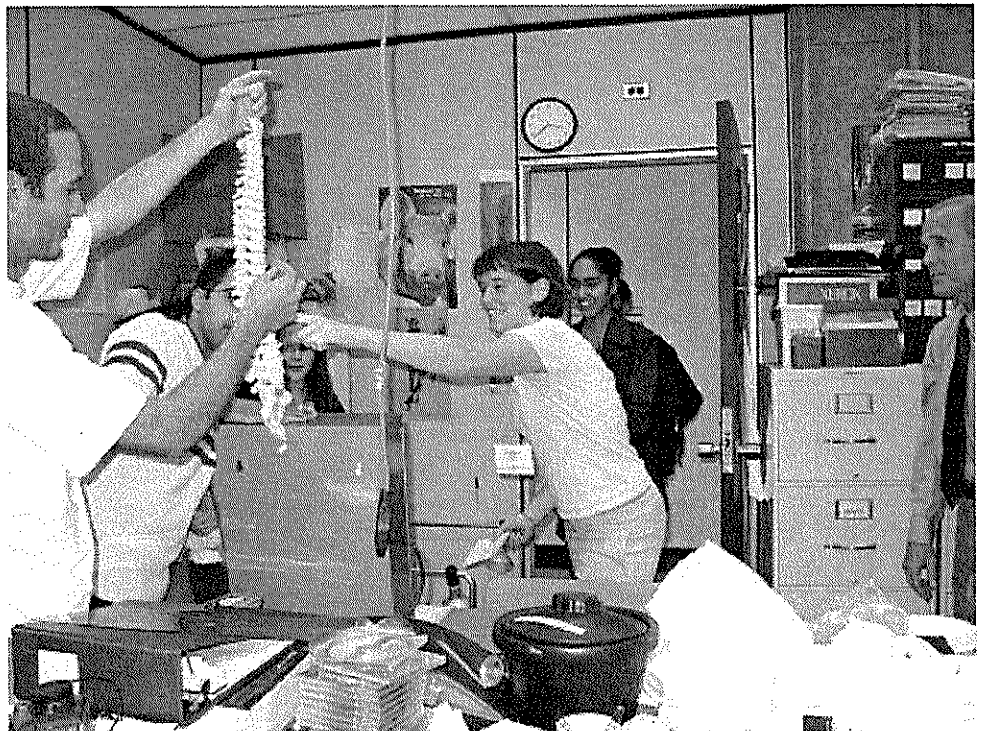
The WISEST Campus Tour

By Emily Penny

The on-campus research lab tour gave each of the WISEST participants a chance to see some of the other kinds of research that are being done at the University. The tour also gave us a chance to meet people who work in a lab environment and discuss their research with them.

The on-campus lab tour was really interesting because it gave us a chance to see what happens in labs that are completely different from the one we spend the whole summer in. It was also amazing to see how many things one lab can have on the go at a time. I toured a lab that had four major projects on the go! I found it was interesting that most of the people working in the lab were undergraduate students. I thought this was cool because it showed me how many opportunities there are at the University for lab work, even at the undergraduate level.

The on-campus lab tour also exposed us to some of the groundbreaking and fundamental research that is being done at the U of A. I knew that there was some important research being done, but I had no idea that there was so much going on. In the lab I toured they were doing research on the strength of tendons, two projects on scoliosis and another project that dealt with 3D visualizations of x-rays. I was amazed with the variety of projects, and the important applications they have in health care. Everyone in the lab we toured was really friendly and eager to share their projects with us. They answered any questions we had, not only about their projects, but also about university, different science programs and anything else we wanted to know. The tour also provided me with some insight as to what kinds of career opportunities there are in the scientific field. Overall I felt that the on-campus lab tour was one of the most valuable activities the WISEST co-ordinators had planned for us.

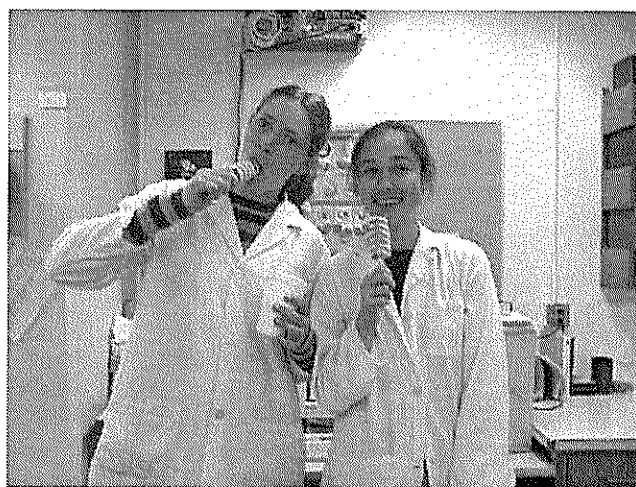


So You Wanna Go to University

By Mandy Lam

As Grade 11 soon-to-be Grade 12 students, our last year of high school is quickly approaching us. Our grade 12 year will undoubtedly go by at lightning speed what with diplomas, IB stress, volunteering, working, sports, arts, music...and of course, grad. Before we know it, university will be here and if we're not prepared for it, it'll smack us right in our faces.

To prevent that from happening, WISEST organized the "So You Wanna Go To University" Wednesday afternoon session for us. Its goal was to inform us about preparing for university, the opportunities available at the U of A, and just university life in general. Thus, a number of speakers were present to inform us of everything we needed to know. We were told about student loans, housing, clubs, and scholarships. By the way, I'm sorry if my account on this info session is a bit fuzzy because I, too, was a victim of Haley and Kirsten's "since there are no volunteer writers, we'll just pick someone randomly" conspiracy.



Anyway, the "So You Wanna Go To University" session was very informative. The student loans speaker was helpful because I'm sure that most, if not all, of us will be filling out a student loan application sometime during our university years. For those out-of-town students and those who just want to be independent and get away from their parents, there was information about housing. We were filled in on all the student residences and the good times that'll be encountered there. The speaker also gave us a helpful warning that if you want to live in rez, you've got to get your application in A.S.A.P. Another speaker informed us of the numerous clubs in existence at the U of A. They're a great way to get involved and to make new friends with similar interests. It was nice to know that if someone ever wanted to form a crocheting club, they could. Scholarships were also talked about during this info session. We were given brochures that contained useful information on the types of entrance scholarships available to us. There was also a speaker that told us where to get additional information about anything on campus when we get to U of A. Apparently, that's the place to go when we "don't know what we're doing."

In conclusion, the "So You Wanna Go To University" session provided us with valuable information that will help prepare us for university when we get there in 2003.

2001 Lack of Yield Games Arrive In Edmonton

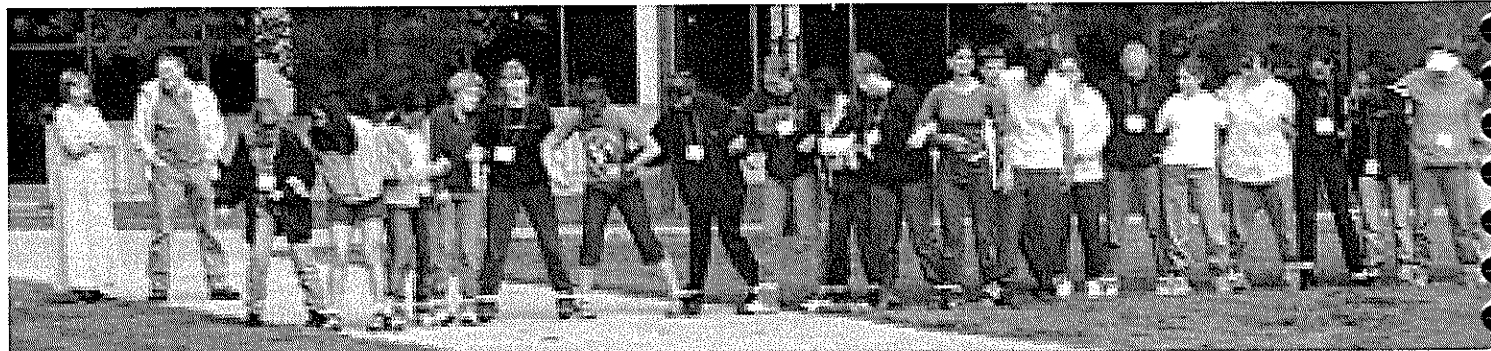
By Shawna Pandya

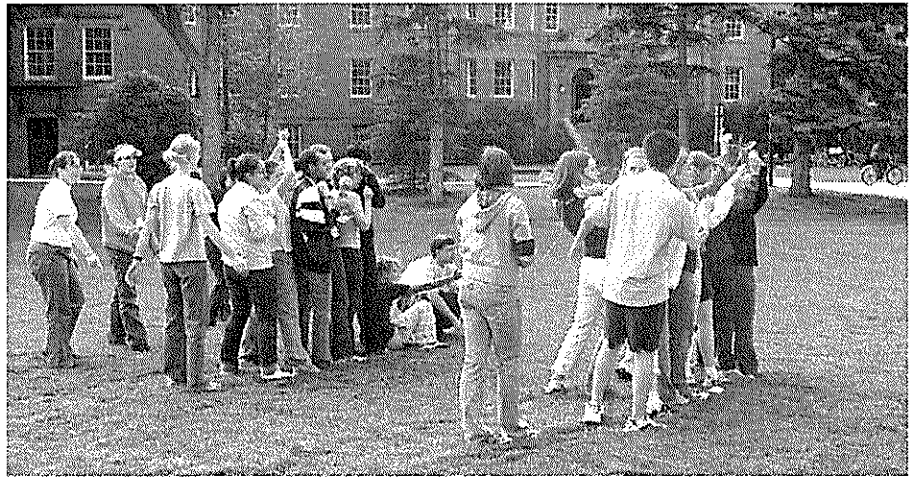
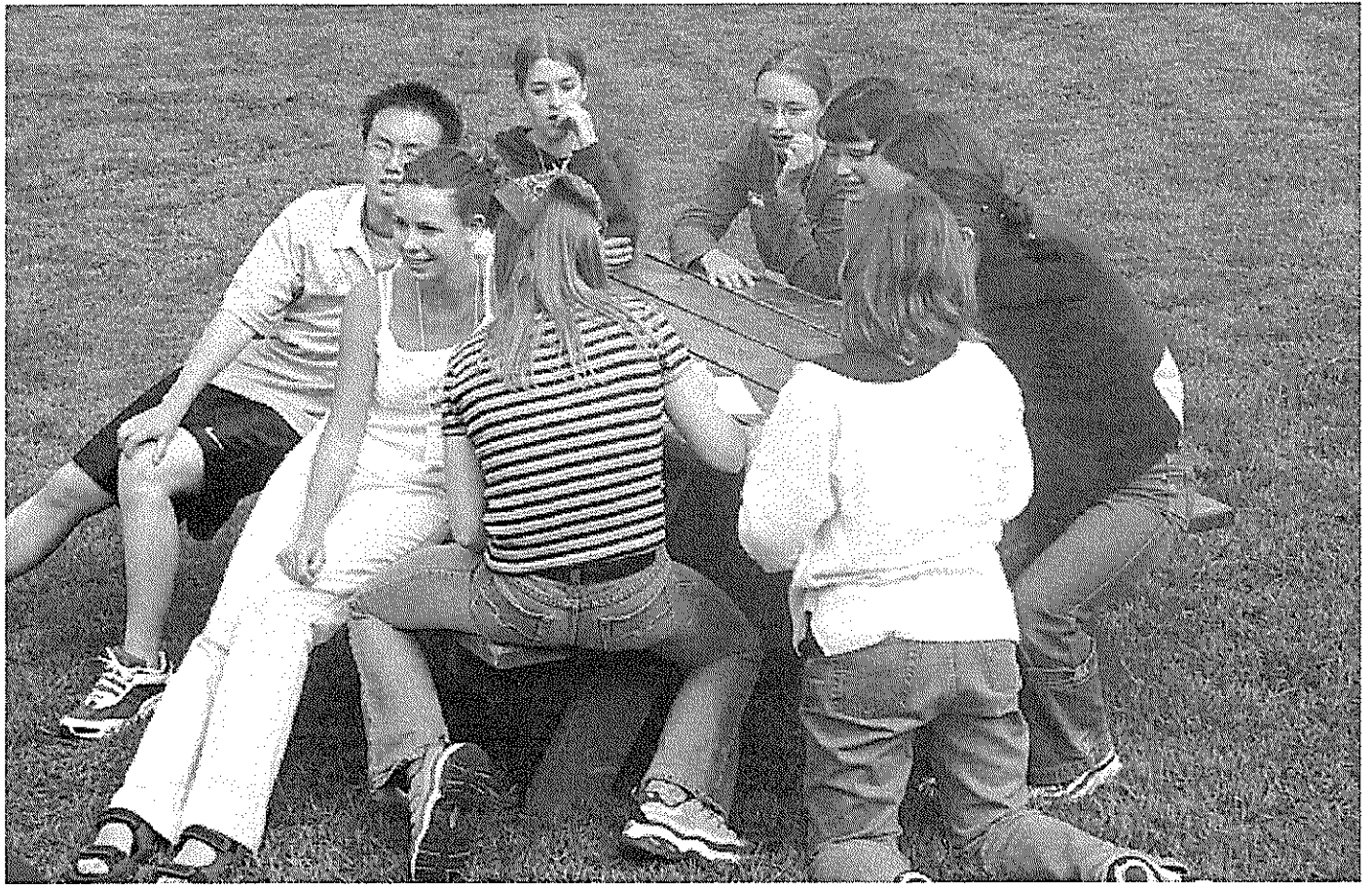
On your marks, get set... yield??? Okay, so maybe this isn't your conventional display of athleticism, but it is certainly a display of talent (try to run a 12-legged race first before you dispute that fact)! In honor of the IAAF World Track and Field Championships, WISEST held its own set of games... with a scientific twist!

In order to lay claim as the Champions of Yield, each of the four teams (Blue, Yellow, Green and No-Color) had to endure 3 grueling, ultra-competitive events worthy of the Science Olympics, always in the quest of gaining percent yield. At the end of the 3 events, the team with the most yield was declared 2001 Lack of Yield Champions. Although there weren't any gold medals, there was chocolate and prizes for all!

The first of the three events consisted of The Dodecane Race, which was a new and improved version of the 50-yard dash, in the form of a 12-legged race! This event paid homage to the gods and goddesses of Organic Chemistry, as each team strove to prove itself the fastest 12-human-carbon chain. The next event, Activate This!, was a type of reverse-hurdles course, in which you had to go *under* the er, human hurdles (supplied by your fellow teammates), in order to prove your team the best model of an energy-activation pathway... always with the goal of more yield! The final event, The Great Haley and Kirsten Challenge, consisted of a science pop quiz... not unlike the grueling drug tests to which many an athlete is subjected, in that both are extremely stressful! Questions ranged everywhere from the terrifying realm of physics to the harsh reality of biochemistry... meanwhile straying to chemistry and engineering in between!

Strangely enough, after a very close and competitive triad of events, alas, by bizarre coincidence, the teams placed alphabetically, with Blue emerging as the 2001 Lack of Yield Champions, Green following in a close second, No-Color next at third, and Yellow, a very distant fourth. In general, a good time was had by all, and rumor has it that all four teams have already begun training for next year, in hopes of becoming 2002 Lack of Yield Champions!





WISEST

Research Poster Presentation



Well, it had come to the last day of the WISEST Summer Research program. The only thing left was the research poster presentation and the final Open House Tea. Through the past 6 weeks, each student has been working in their respective research labs gaining new experiences and life skills, at that same time, they were probably stressing out like me when it came to the poster presentation. Walking in, I was so nervous about the whole presentation and from what I could see, the other students were just as nervous. When we reached the 4th floor lounge of the Education North building, I was surprised at the amazing variety of the posters. Some were made by hand while others had been printed off the computer. All looked spectacular! Everyone was busy putting up their posters and making last minute changes to their presentations.



Then finally, Grace announced the we could go see the posters of the other students. It was a great experience for we got a glimpse into what the other WISEST participants had been doing the past 6 weeks. Each person handled their presentation with grace and knowledge. I know that this research poster presentation was a great success. Well, we all thought that presenting to students were hard, the next bunch of people we would be presenting to would be the professors and graduate students *gasp*. These were the professionals and they would know what was going on. Fortunately, all the professors and grad. Students were all curious and came to satisfy that curiosity, they came and listened and ask questions. I guess high school students could teach these professors a thing or two. The remainder of the day was wrapped up with the Open House Tea, which I won't have to go into...

By Rick Li

The open House Tea

By Vikram Gurtu

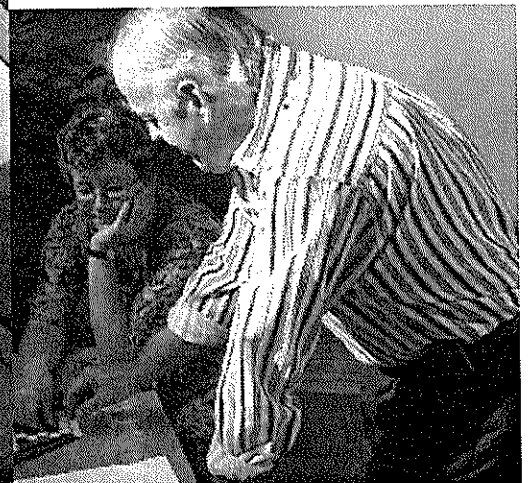
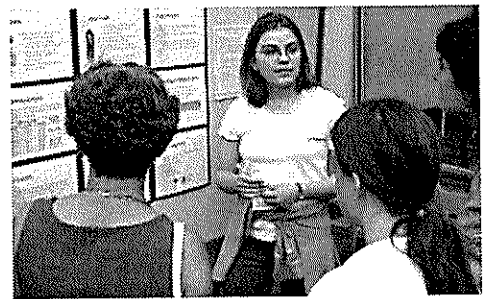
The final day of WISEST was Thursday, August 16th. Being the last day of the summer program, we were able to conclude with a presentation to our peers in the morning, then with an open house tea for the families and special guests in the afternoon. The goal of having this open house was to share with everyone the purpose of the WISEST program and what had been accomplished in the past six weeks. We all were very thankful to have the opportunity to show our families the projects we were working on during the summer. Parents and guests were able to walk around the large 4th floor lounge of the Education Building and look at the various posters created by the 46 grade 11 WISEST students. Each poster was extremely unique and very professional and would describe in detail with visual aids, the projects and experiments that were conducted by the students. During the first week of WISEST, when hearing about doing a poster presentation at the end of the summer, some of us students were quite nervous. However, these presentations on Thursday ended up being quite informal and enjoyable. The parents and guests would come around and read the posters, as we would briefly explain our projects and answer any questions that they had. It was nice to see how everyone was surprised and intrigued by the interesting projects completed, and in general, the type of research conducted by us students this summer.

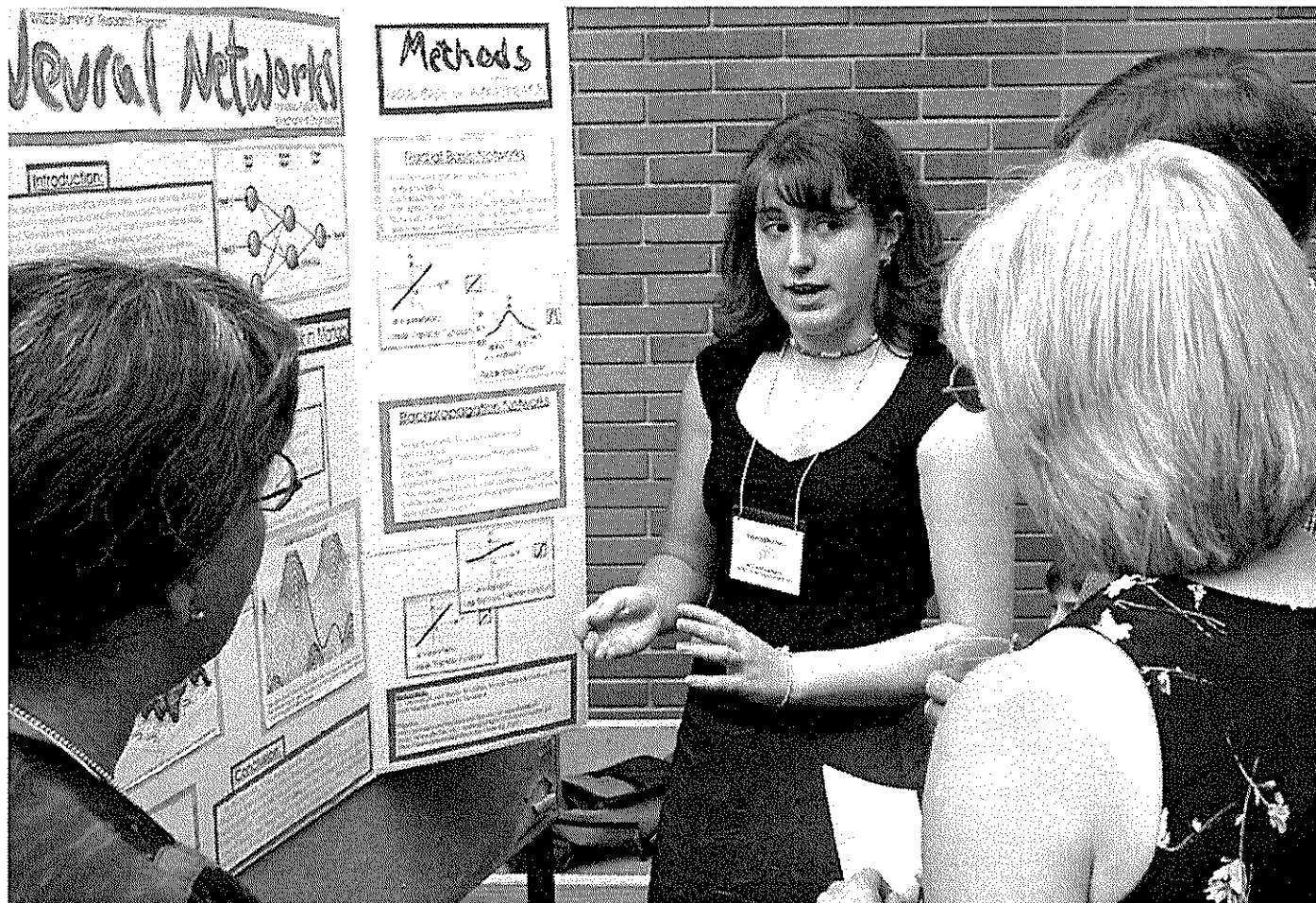
Guest speakers such as the honourable Anne McClellan, Dr. Jean Cooley of Syncrude, Ms. Peggy Au, Associate Vice President Research of the University of Alberta Dr. Bill McBlain, and Vice Chair of WISEST Dr. Margaret Ann Armour, explained the importance of programs such as WISEST. Through their speeches, we learned about their experiences in education and with programs such as WISEST. Also, the speakers reminded us how important it is for students to not be afraid of being different. As we have experienced through the last six weeks, students like us do not have to stay within certain boundaries. There are many opportunities out there waiting for us, including in non-traditional areas that the WISEST program focused on, such as engineering and sciences for the women, and nursing and human ecology for the men. The speakers' wise words inspired and encouraged us to continue to work and excel in what we do.

Six weeks has gone by extremely quickly and WISEST has been a great experience. The coordinators of WISEST organized a wonderful Open House Tea for all of our parents to see the interesting work that we have done over the last one and a half months, and for all of us to celebrate our successful experiences.

Thanks for a wonderful summer WISEST!







MISSION 002: LUNCH WITH THE BUNCH

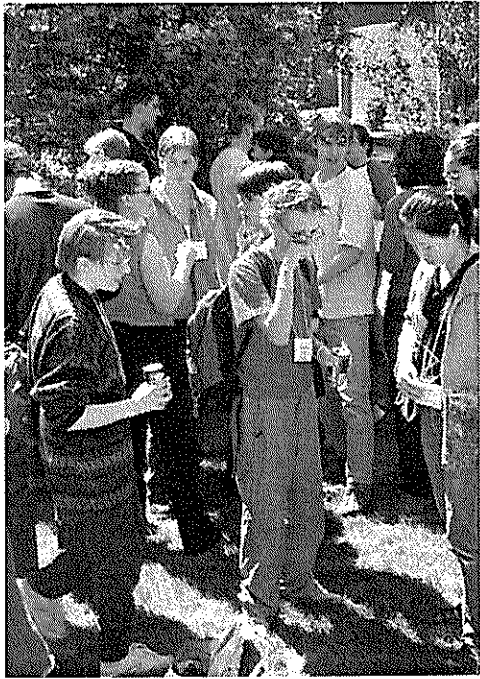
By Chelsea Rieger

After surviving our initiation into the WISEST program we were told to report back to the university for a second day. We were spread out to all corners of the University campus and sent to work with various research teams. With almost 50 WISEST students roaming around the university freely the only thing that could bring us all back together was a mission called "LUNCH WITH THE BUNCH" The goal, to find the meeting area and then meet new friends.

As lunch time neared we all tried to find our way to the top secret "physics courtyard" This secret location was a perfect place to contain the almost 50 WISEST students and 20 HYRS students that were given instructions to attend the secretive meeting. Once inside the courtyard there was no escape. The large grassy area was surrounded completely by tall, impenetrable brick walls. Part one of the mission was now complete we had all successfully navigated our way across the campus to our meeting place. Now it was time for part two.

After we had entered the courtyard we were told by our superiors to put on our name tags so that there would be no strangers among us. To attempt part two of the mission we began to talk to each other about our new research projects. The mood became relaxed as part two of the mission began to take place. We were having fun, but the best part of "LUNCH WITH THE BUNCH" was about to unfold.

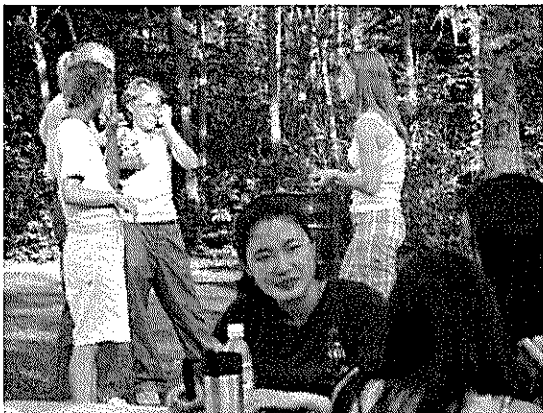
To my surprise our leaders began to set out food. Chips, cookies, licorice, and pop were all revealed for everyone to share. I personally was starving and the mere sight of the food was making my stomach rumble. As an added twist to our mission we were told to get rid of all the food that was set out on a picnic table for us. We all dug into the junk food and when it was all gone we began a game that would test our memory abilities. On our name tags we each had a small colored sticker with a letter on it. The objective of the game was to find the one other person with a matching sticker and letter. Then it was required that you learn 5 new things about that person. The next part of the game involved finding another pair of people and then introducing your partner to them. As we finished the game we were also completing our mission. With the mission accomplished we began to say goodbye to our new friends and headed back to our new jobs.



our WISEST and HYRS Wiener Roast And "Shakespeare In The Park" Performance

By Patricia Comeau

After a hot walk from the University campus to Hawrelak Park, Haley, Kirsten and six others (myself included) were relieved to finally reach our destination of site number one. Though the walk was only about twenty minutes in length, with the temperature well above the average temperature for July 10th at 33 degrees celsius, it was a very LONG walk. Upon reaching site number one it was nice to see so many HYRS and WISEST participants already there. We started the evening with a weiner roast with all the compliments and when everyone had eaten all they could possibly eat, we walked towards the Hawrelak Amphitheatre to see the Free Will Player's performance of Shakespeare's "As You Like It". "As You Like It" is a comedic tale of love found and celebrated. The play captured its audience with its conflicts, triumphs, witticisms and passion. This play is also known for Shakespeare's famous quote of "All the world's a stage, men and women but players." During this performance we even had a few squirrels who not only participated in the audience, but also had "hanging" roles on the backdrop curtains. Everybody had a great time.



Fun times in Churchill Square

By Vanessa Fulford

I have been to Edmonton many times, but I have never seen anything quite like this. Men in mirror covered jackets, women drawing on the sidewalks with chalk, and people standing there blindfolded with celery in their mouths. Sound a little out of the ordinary, unless you are at the Edmonton International Street Performers Festival. Having never been to the festival before, it was quite an experience (Of course for me taking the LRT is exciting, but anyways). We went to Churchill Square on a really hot Saturday afternoon. There was big crowds, music, and performs everywhere.

The first thing we did when we got the grounds was to find a clown that made balloon animals and get Linda a hat. So we ended up with Linda's pink rabbit on a blue hat, a green dragon for myself, and a neon orange flower on neon green hat for Tamara. From there we walked around the ground to find the Australian artists that were drawing with chalk. On the



bricks of the sidewalk they had produced two murals. One was of Jackie Chan karate chopping someone, and the other a scene of circus performers. The art was beautiful; it was amazing to think of all the hard hours the women spent in the hot sun working on them.

From there, we moved on to the shows. We managed to find a seat on the ground for a Yankee show of balancing, fire, and attempted comedy. This crazy guy from New York got up on a unicycle and juggled his flaming batons, but not until taking about 10 minutes of getting up on the cycle by making fun of the audience. The fire was cool though.

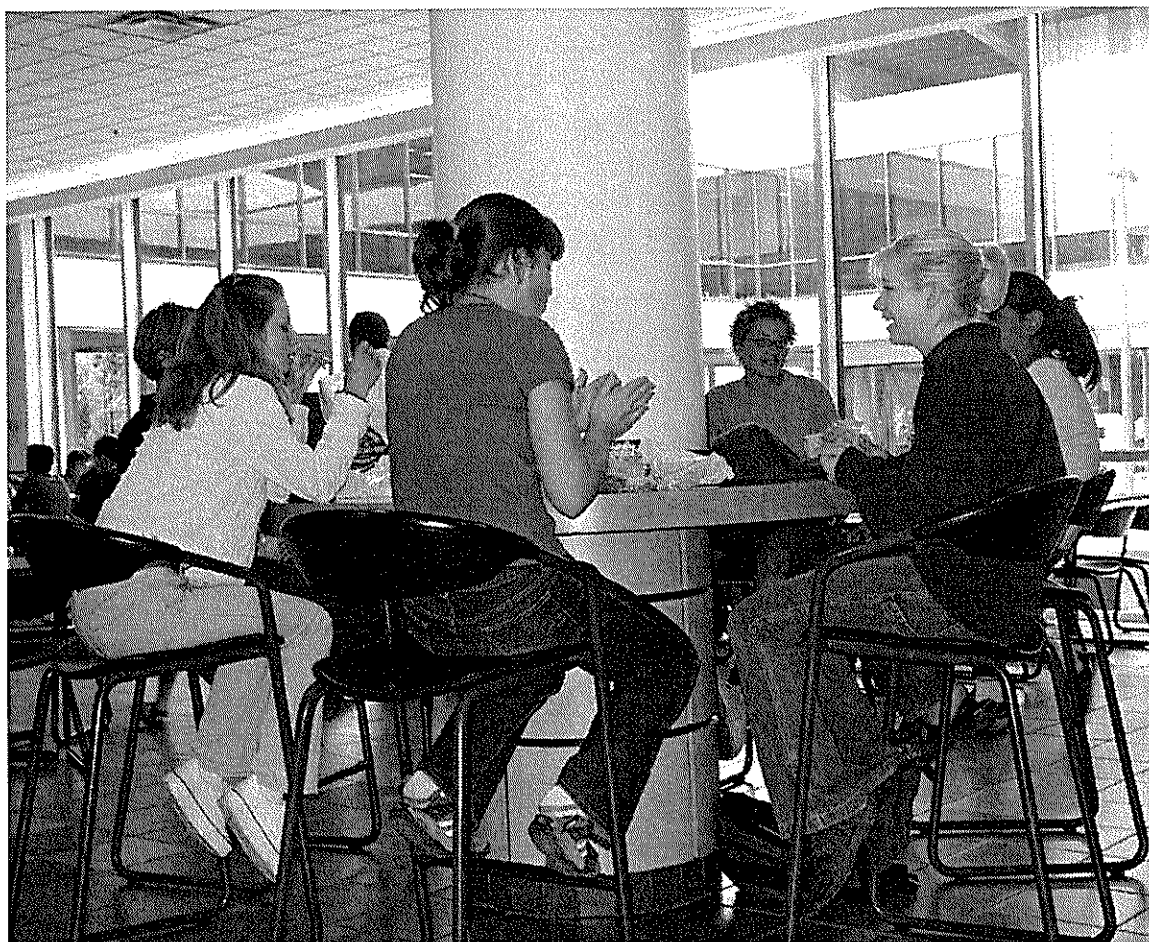
The next show we saw was one that I really enjoyed: The Flying Bob Show. Bob, from Saskatoon Saskatchewan, had this really cool wire tight rope that he preformed many tricks on. He also did a very exciting act where he juggled three razor sharp machete knives and cut off pieces of celery from the mouths of blindfolded victims. It was great.

Lastly, we went to see Elvis. Dressed and painted completely in silver with reflective mirrors all over his jacket, the King was really a sight to behold. While his music played, he would dance around, involving people from the audience to be part of his band and even share a dance with him.

Terrific Tuesday Lunches with H&K

By Mehreen Rashid and Cindy Lee

The highlight of Tuesdays were always Terrific Tuesday Lunches with H&K, and sometimes T. All WISEST students were invited. Though attendance for this event wasn't mandatory, many students came every Tuesday. Unfortunately, not all students could attend every week. The location of lunch depended on the weather. If it was a nice sunny day, lunch was outside in the Quad. If it was a cold or rainy day, lunch was inside in SUB. This was just one of the great opportunities to meet the rest of the gang and make new friends. Terrific Tuesday Lunches usually consisted of talking and, of course, eating. During one Tuesday lunch, a few girls threw around a Frisbee. Conversations drifted from lab experiences to places different students are from to plans after high school to events around Edmonton such as the World's, Heritage Days, and Klondike Days. Every lunch also meant an opportunity to listen to Kirsten tease Haley about her neck problems ("I have no neck!") and about taking credit for her excellent photograph.



The Odyssium (The Edmonton Space and Science Centre)

By Jennifer de Vries

Our trip to the Odyssium started with an Athabaskan and a Calgarian leading the way from the bus station to the Science Centre. An interesting start to an interesting evening!

A huge nose, tongue and eyes welcomed the students to the Body Fantastic display. Here, we learned all kinds of interesting facts about our bodies. We could try out our sense of smell by identifying different things. We could try to read Braille to test our sense of touch. There was a twisty machine that we could sit in and go upside down, it has to do with the effects of gravity, or the lack thereof on the body. The list of activities also included testing our balance, trying to identify a person's injury from the x-rays, and more. On display were also a cat's, a dog's, a woodpecker's, and a cow's tongue. I was surprised at the size of the cow's tongue. It filled a bottle the size of a large pickle jar.

On Mystery Avenue, trouble was brewing. A murder took place and it was up to us to solve it. After rummaging through the recycling bin, we found blank or hardly used copies of the investigation booklet. First we investigated the crime scene. Then witnesses were consulted. Evidence was examined in the crime lab, and finally charges were laid in the prosecutor's office. We charged Page Turner with the murder, and she was found guilty. Over seventy percent of the visitors charge her, so it is likely that she is the murderer. It was really neat to learn how a murder investigation happens.

The sports exhibit was a lot of fun. We raced in wheelchairs; I never knew it hurt your shoulders so much to move a wheelchair quickly. There was a small climbing wall, a basketball challenge, a figure skating simulator that spins, and a balance beam. You could also see if you jump like a cat, or if you can run faster than various animals, including a porcupine, an ostrich, a grizzly bear or a cougar.

There were also really good shows to watch. We could watch an IMAX movie, either Olympic Glory or Alaska. Olympic Glory is about the 1998 Winter Olympics in Nagano. At the end Kirsten couldn't stop laughing because when the Czech Republic men's hockey team won the gold, the goalie threw his stick and hit a teammate in the face. Everyone else started laughing, but at Kirsten! Alaska shows the beautiful and harsh wilderness, with exotic wildlife of the Arctic. Some people also had the chance to take in a laser show, Laser Popfest.

The trip to the Odyssium was definitely a highlight of the summer for the fifteen WISEST students who attended. This was a really fun time where we could socialize with our new friends, and where we could have fun doing some things that we wouldn't do otherwise.

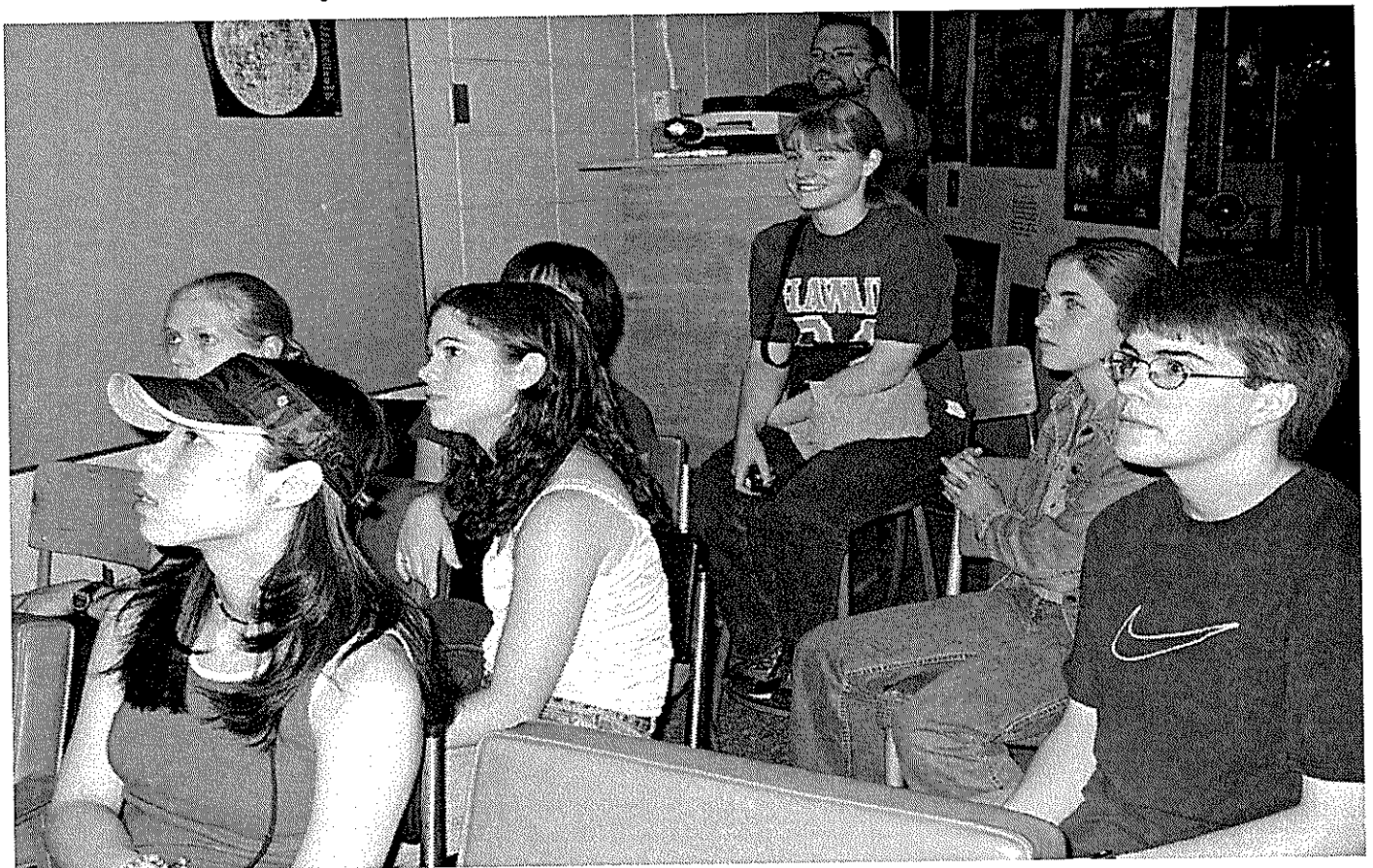
Physics observatory "A Night Amongst The Stars"

By Kirstina Boates

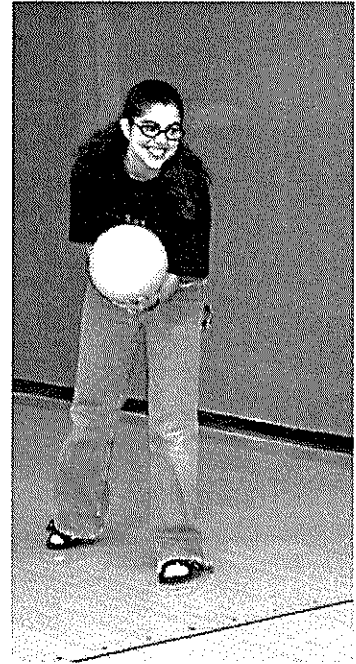
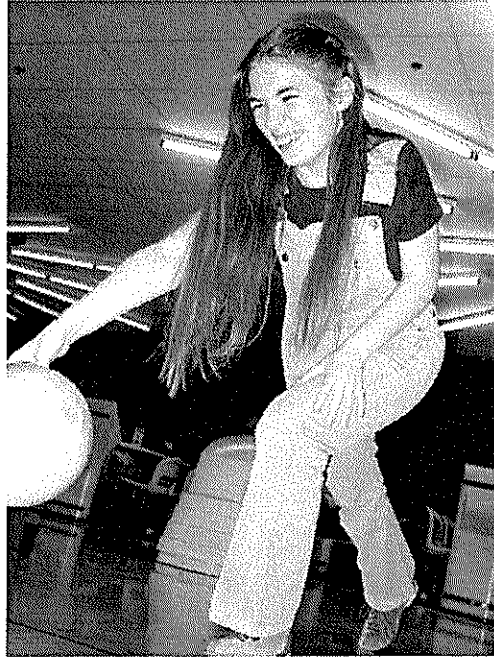
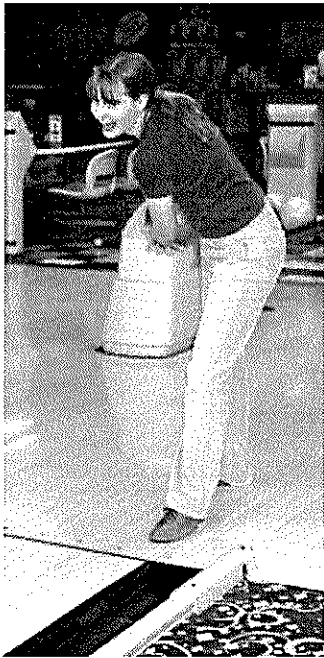
The Physics Observatory is one of the hidden cool things about the University. The observatory is a little house on the seventh-floor roof of the physics building. Our tour was from 9 to 10 at night, which wasn't the greatest because the sun didn't set until after 10. So, while we waited for the sun to go down our tour guides Spencer and Adam showed us the observatory equipment. There was the 12-inch telescope, several radio telescopes and a cosmic ray detector that was used to (you guessed it!) detect the cosmic rays passing through the Earth. After they showed us the equipment, we went inside to see a very informative slide show about the mysteries of the universe. After the slide show, we went back outside and looked at Mars and the Moon through the telescope, and then observed the stars and satellites from the roof.

The observatory was really neat because it was full of posters and diagrams and models about all sorts of different space-related topics, like the space shuttle, the Mars Pathfinder, the Cassini mission to Saturn and a neat model of a black hole with some really complicated math equations.

The observatory was really cool, but next time they should go when it's dark!



Bowl-o-Rama!



By Jessica Mueller

Well, bowling, a sport I am not so great at nor “practice” often, turned out to sure be an evening ‘o’ fun!

When we walked into Red’s I was expecting the usual bowling we have back home. Boy, was I in for a surprise. For those of you who don’t know, Red’s has only 10-pin bowling. For those of us oblivious to the facts of bowling, this means bowling ball with the funky finger holes, and numbers on the side. I was soon to find out that those aren’t “lucky” numbers as my first ball was a 15. This large number just so happened to be the weight of the darn ball, and man I sure am glad I didn’t drop the ball or my poor toes would have been mush. They should really make bowling shoes steel toed for safety reasons!

After losing both of my games to “Freak” or Vanessa as you would know her, we (Sherri, Krista, Vanessa and I) moved on to the arcade game that teaches you to dance. This can really be quite a challenge for those of us who have no rhythm.

We soon discovered that the dancing game was not nearly as much fun as the games that gave us tokens to go towards a prize. After a few short minutes we had tons of tokens to cash in for our “wondrous” prize. These prizes consisted of almost anything that can possibly be made from plastic. There were bouncy balls, rings, bracelets and the list goes on.

So the Red’s guy, not seemingly as intelligent as us “nerd camp” members totaled Vanessa’s tickets with his “special” counting machine. Then instead of clearing the points he just added mine on top, giving me hundreds of points. So seven cheesy rings, two bracelets and a smile later we were a bunch of happy girls.

So, for a night of bowling, I would say ours went very well. Heck, what more can anyone ask for but dorky bowling shoes, dancing, and gawdy jewellery.

Life at St. John's

By Vanessa Fulford

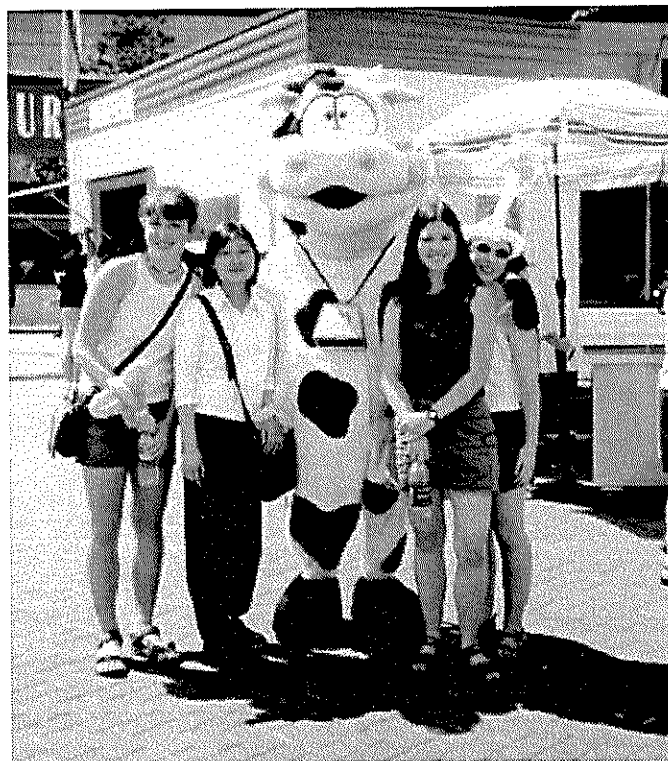
Living at St. John's was a wonderful experience that I was glad to have had. All of the residence there got along very well, and we made some really friendships. Paul, Wendy, and Stash Bondar have made a wonderful home away from home for many students, and it helped to make the WISEST experience more memorable for all the residence

A typical day started with the sounds of everyone's alarms going off from around seven to eight o'clock in the morning. Then we would all stumble into the bathroom to get in line for the showers that always seemed to be busy in the morning. After getting ready to go, we all usually all congregated in the kitchen, still half asleep, for breakfast. The wonderful food seemed to wake us up a little, especially when there were crepes or mini quiches for breakfast!

After eating, we would then meet by the front door and make our way to the university. Walking down 112th in the morning seemed like a hike for the first week, but we soon got used to it as we made the trip twice everyday. After we said our 'have a good day at work' we all went to our separate buildings to begin our research.

At lunch, we would usually meet in CAB, or when it was nice out, in QUAD. This gave us more of a chance to get to know each other and find out what other research was going on in the university.

After work, we made our way home for supper. So from about 4:30 to 5:30, we would march back to the institute and in to eat (the most exciting of these days being chicken finger and fortune cookie nights). As we ate, we would share all the things that we had did that day with work and university experiences.



In the evenings, we would just have fun. We all learned to crochet and knit, we had twister parties, and played monopoly and trivial pursuit. We watched movies and ordered pizza. Went to West Edmonton and Southgate mall. Went to the royal band stage and watched the free shows & light shows.

On the weekends, we also had a lot of fun. Besides participating in WISEST events, like the Street Performers Festival and Shakespeare in the park, we did things as a group on our own. We visited Klondike days and Heritage days, went to the malls, explored Whyte avenue, went to the Ukrainian dances that took place in the institute, and just hung out with each other, sharing experiences and having fun.

When it came time to go to sleep, we would once again all meet in the bathroom. Then we would make our ways to our rooms. Sometimes we would sleep, other times we would stay up and just talk, watch a movie, or have our own private dance party. We even had research poster parties.

We had a lot of fun. Living so close to ten other people helps you to make some good friendships and create some good memories, which were hard to leave behind, but I know I will never forget.



Greetings From the WISEST Resident Advisor - Linda Bui

I was bouncing off walls when I first got this job. I thought I'd had an opportunity of a lifetime...living away from home and all for FREE. I was quite ecstatic. Before I left home, I remember telling my parents that I would never miss them during the six weeks and that I would never come home ever again. Well, it turns out, I was WRONG. My first couple of days, I was so completely homesick that I called home at least five times each day. I couldn't wait till the weekend came so I could go home. But, finally when the out-of-town students began to arrive, I realized that maybe I'd have fun after all. And surely enough, I ended up having one of the BESTEST summers ever. The nine WISEST students living at St. John's were wonderful. I had a terrific time getting to know everyone better. By the time two weeks rolled around, we all became such good friends. We did so many fun things together: from late night talks to crocheting/knitting parties, and from dance parties to watching romantic comedies in the "technology room." Oh, and who can forget Star Wars Monopoly (Hans Solo a.k.a Harrison Ford is soooooo cute) and BLURT challenges where Kristy would always win the game twice before anyone had a chance to catch up. There was never a dull moment here at St. John's. I'll never forget the night we got absolutely soaked at Kinsmen Park just to see Chantal Kreviazuk and Andre Philippe Gagnon. But it was worth it right, guys? It certainly was one of the most fun times of my life and again, it was all FREE. Things weren't always perfect though. There was that one time we lost Krista at K-Days which was quite traumatizing. And the time we missed the Shakespeare in the Park hot dog roast because the "brilliant" R.A. had decided to take a short-cut. Well done Linda! But all in all, I think everyone had a superbly fantastic summer. At least I know I did. I would do it again in a heart beat if I knew I'd be able to get another terrific bunch of students just like these students. I know I couldn't have done it without them. So in closing, I would like to send out a special thank you to the nine fabulous students who will forever change my life:

- To Tamara for always being there starting from Day 1
- To Jessica for introducing me to the wonderful world of sarcasm
- To Renita for helping me eat everything at St. John's Eating Buddies Forever
- To Krista and Vanessa for being so full of enthusiasm
- To Charlene and Sherri for being super sweet
- To Kristy for telling me that Pluto wasn't a real planet so that I'd never embarrass myself in front of an astronomy buff
- To Kelly for making my job so easy by sleeping before 12am every night

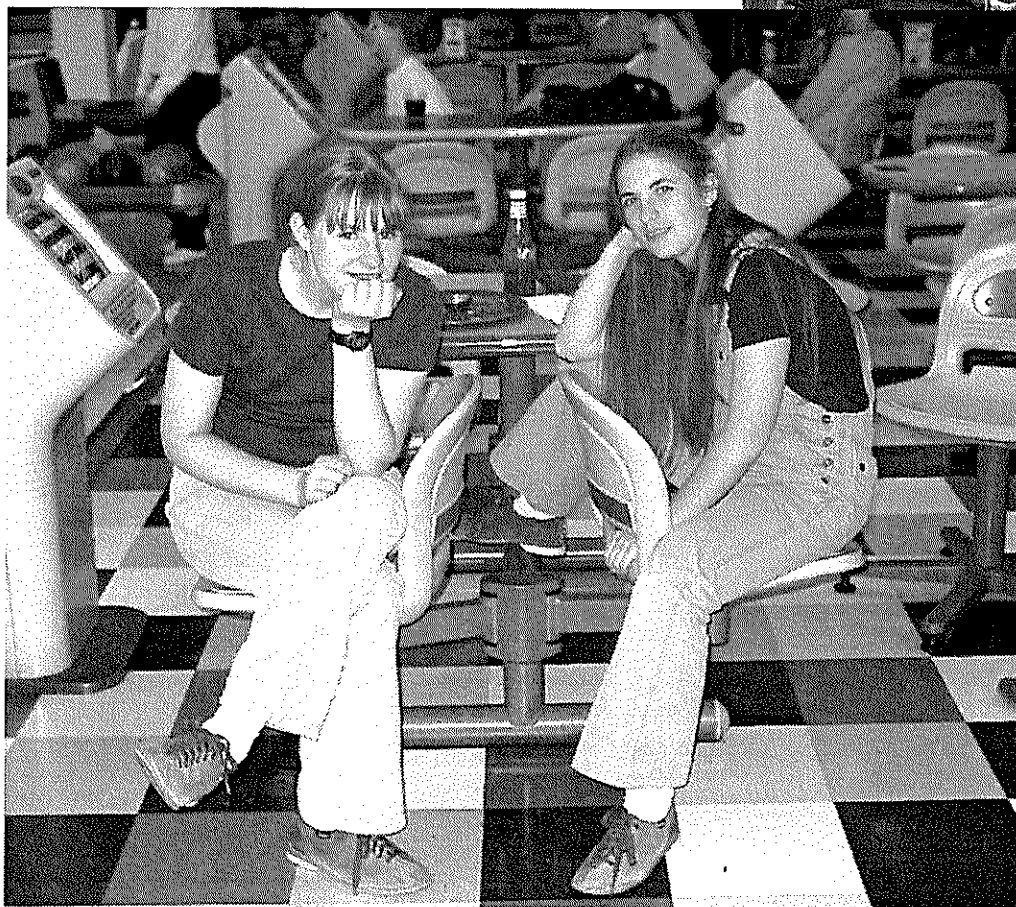
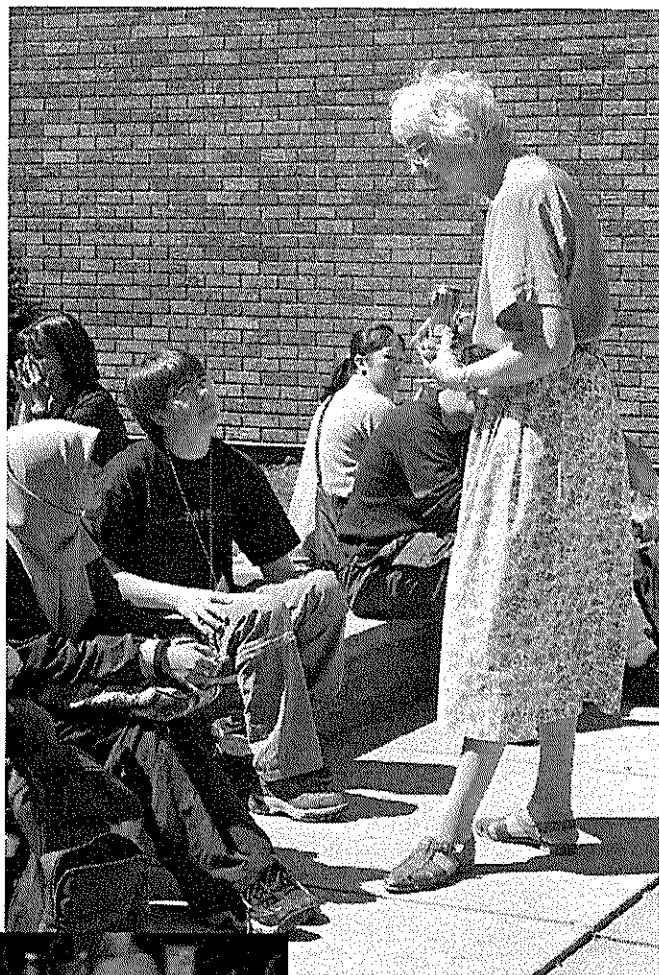
Finally, a very warm thank you goes out to Grace, Dr. Armour, Tara, Kirsten, and Haley for all their support. And at St. John's, we like to say "this is not just a job, it is truly a WISEST experience."

"WISEST taught me about science, university, and life in general, and helped me to learn more about myself (all in six weeks - amazing isn't it?)"

"WISEST has given me the opportunity to learn an incredible amount about research, but more importantly has taught me how to fail and what success really means."

"The combination of gaining experience, meeting new people, and having fun, made this summer a truly memorable one."

"I got paid to learn, how cool is that!!!"



"The WISEST Summer Research Program offered me an amazing opportunity to freely explore my interest in a science-related career, as well as providing me with valuable experiences along the way."

WISEST Students 2001



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(Design on opposite page by Vanessa Fulford)

CHECK IT OUT

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Summer Research Program
July 21-31, 2011

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Expires December 31, 2002

Wine & Image

YOUR OWN

2001

Discover

Magic Pass

Triathlon 2000
mind, body, soul
July 2000
Ha...

Brilliant!

CHALLENGE

Summer

Allison O'Kell

Department Agricultural, Food & Nutritional Science

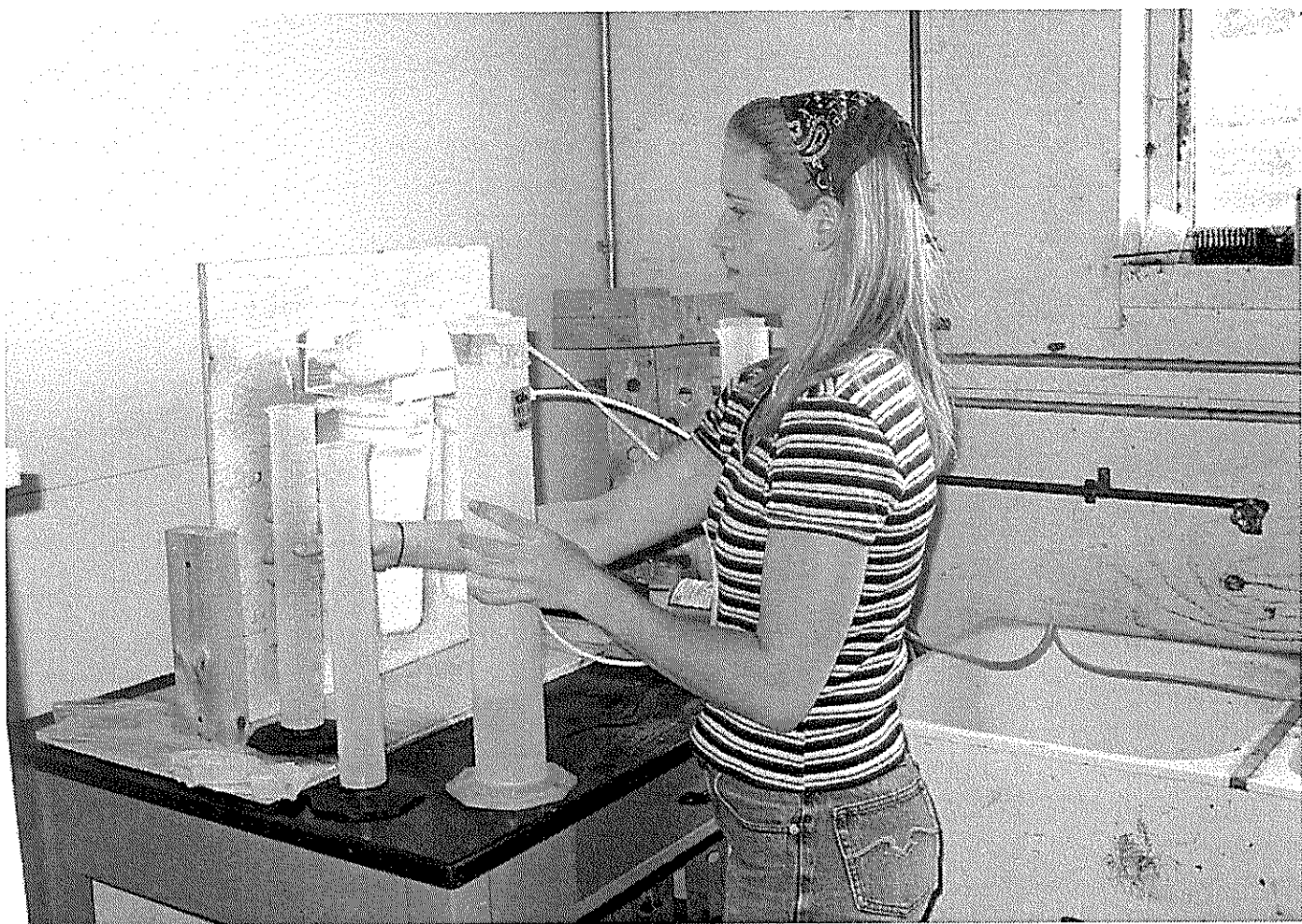
It all began with a phone call informing me that I had been accepted into the WISEST Summer Research Program. I was very excited and happy; I knew it would be a wonderful experience. To my surprise, the field I would be working in was swine manure odour measurement and water conservation from swine manure. This was not exactly what I had in mind, but, as an optimist, I looked forward to the interesting new experiences I knew I would have.

The main places I worked in were at the Edmonton Research Station on the University of Alberta Farm, about five minutes from campus. Under Ahmad Abolghasbemi I worked on a project controlling swine manure odour using biofilters. With Mahendran Navaratnasamy I was involved with the separation of water from liquid swine manure using coagulation, slow sand filtration, and reverse osmosis. These projects were very interesting to learn about and very relevant to society. It was easy to understand the purpose behind the research.

The first day of the program left perhaps the strongest impression on me. As I stepped into the swine unit of the farm for the first time, I was again slightly surprised. Not by the rather intense odour, but by the "labs" I would be working in. There was not a test tube, sink, or counter in sight. This is probably the most important lesson I learned about research: it is rarely glamorous, and is tedious at times. As well, patience is an important characteristic! However, all of the small, seemingly unimportant tasks are a key part of any research project. As I got to know my research team and other grad students and technicians, I began to have lots of fun. From playing wallyball during lunch hour to going out for lunch, there was always a friendly face to talk to.

Another great part of my summer was the WISEST activities. The Wednesday afternoon group sessions were always interesting and different every time. I went on several tours: of campus, of a cell biology lab, and of the Center for Engineering Research. Another great part of my summer was the WISEST activities. The Wednesday afternoon

"..Research is not what I or others expect"



group sessions were always interesting and different every time. I went on several tours: of campus, of a cell biology lab, and of the Center for Engineering Research. One of the highlights was Small Group Discussions, in which successful women in the science field shared their experiences with us. We also learned about the different aspects of going to university and competed in the rather interesting "Lack of Yield Games." There were many social activities as well, letting the students get to know each other and have a good time. The WISEST Coordinators were awesome, always smiling and willing to answer any questions or deal with any problems.

As my WISEST experience winds to a close, I ask myself one question. What is the most important thing I learned this summer? The answer came easily to me. Basically, research is not what I, or most other people, expect. In high school, many students have a very unrealistic view of what research really involves. Research includes everything- hard work, problem-solving skills, and even boredom at times, but rarely excitement. I have developed a great respect for the work researchers do. Most people do not realize the time and effort they put into their projects. It is these researchers that are trying to make a difference in the world, that make the changes and improvements to our lives. For me, the WISEST program opened the door to new realizations and knowledge that I will carry with me as I choose a career and progress through life.

Amani Abdu

Department of Biological Sciences

Well, I really don't know what to tell you about my summer. I could go into the long and tedious details if anyone wants to know. Yet I think an overview will suffice. My summer was not like one of those horror movies that you see, you know going on vacation with your family. I spent my time with people who were interested in what I had to say and contribute. I learned about myself, what I want to do in the future, and found new friends. During the summer I was accepted into the WISEST program, my first job. I worked for about two months (approximately six weeks) in the biological sciences building. I know everyone has heard the horrendous stories about this building. You know, about the many architects who would not see eye to eye. Let me tell you first hand that these stories are...absolutely true, this building is a nightmare to walk through. Thank god it was not too hard to get to my lab, after I was told not to follow the signs, since they were wrong.

I worked in Dr. Gregory Taylor's research lab, with my supervisor, Julie Stephen. No one could have asked for a better supervisor, not only did she take the time to show me around, put up with me, she also let me call her Julie. The specific field I was studying under was Plant Biology. I know what your thinking, plants? However, this was the best experience in my life. (I was not paid to say that, I was only paid for my hard work). I received a different perspective on science in general. I learned lab techniques, such as pipetting, and how to properly sterilize everything. With my beginner's luck, the first batch of plants I had grown was not contaminated. There was not one contamination out of forty plant vessels. As the weeks passed by, it was a different story. I loved my lab experience, and the lessons I learned will be invaluable.

"I loved my lab experience,
and the lessons I learned
will be invaluable."



WISEST is an excellent program, I am happy that I applied. I was very interested in the many other activities planned by WISEST, such as the Off-campus lab tour. All the WISEST students went to C-FER (Centre for Engineering Research Technologies), I had an excellent time. The social activities would have been nice, if I had been able to attend. WISEST is a well-rounded program, illustrating that both academic and social interests are very important. I appreciate all the work Haley, Kirsten, and everyone else did to make my time here very comfortable and fun. Thank You for all your time and effort.

Asha Gupta

Department of Mechanical Engineering

I've always wanted to make an impact on society, especially in the area of scientific research. During the summer of 2001, I took the first steps towards this goal with the WISEST Summer Research Program, an experience that proved to be both exhilarating and enlightening.

I worked with another WISEST student, Vanessa Fulford, in a mechanical engineering research lab, under the supervision of Dr. Walied Moussa and undergraduate student, Jan Bouma. When I arrived, I became a member of a research team. Together, we started our research on neural networks from scratch, and pioneered new ground.

At first, the complexity of our research was a bit overwhelming for me. Fortunately, after two weeks of reading, I grasped a decent understanding of what neural networks are all about. Neural networks are like little babies that you train using input and target data. The babies learn to reach this target data by processing an input and comparing the output to the targets. The difference between the target and the output, also known as the error, is lowered by adjusting weights and bias (parameters) of the network until the error reaches an acceptable minimum. In other words, neural networks learn from experience. Eventually, with enough training, the baby will grow into a knowledgeable adult that can predict an output when given an input not part of the training set.

Neural networks are the basis of artificial intelligence. They are already being used for applications such as automated aircraft control in aerospace, and predictions in the stock market. As you can see, our topic is cutting edge, and I find that this is one of the main reasons that this research is so intriguing.

The future of our research is to design a multi-dimensional neural network that can be used to predict fractures in pipelines, based on many variables such as pressure and temperature. Yet before we developed such a network, we needed to first construct a two-dimensional network with only one input and one output variable.

My task was to build one type of two-dimensional neural network called backpropagation. To develop a successful program that actually functioned properly was a tiresome and sometimes very frustrating process. First, I needed to filter useful information from an 800 page Matlab tutorial and use this knowledge to build the program. Next, the program had to be cleared of any glitches. This was challenging, and I required Jan's experience, but finally the program functioned correctly. At this time I knew I was researching. I was jumping difficult, but necessary hurdles and reaching a goal. For me, surpassing obstacles proved to be the most frustrating, yet exhilarating aspect of research. There is a certain rush felt when one overcomes a problem faced during research and WISEST gave me the opportunity to feel this rush.

After an operative two-dimensional neural network was designed, we continued to pursue our research goals. We constructed neural networks with greater dimensions that were capable of analyzing an input data set with many variables. We were developing eight dimensional programs by the time my job at the mechanical engineering lab drew to a close. When I look back on our research, the progress we made was fascinating. My first time in a lab was definitely a worthwhile and inspiring experience.

Outside the lab, WISEST organized a number of activities that were also eye-openers. Visiting the Research Park proved to me that highly educated women are part of companies doing exciting and influential international research right here in Edmonton. I am now considering specific engineering occupations I never knew existed before this summer. After a trip to a medical genetics lab, future career options that I was considering before WISEST were also reconfirmed in my mind. There is no doubt about it; the WISEST activities left impressions on me that will help shape my future.

Overall, the WISEST program was an experience full of supportive people who gave me a chance to reach new heights in scientific research, and who have inspired me to achieve further heights later on in life. In my application to be a part of WISEST, I said I wanted to taste the life of a researcher. During my summer at the University of Alberta, I did and now I'm thirsty for more.



"I said I wanted a taste of
the life of a researcher. I am
now thirsty for more."

Carol Frost

Department of Biological Sciences

My job in the entomology department this summer, supervised by Dr. John Spence, was to work for anyone in the department who needed help on a certain stage of his or her project. I discovered that almost everyone in the department does projects on beetles, spiders, or water striders.

My main job was sorting pitfall and window traps. A pitfall trap can be used in order to collect data on insect and spider populations in an area. It involves a plastic tub containing antifreeze which is sunk into the ground so that the top is level with the surface of the ground. The idea is that an unsuspecting beetle walking along the forest floor will topple into the antifreeze where it will drown and be preserved until the trap is emptied a week or so later. At that time the contents of each trap are tipped onto a piece of cheesecloth, tied up and brought back to the lab. When all the samples were collected I opened each piece of cheese cloth, and sorted the contents into spiders, carabid beetles, staffolinid beetles, and other insects. The next stage was for each beetle or spider to be classified as to species, sex, and sometimes age under a microscope. Some of the pitfall traps that I sorted were from a project called Beetle Boxes.

This project is a long term study of beetle populations in the woods near George Lake (northwest of Edmonton). Every second Tuesday we emptied and reset these pitfall traps while at George Lake, and brought them back to the university to sort them. I also sorted pitfall and window traps from a project up in northern Alberta forest, examining how different logging techniques affect beetle populations. A window trap is a clear piece of plastic or glass hung from a tree with a tub of antifreeze suspended below it. The piece of plastic is supposed to be invisible to any insect flying through the forest so that unlucky ones crash headlong into the glass and fall out of the air, and then, before being allowed a chance to recover themselves, plunge to their deaths in the antifreeze below. (Don't entomologists show a shocking lack of respect for insect life?)

" and got a feel for how
the University works... "



Other projects I worked on were a water strider lab experiment for which I was pairing up, feeding, and counting eggs of water striders, a baby spider ballooning experiment, which was determining the effect of wind speed and air temperature on the number of baby spiders which decided to balloon. Another project, for which I was taking soil samples was examining human impact on beetle populations in parks in, and just outside of Edmonton.

I worked on my project both at George Lake, and on the roof of the Earth Sciences building. At George Lake I was collecting water striders from experiment pond to be marked and released in a long term population study. At the university I was conducting an experiment to determine the survivorship of water striders protected from UV light versus the survivorship of those left unprotected.

Throughout the course of the WISEST Summer Research Program I learned about research techniques, discovered the wide range of projects that go on in the entomology department, and got a feel for how university works, besides learning a tremendous amount about water striders. I especially enjoyed being paid a fifty-dollar gift certificate at the U. of A. bookstore to taste ice cream twice a week at lunch as part of Robyn's WISEST project!

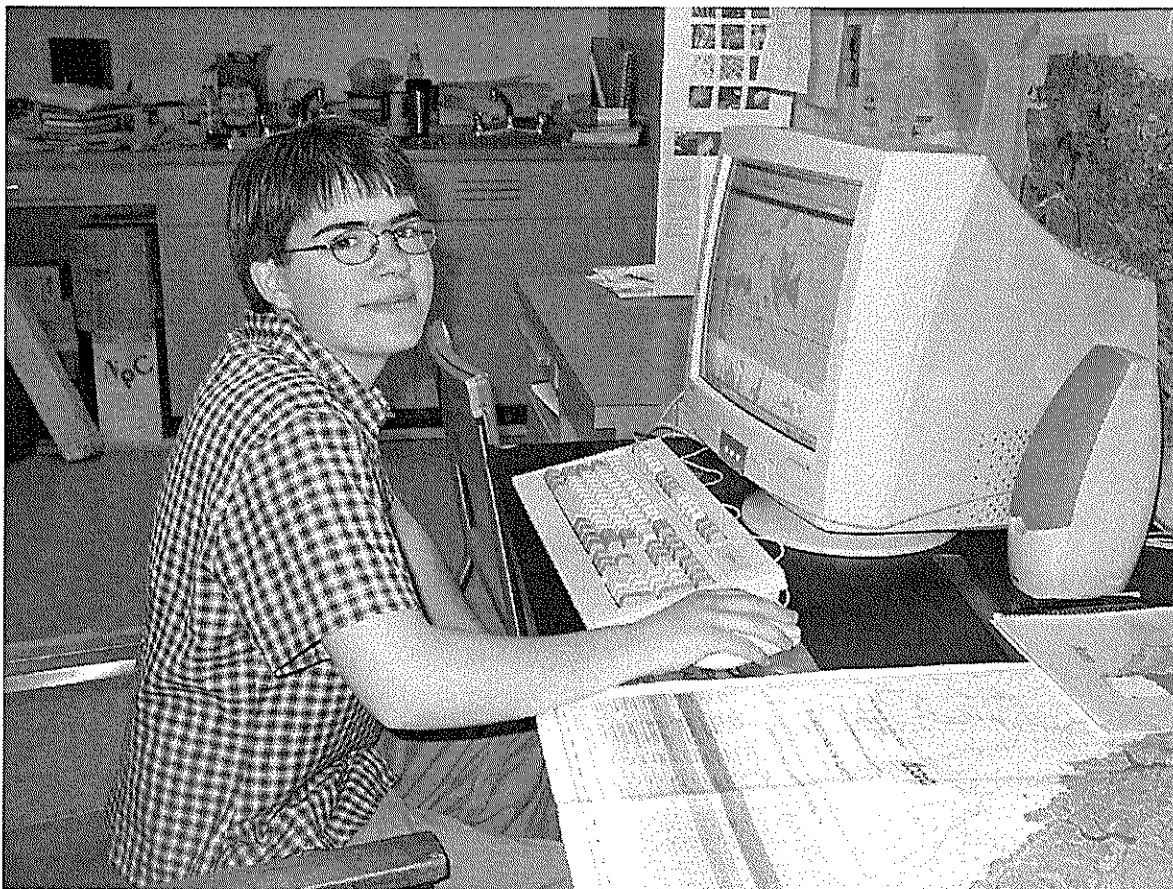
Charlene Scott

Department of Biological Sciences

Working this summer with the WISEST Summer Research Program has been new and exciting in various different ways. Not only was it my first job ever but also it was the first summer I have been able to participate in so many interesting activities while learning and gaining work experience at the same time.

During the six weeks of the program I worked mainly in the Zoology wing of the Biological Sciences building on the tenth floor in Stan Boutin's office where I worked on various projects. Guiding and assisting me in these projects was Ainsley Sykes, Phil Lee, Catherine Shier and Arin MacFarlene. The main project I was working on was assisting Arin MacFarlene in her study of the effects of seismic lines on the plant community in the boreal forest. Arin is doing this study in order to receive her masters. Her study is very important because Canada makes up a large portion of the worlds boreal forest, therefore studying and preserving the boreal forest is vital to Canadian scientists and citizens alike. In helping with her study I learnt not only the map and computer work involved, using a computer program called ArcView GIS, but also the experience needed to work in the field when I went with Ainsley and worked with Arin and Jenn in the Calling Lake area, north of Athabasca, for 4 days. Working in the field was a nice break from the office where I learnt about how sampling along seismic lines is done. I cored trees in order to extract the core thus determining the age of the tree by counting the number of rings present. Along with coring I also took diameter measurements and heights of the trees, learning the different species of trees and plants as I went along. Coming across various wildlife, no bears thankfully, made the field experience even more entertaining, but if I never have to hike in another pair of rubber boots in my life I won't be sorry. Going out into the field made me realize that all the computer and office work is very important to the actual study. Without the map work done in the lab the fieldwork would be impossible. The experiment has to be organized and carried out carefully in order to get proper data to come to a reasonable conclusion.

The number one thing I learnt about science and work in general is that patience is an essential part of scientific research. Most of the research projects can take years to complete and are based on data and facts collected for decades. Although some of the work done can be tedious and not appear to be useful at the present time it is needed to keep the whole project running. It can be compared to a jigsaw puzzle; all the pieces are needed to complete the puzzle.



Along with all my new work experience, that will look great on my resume, I also had a lot of fun. The scheduled Wednesday afternoon activities provided me with the opportunity to navigate my way around campus and learn what work and university life is all about. I feel much more comfortable with university life in general as well as the university campus. Familiarizing myself with the various faculties and facilities available to university students has given me a good idea of what is ahead in the near future; the next five years of my life. I thoroughly enjoyed the tour of the Observatory in the physics building, as astronomy is something I am interested in and wish to pursue in my studies someday at the University of Alberta. Everyone involved in WISEST was very helpful and I am sure everyone enjoyed themselves as much as I did. WISEST has been a huge help in deciding my future and hopefully I will see some WISEST students again as part of the WISEST committee assisting other young women in their pursuit of scientific knowledge. Thank You WISEST.

"I learned...that patience
is an essential part of
scientific research".

Charlene Sinclair

Department of Chemical & Materials Engineering

When I applied to be in the WISEST Summer Research Program, I had no idea what I would be doing or how my summer would be. As it turned out, I became a fully functioning member of a research team and met some great new people while staying in residence at St. John's Institute. It was an experience I'll never forget.

Everyone who was staying at St. John's met the night before the WISEST orientation, and we immediately became the St. John's clique. There were nine girls from the WISEST Program and one girl from the HYRS program, and most of us became friends immediately. That didn't surprise me too much though because we all have similar interests career-wise and are all the same age, plus, we were stuck with each other for six weeks so we had to be nice. The best part about living in residence was having a group of girls to complain to when work was bad or stay up late and eat Froot Loops with right next door. I also got to experience a lot of Edmonton, including the WISEST social activities and more, because I was living in the middle of it all. We went to Klondike Days, shopping on Whyte, movies, Shakespeare in the Park, the Odysseum, and even walked down to cheer on the marathon runners during the World Games. Life in residence was one of the many highlights of my experience in the WISEST Summer Research Program.

Now, the part of the WISEST Summer Research Program that actually is the Summer Research Program. I spent my six weeks working in Dr. Jingli Luo's lab with several different people within the lab. The lab was in Materials Engineering and focused on reducing the corrosion of pipelines. The first few weeks I tested an inhibitor called HTAB which bonds to the metal in the pipeline, creating a protective coating that reduces corrosion.

"Life in residence was one of the many highlights of my experience with the WISEST summer research program."



Later, I worked on testing different types of steel, called martensite, pearlite, and ferrite, to find out their corrosion resistance in different solutions. Because there are many different types of corrosion, there were many different types of tests being done in the lab. However, all of the tests I did focused on corrosion caused by uniform attack. Basically, all that means is that the metal corrodes evenly over the whole surface. To test the metals I used a simple electrochemical cell. An electrochemical cell consists of a working electrode, a counter electrode, and a reference electrode immersed in an electrolyte. The electrodes are hooked up to a machine called a Potentiostat, which applies a current to the electrodes and measures the necessary data. I then graphed and analyzed the data and came to a conclusion about the results of all the testing. I really enjoyed my time in the lab because there were several different aspects to one project. First, I used my knowledge from Chemistry 20 to make solutions of different concentrations for the tests, then I used newly gained knowledge to set up the electrochemical cell and run the tests, and finally I was able to expand on my knowledge of computers and Microsoft Excel when I graphed the data the Potentiostat had measured. Because I tend to get bored of doing one thing over and over, this type of job suited me quite well and kept me interested for six weeks.

The WISEST Summer Research Program was a great experience for me and a great opportunity for students a year away from graduating to get experience in a possible career.

Chelsea Rieger

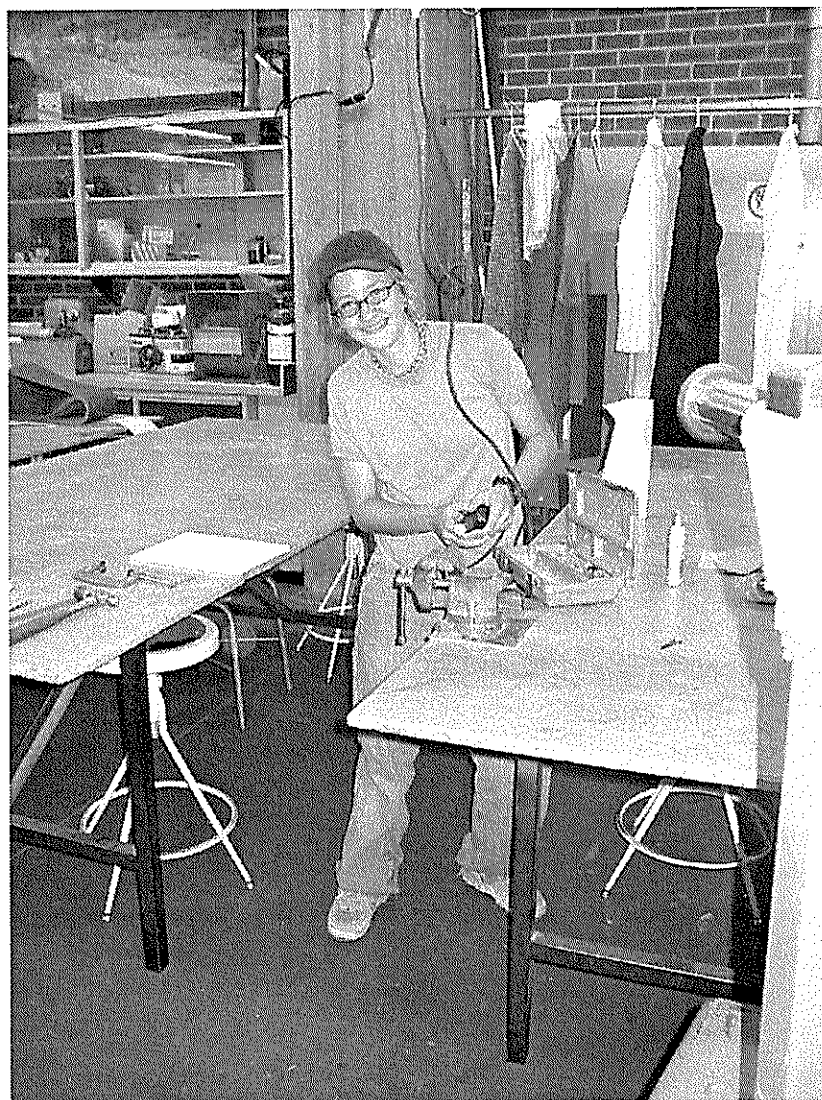
Department of Mechanical Engineering

The first time I heard about the WISEST program was when I was in grade 10. After I heard about it I knew that it was the perfect opportunity for me to expand my knowledge of engineering and science. As Wayne Gretzky once said, "You miss 100% of the shots you don't take." So I applied to WISEST even though I didn't think I had a chance of being accepted. Luckily, I was wrong and now here I am almost done the program writing about my experiences.

I ended up working in the Mechanical Engineering building in Dr. Bhattacharyya's lab where research is done on smart materials and devices. My partner Marta and I worked in a lab with 4 other university students. We didn't really have one specific area of research, but in general worked with SMA wire. One of the main things we did was set up simple experiments showing how SMA wire works and then film them. The videos we made were then used on a website that our research team was building. The website is being created to target high school students to educate them in the area of smart materials and devices. In the six weeks I have spent at the university I have learned so much about smart materials and SMA's, an area which I had little very knowledge of before I entered the program. Besides working on the website experiments Marta and I worked on designing a system of pulleys that could be turned using SMA wire and hot and cold water. We also worked on building a six leg robot that uses SMA wire to walk and is controlled by a computer program.

"Having completed the program I realize that I am very interested in mechanical engineering and will probably pursue this interest in the future."

On top of being able to get hands on experience in a research lab I also got to talk to a lot of people about university and their personal experiences. They all helped me to broaden my view of university and engineering. I met many new people most of who worked in the mechanical engineering building. I am very interested in pursuing mechanical engineering so the advice I have gained from those I have talked to will help me to make the right choices when I enter university.



The WISEST program also allowed me to see different areas of the university such as the chemical engineering building and the scanning electron microscope. I now know my way around the entire university campus which will be very helpful if I do go to university here in a few years.

The most important thing WISEST has done for me is to help me to realize what I am interested in. Having completed the program I realize that I am very interested in mechanical engineering and will probably pursue this interest in the future. My main reason for applying to WISEST was because I didn't know what I wanted to do with my future. I am interested in science and engineering, but coming in to the program I had no idea what I would want as a career. WISEST has given me direction and will be an important influence on my future.

Cindy Lee

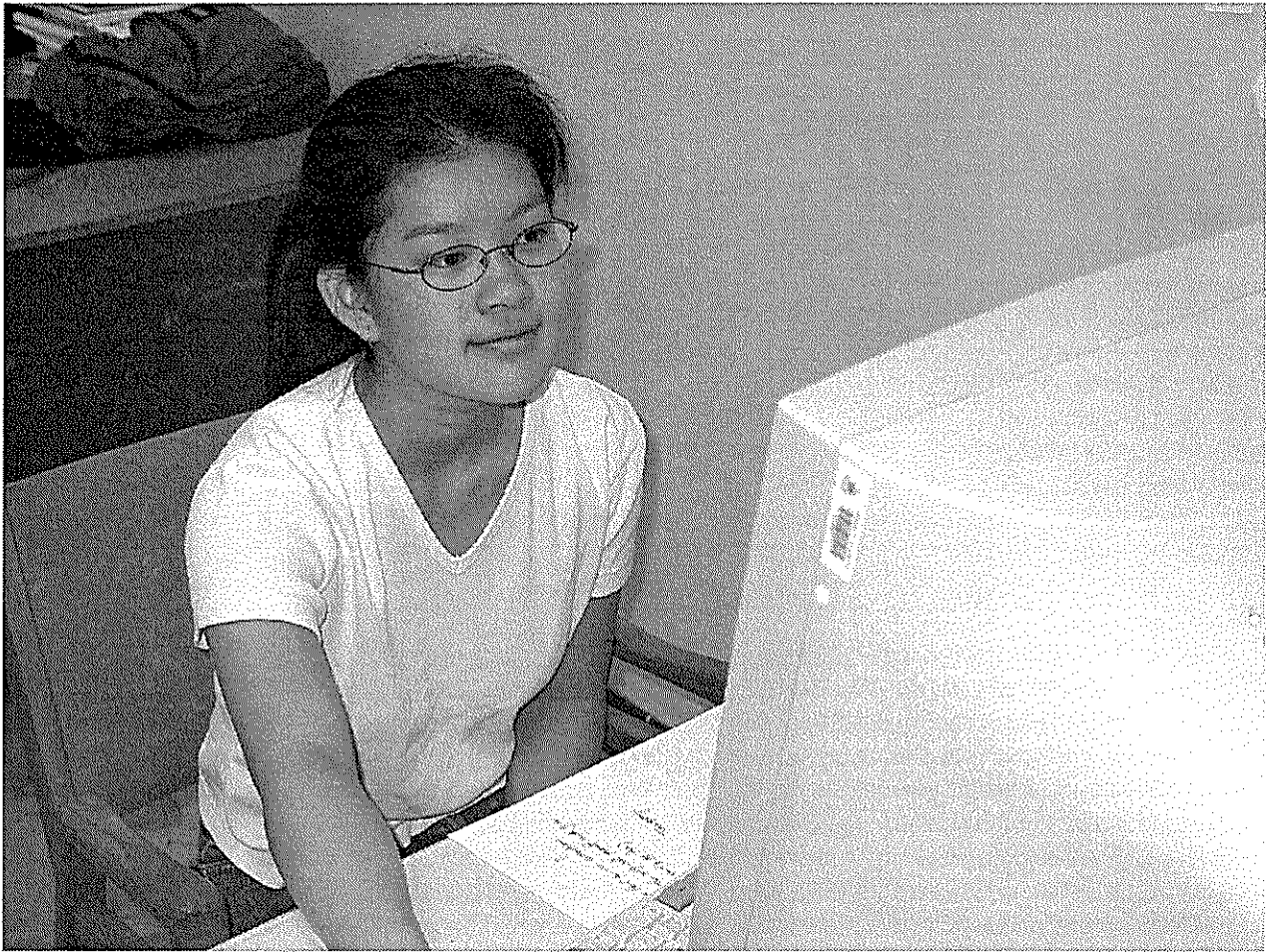
Department of Chemical & Materials Engineering

I spent six weeks of the summer of 2001 working for Women in Scholarships, Engineering, Science, and Technology (WISEST) in the department of chemical and materials engineering. For the majority of the six weeks, I worked in the Chemical and Materials Engineering Building on the eighth floor. Dr. Dongyang Li was my supervisor and Wen Li guided me in my work. There were about 12 people on the research team, including Jocelyn Sprinkle, another WISEST student working on a different project, and me. There was only one other female on the team. The majority of the team was from China and they all spoke Mandarin and had difficulty speaking English. It took some patience when conversing with them, but they were very kind and were happy to answer any of my questions.

My project, in a nutshell, was developing a basic computer code to calculate stress and strain of metals during bending tests. I initially thought it was a simple task. But I learned on the first day that it wasn't. First of all, I wasn't entirely sure what stress and strain are. I had an idea, but I wasn't positive it was absolutely correct in terms of materials engineering. Secondly, I thought I knew how to use computers, but when my supervisor asked if I intended to use C or Basic, my heart stopped. Luckily, I have a computer geek for a brother and he messes around with computer software all the time. Unfortunately, I know what the software does, but I don't have any clue whatsoever as how to use them. Wen Li suggested I use software called Maple. It was very simple to use, especially since I was given a learning guide. Anyways, many engineering students will have to learn how to use this software. If I decide to become an engineer (I'm still undecided), I have an advantage over others.

The purpose of the research is to investigate how deformation, which occurs during bending tests, affects the electron work function (EWF) of metals. The EWF is the minimum energy required to remove an electron from the interior of a solid to a point just outside the solid and is important in investigating tribological phenomena.

"I find it amazing how much
one person can learn in just
six weeks."



The bending tests were done with an instrument called the scanning Kelvin probe, or SKP. My contribution was facilitating the process of determining surface stress. Previously, calculations of strain and stress were done manually. I developed a very simple program/code using Maple. This enables other members of the research team to simply input values for certain variables, such as length, thickness, and height, into the equation to obtain an answer.

I have learned a great deal about materials engineering research just by reading research documents and listening to explanations. Grace was correct when she said that for the first few weeks we would experience a steep learning curve. I find it amazing how much one person can learn in just six weeks.

I also participated in other activities organized by WISEST. Every Tuesday was Terrific Tuesday Lunches with H&K. Every Wednesday there were educational activities such as tours and small group discussions with women involved in science fields. There were also social activities, which took place after work. I went to the Space and Science Center (the Odysseum) and bowling at Red's. I also met students in the HYRS program and went to see Rush Hour 2 with them.

We got paid to learn, have fun, and meet new people. I made a few friends. I don't really consider the six weeks work. It's way better than waiting tables and washing dishes, which is what I would be doing if I were not in the WISEST program.

Diana Tran

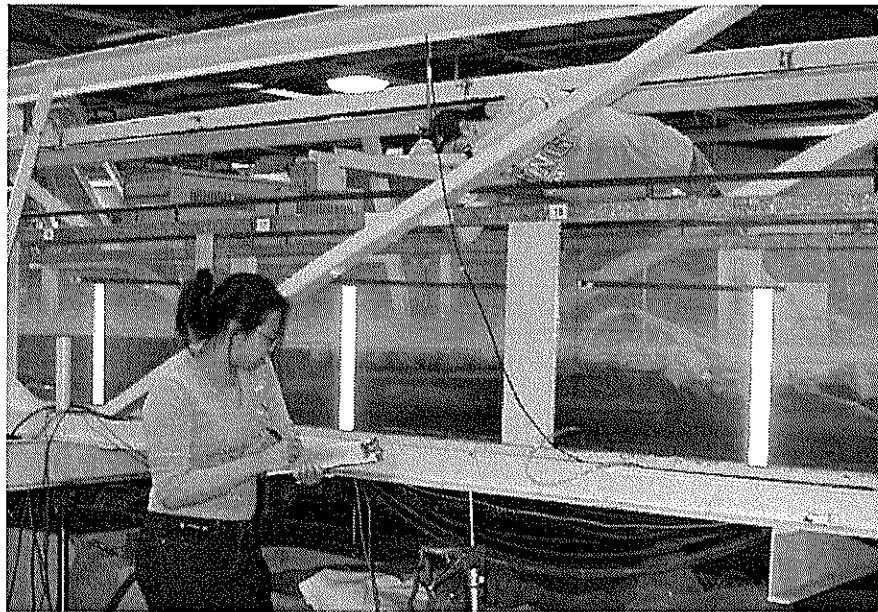
Department of Civil & Environmental Engineering

Working in the Department of Civil and Environmental Engineering at the University of Alberta was definitely a highlight of my summer as well as volunteering at the World's. Wow! What a summer. Imagine getting paid for something you love to do. Although it got really hectic at times, I credit my great experience on campus this summer to my supervisors and research teams who were always helpful in teaching me new things and patient with me while I was learning. I think I was fortunate in that I had the opportunity to experience three very different projects within the field of civil engineering this summer instead of just one as it gave me a chance to experience more and explore.

During my six weeks, I worked in Dr. Faye Hicks's and Dr. Selma Guigard's labs on three projects, spending approximately two weeks on each. First, I worked on the study of river ice jams with Dan Healy, and then on the remediation of heavy metal contaminated soils with Nadia Savoie. Lastly, I worked on the fate of phosphorus within the processed Kimberlite containment area at BHP's Ekati™ Diamond Mine with Karen Graham.

My first two weeks were spent in the huge warehouse Hydraulics Lab with Dan. The basic goal of Dan's research was to learn more about the effect of river ice jams and how they form so that the severe flooding that usually occurs with these jams could be prevented. Data was collected from a flume, which is a basically a big, long box which is supposed to represent a river. Water is run through the flume as in a real river and the discharge rate is varied as in a real river. In addition, measurements of the height of the water surface and the bed surface (a water profile) are taken as well as velocity readings through probes in the water. Ice was added to the flume and several cameras on the ceiling and at the side of the flume recorded water levels and the motion of the ice. The "ice" is really a plastic material called Acrylite, which is used because it has the same density of real ice but does not melt. The ice jams are simulated by increasing the water discharge in the flume so that the ice builds up around a barrier at the end of the flume as in a real ice jam where an obstruction in the river during the spring break up time causes the floating ice to jam and runs the risk of flooding. When the discharge is increased, I help to track particles of ice as they move along the flume and record their positions at certain times so that Dan knows of the relative velocity of the ice as it jams. In a little side project, I set out to learn more about the properties of the ice, most importantly the ice's buoyant angle of repose. An angle of repose is the angle that a material makes when in a pile with the horizontal. The angle is a numerical indication of the materials strength as the steeper the angle the stronger the material as it is more able to interlock within itself to create a stronger force to oppose gravity. My findings will help Dan learn more about ice so that the effect it has in ice jams is better understood.

The next four weeks were passed were passed in the once Home Economics Building but now Environmental Engineering Building with Nadia Savoie and Karen Graham. I basically went to whoever needed me at the time because delays in the working of pressure pumps in Nadia's lab and waiting periods for the equilibration of Karen's samples disrupted the schedule. With Nadia, I used the promising new technology of supercritical fluid extraction (SFE) in the treatment or remediation of heavy metal contaminated soils. The main goal was to evaluate the extraction efficiency of SFE to remove copper from soil using thenoyltrifluoroacetone (tta) as the chelating agent. The focus was on extracting copper from two different types of soil at several conditions of pressure and temperature. Copper (II) nitrate was combined with the tta beforehand to form $\text{Cu}(\text{tta})_2$ and a measured amount is placed in a vessel. Pressurized pumps send supercritical (SC) carbon dioxide into the vessel where it dissolves the $\text{Cu}(\text{tta})_2$ and forms a chelate. Methanol is introduced to the system via a mixing tee when the pressure in the system is decreasing the further along the system you go. The lower pressure causes the $\text{Cu}(\text{tta})_2$ to fall out of solution with the carbon dioxide and into solution with the methanol. This solution is then collected in two traps at the end of the system to be analyzed later. Using a spectrophotometer, which gives me an absorbency reading, which correlates to a concentration of $\text{Cu}(\text{tta})_2$, I analyze the traps. The concentrations are taken from the standard calibration curve that I made earlier on. It is made using known concentrations of samples, which are then measured for their absorbency and then graphed. This then gives a visual correlation between absorbency and the concentration of copper(II)tta.



The anticipated results is that with increasing pressure, the density increases which increases the solubility which should result in a higher extraction efficiency but not enough runs have been conducted to make an accurate conclusion.

The final project I worked on was doing some research for a Canadian diamond mine company with Karen Graham. Sewage from BHP's Ekati™ Diamond mine, located 300km northeast of Yellowknife, was previously collected, treated, and discharged into Kodiak Lake. The discharge was observed to have an impact of increased algae growth and lowered oxygen levels in Kodiak Lake as early as 1997. The cause of this impact was believed to be due to increased phosphorus concentrations in the lake. To minimize the impact BHP Diamonds Inc. relocated the discharge of treated sewage to its processed kimberlite containment system. Kimberlite is a rare variety of ultrabasic igneous rock (a volcanic rock) and the formation of it results in a carrot-shaped pipe. The kimberlite was tested for the absorption of phosphate through batch experiments. Bottles containing different dosages of kimberlite and different standard solutions are used to evaluate the absorption capabilities of the kimberlite. The bottles were mixed in a custom-built tumbler for the equilibration time of two days in a temperature-controlled room.

The phosphate being tested for was orthophosphate because it was anticipated that the phosphate in the water from the wastewater treatment plant at Ekati™ is, for the most part, in the form of orthophosphate. The phosphate concentrations were determined using a combination of Pesulfate Digestion method using a hot plate and the Vanadomolybdophosphoric Acid Colorimetric (VAC) method. In the VAC method, a yellow acid is formed and the intensity of the yellow colour is proportional to the phosphate concentration. There are three different wavelengths, 400, 420, and 470nm, at which the intensity of the yellow colour can be determined. Because for the most part the absorbency readings from the samples using a spectrophotometer, fall into the 420nm category, it was used. A calibration curve is prepared for each wavelength and ultimately the concentration of the remaining phosphate in the samples is determined. This research will improve the understanding of future impacts and advantages of the addition of treated sewage to the processed kimberlite containment area.

To conclude, I thoroughly enjoyed working in all of the labs this summer and learned a great deal about engineering and how there are so many different areas to explore within a field. I enjoyed the WISEST social activities too as they gave me a chance to meet other people interested in the areas of science outside of a lab setting. I think the greatest benefit from this experience was having the chance to network and talk to people who have been in the position I am in now trying to decide what I want to do later with my life and knowing that I don't have to decide now and that I will know when I know and that it's normal. I think the biggest impression I will take away from the WISEST program about research is that it is a time-consuming profession and that you must always expect the impossible to happen. All in all, a very rewarding summer.

Emily Penny

Department of Civil & Environmental Engineering

Working through the WISEST summer research program I spent six weeks of my summer working in the Geotechnical Engineering Group with Dr. Irene Meglis. Geotechnical Engineering? That's what I thought at first too. Geotechnical Engineering is engineering involving dirt, sand, clay, etc. Geotechnical Engineers test these materials and define the properties (i.e. strength, thickness, etc.) of these materials and mixtures involving the materials. It's actually really interesting and plus you get to play in the mud all day.

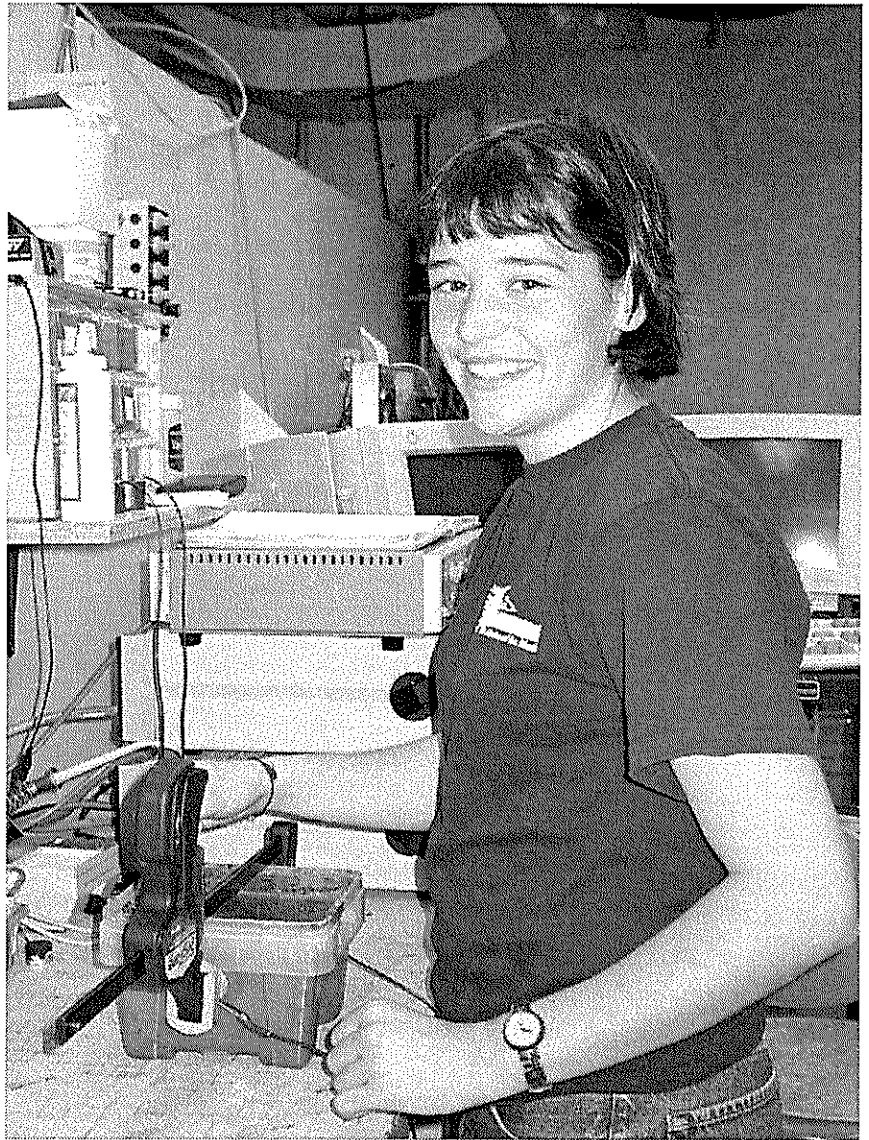
My project mainly involved oilsand tailings. Oilsand tailings are the byproducts of oilsand refinery; they are pretty much whatever is left over after the oil is taken out. The tailings are different mixtures of clay, silt, sand and some larger particles like gravel. Particles such as silt and clay are called fines; the rest is usually called sands. I tested six different mixtures of different concentrations of fines and sands.

I tested the tailings mixtures by using two transducers, that I built myself, the first to send ultrasonic pulses through the mixtures and the second to receive the pulse on the other end. Each of the transducers contains a small sensor; this sensor is a small disc of crystal that has gold foil on each of its ends. When these sensors are jolted with an electrical pulse, they jump and create high frequency or ultrasonic waves and vice versa. I used two oscilloscopes to collect the electrical pulses that were created when the electromagnetic pulses or signals that traveled through the mixture were received by the receiver transducer. Both the frequency and amplitude of the collected wave or waveform depended on the concentrations of fines and sands in each of the mixtures.

"This research is really exciting, because it has never been done before with such direct applications to field use."

Another project I was involved in was helping design an apparatus that will allow the oilsand refiners (such as Syncrude) to test the properties of the mixtures they are holding in their tailings ponds.

This research is really exciting, because it has never been done before with such direct applications to field use.



When I began working almost six weeks ago, I didn't know what a Geotechnical Engineer did or why anyone cared about oilsand tailings. But the WISEST program gave me the opportunity to learn these things and so much more.

Through the WISEST summer research program I learned so much about not only my field of research, but also my own interests and goals. I have always been interested in science, but not always engineering. Now I know enough about many careers in both fields and will be able to make a completely informed decision when I decide on a career. After speaking with many people who work in a lab environment, I now also know whether I would enjoy working in a lab in another discipline. It was also really great to meet people who could share any wisdom they had about University overall. I learned so much about what's in store for me in a year. The WISEST program really made me aware of the options that are out there for me if I decide to go into science.

Overall, I have to say participating in the WISEST summer research program is by far the best summer job I could have asked for.

Faruga Ladha

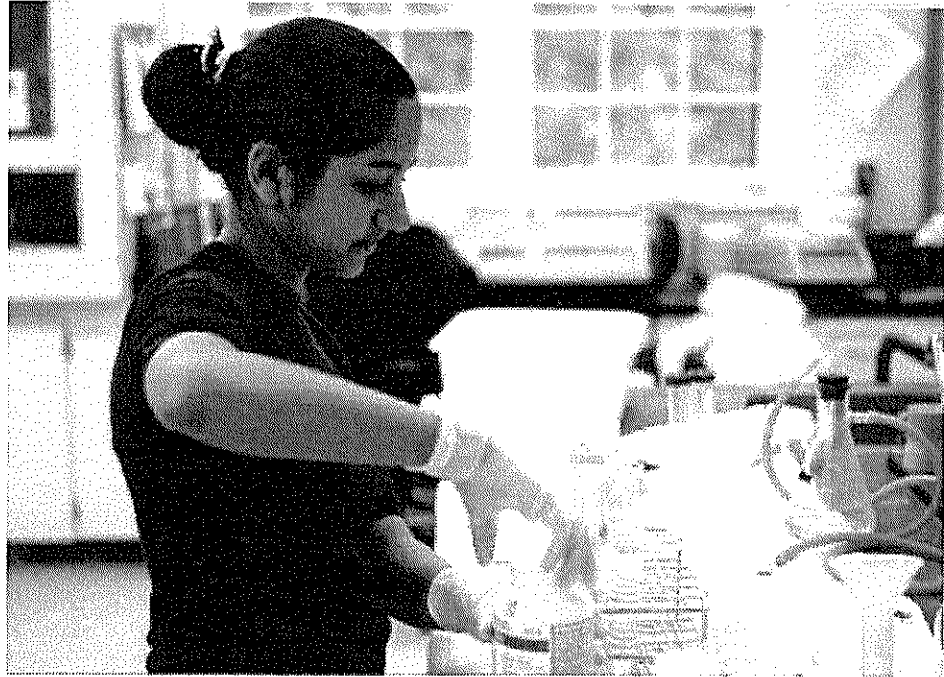
Meanook Biological Research Station

Participating in the WISEST Program enabled me to gain a better knowledge about the research opportunities that exist in the field of science. I had the privilege of being one of the two students to work and live on-site at the Meanook Biological Research Station. This research station, situated on a National Wildlife Area 15 km south of Athabasca, is an ecological research center for the University of Alberta. Under the guidance of the station manager, Kate Murie, and the station director, Dr. Ellie Prepas, I worked in the chemistry lab on limnology. Limnology is "the study of fresh or saline waters which are contained within continental boundaries."

At Meanook I worked on two interesting projects. The first is designed to compare the effects of logging and fire on the nutrients in boreal streams. By doing so, researchers hope to find a way to make man-made disturbances ie. logging similar to natural occurrences like fires to minimize any unnatural shifts in the environment. For this project, water samples were delivered to the lab each week from areas that have been logged or have undergone forest fires. I then filtered these samples and analyze their chemical compounds. I also determined the samples' pH, carbonate, conductivity levels as well as the masses of total dissolved solids and nonfilterable residue in specific volumes of the samples. The analysis of the phosphorous levels required a long series of steps to be followed. First, samples of whole water and filtered water had to be poured into phosphorous tubes. After potassium sulfate was added to the samples, they endured high temperatures and pressures in the autoclave as a part of the digestion process. A reagent was then added to convert the phosphorous into a readable form. Finally, the samples were read on a spectrophotometer in which a beam of light passes through the sample. If the sample is too cloudy, it is placed in the centrifuge for several minutes prior to being read.

For my second project I was researching the way in which the levels of nitrogen and phosphorous compounds change over time in water samples as they are subjected to naturally changing temperatures. This project required me to take samples of water everyday and test them just as the fire/logging water samples were tested.

Although working at Meanook prevented me from participating in the weekly WISEST sessions because I followed a ten-day working shift, living there had many advantages and provided me with exciting opportunities. For instance, I had the unique opportunity to explore field biology in addition to laboratory research. On one such occasion, I went out with two field biologists to collect water samples from Delorme Lake, which lies in the forests that were destroyed by the recent fire. Some sites from which water is collected can only be reached by helicopter due to dense boreal forest. Treacherous muddy paths can only be navigated by quads, four-wheeled trekkers.



Following an hour and a half drive, I was able to ride on a quad out to the lake. This exhilarating experience included fast bumpy rides through mud puddles. At times, we had to saw our way through trees that had fallen on the path. There were numerous times when the quad, and I for that matter, got stuck up to my knees in mud and muskeg. We also endured having to row across the lake with one oar (as the other was lost in the water) and walking through waist high grass and stinging nettle (which really hurts if you touch it with your bare skin, as I did). Without the WISEST Program I would have never been able to get so dirty but have so much fun while researching a possible career option. Living at MBRS allowed me to meet researchers and university students from all over the world. For the first three weeks, there were only nine Meanook inhabitants. Thus, we formed a close-knit community, and I learned all about bird research from the three birders. I even got to accompany them as they banded two baby Redstart chicks and caught and banded their fearful mother. The natural surroundings of Meanook are simply breathtaking! Where else could I have ever seen a Great Grey owl in the wild?

Although at times life seemed kind of isolated, there was much to do. Our visits to Athabasca, for the Athabasca Fringe, for example, and our berry picking excursions helped me to enjoy my stay at Meanook. We would regularly rent movies and have our own parties with cookies, pies, and homemade fudge. The last three weeks at Meanook proved to be exciting as 21 Jamaicans stayed at the station while attending Athabasca University for computer science courses. Living at Meanook taught me independence and allowed me to create new friendships while learning about other careers in biology.

My experience at Meanook taught me many things about research. I learned about the flexibility of the profession but also about the long hours required when over a hundred water samples need to be filtered within 24 hours of their arrival. Lab work involves much repetition, making it tedious at times. However, I was able to learn good lab practice which will be useful in university. This valuable program enabled me to explore my career options, gave me a glimpse of the field of biology, and proved to be the most worthwhile experience of my life.

Gillian CORNES

Department of Biological Sciences

How do I start? I had such a cool job and an awesome summer that there's no way I could tell every story!

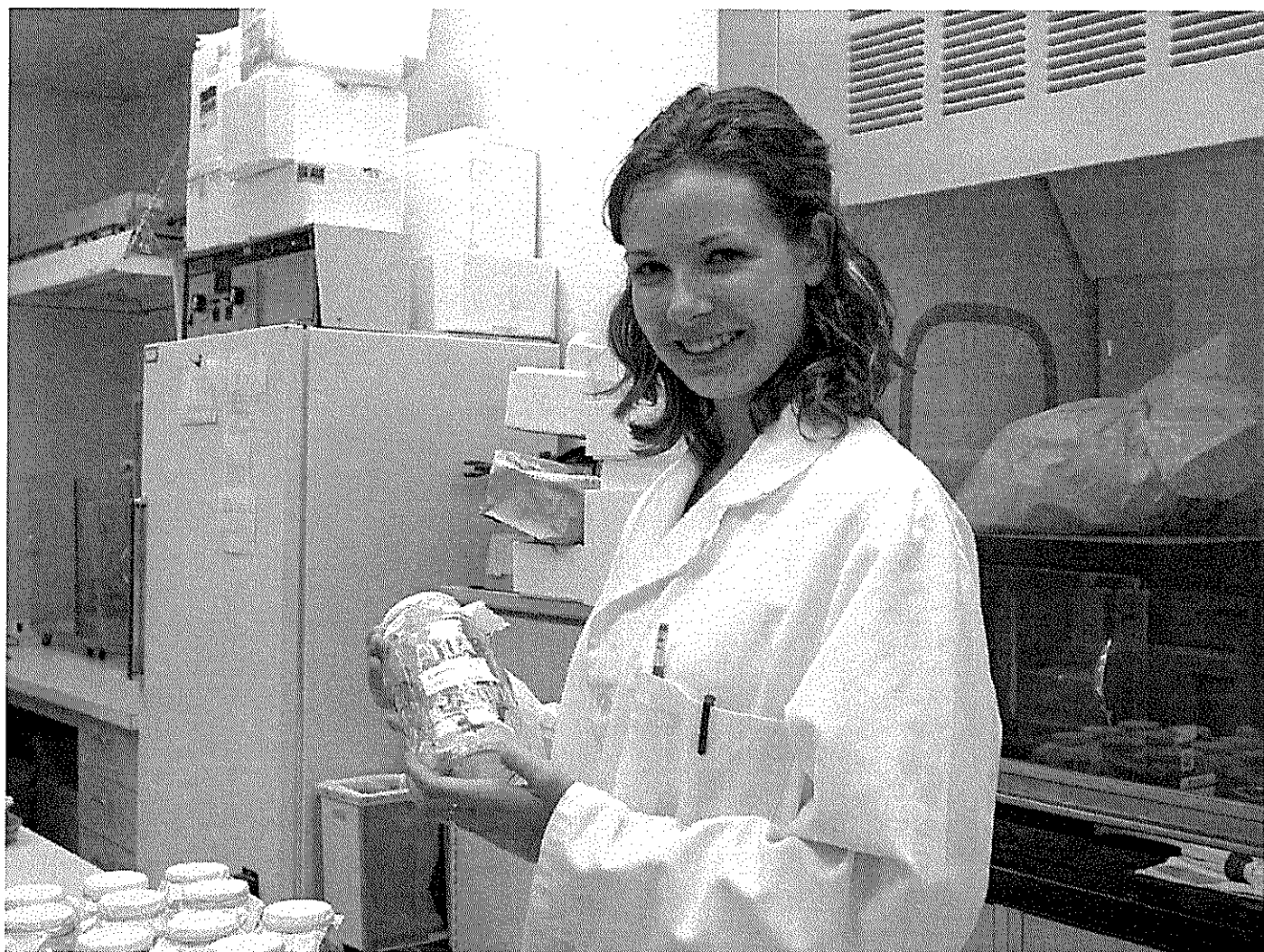
I first learned about the WISEST program through an older friend that enrolled when she finished her grade 11 year. Hearing her talk about her amazing experiences convinced me to check it out for myself. The more I read the more I realized that the program would be perfect for me. Interested in science and curious about university I would get the opportunity to occupy myself for the summer and find out exactly whether or not a career in science would be suitable for me.

When I got to CAB on the first day I was pretty nervous, considering that I was the only one from Onoway and that I wouldn't know anybody. After about 10 minutes that all changed with Haley and Kirsten's get-to-know-everybody-in-half-an-hour games! Forty-six names all at once was quite an experience! I found other people that were in the same situation as I was and also people that knew quite a few people in the program. After everybody had been introduced we listened to speakers talk about how the next six weeks of our summers would be spent. I thought "SIX WEEKS! That's practically my whole summer!"

As I think back now I can't believe how fast it went. Where did all the time go?

Working in under Dr. Andrew Keddie's supervision, along with Josh and Sunil (fellow students getting in some experience for their courses) was awesome. Listening to Josh talk as fast as a energetic kid after his usual caffeine fix was hilarious, Sunil asking me "trivia questions" filled me with knowledge that I didn't think anyone but Sunil knew kept me on my toes, and watching Dr. Keddie get extremely enthusiastic over blood cells that made cool shapes was entertaining.

"I only wish there was
a WISEST for my next summer!"



All of this on top of having the opportunity to aid in the research of pathogenic bacteria in insects, getting to work in a level 2 biohazard laboratory, learning techniques (such as culturing bacteria, Gram staining and general laboratory etiquette) that I will need to use in first year university and getting a taste of what university life will be like.

Wednesday afternoon activities that were planned by the WISEST co-ordinators (Grace, Haley and Kirsten) kicked butt! They included the kind of information that you wouldn't be able to get any other way. Bringing in speakers almost every week to talk about everything from their current jobs to university life really helped everyone learn what university was all about, and what life was like after school. I know that I benefited immensely from these sessions.

So, as you can see WISEST is an amazing program. Meeting almost 50 new friends, getting a taste of university, and learning valuable information not only gives me an edge for first year university, but also made my vacation unforgettable. I only wish there was a WISEST for my next summer!

Jagreet Uppal

Department of Earth & Atmospheric Sciences

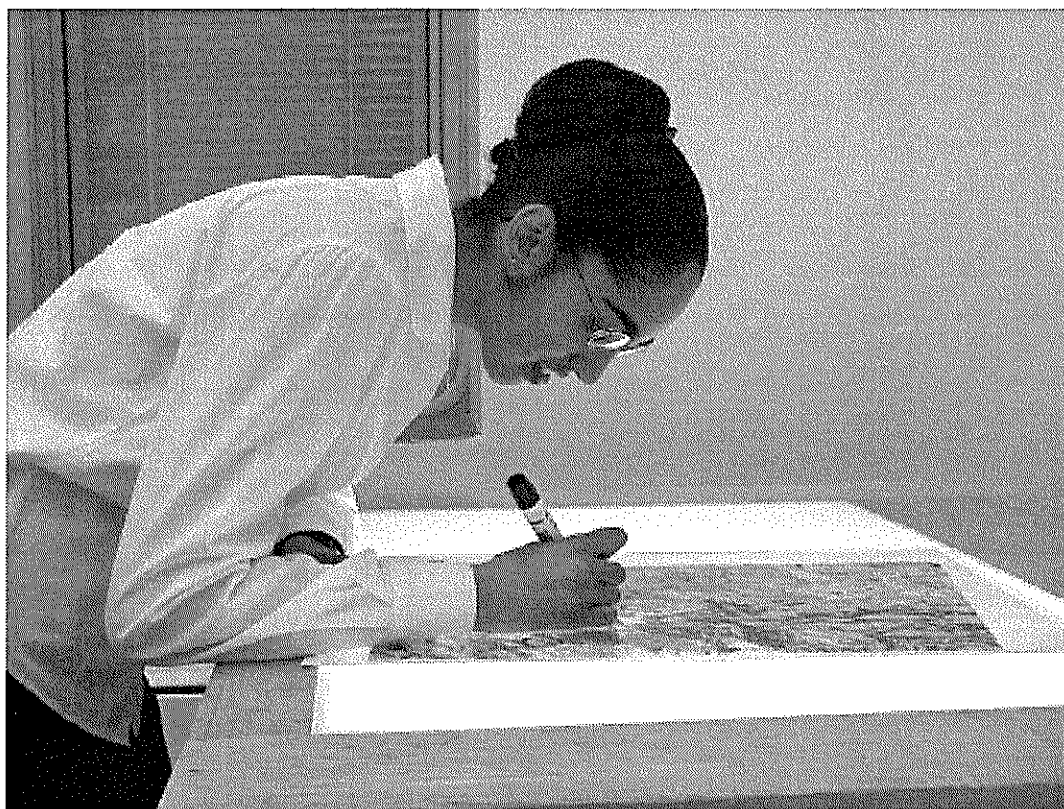
This summer I had an opportunity to work in the department of Earth and Atmospheric Sciences. The six weeks that I spent in the WISEST program were not comparable to any other summer. There was a great deal to experience and learn. My first day of the program started two days earlier than the other WISEST students because of my supervisor leaving for a conference in India. I was nervous for the fact that I was the only student there but also excited to know who I would work with and what research I would be doing. Although I couldn't find my way across campus for the first few days, the numerous buildings surrounded by a beautiful scenic landscape astounded me. The building I worked in was the Tory Building which is the tallest building on campus. Dr. Arturo Sanchez and my lab supervisors, Margaret Kalacska and Sheri Foley, were extremely generous and offered a tremendous amount of support. In fact, working with them and the rest of the research team made me feel very privileged.

Throughout my six weeks that I spent in the Earth Observations Systems Laboratory, I worked on various projects, which were all involved in remote sensing. There were two projects in particular that I mainly worked on which I will summarize below.

During the first part of my research, I worked on classifying four images from Santa Rosa National Park, which is in Costa Rica. The images were from January 2000, January 2001, March 2001, and April 2001. By using the method of classification, I was able to classify all four images into either forest or non-forest. The purpose of this classification is to extract only the forest areas in Santa Rosa National Park. The results led me to conclude that: a.) the park has greater forest area during the wet season than the dry season b.) there is a very slight change in forest area from year to year and c.) there is a difference of approximately 2800 hectares of forest area between the months of March 2001 and April 2001. My poster project was based on this part of my research work.

The second part of my research involved working with several images of Costa Rica. These images consist of eight forest images and eight non-forest images. The research work behind these images is to extract two hundred points from each image. The purpose of this is that the values of the random points can be used for statistical analysis.

"I discussed issues about making career choices
with role models."



Most of my research work was done on the computer in order to work on the images. Besides the actual research that I performed in the lab, I had an opportunity to attend a conference. The conference gave me a different perspective to the lab experience which I really enjoyed being a part of. The conference was by a representative from the Canadian Centre for Remote Sensing. It also gave me a chance to see how information regarding research is exchanged with people working in a lab. On several occasions, I ate lunch with the lab members and experienced a social perspective of doing research. One thing I learned was that it is important to have fun. Research can be time consuming but it is an essential part of science.

To bring this report to a close, I would like to emphasize once again how much I enjoyed working in Dr. Sanchez's lab, in Earth and Atmospheric Sciences. I had a wonderful chance to experience how research is done in a lab, or in any other lab. The WISEST program overall was a great opportunity for me to expand my research knowledge of science and engineering. Not only do I know quite a bit about my research lab, but I also had a chance to visit other labs on campus. I also discussed issues about making career choices with role models from various other fields. The many social events and group activities were very well organized. I met many students from a variety of schools and cities who were all inspired by science and or engineering. Towards the end of the program, I was quite familiar with the University campus and the many facilities that are available.

Generally speaking, I was extremely satisfied with having participated in the WISEST program. The six weeks that I spent in Dr. Sanchez's lab were a very valuable experience.

Jamil Jannmohamed

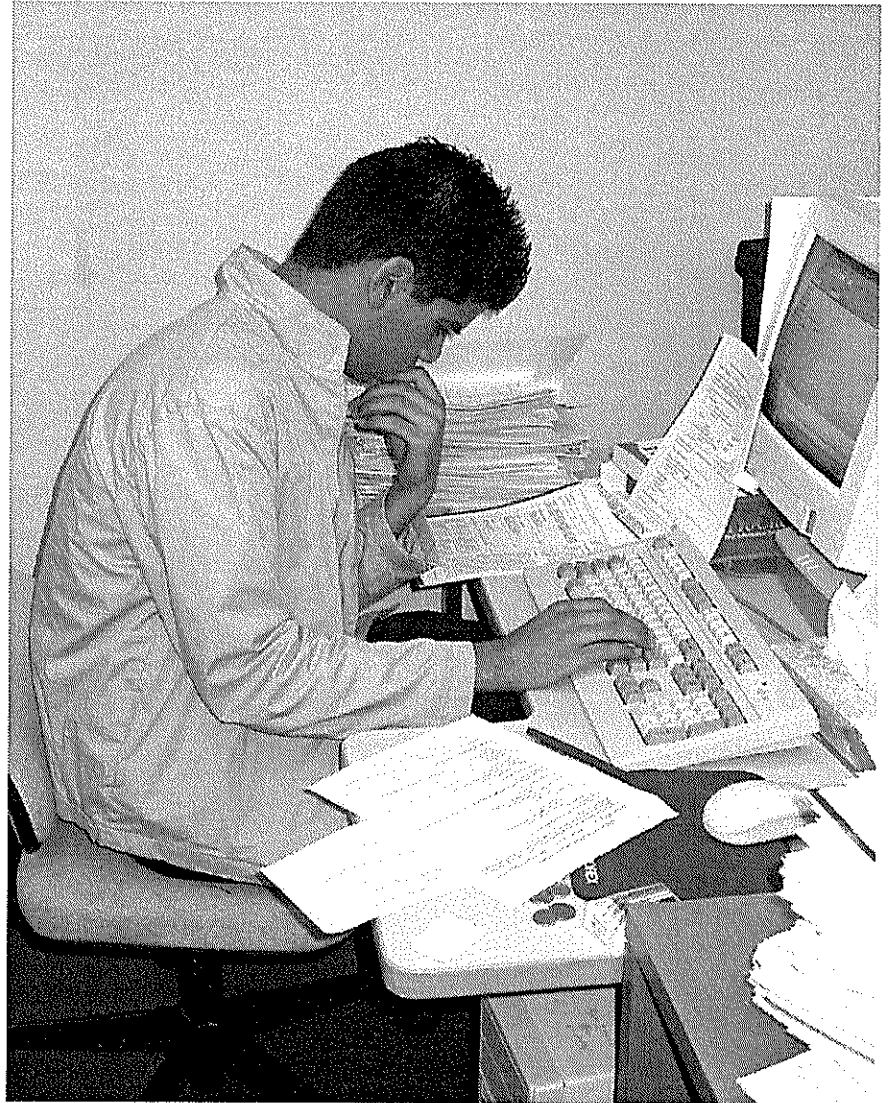
Faculty of Nursing

Coming into the WISEST program, at first I felt somewhat nervous about being able to perform the tasks that were asked of me. However, after the first week of attending the program, I realized that the level of consideration put into my summer experience by both the WISEST co-ordinators and the supervisors of the research project ensured my successful participation. The six-week experience of the WISEST Program has been quite a valuable experience for myself as I feel that the program has drastically expanded my knowledge base about university life. Seemingly, the most important reason for this is that by working on campus with members of faculty, the opportunity arose in which I was able to ask any questions I had about the University of Alberta and universities across Canada in general. This knowledge base which I had access to was quite expansive as I worked with Dr. Olive Yonge, who has and does play a large role in many University of Alberta programs. Along with learning about the basics of what a university experience is, I learned about other disciplines which I had never considered to be possible fields of study for myself. Coming into the program wishing to only pursue a career in medicine, I came out of the program with new information about possible career choices for myself. This new information came from both the field trips and activities arranged by the WISEST Program, and the meetings arranged by my supervisors. They felt that I should witness many of the different fields of nursing that a nursing student could choose as an occupation. These firsthand encounters opened my eyes to a whole new aspect of the health sciences. They also arranged other non-nursing related activities such as arrangements involving the field of engineering and also experiences with the international students at the International Centre.

The research project itself taught me a great deal in that I was exposed to nursing research, and I was introduced to the vast amount that goes on with each field. The research project was a systematic review of nursing education research. Essentially, we attempted to gather as many articles from journals as we possibly could that pertained to our study. Next, members of the research team reviewed each article and decided if the article was fit to be included in the study.

"I also experienced being a gender minority myself in the field of nursing."

Lastly, it was sent to us (my partner, Vikram and I), and our main work would begin. Following the basic guidelines given to us by our supervisors, Vikram and I entered (or attempted to) as many articles as we could. This often would involve reading entire articles, but most often involve a quick reading of the article's main points of interest (to the researchers). We would then summarize the article and designate keywords that describe the subject of the article and various other aspects of the article. This information was entered to a computer and the program Procite®, which could later be used as a search engine for nursing students to use for a source of nursing information. However, the main objective was a statistical analysis of the articles, and trend analysis of various aspects of the articles.



The job was essentially data entry, however, it was made interesting through working with a partner, and also by the content of the articles which often being thought-provoking. Being exposed to this type research helped me become familiar with obtaining information from articles and journals, which is a skill that will prove valuable when I attend university.

Another positive aspect of the WISEST program was the whole experience of being one of four males in a large group of females. This experience made me more aware of the stresses and pressures felt by females in fields of occupation mainly dominated by males. I also experienced being a gender minority myself in the field of nursing, however, my experience was very pleasant, as I never felt uncomfortable when I went to work.

Essentially, I feel that this program has been a great experience to me as I have learnt a great deal about the post-secondary experience along with having some fun while making new friends and earning some money to save up for university. The experience has left me with everlasting knowledge and friendships with fellow participants and my supervisors alike. I would like to take this opportunity to thank my supervisors and those involved with organizing and implementing the WISEST program, for the excellent experience.

Jennifer de Vries

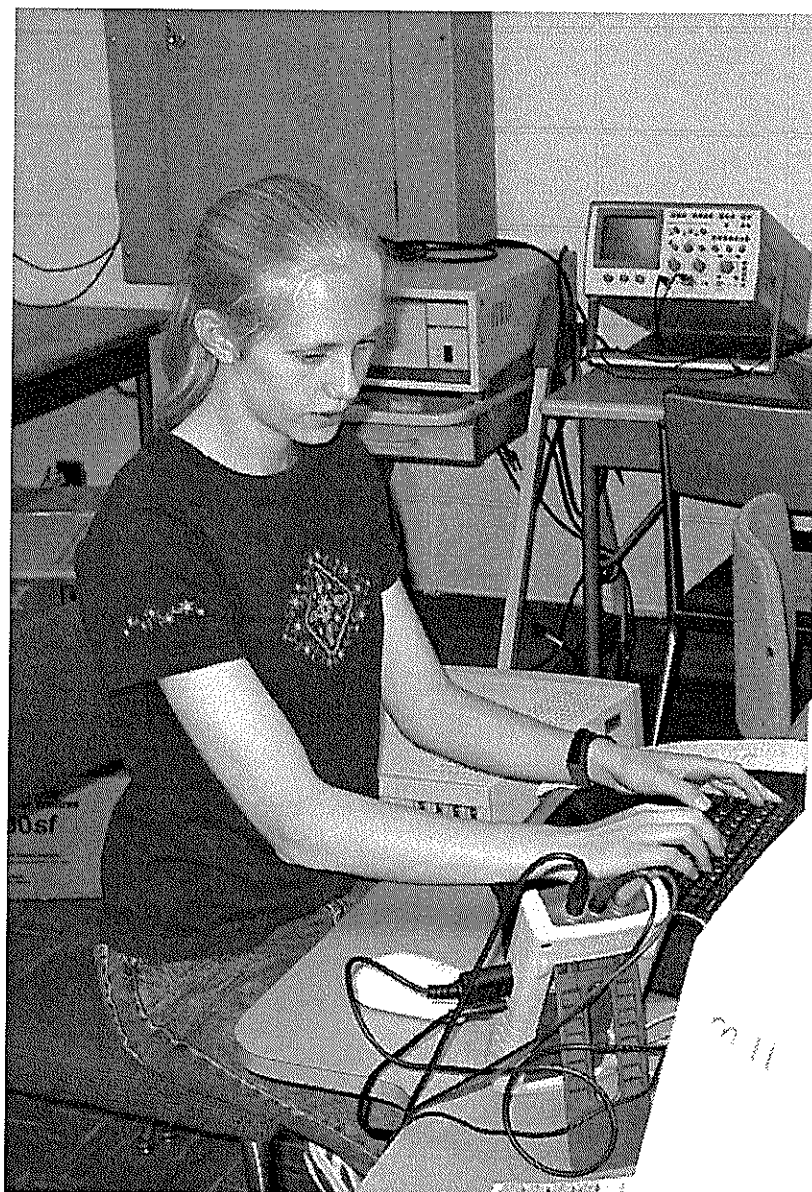
Department of Electrical & Computer Engineering

When I found out about the WISEST Summer Research Program, I thought that six weeks of working at the University of Alberta would be a pretty long time. But here I am, writing this report already. This summer I have had the wonderful opportunity to discover the many aspects of science and its real-world applications, as well as meeting many other students with similar interests.

When I learned that I was accepted to the program, I was really excited about it, but also very nervous because I would be challenged in many ways. I would have the chance to meet new people, and learn new things. I would also have to leave my home in Calgary and try to get used to the work environment in a university research lab. In school I have always liked math and science, but I never knew exactly how these areas are used in the workplace. Now I have a better idea of how people use science to solve problems that affect everyone. I didn't know what to expect from the lab experience. Some of my thoughts were, I've only finished grade eleven, how can I contribute in a university lab? But with the help of my supervisors, I did contribute to their research project.

I was placed in the field of Electrical Engineering in the lab of Dr. Wilsun Xu. The project here is working for the oil and gas industry on their electrical systems, so that the operating performance of some equipment will be improved by reducing the distortion in the voltage and current. Reduction of the distortion will also prevent damage to some electrical equipment and reduce telephone interference. The research team is looking to improve power quality by reducing the number of harmonics in the voltage and current waveforms. Harmonics are various other frequencies that distort the fundamental current. Harmonics will always exist, but they can be minimized. In order to minimize distortion, filters need to be made, but to make effective filters the size of the harmonics must be known. So, under the supervision of Tarek Kandil and Emad Ahmed, I took measurements of the voltage and current of many computers, as well as their harmonics. This is some of the preliminary work for an experiment that will take place in the new building, where they have more room. Other people in the lab can eventually apply this information to create filters for the oil and gas industry. All of this is good for the oil and gas industry, but it will also help for the computer industry, as harmonics cause lots of problems in PC's as well. Electrical heat and noise are just a few of these problems that need to be and will be solved with the reduction of harmonics.

All this sounds pretty serious, but there was more to the program than the lab work. The informal part was just as rewarding. I had fun on our social activities, which included the Odyssium, Shakespeare in the Park and bowling. I enjoyed the Wednesday afternoon sessions, where we got lots of good advice from other women, and learned about other areas of science and engineering on our tours. I really appreciated being able to talk to women who are in science and engineering, and learning about some of the struggles and rewards that they have faced. I was also able to meet many new people who have the same interests as me.



This summer was a fun and unforgettable time where I had the chance to learn a lot about my future career. Dr. Xu and his team were very welcoming, and made me feel like a part of the team. I came all the way from Calgary because this program is very unique in the opportunity it gives to high school girls. After all, how many people can say that they worked in a university lab for their summer job when they were in high school? This summer I've met forty-one girls and four boys who can!

"Now I have a better idea of
how people use science to solve problems that
affect everyone!"

Jessica Mueller

Department of Civil & Environmental Engineering

I wasn't really sure of what all to expect when I left home to come to the WISEST Summer Research Program. All of my friends had excellent summer plans but my plans didn't seem to be nearly as exciting. This was all to change as the six weeks elapsed and I realized my summer was the best summer anyone could experience.

On the first day I was very nervous. I wasn't sure what a research project in the Civil Engineering Department would have in store for me. I knew there would not be any cool chemicals, lab coats or safety goggles to play with but what I discovered was a world far from anything I had ever experienced.

I arrived at my lab nervous to meet my supervisors, Mohamed Al-Hussein, Susan Keaton, and Robert Langevine, who all work under the head of my department, Simaan AbouRizk. The next few days went by rather quickly, with meeting many new people and trying to learn all the ins and outs of the ongoing research project that I was expected to contribute to.

The project that I worked on for the six-week duration is the Facilities Management project being conducted for the City of Edmonton. This is a project that deals with analyzing city owned buildings to eventually come up with a Decision Support System for the Maintenance Management of these city buildings. This will eventually assist city engineers and facility managers to make better maintenance choices. My job on this project was to help to gather and present data so that it can be used eventually in a neural network program to be able to predict the amount of maintenance that needs to be put into a specific building each year.

"My six weeks of summer 'vacation' are a time
that I will never forget."

This may sound rather enduring but due to the WISEST weekly activities stress levels were easily reduced. Wednesdays were always a day to look forward to, because this was our day to unwind with activities planned by Kirsten and Haley. These consisted of very useful tours and group discussions with women in science related fields. WISEST students also hung out together at various activities such as the excellent evening of Shakespeare in the Park, the interesting new Space and Science Center and bowling at Red's. Without these activities I wouldn't have had the chance to meet



Then on top of all of the wonderful and exciting experiences that I had, I received the opportunity to add one more to the list. This was due to the fact that I stayed at the St. John's Institute for the duration of the six weeks. When I arrived at St. John's I wasn't really sure what to expect but it was a wonderful experience to prepare me for university. I shared a room with another WISEST student and the residence with 7 other WISEST students. By the end of the six weeks the 9 of us had grown together as a group of close friends. We spent much of our time together up till late, hanging out with other residents and shopping. Staying at St. John's helped me make an informed decision of where to stay during university. I now highly recommend staying in residence because the people, food and atmosphere are great at the St. John's Institute.

My six weeks of summer "vacation" are a time that I will never forget. It is a much fonder experience than the one I would have had at home sitting on the couch doing nothing. The WISEST Summer Research Program was an excellent chance for me to experience the life of a university student first hand and become that much more excited and looking forward to attending university in just one short year.

Jocelyn Sprinkle

Department of Chemical & Materials Engineering

This summer has been one I will not soon forget. I gave up my lazy summer days of sleeping in and wearing my pyjamas all day to participate in the WISEST Summer Research Program. I went into it not really knowing what to expect, just knowing that it was a paying job that had something to do with engineering. I'll tell you what I found though. I found a bunch of new friends, including the other participants and the coordinators. I found an awesome opportunity to learn about what really goes on in a research lab, and what engineers actually do. I also found out that WISEST was such a great experience, it was completely worth giving up all those sunshiney (and some rainy) days to be indoors in a research lab.

I was placed in the Department of Materials Engineering, or as I soon found out, Mat E. I worked as a part of Dr. Dongyang Li's research team directly under the guidance of Qiang Chen. Also working in my lab were post-docs, graduate students and another WISEST student, Cindy Lee. My project consisted of testing aluminum for erosion rates by blasting sand at samples from different impact angles. To prepare the samples for testing, they first had to be polished. This was a very time-consuming and tedious activity. However it was essential to observing the changes made to the surface by the sand. Next came the fun part! In using the sandblasting machine, the amount of sand was kept constant, as was the pressure. However the pressure also became a manipulated variable as I did more testing.

"I also found out that WISEST was such a great experience, it was completely worth giving up all those sunshiney (and some rainy) days to be indoors in a research lab."



Working in a research lab has been a new experience for me. For one it was my first full-time job and I found out just how difficult it is rising at the crack of dawn in the summertime in order to get to work on time. Also, up until now, I have been used to being placed in highly structured environments, like school. Yet, I found myself in a completely laid-back atmosphere where people work at their own pace and are not constantly supervised. It was a very different experience in that aspect, but one of the best things was not having to ask to go to the bathroom.

As I look back on WISEST, the thing that sticks out most in my mind, besides all the new people I have met, is the Wednesday afternoon activities. Some of those activities were small-group discussions, tours of research labs, and of course, the Lack of Yield Games. To me these were some of my most valuable moments of WISEST. These were the times where I learned the most about what interested me, but also the times where the friendships I made were cemented.

In conclusion, I have thoroughly enjoyed the WISEST program and would definitely recommend it to other girls with an interest in science or engineering. From WISEST I learned a lot about engineering, research and university in general. It has peaked my interest in engineering and given me a better sense of my goals for my life. WISEST has been an extremely valuable and unforgettable experience for me.

Karen Ensslen

Department of Civil & Environmental Engineering

After anxiously awaiting word, the big day came at the end of May. I had been selected as a summer research student in geotechnical engineering. My first job ever, and I got flexible hours, relaxing Wednesday afternoon activities, and, yes, even paycheques. The title of my project was announced to me as Freeze Separation and Nutrient Extraction of Hog Manure- what did that mean? I had no clue, but plenty of apprehensions.

The project involved freezing hog barn wash water, a mixture of about 98% water and 2% manure solids, which is gathered when cleaning barns. As the hog barn wash water freezes, solids settle out to the bottom. A freezing front advances downward because of the cool ambient air temperature in the freezer. When freezing occurs slowly, the strong crystal structure of the freezing ice forces out solutes. This results in a layer of hog barn wash water that is divided into 3 sublayers: relatively pure ice, a concentrated solution of the expelled solutes, and settled solids. After a layer of hog barn wash water has frozen for 24 hours, a new layer is frozen above it.

The purpose of all these strange procedures is to solve an increasingly widescale problem. Hog farms in Canada are growing larger, and over the last 20 years, management of the huge volumes of manure they produce has become difficult. When the average farm produces 1.15×10^6 kg of manure yearly, it is no longer possible to simply lay their manure on the fields every spring and fall.

The solution that is proposed by my research team involves separating the hog barn wash water into its reusable components, using our freeze-separation method. Dr. K. Biggar and Dr. D. Sego advise one undergraduate student, Amanda Willoughby, on the project.

"Engineers are problem solvers who use diverse methods of achieving results."

They hope that the concentrated solution of excluded solutes, referred to as thaw fluid, will be an excellent fertilizer. The ice, when melted, would be used as washing water for barns, and the settled solids would be suitable for composting material.

Preliminary results have been positive. We have noted a 6-fold increase in the dissolved organic content from the hog barn wash water to the thaw fluid. Ammonia levels also increased 3-fold. The electrical conductivity of the remaining ice water further indicates nearly complete solute exclusion (i.e. a success).

The experience of working in lab has taught me a great deal about engineering and research in general. First of all, engineering is not about math. Engineers are problem solvers who use diverse methods of achieving results. While I expected to spend my summer performing calculations, instead I spent it building an apparatus with power tools.

The second thing I learned is that research never goes as well as planned. Our apparatus did not take the two days we expected to build, but rather over two weeks. If something bad could happen it often would. Researchers must take initiative and often are forced into dreaming up creative solutions to cope with problems.

I truly enjoyed my lab environment, despite knowing that women were an obscure minority in it. Working with both grad and undergrad students gave me a real perspective of the life of a student. The excitement of that first day in May has carried through my six-week experience.

WISEST has given me wonderful opportunities to understand the source of scientific information, not to mention a few chances to play children's games with a science twist. This summer I had fun working.



Karen Ma

Department of Cell Biology

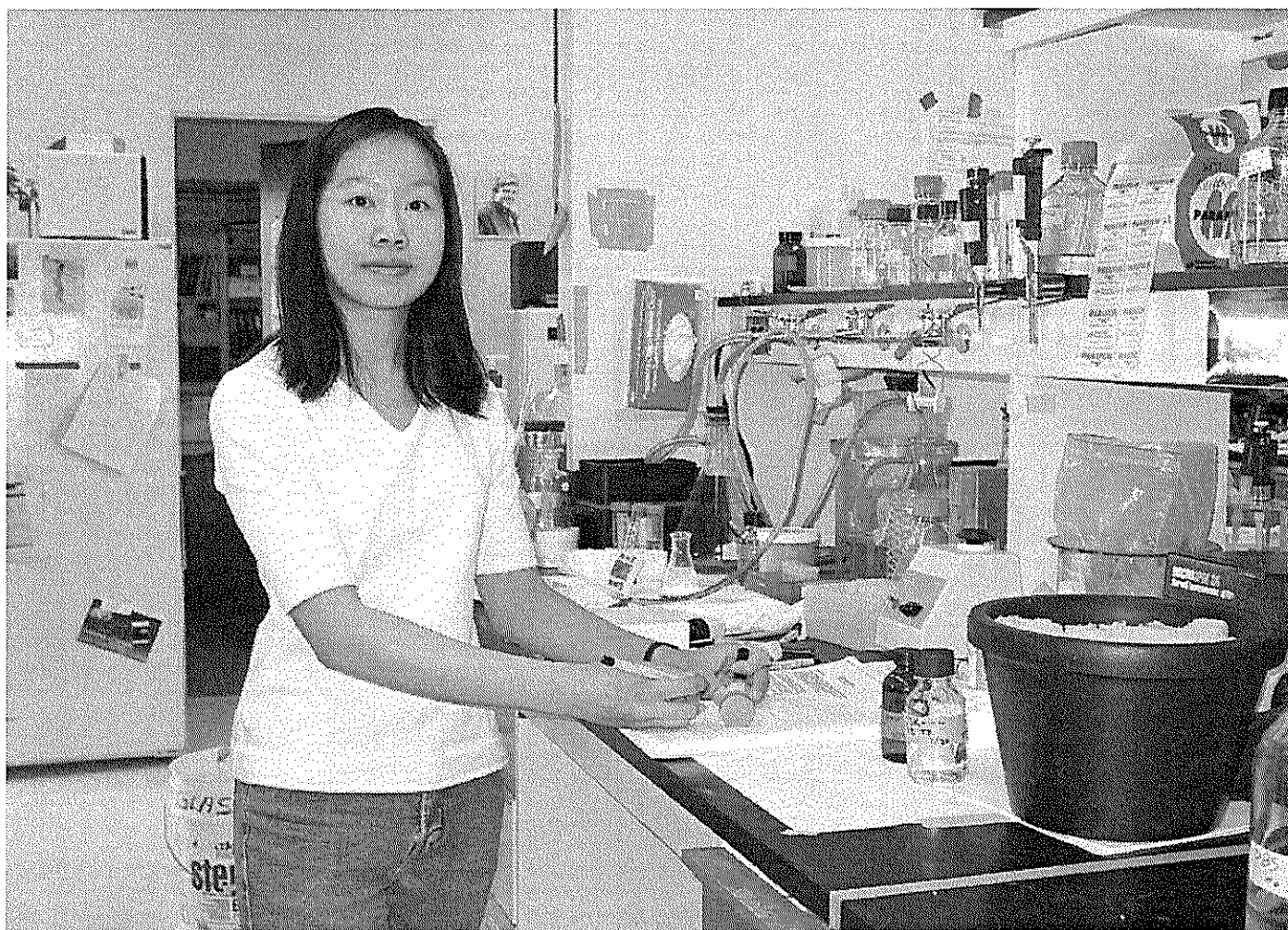
One of the major highlights of my summer involved working at the University of Alberta in the Department of Cell Biology, with Dr. Manijeh Pasdar, Annissa Wong, Jodi Backer, and Dr. Laiji Li. As one of the WISEST participants, I was privileged to be able to get a head start in experiencing university life. First of all, the campus tours helped me feel more comfortable around the university and it was a very informative addition to my WISEST experience. But most importantly, it was the laboratory practices that helped me get a taste of a career in cell biology research. Prior to my involvement in WISEST, I was thinking about a potential career in the research field, but I wanted the hands-on practice before I was to commit myself to the professional work field on a long term basis. Working with Dr. Pasdar and the other research team members, particularly my supervisor Annissa Wong, gave me the necessary hands-on experience.

During my six weeks at Dr. Pasdar's laboratory, I was assigned my own project that involved the investigation of five different cell lines, MCF 10A, MCF 7, SKBR-3, BT 20, and MDA 231, which were specifically obtained from female human mammary glands. I examined the various types of cell adhesion proteins expressed in each of the cell lines, their extent of expression, and the location of these proteins, by preparing slides for each of the five cell lines and taking immunofluorescence photographs of them, to observe the various proteins.

I began my project with the cells in petri dishes and allowed them to grow and multiply. During my first week, I had learned many important processes like changing the media (a substitute for blood), trypsinization, counting cells, cell fixation techniques, primary and secondary antibody processes, and many others.

As the weeks progressed, I learned how to take phase photographs of my cells, and perform Western blotting. In addition, I was able to learn how to use sophisticated equipment like precision pipettes, centrifuges, immunofluorescence imaging with a microscope and a computer, a haemocytometer for counting cells, and operating a running and transfer chamber.

"It was a unique experience for me..."



Apart from the laboratory work, I was able to participate in several weekly lab meetings with my research team, in which a research paper presentation was prepared by one of the members of the research team, followed by a discussion relating to work progress and other important matters. I realized that the value of these discussions were significant in maintaining a focus between lab members.

Through my participation in WISEST, I was able to hone and foster my work habits, which will likely help me when I proceed into post-secondary education. I believe that my lab experience with Dr. Pasdar will benefit me in my grade 12 year, and beyond, particularly if I choose to pursue a career in the science field, because I have learned the precision and care that is required when working in a laboratory. It was a unique experience for me, because working in a university lab made me realize the importance of patience and discipline that is a crucial and integral part of the research field. I acquired the experience of what it is like to be a researcher, and learned a great deal about lab work, lab techniques and skills, and the specific research projects that occur in a cell biology lab.

Kate Chorna

Meanook Biological Research Station

My experience as a participant of WISEST this summer has definitely been one-of-a-kind. I can't say that it was what I expected mainly because when I first found out that I was accepted into the program I did not know what to expect. Coming to WISEST, I had in my mind a tentative picture of what a biologist is and does. This six-week period has shattered and rebuilt most of that picture, so that I now have a clear view of what an individual working in this field does.

Being in WISEST has given me the opportunity to meet and work with many great people from several areas of field and laboratory biology. Their answers to my numerous questions and the many field trips that I went on are steering me along the right path towards choosing a career.

I had a wonderful time working at Meanook Biological Research Station this summer, and consider the WISEST experience an invaluable one. Not many people get to test the careers that they are interested in pursuing before actually entering university, and I am very glad that I did get a taste of life as a biologist before actually beginning my post-secondary studies.

Working at Meanook, I was given the opportunity to work both in the field and in a water chemistry laboratory. In the mornings I was responsible for managing the RANA (Researching Amphibian Numbers in Alberta) site located in one of the experimental ponds around the station. My duties included checking the traps for frogs, and recording the species, weight, snout-vent length, and if possible sex, of any frogs and toads that had fallen into the traps. I also had to make sure that the fencing and traps were in good repair.

Running the RANA project as well as going out with the birders to band chicks and with Devin and Lorraine to collect water samples gave me a small taste of field work. Being outdoors was wonderful and the sunshine and beauty of the woods were amazing. There was even a duck that hatched her four chicks at the RANA pond that I got to observe them growing up. On the flip side of the coin, there were the dead mice and shrews in the traps, mosquitoes and "face" flies constantly buzzing around, and the unpredictable weather, which were also part of the whole field experience.

"I had a wonderful time working at Meanook
Biological Research Station
this summer."



Despite my resulting mixed feelings about this career path, I still thought that all of my field experiences were extremely fun, especially riding quads and being stuck in the mud at Delorme Lake when we were collecting water samples.

On the other hand were my lab experiences in the afternoons. Working with Rachel Mount, Candace Jwaszco, Kate Murie, and fellow WISEST student Faruqa Ladha was loads of fun. We listened to great music, had some entertaining conversations, and the afternoons when acid baths were on the agenda, I spent some quality time contemplating the meaning of life. Laboratory work was interesting, especially when I first learned how to filter water samples and run all of the tests, like the one for phosphorous done on the spectrophotometer. The one thing about laboratory work that bothered me was its redundancy. After about the tenth rack of phosphorous, I was ready to quit. Despite the repetitiveness of having to run the same test over and over on each sample, in duplicate, lab work still had it's good moments. I was definitely glad to be inside during the hailstorm we had one day, and the routine of lab work was quite nice on days when thinking seemed to be extremely hard.

All in all I definitely have to say this has been an enjoyable and totally unforgettable six weeks. I met many great people and made new friends. Although I did not get to spend time with most other WISEST participants, I believe that my life at Meanook makes up for anything I missed. WISEST is a great program, and I hope that in years to come, more people will get to enjoy the same fun learning experience that forty-five other students and I had. There would be many people happier with their jobs if they had the opportunity that we got: to see if their dream careers are all they are cracked up to be.

Kayla Scanga

Department of Biological Sciences

This summer I spent six weeks in the Biological Sciences Building in Dr. David Cass's research laboratory. Being able to work in an actual real-life scientific lab was definitely an exceptional part of my summer. Also, I felt very fortunate and lucky to be working with Dr. Cass and other gifted scientists. They were extremely friendly and always there to help me answer any questions or problems that I had (which were quite a few). For six weeks I was immersed in the knowledge of Botany and I was taught by some of the smartest people I now know. How many people can say that about their summer?

I really enjoyed being able to work in a scientific lab. I was introduced to many scientific techniques, such as how to use a pipette, and I was introduced to many scientific machines, such as a centrifuge. No doubt, these skills and knowledge will definitely help me in the near future when I take courses at the U of A.

During my six weeks in the Department of Botany I worked mainly with Pamela Hall in trying to determine how different pH levels effect the amount of calcium found in the cytoplasm of the Maize (corn) sperm cells. I soon found out that it would take a longer time (for me at least) to be able to actually isolate the sperm cells then analyze them. Isolating the sperm cells involved building concentration gradients, using pipettes, using a centrifuge, handling dyes and different pH solutions, and using inverted fluorescence compound light microscopes. Using a control pH, a slightly acidic pH, and a slightly alkaline pH, Pam and I were able to observe how calcium in the cytoplasm of Maize sperm cells reacted in each pH solution. By analyzing images taken while using a fluorescence microscope we were able to consider and discuss the effects of pH on cytosolic calcium.

"It opened my eyes and mind to all the other possibilities and future careers that I could have in Science."

Besides working in the lab I was also able to share my experiences with many other students thanks to the WISEST Program. Through the WISEST Program I met many people who had similar interests to mine. I was able to learn about other aspects of Science and Engineering through the conversations I had with many of the other WISEST students. Also, because of the WISEST Program I was able to visit other labs, both an off campus Engineering research lab and an on campus Medical Science research lab, and I had a chance to meet and talk with people working in non-traditional gender roles. If it had not been for the WISEST Program I most likely would never have had the opportunity to participate in such events.



What I also really appreciated during my six weeks while working in a scientific lab and talking with other professors and scientists is that it opened my eyes and mind to all the other possibilities and future careers that I could have in Science. Being able to actually work at the U of A before going there for my studies allowed me to be introduced and even get experience in some areas of Science that I previously had not even known existed. Because I participated in the WISEST Summer Research Program this summer I am more aware of all the choices and opportunities that await me in the future.

Thank you to Dr. Cass, Pam Hall, Grace Hill-Rackette, Ranessa Cooper, the U of A Faculty of Science, and WISEST for a very enjoyable and worthwhile experience.

Kelly Hearn

Department of Mathematical Sciences

If I had to pick one word to describe my experience with the W.I.S.E.S.T. Summer Research Program, I would have to say that it was unique. Not only was it unique compared to all of my past summers, but also the "lab" I worked in was significantly different than any of the labs that the other girls worked in.

When I first found out about where I would be working, I remember that I was immediately told that my project was going to be "a little different". Now, realize that I spent the summer working the Mathematics Department. We all know what people who work with mathematics all day are like, we all tend to be a little, well, eccentric at times. So I was working with two very nice professors, Dr. Ted Lewis and Dr. Andy Liu, that could be a little unorthodox at times, and one crazy partner, Tamara Mundy.

However, the people I was working with were not the only unusual aspect of my summer job. My partner and I did not have an actual lab to work in like the rest of the W.I.S.E.S.T. girls had. The Math Department is somewhat squished, so they had no space for us to work in. The lack of a specific working area was actually an advantage, though. Tamara and I both lived at the St. John's institute while we were in Edmonton, so we just worked there. We never had to travel to the University, or even go out of St. John's, so we could work in our pajamas. We quickly took up permanent residence on the extremely comfortable couches in the lobby there. I am very grateful that we never had a lab.

"When I first found out about where I would be working, I remember that I was immediately told that my project was going to be a little different."

Now that I have covered the people and the place, it is about time that I talk about the job itself. Just as everything else about our research project was completely different, the work was very different as well. We did not do any lab work (which might have been hard without a lab); we did not mix chemicals or polish instruments.



Our job was to prepare math problems so that they could be used in a math fair. Now, I bet you are asking yourself, "What in the world is a math fair?" Well, a math fair is a lot like a science fair. It is intended for students in upper elementary and junior high. There is not competition involved, though, and the students are assigned their problems. The purpose of a math fair is to get students interested in math and help them realize that math is not just a bunch of numbers, it is problem solving. The problems used in math fairs are a type of math called "discrete math", which is math that does not seem quite like math. They are often logic problems, games, and other intriguing brainteasers. My personal favorites are the toothpick problems, for example: how can you make 4 triangles that are exactly the same size with only 6 toothpicks? I will just let you think about that one.

So that was my summer "research" experience. I am very glad that I had such a unique job, it was a ton of fun and my partner and I had the privilege of torturing all of the people staying at the St. John's Institute with our brainteasers. This was by far the best summer vacation I have ever had. I would not have traded it for anything.

Krista Johnson

Department of Mechanical Engineering

The title "True Space and the Tutorial" sounds like something out of a storybook, this is the true tale of my summer vacation. On July 4, 2001, I nervously packed my bags and began the experience of a lifetime. Through the WISEST summer research program, I lived in Edmonton and worked at the U of A for six weeks, ready for an in-depth look at the Faculty of Engineering.

As one of nine WISEST girls living at St. John's Institute, I prepared myself for the ordeals of dorm life with a bunch of strangers. However, they didn't remain strangers long. How can you help but become friends when living together practically 24/7? Of course, the late night talks, dance parties, and froot loop binge sessions didn't help. One of my favorite moments was taking the bus for the first time. Oh, the joys of public transportation! As a bunch of nerds at "nerd camp", we had a great time. The only downside to living in the dorm was six weeks of sandwiches and apple juice for lunch.

And then there was work. Well, if you call having fun with a bunch of great people work, then that's what I was doing. I worked in the Mechanical Engineering building under Dr. Ken Fyfe and with Jody Mccaw. My job was to create graphics for the ANSYS tutorial posted on the web. This is a tutorial designed to help engineers and engineering students solve problems and equations. Part of my job description was to go through the tutorials and see if I could follow them. Notice I said "follow" not "understand".

In addition to drawing pictures (really cool pictures, mind you), I also learned about HTML coding (HyperText Markup Language) and built my own website. While ANSYS itself is quite complicated, I enjoyed seeing how the coding became put together for the website.

The images I created for the tutorial were done through Caligari TrueSpace 5.1. It is a program for creating 3D images and animations. My first opportunity using TrueSpace was when they sat me down in my cubicle and said "We don't know how to use this program, but it's supposed to be really cool. See what you can do with it". Aaghh! I had walked into MecE barely knowing how to send e-mail and came out a computer wizard (sort of). Through a lot of trial and error, eventually I was able to figure it out.

The WISEST summer research program was a great opportunity to learn and actually do something over my summer, but was even better as a chance to challenge myself. I began scared and ended confident. More than any other part of the program, I enjoyed learning about myself the most. Yes, I can walk into a building knowing no one and make friends. Yes, I can accept challenges. Yes, I can master (sort of) the computer. And even better, Yes, I can go to nerd camp for the summer and have fun!!



"True Space & the Tutorial sounds like something out of a storybook, this is the true tale of my summer vacation."

Kristy Boates

Department of Chemistry

This summer I was very fortunate to be able to do something I'd only dreamed about: work in a real chemistry lab with toxic and potentially dangerous chemicals while gaining valuable experience, earning money and getting to live away from home for six weeks. Not to mention the amazing people I've met and the friendships I've developed. One of the best things, though, was getting to spend the summer doing things I love with people who are (nerdy) like me.

As part of the WISEST program, I worked in an organic chemistry lab with Dr. Margaret-Anne Armour and Dr. Wily Hunter. My project involved developing a practical method to destroy hazardous and toxic chemicals. The catch was that we wanted to make sure that the products we created weren't harmful to the environment. I did most of my work with an oxidizing agent called perborate. I used the perborate to develop methods to destroy chemicals like aniline and toluidine (which are used in dyes and might be carcinogenic) and pesticides like diazinon and chlorpyrifos. I got to learn a lot of different techniques and laboratory methods, which is going to really help once I get to university.

As well, I got to do work that 3rd year chemistry students do, like learning how to use the gas chromatographer and mass spectrometer. We used the "GC Mass Spec" to separate the samples I took from my experiments and then identify what's in them. The work was really neat and different from anything I'd done in school.

"Top lessons learned during my best summer ever: nothing in the world isn't chemistry."

The summer, of course, was about way more than just work. I stayed at the St. John's Institute, which was wonderful. The food was great, the rooms were comfortable, and I really got to know some of the other girls in the WISEST program. Living in rez meant that this wasn't just a summer job, but a summer camp. We did tons of fun social events like bowling at Red's, going to the Street Performer's Festival, visiting the physics observatory, going to the free concerts for the World Track and Field Championships and just shopping on Whyte Ave. And let's not forget the WISESTLack of Yield games! The best thing, though, was getting to live on my own. I feel really prepared for university now! (I hope) I now know that I can take care of myself for six weeks without too much personal harm (and maybe not quite enough sleep).



WISEST has been an incredible opportunity for me and I really encourage people to apply to this program. Even if at the end of the six weeks you decide that you don't like science, there are still so many benefits for the participants. Experience is the best thing to have and this program offers more than just experience.

Top lessons learned during my best summer ever: nothing in the world isn't chemistry, and science rules!

Lindsay Radford

Department of Biological Sciences

Not many people can say that they would enjoy spending their whole summer working with insects. Before doing the WISEST Program I was of the same mind. I never thought that insects were such an important part of science. I regarded them as the lowly, little "things" that were constantly annoying everyone. Working with them is certainly not what I had planned on doing over the summer. Surprisingly enough it was a lot of fun. You wouldn't think it at first but insects are truly interesting. Now, I wouldn't go so far as to say that I would like to become an entomologist (person who studies insects), but it sure has opened up my mind to a lot of new opportunities.

Over the summer I worked in the Department of Entomology, under Dr. John Spence, who has been working with gerrids for about 15 years. There were many others who I worked with also. I worked with many different types of insects, but I specifically focussed on gerrids. These are commonly known as water striders or water skaters. They are those almost spider-looking insect that runs along the surface of the water. Every Tuesday my research team and I would go to George Lake and collect and count water striders. We would put a mark on them and then release them back onto the pond. This way we could monitor the number of gerrids over the summer. By collecting this data, we are able to compare to data from other years and see how the change in environment is affecting them. While out at George Lake we would have to put on hip waders (which were much too big) and walk around the lake and snatch up water striders with nets. I never realized how fast such little insects could be!

A good bit of the time I also spent sorting out pitfall trap samples. A pitfall trap is a small hole, out in the field, in the ground with a container inside of it filled with antifreeze. An insect will come along and fall into it and die. We go out into the field and collect these dead insects and bring them back to the lab.

"Not many people can say that they would enjoy spending their whole summer working with insects."



We then proceed to sort out the insects into species and put them into vials. Most of the insects caught were beetles, but we catch the odd frog or mouse. Some of the samples can be quite stinky as well.

Carol Frost (another WISEST student) and I also did a research project all on our own. We put eight gerrids in nine tubs (eight in each) and put pieces of plexiglass on top of them. Some of the plexiglass lets UV light through some don't. Over the years Dr. Spence has noticed that the colour of the gerrids has darkened and the numbers have changed. He believes that the increased amount of UV light in the environment is affecting the gerrids. So we put our tubs on the roof of our building and monitored how the gerrids were surviving. Our experiment did not work out 100% perfect, because up on the roof it gets really hot and windy and sometimes only a few of the tubs were in shade. Nevertheless, we did notice that the gerrids tended to stay under the UV blocking plexiglass instead of out in the open. Hopefully the next time this type of experiment is done the design could be improved.

Before starting work back in July, I was really nervous. I kept on wondering if I would have fun and whether or not I get along with everyone. But now that it is almost over I'm wondering what it's going to be like to not be working this great environment. I have no regrets. I can't recall a summer where I have had this much fun working. It makes me very anxious to get to university. I am so happy I got the opportunity to participate in the WISEST Summer Research Program.

Mandy Lam

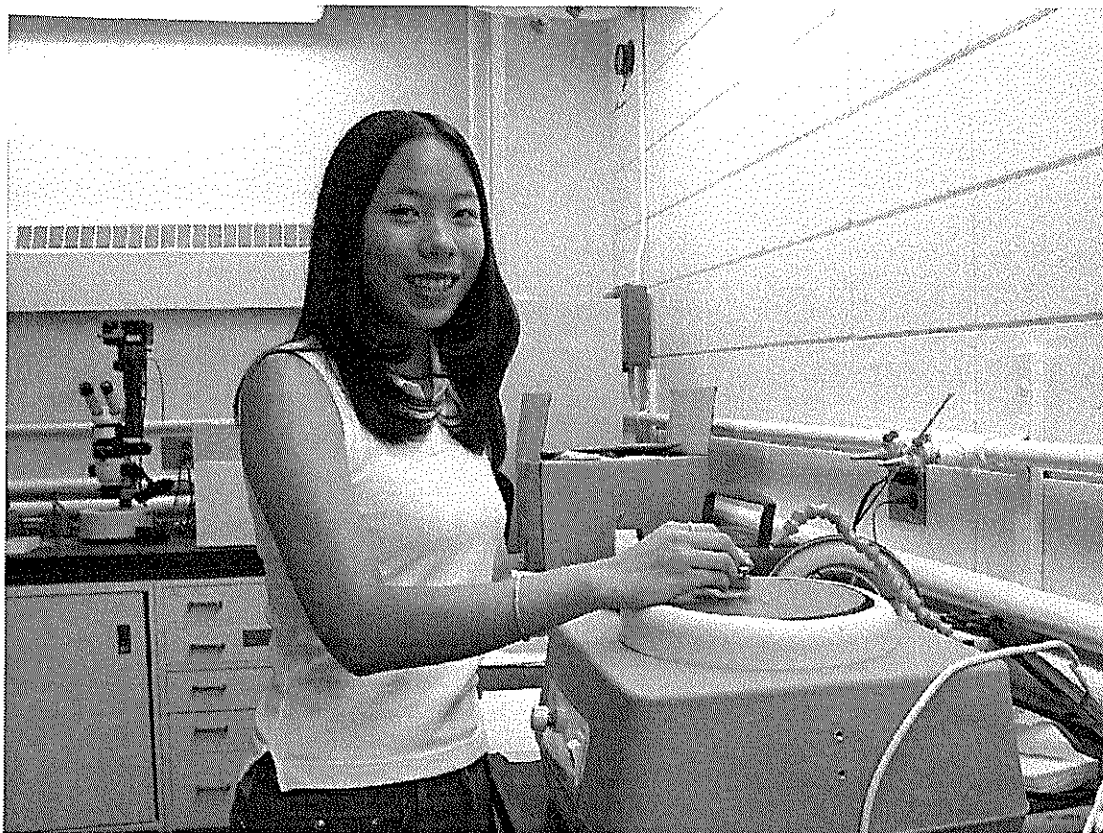
Department of Physics

The WISEST Summer Research Program was the place of my first legitimate employment in my sixteen years of life. Now you must be thinking, "...So what are you saying? Your other jobs were illegitimate?" No, it wasn't like I was involved in some shady business in the past. I've always only done odd jobs for my parents at their workplaces for a little extra allowance, but I have never had a real job before. While the majority of my friends were already holding part-time jobs, I was content to just concentrate on school and basically "sit around and do nothing." However, when I was informed of the WISEST Summer Research Program by my Biology teacher, I was immediately interested.

I knew that the WISEST Summer Research Program would provide me with an amazing opportunity to explore the genuine interest I have in the sciences, as well as the world of scientific research. By placing students into various lab environments in which they work alongside a research team, the students are given a taste of what it's like to work as a real scientific researcher. Thus, I was truly excited when I got that acceptance phone call from Kirsten, one of the two WISEST student coordinators we have all come to know by now. I was given a brief explanation of the research project that I would be working on during my six weeks in the WISEST Summer Research Program. I was told that I would be working under Dr. Al Meldrum in the Department of Physics and studying the nanostructure of materials with the use of a transmission electron microscope, all of which I did not understand at that time, by the way. As a result, with that aforementioned feeling of excitement, came nervousness. Questions immediately sprang up in my mind – What should I expect? What if I don't understand any of the complex and profound research going on around me? What if I fail to live up to the expectations of WISEST and my research team? – These were only a few of my apprehensions going into the WISEST Summer Research Program.

However, all of my nervousness was completely washed away at my first meeting with my supervisor, Dr. Al Meldrum, and my subsequent introductions to members of his research team, including Nick Mys, Kristen Beaty, Len Tober, and Greg Popowich. Their indescribable friendliness and helpfulness, as well as the relaxed atmosphere in the lab all served to put me quickly at ease. It was made clear to me that the only expectations of me were to embrace this intellectually stimulating experience in front of me and to learn as much as I can from my six-week participation in the WISEST Summer Research Program.

Initially, when Dr. Meldrum explained to me what my research project entailed, I thought to myself, "I have no idea what he's talking about," as I smiled and nodded, portraying complete understanding. However, now that these six weeks are nearly up, I can confidently explain to you what I've been doing this whole time down in the basement labs of the Physics building. My research project deals with magnetic nanocrystals and transmission electron microscopy.



Magnetic nanocrystals are prepared through the method of ion-implantation, in which energetic ions are injected into the near-surface region of a particular material. For my project, the Oak Ridge National Laboratory, a collaborative partner of the University of Alberta's Department of Physics, provided three samples of SiO_2 materials implanted with the same concentration of iron, but varying concentrations of platinum. It was my job to then prepare these samples for the transmission electron microscope in order to observe how the different concentrations of platinum affect the nanostructure of the materials. Thus began the very long process of cutting, polishing, and ion milling these samples in order to get them thin enough for the electrons in the microscope to pass through the sample and reveal the nanostructure of the samples. So what is the objective of all this hard work done by me? Well, once the results are obtained from the transmission electron microscope and further analysis is done, researchers can get an idea of the optical, electronic, magnetic and microstructural properties of the materials and hopefully use these materials with specific properties for specific purposes.

Don't go getting the wrong idea here now. It wasn't "all work and no play" during my time in the WISEST Summer Research Program. There were numerous social activities organized to allow a break from the often-isolated lab work and to get to know the other WISEST students. As the only one here from Red Deer, I was happy to make some new friends who will be a welcome recognizable face when I attend the U of A in 2002.

So this is it. This was my experience working in the WISEST Summer Research Program squeezed into one-and-a-half pages. However, my experience this summer goes far beyond this little report. I walk away from WISEST on August 16 with newfound knowledge, newfound friends, and newfound experiences.

Marta Gawel

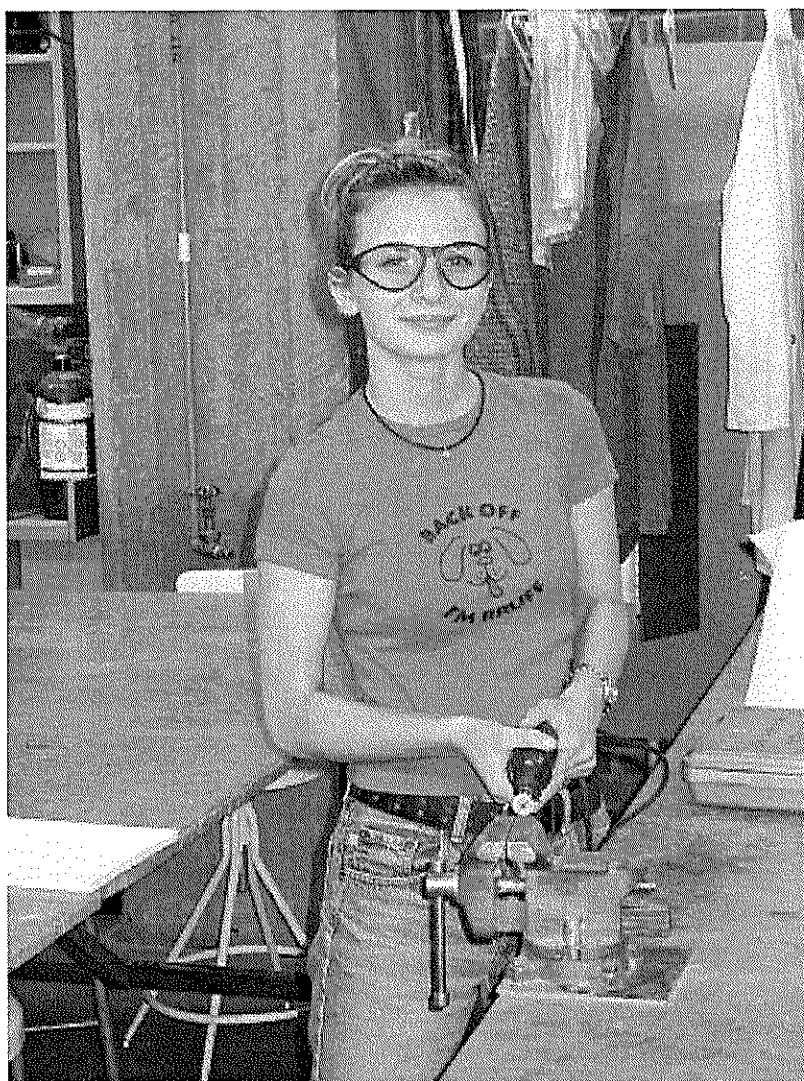
Department of Mechanical Engineering

This was definitely not one of those boring sit-at-home summers. This summer I had better things to do. I was in the WISEST Summer Research Program and it was the best choice I've made my entire life. When I first received the phone call from Kirsten Kae Merle in late May, I was surprised that I got the opportunity but I thought *would I want to waste 6 weeks of my summer working?* Some friends and teachers had to convince me to take the position. Deep inside of me I knew it was what I wanted to do, but I wasn't sure if I wanted to let most of my summer just slip away to school. Boy was I ever wrong about that! This summer turned out to be unforgettable.

On the first day, I was a nervous wreck. I got there early and saw all these girls and a few guys that I did not know. I'm usually not fearful about meeting other people but I just kept thinking that all these people would be much smarter than me. However, after meeting just a few other girls, I realized that we were all alike in that aspect. We were good in school and that's why we were there, to learn. After the first day I didn't know what to expect. I was scared that if I'd be late a few minutes, I'd get in trouble, or that if I did something wrong, they wouldn't want me there anymore, all these weird thoughts were racing through my mind. I found out soon though, that this WISEST experience was nothing but relaxing and in fact useful knowledge.

"The most memorable experiences that I've had this summer were meeting people on campus and in companies who told me about the choices they've made while choosing a career."

I was introduced to Sheldon, my supervisor, as part of Dr. Abhijit Bhattacharyya's research team in Mechanical Engineering. Chelsea Rieger, another girl from WISEST, also joined me in the team. Right from the beginning, Chelsea and I were introduced to a very laid back, comfortable atmosphere in the lab, helping us to work great together. Our lab, consisting of Sheldon, three other undergraduates and us, were all working with Shape Memory Alloys (SMA). This is an alloy that has some very interesting properties such as behaving almost like rubber; being very flexible and returning to its original position with no required force. Our entire six weeks was based on designing experiments using SMAs for a web sire, and constructing a heat engine and a walking robot that contain SMAs.



The most memorable experiences that I've had this summer were meeting people on campus and in companies who told me about the choices they've made while choosing a career. I've learned that I shouldn't force myself to choose what I want to do for the rest of my life now, because I've got the rest of my life to choose. This program has opened my eyes to new thoughts about my life and unheard-of careers that have me interested. My list of careers that I'd like has changed dramatically. Many have been crossed off because I've become aware of what the career has to offer and I didn't like that. Also, plenty of others were put on, that I had no idea existed.

The WISEST program has changed my life. Being part of a research team at the University of Alberta has made me feel that I am a step ahead of my peers. I got to experience campus life and all that comes with it: some stress, the crowded cafeterias, getting lost and the busy schedules. I am grateful that I have given up my summer of laziness to a summer of informative and useful knowledge that will be rewarding in the future

Mehreen Rashid

Department of Biological Sciences

When people hear the words “genetic engineering,” they think: playing God. Playing God??? I don’t think so. Discovering the wonders of His creation is what I did this summer. There is so much stuff going on in our bodies that we don’t even realize. From the blood that carries nutrients to all parts of our body, to the tiniest piece of DNA that outlines our genetic characteristics, all goes unnoticed as our bodies take care of themselves.

Cell replication is something we all take for granted. I mean, who tosses and turns in bed every night, worrying that their nerve cells or muscle cells are not going to reproduce properly?

Every time a cell divides, DNA replication needs to occur, i.e. an exact copy of the DNA is made and is then transferred into the new cell. When UV rays from the sun strike our cells, they cause damage to the DNA. Usually, this damaged DNA is cut out and repaired. But suppose the damaged DNA is not excised and it itself is replicated. This would mean mutations in those cells. Numerous replications of damaged DNA could eventually lead to such severe mutations, that cancer could occur. Accurate replication of DNA, hence, is important for cells to function properly, and be normal.

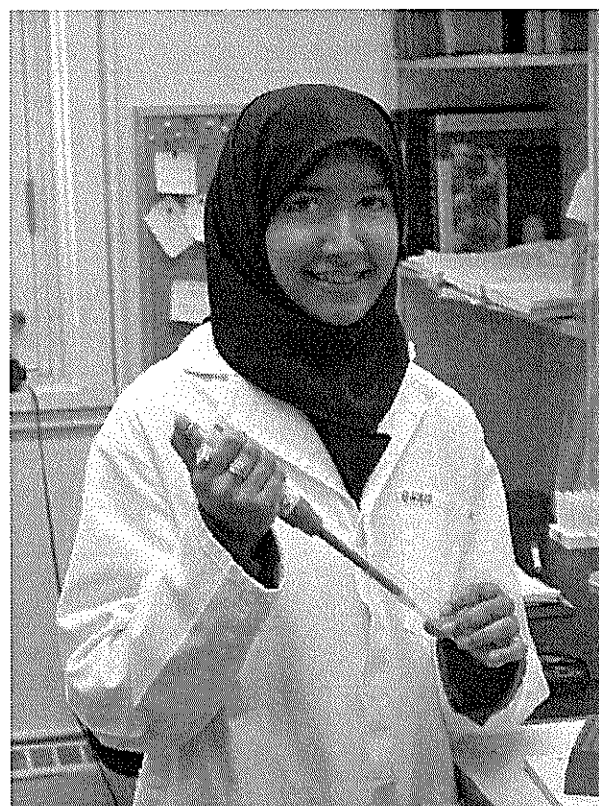
This is where my research project comes in, which is concerned with the enzyme that replicates DNA, called the DNA polymerase. DNA polymerases must replicate the DNA with accuracy, whereas if they make mistakes when replicating, it causes mutations which may prove to be deleterious. The main question to be answered is “How do DNA polymerases replicate DNA with very high accuracy?”

One way of looking at this is to study defective DNA polymerases that make mistakes when replicating. By discovering defects in different parts of the polymerase, and then observing the consequences of those defects, the purpose of those parts can be found.

We are interested in defective DNA polymerases that are called “mutators” because they “mutate” or change the DNA, producing “mutant” cells. But where does genetic engineering come in all of this? Well, I made these mutator DNA polymerases in the lab using genetic engineering techniques. I took a mutated piece of DNA, that carries the information to make a DNA polymerase. It had modifications that changed its genetic code. These DNAs were put in a solution of yeast cells, creating the possibility that some of the yeast cells would welcome this DNA and incorporate it into their own DNA, and thus change (or mutate) their own DNA polymerase gene.

So, exactly which yeast cells have the mutant DNA polymerase gene? A drug, which inhibits some mutator DNA polymerases, was used to find the mutators.

So, I put colonies of yeast cells onto plates that contained that drug, PAA (phosphonoacetic acid). Most were not inhibited, but 5 (out of a total of 286) definitely appeared to be sensitive to PAA. Since PAA sensitivity is used as a way to test which cells have mutators, these 5 were given the tag of mutators. Further mutational frequency tests are done to give more assurance that these, indeed, are mutators. However, my mutational analysis proved me to be wrong. Although these DNA polymerases do make mistakes when replicating, they don't make any great or abnormal number of mistakes than the wild type (naturally occurring) DNA polymerase does. My 5 PAA-sensitive cells turned out to be non-mutators. So what does this all mean? This simply shows that PAA-sensitivity does not necessarily correlate with mutator activity. Not all mutators will show PAA-sensitivity, and some of those that do show PAA-sensitivity can turn out to be non-mutants.



Whoa! Quite a bit to know in 6 weeks, eh? Think I got all that to sink in my head all by myself? No way. If it hadn't been for Dr. Linda Reha-Krantz and her research team, I would have been as lost as I was on the first day. The entire lab group, consisting of Dr. Reha-Krantz, Kelly, Lei, Michael, Sheila, Hannah, Beth, Zerrin, Shelli, and Sunita, has been so extremely friendly, helpful, and supportive since Day One. The Friday group lunches, during which we all shared food, chatted, and relaxed, aroused a very homely atmosphere, making the team feel like a family. My Tuesday meetings with Dr. Reha-Krantz have definitely been valuable. This is when she talked to me and explained as much as she could about my research project. She gave everything to me nice and slow, making sure that I don't get overwhelmed by the information and that by the end of it all, I would know exactly what's going on. And I did, thanks to her. Then, there were the little talks with Michael, my "mentor," who elaborated, exemplified, illustrated, interpreted, and clarified anything and everything. I am really grateful to him for teaching me every single little thing that there was to know. There wasn't a single person in the lab who did not help me in some way; and with everything put together, it made my research experience only more worthwhile.

The WISEST program has been a positive experience and a real eye-opener. Haley and Kirsten, the student coordinators, deserve definite thanks as they worked hard so that all the students would encounter no problems and be able to make the most out of the well-organized social activities and events. The program itself has definitely helped me become familiar with the type of work research is, and has opened up a possible career choice for me. It has also made me realize the importance of scientific research and how much it impacts our daily lives. And for all of this, I have WISEST to thank.

Nancy Gallant

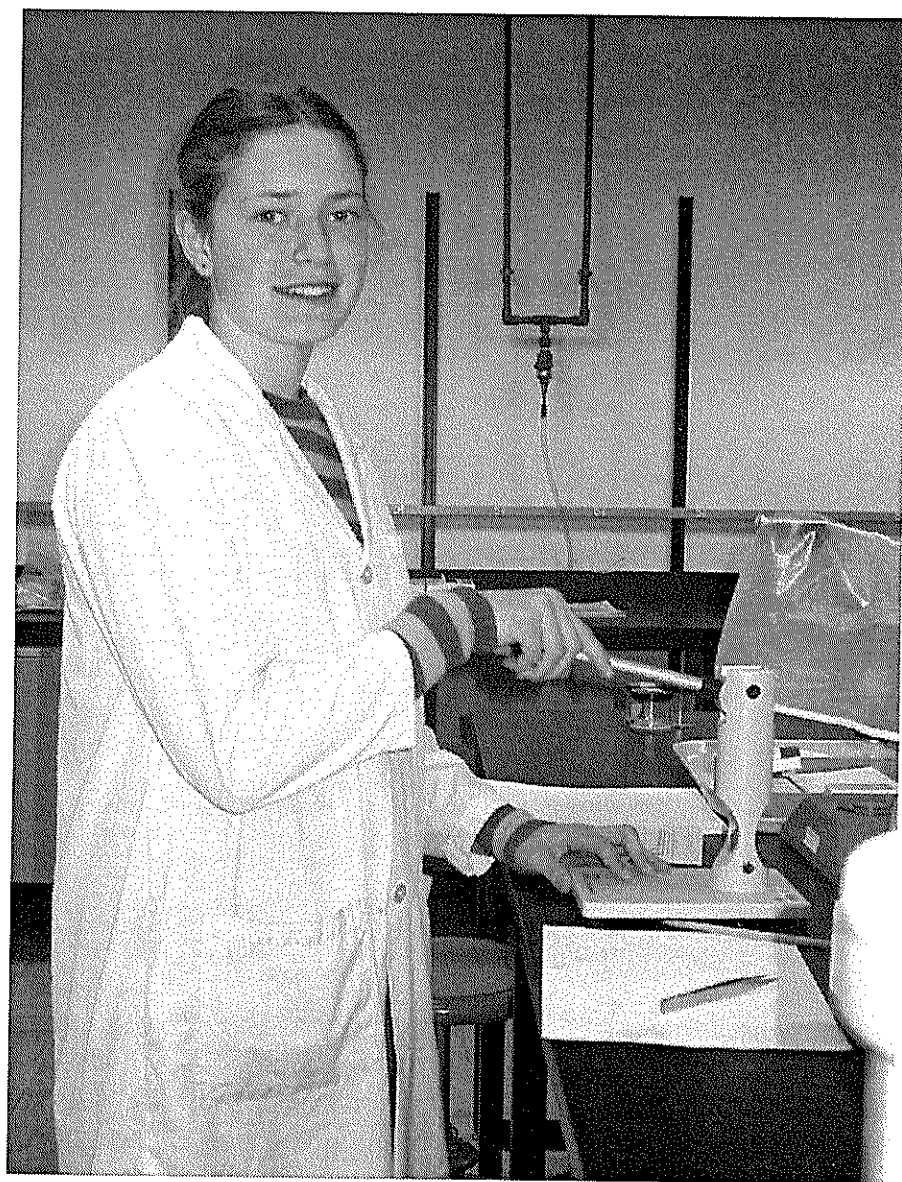
Department of Agricultural, Food & Nutritional Science

What did I do this summer? Well, gosh darn, I did tons of stuff. I went on vacation, visited family and I spent time outside with my friends, but of course that's not what made this particular summer the coolest summer ever. It was participating in the WISEST Summer Research Program that filled up most of those long summer days. I worked in Agriculture, Food and Nutritional Science's lab under the supervision of Dr. Suresh Narine, and also worked with other lab members, one of them being another WISEST member. For our project we were working with fats and shortenings trying to find the procedure that makes it so the fat most imitates cocoa butter. Hmmm, fat! My thoughts exactly. It only smells a little bad and gets kind of icky when I got it on my hands, but other than that I got used to it. Well anyway we have found some very interesting information, which is strictly confidential, so don't even bother to ask.

Many an exciting thing has happened in my lab over the summer including four little floods, a ton of lost data, a few whacked up machines that shut off right when I needed them most and one very memorable event that freaked me out of my mind. You see the thing was that I, being the weakling that I am, tried to open a tank of Nitrogen gas and nothing was happening so I was fiddling with the pressure valves and still no success. Later that morning Dr. Narine came to check on it, turned it on and since the pressure was still at the highest, the connecting tube shot away from the tank along with a bunch of papers as the gas was spewing from the tank. It was very loud and I was actually quite terrified. Anyway, I know now not to do that again.

"Many an exciting thing has happened in my lab over the summer including four little floods, a ton of lost data, a few whacked up machines....."

So how did I become the nine to five girl, well the deal was that I needed to work, to pay for university and plus I generally like to have money, so why not explore my career in science right now. I gained a lot of experience in a lab (science can be very slow moving at times) and I am now familiar with the U of A campus which as I see it can only work to my advantage. I was also taught how to use a bunch of cool machines, like an NMR and a super duper Microscope and a DSC.



I met a ton of cool people during the WISEST Tuesday Lunches with H&K. WISEST also organized informative Wednesday afternoon activities which included tours and the Lack of Yield games, in which my blue team came in first place. Those Wednesdays were a nice midweek break to have some fun and learn more of other science fields. There were other social events but unfortunately my rehearsals for the Opening Ceremonies got in the way. Which reminds me also of how lenient the work hours are, I was able to leave early some days to get to my rehearsals, and working longer other days to make it up, all without disturbing the experiments.

Overall I had a lot of fun working this summer but I'm not really sure if this area of food science is really what I want to do in the future. Whether or not I settle on this path I am glad to be more aware of the different opportunities, because my future is full of choices that I don't intend to take too lightly. Anywho, hope you all had a great summer, tootles.

Natalie Nowicki

Department of Mechanical Engineering

As a participant in the WISEST Summer Research Program, I feel that the program has impacted me in many ways. The time I spent working as a part of Dr. Forest's research team in Mechanical Engineering passed quickly and was always interesting. I have learned so many things this summer, and gained many skills I will use in the future.

Going back to school this summer will be very different than in previous years. Firstly, doing all of those tried, tested and true, labs will seem a little unrealistic. I now know that experiments do not always work as planned and results are not always easily interpreted. After some difficulties with the equipment we used, I also learned that sometimes the "controlled variables" are very difficult to control.

This summer has built my confidence regarding my future. I now realize that it is not important to know exactly what you want to do, but to take it one step at a time.

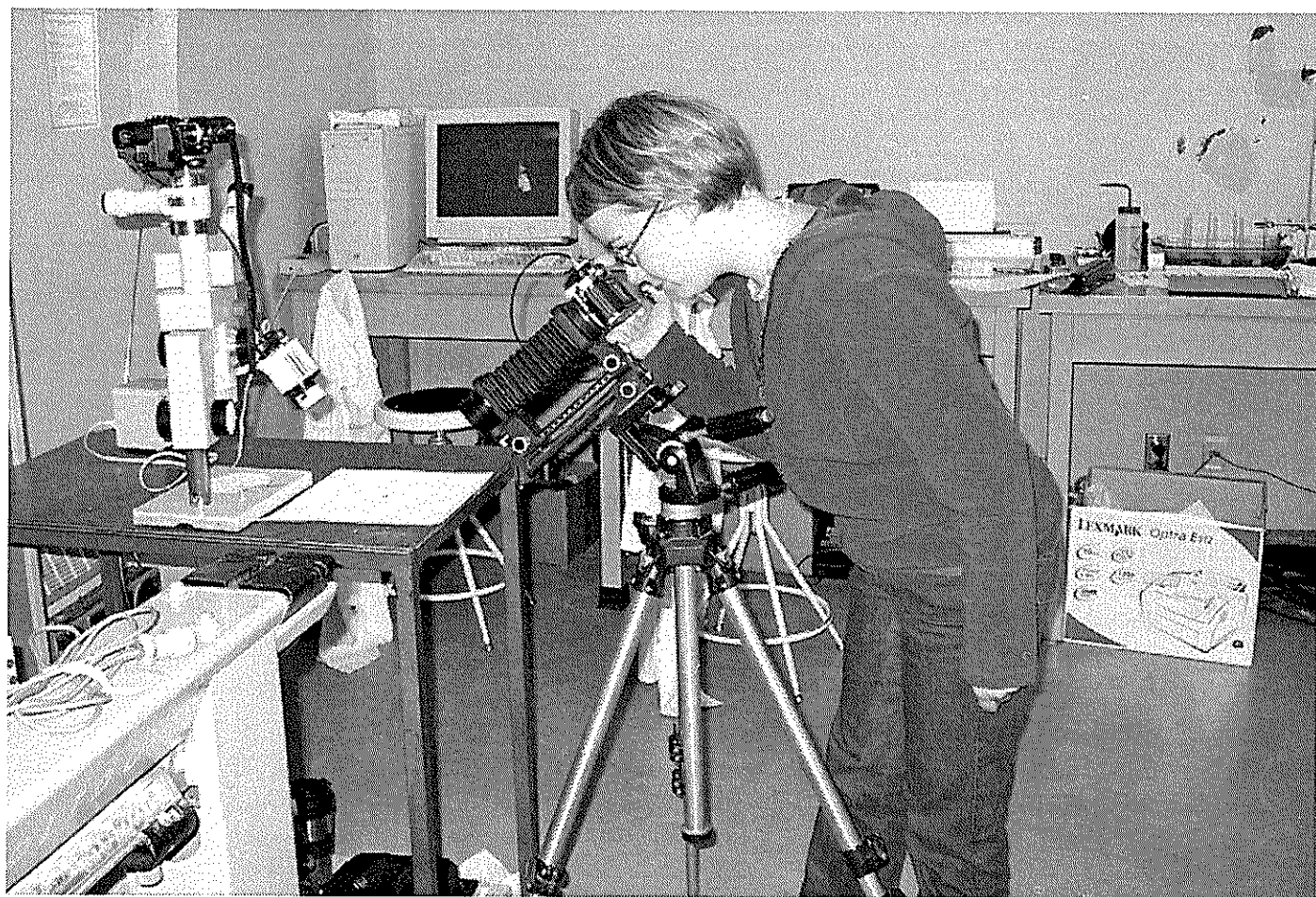
I worked on two research projects this summer. The first dealt with measuring the amount of flaw in viton (a type of rubber) samples after we treated them with carbon dioxide at different pressures. We measured the amount of flaw before and after treatment. Through analysis and comparison of the data, we worked towards finding the critical pressure (the point at which there is a large increase in flaw). This project, which has never been researched before, has applications in pipelines.

The second project I worked on was for a company that does cryogenic freezing of a variety of parts to strengthen them. Using specialized equipment, we measured the amount of liquid nitrogen used over the whole process. We went to Spruce Grove and took the measurements while the process was going on. Using the liquid nitrogen was a chilling experience. On a more serious note, the experiences I have had at work have been very educational. I have learned to use some very practical computer programs and have gained a concept of the huge amount of research being performed.

Another highlight of the summer was that I had the opportunity to use the Scanning Electron Microscope to look at our treated viton samples under high magnification. It amazes me that I have used the Scanning Electron Microscope, an instrument only talked about in textbooks until now.

The after hours and Wednesday afternoon activities were a great bonus to the Summer Research Program. I will never forget spinning around in the Discovery Zone at the Space and Science Center and learning all about the law of conservation of angular momentum at the same time! All those Terrific Tuesday lunches at SUB were good excuses to get together with all the great girls (and guys) in WISEST. I really enjoyed learning about everyone else's experiences and sharing my own.

The Summer Research Program has been a well-balanced mixture of good times and learning. I will never forget this summer, and I cannot wait to meet up with all the WISEST students later in life, and see how successful we all are, no matter what profession we choose.



"This summer has built my confidence regarding my future. I now realize that it is not important to know exactly what you want to do, but to take it one step at a time."

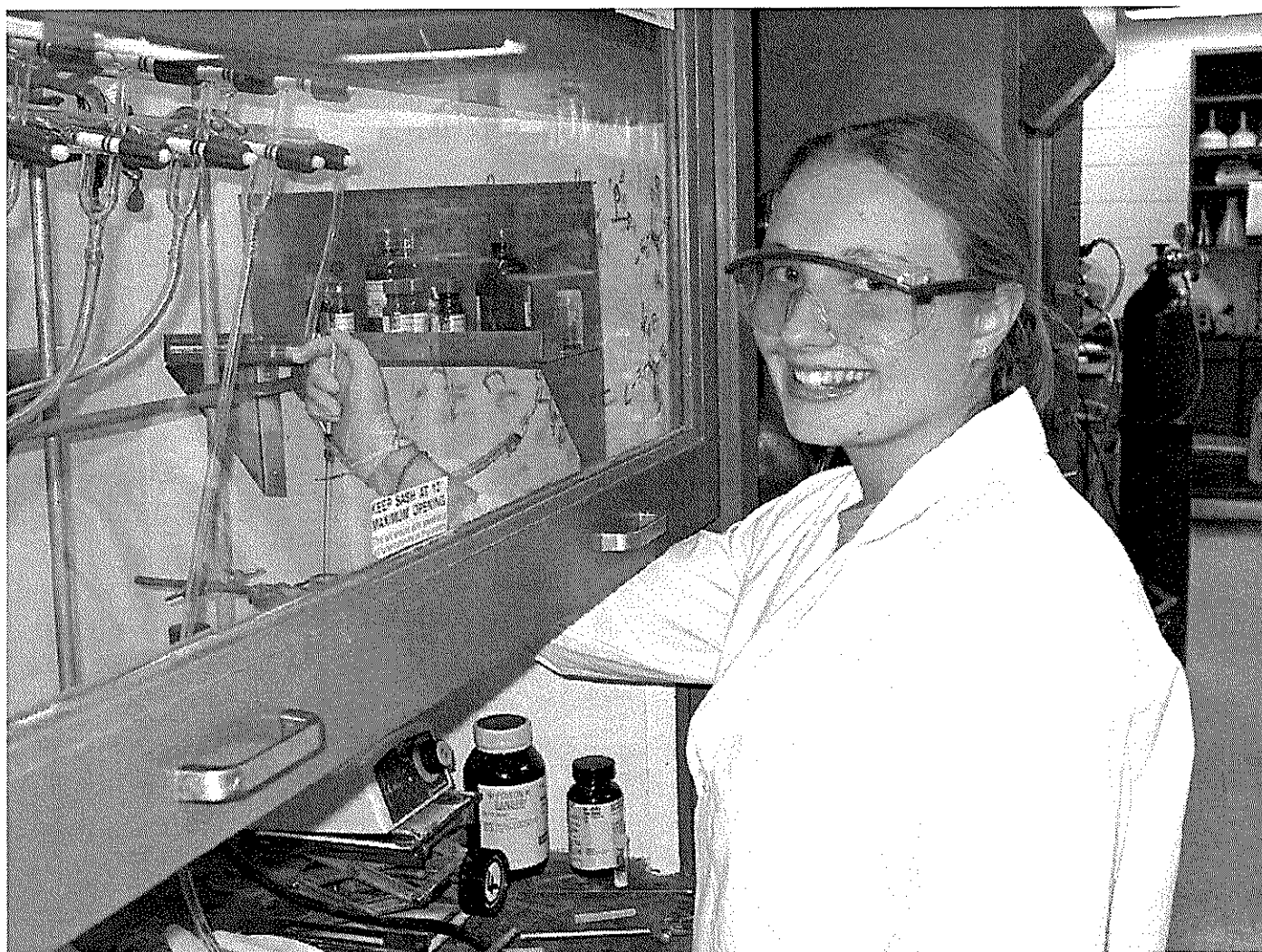
Natasha Prepas-Strobeck

Department of Chemistry

When I got a phone call saying that I would be working as a WISEST student this summer, I really didn't know what to expect. As I walked into CAB on the first day, I was filled with excitement and curiosity. What was it going to be like? My imagination went into overtime thinking of all the possible answers. In fact, my six weeks at WISEST have turned out to be a great learning experience. I feel much more confident finding my way around campus, I met new friends, and I experienced the excitement of science first hand.

When I was called up, I was told that I would be working with Dr. Tykwinski in organic chemistry on the 'organic synthesis of conjugate molecules.' Great, I thought, now if I could only understand what on earth that actually means. Well, as I later found out, all it meant was that I'd be making molecules that have a lot of carbon double and triple bonds. My project, supervised by Dr. Rik Tykwinski and Katie Campbell, was to synthesize a macrocycle and try to attach different metals to the inside of the molecule. I started off with a monomer containing pyridine, a benzene ring that has five carbons and one nitrogen. I deprotected it and added two diphenyltriflates to it, producing a trimer, which I named NAT-A1. I deprotected the trimer, added $\text{Pd}(\text{PPh}_3)_4$, CuI and tetrabutylammonium fluoride, which formed my macrocycle, which was named NAT-A2. NAT-A2 is composed of two of my trimers that attached to one another, with the nitrogens of the two pyridines on the inside of the macrocycle. The two nitrogens are the functional group of the macrocycle. As they are quite electronegative, it makes it easy for them to bind to metals. Compounds containing metals such as silver and cobalt were bound to the molecule. The percent yield for both NAT-A1 and NAT-A2 were quite low (30%), so I only had around 15mg of NAT-A2 in the end to try binding metals to.

"As I walked into CAB on the first day, I was filled with excitement and curiosity. What was it going to be like? My imagination went into overtime thinking of all the possible answers."



However, I certainly do not regret applying for the WISEST program, as I have learned an incredible amount over the six week period. The equipment that I got to see and use, such as the nmr tests, the mass spectrometry lab, the UV and fluorescence tests, and all of the lab equipment that I used on a day-to-day basis were beyond amazing, especially compared to high school labs. I have become familiar with certain techniques, such as work-ups, columns, TLC plates, Rotovaping, de-gasing, crystalization and even a melting point apparatus.

I also got a sense of the university atmosphere. While working in the lab, I talked with the graduate students and undergraduate students and and felt a part of their team. Every Thursday we had group discussions, where one person from the group would give a half hour talk on his or her research. We even had a practise thesis defence for one graduate, even though I only understood portions of his talk. The graduate and undergraduate students were always happy to answer any questions that I had, and always had a positive attitude, which was very helpful.

As I look back on the past six weeks, all I can see is an amazing experience that will not soon be forgotten!

Patricia Comeau

Department of Chemical & Materials Engineering

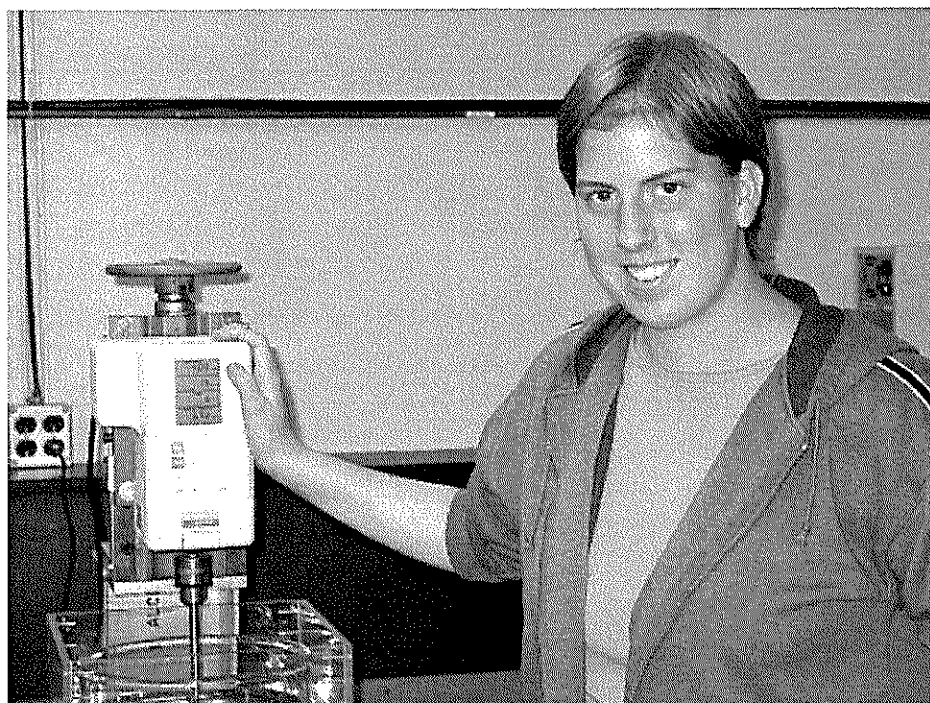
For the past few weeks I have been working under the supervision of Dr. Suzanne Kresta and Vesselina Roussinova in the Department of Chemical and Materials Engineering. I have thoroughly enjoyed being a part of the WISEST program and Dr. Kresta's research team. I'd like to thank all of those who made my being part of both the program and the team possible. Thank you.

On the first day of the WISEST program I had lots of questions, such as: "What would I be doing in the lab?" "Who would I be working with?" "Would I be able to find my lab again after today???" and the list goes on. As I soon found out, I had no cause to be uneasy or worried about anything to do with my position or the campus in general. Vesselina helped me feel confident that I would be able to contribute, at least a little, to the team. By the end of the day, I also knew where the WISEST office was so that if I forgot at any time where I was supposed to be, I would have assistance in leading me to the right place on campus.

What I understood of the project before the first day of the program was that it had something to do with a laser and some water. That's all I knew, or rather had understood, when it had been explained to me over the phone. When I told my friends about my job and what it would be about I received different reactions. In general, the guys asked if I would be burning the water or other objects with the laser (then using the water to douse the flames), and the girls asked if I would be playing underwater laser tag. I didn't really know what to think. I was just really happy that I had been selected and thought that I would figure it out when work started. I did figure it out and am now capable of writing this report in order to explain it.

This "water and laser" project that I did for the first two weeks of the program was much more than some water and a laser. First I will explain the process involved and then I will explain our lab set-up and why we did this project. This project is also what I will discuss in my presentation.

The process involved in my research project is called Laser Doppler Velocimetry or LDV (also known as Laser Doppler Anemometry or LDA). LDV is "a non-intrusive optical technique used to measure velocity and turbulence at a specific point in a gas or liquid." It was invented by Yeh and Cummins in 1964 and has not only a very high accuracy in measurements taken, but also a very high spatial resolution due to small measurement volume. LDV measures the velocity of the moving particles using the Doppler effect. The particle moving through the measuring volume scatters the light and causes a shift in Doppler frequency. The scattered light, which carries information for this shift, is collected in a photodetector. Then the signal is processed through electronics and the frequency obtained from the signal is used to calculate the velocity of the particle.



In our lab set-up we have an impeller with 4 blades, called 45 PBT, mounted on the shaft within a cylindrical tank of diameter 240mm. The impeller is run at a speed between 200 and 400 rpm. Everything in this part of the set-up is scaled as it is in industries involved in turbulence mixing, so that the measurements and results we obtain can also be scaled and applied to those same industries. Scale up experiments are helpful to industries because it is less expensive and less time consuming to study a smaller model than a bigger model. The impellers we used in our experiment were with diameters $T/3$ and $T/2$, T represents the diameter of the cylindrical tank. The impeller is responsible for creating a specific axial flow field within the tank that presents a favourable situation for better mixing of fluids. For this research project our aim was to determine how much power the impeller consumed during our experiment. First we had to determine the angular momentum of the impeller, which is derived from the velocities we obtain during our experiment with LDV. The rest of the lab represents the basic components of an LDV system. The basic components are a laser, a beam splitter, transmitting optics, receiving optics, a photodetector, a signal processor, and a data analysis system. In our experiment the beam splitter was a Bragg cell, which is a Piezo crystal working as an acousto-optical modulator. Once the moving particles are found within the measuring volume they scatter the light.

The next few weeks following the "water and laser" project were spent doing an analysis of the data we had obtained, making calculations and doing another project involving water. Being part of Dr.Kresta's team and the WISEST program has been well worth the six weeks I would have otherwise spent moping around the house looking for something to do. I've experienced first-hand what it is like to be on a research team and met lots of people from differing backgrounds but similar interests. I don't know yet whether this is the field I will study in when I get to University, but nothing has happened during this experience to make me believe that this is not the field for me.

Overall, the past few weeks have been lots of fun and I will certainly recommend it to future grade 11 students.

Rebecca Hansen

Department of Civil & Environmental Engineering

By the time summer holidays roll around, most people are envisioning their dream vacations – usually something along the lines of palm trees, lemonade, and sunny days spent relaxing on a beautiful sandy beach. Unfortunately, I highly doubt that many of us had the opportunity to enjoy just such a vacation, since we have all been busy working in the WISEST Summer Research Program of 2001. Chances are, however, that given the choice between the vacation and a WISEST summer job, few of us would have gone to the beach. The wonderful experience I had in this program convinces me that I would have gladly passed up that vacation. Looking back, however, I see that in a way, the program may actually have put me a step closer than most to the sunny beach . . . or at least to the sand.

I spent this summer working in the Department of Civil and Environmental Engineering with the Geotechnical Group. Geotechnical Engineers work at building structures and using technology that applies to the ground. They are most often associated with the construction of tunnels, dams, and pipelines, as well as the analysis of ground stability before the foundations of buildings are laid. (An interesting example of geotechnical engineering was the analysis of the risk posed by the increased slant of the Leaning Tower of Pisa.) The aspect of geotechnical engineering with which I became most familiarized during the course of the summer was the testing and evaluation of sand and soil samples to determine their contents and qualities. This is particularly applicable in mining or oil drilling operations.

My supervisor was Dr. Dave Chan, and I had the chance to work with Ken Leung and Gilbert Wong on the project. Our research project was a study on the formation of composite ("non-segregating") oil sand tailings. Tailings are the waste water and oil sand mixtures remaining after most of the sand's bitumen (a form of crude oil) has been removed. Tailings are generally hazardous to the environment, as there is a considerable amount of very fine clay/silt (approximately less than $45\frac{1}{4}\mu$ m in diameter) that remains suspended in the water, making it uninhabitable for the many years it takes to settle. The goal of our project, therefore, is to create a tailings mixture that will settle from the water (i.e. water will layer on top of sand) but will not segregate. By non-segregation we mean that the very fine particles of the tailings do not layer out on top of the coarser particles to be suspended in the water again. A non-segregated mixture will have completely intermingled particles of sand, clay, and/or silt, but will not retain very much water.

"It was beneficial & enjoyable."

The various methods and processes we used would require a lengthy description, but from practice and repetition of the procedures, I have learned how to prepare standpipe tests, perform hydrometer tests, complete particle size distribution analyses (fines content tests in particular), and determine the specific gravity of various substances. To oversimplify these processes, this is what we generally did: we stirred sand, scooped sand, measured sand, weighed sand, combined sand, washed sand, boiled sand, baked sand, observed sand, compared sand, recorded data about sand, and graphed sand properties. The research has yet to be completed, however, for the six weeks that I participated in it, I learned many new and fascinating theories and techniques, and gained valuable experience in working in a lab.



Participation in the WISEST Program was both beneficial and enjoyable. Through this program, we all gained invaluable knowledge while being simultaneously immersed in the light-hearted social atmosphere established by our research teams and the WISEST coordinators, Haley Cleary, Kirsten Merle, and Grace Ennis. I found the Wednesday afternoon sessions to be very informative and helpful (in particular, the campus tours, small group discussions, and the trip to C-FER). Luckily for us, the fun wasn't limited to Wednesday afternoons. It definitely did not take a long time for me to start looking forward to the social events (like the barbecue and Shakespeare in the Park) and the Terrific Tuesday lunches. These get-togethers gave me the opportunity to make new friends and learn more of what others were accomplishing on their own research projects.

All in all, I found the WISEST Summer Research Program to be a wonderful experience that allowed me to further explore my educational options at the University of Alberta.

Renita Kakfwi

Department of Chemistry

When I came to work in the Wisest Summer Research Program I was very excited because where I come from my school doesn't have the equipment and chemicals to do experiments and at first it was very confusing since I never really had the experience in a real lab but by the third week I had learned a lot more than I knew when I first came to the University of Alberta. The first week of work here we started an experiment called "The separation of Benzoic Acid, Naphthalene and Chloroaniline". The problem was how do we separate a mixture containing an acid, base, and neutral compound in an organized solvent. We poured 20mL solution into a 60mL separatory funnel, we added 5mL of 5% NaOH and put the stopper on the funnel shook the funnel 4 times but after each shake we pointed the end away from us and released the vapor. We waited for the layers to separate and drained out the dichloromethane layer into a flask and repeated this procedure 4 times and the top layer we poured into the reaction waste container, then we distilled it and did the TLC's. We did other experiments like Aniline and Sodium persulphate solution and The Oxidation of Diazinon with potassium persulphate solution. The experience I had working here the 6 weeks at the University of Alberta was great although I missed home a lot, but I had fun working with all the different chemicals and my lab partner Kristy without her help I wouldn't of got this far without her help, and the help from Dr.Armour and Dr.Hunter. Working here really got me thinking about University after I finish my last year of high school and coming to the University of Alberta after I decide what I want to take when I come back to school. The person who told me about the Wisest Summer Research Program was my Biology Teacher Mr. Jones who gave me the first opportunity because I had one of the Highest mark in Biology 20, and I thank him for it because I learned a lot in the 6 weeks I stayed here.

"Working here really got me thinking about University after I finish my last year of high school."



What made me take the job was the Experience in science, living far from home, having this experience on my resume and to meet new people, which I did and they are very nice. I work in a lab containing a lot of chemicals and you have to be careful because there are explosive chemicals in the lab. I enjoy this job and the people I met here at the University they were very nice to me and wanted to know about the place I come from because I live up north in The N.W.T. I'm living at St. Johns with 9 other girls from the Wisest Program and at first I wasn't really there all the time but once I got to know them I started having fun and I enjoy hanging out with them, the food there is great but I'm use to food off the land and not always store bought but the cooks are very good in the kitchen and the food is always enjoyed by everyone. I like having the Tuesday lunches with the group and meeting new people from all over Canada. When I first came I was introduced to the people from Student Native Services and they were very nice to me and I was invited to one of their picnics and I had fun. When I get back home I am definitely telling the grade 11 students about this program and the experience they can gain in science and having the opportunity to meet new people, living away from home and working in the University of Alberta. I want to thank everyone who made this happen for me and giving me the opportunity to work in the U of A.

Mushi. (Thank you)

Rick Xiao Rui Li

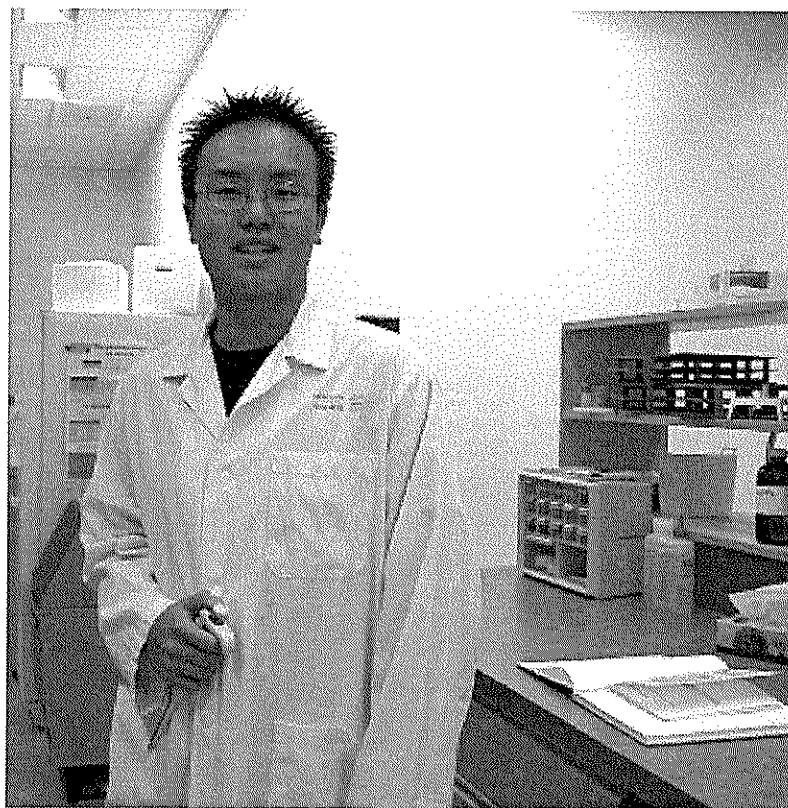
Faculty of Nursing

What did I do for my summer vacation? Come to think of it now, I can hardly remember as it has flown by so fast. Wait, wait... now I remember! I was in the WISEST program having the best time of my life. I can still remember when our teachers at school first talked to us about both the WISEST and HYRS programs. She said that it offers grade 11 students a chance to experience research at the University of Alberta. To be honest, at first I really wanted to be accepted for the HYRS program but now that I have had six amazing weeks working with the WISEST program, I feel that I have made the right decision in choosing WISEST.

I guess you may be asking what I did in the six weeks; when the first day rolled around, I was excited, nervous and scared all at the same time. I didn't know anybody except for Vik and Karen and I didn't know what the other WISEST students would be like. When I saw that all the students were friendly and easy-going, I also relaxed. That first day was quite a rush; I knew that the supervisors from the various research labs would come to Chem. E2-35 and pick up their students and show them to their respective research buildings. To my surprise and dismay, my supervisor didn't show up. I sat there and waited until everybody had left and wondered "Ahh! They don't want me anymore!" Fortunately for me, Haley offered to take me to find my supervisor. When we got to Clin. Sci. building I anxiously knocked on the door hoping that I would get a second chance. As it turned out, the supervisor had forgotten to come pick me up they were all really sorry. (Yay! I was going to have a research lab after all!) So that little adventure was how I got to meet my research team.

I was going to be working in the Faculty of Nursing, Women's Health Research Unit under the supervision of Dr. Kathy Hegadoren. It turns out that Dr. Hegadoren has extensive knowledge of nursing and nursing research. Besides this, she is also a gifted teacher. Even though she has vast amounts of knowledge, she still manages to explain everything, no matter how complicated, in a way that every one can understand. During my time there at her lab, she had two projects going and I was assigned to a pilot longitudinal study that dealt with women with depression and posttraumatic stress disorder. This study involved women answering questions about past traumas and other stressors during their childhood. Throughout the study at three different time periods, these women would submit three saliva samples. These samples would be then measured for salivary cortisol levels.

"That first day was quite a rush..."



Cortisol is a hormone that is secreted by the stress hormone system of the body when a patient is under stress. By measuring these stress cortisol levels with ELISA kits, researchers like Dr. Hegadoren hope to gain more knowledge of the stress hormone system's regulation and activity and therefore, in the future offer better treatment to women with depression and posttraumatic stress disorder symptoms. Besides my project, I was able to also experience some blood spinning and see different assays being performed on the lab's very expensive GC (gas chromatography) machine.

My six weeks in the WISEST program has allowed me to gain valuable experience both as a researcher working in a real working situation and as person. I learned more about what I want to do with my life and got to interact with many interesting and amazing people. The Wednesday afternoon activities and Tuesday lunches with Haley and Kirsten were excellent opportunities to meet some of the other WISEST students.

First off, I want to give a shout to my other nursing boys upstairs. Vik, Jamil, y'all know who you are. Also, shouts go out to Asha, Emily and Karen, the other WISEST students, I hope y'all had an awesome time, too bad I didn't get to know you all. On a serious note, I would like to extend my heartfelt thanks to the other ladies in the Women's Health Research Unit. Dr. Kathy Hegadoren, Tina O'Donnell, Evelyn Mitchell, Debbie Kuefler, Shreyasi Galapouldi and Melissa Anderson, I love you all. I would like to thank you for all your help and inspiration, I had a wonderful experience in your lab and I hope we can share many more laughs in the future. Special thanks to Haley, Kirsten and especially Grace Ennis who let me participate even though my acceptance letter was a week overdue. (Oops..hehe) And finally, to the people at AHFMR (Alberta Foundation for Medical Research) for the gracious financial support that made this possible. I wish continued success for this program so it can offer to other students what it offered me.

Robyn Ferguson

Department of Agricultural, Food & Nutritional Science

The WISEST Summer Research Program was an amazing experience for me, and not just because of the science aspect of it. There was so much more to it than that, and I'd like to explain a little bit about the program that anyone who wasn't in it probably doesn't know about it.

On the first day of the program, I admit, I was totally terrified, but I got over that shortly. I made new friends and learned all about what was expected of me in the lab and some other useful points as well. Which brings me to the first realization that I made about the difference between working in the lab at the University and working in a science class or lab in high school, and that was: You don't have to ask for permission to go to the washroom when you're in university (or at least when you're working there). Which, as I found out, is a good thing to know in case no one is around when you need to go.... Secondly, I realized that not all fluffy little animals are as cute as they may appear. Have you ever spent half a day with 360 chickens? If so, then I'm sure you'll understand what I mean. Thirdly, I learned that you shouldn't eat too much ice cream in a short period of time or over-analyze it when you do, not so much because it isn't healthy, but more because you'll never be able to eat it again. (Here's where I'd like to thank and at the same time apologize to anyone that volunteered to be a panelist for my project.)

So right now I can imagine what you all are thinking about WISEST. "What do you mean you learned that you don't have to get permission to go to the washroom? What does that have to do with science?"

Well it *doesn't* have anything to do with science, but WISEST wasn't just about working, getting paid, and learning about science. Through the Summer Research Program, we were introduced to university life, possible fields of interest that we may never have even considered, and other people in fields like those that many of us plan to enter.

"Many of us had similar worries or questions that were resolved by someone that played a role in the program."



after university. Many of us had similar worries or questions that were resolved by someone that played a role in the program, and after these six weeks I now have a much more solid idea of what fields I am and am not interested in pursuing in and after university. The experience that I had in Dr. Wismer's lab was amazing, and I'd like to thank her and the other people in the department of Agriculture, Food and Nutritional Sciences that I dealt with for being so wonderful to me during the six weeks that I spent there.

Seeing as the WISEST Program's primary purpose is to expose girls to the sciences (and our four lone boys to the fields of nursing and human ecology), I suppose it would be appropriate to explain at least a little bit about the scientific experience that I had this summer. My project was entitled "Sensory Perception of Ice Crystal Size in Ice Cream", and involved the training and testing of twelve panelists to gain insight on what size ice crystals must be to significantly influence the quality of taste perception in the ice cream. The project's concepts were relatively new to me, as nothing that I have learned in any of my high school courses has really covered the topic of sensory science. However, after reading a few articles from research journals, I had a pretty good grasp on all that was going on. The project went relatively well, and it will be interesting to see how it turns out (which I will not know until after this report is due) but as now, it looks pretty good.

Overall, WISEST provided me with countless invaluable experiences in and out of the lab, and if I had the opportunity to re-consider my participation in the program, I can honestly say that I would do it again in a second.

Sarah McCalla

Department of Agricultural, Food & Nutritional Science

Tired of sitting around all summer with only the TV for company? Dreading the moment that your parents finally coin that dreaded phrase: "Why don't you get a job?"? Finding that time's ancestors must have been snails stuck in molasses 'cause the clock travels at about the same speed? So bored that you actually *want* school to start again? Well, I can't say as I am.

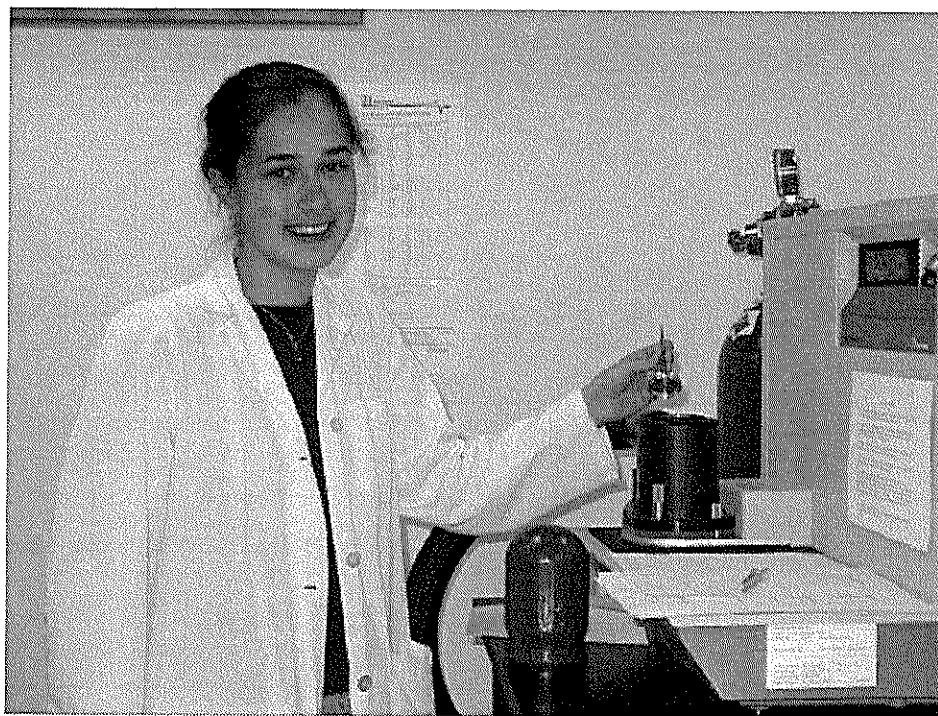
Why? How did I, an average girl from St. Albert, Alberta, escape yet another long tedious summer? Well the secret looks a little something like this: WISEST Summer Research Program. This program gave me the chance to explore science, campus and possibilities. I was given the opportunity to submerge myself in the life of a researcher and learn of the successes and failures that set this career apart from the average jobs out there. I joined a research team and experienced the non-fiction version of all those weird movie sets where guys with white hair are running around screaming "It's alive!" This more authentic look at life in a lab gave me a chance to not only see if a life as a researcher is for me but to live that life before I have to make any limiting decisions about a career path.

For six weeks, I worked under the supervision of Dr. Suresh Narine in his Agricultural, Food and Nutritional Science lab, and for six weeks, I was given responsibility for my own project. I think what really drew me in and what made all the hard work worthwhile was the fact that this wasn't a 'busy work' project like those so often assigned in school. No, the work I did has practical uses as well as theoretical value. We were pioneers, exploring the wonderful world of fat.

Yes, fat.

It seems so insignificant, and yes maybe even humorous, yet fats, or lipids, are a huge part of what we eat and how we eat it. Who doesn't put butter on their toast, or perhaps margarine is the preferred choice? Well both these shortenings are made of fats that can be altered to have a different effect, form and structure. Studying the result of

"Well the secret looks a little something
like this:
WISEST Summer Research Program."



processing these shortenings in different ways, we can give Alberta a valuable industry. A member of our lab was even exploring ways of making polymers, like plastic, from oils. Imagine a world full of biodegradable plastics, or I guess technically it wouldn't be full of those sorts of things anymore would it?

But all that sounds like hard work and who really wants to work during their vacation? Well rather than dunking me into the mirror image of a summer spent wasting away, my lab experience gave me the chance to balance both work and fun. Yes, hard work was involved, but there was always a tempering of fun to our activities. On two occasions we ended work early in order to eat cake in celebration of lab members' birthdays, and we spent a lot of time just meeting each other and learning how to work as a group. And then there is the WISEST group itself. A fair bit of fun was had there as well: evenings spent in the park watching comedies written by the Bard, days spent touring facilities where work as an engineer is exciting, lunches spent talking about my work with a great group of people and an afternoon spent talking to women who thrive in the world of science. Then there is the chocolate ice cream taste testing: all to help another WISEST student with her project of course.

Time shook off its' gooey chains of molasses, and the clock flew. The six weeks, which in years gone by were not strangers to yawns of boredom, became close acquaintances with fun and learning. Much was learnt; more was experienced. The WISEST Summer Research Program has left its mark on yet another convert, and I almost dread the end of school next year, knowing now that summer can be devoted to so much more than perfecting a mere tan.

Almost.

Scott Thiesse

Department of Human Ecology

Although I would have preferred to stay at home in Grande Prairie with my family and friends for the summer, the WISEST experience was one experience that I will never forget. When I first came to Edmonton, I still didn't really know what to expect from the WISEST program, other than that I would be working with and in textiles.

The first day was orientation where we reviewed WHMIS and some safety guidelines, as well as learn some tips and pointers. After the orientation I finally met my supervisor, Linda Capjack, and shortly thereafter I got a quick tour of the Human Ecology Building (HEB) where I was to work in the following six weeks.

The next day was my first day working in HEB. On that first day I learned that for the next two weeks I would be working with the collection. The collection is a collection of more than 15 000 artifacts dating back hundreds of years ago. Most artifacts are stored in giant storage units called compactors. The compactors are all in one big controlled room. In the compactor room, the temperature, humidity and light are kept at a level so as to keep the artifacts in better shape longer. All around the room you can find sensors for temperature, humidity, and water. I found it very interesting how the artifacts are kept.

In addition to being stored in the compactors, all of the artifacts have information stored about them in a huge database, which can be accessed from the Internet. However, most artifacts don't have pictures in the database, which was where I came in. I got to take images of the artifacts, digitize them, and export them to the database. A daunting task when you sit to think about how long that would actually take if you did all 15 000+ artifacts. So I only got to do several hundred of the artifacts. And then the first two weeks were already over.

The next two weeks I was placed under the supervision of Lilia and Elaine, respectively. Under Lilia I got to do some flame testing on garments to see how well they resisted being lit on fire. After reading the multiple pages of test methods, including the vertical flame test, TPP test, and RPG test, I finally got to start playing with fire. At first I only played with spare samples of clothing and found out very quickly that fleece tends to light on fire very quick. After I got used to the test methods, and got consistent results, I got to test a coat used in the oil patches. I expected that the coat would have a high flame resistance, but found out after testing that although it didn't light on fire, the coat didn't resist the flame near as much as I had first expected.

During the fourth week I worked under Elaine's supervision doing tensile, and abrasion strength. Both of these tests were done in the conditioning room, because the tests had to be done at standard conditions. I was doing abrasion testing to find cotton, and a cotton/polyester blend fabric that had close thread counts to use in a demonstration showing how much stronger one fabric is over the other. After counting the warp and filling threads of about 5 fabrics I found two that were similar in count. I then got to cut out samples of each fabric using a hammer and die. Finally, I could test the samples. To explain the machine in simple terms, it's a rotating disc with two abrasive wheels put on the disc with the fabric in between the disc and wheels. Using CS-17 abrasive wheels and a 1 Kg counterweight I tested the cotton/polyester blend fabric first.



After around 200 full turns of the disc, the cotton/polyester fabric would usually break a thread. Then I tested the cotton fabric with the same wheels and counterweight, and to my surprise it only took 40 turns to break! Obviously a cotton polyester blend is stronger than just cotton, and now we had two samples to use for a demonstration in the future.

Tensile strength testing was very tedious. You would start by cutting out five 35 mm by 150 mm samples then unravel the samples thread by thread to exactly 25 mm. This could take a while on some of the more dense fabrics, some of which were in the range of 200 threads or more in that 35 mm! With the samples ready for testing, I got to use the Instron, which is a machine used for measuring how much strength it takes to break a fabric. Some fabrics would have threads break thread by thread, while others would have all of the threads break at the exact same time with a loud BANG. The point of this testing was to find out which fabric / fabric blends were stronger.

Lastly, I've gotten to work with lots of hemp. The day I went out to the hemp field I was pretty excited, cause I've never seen hemp growing before and wondered what it looked like. When I got there the hemp we were using was already cut down and I got to strip the leaves off of the stalk, because its illegal to transport hemp with the leaves attached. After stripping 13 bundles of hemp, we had collected a huge pile of leaves. Supposedly you'd have to smoke the whole field just to get a smile though. That's because it was industrial hemp which contains less than 0.3% TMC, unlike marijuana, which contains around 15%. After stripping the hemp, I got to go look at the hemp field itself. I quickly noticed two things about the hemp: 1) It was tall, and 2) You could really smell it. After I learned that the hemp had grown 7 feet tall in 70 days I realized just how fast it grows, that's 1 foot per 10 days! The hemp was then transported back to HEB where we would strip the outer layer of fiber from the stalk and test how strong it is. However, I sadly can't stay around for that test because my 6 weeks is already up!

All in all, even though I would rather have spent the summer back home with my family and friends, if I had the chance to go back and do this again, I defiantly would.

Shaina Archer

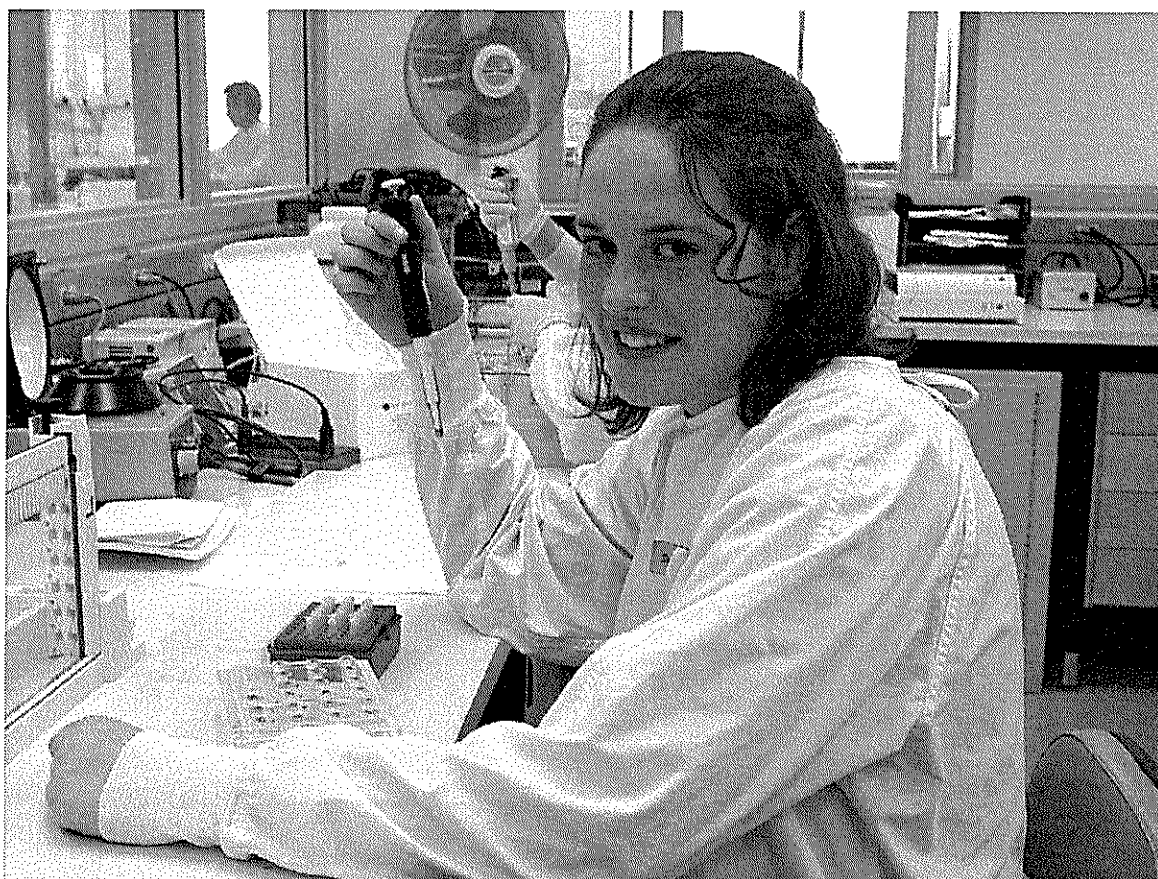
Department of Laboratory Medicine & Pathology

For six weeks this summer I had the incredible opportunity to work with Dr. Fiona Bamforth in the Department of Laboratory Medicine and Pathology. The knowledge and experience I gained from participation in the WISEST program was invaluable and I am confident that I will take what I learned this summer with me for the rest of my life. The project that I was a part of involved extracting mitochondrial DNA from teeth samples. The purpose of my investigations was to eventually extract and analyze the mitochondrial DNA from Mesolithic-Neolithic teeth discovered in Portugal, which are between 4700 and 8000 years old! I worked with modern teeth and with archaeological teeth that were several hundred years old in order to develop a technique to extract the pulp and dentin from inside the tooth without damaging the exterior of the tooth. Basically, I performed reverse root canals. (After spending a morning in the dentistry building learning how to use the root canal tools, a dentist remarked to me, "Wow! You just performed your first root canal and you're not even out of high school!") After the cellular material from the tooth is removed, the DNA is amplified through the polymerase chain reaction (PCR) and then undergoes a process called electrophoresis. At this point, a UV light photograph should be able to indicate the presence and length of DNA strands.

When I entered the lab in the first week of July, I was completely overwhelmed. Everything seemed so foreign to me but, thankfully, everyone in the lab was extremely welcoming and willing to help whenever and however they could. I greatly appreciate the efforts of Julija, William, Teresa, Laurie, and Cheryl. Thanks to Dr. Bamforth and everyone else in the lab, I soon learned my way around and started to gain independence and confidence. This summer, I learned a great deal about an area that has always interested me.

I learned more than the technique for extracting and analyzing DNA, though. I learned that success is not the most important thing and that when something fails, the world will not come to an end. Failure can teach just as much, if not more, than success can teach. Trust me on this, I know firsthand. For five weeks this summer, I did not have a single successful PCR.

"What surprises me now, though, is that looking back I would still want to experience those failures. I am a stronger person for it."



I failed over and over. What surprises me now, though, is that looking back I would still want to experience those failures. I am a stronger person for it. Research is not perfect. Research does not always go as planned. Life, itself, does not go as planned. I am happy to report that after five weeks of hacking away at teeth and failed PCR runs, I finally experienced success. I felt such an amazing sense of accomplishment after it all came together and the success could not have been any sweeter than after the series of failures I experienced. I took my UV light photograph of my first successful results home and I literally stared at it all night. Pitiful, I know.

Eleanor Roosevelt once said that, "You gain strength, experience, and confidence by every experience where you really stop to look fear in the face... You must do the thing you cannot do." Okay, so I didn't actually "look fear in the face" this summer, but I know that I definitely did gain strength, experience, and confidence by doing what I could not do. I accomplished what I was beginning to think I never would and I know that I am better for it. Had I experienced success initially, I know I would not have gained the strength, experience and confidence that I did.

I learned a lot in these six weeks, more than I ever thought I would. I learned all about DNA, perseverance, the value of failure, and the joy of success that has been worked for and earned. Oh, and I also learned that I never, ever, ever want to have a root canal.

Thank you to WISEST for giving me these opportunities this summer and to the Faculty of Medicine and Dentistry for sponsoring me. Thank you especially to Dr. Fiona Bamforth for giving me the opportunity to challenge myself and to learn so much valuable knowledge while under her supervision.

Shawna Pandya

Department of Biological Sciences

What do snapping turtles, minnows that think they are dolphins, gopher dissections, scanners, data entry, unidentified mammals, large, ultra-sensitive scales, wriggling beetle larvae, and a bunch of dead insects have in common? Your first inclination, most likely, is to tilt your head, look at me as if I have gone insane, say “nothing”, and run away in search of a phone so that you may call the nearest mental institution to commit me. Up until this summer, I probably would have agreed with your response, never in my wildest dreams even imagining that the words “snapping turtles” and “scanners” could even appear together in the same sentence. However, now that I have experienced the WISEST program— and lived to tell about it— I can tell you that the very first sentence is, in brief, a summation of my experiences throughout the six-week WISEST summer research program.

This summer, I had the privilege of working with Dr. Cindy Paszkowski's research team in the field of Zoology. Throughout this time, I met and worked with many different people, including grad students, university students, and lab techs. During this time, rather than completing one research project, I worked on four or five different projects, working with live and dead fish, dead and soon-to-be-dead insects, live amphibians and reptiles, dead mammals, and computers for data collection and entry, graphing, and scanning.

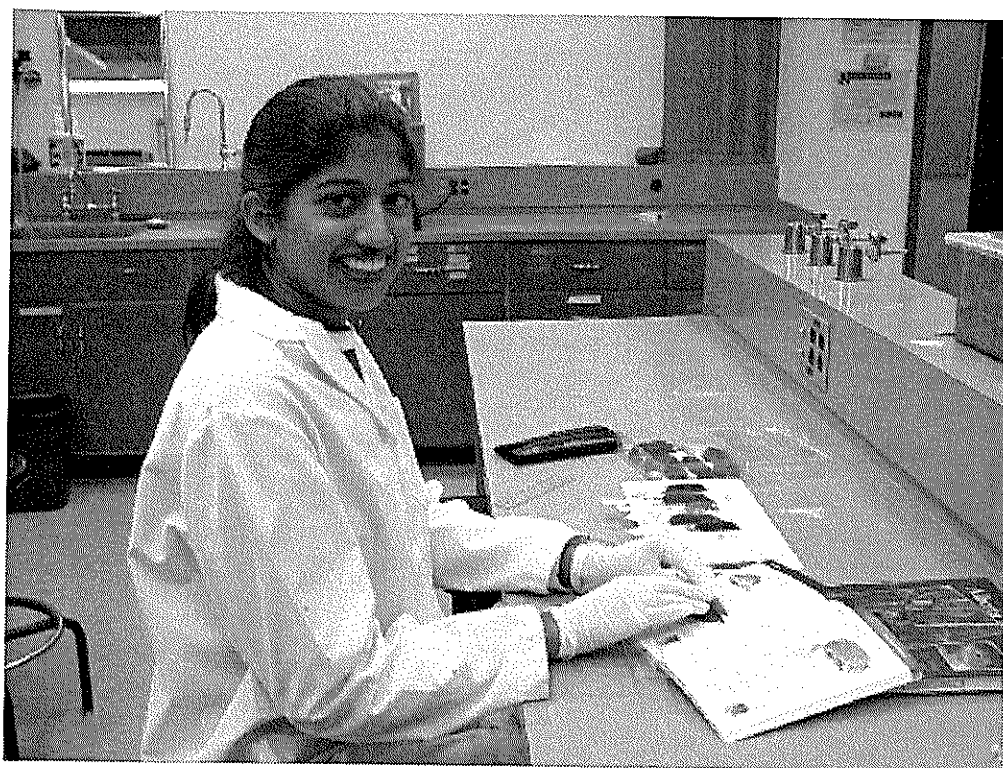
Some of the first projects I worked on were the “Flaming Fish” and “Rate of Turnover in the Cells of Fish” projects. “Flaming Fish” was an ongoing project that was designed to examine the effects of forest fires (impacted areas) on the lengths of fish; gill nets and minnow traps were set up at various lakes all over Alberta to catch fish so that they could be measured, tagged, and released. My part in this experiment included measuring dead fish samples brought back from the field, and entering previously collected data into a computer.

The “Rate of Turnover in the Cells of Fish” was also an ongoing project, designed to— big surprise— observe the rate of turnover in the cells of fathead minnows. The minnows were separated into two groups, control and experimental, each of these groups consisting of four separate tanks, including male, female, young of year, and extra. I was responsible for feeding the two groups different amounts of experimental and control foods. It was about two weeks into this project that I observed that control male minnows' strange behavior. For reasons still unknown to me, whenever I entered the room, the male minnows would be attempting to jump out of their tanks and be skimming and diving along the water's surface like dolphins (this is extremely disconcerting when you remembering that minnows have absolutely no reason to want leave their tanks, considering they cannot breathe outside of the water). Even stranger, when I entered the room, the male minnows would settle down somewhat, only to resume their antics when I turned my back to them.

My final involvement with fish consisted of the feeding of the Mud Minnows. Sounds easy enough, right? That's what I thought... until I found out *what* they eat. Close your eyes and imagine the wriggliest, squirmiest grub-like creatures you can (if it helps, think back to Survivor and Fear Factor). *That's* what they ate... squirmy, writhing beetle larvae. Alive. And it was *my* job to feed them the week the minnows' usual caretaker was away. It was at this point that I sent up a silent prayer of thanks for the invention of tweezers.

During my six-week adventure—er, experience, in Dr. Paszkowski's lab, I also had the pleasure of sorting dead mammals. Apparently, one of the grad student's (Alison) projects involved the catching of frogs in pitfall traps. However, the pitfalls caught more than just frogs, to encompass many pocket gophers, and various different types voles and shrews. And it was up to us to identify the voles and shrews according to genus species. But before all that could happen, we had to take ‘preventative’ measures against the possible risk of Hantavirus; this included wearing latex gloves, lab coats, and respirator masks (which I would later be extremely grateful for, as it helped keep out the smell of dead thawing rodent). Some wise guy told Alison that mammal identification would be a breeze, and that we shouldn't have any trouble sorting them; in fact, we should breeze right through them. Yeah, right. It took us an hour to identify the very first vole. That's when we realized the Prairie and Meadow voles (the two types native to Alberta) looked exactly alike physically; thus we were forced to slice into and dislocate their jaws, and examine their second and third molars under a microscope. The third molar of the Meadow vole appeared to form the word “WIT”, and the Prairie vole, the letters “NT”; thus our identification system was born: the “witty” Meadow vole and the “nutty” Prairie vole (zoology humor, don't ask). The shrews were slightly easier to identify, as most were Arctic shrews, which could, for the most part, be distinguished by their physical characteristics. The remaining species, the Hayden's, Masked, Dusky, and Pygmy shrews, were identified by examining their unicuspid teeth. After two rigorous weeks of rodent ID-ing, I asked if we were allowed to dissect one of the rodents, just for Biology review. Let me tell you, as soon as I caught a glimpse of the gopher's various internal organs and systems, every term gleaned from high school biology courses unearthed itself from the dark recesses of my mind and leapt to the tip of my tongue!

This summer, I also experienced the unpleasantness, I mean, pleasure of working with Kristen, Ryan, and Paul, three crazy but fun university students who must have inhaled way too much ethanol during their work with insect classification and categorization. Pitfall traps for insects were set up at various habitats, in order to obtain a sample of the organisms present in that particular area. The insects found in the samples were then sorted into different vials according



to their order, family, and the site at which they were found. I helped count, label, and sort these bugs into different vials.

Nick's was another research project that involved bugs. For a short time, I was identifying and measuring various insects from a Tundra stream under a microscope, but before long, I was given the task of pre-weighing the small aluminum boats in which the insects would later be weighed. Perhaps that doesn't sound too difficult. Take into consideration the fact that each boat was no bigger than the eraser on a pencil. Also take into account that the scale I was using to measure the darn things was precise enough to weigh a flake of skin; thus the scale took forever to decide the last decimal place (which happened to be 0.00000001 of a kilogram) of the object's weight. This scale also happened to cost \$20 000. You can imagine how freaked out I was when the scale suddenly mal-functioned one day while I was using it; the first thing that went through my mind was, "Ohmygod, I broke a *twenty-thousand dollar scale!!!!*" (Luckily, it turned out that the motherboard was just malfunctioning).

Another amusing task undertaken during my six-week adventure in the Zoology department was the feeding of various small creatures (mainly insects) to other small creatures. The wood frogs were pleasant enough, and would eagerly await their crickets (although sometimes the frogs became scared of their meal and ran away), but the turtles— the snapping turtles— were a different story. One afternoon while cleaning the turtle tank, the siphon swept too close to the turtle, and instantly, it had clamped on; it took two people to wrestle the siphon out of the creature's jaws. During my experience in the Zoology Department, I also became a pro with computers. Data entry quickly reacquainted me with an old friend, MS Excel, and I also rediscovered the Lost Art of Making Complicated Graphs during Lab Poster Week, when professors and grad students alike were hastening to finish their posters for two upcoming conferences. It was also during this week that I learned how to use the scanner; before long, I was touching up color photos and black and white documents like a pro.

Taking part in the WISEST program this summer meant more than learning the Latin names of bugs (for future reference, all beetles are known as *Carabidae*), more than doing something educational, more than having a summer job. WISEST gave me the opportunity to meet new people, get reacquainted with old friends (an old friend of mine was in the program, and we took the same bus home everyday), and gain real insight into the world of science. Not only did I learn new and exciting things about different living organisms, but also WISEST showed me the many different careers existing in the field of science. Before this summer, I was interested in the field of neurology. Well, after Dr. Pazkowski arranged for me to speak with two neurologists on the 5th floor of the Bio Sci building, I am more interested than ever in neurology, but I am now aware of the many different branches of neurology that exist, such as medical neurology, neurophysiology, neurochemistry, neuroendocrinology, neurobiology, neurobiochemistry, neurosurgery, etc. Furthermore, I am now able to understand scientist humor (well sort of). I laugh at sign on the 7th floor of the Bio Sciences building that says "Grad Student Behavior", and penciled in underneath, "is often questionable". And the T-Shirt on display on the main floor that says "Let a Geneticist into your Genes". The WISEST program for me was truly the experience of a lifetime... lived in the space of one summer!

Sherry Bain

Department of Biological Sciences

This summer, I was lucky enough to be chosen as one of the participants in the WISEST summer research program. I worked in the lab of Dr. Frank Nargang in the Department of Genetics in the Biological Sciences Building. As part of the WISEST program, I knew this would be no ordinary job. For starters, not too many people can say that they isolated DNA on their first day of work, but I can.

Needless to say, things were definitely overwhelming at first. I hadn't studied genetics specifically in school, so I had a lot to learn. I was extremely nervous, but luckily I had a lab full of extremely helpful and friendly people who were always willing to help. My confusion was greatly reduced by numerous offers to explain techniques or ideas. Assistance was often present when I needed to find things in the lab. For the first couple weeks, I worked with Frank until I understood things and was more able to work independently.

Our studies centered on how signals from the mitochondria were sent to nuclear genes within *Neurospora Crassa*, a type of fungus. My work focused more specifically around the Alternative Oxidase gene within DNA. This particular gene sends signals that allow cellular respiration to continue when problems would cause it to cease. My work involved a series of many different steps, so I got to do lots of different things. I started out by isolating the DNA, transferring it back into conidia, and then purifying the DNA through a series of plates and tubes. Colonies from the initial plates were picked to tubes, and then streaked to plates, and those colonies were once again picked back into tubes. These tubes were inoculated and transferred to flasks so that respiration work could be completed. The respirometer results showed whether or not changes in the DNA affected the regulation of the Alternative Oxidase gene. My work involved making lots of gels, various types of plates and slants, and preparing DNA. I also got to use various machines like the autoclave, electroporator, and respirometer.

Aside from working hard at the lab, I also had lots of fun, whether it was with my coworkers or WISEST. Our lab participated in a couple of barbeques, soccer games, and a trip to the movies. Our WISEST activities included things like bowling, Shakespeare in the Park, the Odysseum, lab tours, the lack of yield games, and small group discussions. Weekly lunches also gave me a chance to socialize with the other WISEST participants.

Being from a small town three hours outside of Edmonton, I stayed in residence at St. John's Institute. Life there was always an adventure and we had lots of fun. We definitely kept ourselves busy with numerous shopping trips, Klondike Days, TV/movie nights, walks down White Ave, or just hanging out in the common area.

Overall, my summer in the WISEST summer research program was awesome. I got to meet lots of interesting people, stay in the city for six weeks, learn all about genetics and the university campus, learn proper lab procedure, and was paid for it all. It was definitely a great way to spend six weeks of my summer.



"As part of the WISEST program, I knew this would be no ordinary job. For starters, not too many people can say that they isolated DNA on their first day of work, but I can."

Tamara Mundy

Department of Mathematical Sciences

The life of every person between the ages of 6 and 18 is school. Often a person's self-worth is determined by what other people think of them. For some, being labeled a "nerd" or a "geek" can be detrimental. I am proud to be a nerd. I enjoy school and actually do well in it. Normally I am a part of a minority because of this. Here, at the WISEST Summer Research Program, it is not only normal but considered a compliment to be called a "nerd".

This summer I have been working alongside Kelly Hearn, and under the supervision of Dr. Andy Liu and Dr. Ted Lewis. Together we are creating a booklet of math problems. These problems will be given to elementary and junior high students to solve in a hands-on manner for math fairs. Math fairs are similar to science fairs in the respect that they give young people a chance to learn and to share what they know. The idea behind math fairs is to provide an opportunity for young people to discover that math is more than just numbers, it is problem-solving-fun. It is amazing, the feeling of accomplishment, to work tirelessly on a difficult puzzle and then to finally solve it. The ideas behind math fairs are spreading throughout Alberta and the world. I had the privilege of meeting a professor from Sweden interested in starting math fairs there. The idea is to show children that math is fun, and there is nothing wrong with enjoying it. I know I do.

It is truly amazing that you can place 11 people together in a dorm for six weeks, no matter how diverse a group, and have them become friends. People you may never otherwise have bothered to truly get to know quickly become your dearest friends. The girls that stayed at St. John's Institute know about this. We may all seem quite different at first glance, (our interests include sports, music, cheerleading, astronomy, trivial pursuit and Star Wars Monopoly), but at closer inspection reality shines through. We are girls. We love science, shopping, talking, watching movies, being free to be the people we truly are. That is what St. John's Institute has really been about.

"It is truly amazing that you can place 11 people together in a dorm for six weeks, no matter how diverse a group, and have them become friends."



With every experience something is learned, a new piece of knowledge is gained. This summer I helped create a booklet that will hopefully play a part in encouraging young students to be interested, curious and learn wonderful lessons from math. Along the way I have learnt a few lessons of my own. I have learnt that to solve a puzzle you must think outside of the box, you must look at the situation from any and every possible angle. As life is made up of a series of puzzles and problems, these are valuable life lessons that will help me always.

Math, numbers, shapes, problem solving, fun! Really all these words do belong in the same sentence. Just like these ones: During the summer vacation "cool nerds" get together to work. I am proud to be a math nerd.

Thank you to each and every WISEST student for adding yourself to my WISEST experiences. To Dr. Liu and Dr. Lewis for sharing their love of math and puzzles with me. To Grace, Haley and Kirsten for helping to guide me through this summer. To all the volunteers for sharing themselves and their experiences. To my sponsor, Imperial Oil National Centre for Mathematics, Science, and Technology Education (IONCMASTE) for encouraging this program. To Linda for being not only our resident assistant but also a good friend.

May we all remember our WISEST experience that rest of our lives. :O)

Tiffany Lau

Department of Chemical & Materials Engineering

Materials engineering? With the local and worldwide community drilling into young minds the professions of doctors, dentists, and lawyers, who knew that such a thing even existed? Well, the situation might not be to that extreme exactly, for I am sure developing youths have heard the field of materials engineering floating around in the air every once in a while. However, to me, materials engineering had always been just that: materials engineering. It was never anything more, and a few months ago, due to my lack of knowledge of this area, the idea of entering this field would have been completely out of the question. It had always been the vocation of, well, doctor, dentist, or lawyer that had interested me. However, with the WISEST Summer Research Program, I can honestly say that my career options have significantly broadened, and materials engineering is not just simply materials engineering anymore.

During the six-week term of the WISEST program, I was asked to carry out materials research by examining sections of a pipe that failed due to corrosion. Under normal circumstances, the substance the pipe had been comprised of, austenitic stainless steel, would not have corroded, as the austenitic form retains its microstructure under ambient environmental conditions. Therefore, I undertook the task of discovering the cause of this unexpected corrosion activity, which unquestionably could not have been accomplished without the help of my supervisor, Dr. Barry Patchett, and his graduate students, Patricia Cameron and Jason Reinhart, who all took the time to explain information about unfamiliar subjects and teach proper lab methods. These methods were all applied not only in the Materials lab, where I learned how to polish and etch metal samples to reveal their grain structures, but also to machines such as the Hardness Tester, an instrument that allows you to measure the hardness of different areas in the samples, and the Scanning Electron Microscope, which had been used to reveal the presence of certain metals in the steel.

"I, along with the other forty-five WISEST summer students, was able to explore all sorts of other opportunities..."

Not only did I have a chance to familiarise myself with new technology and materials science and engineering, but I also received an opportunity to become acquainted with the university campus and the assortment of programs that it offers. Instead of being limited to the boundaries of my assigned field, I, along with the other forty-five WISEST summer students, was able to explore all sorts of other opportunities, whether it was fields of interest or even areas that before had been unheard of.



This had been done with the WISEST weekly Wednesday activities, ranging from on and off campus tours of various research facilities to small group discussions of university life to the information session known as “So You Wanna Go to University” which all helped to provide me with some sort of direction for my future university years.

All in all, the WISEST Summer Research Program had been a momentous learning experience. In terms of university life, I learned that university is not as frightening and intimidating as it is cut out to be, and in terms of materials engineering, I learned that there is so much more to this field than I ever imagined there to be, so much to discover and experience...and to think, I haven't even scratched the surface yet.

Vanessa Fulford

Department of Mechanical Engineering

Grade 11 was over and there I was, going to university. Well, not quite, but close enough. I was going to the university to participate in the WISEST Summer research program. Six weeks away from home, being totally responsible for myself (and having to do my own laundry) for the first time. When I got to Edmonton in early July, I was definitely nervous, but excited at the same time. This was my first look at university life, and I have to say, I liked what I saw.

When I was told that I was going to be working in a lab, I imagined a huge laboratory with everyone in lab coats, goggles, and rubber gloves. I learned that in Mechanical Engineering, things are a bit different. The lab in room 4-25 of the MECE building consists of computers, desks, static whiteboards, and a stubborn printer. That's where I spent my summer, researching Artificial Neural Networks. Under the supervision of Dr. Walid Moussa and undergraduate student Jan Bouma, myself and fellow WISEST student Asha Gupta worked to develop neural networks, write documentations, and broaden our knowledge of science and engineering. Neural Networks are like artificial intelligence; the computer analyzes inputs and then learns. Being a newer project, things started slow. We did a lot of reading. This gave me a great opportunity to check out the Cameron library and other engineering resources. Once we got on the computers, things picked up and we saw results. Our first task was to teach the network to approximate a two-dimensional function, like a parabola. When we got the network to work, it was exciting, so like any great researchers, we documented our findings. Then, we moved on to integration (finding the area under the graph), and quickly progressed from there to approximating three-dimensional functions. This is a more difficult area, but we are already starting to see the results. Jan has already been able to get a network to smoothly approximate a 3D parabola. Working in this lab has been a huge learning experience for me that I am positive I will always remember.

The program has been much more than just working in a lab. Wednesday activities have helped me learn even more about university life and my future. During the off campus tour, I visited a Microbiology lab. This was very exciting because that is an area that I had never considered before. Also, during small group discussions, I got to hear the experiences of other women in science. This really gave me an idea of just how much out there is available to me. Another very helpful event was my tour of the Syncrude research facility. Because Syncrude was my sponsor, I was allowed on an incredible tour of their facility with Dr. Jean Cooley.



Coming from Fort McMurray, the Oil sands are a big part of my community. I was able to relate all the practical applications of the engineering and technology that I have witnessed over the summer. One thing for sure is that the WISEST program has really expanded my horizons in terms of all the careers that I can enter and all the amazing things that I could devote my life to.

The university part of this experience has been amazing, but I would be lying if I didn't say that staying at residence really made it all worthwhile. For my six-week stay in Edmonton, I resided on Whyte Ave at the St. John's institute. The food was great, the people were so nice, and being able to tell people that they let you out of the institute for the afternoon is really fun. I don't think I've ever had such a good time. You know you have made some real friends when you can floss your teeth in front of nine other girls. I have somehow gotten used to having an average of five hours of sleep a night and having the Ukrainian Osvita boys at the institute didn't hurt either. I haven't been home once in these past six weeks, but I don't miss it at all. I've made a new home at the institute.

I don't think that I could have spent my summer in a better way than to take part in the WISEST summer research program. I learned, saw, and experience so much. I got to see all that the University and Edmonton has to offer. I know this sounds cheesy, but this is the best time I have ever had. I've never met so many extraordinary people, done so many exceptional things, or had so many memorable experiences. Now that summer is over, I'm really sad to see it gone. I doubt I will ever have such a unique time again. This program has really helped me to learn so much about the world, my future, and myself.

Vikram Gurtu

Faculty of Nursing

When first notified of this position in WISEST in the nursing faculty, I was quite confused on what my duties would be and what the program itself would be like. However, after meeting the WISEST coordinators and the faculty members that I was going to work with, I was quite confident that I was going to enjoy the next six weeks. I was correct.

Being my first job, I was quite nervous at first, however, gradually overtime I became comfortable with it. I was introduced to Dr. Yonge, my supervisor, and Jamil Janmohamed, my co-worker, on the first day. Later that day I was taken to the office on the sixth floor of the Clinical Sciences building. I learned right away how fast-paced the people at the university are but also learned that the projects that we would be part of would require much patience.

The project itself was about articles on nursing education. Our job was to review the articles that the professors had analyzed and enter them into the database program known as ProCite®. We would have to skim through each article to understand its main concepts, and add keywords that fit the topics and methods utilized by the researcher. The faculty would then use these keywords to search the database that we had created so that they could find various articles that pertained to their area of interest.

When I first saw the package and extremely thick manual to ProCite®, I honestly was quite intimidated. "Yes, you can take it home and read through it if you'd like," said Dr. Yonge. Both Jamil and I thought that would be a good idea, as neither of us knew this program. The next day we would be able to try it out and found out that it was more simplified than we initially had expected. We eventually became comfortable with the data entry and reviewing of articles.

"So Dr. Yonge," asks Jamil, "how many articles do you think we will complete by the end of the program?"

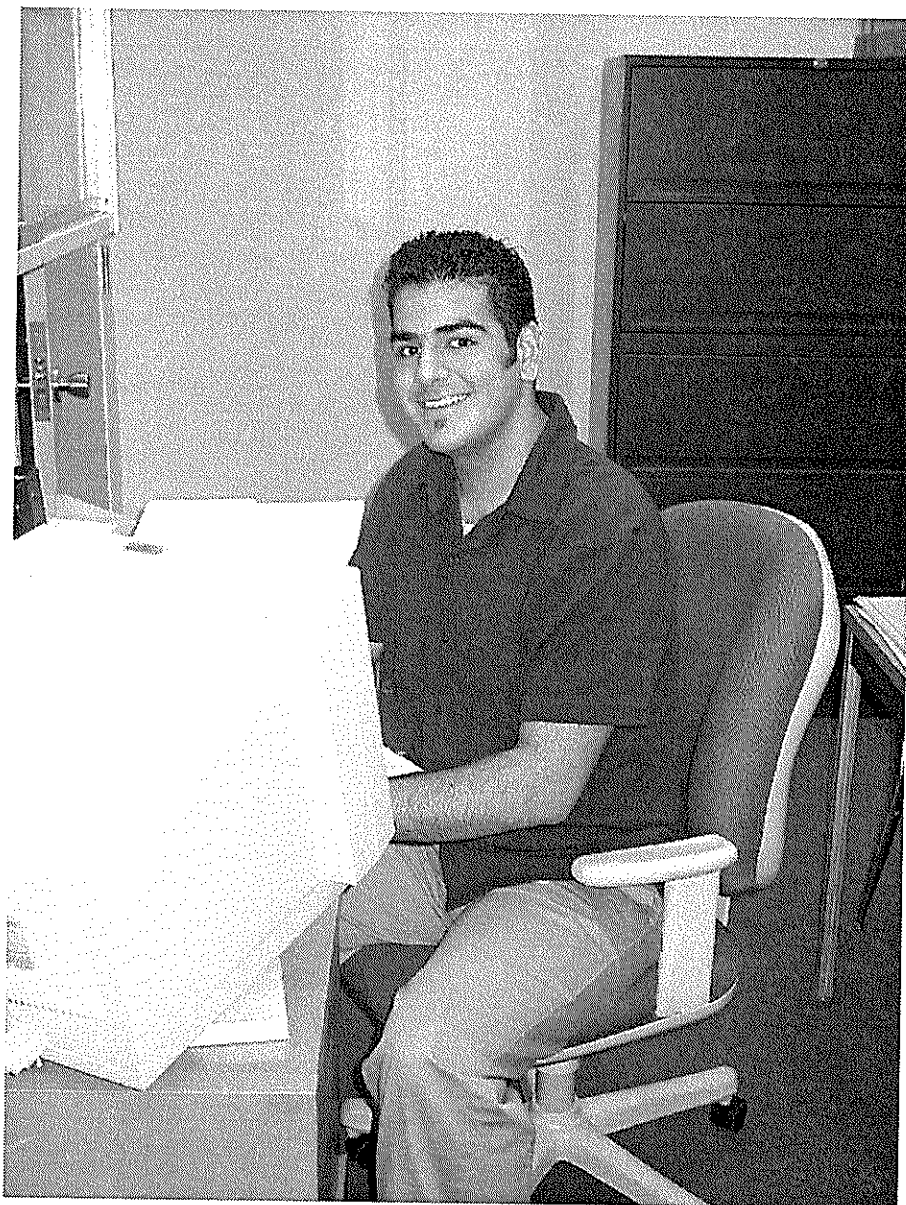
"Oh about 5000? Just a rough estimate," she replied. We found out over the first week how long each article would take to enter. 400 articles later, we find that we only have one week to complete the remaining 4600. But we have realized that the project is not as large as expected, and we have completed entering about one-third of the articles necessary.

Working with Dr. Yonge has been an excellent experience for me. She not only exposed us to the world of nursing, but also to the whole university and life after high school. She not only came to speak with us almost every day, but also arranged many field trips for us. During her vacation, we were fortunate to have Dr. Olson as a temporary supervisor who did the same.

Because of their generosity and great efforts, Jamil and I were able to visit many professionals along with our friend from the fourth floor, Rick Li, including an occupational therapist at Alberta Hospital, psychiatric nurses at the University Hospital, the Associate Dean of Engineering Ken Porteous, and nurses such as Susan Chernenko who did a talk on organ transplants. I learned of various post-high school opportunities through not only these field trips but through the WISEST activities such as the small group discussions and the trip to the Center for Engineering Research Technologies.

The WISEST experience was a little different than what I first expected, but it turned out to be a great success for me. Academically, I learned the lifestyle of the people of the university and also was exposed to various areas of post-secondary education, as well as many professional occupations. I was also glad that I was able to meet other students from WISEST and HYRS and make some new friends to see at lunch or at WISEST activities.

Overall, this summer was an excellent experience. I learned a great deal during this memorable summer thanks to the WISEST program and all of its organizers and participants. The events of the past six weeks have given me a new perspective of the work force and post-secondary education. These experiences will aid me in the future and stay with me for the rest of my life.



"WISEST was a great success for me."

Yanna Stivar

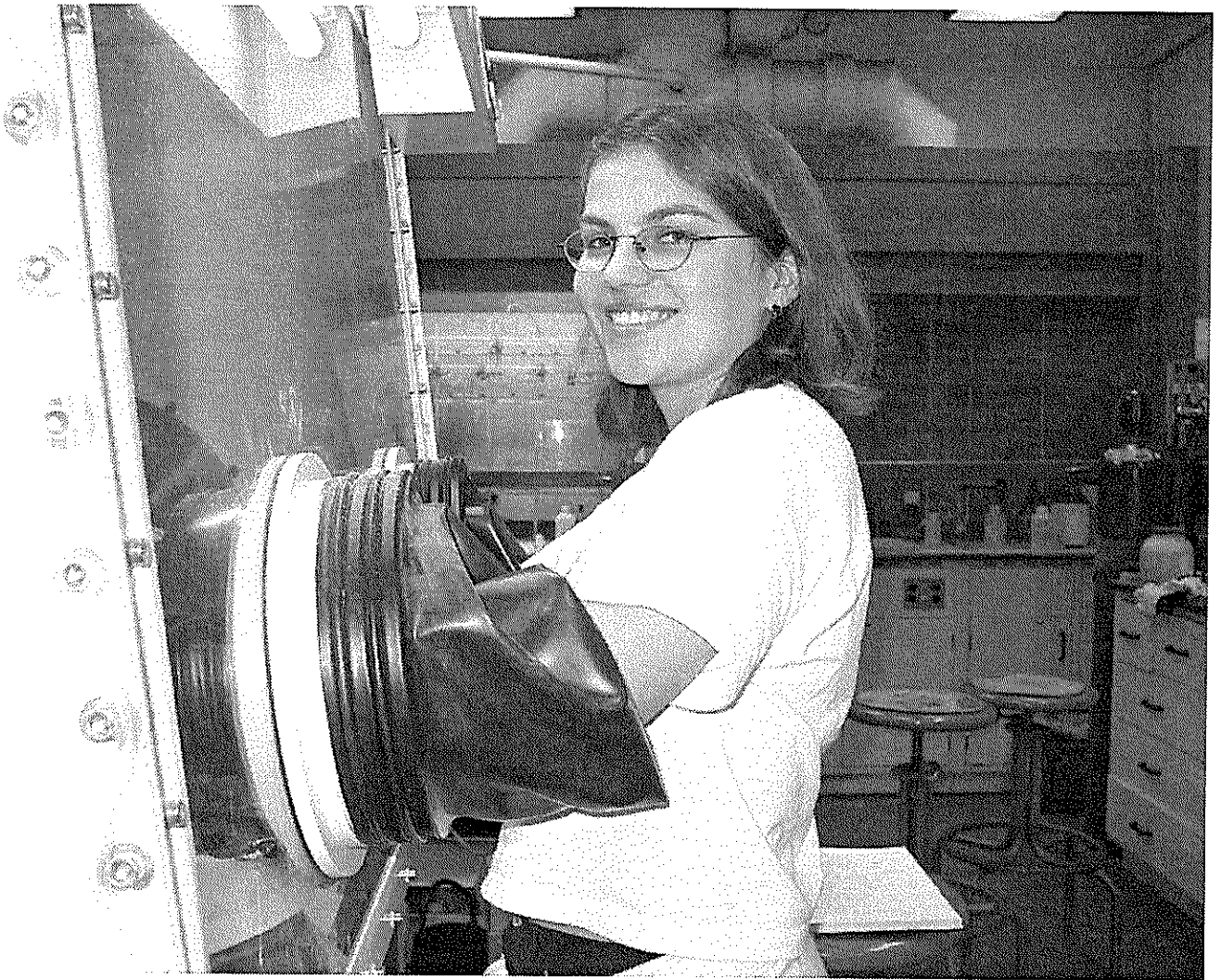
Department of Chemistry

When I filled out the application for the WISEST Summer Research Program, I wasn't sure what to expect. It turns out that I couldn't have made a better decision. The experience I gained as a result of participating in the program will be a lifelong asset. I spent six weeks working in the chemistry department at the University of Alberta as a member of Dr. Arthur Mar's research team. With the help of the other lab members, I learned a lot about research and what it is they hope to attain.

The project involved inorganic solid state chemistry; the synthesis and characterization of intermetallic compounds. In particular, the Mar group is interested in the less explored phases and combinations that form from mixed rare-earths and pnictogens (Group XV). A mixed rare-earth pnictide has yet to be developed. Be that as it may, various intermetallic compounds are used for all sorts of purposes, including superconductors and thermoelectric materials.

Mixtures of metal powders (> 99% pure) were used as the starting materials. In order for metals to combine, they need to be in the liquid state. High temperatures can be reached by arc melting or with a reaction furnace. In arc melting, the metal powders are compressed into a pellet and zapped with electric current. The resistivity of the metals causes them to become hot and melt into a ball. The arc melted sample or the powdered mixture is sealed in an evacuated silica tube. (Rare-earths readily oxidize when they are exposed to air.) The silica ampoules are heated in a reaction furnace for a week or more to allow enough time for the metal particles to diffuse and react with each other. Diffusion can be aided with the use of various fluxes, which provide a molten medium for the atoms to move around in.

Using the techniques mentioned, I explored the relationship between cerium, erbium, and antimony. Different ratios of these three elements were mixed and then pelleted and arc melted. Each arc melted sample was placed in silica tubes along with a salt flux. The samples remained ten days in the reaction furnace, reaching temperatures of about 900°C. Afterwards, the product was mounted for Energy Dispersive X-ray (EDX) analysis. EDX identifies the elements in the compound that forms and their percent composition. According to EDX, most of the products contained all three metallic elements in a $\text{Ce}_{1-x}\text{Er}_x\text{Sb}$ relationship. Further investigation of the compounds by powder diffraction suggested a disordered crystal structure with a face-centred cubic unit cell similar to that of sodium chloride (table salt). In the future, a greater understanding of the chemistry of the compound can be acquired through structure determination and property measurements.

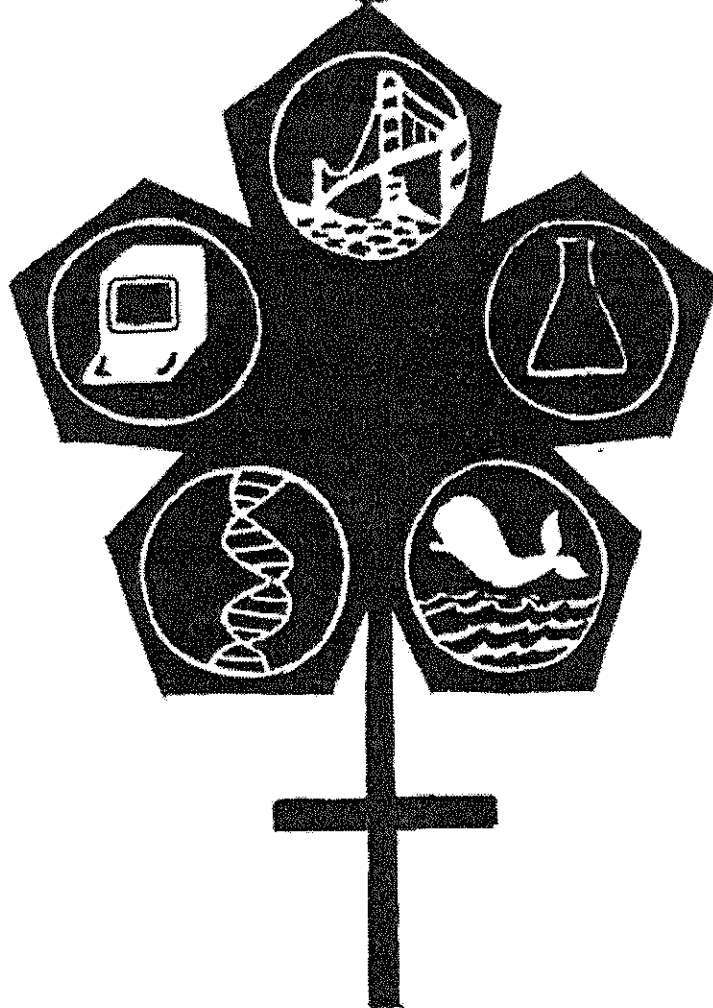
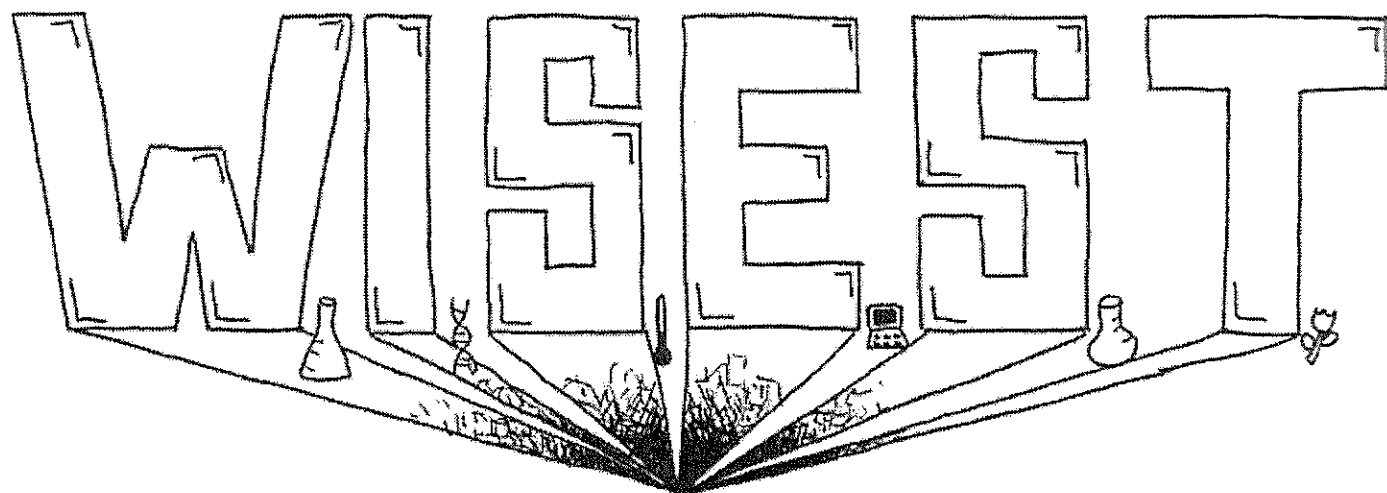


However, before this can be done a crystal is necessary.

My experience both inside and outside the laboratory was largely influenced by the people I met. The other lab members were both friendly and informative. Not to mention, they had a great sense of humor. Furthermore, the WISEST coordinators organized Days o' Fun where the WISEST students got together to have a great time. We learned a lot from the small group discussions, the field-trip to C-FER, and the on campus tour of another research lab, about different career opportunities. We also just hung out and got to know each other during our "Terrific Tuesday" lunches and the Hot Dog Roast in Hawrelak park. Sadly, the summer had to come to an end, but the memories we made are priceless. I hope that other students for years to come will also be able to share the same experience. The program expands on school subjects and introduces new possibilities. It certainly gave me something to think about when it comes to my future.

"The memories we made are priceless."

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WOMEN IN SCHOLARSHIP, ENGINEERING, SCIENCE, AND TECHNOLOGY

