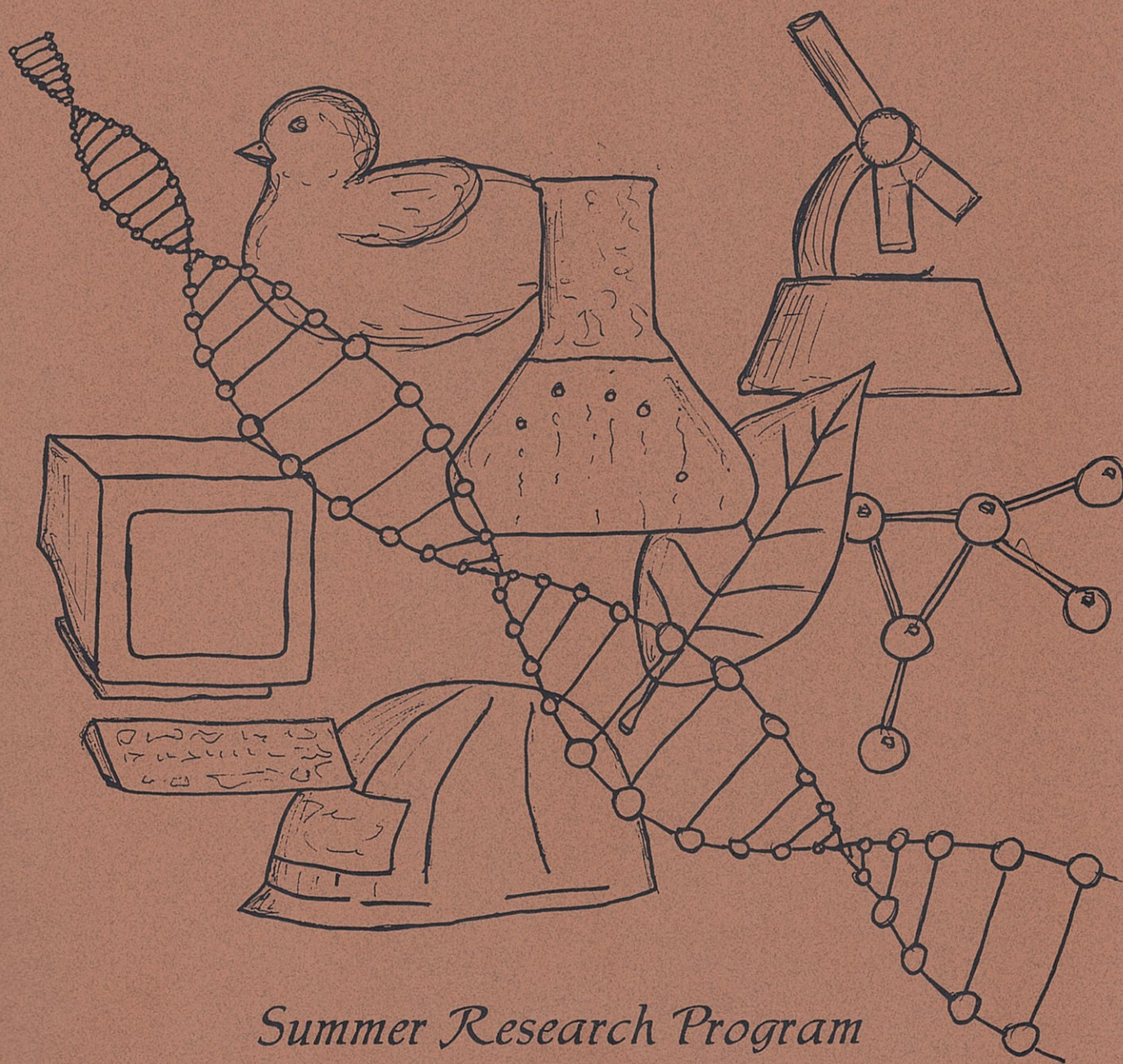




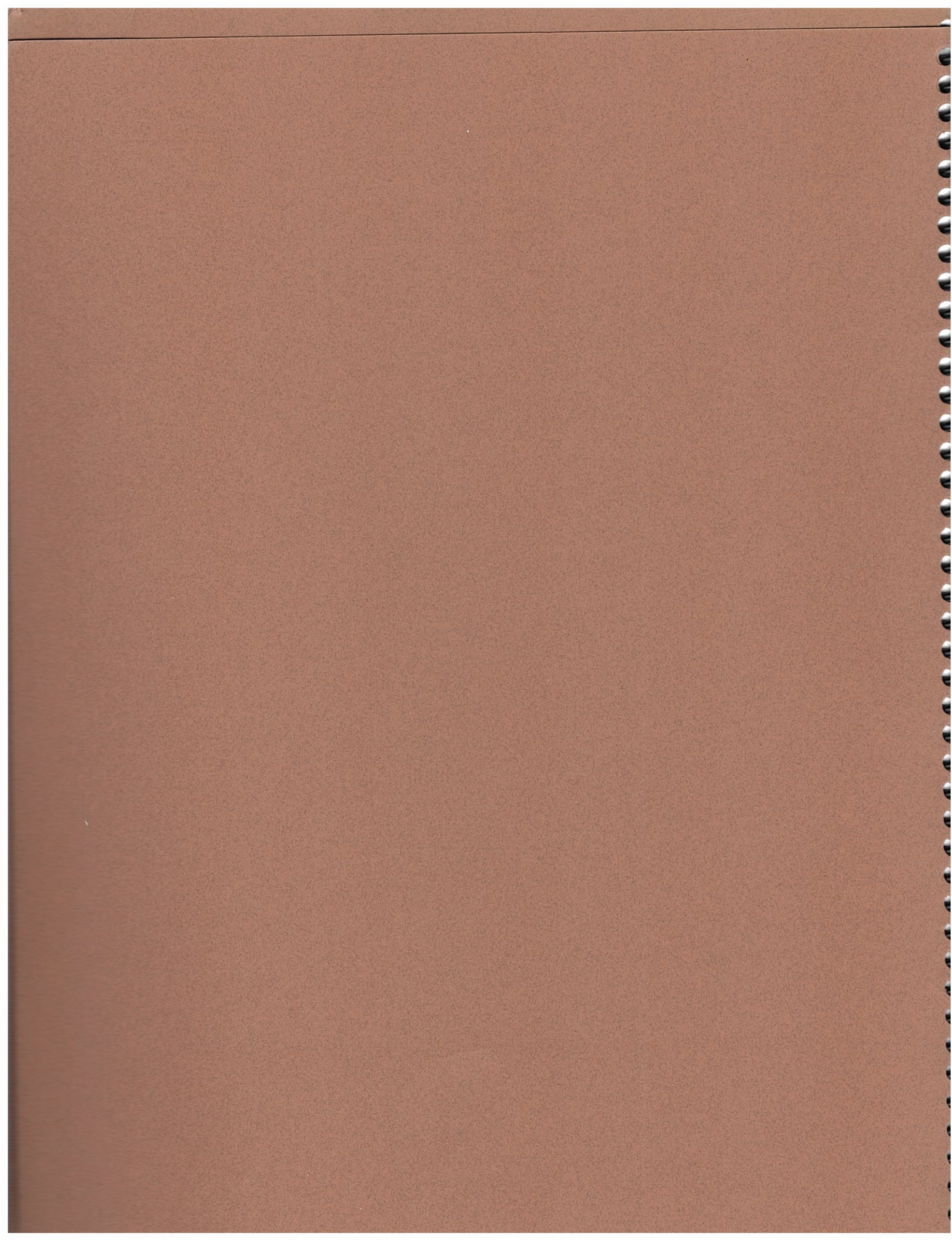
WISEST

Women in Scholarship, Engineering, Science and Technology



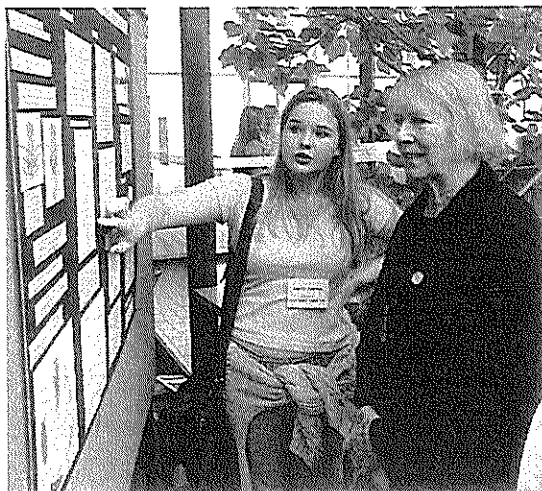
*Summer Research Program
Student Reports*

2000



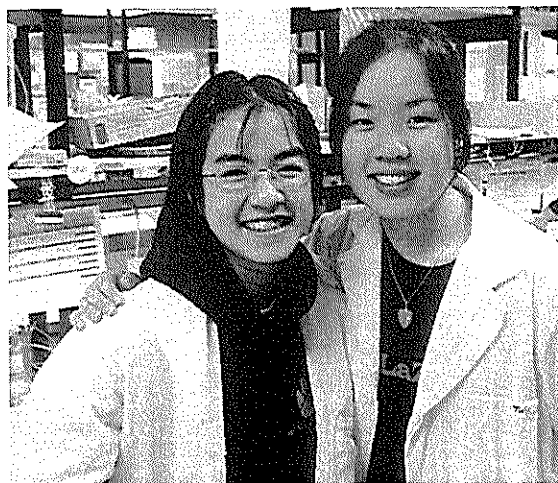
WISEST

Women in Scholarship Engineering, Science and Technology Summer Research Program 2000 Student Reports

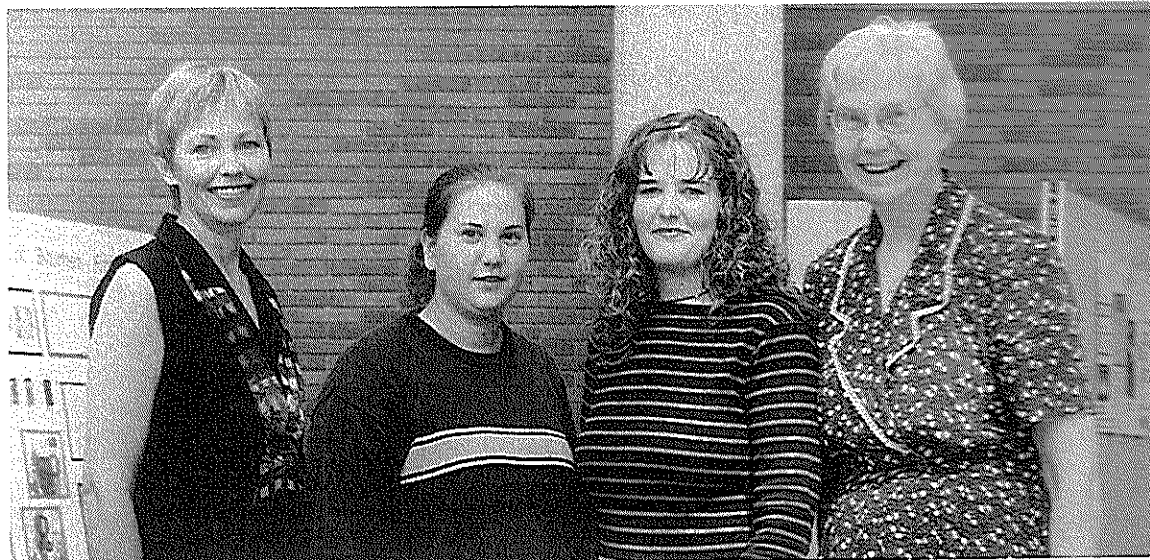


"I have acquired invaluable skills and my interest in science has been strengthened."

"WISEST is a wonderful experience both intellectually and socially. You meet the most amazing people!"



"It was a pleasure to have the student in our research program. She was quick to pick up skills, very efficient, interested and able to communicate well with the research team members and advisory group."



Welcome to the WISEST Student Report Booklet

In early 1982, while attending a seminar on microprocessors, Dr. Gordin Kaplan (then the University of Alberta Vice-President, Research) noted that there was only one woman among the 150 people present. This triggered the creation of a new group to promote participation of women in the non-traditional careers - Women in Scholarship, Engineering, Science and Technology (WISEST). The primary job of this group, said Dr. Kaplan, is to try to understand why women are under-represented in the hard sciences and engineering, and then do something about it. Since women are still markedly under-represented in decision-making roles in the sciences and engineering, WISEST has 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.

The WISEST initiatives include annual conferences for Grade Six girls (CHOICES) and for high school girls (SET - Science, Engineering and Technology). WISEST is also pursuing a variety of research projects that investigate the teaching and promotion of science and engineering for women, the retention of young women in science who are pursuing their studies in regional colleges, and the approach of the aboriginal students to the students.

One of the first major initiatives of WISEST is the WISEST Summer Research Program. It has evolved over the last 16 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 success of the WISEST Program is a reflection of the support of many, many people: high school teachers, faculty supervisors, research team members and WISEST Partners. 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 that give us a sense of the individual'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 join the team in an on-going research project, or to work on research projects specifically designed for the students. In many cases, the supervisors arranged for the WISEST students to study and develop skills under the day-to-day supervision of a research associate, technician, or a senior graduate student in his or her laboratory. A complete list of the students, their supervisors and the corresponding departments is found within this book. Many thanks to the faculty and research team members who taught and encouraged the Program students.

There are many long-term benefits of participating in the Program that the students will continue to discover over the course of their studies and career work. On a short-term basis, they are paid at the minimum wage for their six weeks of work. The total number of students who can participate in the Program fluctuates from year to year, depending on the funding that WISEST can procure to pay for the students' wages and the Program costs. 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 2000 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.

On our WISEST team we were so fortunate to have Michelle Radmanovich and Cheryl Strydhorst. Michelle Radmanovich (Student Coordinator) dealt with the students' individual concerns, helped to organize all of the WISEST formal activities, arranged a broad assortment of social activities, ensured that the supervisors knew what WISEST expected of the students and she shared her strong university experience with the students. A very busy role, and throughout, Michelle continued to be considerate and caring for the students' needs. Cheryl Strydhorst served as "Big Sister" to the six girls who were living in St. John's Institute, a residence close to the University of Alberta campus. Many thanks to both Michelle and Cheryl for ensuring that the WISEST Program was successful for everyone involved.

We hope that you enjoy reading the WISEST Student Report Booklet as it contains the students' own stories about their summer experience, both in a written manner and pictorially. We in the WISEST office 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)

Hello from the WISEST Student Coordinator

Michelle Radmanovich

Like all of you I've been back at school for the past month or so and haven't had much time to think about my summer with the WISEST Summer Research Program. I've just been too busy watching TV and hanging out ... er... I mean doing assignments and studying - that I don't really have any profound or philosophical statements for you. But there are a few things I do know (yes, its true, I do actually know something). So here it is, my list of the things that I learned from the WISEST Summer Research Program (you'll notice it's fairly short because I am a true procrastinator and I didn't start doing this until 10:30 the night before it needed to be done - shhhhh, don't tell Grace!)

There are far too many schools in the Edmonton and Surrounding Areas to remember

Not every person interested in Science wants to be a doctor

Playing phone tag with 15 or so Grade 11 students isn't a lot of fun until you hear how excited they are to be in the Program

Making 'information packages' for 40 students takes a lot of photocopying

You should always check your handouts before you photocopy 40 of them - just in case you make a huge mistake (to all of you who thought we were supposed to meet in Jubilee Parking Lot instead of Parking Lot E - I apologize, again)

40 Grade 11 students will actually sit and listen to someone that doesn't look any older than 16, and who is extremely nervous

2 guys in a group of 38 girls may not want to hold the door open

It is possible to remember and correctly spell the first and last names (and even some middle names) of 40 people

Some of you will actually hang out with two 'ancient' 22 year olds

A campus tour and library session can be fun and informative - sort of

Canada can play soccer - we almost won!

Having pizza and pop in the park is a good way to relax and hang out

Juice and granola bars make Small Group Discussions go well

The Space Science Center is more fun for Grade 11 students than it is for 6 year olds

Tours of other labs on campus are more enjoyable if you know where you are supposed to go

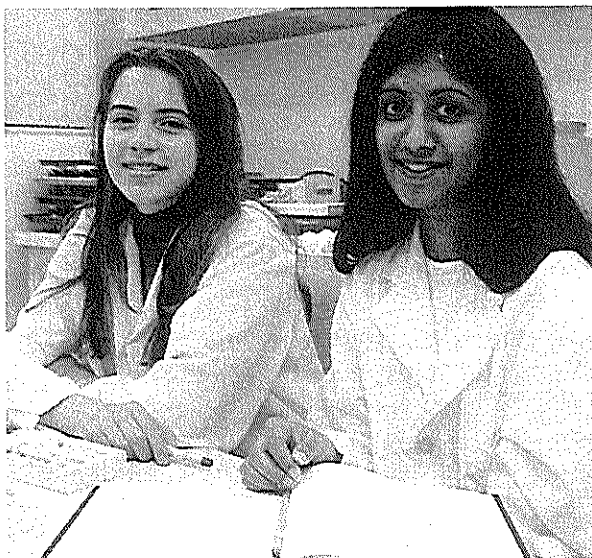
Making posters is fun! So is giving your spiel about your 6 week research project to people over and over again

Teresa really likes to take pictures

And more seriously,

It gave me a chance to meet some really neat girls & guys/young women & men/young adults - you know I really never knew what to call you all

Spending your summer doing real research can be both an exciting and a trying experience - either way you've all learned something



"We feel that this is an exciting, educational venture that will benefit the community."

Jim Stewart,
Vice President and
Regional Manager,
UMA Engineering

"Weyerhaeuser Canada is pleased to be able to support a positive approach to get more women involved in scientific professions, especially engineering careers. Weyerhaeuser's site principles encourage diversity throughout our workforce. By participating in your program, we can slowly expand the talent base we recruit from at the University of Alberta."

Ms. Lisa Hall,
Process Engineer,
Weyerhaeuser Canada

"The Women in Scholarship, Engineering, Science and Technology Summer Research Program is an important event for this province, as it encourages young girls to pursue careers in science and technology and be a driving force in the new economy."

Dr. Lorne Taylor,
Minister of Innovation and Science
Province of Alberta

"I have been very impressed with the success of WISEST. It is nice to see the excellent recognition that it has received."

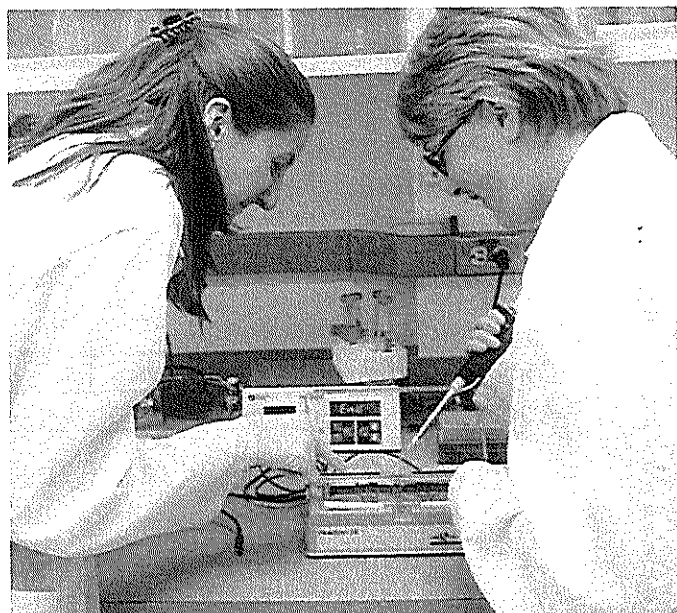
Dr. Lorne Tyrrell,
Dean, Faculty of
Medicine and Dentistry

"We value our partnership with WISEST and wish you continued success with the many excellent initiatives WISEST offers."

Dr. Mary Fairhurst,
Research and Development,
Dow Chemical Canada Inc.

"We are very happy to support a program which provides opportunities for young people to experience scholarly work in science and technology and wish you every success in your endeavours."

Dr David Blades,
Director IONMASTE
Imperial Oil National
Centre for Mathematics
Science, and Technology Education



PARTNERSHIP 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.

Become a WISEST 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 | • UAYs for University of Alberta Women in Science and Engineering |
| • <i>Choices</i> for grade 6 girls | • Other |
| • We would appreciate further information. | |

Please contact us.

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

**SPECIAL THANKS
TO THE WISEST PARTNERS AND CONTRIBUTORS
FOR THEIR FINANCIAL SUPPORT
OF THE
WISEST SUMMER RESEARCH PROGRAM 2000**

PARTNERS

Alberta Heritage Foundation for Medical Research
Alberta Research Council
Alberta Science Research Authority
Canadian Information Processing Society
Canadian National
Department of Computing Science
Dow Chemical Canada Inc.
Edmonton Glenora Rotary Club
Faculty of Agriculture, Forestry, and Home Economics
Faculty of Engineering
Faculty of Medicine and Dentistry
Faculty of Science
Glaxo Wellcome Inc.
Human Resources Development Canada (Summer Career Placement Program)
Imperial Oil National Centre for Mathematics, Science and Technology Education
Ministry of Innovation and Science
NSERC/Petro-Canada Chair for Women in Science and Engineering
Summer Temporary Employment Program (STEP)
Suncrude Canada Limited
UMA Engineering Ltd.
Vice-President (Research)
Weyerhaeuser

CONTRIBUTORS

BP-TEC Engineering Group Ltd.
Brinsmead Ziola Associates
Celanese Canada Inc.
Chieftain International Inc.



THE FIRST DAY - YIPE

By Kim Lam

I knew the first day wasn't going to be as bad as I thought it would be. Michelle sounded really nice over the phone. I had talked to my parents and they agreed with me when I said that I probably only need paper and a pen or two. I brought a backpack, just in case they gave us stuff. I was totally prepared, totally psyched, and not in any way nervous.

Hey, look, there in the sky. Is that a pig?

Okay, so I was very nervous. What if I made a complete fool of myself? What if I hated everyone there? What if everyone hated *me*? What if I was supposed to bring something else with me besides pen and paper? What if I got completely lost? What if...?

Well, it turns out I was right about one thing. It wasn't as bad as I thought it would be. The second I walked into the room, I saw a couple of junior high friends, Violet and Julie. Cool! I relaxed. Grace and Michelle were really nice during the session, putting all of us at ease. The "Get to Know Your Neighbour!" activity seemed a bit corny, but it was a good excuse to talk to the others. By the time lunch rolled around, I was chatting with the girls around me and enjoying myself.

Lunch was fun. I spent my time munching and getting to know other people. It was amusing to see some of the looks we got when the huge group of WISEST people went down to SUB for lunch. It made me think of a herd of cattle. Moo!

After lunch we went back to the session, and soon we met our supervisors. I became nervous again, but it didn't turn out badly. In fact, my supervisor was a really nice guy. Whew!

With luck, the rest of the summer was going to turn out just as cool as the first day.



OUR CAMPUS TOUR

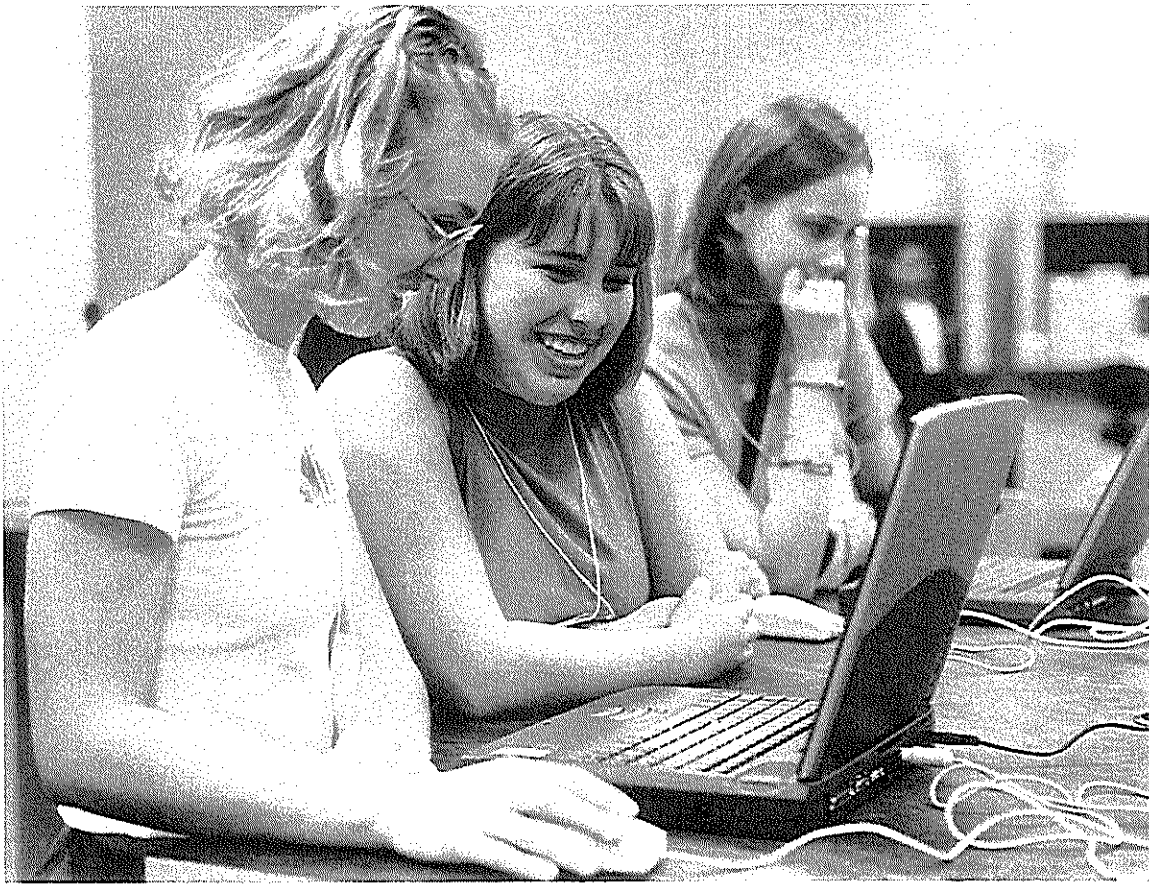
By Molly Hildebrand

By the end of the U of A campus tour I was only slightly more aware that buildings other than SUB and CAB existed. The position of these buildings and how to get from one to the other still eluded me. Although I still could not find my way across campus, I don't think that I would mind getting lost in the picturesque landscape. Wondering along the paths lined with lush greenery and surrounded by large historic buildings would definitely not be so bad.

The day of our tour was hot, but luckily the mosquitoes had not hatched yet. We started at CAB and worked our way down to Saskatchewan Drive past the tallest building at the U of A, the Tory Building. We then looped back past the most important place on our tour by far, Athabasca Hall, home of WISEST and our pay checks.

All in all the tour was a success. I will now take the time to apologize to all office inhabitants and pedestrians that we may have disturbed or blocked while on our tour. I think they understood a tour was taking place though - the name tags must have tipped them off.

Anyway, here's a recap of the most important places at the U of A that we found out about while on the tour. 1) the WISEST offices in Athabasca hall - where we get our money honey. 2) SUB and CAB - for an excellent source of nutrition such as Taco Bell or burger King either of these buildings are great. 3) The Power Plant and the Room at the Top - OK so we can't get into these two bars for another year, but you can bet I made note of their locations. 4) The Administration Building - this is where we'll need to go to do important things like argue about money and sign up for classes the day before the registration deadline. 5) U of A athletics facilities - we'll need to make use of these to work off the freshmen five if we end up here next fall. Of all the buildings on campus, I was most impressed by the athletic facilities. I am embarrassed to say that I only recently found out that the ice skating treadmill thing in the gym was not made out of ice, but instead plastic. I was wondering how they kept it from melting.



THE TOUR OF COMP CANADA

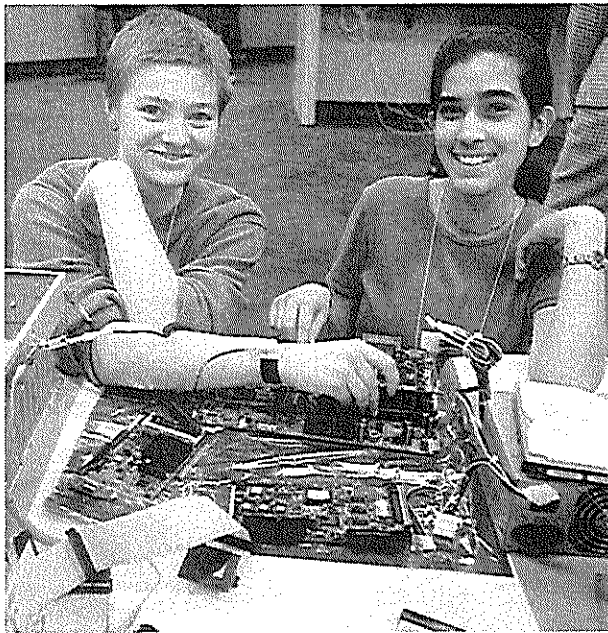
By Nicole Lutic

As one of our Wednesday activities all of the WISEST students went as a group to tour Comp Canada. Before we arrived I had no idea what this company was about or all that it had to offer. Upon arrival we were broken up into several smaller groups and taken through several stations. At each station we were shown some new technology sold at Comp Canada. It is amazing all of the things that you are now able to do with computers.

One of my favorite stations was a demonstration of a video camera that could be used to see and talk to other people around the world. All that you needed to do was talk into a microphone and the other person was able to clearly and immediately hear and see you from their computer. I am sure that this could sure save large companies on their long distance phone bills.

Another interesting station was where you could register your voice into the computer so that when you talk it would recognize your voice it and type out what you said. This would be useful for people like myself who are extremely slow at typing !.

There were also many other interesting stations and things to see. For example the inside of a computer and interactive games on a laptop computer. I think that everyone had a great time and learnt something new about the technology available to them.





SMALL GROUP DISCUSSIONS

BY CANDICE HERON

This session was truly enjoyable. Being able to meet six successful women who have pursued careers in sciences, engineering and computer technology was really inspiring. It also gave my group and I a chance to learn what areas each of us were interested in and become closer. One interesting aspect of the discussion was about how working in these areas affects the families of these women. Many conversations focused around the flexibility of jobs in science-related work and the ability of people to travel abroad within their field of work. We talked about different opportunities such as BUNAC and co-op programs to expand the traditional approach to University study and work experience. It was really great to have a variety in the ages of our role models, as we could see the differences in opinions of women who are still in classes and those who have been in the work force for a number of years. It was also nice to learn that many industries are beginning to allow more choices regarding schedules and type of work to accommodate women. We learned that most companies are very interested in the skills women can bring to the jobsite making our future endeavors in sciences something to look forward to. I would like to thank Jean Cooley, Casey Jones, Martha Watson, Lori Meller, Shannon Warner and Famida Tejani for sharing so much with us.



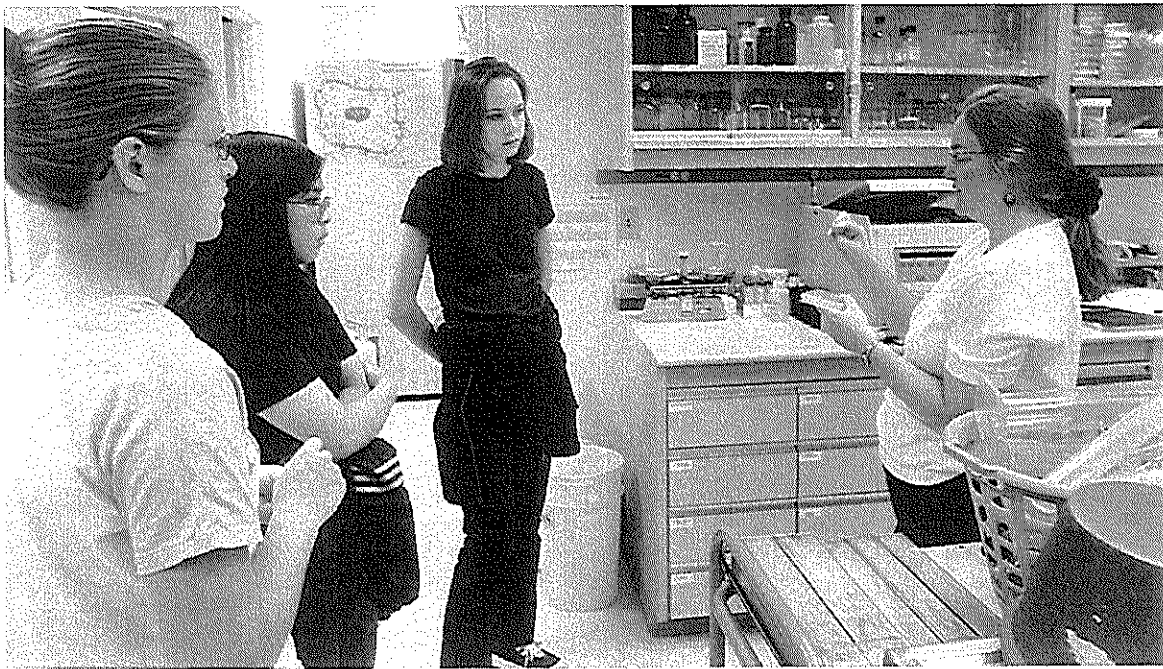
SMALL GROUP DISCUSSIONS

By Julie Dien

One of our activity Wednesday was a small group discussion, where we broke off into groups of about 8 people and we met with some of the greatest female pioneers in the scientific and engineering field. My groups consisted mainly of engineers for our role model speakers, and the most interesting issue we addressed was how could a woman have a career and a family too. One of the engineers related her dilemma between choosing her career and her family. She is a mechanical engineer and she cannot bring her work home to do. It is also a technologically advancing field where a person missing 2 months work would come back almost unqualified. She was also recently married, so having a family is also one of her top priority.

Unhappily, that is a dilemma that many women, who have entered a field where female exceptions, such as maternity leave, have not yet been incorporated with the fast pace technology, have been plagued with time and time again. Our group decided that there is no one solution for everyone, as it is a matter of personal choice and values. However, industries are slowly making it easier, as time goes by, for the mother to have both a career and family.

The small group discussion also opened my eyes to a field which I previously had closed off: engineering, as well as reminding me to keep my options open.



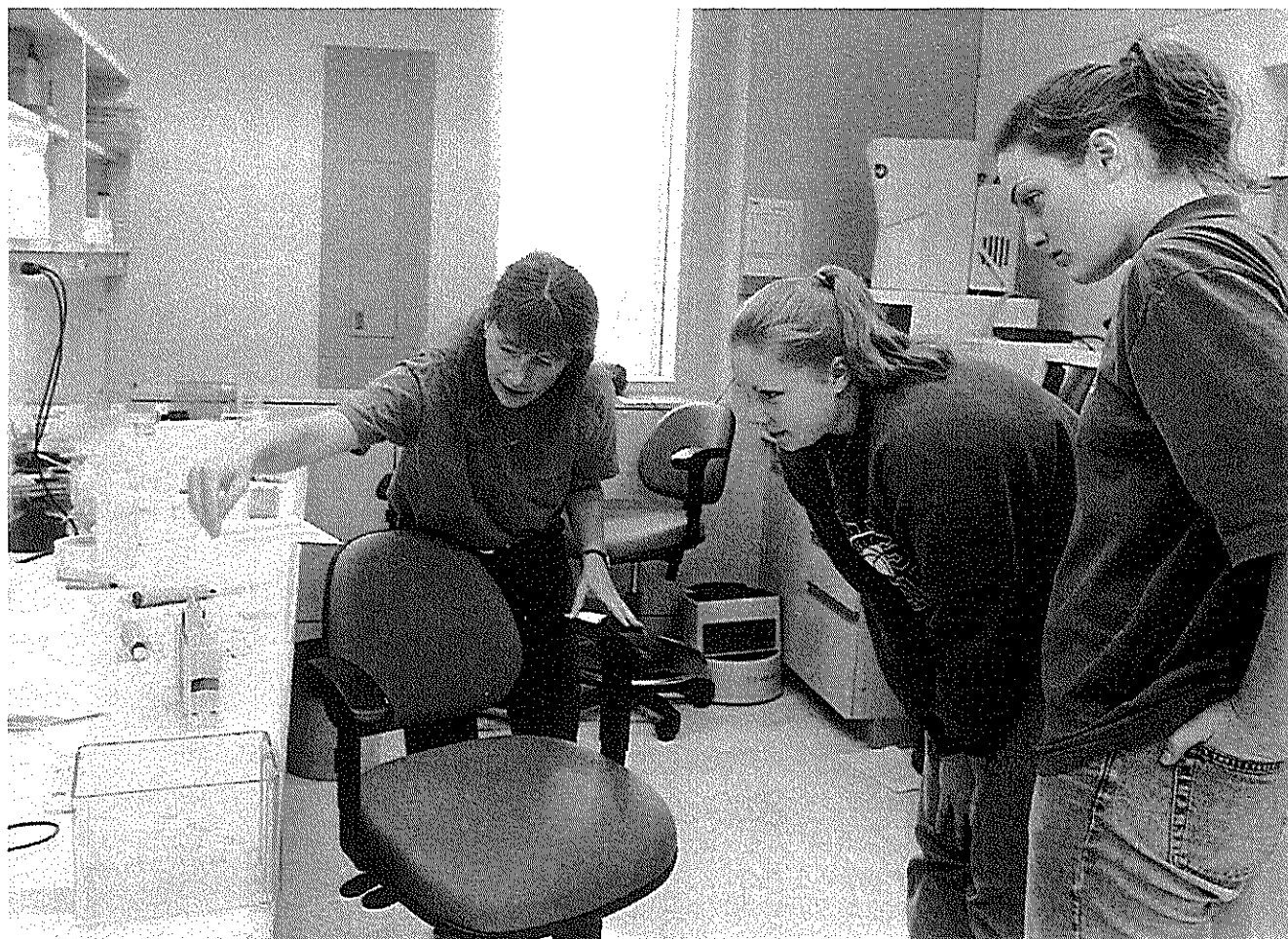
ON-CAMPUS LAB TOURS

By Angela Sanders

Visiting Dr. Underhill's lab genetics lab was among the most interesting of the many new things that I've done this summer. Who knew that there could be so many different facets of genetics? Our tour took us through the lab investigating neuro-tube defects in mice, seeing all the complicated and fascinating tests and equipment. Dr. Underhill explained about his project on neuro-tube defects and how it affects the spinal cord area, and even showed us two mouse embryos in development. Because mice are so similar to humans, this type of research can help prospective parents know if their child is at risk for a birth defect. It was great to see a lab on campus besides the one that we're working at, and yet another option in our futures. Thank you to Dr. Underhill for showing us around and permitting four girls to go hiking through his lab. It was very much appreciated.

By Dominique Hebert

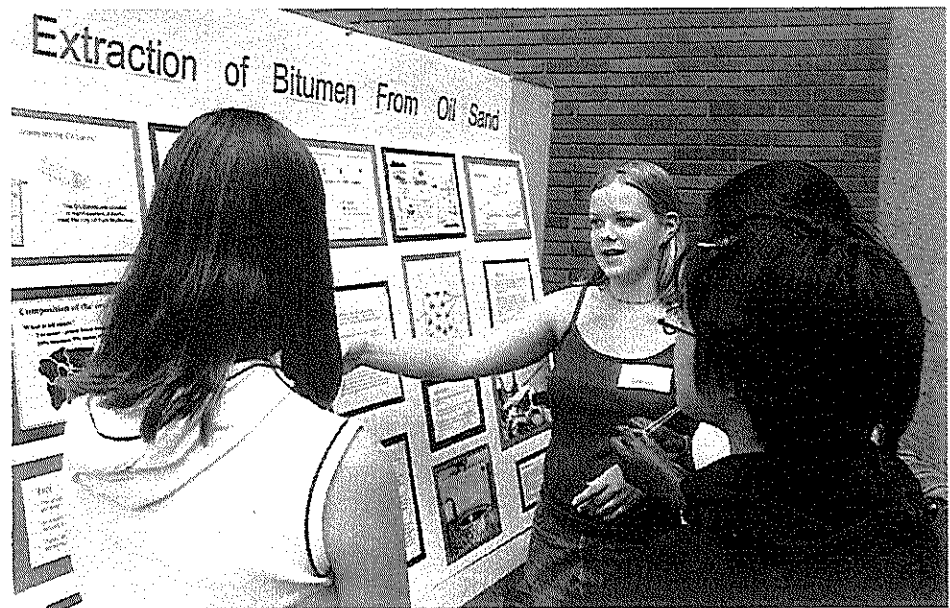
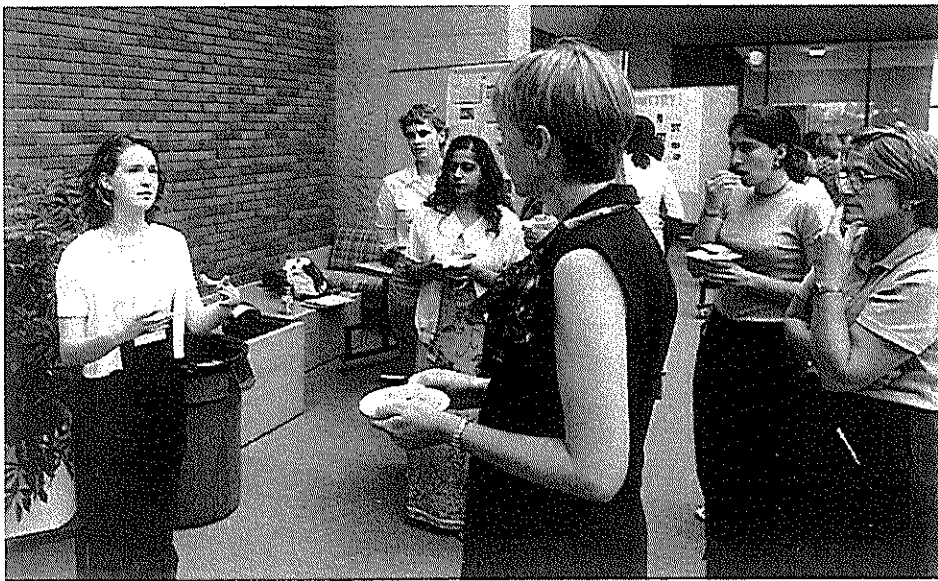
When I think of the word 'hydraulic' the first thing that comes to mind is the lift system used in large equipment. I was surprised when I visited this on-campus lab because the hydraulics lab actually deals with water and its behavior in accordance to manmade structures. Many working models were shown to us. At the first model we witnessed what happens when a dam breaks - the path, speed, and depth of the water was recorded using video technology. We viewed a fishway, the method by which fish bypass manmade structures like dams. Our guide demonstrated a working spillway to us. A spillway is a precaution taken so that water does not flow over the top of a dam and undermine the structure. We saw a model that uses dye and tiny beads to study how fresh water and salt water mix in an estuary. Lastly we saw a model of what happens when an ice jam forms in a river. Overall, I must say that my visit to the hydraulics lab was an intriguing and enlightening experience.



VERY INTERESTING TOUR

By Rae Anne Eherer

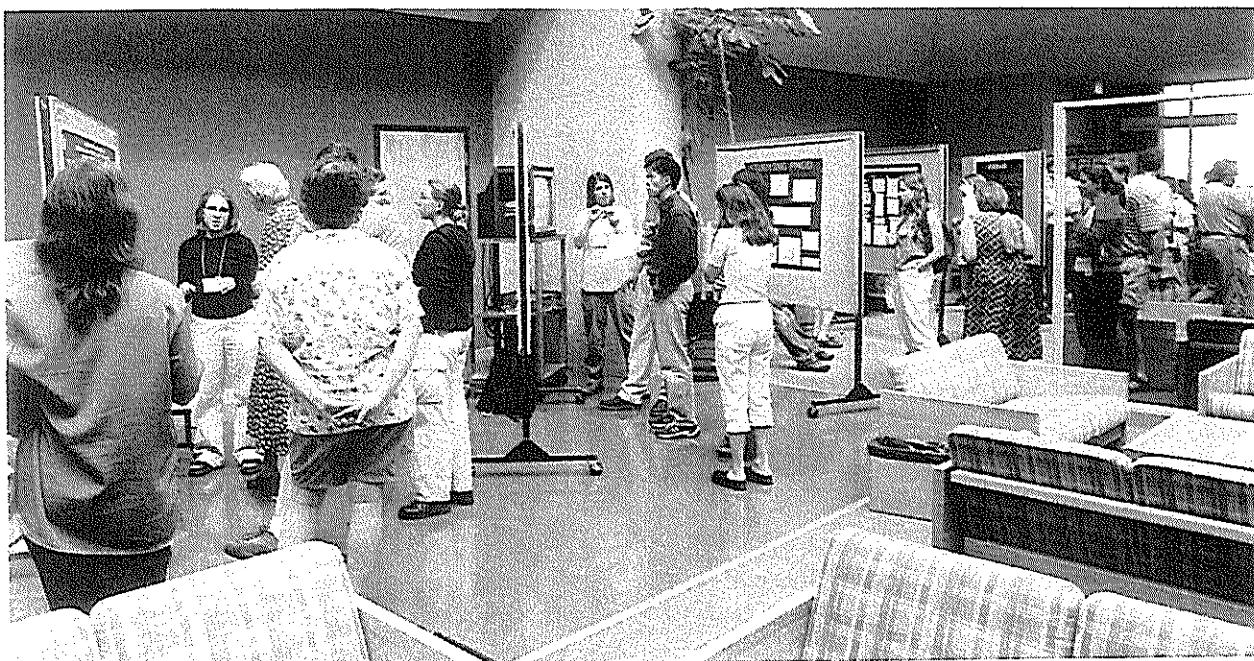
Our campus lab tour was of the prenatal centre which is made up of quite a few labs throughout campus that deal with pregnancy up to birth. One of the first labs we saw was studying high blood pressure during pregnancy, the causes of it and the risks associated with it. A student in another lab was studying premature babies with underdeveloped lungs. For this study she was using baby mice because when mice are born their lungs are not fully developed and to keep them this way in order to study them they are given pure oxygen to keep the lungs from completing their development. When we went to visit the mice, we had to put on scrubs and wear plastic boots over our shoes to keep germs from spreading into the restricted area. It was a very interesting lab to visit since Kristie was in engineering and I was in physics. It was another side to science that we got to see.



THE RESEARCH POSTER PRESENTATION

By ELSA OBERG

As part of the WISEST program, we were asked to create a research poster that we would present at the end of the summer. The posters reflected the work that we did over the summer. On the day of the presentation, everyone assembled on the 4th floor of the Education building; posters in hand. Posters were tacked up to bulletin boards that lined both sides of the room. We then headed outside to take a group photo. It was pretty painless except we had to wait until the sun went behind the clouds so that we weren't squinting in the picture. We then headed back to the presentation room, where supervisors and research team members were beginning to assemble. When everyone was present, Dr. Armour made a wonderful speech in which she expressed thanks to those who made the posters possible. The WISEST participants were then split up into two groups, each taking a half-hour shift next to their posters to answer questions about their research. People browsed through the posters, visited, and had a taste of the wonderful snacks. Overall, I think that the presentation went very well and that it was enjoyed by everyone who attended.



RESEARCH POSTER PRESENTATIONS

By Paige Smith

Frantic preparation accompanied eager excitement as the 40 W.I.E.S.T. students gathered to set up their research posters on Wednesday, August 9, 2000. Some were rushing around trying to find where the tack box disappeared to while others tried to catch a glimpse at the wonderful works of art. The posters were as varied as the people who had created them, as this was an opportunity to spread the wings of creativity. Some were nervous about having to present their research while others appeared calm and collected when in only a few more minutes people would be examining their work and asking about what they had learned in the last 5 weeks.

The research posters gave everyone a chance to share their experiences, show what they learned and pay tribute to those who made it happen. Research supervisors, the W.I.S.E.S.T. committee and fellow W.I.S.E.S.T. students were given the opportunity to explore the various avenues of study that each had participated in thus far, casually wandering the room while munching on the beautiful spread of snacks. It was very interesting to see the different areas of research and exhilarating to be able to confidently describe a project that was foreign a few short weeks ago. The event was much more laid back and much less stress than one might have anticipated.

In all, the Research Poster Presentation was a great success that commemorated the efforts of everyone in attendance and celebrated the friendships, knowledge and experience gained over the last 5 weeks.

STREET PERFORMERS DAZZLE

By Angela Kos

What could be better than fabulous weather, awesome performers, and a small group with ranging athletic abilities for the first social activity of the WISEST and HYRS programs? Nothing, which is why the Saturday afternoon outing was such a big success! At the Street Performers Festival in Churchill Square, our group of about ten split up to take in performers of our choosing. While we never stayed at a performance for its entirety, thus any "review" of a show would be shortchanged, a definite favorite was the songwriting/performing duo "The Scared, Weird, Little Guys" (or something along that line). With smart, snappy songs and endless plugs for their self-produced CD, the performance definitely made us laugh. Not to mention its location provided shade from the hot sun. Some found a different way to cool down—in the city hall water fountain.

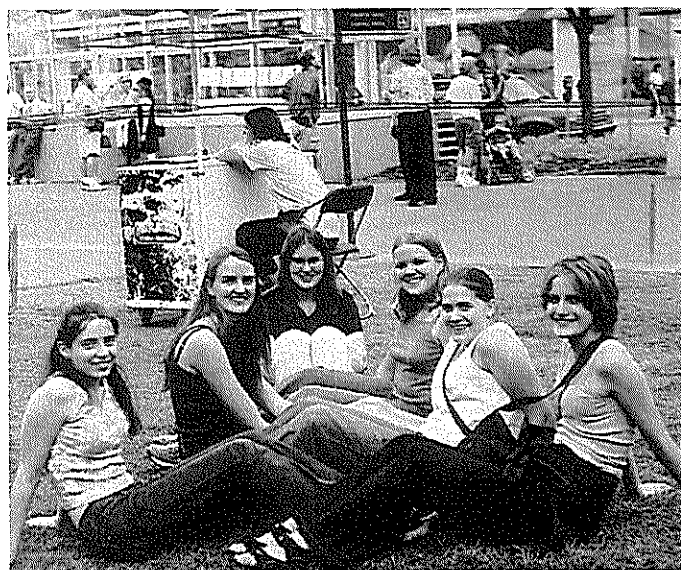
After about two hours at the SPF, we moved on to the Garneau field where some of us showed that not all "science minds" are hopeless on the football field, while others...didn't. Everybody's competitive spirit showed when the football came towards the groups, with some people even accidentally knocking over others just to catch the ball. But, it was all done in the name of fun. And fun is what everybody had.

All in all, everybody had a great time that afternoon. It gave the ten of us a chance to get to know each other a little better and made each of us look forward to the next planned event.

SHAKESPEARE IN THE PARK

By Candice Heron

As I turned my windshield wipers to high speed and watched another lightning bolt flash



across the sky, I couldn't help wondering if it was such a good idea to be going out to watch an outdoor play! We arrived at Hawrelak Park just in time for Michelle to direct us to the picnic site. She went back to the park entrance to rescue any other lost, waterlogged WISEST students. For the most part, the rain stopped shortly into the picnic and the few of us who had braved the weather enjoyed a picnic that could have fed an army. It was a nice chance for us to get to know each other better (and frantically try to remember names!). And who could forget Nicole's entrance: covered in mud after a bike vs. hill incident! In spite of the rain, the amphitheater was filled with people. The Free Will Players' production of King Lear was amazing. Ashley Wright, as Lear, delivered an incredible performance leaving half of us wondering if was going to make it through the entire play without giving himself a heart attack. The "adulterous kiss" between Edmund and his dad's wife's real husband's daughter, Goneril, was a much anticipated event (Shakespeare at his best right!). Although it was great, it was long and by the end of the play only the die-hards were left (but apparently there was a bunch of WISEST people who had never found the group. Where were you guys?). All in all it was a terrific evening and I'm sure that a good time was had by everyone.



NEWSFLASH!

HIGH SCHOOL STUDENTS SOLVE CRIME...

... And have fun in the process!

By Carlo Dimailig

On Monday, August 31st at approximately seven o'clock in the evening, a group of students entered the premises of the Edmonton Space & Science Center. It remains unclear as to what their original intentions were, but as soon as they entered the Forensics exhibit crime scene, they were thrown into the middle of a homicide investigation. A man name Billy White had been murdered at the rooming house built inside the exhibit. After gathering the clues and taking part in the forensics examination, they were still unsure as to which of the suspects was the actual murderer. Cries of "Esther's the murderer" and "Eddie's the one" were heard as the students pondered over the evidence. After a short discussion, it was agreed upon that Danny had been the killer. With only minimal effort, the students had been able to discover the identity of the murderer.

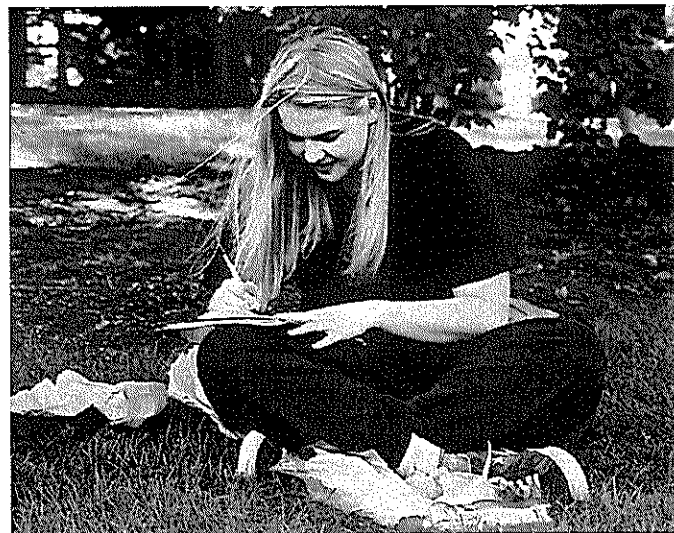
After completing the Forensics exhibit, the students proceeded to the sports exhibit where all took part in some

type of physical workout. From free throw competitions, to balance beams, to animal-racing challenges, the students learned that there was a lot of science involved in sports.

Nearing the end of the evening, the students discovered the Kids' play area, and proved that they weren't too young to have a little fun. In the play area, their main interest was focused on the gigantic piano keyboard, as well as the Puppet Theater Show.

Their evening finished off with the Space, Science and Technology exhibit. Here, the students concluded the evening by experimenting with the different science and technology demonstrations available to them.

By the end of the evening, the group had begun to decrease in magnitude as its members began to head home. From this reporter's point of view, it looked as if all had enjoyed their learning experience.



TUESDAY BAG LUNCHES

By Chandra Zimmer

This event was well received by the students involved in the WISEST Program. Those who were working near campus or able to make the trip in to SUB every Tuesday made the most of being able to talk to the rest of the group. We all gathered together and made a monster table, (a.k.a. four tables placed end to end) where we ate, talked, and joked around. Michelle was amazed at the turn out of the event. The number of people increased when Tara and the participants in the HYRS program joined us. It was interesting to be around students from both groups. There were a wide variety of conversations. These included the rally of the Students Union Executives, exchange student programs, sports talk, trying to remember what school everybody was from then asking all over again two minutes later, and of course finding out what the current situation was in each person's lab. I think that people enjoyed being part of the group, and liked the atmosphere that this event created.

CANADA VS. TRINIDAD AND TOBAGO

By Deepti Damaraju

Ahh...another season of summer Olympics, sunshine, rain and soccer (in no particular order)! Promises of good weather and great fun brought WISEST to Commonwealth Stadium on July 16 to enjoy a World Cup Qualifying Match between Canada and Trinidad and Tobago. Our boys donned the Red and White against their well-respected Red and Black opponents, wore their hearts on their sleeves and battled in a spectacular showdown...

Over 25,000 people packed into Commonwealth Stadium to watch the game (the largest crowd at a soccer game here in Edmonton since 1994!) and cheer on our national team. Numerous enthusiastic fans graced the Jumbotron with painted faces and massive Canadian flags, screaming their lungs out in support of the Canadian troops. On the other end, a small section of patriotic Trinidad and Tobago fans wore the colors of their team and danced to steel drums in anticipation of their team's victory. Neither side was disappointed.

From kick-off, Canada dominated the game. The first half was filled with highlight reel chances by Canadian players, many of them well planned but none of them rewarding a goal. The stadium often erupted in shouts and cheers of excitement at a promising chance, then sounds of groaning at the realization that the ball was going everywhere but past T&T's goalie. Canada constantly kept the pressure on the opposing team, forcing them into the defensive mode for most of the first half. Trinidad and Tobago had very few good scoring opportunities compared with those of the Canadian team. It looked as if the Canadian team would feed off the electricity of the crowd and win a few goals before the game was over.

Then something went wrong. With three minutes left in the first half, Canada committed a critical defensive error, sending the ball deep into their zone with only Trinidad players in pursuit. The result was a quick, heartbreaking goal by Trinidad, rendering the last 75% of Canada's first half effort useless. Nonetheless, the crowd stayed on its feet, and WISEST cheered on.

The second half turned more to Trinidad and Tobago's favor. Though Canada still maintained good offensive pressure, Trinidad managed to exact some of the same on Canadian defense. In the end, what turned Canada in was their less-than-perfect defensive coverage and the exceptional play of Trinidad and Tobago's goalie. He often took any chance of a Canadian rebound away. The Trinidad defense was also critical in the second half; more disciplined than that of Canada, they effectively robbed the Canadians of every chance they could generate—blocking shots, heading them out of the zone, and out-maneuvering the Canadian offense. The result? Trinidad and Tobago 2, Canada 0.

On happier notes, the Canadian team was not outplayed, by any measure. They played an awesome game worthy of the crowd's unwavering support. GO CANADA GO!! As for us WISEST students, we got to witness a great game, in good weather (for most of the time) and have some fun with our peers. Goooooooooal!!!!!!



LIFE AT MEANOOK (From a tree's point of view)

By Stacey Hamer

Always new names, new faces, I can't keep track of them all. They come from all across the country, some from outside the country: America, India. There are a few people that return for consecutive years but never many, many years or many people.

The winter is slow, but from spring to fall there is a constant stream of activity. People coming and going. Different groups work different hours through the day. Some are up for breakfast in the early hours of the morning when the night sounds are just beginning to fade and a dusky mist still hugs the dew-covered earth. From dawn until the sun is well on its course, workers, researchers, university students, and others who are just passing through wake and walk from the long, small-roomed trailers to the main house for breakfast.

After breakfast, they are off, all headed in different directions. As many directions it seems as my branches can reach. Researchers off into the woods to study birds, others to study plants, all wary of the prospect of bears, porcupines, even fallen trees that could present a potential hazard. Workers off to the ponds to monitor tadpoles, process fish, and collect amphibians for population research. Students off to their university courses. Others carrying out grueling lab work. And the list goes on.

The weather offers no threat or protection. Hoping for rain does not excuse that there is still work to be done. The most extreme heat is also bared, though on such days the reward may be a trip to the lake for a cool swim once the work is complete.

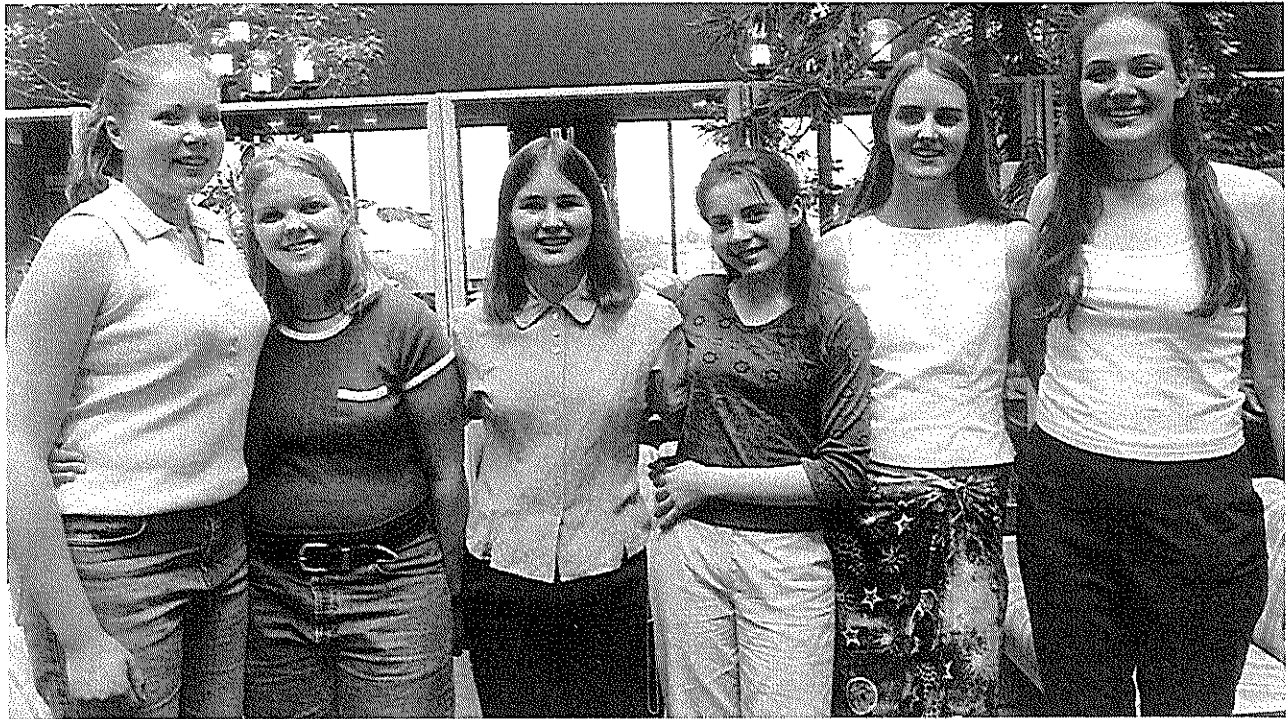
Lunch is usually a social gathering as is supper in the evening. Lunch is a coincidental meeting of stomachs wandering towards the kitchen after a morning of work. It is an informal meal of what ever can be found, usually leftovers from the night before. A cook prepares supper for all and supper is served at six. On nice afternoons either or both meals may be eaten outside in the fresh air sitting in the shade or basking in the sun. Laughter lifts on the air during meals and even on cooler days can often be heard echoing forth from the dining room. In general spirits are high, and patience great, there is no need to hurry. Everything that needs doing will get done eventually.



Post dinner chores are carried out much like the rest of the day's activities, through laughter and cooperation; the job gets done swiftly. Evenings are varied. Organized activities are randomly dispersed over the months. From time to time lake trips, movie rentals, soccer games, board games, or campfires entertain those interested. On other evenings, everyone seems to do their own thing: explore the trails, finish some work that has been put off, curl up with a book, study, or turn in early for bed.

I watch it all as the months pass and the summers pass. Learning even as they learn the name of a plant, the call of a bird, or the scream of a porcupine. Did you know that there are flying squirrels in Alberta? Stargazing, one of the few things that is weather permitting, uncovers the name of a new constellation, legends about the northern lights are shared, and wishes are cast upon shooting stars.

Bedtimes are as scattered as waking hours as Meanook's human inhabitants, however temporary, randomly wander down the small, curving path on their way to bed. Tomorrow there will be a new variety of faces, each carrying their own knowledge, some of which will be shared throughout their stay. And next summer will see another wealth of facts and opinions for me to overhear because unlike these humans who come and go like the wind and the clouds, I can only stand by and watch and listen and learn. And I will be doing so for many years to come.



LIFE IN ST. JOHN'S INSTITUTE

By The St-John's Girls

Angela Sanders, Teresa Van Ember, Kristie Bruemmer, Jessica Verhagen and
Rae Anne Eherer

More than four walls and a roof

Life at St-John's Institute this summer was an awesome experience for all of us. We had an extraordinary time during which lot of growing up happened and we made friends that we'll try really hard to keep in touch with. Some highlights that we'll all want to remember are how Teresa always knew exactly where the boys' dorm on campus was (bzzzzt or beep?), RaeAnne yelling in the night, Jess's escapade to Calgary and her apartment search, Angie's first rollerblade, and trying to brake, innumerable trips to Boston Pizza, and the cute waiter there, the friendly staff at St-John's, meeting all sorts of different people, teaching the Mexicans the difference between crepes, creep and crap, RaeAnne's sore throat, late night talks, Kristie's frogs on the ceiling who were unexpectedly joined be a troop of salamanders, corrupting Angie, jumping on the beds, the education we provided the construction workers across the alley, the entertainment the HYRS girls provided, Cheryl's helpful guidance, and of course "RUN FROM THE SUGAR PACKAGE!!!!"

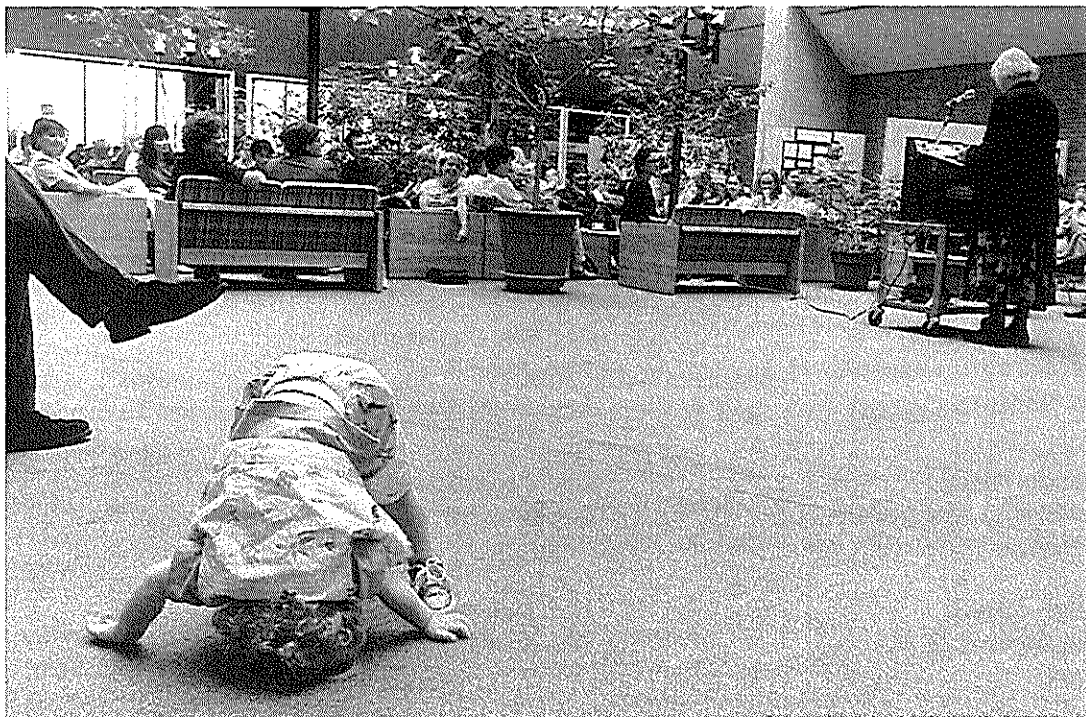
Throughout this summer, we've been together, making lifelong friends, growing, learning and having fun. And of course, we stayed out of trouble...mostly.

WISEST Class of 2000



WISEST Open House Tea



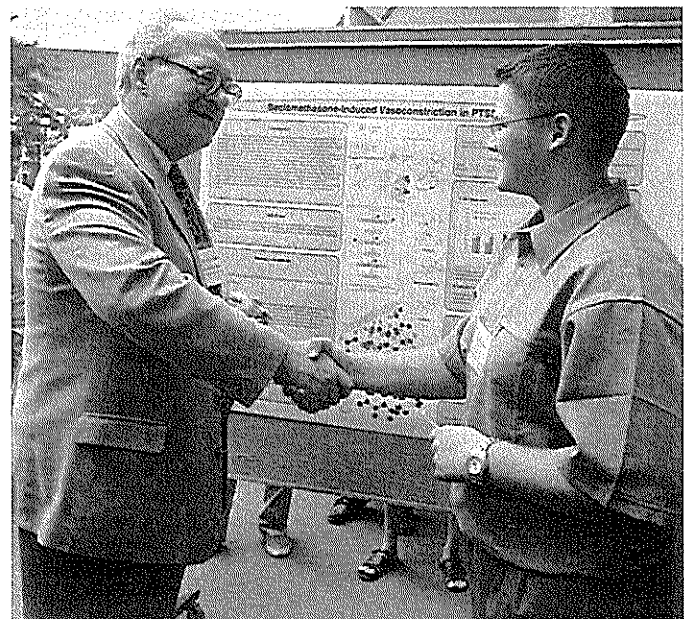


The WISEST Program wrapped up its 16th year with the annual Open House Tea. Students displayed their posters for family, friends, lab partners, sponsors and Her Honor Lt. Governor Lois Hole.

Refreshments were served as students shared the excitement generated by a summer of learning. Confidently answering questions about their research projects it was hard to believe they had just joined the world of research six short weeks ago..

The highlight of the function was the speech given by the former chancellor, an impassioned reinforcement of the importance of education, learning and the role woman must play in the shaping of our society.

She was just getting started when she put away her



prepared remarks. It was evident the subject was one close to her heart as she challenged the crowd of 250 guests to spread the word, by talking to at least one other person about the WISEST Program.

Her remarks drew an enthusiastic response and seemed to be a fitting conclusion to a six weeks of intellectual and personal discovery.

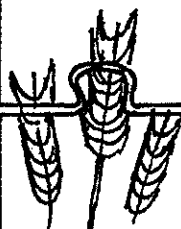
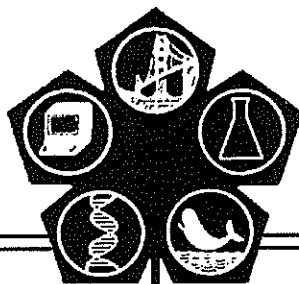
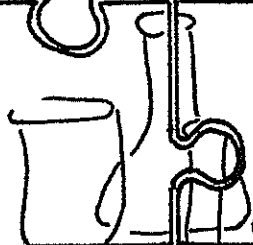
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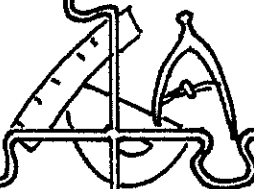
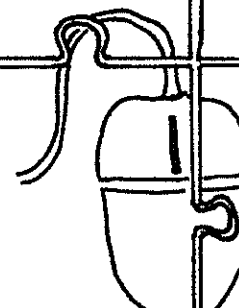
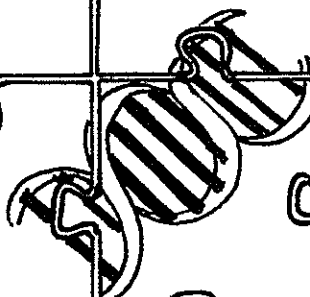
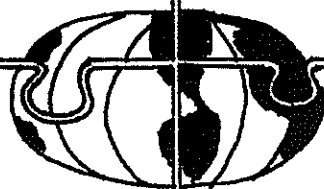
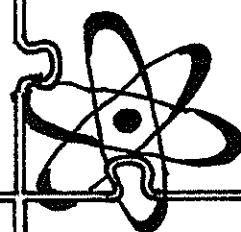
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Women in Scholarship, Engineering, Science and Technology



WISEST

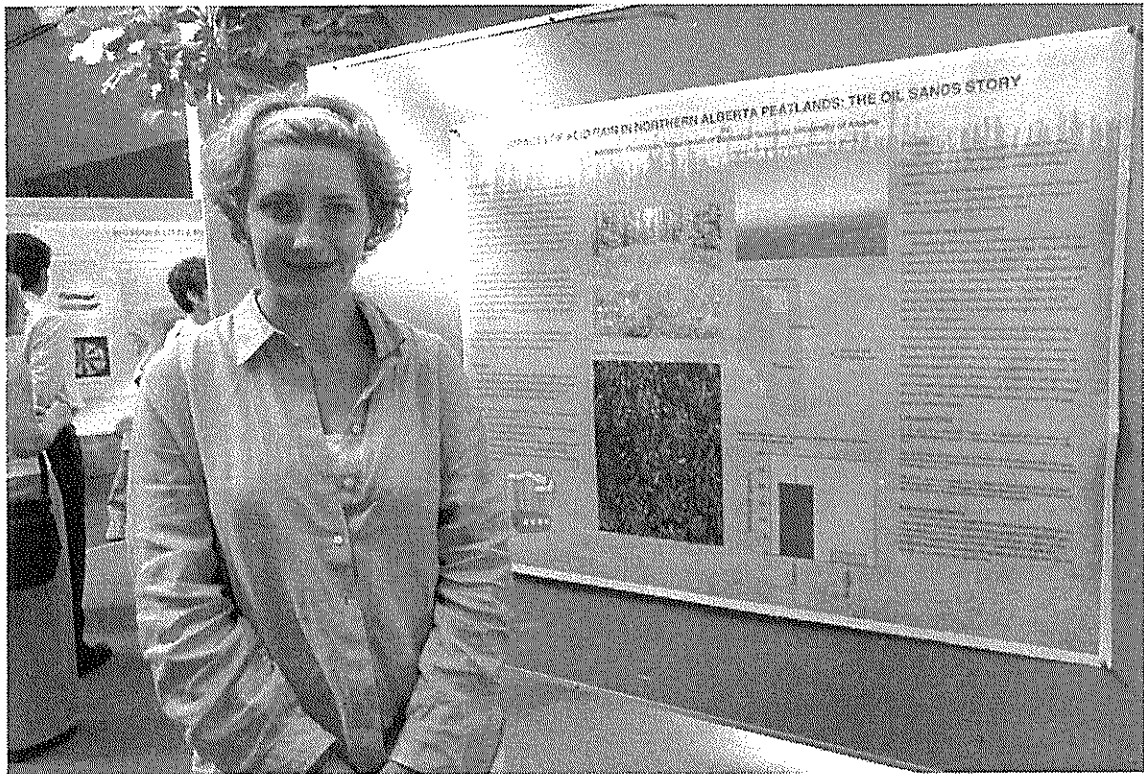


WISEST Summer Research Program 2000

Student Reports

The WISEST experience has opened up many new doors for me, and has allowed me a preview of what life will be like in a year or so. I have a new understanding of how the university works, how it is set up, and what needs to be done to accomplish my goals. When I first entered the program, the campus was foreign to me, so big and impersonal. I had no idea what "graduate" or "under-graduate" meant, and what the heck were CAB, HUB, and SUB? But soon I learned the ropes, and I realized that I was anything but alone. So many people were willing to help, and my new friends were right there with me, as clueless as I was. It was also interesting to watch as all the WISEST students progressed from timid and unsure to confident and decisive.

I was nervous at first, but in the end I wanted to be nowhere else but in my lab. I had so many wonderful people to work with, people who perfectly understood my position and who were always such great company. I worked in the Biological Sciences Building under Linda Halsey and Dr. Dale Vitt. We were trying to discover whether acid rain has actually formed in northern Alberta near the Oil Sands Activity, and whether it is affecting the peatlands up there. During this project I learned many new skills in the lab, all the while realizing how important precision, patience, and sanitation really are. In addition to this, I was given the opportunity to go out into the field twice, to Seba Beach and Fort McMurray. These trips were so exciting and they gave me a good break from all the lab work. I have always wanted to do field work, so it was excellent for me to have my first field experience while at WISEST. On top of it all, my project was a success.



I have had so many good times at WISEST with my research team and my WISEST friends. The bag lunches were fantastic, the soccer game was great fun, and I always looked forward to our Wednesday afternoon activities. The group session exposed me to some very interesting women, who told of their shifting career paths. The university tour made the campus much less intimidating. I discovered how to make a research poster. These are only a few of the things that I have learned and experienced through WISEST, and as the program wraps up, I can see that I am well prepared for the big step I must take in one year's time.

Adrienne Thompson

Core Science

CO₂ is a large contributor to the greenhouse effect. Decreasing atmospheric CO₂, through sequestration in deep aquifers, disused salt caverns, deep oceans, and depleted oil and gas reservoirs, is currently being researched. The most promising approach of disposing excess CO₂ appears to be in deep aquifers due to their large capacity.

The integrity of the overlaying cap rock material is being investigated. The research that I was involved with looked at clay shale as a possible cap rock material.

Using a drilling rig, core samples were obtained and returned to the lab in PVC casing. They were then cut open, and logged according to their color, grain size, presence of fractures and fissures, etc.

Moisture content tests were performed on all of the core samples. This is a test where samples of soil are taken from the cores as soon as they are opened to measure the amount of water naturally in the ground at a certain level. Our core samples were taken from the 200 to 300 meter depths. To measure the moisture content you weigh the wet sample straight from the core, and then put it into an oven at a standard temperature of around 110 degrees Celsius. After the sample is dry you take it out of the oven and weigh it again. The moisture content is the percent of the mass of water over the mass of soil.

Grain size tests were done on coarser material, such as sand. This test measures the particle size distribution. To do this you pour the soil into a stack of sieves, which are then placed, into a sieve shaker. When the sieve shaker is finished, the soil will be separated into different sizes by the different sieves. By weighing the amount of soil in each sieve you can find out the percentage of the material at each size. This is then graphed to determine if the soil is well graded or uniform. Well graded soil has particles of all different sizes while uniform soils have the majority of the particles in one size.

Atterberg limits were performed on the fine grained clayey material in order to characterize it. These tests use remolded soil which is soil that has been mixed with water and its original structure is gone. In one test the soil is rolled into strands 3mm in diameter. If the strands start breaking apart when they are 3mm in diam-



eter they are at the moisture content of the plastic limit. The other test uses soil with more water in it to test at which moisture content the soil will flow at in a standardized mechanical device. This is the liquid limit. The plastic limit and the liquid limit are used to characterize the soil in a plasticity chart.

In fundamental soil mechanics, soil must be classified within the Unified Soil Classification System (USCS), which requires an understanding of its Grain Size Distribution, Atterberg Limits, and Moisture Content.

My experience at the WISEST Summer Research Program was very helpful. I now have a better understanding of what scientific research is like. This program also helped me decide future goals for a University education.

Amanda Lemke

My experience with the WISEST summer research program 2000 was not what I expected. I worked under Dr. John Spence in the Entomology department. I spent most of my time sorting through pitfall traps. These traps were collected at EMEND, a research station located about 20km Northwest of Dixonville (north of Peace River). A research team collected the traps and brought them to the University. I would go through these traps and sort the bugs into the following categories: spiders, carabids, staphylinids, and ants. Carabids and staphylinids are two kinds of beetles. Then I had to place them in specimen containers with 70% ethanol and seal them. The traps are full of antifreeze, which smells extremely bad. I burnt scented candles to burn off some of the vapours and to hide the smell but it did not work very well. The purpose of sorting the bugs was so that other members of my research team could identify them and then examine the effects of different forestry practices on the bugs in the area. I had to make sure I had picked out all the bugs from the traps. This was rather difficult because some of the bugs were extremely small and some traps were full of dirt or contained leaves that had to be cleaned. I learned nothing from sorting through these traps.

Every Tuesday my research team would go to George Lake to do a number count on the waterstriders in one of the ponds. We would wear hipwaders and walk slowly through the pond collecting all the adult waterstriders, which are identified by their fully grown wings. In the afternoon some of us would go back out and catch more water striders; other would collect pitfall traps; plant trees; or identify the water striders according to sex, species, and by the dot on their back. All the new or unmarked ones would be given a different color dot to identify which week they were first caught. We then used this data to determine how many died off in a week, how many had left the pond, and how many new ones there were. The



water striders were returned to the pond after the second collection.

The project that I did my poster on was a side project for me on the "Affects of Adult Feedings on the survival and flight ability of the Sarcophagid fly". This experiment took very little time to perform and was interesting but I was unable to make any real conclusions because I only used 24 flies and that is too small a sample.

I enjoyed the company of everyone in my research team, the other WISEST participants and the WISEST organisers. I enjoyed the Wednesday afternoon activities because they gave me a much needed break and they were informative. I also enjoyed the lunches I had with other WISEST students at SUB.

Amanda Pasini

My Summer Job

By Amber Schick

My summer research job was in the Chemistry Department under Dr. Neil Branda. My supervisor was Andrea Peters, a graduate student. One of my very first lessons learned was the importance of venting when washing or extracting my product. I was extracting my switch with ether and as I was shaking it in a separating funnel I took a little too long to let out the pressure. Before I knew it "POP", the stopper flew off and the ether splattered all over me and the counter. For a moment I thought I was going to have to go under the shower, but my supervisor was not worried. I realized the importance of safety goggles and wearing old clothes to work. I had to do the entire experiment over again, but believe me, I never forgot to vent after that.

As well, my job required me to work with some very dangerous and harmful chemicals. The highly reactive T-Butyl Lithium was the worst as it could not come in contact with air or water in danger of it exploding. One time a drop of it fell out of the syringe and landed in the CO_2 bath making a small pop which scared me half to death. I received many warnings on the job such as "try not to breath the silica in because it causes lung cancer" or "be careful when weighing the trichloro-acetic acid to not breath it in as it is poisonous. You may just feel some burning in your nose."

My project, however, was to work with photochromic switches, which are used for high density optical storage. Originally, I was suppose to compare the fluorinated thiophene compound with the non-fluorinated version. However, I ran out of time so I completed UV/vis studies on different conjugated molecules of the non- fluorinated form that I created.

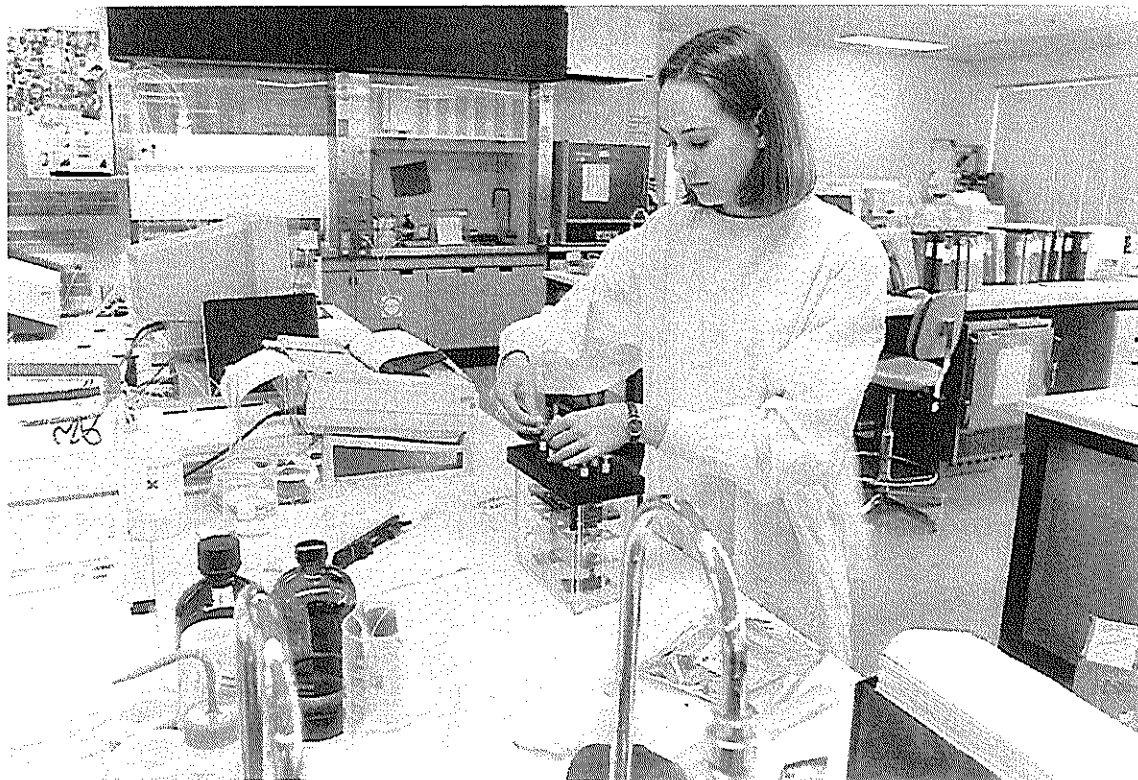


Overall, my time in the WISEST program was a memorable one. Much was learned and accomplished. Now I am not so afraid of university and I have a better understanding of what chemists do and the types of jobs they enter. Although, it was very similar to school, having field trips, making posters and the hours, I had a good time in this program. For this being my first real job it was very good as I couldn't get fired and did not get in trouble if I was five minutes late. Altogether, it was a great experience!

This is not your typical "How I Spent My Summer Vacation" write up. For one thing, I worked during the summer vacation (notice the key word "vacation" does not correlate with the word "worked"). Secondly, I had a good time while learning and experiencing many new things. How, you may ask, did I manage to have a summer that was education, interesting, enjoyable and profitable, all at the same time? Through the WISEST Summer Research Program. The opportunity this program offered to me was immeasurable, as I experienced not only the atmosphere of a workplace laboratory, but got to know 39 other students who are interested in the same field of study that I am.

Working in Laboratory Medicine and Pathology at the University of Alberta Hospital, under Dr. Fiona Bamforth, with Val Dias and Colleen Kohlman assisting me, I tested a new method of acid extraction from urine that will hopefully prove to eventually serve as a better indicator of hereditary diseases than the current method. Being allowed to work in a lab at the hospital gave me the chance to experience the field which I am looking at pursuing before I commit myself full-time. How many people actually know for a fact that they enjoy their work not only in theory but in practice before obtaining the required education and entering the professional work field? I know of 40seventeen year olds who have.

Sound like a hard-core, stressful and serious summer? Not really. Yes, there were days that were long and tiring; there was a lot of responsibility and maturity required; there were expectations to live up to. Yet, when the six week period is looked at as a whole, there was a lot more involved. Though this program was designed as an educational experience, it does not mean that I never socialized and had fun. Through activities planned by WISEST organizers I spent afternoons and evenings out in the nice summer weather with a group of teenagers who have similar interests and characteristics to mine. An instant and well-formulated group that knows when to work and how to have fun. Almost unimaginable, isn't it? Yet, WISEST offered it to grade eleven students. The Street Performers Festival, a rainy picnic in the park followed by a chilly (in regards to the weather) Shakespeare performance, murder mysteries at the Space and Science Cen-



ter, campus tours and group discussions all added a comfortable social atmosphere to my experience.

So, six weeks of my summer vacation went by quickly but not and can not be forgotten. How can it be? This will be the first year my "How I Spent My Summer Vacation" won't be "watched TV, ate, slept, swam, watched TV...". Okay, so it's not usually exactly like that, but compared to the WISEST Summer Research Program, it might as well have been.

Angela Kos

Steel, St-John's, and the best summer of my life

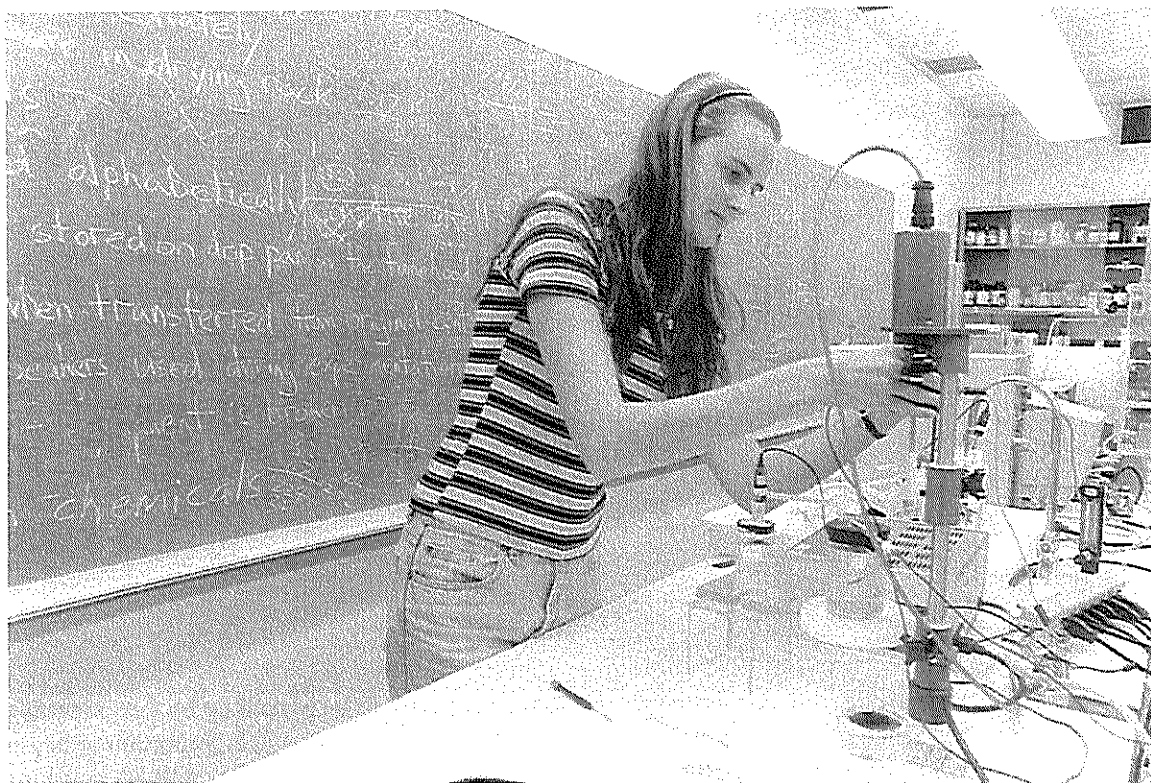
By Angela Sanders

The day I moved into St-John's Institute, I had no idea what to expect of this summer: of living away from home, of my research experience, or of all the people I would meet in the six weeks to come. I'm happy to say that all three were a tremendous success.

Staying at St-John's was a blast, thanks in no small part to the great people I met. We shared laughter, fun and the occasional tear over the duration of the program. We've grown together and grown up together, learning about life and ourselves.

I worked in the corrosion lab, under Dr. Jingli Luo, on a project investigating how the different microstructures of carbon steel affect corrosion. My piece of the research involved grinding any contamination off the samples, painting them, except for a small test area, and running the tests on them with a computer. After that, I made a lot of charts with the data and got to be pretty good at working Excel. Even though I did spend a lot of time staring at the wall when grinding the samples, I'm amazed at how much I learnt in such a short time. Before this summer, I'd been interested in research, but I didn't really know what it was about. It's really great that WISEST can give high school students the opportunity to experience real research work before they even enter university.

Besides life at the dorm and my lab work, there were several other WISEST activities. I got to tour the entire U of A campus (fortunately early in the program: without it, I would have been lost all the time), see another research lab, completely different from my



own, talk to women who have already been through university and who had lots to share with us for the future, and, most importantly, talk with other youths like myself.

I met so many people this summer, who have a lot of the same interests, goals and doubts that I do. I've accomplished a lot this summer, from learning how to manage the ETS system and the LRT, to learning how to live with someone I'd never met. I know that I've made some lifelong friends this summer, and that I'll always remember my experience with WISEST.

Since the beginning of high school, I had wanted to be a part of the WISEST program. When Michelle called to let me know that I had been accepted I was really enthusiastic. I thought it was terrible that she made me wait an entire 24 hours before giving her my final answer!

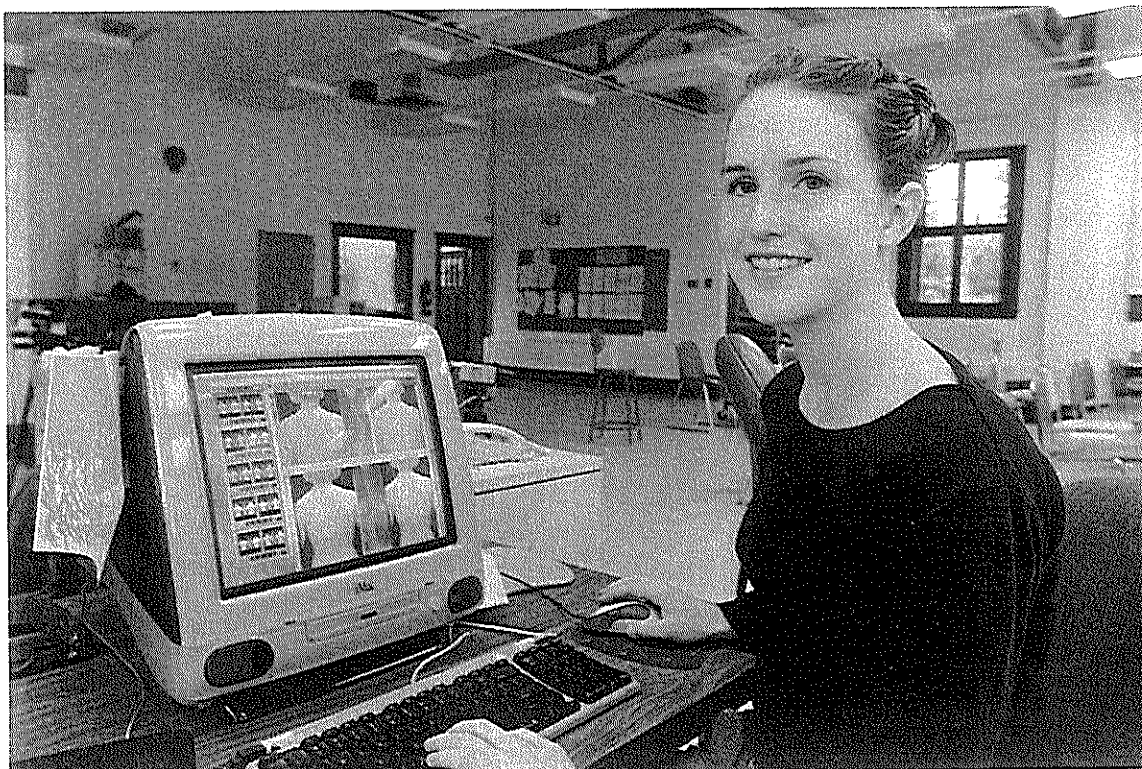
I was placed at the Glenrose Medical Research Center. Most of the research going on in the center involves studies of scoliosis, a curvature of the spine. I was very surprised at the diversity of projects at the facility even though they involve the same disease.

The first project my partner and I were involved in was a new tool in which one could visualize adult idiopathic scoliosis as a continuous process. This involved the use of digital morphing. Up until now, scoliosis was observed only through the comparison of still X-rays and back topography images. Technology is now available in which separate images (such as X-rays) can be blended to create continuous movement. Each image is scanned into the computer and balanced for size and contrast using image enhancement software. Reference points on each image are used to mark points of change in creating the movie. The morphing software is then used to create interpolated images between actual images. X-rays can be superimposed on back topography images to show curve development and how it affects a cosmesis image. There are limitations to this interpolation, though as it assumes that an average change takes place between each image and cannot show if curves increased rapidly at one point and slowly at another point. This method of viewing scoliosis is very helpful in educating clinicians and patients about the disease by seeing information one could not attain from still images.

The next project involved using the VICON computer and camera system in the operating room. The VICON system involves the use of several cameras that emit infrared light to record movement in three dimensions. Markers with super-reflective properties allow the infrared light to be picked up by the cameras and recorded in a computer. Since scoliosis curves are found in all three dimensions, it is important to begin studying the disease in 3-D. Cotrel-Doubousset Instrumentation is the application of a complex combination of forces to correct spinal curves. It involves a derotation maneuver that translates and rotates along all three axes. Technical improvement could give more accuracy in correcting the curves. The VICON system will be set up in the operating room and clips with three markers will be attached to vertebrae during the derotation maneuver. VICON will be programmed to record the kinematics of the vertebrae during surgery.

The next project we observed also involved the VICON system, but it was used to study the effect on patient gait after hip replacement surgery. A new physiotherapy program was being studied to see how it affected the quality of movement of a patient after surgery over patients who received a less intense program. Markers are attached to the patient's lower back, hips, thighs, knees, calves, ankles and feet. The patient will walk across the room and the VICON cameras will record the movement. Also, the patient will walk across force plate in the floor, which allows the clinician to analyze the distribution of weight over the feet. The patient then gets standard joint measurements for flexion and extension, then has a strength analysis using the Kin-Com machine. Kin-Com resembles a torture device and feels like it too! Hip abduction, flexion, extension and internal and external rotations as well as knee flexion and extensions are measured. The force applied against a resistance is measured in many trials. I learned that if you laugh during your tests, your strength measurement bounces around a lot!

Another technology that is being developed at the Glenrose to be used in the operating room is the Gripper. This was developed to measure the forces involved during corrective surgery. The derotation maneuver involves screws and hooks being inserted into vertebrae then a rod rotator is used to fix the hooks and screws to the rod. At the moment there are no guidelines for how much force to use during this rotation and there is a risk of fracturing vertebrae during this procedure. The Gripper is a rod rotator with sleeve that measures forces attached to the handle. My partner and I helped in calibrating the Gripper's measurements of angles so that its position in space could be determined before use in the operating room.



Kim and I spent a lot of time researching scoliosis so we could have a better understanding of the disease and the importance of these projects. We also spent time soldering electrical components to circuit boards to be used in other technologies being developed in the center. I had soldered before, but never elements so tiny you had to look at them under a microscope! Seeing technology being used in a lab is one thing, but the experience of it being designed, developed and implemented at the research center was very interesting.

My favorite experience this summer was spending a morning at the Glenrose Rehabilitation Hospital in the prosthetics lab. This is an area in which I am really interested in pursuing a career and seeing the types of jobs available and how to get into the field was really great. I got a lot of advice on how to get into programs involving prosthetics and orthotics and I may have a potential place to volunteer at next summer!

I would like to thank Allison Elander, Jesse Kautz, Alice Bardas, Kajsa Duke, Darren Berg, Edmond Lou, Kathleen Moreau, Jim Raso, Geneil Campbell, Ryan Corbett, Michelle Martin, and especially Doug Hill and Nelson Durdle for all their guidance this summer. Thank you also to Grace Ennis, Michelle Radmanovich, Tara Nord, Margaret Ann Amour, as well as the Glenora Rotary Club for making this experience possible. I had a wonderful summer and each day that I have spent in the WISEST program has enforced my desire to pursue the science and engineering fields of study later on in life.

Candice Heron

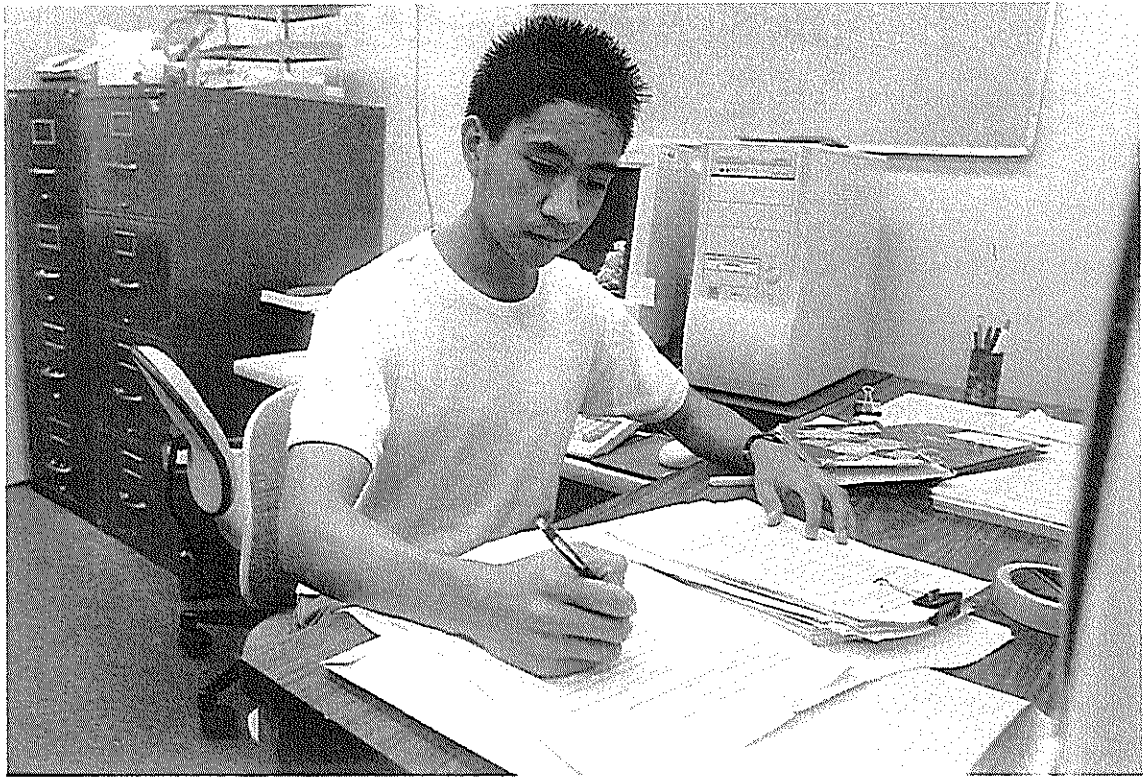
Spending six weeks of my summer working in a “non-traditional” field of study wasn’t exactly what I thought I’d be doing during my summer off of school. But after participating in the WISEST Summer Research Program, I realized I couldn’t have made a better choice.

Being one of the few males in the WISEST Program, the non-traditional field of study that I had been assigned to was nursing. I was really pleased with this assignment, since I was originally interested in something in the health field.

My project for the summer was under the directorship of Dr. Linda Ogilvie from the International Nursing Centre. I was to take part in the developmental processes of a questionnaire called the New Canadian Children and Youth Study. The study was focused on immigrant children from selected immigrant communities, and its purpose was to discover how well these children were integrating into Canadian society.

Over the summer I took part in several of the different processes involved in creating a questionnaire such as: entering previous questionnaires into databases, creating a code book, attending community advisory committees, and chairing focus groups. All of these were great in helping me to understand the work that was involved in creating a simple questionnaire.

Since this survey was of an inter-disciplinary nature, I got to meet many different people both in and out of the nursing field. Even Dr. Ogilvie’s co-investigators came from different areas of study: Elizabeth Burgess and Jeannette van der Velde were nursing students, Chuck Humphrey was a data coordinator and Frank Trovato was a sociologist. All of these people helped me to understand how each of these disciplines was involved with the study. And after attending an advisory committee meeting, I learned that there were even more groups represented there, from government agencies to child and social services.



But of course, WISEST wasn't all just work. There were also the little "extra" events that helped make the Summer Program more interesting. Michelle's bag lunch every Tuesday provided a great venue for the WISEST and HYRS students to get together and spend time with other students (if they could make the trek across campus). The Wednesday afternoon activities were surprisingly fun and educational at the same time. And those extra social events in the evenings were a great way for students with similar interests to spend even more time together. Although I was only able to make it to Shakespeare in the Park and the Space and Science Center, they were still a lot of fun.

The past six weeks with WISEST have made a great impact and I'm sorry that it had to end. Then there's the cliché that says, "All good things must come to an end." And the WISEST Summer Research Program was definitely a good thing.

Carlo Dimailig

The Six Week Summer of 2000

Chandra Zimmer

There are many things that I have learned this summer. They include everything from the art of pipetting, to how to use the LRT system. I am not from Edmonton so there were special city skills I had to acquire. I now never travel anywhere without my maps, and when I buy something I try to make sure I have close to \$1.65 in change. I found that these are essential skills when trying to travel around the city.

Learning about work in my lab was another story. I was assigned to Dr. Taylor's Lab in room # 437 in the Biological Sciences building. My first step was learning my way to, from, and around the building. Let me clarify- I know the areas near my wing, and I don't get lost so long as I don't venture far into unknown territory. I have found some neat quirks that the 3 crazy architects left behind!

As well as learning my way around the building, I have become familiar with my lab. I helped three different people with parts of their individual projects. I was involved in experimenting with wheat, bean and canola. For the work directly relating to the plants, I germinated, planted, fed, poisoned, harvested, measured, cut, and weighed them. Poisoned, poisoned you say! Yes, that's right. I slipped some aluminum into their tanks when they were looking the other way. No, it didn't happen quite like that, it was all part of the experimental plan. We added various amounts of aluminum to the plants, then watched for signs of weakness. We worked with four varieties of wheat starting off, then moved to two different types of bean, and finally experimented with two cultivars of canola. We were trying to pinpoint the concentration of aluminum where one variety of a species would be able to live, yet the others would suffer.

The idea for the big picture is to find the gene that is responsible for protecting the plant, then insert it into the varieties of plants that do not have the



gene. In this way highest yielding crops which are presently aluminum sensitive could be made tolerant. This would allow these very productive crops to be grown all over world, even in places that have a high level of Al toxicity in the soil.

This job provided me with an awesome opportunity to get an inside view of what research entails. The experience has been a good one, in no small part due to the people that I worked with and met through the WISEST program. I have become friends with a ton of nice people who I will definitely remember. I especially enjoyed all of the activities that were organized for the students in the program. It was a fun and interesting time!

WISEST FINAL REPORT
Deepti Damaraju
Department of Medical Genetics

Working in the Department of Medical Genetics at the University of Alberta was definitely a highlight of my summer. In particular, being able to work in the lab of Dr. Diane Cox left me feeling very fortunate. On the first day of the program, I had no idea as to what to expect in my work. Who would I work with? What would I do? Would I even understand the research I would be helping with?? These and numerous other questions plagued me, until I actually saw my research lab and met the people in it. Everyone, Dr. Cox and lab colleagues alike, were extremely friendly and helpful. I credit my wonderful research experience solely to their efforts in teaching me and making me a part of their research team.

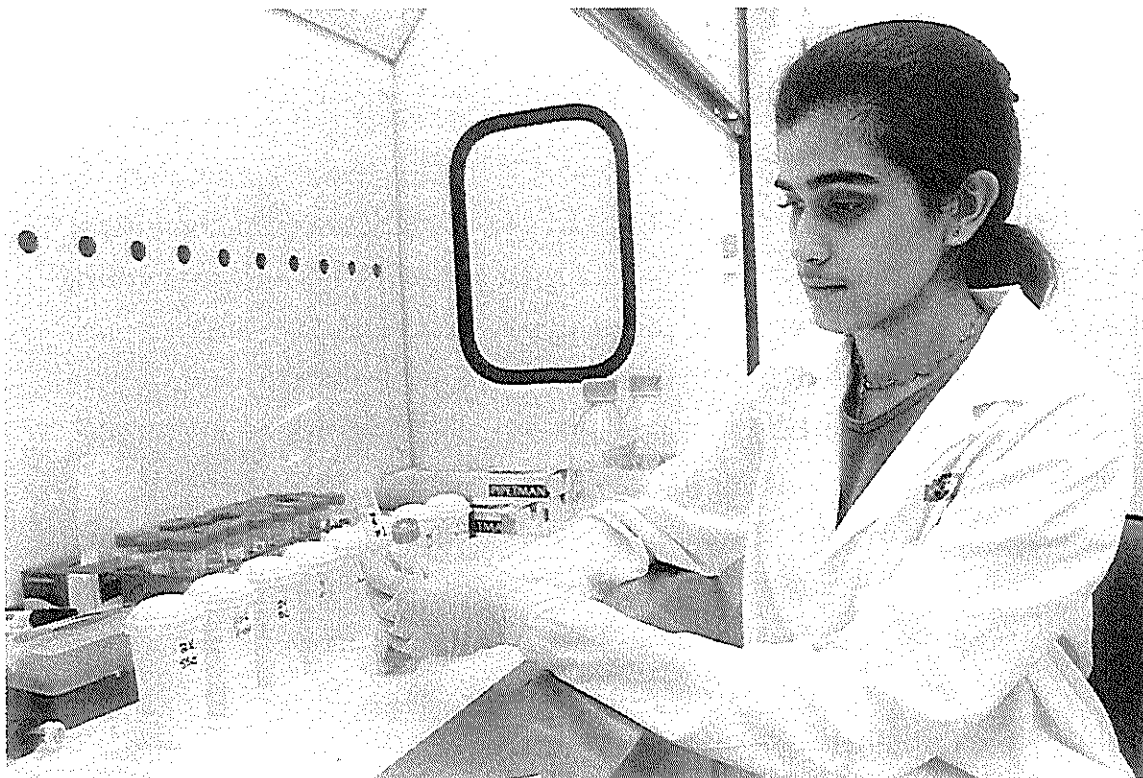
During my six weeks in Dr. Cox's lab, I worked mainly on two projects: *in situ* hybridization, with Steven Moore, and yeast assays with Gloria Hsi. My poster project was based on *in situ* hybridization, which I will summarize below:

Our basic goal is to learn more about the function of two copper transporting proteins, ATP7B and ATP7A. When the gene for these proteins is mutated, the protein is dysfunctional or non-functional, resulting in either Wilson disease, or Menkes disease, respectively. In order to learn about the function of the proteins in mammalian tissues, we used *in situ* hybridization on mouse liver and kidney sections to see tissue specific expression of each gene. By using different probes and detecting mechanisms to identify where the probe hybridized in the tissue, and by observing the slides under a light microscope, we were able to come to a few conclusions. In my section of the project, I learned that the Wilson gene (*Atp7b*) in mice was expressed in areas of reabsorption in the kidney. This led me to conclude that the protein may serve a reabsorptive function. The value of this research, then, is allowing us to localize expression with areas of known function, and thus allow us to explain the cause of certain phenotypes in the disease.

My work with Gloria involved testing mutations in the Wilson and Menkes genes of patients showing clinical symptoms to see if the mutations were disease causing. Setting the stage for the completion of a yeast assay involved my work with preliminary protocol. This involved cloning bacterial vectors with the mutation insert, sequencing, running gels and digests, cloning and inserting many times over into different vectors, checking by digests, gels, and sequencing many times over, all to achieve the final end: transformation into yeast. Yeast assays are a good way to test mutations, simply because yeast have a similar copper transport gene, they grow quickly, and mutation functionality can be tested by observing yeast growth on iron and copper supplemented plates, and iron and copper limited plates.

What I really enjoyed about my work was that I was able to apply almost all of the genetics I learned in school to the techniques I was using in the lab. My school knowledge helped me to learn the techniques better, while learning the techniques strengthened whatever I had learned in school. Examples of procedures and techniques I became familiar with are cloning, using restriction enzymes, running gels, using and making probes, and doing Southern blots. The fact that I was actually doing what I had learned about was the neatest part of working in this lab.

Aside from my actual research experience, I also got to experience the different things you get to do when you're part of a lab. I attended several lab meetings (though I didn't fully understand much of what anybody was saying) and saw how people in a lab keep others in touch with their work. On a less professional note, I also learned that researchers in Medical Genetics really know how to have fun. On a few occasions I went out for lunch with lab members, and the activities I



didn't get a chance to attend included a department golf tournament, lab laser tag, and a barbecue. However, it was really great to witness so many people who work together have so much fun. I'm not sure if there is any other profession that compares to research in terms of the flexibility you have with your work hours and getting the most out of the many friendships you make.

To conclude, I thoroughly enjoyed working in Dr. Cox's lab in Medical Genetics for three main reasons: a) I got to experience what it is like to work as a researcher b) I learned much about lab work, lab techniques, goals of medical genetic research, and specifics about the projects going on in the lab, and c) I was made to feel welcome and had all my questions, doubts, and requests faithfully resolved by any lab member I happened to talk to. It was through the efforts of the Cox lab that I was able to get the most out of my research experience.

All in all, I was very pleased with the results of having participated in the WISEST program. All our social meetings and events were very well organized, I met many new students with diverse interests, I learned my way around the University campus, and I learned not only many techniques in my lab, but also proper research protocol (ie: recording everything you do, keeping track of procedures, results, and even increasing the chances of your research success by reading papers from others who have succeeded). I learned that research is a very time-consuming profession, but nevertheless useful and needed in the scientific community.

All in all, a very worthwhile 6 weeks of my summer.

The WISEST Experience

During the six weeks I spent in Dr. Branda's research lab in the Department of Chemistry at the University of Alberta I learned a great deal. I learned that I would most definitely like to pursue a career in chemistry. The first week was the hardest part of the whole time because everything was new. I didn't know any of the people or how to use any of the equipment, but by the end of that first week I did. I knew how to set up a reaction for organic chemistry – this included learning something about organic solvents. The students in my lab were very helpful. I worked mainly with Andrew while in the lab. We worked on two projects during the six weeks: the first was a variation on a basic molecular switch that had already been made, and the second was the synthesis of a molecule that would be able to switch only in the presence of potassium. Both switches are photochromes that switch from a colorless-open form to a colored-closed form when irradiated with certain wavelengths of light. On the first project there were some interesting moments when I worked with $t\text{-BuLi}$ because it will spark if you drop it in an ice bath – needless to say this can be rather startling. On the second project (which I liked more because I was there when it started and witnessed the results when the switch was finally made) the most memorable piece of advice I was given was when I worked with PCl_5 . This compound forms HCl gas when exposed to air – that was enough to make me a little nervous but then Andrew told me “ HCl gas is heavier than air, so if you inhale some you have to stand on your head and exhale deeply.” This was a bit of nerve-wracking advice and fortunately I didn't have to use it. After working with some of the compounds for the first time I lost my apprehension because it was easy to avoid the danger once you knew about it. I won't go into the exact reaction details because they would be pretty dull to read about, but I will say that it was a very interesting process. I had to learn several new laboratory techniques, which was really fun because it was completely new and challenging to me. I learned how to purify a product using column



chromatography (I quickly discovered that running the reaction was relatively easy when compared with the effort needed to purify the product we needed.) Being part of the WISEST Summer Research Program has made a significant impact on my life and I will never forget my experiences during those six weeks. I want to extend my thanks to the understanding individuals that I worked with in Dr. Neil Branda's lab, my sponsors at the Alberta Research Council, my teachers from St. Thomas Aquinas Catholic High School, and my family (who drove me to and from work everyday). I reserve a special thanks for Grace and Michelle for all the work they put into coordinating the WISEST Summer Research Program.

Dominique Hebert

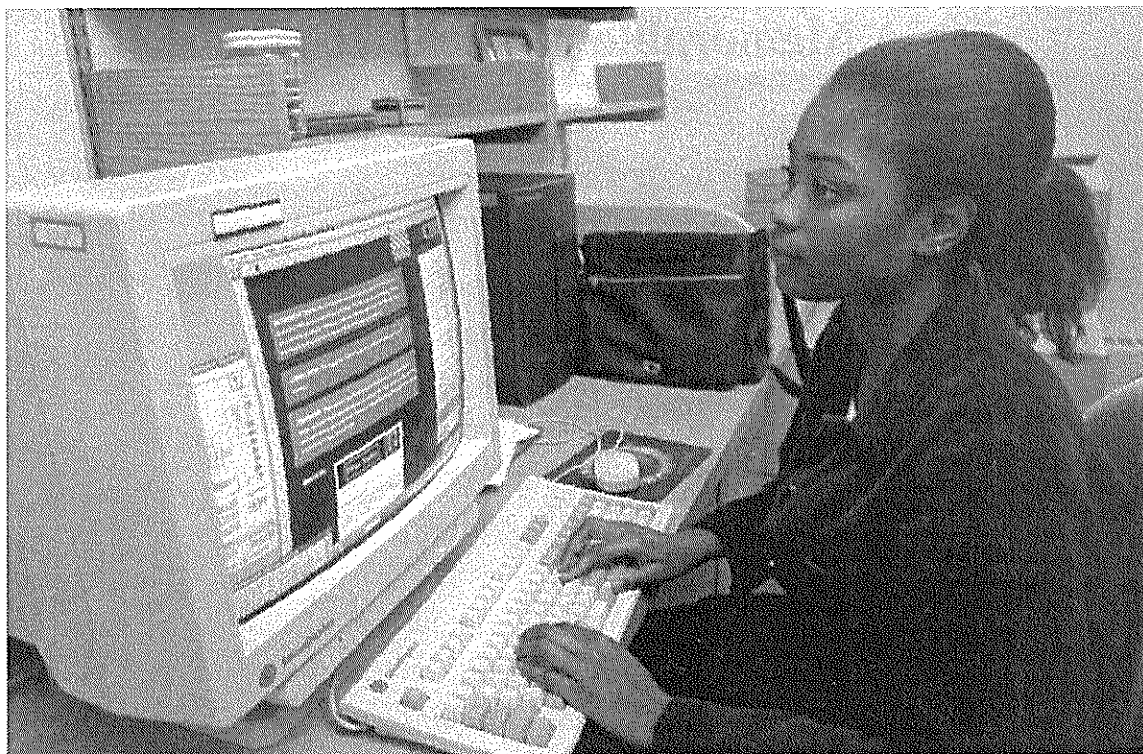
Women in Science: Tearing Down Barriers

By Ekua Yorke

When I was first informed about being selected to participate in WISEST, I was ecstatic. As the workdays approached fear crept into me as I worried about various expectations and whether I would be able meet them. On July 4, I attended the opening session for the WISEST program at the University of Alberta. I discovered my fears were unfounded as Grace Ennis explained the program. After I met my supervisor Rob Lake, and he outlined my project I was eager to spend my next weeks working with WISEST.

During the six-week sojourn I worked in the Department of Computing Science. My project involved revamping Chinook (the World Checkers Champion). To acquire the skills necessary to do my project, I had to familiarize myself with the UNIX operating system and learn HTML (Hypertext Mark-up Language). I also learned how to use Showcase, a program that creates graphics. I created my personal webpage and an online application form for the department. I also researched various university websites across Canada and the United States to find the most popular links among these universities. Revamping the Chinook homepage involved improving the page's aesthetics and layout. I also tried to make the page user-friendly. I presented a research poster – “The New-look Chinook” – that briefly outlined my six of works in the Computing Science Department.

Every Wednesday, WISEST organized group activities that included a safety seminar, a tour of the campus, an introduction to the “Gate” library catalogue, and an off-campus tour to CompCanada. The group also met other women working or studying in non-traditional careers. I visited the Cardiology Department at the Heritage Medical Research Center where I met a researcher, Dr. Kavanaugh. The WISEST participants visited the Space and Science Center, the Street Performers Festival and watched the World Cup Soccer Qualifying Game between Canada and Trinidad and Tobago. I had an opportunity to make new friends at the Tuesday Bag Lunches with Michelle.



The WISEST experience was wonderful and valuable. I made new contacts and learned valuable skills including operating UNIX and using Showcase. I am now proficient in HTML and webpage building and have also been exposed to university campus life. I am anxious to share the knowledge with friends at Holy Trinity High School.

I wish to thank my supervisor Rob Lake, my sponsor Dr. Ron Unrau, Grace Ennis and other staff at WISEST, Mr. McDonough, Mr. Russo, Mr. Tabaka and Mr. Grattan for making it possible for me to participate in the WISEST 2000 Summer Research Program.

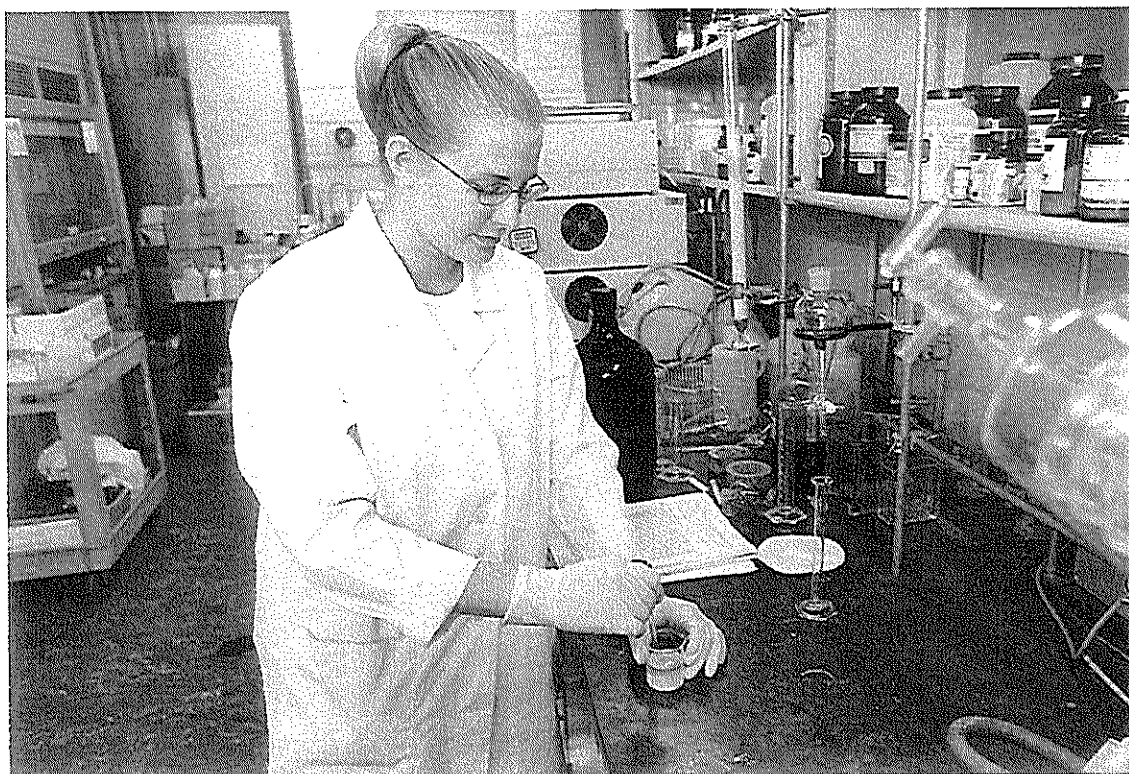
A Memorable Experience

By Elsa Oberg

WOW....I can't believe how fast this summer has flew by. I think back to when I first found out that I was accepted to the WISEST program. I was so excited, but nervous as well. I had no idea what to expect. There were so many questions that rolled through my mind. I couldn't believe that I was going to be working at the University of Alberta for the summer.

I had the privilege of working with Dr. Margaret Ann Armour and Dr. William Hunter in the Department of Chemistry. For the first week of work I completed a first year chemistry experiment. By doing this, I became comfortable with the lab and learned where everything was. I also learned lab techniques that would be needed for my research project.

My research project dealt with the destruction of diazinon. Diazinon is a pesticide that is used to control insects on a wide range of crops. The project was composed of two parts. The first part involved the revision of an undergraduate experiment. The experiment deconstructed diazinon for the purpose of viewing the products. Revision was necessary because the experiment yielded inconsistent results. Diazinon was reacted with two different oxidizing agents; sodium hypochlorite (bleach) and potassium permanganate and then the products were extracted with dichloromethane. Primary analysis of the solutions was done using thin layer chromatography and further analysis was done by gas chromatography/mass spectrometry. I made changes to the experiment enabling for the best identification of the products. The second part involved finding the conditions to destroy diazinon to 99.9% completion. This would allow for diazinon waste and spills to be treated on-site. I used the revised undergraduate experiment as the basic experiment and then manipulated reaction time in order to destroy a larger percent of the diazinon.



This summer has been a wonderful experience for me. I am so glad that I was given the opportunity to participate in the WISEST program. I have learned so much and in such a short period of time. I am now aware of many more career options that exist, which will help me make future decisions. I now have a much better understanding of the fields of science and engineering and the way in which research is done. This summer has definitely been an unforgettable experience for me, one that I will reflect on for years to come.

Thank you to Dr. Margaret Ann Armour and Dr. William Hunter for the opportunity to work with them. They were absolutely wonderful. Thank you also to Grace, Tara and Michelle for doing a great job running the program and to ICONMASTE for their generous support.

What I Did On My Summer Vacation

Heather Fenton

This summer, I was fortunate enough to participate in a truly amazing experience. The WISEST Summer Research Program allowed me to be involved in scientific research. Although repetitive at times, the overall exposure to research provided knowledge and understanding of the scientific process. My supervisors were remarkable people who made the experience as pleasant as possible. The job was kept exciting because of the various projects that I contributed to.

The first project that I worked on involved a study of the effects of forestry on amphibians. Specifically, I counted wood frog egg masses and entered data, but the broad goal is the protection of amphibians. Other projects involved with amphibians included field trips to Elk Island to install traps used to catch frogs and toads. The intention of this study was to determine the effects of fire on amphibian populations. In order to determine the most appropriate method to protect amphibians, every aspect of interaction with other species (including humans) must be understood. Intraspecific (between members of the same species) and interspecific (between members of other species) competition help determine the survival of species. By studying the effects of human interaction on animals, we are able to suggest alternatives that generate minimal influence on biotic populations. This allows the continuation of biodiversity and interactions within the biosphere.

Another amphibian project included a study of the possible predation of tadpoles by small-bodied fish. This particular study occurs at the Meanook Research Station and involves experimental ponds including fathead minnows, stickleback minnows, and a control pond without fish. Similarly to the other studies, the frogs caught in traps are weighed, measured and have their toes cut off. This allows researchers to determine the age of the frogs by counting the "rings" on the toes and identify recaptured frogs.

After the amphibian studies, I participated in a study of the aspects of predation of owls. This involved field work at nest boxes to collect pellets, which I later analysed, to determine the choice of prey by the owls. Also, I entered



12 years worth of nest box data, which will be analyzed to determine any changes in prey. The most interesting aspect of my experience with WISEST was working with live owls. I assisted in running trials that will be used to determine the sensory aspects of predation. Also, I scored videotapes of trials to determine mouse head position, relative to the owl, when attacked. The amount and duration of head bobbing (circular head movement), was scored in addition to mouse position. Future studies will determine if head bobbing assists the owl's visual or auditory component of prey recognition. The larger scope of this study involves studies of memory and object recognition among animals and humans.

The experience of scientific research was very worthwhile. I am aware of additional career and educational opportunities that I may choose to pursue. This opportunity of becoming directly involved in scientific research will allow me to make informed decisions regarding the specific career path I plan to take.

The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' (I've found it!), but "That's funny..."¹

- Isaac Asimov

Ever since I was really little, I have loved science. As a child, I was constantly asking the question "why?" or "how?" What science couldn't answer, my imagination had explained until I had the whole universe figured out. WISEST has provided me with an amazing experience in a field I enjoy very much.

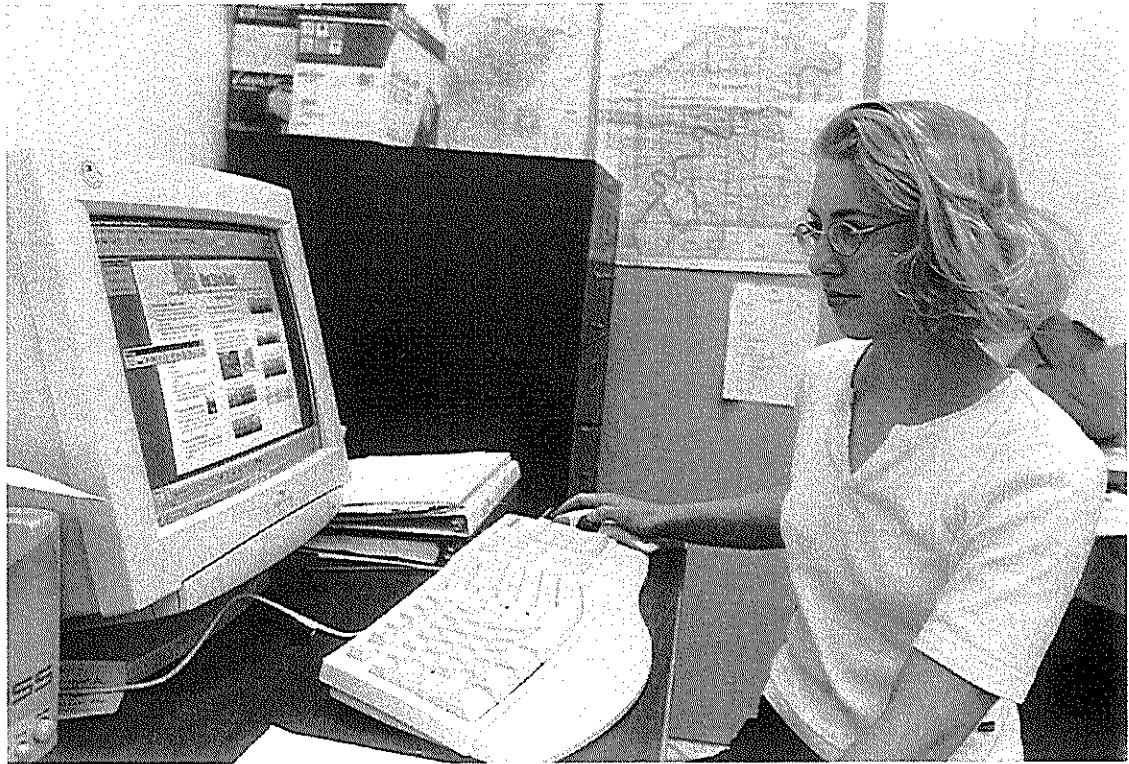
During the summer I worked under the direction of Dr. Karen E. Smoyer and her research team in the Earth and Atmospheric Sciences. Initially my research objective was to determine the relationship between heat waves and mortality in southeastern Europe, but unfortunately there was no available data for mortality rates during the period I was investigating. Instead I was able to study temperature anomalies during the June to July period.

Initially I completed a literature review on the Internet looking for heat wave information and related media reports. I learned some surprising facts about heat waves and how they affect human health. For example, heat waves take the greatest toll on human life next to cold waves. Although heat waves do not make the media's headlines as often as hurricanes, tornadoes, floods or earthquakes, they are one of the more deadly natural disasters. This is part of the reason for wanting to study heat waves because once we know what environmental or physical factors decrease the affect that heat waves have on the human body, the sooner we can begin to prevent heat-related deaths.

A heat wave is a period of abnormally hot weather conditions that last for extended periods of time. They are formed when an air mass becomes stationary over a region; in this case the heat wave affecting southeastern Europe was formed when an air mass from the Sahara Desert descended upon the region. The vulnerable populations include: chronic invalids, the elderly, infants, people with low socioeconomic status, the disabled, people with heart, respiratory, weight or alcohol problems. The extreme heat aggravates preexisting illnesses such as heart problems and respiratory ailments (bronchitis and asthma). Many people die of heart attacks and heat stroke after suffering through long periods of high temperatures. During a heat stroke the body is no longer able to decrease its core temperature through the dilation of blood vessels and sweating, subsequently the body is unable to maintain homeostasis.

Heat stress arises when temperature levels exceed threshold levels that are relative to the normal for that particular climate. For example, Turkey has high average maximum temperatures compared to Yugoslavia so what would be considered a heat wave in Yugoslavia would not actually be that hot in Turkey where the people there have adapted to the hot weather conditions. Urban areas filled with low income people typically have the highest heat-related mortality rate because of limited access to air conditioning, heat trapped by buildings and city pavement (called the "heat island effect"), and poor air quality.

To study heat waves in Europe I had to choose which cities I would collect temperature data for. Initially I had twenty cities from all over southeastern Europe, but due to the lack of the required data I narrowed my study down to six cities, three in Turkey (Ankara, Istanbul, and Izmir) and the rest in Croatia (Zagreb), Macedonia (Skopje) and Yugoslavia (Pristina). I



compiled 30- year average maximum and minimum temperatures for each city (these data established the normal maximum temperature for the whole of June and July) and then I collected current daily maximum and minimum temperatures throughout June and July. Then I organized the data into graphs to give a visual representation of suspected heat wave periods. Although there appeared to be periods of abnormally hot weather conditions, a statistical test was required in order to determine if these distinct periods were actually heat waves. We used the t- test because we were comparing short periods of time to 30- year normals.

We discovered when the significant hot episodes occurred and predicted that during these heat wave periods we should expect to find increased mortality rates and hospitalizations. The dates of the media reports corresponded with the occurrence of the longest heat wave that occurred in each city during early July. Examples of these headlines are: "Blistering heat wave in Europe leaves 25 dead, melts road", "Heat wave scorches southeastern Europe, kills four", and "8 deaths tied to heat wave in southeastern Europe."

No "Eureka" heralded our discovery, but there were some interesting findings. The minimum temperatures for July were discovered to be above the 30- year average minimum temperature, which would also have adverse affects on human health because there would be no relief from the heat, even during the nights (the coolest temperatures generally occur at night). Our conclusion was that more research was needed to focus on the health effects of high minimum temperatures and remember: Heat kills.

Jennifer Brogly

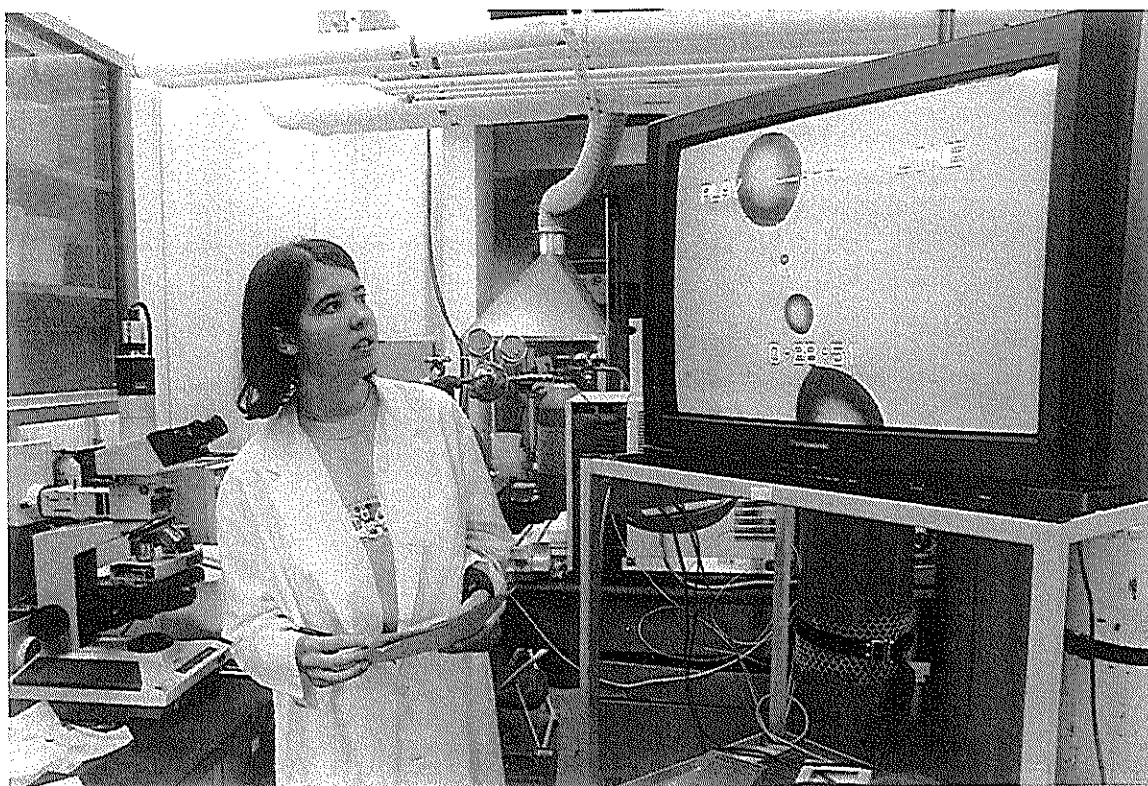
The Experience

Jennifer Ormsbee

In the summer of 2000, I spent six weeks in a laboratory. I was working in the Department of Chemical and Materials Engineering doing research with polymers. I wanted to participate in the WISEST Summer Research Program because I was unsure of what I wanted to do in university. I thought that the Program would show me different perspectives of different fields of study while at the same time giving me experience in a laboratory setting with researchers.

My project involved using visualization techniques to measure interfacial tension of polymer systems. Many materials that we use today such as telephones, car bumpers, and computer cases are made from polymer blends so it is important to understand polymer systems in order to be able to make better blends with better properties. The type of structure and properties that result from blending polymers depends on the interfacial tension of the system. The breaking thread method was used to measure interfacial tension. This method involves placing a polymer thread between a polymer matrix, heating the system, and measuring the rate of breakup.

My experience in the lab involved preparing samples, recording thread breakup, and calculating interfacial tension. It was enjoyable work that required lengthy waiting periods. The work gave me an understanding of what is involved in doing research and how much time and patience are required.



On Wednesday afternoons there was a planned session where all WISEST participants got together and did an activity. I found these enjoyable because it was a time to see other participants and showed us different aspects of science and engineering than we would learn in our lab setting. The most useful session for me was the small group discussions. It allowed us to talk to people who are currently working in a science, engineering, or technology based career and for them to share their experiences with us and for us to ask questions.

I would definitely participate in the program again and I recommend all others who are interested in science or engineering to look into the WISEST Summer Research Program. It was a great learning experience and helped me to decide if science or engineering was a field that I wanted to go into.

Memoirs of a Fly Girl

When people ask me how I spent my summer, they don't expect the answer that they get.

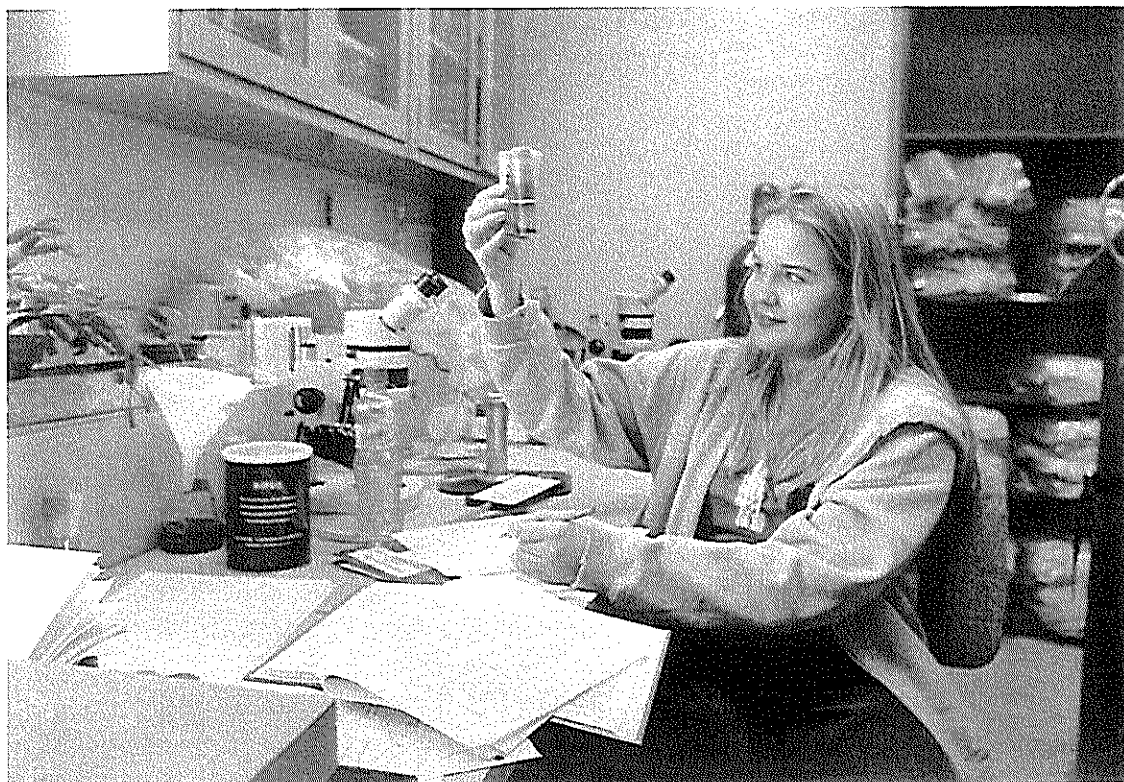
"Oh well, you know, the usual...fly pushing, fly tipping, fly collecting, fly sorting, fly mutating..."

I guess it's not the most conventional way a teenager hopes to spend her summer, but for me, it was definately one of the most rewarding. Ok, so you're probably shaking your head right now, and cringing to think of the crazies that will one day be running the world.

"Flies...she *liked* working with flies! Okay..."

First of all, let me tell you. The flies grow on you. Really. Once creepy and gross looking, I now find those same little darlings quite cute and admirable. In addition, the amount of *Drosophila melanogaster* genetics I was exposed to, not to mention the university-level genetic concepts in general I absorbed, was phenomenal. One of the most valuable lessons I learned this summer was that there are galaxies of information out there just waiting to be discovered. The things that I was exposed to made my formerly somewhat challenging Biology 30 class seem like kindergarten. I will definately not be complaining about my course load next year, that's for sure. Another thing I learned this summer, perhaps not so valuable when made known to my slacker self, was that lab work is pretty laid back. Undertaking research in your own lab means freedom from the rigid, ungodly banking hours employed in most other occupations. As well, breaks can be taken at will. Don't get me wrong, there is work to be completed, and there abounds (or so I was told by certain individuals) many a hard-working lab tech. Strange but true, although I had the freedom to set my own hours, I found myself *trying* to get to work early. I guess liking your job will do that to you.

If I'm going to regret anything at all about my summer spent with WISEST, it would be not keeping in touch with all the wonderful and interesting



people I was given the privelage of interacting with. Not only did I get to spend time with the other awesome girls in the program, but I was lucky enough to be matched up with a lab full of fun, young U of A students as well as some former hippies. I made some really good friends this summer.

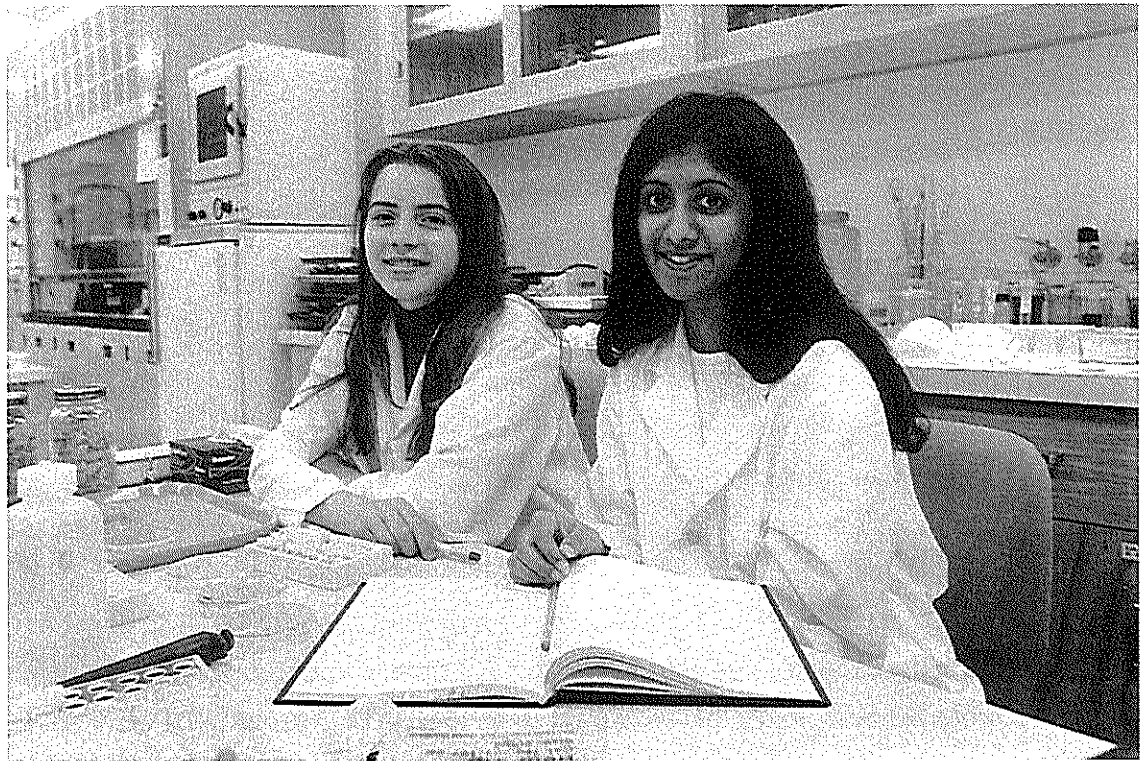
Well, in conclusion, even though I found research to be pretty interesting, being up close to it made me realize it isn't as much for me as I thought it would be. However, being involved in WISEST gave me the initiative to think seriously about my future, and exposed me to some very inspiring individuals. I now know I want to pursue medicine, in hopes of one day practising overseas. Well anyways, I suppose I have rambled on enough. I would like to leave off by giving my sincere thanks to WISEST, its coordinaters and sponsors for the invaluable and most memorable experience they have given me. Thank you.

Jennifer Starchuk

Summer of Bugs

This summer we worked with bugs, mostly caterpillars. Rather than doing an experiment that has been repeated numerous times, our professor, Dr. Keddle, got us to do something new. In our experiment we fed each group of caterpillars different isolates of bacteria and yeasts, then observed the effects on the caterpillars' growth and survivorship. At first, we were a little hesitant about working with caterpillars (ewwww), but now we are much more comfortable, they even look kind of cute. Our experiment generated some really interesting results. One bacteria killed the whole group of caterpillars. Another bacteria caused a behavioural change in which the caterpillars became cannibalistic. Overall, we liked our project because we were essentially responsible for the whole experiment.

The WISEST Summer Research Program gave us work experience in science helping us determine if we wanted to pursue careers in science. WISEST provided the opportunity for us to be exposed to current, innovative research. We learned so much more doing hands-on experimentation than we would from textbooks at school. We want to thank WISEST for this program, our sponsors for their support and everyone in our lab for their knowledge and helpfulness.



It was really fun and exciting meeting new people and getting acquainted with the university. The campus is really beautiful, especially the arts building. We noticed everyone was helpful once we got lost about ten times during the first week. The Earth Sciences building still confuses us because all the hallways look the same. Eventually the memory of our job will fade, but we will still stay in contact with all the friends that we've made.

By Jessica Verhagen and Esther Goonewardene

Smart... in Theory...

By Julie Dien

When someone mentions WISEST, I always pictured a congregation of the most mature and intelligent... but, then I met up with some people in the program with me, and some of the things that we did made me think twice. I don't think that it would be very fair for me to get into particulars because some of us would like to keep the 'genius' persona, but a couple I must mention: Emily-Murphy park and R.A's White Ave corners (see you all there!), the challenge we faced in getting our group into a *circle* at the small group discussion, and remembering everyone's name proved too much of a feat... but we all managed to remember Carlo and Ryan's (go figure.)

Anyway, getting on with my WISEST experience... When we all first met in Chem E3-25, I was really excited about getting to spend my time with all the people there... but then someone broke the news to me that we would all be ISOLATED in our INDIVIDUAL labs. I almost cried. Then I saw Violet, my long lost friend from junior high... lo and behold... she was in my lab! I was most fortunate to have a lab partner, as most of the WISEST students were on his or her own. I never realized how valuable it was to have a partner until I began to work in the lab. It must be said that as a researcher, you spend a lot of time alone... a situation that I personally could not bear for much longer than two days. Both of us are in complete agreement that if we did not have a partner, we'd go absolutely nuts!

Vi and I had the time of our lives. In our free time (which was not very often I might add), we would make parafilm art and jewelry. We gave a parafilm ring to our supervisor, Dennis Reinecke, and he was sweet enough to wear it for a whole 10 minutes. We also made our own pencil holder using a beaker and decorating it with labeling tape... watch out Martha Stewart!

Another huge factor that made my lab so incredibly enjoyable was the kindness and company of my supervisors. Dr. Jocelyn Ozga drove Violet and I out to the University farm to pick saskatoon berries for a morning. We had an absolute blast (once you forget about the scorching heat and mutant mosquitoes.) Dennis kept Violet and I company as we labored over our plants. We talked about subjects ranging from sumo wrestlers to Kurt Browning's ice version of Singing in the Rain. Marilyn Johnstone, a graduate student, took us to the Muttart



Conservatory for a day, and aside from the ladybugs, I had a great time! I can't help but feel totally grateful for the attention and friendship that these wonderful people have extended to Violet and myself.

Two, very important memories that I must mention are: Scott Messenger's radio and heavy metal music and **LONG LIVE THE STRAWBERRY MARSHMALLOWS!**

As the six weeks flew by, a fact that I have known, but had not taken to heart, began to show its face in a way that I couldn't ignore. We are Women in Science. From the very first day when about 40 girls were crammed into that room, all waiting to embark on their journey of science, to the very last day when we proudly showed what we had learned and are now capable of doing, each of us was making her mark in a field that had previously been dominated by males. It is empowering to know what we can do and what we can contribute to a world of pure discovery.

P.S. I worked in Agriculture and Forestry with *Arabidopsis thaliana* (check our Violet En's page for more details of lab life)

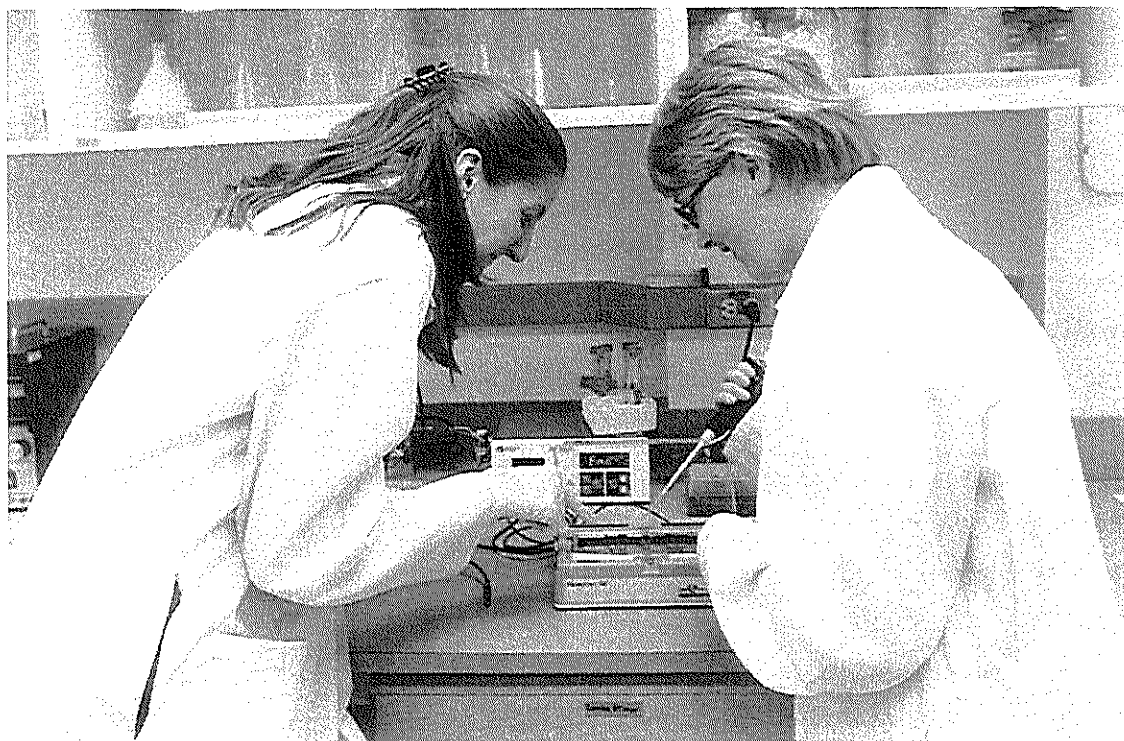
Becoming a Scientist

The days of WISEST are slowly coming to an end and it seems all too soon. I vividly recall the day I mailed my application and the excitement I felt the day I received that much awaited phone call congratulating me on my acceptance into the program. The time I have spent at the University of Alberta, six weeks in the summer of 2000, gave me an amazing insight into the world of science and technology. I have been exposed to something that not many have had, or will have, the opportunity to and for that I am grateful.

For the past six weeks, I have been working in Dr. McDermid's lab in the biological sciences department. I have been able to put various skills that I have acquired in chemistry class to work, such as preparing solutions and pipetting. As well, I have gained a whole new set of skills that are far too advanced for a high school laboratory, such as cloning. The knowledge that I have accumulated over the past six weeks will be essential in my final year of high school and has steered me towards a field that I wish to pursue for a career.

The first day in the lab was memorable to me. I was introduced to a higher level of thinking, which in itself added tremendously to the experience. I was given the chance to work with individuals who didn't doubt my ability, but rather encouraged me to learn new skills. They were extremely helpful in discussing university life and courses. Overall, I have a good sense now of what I wish to do for a career.

When I was told of what my research project was, I remember thinking how lucky I was. Who else would have the chance to clone a gene? My project in the lab was to clone the CES 38 gene located on chromosome 22 which will eventually be used as a probe on mice embryos to determine if CES 38 may be



responsible for causing Cat Eye Syndrome. I was introduced to a variety of techniques and technology involved in the cloning process. Learning how the technology performed its function was exciting. Everyday I learned something new and was given the opportunity to try things I never even knew existed.

My experience with WISEST has been most rewarding and I look forward to sharing it with others. Cloning things is something that scientists do and for six weeks I was a scientist.

By: Katrina Malley

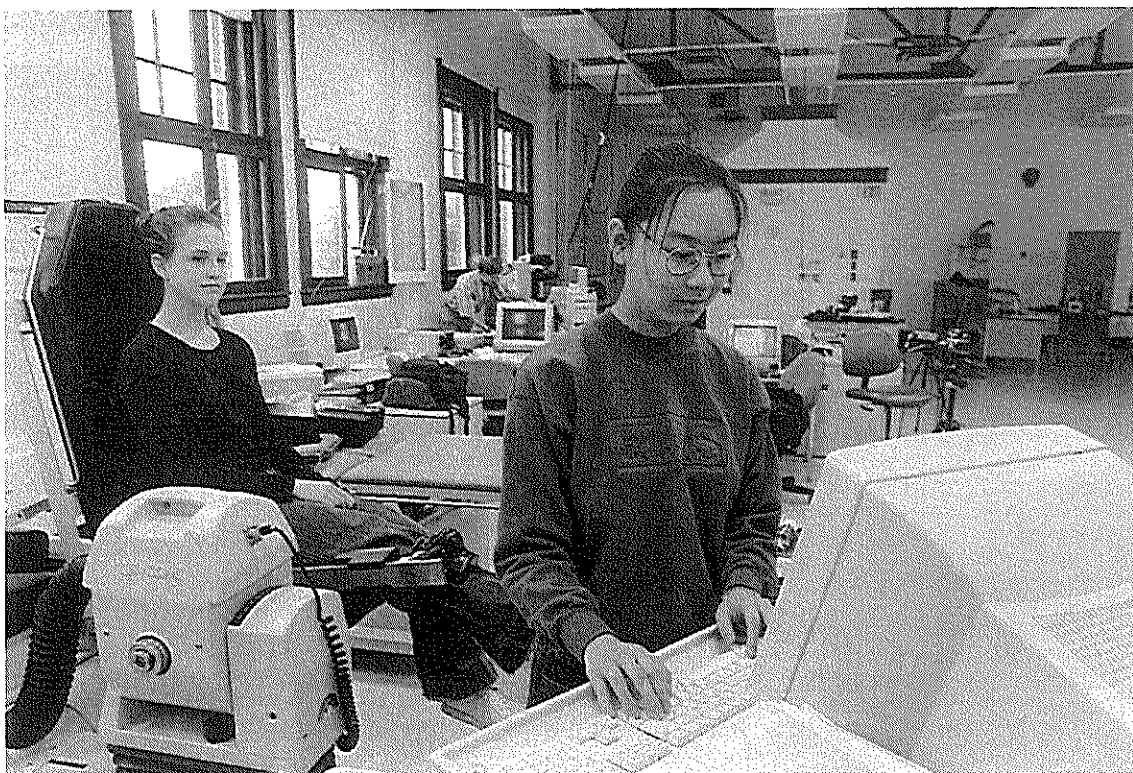
My Very Original Title for the WISEST Report

Kim Lam

I was extremely nervous when I first went to the Glenrose Research Centre, which is where I spent most of my time during the WISEST summer research program. I was expecting to be at the U of A doing research in a lab. I was expecting a research problem, with a clear problem, method, and an expected result. To put it in a nutshell, I was expecting the type of lab from school, except that it would last longer. I didn't get that, and I'm glad I didn't.

At the Glenrose, I was able to observe a wide variety of projects that were being conducted, and I was able to help with some of them. The main focus of the Glenrose is scoliosis, which is a lateral (sideways) curvature of the back usually accompanied by a rotation of the vertebrae. This curve can sometimes progress and may lead to deformities such as a rib hump, unevenness in the level of the shoulders, or a scapula (shoulder blade) that protrudes more than the other one. Treatment for scoliosis tends to be either doing nothing (for smaller curves that will probably not progress), wearing a back brace (which is used mostly to stop the progression of the curve, not correct it), or surgery (which is only for the severe curves).

Candice (she was with me at the Glenrose) and I began by learning about morphing, which is the creation of a movie from still images using computer software. We moved on to learning about the Vicon system, which is a set of two or more (preferably more) cameras that emit infrared light. The infrared is reflected from markers, which are small round balls with a reflective coating (reflective tape works too), and picked up by the cameras. The cameras send the information to the computer which can then tell where the markers were in 3D space. We also learned about Kin-Com, a machine that can test strength. There were a multitude of other projects that we learned about, such as cosmetic scoring (a score of the deformity of a patient with scoliosis) and the gripper (a device used during a scoliosis operation which is used to derotate the spine), but morphing, Vicon, and Kin-Com were the major ones. If I remember correctly, Candice's report has much more information on what all of this technology was used for, so I won't bore you (much) with too much repetition.



I had a great time. It gave me the opportunity to see what research is like outside of a “school” lab. My former stereotypical vision of research was whisked away and I found that I liked the casual atmosphere at the Glenrose. Being exposed to all of the different projects allowed me a much broader view of the different types of research that can go on. It was a very good learning experience.

All the people at the Glenrose were very helpful when I didn’t understand something and were very nice. I don’t think I’ll ever forget the hilarious lunchtime conversations or how quickly everyone inhaled the candy from the candy jar.

I would like to thank Doug Hill, Allison Elander, Jessie Kautz, Geneil Campbell, Dr. Durdle, and everyone else at the Glenrose (If I named them all, I think I would add a page to this report!) for helping me out and making this experience memorable. I would also like to thank Grace Ennis, Dr. Margaret-Ann Armour, and Michelle Radmanovich for giving me this great opportunity. And thanks to the rest of you WISEST students for some great times and laughs!

WISEST Report

by Kim Paulson

My experience with WISEST was one of the best of my life. I was placed at Meanook Biological Research Station close to Athabasca. I had the opportunity to work on several different projects based at the Station, including one with fish and frogs, one with vegetation, and one with birds.

The fish and frog project involved work such as checking traps for frogs, fish, and other animals living in and around the experimental ponds, as well as weighing, measuring and clipping frogs. There was some lab work involved in this project as well. I tested for chlorophyll in water samples and took pH measurements. Part of the purpose of this project was to study the interaction between the fish and the frogs. In this one project alone I got to try many different things and I found out that I love working with frogs.

The next project I worked on was a vegetation project. It involved taking sample plots around the area of the research station and determining the types and relative amounts of various plants in the region. The ultimate goal of the project was to gain a better understanding of the native vegetation in the area studied. In this project I helped researchers identify various plants and grasses and to estimate the percent cover in the region. I also took moss and lichen samples from the plot. Another job I got to help with was determining the age of trees in the plots with the help of a special apparatus. This project taught me a lot about the native plants in the area.

The third main project I worked on had to do with the American Redstart, a small bird nesting in the area of the Station. My part of the project was to research the types and numbers of small mammals in the area as the beginning of a project determining the predation rates of Redstart eggs and chicks by small mammals. I was in charge of putting track boards – plywood covered in gooey coating – in the forest near Redstart nests to collect animal tracks. I went out to photograph the boards each week and at the end I helped to identify the tracks imprinted on the boards. I enjoyed working in the forest very much.



Besides these main projects I also helped with other smaller ones as I was needed. I am glad I was able to do so many different things. I learned a lot about the subject of each individual project, but I learned even more about what it is like to be on a research team. I experienced how data is taken and recorded, how to keep experiment conditions as constant as possible, how to write a protocol, and many other skills that will be invaluable for me in the future. Now I know that I love lab work and fieldwork, and I have a better idea about what I want to study in university and as a career. Everyone that I worked with at the Station was very nice and helpful. It was a wonderful experience. I consider myself very lucky to have been accepted into the WIS-EST Program and to have been placed at Meanook Biological Research Station.

My WISEST Experience Horizontal Directional Drilling for Potable Water

This summer I had the privilege to work with Rick Lau on a project supervised by Dr. Sego and Dr. Biggar. Our project involved drilling horizontal wells in river bottom sediments, so the alluvial soils can filter out the suspended solids in the water. The objective of this project is to examine the viability of using horizontal directional drilling to provide potable (drinking) water from river bottom sediments.

Thanks to Syncrude and Epcor this summer has allowed me to see what careers in research and civil engineering are like. I most enjoyed the design and construction aspects of the project. As a result of this hands on experience I intend to enroll in engineering when I go to university.

Staying in Saint John's Institute on Campus gave me a taste of what residence life is like. I really enjoyed my time spent here with the four other WISEST girls. I know our friendship will extend past this summer. Living and working on campus has allowed me to meet new people so if I return to U of A for my bachelors degree I will have friends and contacts in the university.



Apart from the academic and social aspects I feel like I have matured and become more self reliant when facing the world on my own. I have more confidence in the decisions I make and who I am. Finally I'd like to thank everyone that made this program possible, I had the time of my life.

Kristie Bruemmer

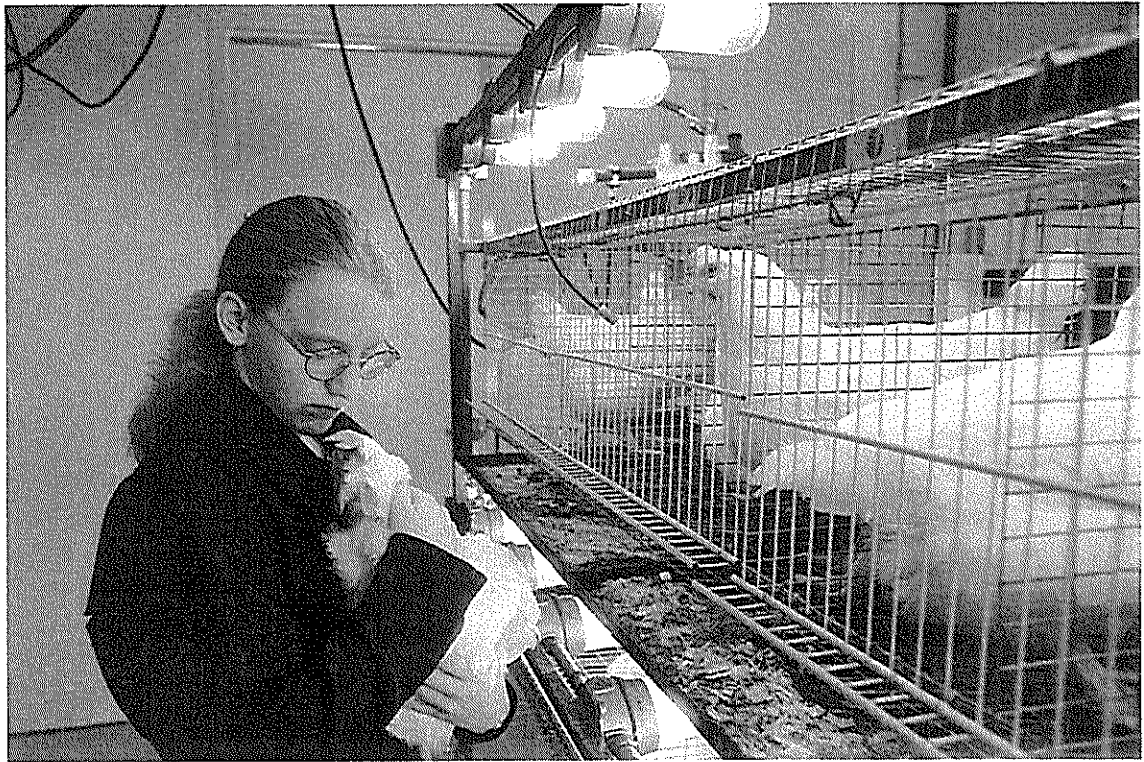
Chickens

This had to be one of the most interesting summers that I have ever had. Most summers I just laze about watching T.V., playing computer games, shirking chores and enjoying summer time reveries. But this summer was different. This summer I helped to raise chickens as part of WISEST. For six weeks thirty-seven girls and two guys got research projects that were designed to further their knowledge of academic research and possible career options. I was mildly disappointed that I was not one of these people.

In the past the Poultry Research Centre has provided WISEST students with research projects but this year they were not fully prepared. I was disappointed to not have been given a real research project and instead helped out with various farm chores. With about one and a half weeks before the research poster presentation, the staff at the Poultry Research Centre told me that I could use a grad student's project for my poster and report.

The project took place at the Poultry Research Centre on the University Farm. A total of one hundred and twenty-eight birds are placed in eight different environmentally controlled rooms. The rooms are divided into two groups. The first group has 12 hour days and the second group has 16 hour days. Each group is then divided into four separate rooms, each with a different amount of light intensity. These light intensities are 1, 5, 50, and 500 Lux. The project was to study the effects of light intensity on sexual maturation and egg production in broiler breeders chickens.

This project started back in January and probably won't be over until December, therefore results aren't clear yet. The results that are known to us are that the birds in the 500 Lux room, equivalent to bright daylight, at 16 hour days reached sexual maturation faster than the other seven pens. These birds also began producing eggs much earlier than the other birds. It was also discovered that the birds in the 1 Lux rooms, equivalent to a moonless night, at 12 hour days started laying 13 days after the rest of the pens.



The conclusion drawn from this is that the more light stimulus that is given to the birds, the earlier they will reach sexual maturation and will begin to produce eggs.

I met some great people at the Poultry Research Centre and made a few new friends with other WISEST students. I got a greater understanding of research that is done for practical purposes and all the little things that make up a research project. Despite the disappointment of not having a real project I would still recommend that others participate in the WISEST Summer Research Project.

With much thanks to the staff at WISEST for trying their best,
Laura Hamilton

Seeking Salt Solutions for Syncrude

By Megan Stoker

I can't believe that six weeks is already over! It has gone by so fast and I have done so much. This summer, I met some great people. I know the advice that they have given me will be more valuable than they can imagine. A great big "Thank you!" goes to Grace, Michelle and Tara for their hard work and for making sure we were taken care of all summer. You did a great job! I would also like to thank Edmund and Steph for their friendship and guidance at work and Dr. Zwiazek for welcoming me into his lab.

When I came to the University the first day, I did not know what to expect. I knew that I would be working with plants in a project having to do with salt tolerance but I wasn't really sure what that meant. I have learned a lot since then. My lab is involved in a larger project funded by Syncrude. It is concerning revegetation of the mine site after the bitumen has been removed from the tar sands. The end product of the process of removing the bitumen is a sandy material called composite tailings (CT). Although better than precursor to CT, fine tailings, there are some properties to CT that make it difficult to revegetation. One of these is that it has high NaCl and Na SO₂⁴ content. It is quite saline. My lab has been carrying out experiments to determine the effects of CT and components of CT on different species of plants. Up until this summer, they had done experiments with a number of different species but nothing had ever been done with birch. They knew very little about the salt tolerance of this plant. My project was an experiment on the effects of NaCl and Na SO₂⁴ on birch. The goal was to see whether it was the toxicity caused by the Cl⁻ in NaCl or the water deficit caused by a high concentration of salt in the water that was the most damaging to the birch seedlings.

The experiment was run over four weeks during which the plants got a treatment solution once a week and measurements were taken. There were three treatments: NaCl, Na SO₂⁴, and a control. The measurements that we took determined the rate of transpiration, chlorophyll content, height, and electrolyte leakage. I used some interesting technology and learned a lot about the processes involved in research. It was all quite interesting and pretty exciting to be part of an actual research project. The results of my experiment will probably be included in the yearly report.



By the end of the four weeks, the plants with salt treatments had some definite, very visible, treatment effects. The leaves were browning, there was an obvious height difference between treatments, and the leaves on the control plants were much larger than the leaves on the salt-affected plants. Although there is always some tedious work in research, if you are interested in what you are researching, once you have the results, it is all worth it. It was quite interesting to learn what is considered significant and how it is chosen what results are most important to report. Research is an interesting process and this summer has been a great introduction.

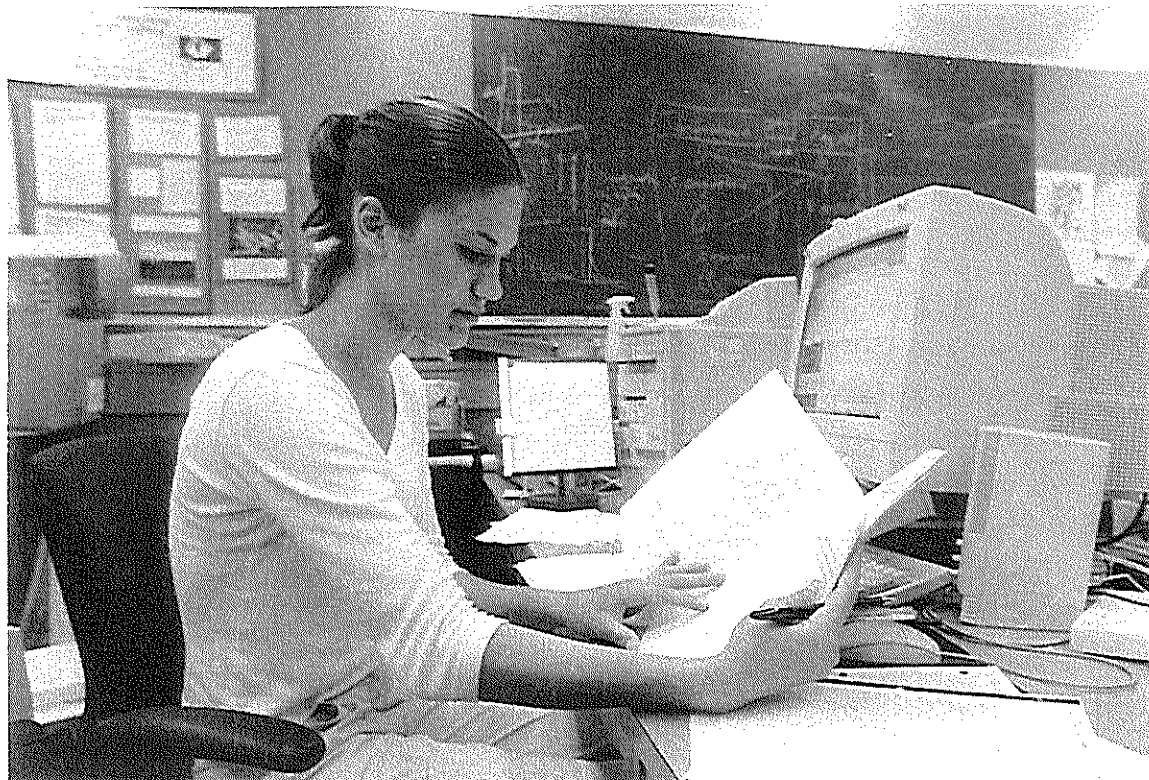
Besides my work, my experiences with the other WISEST students has been a lot of fun. It was always interesting to hear what everybody was up to at Tuesday lunches and the organized activities were great. It will be interesting to see where everybody goes from here. The Wednesday afternoon activities were very informative and fun. It was great to talk to some women in scientific and technological fields. They showed us that there are so many opportunities for our futures. The WISEST program has been just the first.

I hope everybody else has had as great a time as I have. Thanks again to everybody and good luck!

WISEST REPORT – SUMMER 2000

The first day of the WISEST Program brought a mix of anxiety, nervousness and excitement. I didn't know where any of the buildings were located and I was scared of getting lost on the gigantic campus! But, I found the right room and took my place among 39 other WISEST employees.

At the end of the day I met my supervisor, April Mitchell, and I was shown where I would be working. My job description involved "examining the effects of forest fragmentation on forest tent caterpillars and their natural enemies." WOW! Although I didn't really know what I would be doing, it sounded quite interesting to me. Over the six weeks I did various tasks. I started out sorting through bags of caterpillars and counting the number of dead larvae, cocoons and maggots! But by August, I was doing data entry or researching the internet for pictures of forest tent caterpillars! I also got to experience fieldwork and went out a number of times to tromp through the bushes and record data. But, that's not all I did! I also went camping in Prince George, B.C. for five days where we set out cages of pupa under aspen trees. AND, I also went to Kananaskis for two days where we hiked up to the top of low mountains and did a butterfly count! I can't think of any other job in which this much variation - hiking, camping, lab work, fieldwork - can occur!



The WISEST program gave me such an awesome opportunity to explore my possible future career choices. It also helped me understand the huge amount of dedication and work required in University! The Wednesday afternoon sessions helped me to see the vast areas of study available at the University of Alberta. Overall, the program was a very positive opportunity for me and I am very grateful I was able to take part in it. Taking the bus and LRT every day for three hours was definitely worth it for this job!!

- Melisa Spaling

GLAD THEY WEREN'T USING MY BRAIN

MY SUMMER IN A NEUROLOGY LAB

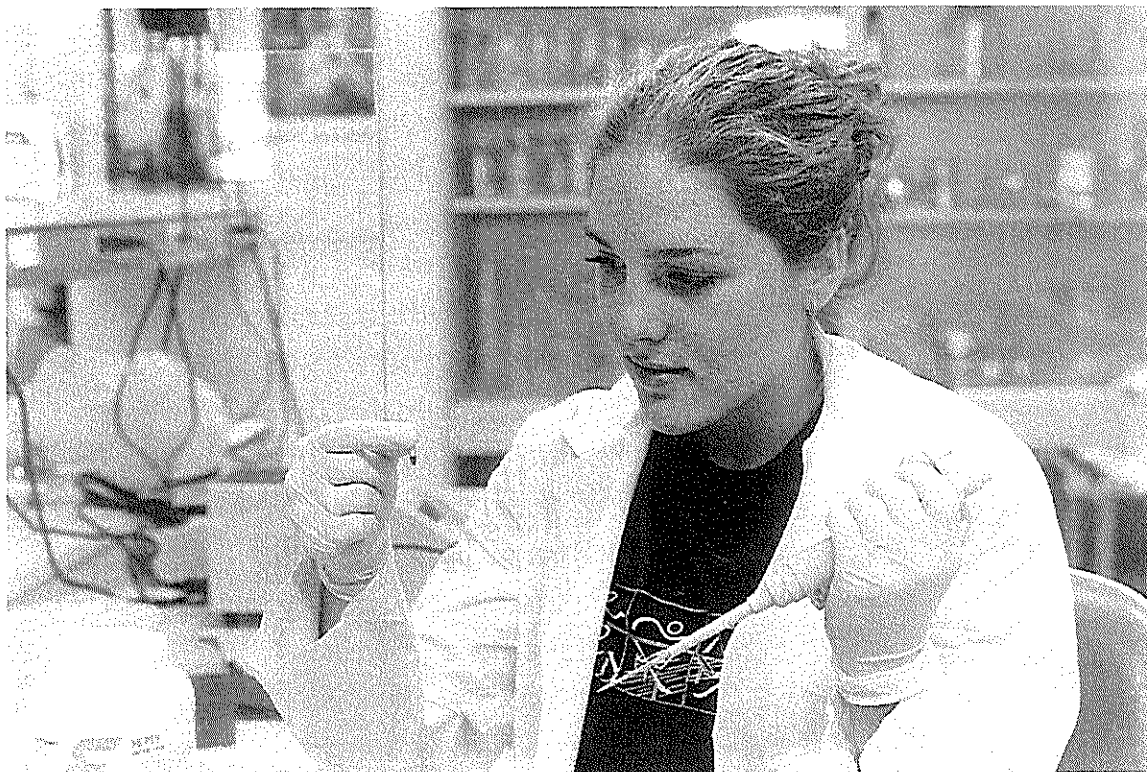
By Molly Hildebrand

As I waited for my supervisor to pick me up on July 4, the excitement that had filled me throughout the day was quickly replaced by fear. I was terrified that he would be mean and that I would make mistakes. I didn't even want to go to my lab. When a pleasant looking graduate student showed up instead, I breathed a huge sigh of relief. When I got to my lab and met my supervisor for the first time I was pleased to find out that he was funny, smart, and extremely nice. In addition, in the lab I no longer felt like it was obvious that I was still in high school. This feeling lasted for a few hours - until I tried to figure out what was going on in all of the experiments.

There are two projects being worked on in my lab. I only ever understood one of them. We were exploring the causes of Alzheimer's and hoping that by gaining an understanding of the mechanisms that cause the degeneration of the brain cells we could do something to prevent the onset of Alzheimer's disease all together. My individual project required much simpler lab techniques, but could provide useful information that would aid in understanding Alzheimer's.

We started out by trying to figure out the link between two primary pathological features of Alzheimer's: deposits of Amyloid Beta Protein (a protein resulting from irregular deconstruction of another protein) in the basal forebrain and a loss of cholinergic neurons (brain cells that produce the neurotransmitter acetylcholine) in this same region. We used an electrode to measure the current of a brain cell that we believed to be cholinergic (cholinergic cells are larger than GABAergic). We then applied Amyloid Beta Protein (A β) and saw that the current running through the cell was lower. After doing further testing and analysis we could tell that the flow of potassium was being effected by (A β).

The flow of potassium is regulated by potassium channels, but over 25 different families and subfamilies of potassium channels exist. Unfortunately we didn't know which one was being affected. My job was to look for the specific potassium channel being modified by (A β). We knew from another paper, that the potassium channel Kv4.2 is commonly found in the basal forebrain (the same region that cell loss and (A β) deposition occurs). So we decided to look for the potassium channel Kv4.2 in hopes of determining the mechanism through which (A β) causes its detrimental effects. Unfortunately we never collected much data because we could not get any of our lab techniques to work. We were performing DNA analysis, specifically



RT-PCR to confirm that our cells were cholinergic and to see if Kv4.2 was present. We spent more time and energy trying to solve our RT-PCR problem than trying to understand Alzheimer's disease.

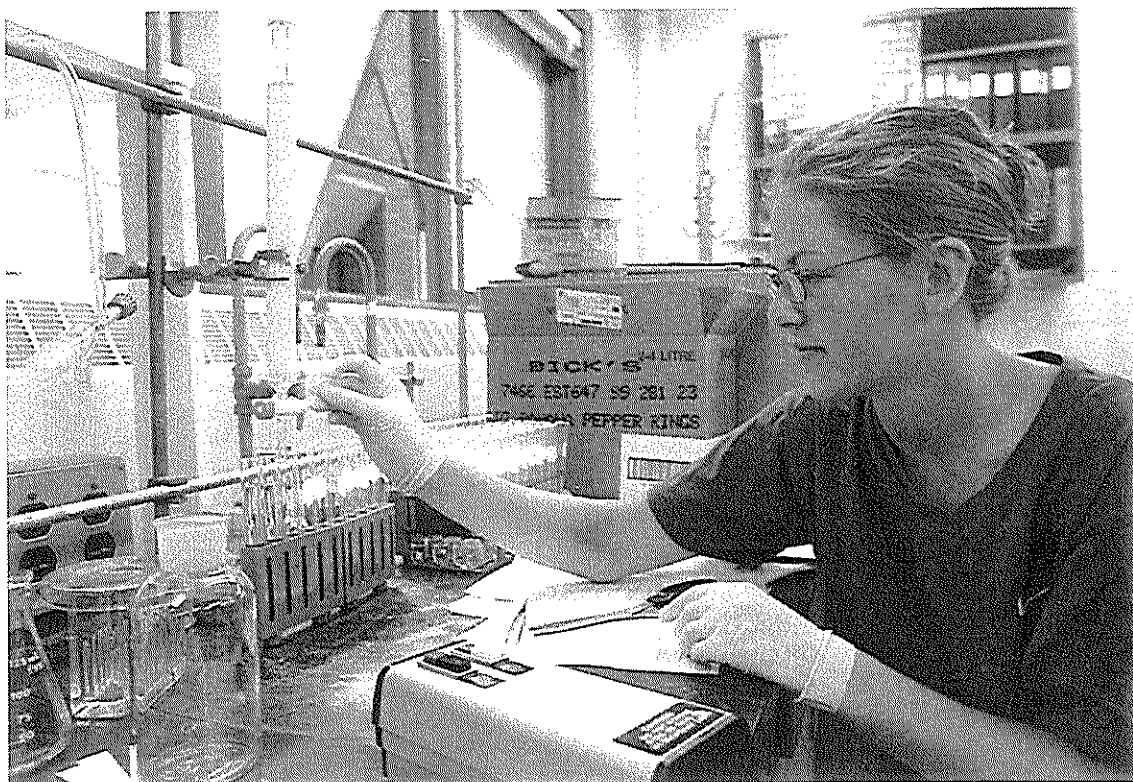
This was probably one of the most important lessons that I learned. Science never works perfectly, but that is what makes it interesting. Many of the graduate students in my lab were preparing to become doctors and didn't enjoy the research aspect of science as much as the prospect of working with people. I, on the other hand, did enjoy the "try and try again" thinking process that is involved with research. Maybe I enjoyed it so much only because I am so naive. I came to work every day thinking that we were going to find a cure for Alzheimer's disease. I think that's what made it so fun and interesting.

I'm still not much closer to making a decision about my future career. But after being surrounded by people who started out lost and eventually found themselves and who when they couldn't decide between two things, did both, I've decided that it's OK not to have a plan right now. I've made excellent contacts, assured myself that science is what I love, and I am now confident it will all work out.

Participating in the WISEST Summer Research Program was a very beneficial experience. It gave me the opportunity to discover what scientific research is about, become accustomed to the University of Alberta's campus, and what living away from home requires.

The research team I was involved with was responsible for the synthesis of organic molecules. They use these newly created molecules to change the characteristics of light for a newly forming industry, phototonics. Since phototonics involves using light to carry information, the key to the development of this industry are devices that manipulate the characteristics of light, such as its frequency or wavelength. For example, a computer uses a binary number system etched onto silicon chips, therefore the chips cannot be smaller than the numbers can be written on them. Imagine finding a single molecule that could act as a switch, essentially doing the same job as the entire silicon chip! The highlight of this research was creating materials that have never existed before and examining their characteristics. Although most materials were yellow when pure, some were an iridescent deep purple, others were red and felt like plastic, and yet others didn't seem to be soluble in any solvent system. It was these characteristics that made my job unique, but very interesting and fun.

This summer I learned so much about research. Although scientific research is a very important part of our society, it can be very challenging and difficult. The hardest thing for me to adjust to was the amount of work, without the guarantee that the experiment is going to work. It became very frustrating when I had to run the same experiment over three times, changing one variable at a time, until I finally found the results I was looking for. On the other hand, this type of work is very rewarding, because there is no better feeling than when a week of hard work finally proves useful.



I met a lot of people this summer, both on campus and off. For example, my research team, made up of Rik, Katie, Erin, Nolan, Trent, Joon Juming, Sorin, Colin, and Sara. They made me feel comfortable and part of the team throughout my six week stay, and even made me feel bad because I was leaving. There were also many others that worked in the same building, such as Jason that made me feel very welcome.

I would like to thank the University of Alberta, specifically the WISEST Summer Research Program, my professor, Dr. Rik Tykwinski, my supervisor, Katie Campbell, and the rest of the research team for making this experience possible, and very enjoyable. I would also like to thank Canadian National and NSERC for funding.

Natasha Tiemstra

My Experience at the Cross Cancer

This summer I got the opportunity to work in an Experimental Oncology laboratory at the Cross-Cancer Institute. Throughout my work experience I learnt many valuable things. I learnt a great deal about the field of Oncology and about all of the opportunities available in this field. But even more importantly, I had a chance to discover my own personal needs and interests in a career.

I must admit the first day of work was quite intimidating. I arrived in the lab and was immediately expected to start my work. I had all of this new information come flying my way within the first half an hour in the lab. It was a challenge to keep up with everything that I needed to remember. But as time went on I began to understand and was amazed at what I actually got to do as a summer student. I got to participate in a real research project!!

At the Cross-Cancer, they study Nucleoside Transporters. Nucleosides are metabolic precursors of RNA and DNA. Nucleoside analogs are used in anti-cancer and anti-viral therapies. For example, Zidovudine (AZT) is used in the treatment of HIV patients, Fludarabine and Cytarabine are used in the treatment of leukemia and Gemcitabine is used in the treatment of a variety of solid tumors, including breast and pancreatic cancer. My project objective was the characterization of a predicted nucleoside transporter from the yeast *Schizosaccharomyces pombe*. My first step was to amplify the cDNA directly from the yeast cells by PCR. I then cloned the PCR product into the *Saccharomyces cerevisiae* expression vector (pYPGE15) and was able to confirm the resulting construct by a restriction enzyme analysis. I was also able to sequence the



cloned insert in order to confirm the cDNA sequence and that the insert was properly cloned. The new construct was transformed into baker's yeast. After all of this preparation work, direct measurement of radiolabeled nucleoside uptake was attempted, however uptake was not detected. This may be due to intracellular protein expression, lack of function due to protein misfolding/ low level expression, or because the predicted protein is not a nucleoside transporter.

Despite some frustration from a little lack of success, I greatly enjoyed my time in WISEST. My lab was an extremely friendly environment (we even did extra activities together after work like mountain biking) and I learnt a lot. I am sure that the experience and knowledge that I gained will be extremely valuable in my near future.

Nicole Lutic

Labs and Leaves

By Oriana Pegoraro

I had a wonderful time this summer during the WISEST Summer Research Program. It was an excellent opportunity to learn, as well as to have fun. This unique program gave me the chance to experience a university environment, work with a professor on a research project, and learn a variety of skills that I would not have otherwise had a chance to encounter.

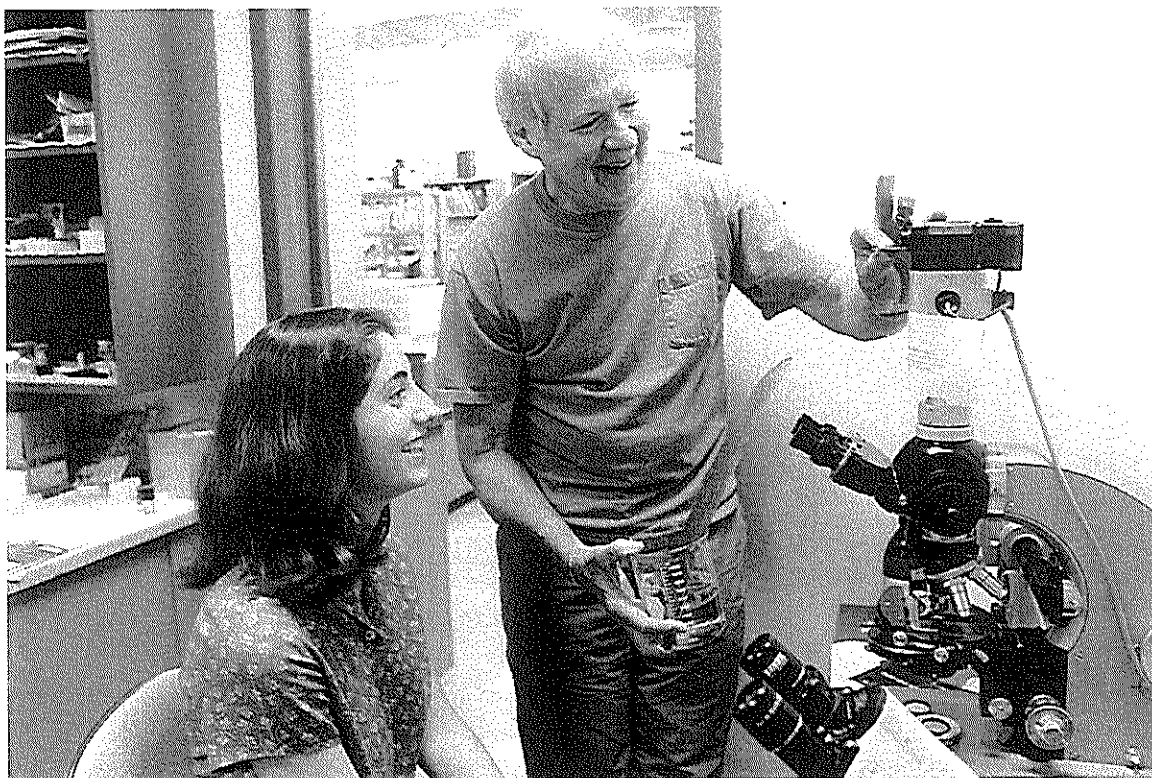
The project on which I worked involved the *Clivia* plant (monocot, family Amaryllidaceae). In a structural botany class in 1998, the epidermal cells in the leaves of this plant were, for the first time, observed to exhibit band plasmolysis. Plasmolysis is when cells lose turgor (pressure against the cell wall) and the cell membrane shrivels. This normally occurs in cases of extreme water loss. Band plasmolysis occurs when there is "band" of a chemical called suberin deposited in a strip around the primary wall. This chemical keeps the membrane attached in the places where the deposits are found, even when the membrane pulls away from other areas of the wall. Suberin also stops the apoplastic (through cell walls) movement of molecules.

The phenomenon of band plasmolysis has been known to exist in root endodermis and exodermis for many years. These structures act as barriers, regulating what enters the xylem and thus the rest of the plant. This is done by blocking apoplastic water movement and keeping a layer of connected cell membranes intact, even during drought. This forces all molecules entering the plant from the root to be taken up by active transport through the endodermis and exodermis (if one is present).

In *Clivia*, it would seem unlikely that band plasmolysis in the epidermis of the leaves would be a barrier to the entrance of undesirable molecules. Instead, it is hypothesized that it acts as a barrier to water loss. *Clivia* lives in areas where extremely arid conditions exist, and a structure that prevents water loss would be selectively advantageous. A barrier to apoplastic water loss would greatly reduce transpiration rates.

During the course of the summer, Dr. D. Cass, the professor with whom I worked, and I formulated both the above hypothesis and several tests to prove it. Berberine, an organic chemical, was used to dye suberin deposits. This proved the existence in many areas of a Casparian strip (the name given to strips of suberin deposits that cause band plasmolysis). However, the strip appeared to have gaps. This finding was confirmed by uptake experiments with trisodium, 3-hydroxy-5, 8, 10 pyrene trisulfonate (PTS). This chemical moves apoplastically. When leaves that had taken up the dye were sectioned, there were areas where the dye had stopped at the Casparian strip, but in places it had leaked out. Finally, RH414, a membrane stain, was used to observe cells that had undergone band plasmolysis.

The results of the experiments appear to be that there are Casparian strips, but they are not uniform. This is similar to root exodermis, which, based on the stresses placed on



the plant, has varying levels of completion, from Casparian strips on every cell in plants that had drought conditions during maturation to no Casparian strips in plants that were given plenty of water. Perhaps the strips in *Clivia* would have been more uniform if the plant had grown in a desert instead of the university greenhouse. Conversely, the plant may have had uniform cells with Casparian strips, but were damaged during sectioning. More testing is required.

During the summer I used a Carl Zeiss microscope employing brightfield, ultraviolet light, phase contrast, and differential interference. I also saw confocal microscopes in use, both with and without ultraviolet light. After I completed my project, I spent three days in a chemistry lab separating a mixture of benzoic acid, naphthalene, and chloroaniline. This lab familiarized me with the use of separatory funnels, distilling equipment, and vacuum filtration.

During this summer, I learned an enormous amount about lab work, the use of lab equipment, as well as botany in general. It has given me the background I need to decide for certain to enter biological sciences when I attend university. I also learned a lot about the U of A campus and met many wonderful people, especially my inspirational professor Dr. Cass, and in the chemistry lab Dr. Hunter (Willie) and Dr. Margaret-Ann Armour (Vice-chair of WISEST).

I am grateful for this experience, and I know it will impact my life in the years to come.

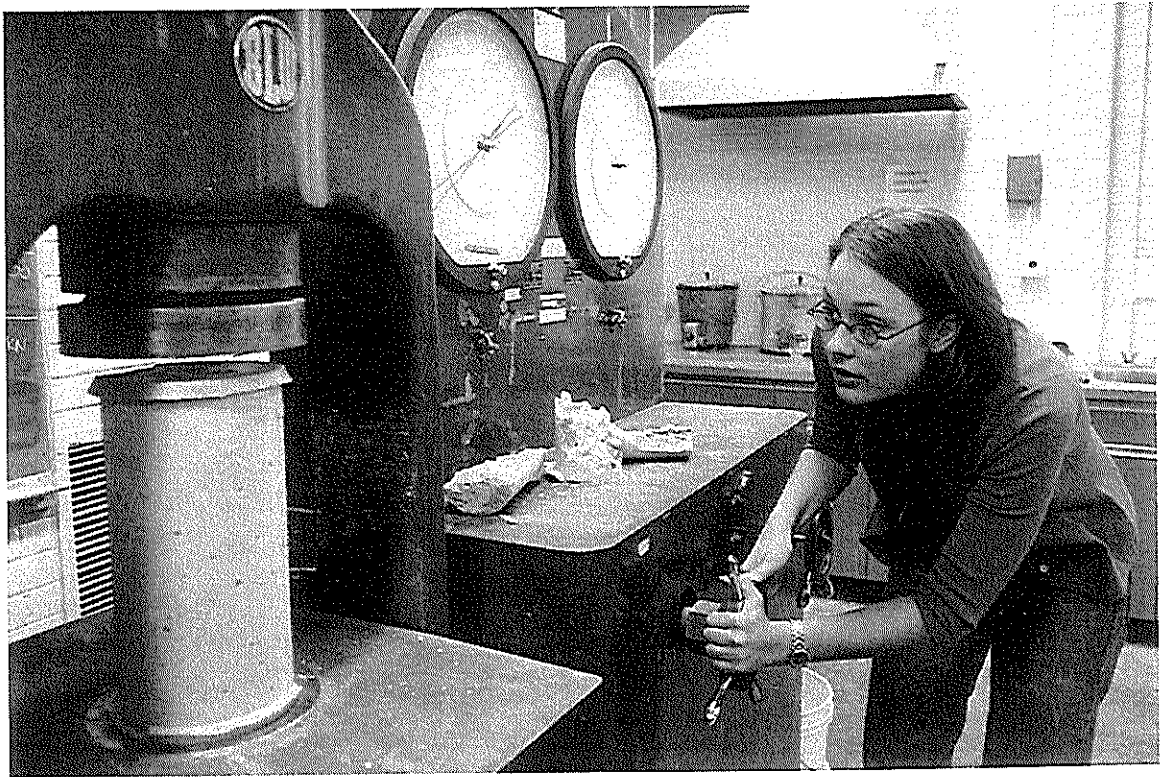
What's So Intelligent About Concrete Curing?

By: Paige Smith

In the department of Construction Engineering and Management, under the faculty of Civil Engineering, I have had the extreme pleasure of aiding Sylvia Jancewicz, under Dr. S. AbouRizk, in the research of her thesis on Intelligent Concrete Curing. When I first found out that I would be spending six weeks of my summer working with concrete I was both excited and confused, after all, how much can one learn about concrete? The answer to that might surprise you. (A lot!) First of all, did you know that cement and concrete are two different things? Cement is the powder form of wet concrete. As well, did you know that concrete does not dry as other typical substances, but rather needs a constant supply of moisture to properly cure? These little pieces of information only scratch the surface of what has proved to be quite an interesting topic.

Before my part in the research began, my friends and I would jokingly speculate about what researching concrete would entail. Would I get to smash it with a sledgehammer and maybe even walk around an actual construction site? As it turned out we were not too far off. The intent of the project is to study the effects of time and temperature on the curing of concrete in attempts to verify a formula that will eventually save contractors both time and money in the process of building concrete structures. By using a modified version of the Maturity Method that takes into account a base temperature of -10°C , the research team has been able to gain information about how degree-hours are related to concrete strength. With the new Electrical Engineering building on campus being in the construction phase this project was given the perfect opportunity to gather site information to verify the work done in the lab. Sensors are placed in various slabs, columns, and beams of a concrete pour as well as in the sample cylinders cast for lab analysis. The information received by portable computers and data programs from these sensors is put into charts and graphs that predict the strength of the concrete after a certain amount of time. Strengths are then confirmed by a crushing process done in the lab, as such knowledge helps contractors determine the quickest and safest time to remove the structural forms. C.S.A. standards require that a minimum safety standard strength has been reached before construction continues on a poured area, making the usual curing time approximately seven days. With the help of Intelligent Concrete Curing, contractors will be able to accurately determine when the minimum strength has been reached, allowing for decreased project time and cost.

This project has proven to be most beneficial as I have learned a great deal about the different aspects and applications of Civil Engineering from both the tasks at hand and those around me. Those in my research team were always willing to share their University experiences and give me advice. Coming into the W.I.S.E.S.T. program I had little understanding of University life and the field of Engineering in general. Yet through the help of those I work with, I feel that a large majority of my questions have been answered and my fears alleviated. I am very fortunate to have been placed in such a multifaceted field of study with such a wonderful group of people. It was also very encouraging to be placed under one of the few females working toward her Masters Degree within the department, especially considering that the purpose of the W.I.S.E.S.T. program is to involve women in nontraditional areas of study.



My experience in the department of Civil Engineering over the last six weeks has been quite diverse. In addition to my research in concrete I have also had the opportunity to aid in bore hole data collection as well as take part in administering an annual audit for the City of Edmonton Design and Construction Section. Being able to explore different avenues of Civil Engineering has given me a wide range of views and a first hand experience in the work field. Not only was I able to meet and work with a wide variety of laborers, engineers, and managers, but I was also given the opportunity to go on different job site, including survey sites, open cut tunneling, erosion control, servicing sites and even down into the tunnels on Ellerslie Road. I don't know of any other grade 11 student who has been blessed with such opportunities or seen a Mole cuts through the depths of the earth up close. My steel-toed boots and hardhat have definitely come in handy this summer!

It is hard to believe that such an exciting time in my life is now drawing to a close. W.I.S.E.S.T. has been a very positive experience from which I have gained friendships, knowledge, and hands on training that applies to both the field of engineering as well as everyday life. Taking part in this years W.I.S.E.S.T. Summer Research Program has been such a wonderful privilege that has benefited me far beyond what I ever would have known possible. I am extremely grateful to everyone who helped make this summer possible for me. Thank-you to the W.I.S.E.S.T. committee and it's sponsors for facilitating such a vast program, and to the department of Construction and Engineering Management, Dr. S. AbouRizk, Sylvia Jancewicz, her research team and the City of Edmonton Design and Construction Section for showing and including me in the inner workings of your departments. This is a time I will never forget.

Brrrrrr! It's Cold in Here

When I first heard of the WISEST Summer Research Program I thought it sounded pretty interesting but who would want to give up six weeks of their summer to learn. But you know what, I'm glad I did. This past six weeks has been a wonderful experience full of knowledge, fun and friendships.

I am from a small town in northern Alberta called Fairview, its population is about 3000 people(on a good day). Living in Edmonton by myself for six weeks was a new experience. I lived at St. John's institute with four other girls in WISEST and we had lots of fun together. I developed a different and special bond with each girl, making friendships that will last a lifetime. This summer really gave me a realistic picture of what it will be like when I move out on my own. Sharing a room with someone, you learn to compromise and just live with each other. Overall, living at St. John's was a fun filled experience.

I was paired up with Dr. John Beamish from the physics department who works in a low temperature physics laboratory. Dr. Beamish also has a graduate student (Toby Herman) and an undergraduate student(Joe Ngai) working with him. I didn't work on just one project all the time but I spent most of my time helping Joe build a cerium magnesium nitrate(CMN) thermometer. They were building the CMN thermometer to more accurately measure temperatures below 50mK. The thermometer is made of 30 silver foil strips, CMN powder, wire coils, and epoxy. The CMN powder was pressed onto the silver strips to maintain good thermal contact with the sample. I had to press the CMN powder on the strips three times because somehow a step down the line things would be messed up, but that's all part of research, and each time it got easier and easier. The strips all get epoxied together, then the coils are put on and hooked to a current source. The current passing through the coils creates a magnetic field which changes the orien-



tation of the CMN molecules and then from measuring the inductance they can determine the temperature.

I learned a lot the past six weeks. I've learned about the University of Alberta, thermometers and low temperature background and theory, but most importantly I had fun and I have made some friendships here that will last forever. The WISEST Summer Research Program has been a wonderful experience and I know that any participants in future years will have just as much fun as I did.

RaeAnne Eherer

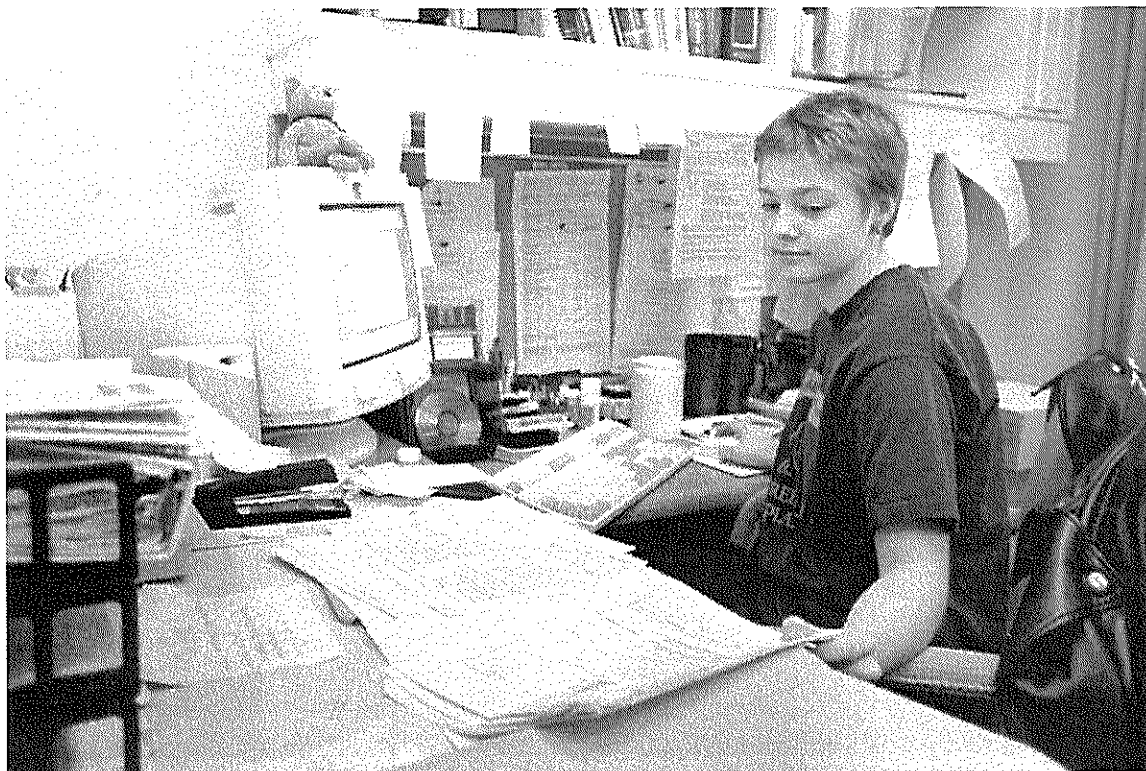
Six Weeks in Psychiatry

By Raissa Petriw

This summer I had the opportunity to work with Dr. Le Mellédo and his research team, Janisse, Tina, Bobby, Nathalie and Wendy, in the department of psychiatry. I found they had a very busy office and lab, as at least three studies were being conducted. One of these studies looked at nitric oxide levels in men with either panic disorder or depression, while another involved treatment of Premenstrual Dysphoric Disorder (PMDD), with a drug called Paxil. Finally, the study I was most involved with dealt with GABA (gamma-aminobutyric acid) neurotransmitter dysregulation in women with PMDD.

PMDD is characterized by severe PMS symptoms, especially mood swings and anxiety. In order to study the mechanism which causes these symptoms, patients were injected with flumazenil, a drug which acts on the GABA receptor. Dr. Le Mellédo and his research team looked at women's response to flumazenil in both the luteal and the follicular phase of the ovarian cycle.

During my six weeks at WISEST I did a variety of things, as the visits each patient had to undergo required a great deal of preparation and scheduling. Participants had to be recruited by means of colorful posters pinned up around campus. After contacting the office, a telephone screen was done; if the patient was eligible, then their first visit was booked. I sat in on both the telephone screens, and the more in depth screens done during visit one. During visits two and four, blood samples were taken, which then needed to be centrifuged in order to separate and freeze the plasma. All the visits involved asking the patients questions relating to mood and anxiety as well as taking an ECG for several minutes after the injection. As it was a blinded study, neither the patient, nor the person asking questions knew whether flumazenil or placebo was being administered. While a healthy control usually had few symptoms, a patient with PMDD would exhibit a much stronger reaction to flumazenil, indicating that the GABA benzodiazepine receptor is more sensitive to flumazenil in women with PMDD. Some of the symptoms a patient may have experienced include faintness, dizziness, and a fear of losing control; because flumazenil is rapidly metabolized by the body, any symptoms incurred last for only a few minutes.



The whole experience with WISEST gave me a new glimpse of research, different fields of medicine and science related careers. I found it rewarding to talk with other WISEST students, as well as members of the research team about women in science and research. My time in the psychiatry department was certainly an eye-opener, as all the research dealt with humans rather than creatures in a dish. This made me realize that although dealing with patients brings new layers of complexity to the studies conducted, it also makes the studies more interesting. It was amazing to discover the number of projects people were involved in; I remember always seeing various researchers (many of which were women) running in and out of the lab. The fact that this project represents such a small portion of the opportunities available to students made me realize how much there was to learn and to discover, in research, in science, in whatever interests a person most in their life.

Ryan's WISEST Summer

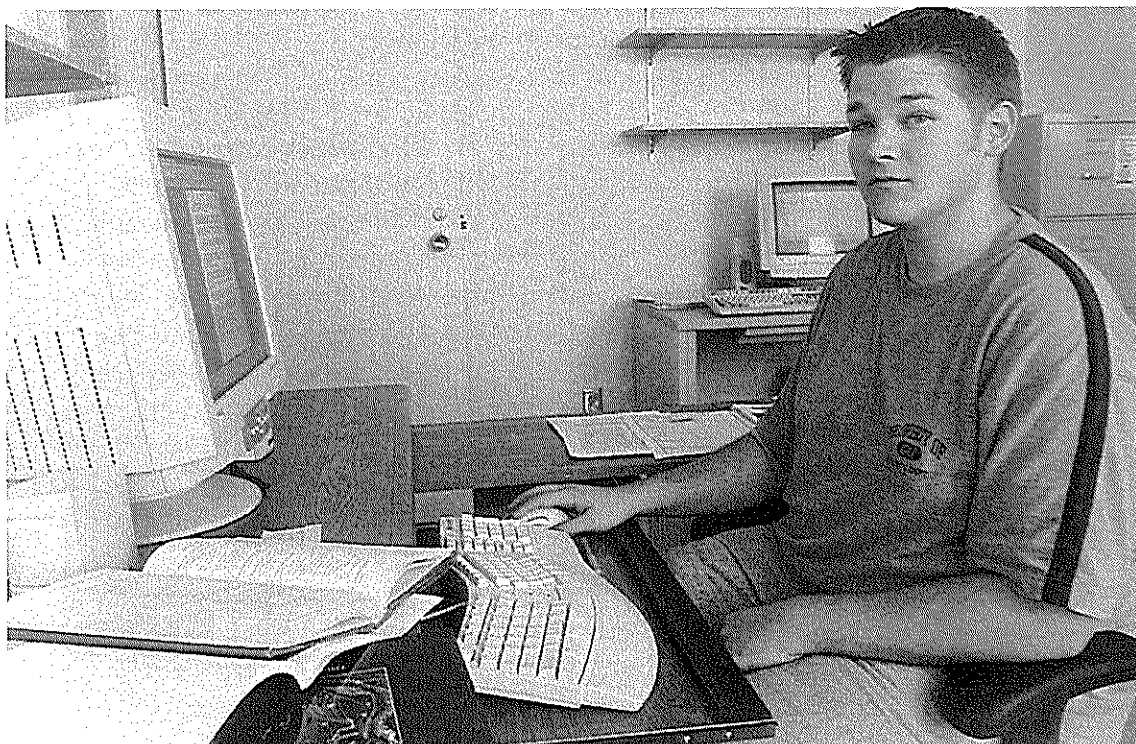
Initially I wasn't thrilled with the idea of working in a program focusing on WOMEN in scholarship, engineering, science and technology. When others at school asked what I was doing for the summer I told them I was working. Then when they ask where I reluctantly told them. Both teachers who referred me to the program were excited and very congratulatory. I still wasn't enthralled but I did hear some good news; my friend said he knew another guy going into the program as well. I was glad that there would be more male WISEST students than just me. When I arrived on the first day it turned out that Carlo and me were the only two male students. Thankfully, I am use to being surrounded by girls, not because I'm a "ladies man" but because I have numerous sisters and only one brother (Kind of ironic, isn't it?). The first day was still awkward but talking is a good way to break the ice.

After the opening session I met my supervisor and her research assistant. I was concerned my supervisor would be a severely strict and very orderly, not tolerating anything unproductive. Fortunately, Dr. K. Hegadoren (or as I call her Dr. Kathy) is very friendly and humorous. I do not think I could have worked for someone who doesn't often laugh, as she does. I found the office very hospitable, and the newly constructed workspace was very inviting. Jessica, Dr. Kathy's research assistant and my superior, treated me very fairly and did not boss me around. I felt like an equal because I was treated as such. They trusted me whether I was retrieving particular articles from the library or applying skin drops to the subjects.

Dr. Kathy provided me with a surplus of materials that were at my disposal in order to learn all the background information necessary to understand their project, now our project. Most of the material was at a higher level than I could grasp so to clarify I needed to pick up some more elementary materials to fully understand.

For the project I helped by applying the beclomethasone solutions on to the subjects, preparing the different concentrations of the solution, spinning the salivary cortisol samples and helped set-up the new lab equipment. I received a full perspective of the different tasks necessary for a research product. I even got to see what is needed to start a new study because Dr. Kathy and her team will be starting another study, in early fall, in addition to the beclomethasone study. There was a thirty paged application form to satisfy the government and the ethics committee, plus all the application forms for grants. Working in the lab allowed me to gain some good lab skills I will use these next few years and possibly for the rest of my life.

It has been a pleasure to work with Dr. Kathy and Jessica in the Faculty of Nursing. Initially I was weary of working in Nursing because I had a very stereotypical view of this field and was oblivious to the type of research done in this faculty. Her research is very interesting and captivates me. Trying to make biological connections with depression and posttraumatic stress disorder is difficult, complex and important. I was extremely lucky to be able to be here when construction of Dr. Kathy's laboratory just



finished and all the equipment began arriving. This summer has completely opened a world of opportunity for me, a world I had never seriously thought about before. I would like to express my sincere gratitude toward everyone who made this experience one I will never forget including Grace and Michelle for coordinating all of the placements and activities for the students, Dr. Roger Smith for sponsoring me, my teacher Mrs. Deptuck for encouraging me to apply and especially Dr. Kathy and Jessica for having and helping me during the last six weeks.

This program was an excellent way to spend a summer and I will highly recommend this to other grade 11 students at my school. It truly is an unforgettable experience and I will cherish it forever. My only regret is that I did not get to know many of the other WISEST students as well as I would have liked. And I recommend to those who are accepted to be as outgoing as possible. Go to the social group activities and plan some of your own. I wish the other students this year luck and hope to see them some time in the future.

Sincerely,

Ryan Williams

How I Spent My Summer Vacation:

Torturing Yeast and Playing With Lasers

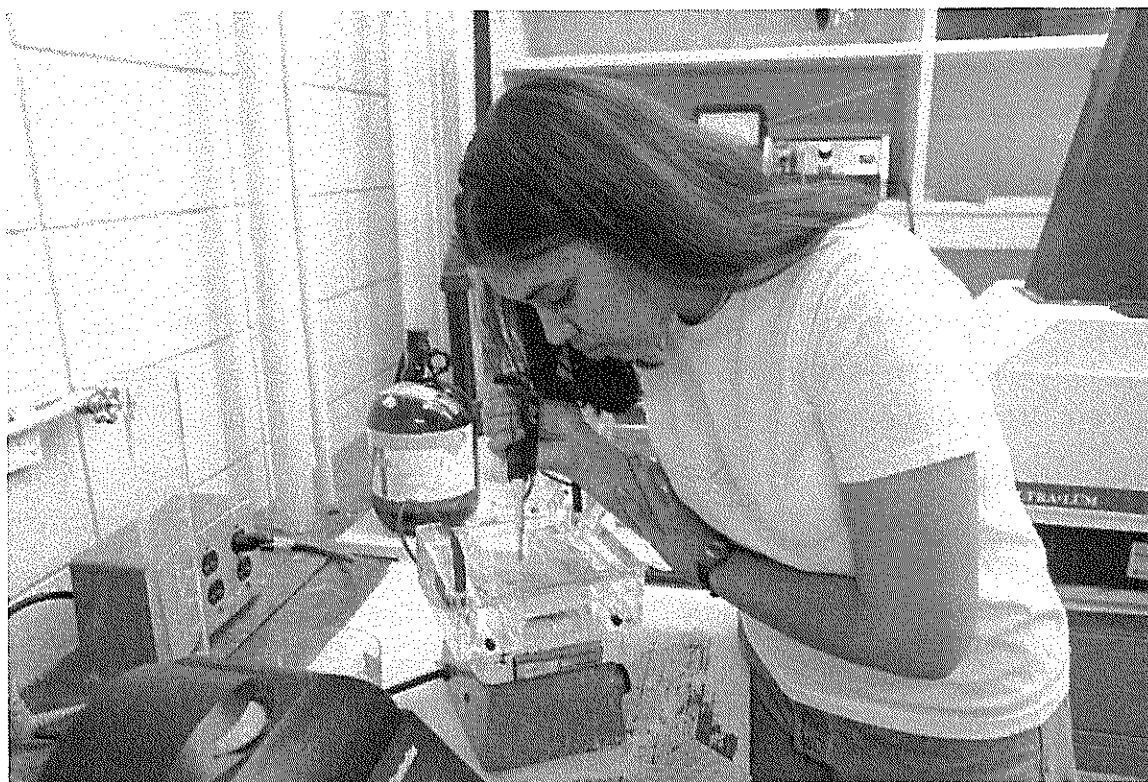
About a thousand things were racing through my head when I arrived at the University of Alberta for my first day in the WISEST Summer Research Program. Would I find the room? Am I going to know anyone? What if my supervisor doesn't show up? Yet, once the orientation began I managed to calm down. I found some people I knew and managed to introduce myself to other girls. My supervisor, Amy Dambrowitz, showed up and took me up the flight of stairs to my work area for the next six weeks. I was quickly introduced to Dr. Dovichi's Northern Lights Laser Lab, which comprised of close to 30 people ranging from summer students, grad students, post docs, and technicians. I was given the run through of my project and introduced into the world of biochemistry.

Apart from showing up at the wrong lab on the second day, the rest of the six weeks went off without any major embarrassments. My first challenge was to attempt to remember all the names, and doing so unsuccessfully, I resorted to calling "Hey you!" when I needed help. I then began learning how to see, and then to work in mL (one millionth of a litre...) and eventually to think that that was a huge volume.

My project was basically split into two parts: plasmid construction and protein separation. I had to construct plasmids that expressed Gal1p-GFP, a fusion protein of Gal1p (a yeast protein) and GFP (a green fluorescent protein). This was accomplished through a series of cloning steps, involving performing numerous restriction digests using a variety of restriction enzymes and separating the digested DNA on an agarose gel. The end result was three different plasmids, each expressing Gal1p-GFP, which were transformed (force-fed) into yeast.

Using extracts from the yeast cells, I began the second part of my project: protein separation using capillary electrophoresis with laser induced fluorescence. Although this sounds very complicated, it only took about 5 or 6 detailed explanations in order for me to understand. Basically, the yeast extract is loaded into one end of a 50 mm wide glass capillary, and a voltage is applied. The proteins separate in the capillary based on their mass to charge ratio and come out at the detection end. Here, a laser passes through the sample, and if the sample contains GFP, the laser excites the sample and a fluorescent signal is transmitted to a photomultiplier tube, which records the signal on a computer in the form of peaks. We got as far as running a different fusion protein (not the one I made), Gal4p-GFP, through the instrument we fondly referred to as 'Herman'. Our attempts were successful and we separated the fusion protein.

To say that this has been a valuable experience would be an understatement. I have gained many skills that I'm sure I will never forget. For example, the art of torturing yeast cells so that they co operate with us, or the joy of crushing yeast open with beads and a vortex. I also learned how to 'speed up' a gel (i.e. doubling the voltage) when late for a lab meeting. Of course, safety was a major issue, and although I didn't *ALWAYS* wear a lab coat or runners, I was warned on several occasions not to touch gels or wires when the power/voltage was on.



I was also presented with several opportunities to observe different careers in science, outside of my lab. On one occasion I spent the afternoon learning about snail embryos and imaging. I spent another day working with proteins from cancer cells. Above all, the most educational tour was that of the Labatt Brewery, where I learned the technical side of beer making, which did affect me, as the yeast we used is commonly known as the beer yeast.

Overall I had a great time both in and outside of the lab. The people I worked with (whose names I now know) were fun to be around, very helpful and encouraging. I was given a lot of independence in my work and that added to the experience. The WISEST group was great and I always had fun with the other girls on Wednesday afternoons. My project proved successful and I completed most of it, but I did have a few problems and what kept me going was Amy's favorite quote from Jurassic Park, "Life will find a way".

(For those of you who were wondering what the cartoon was: it's known as a Shmoo, the technical term for the shape yeast take when mating.)

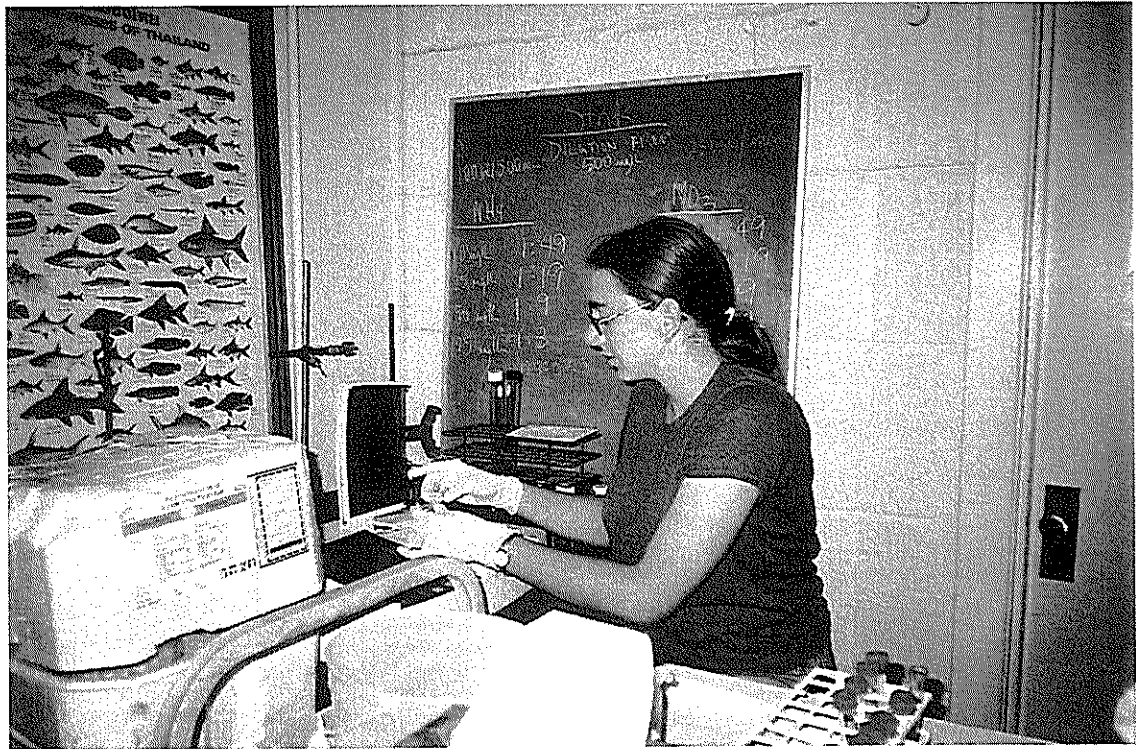
-Shirmee Doshi

Frogs, Fish, and Fun at the Meanook Biological Research Station

It's not all about facts and figures. Trips to the lake can be as educational as lab experiments when you're with people who know and are willing to share their knowledge. That's how it was at Meanook. My WISEST experience was full of new people and new experiences all contributing to a super, very educational summer.

My research team was composed of Holly, and me. Holly is a U of A student who was doing research for a professor for the summer. Occasionally Kim, the other WISEST student at Meanook, would help us out and other times I worked totally by myself for a few days while Holly was on days off. Of course there were always other people out at Meanook. There were usually at least 3 projects going on at once. This was a huge benefit of working out at Meanook because even though I was only working in one area (unlike Kim who floated between three) I still learned a lot just by listening to the other researchers talk about their projects or occasionally spending an afternoon with them. One afternoon was spent watching baby birds get banded and another was spent on a nature hike identifying different vegetation found along the path. Sometimes after work on a really hot day, we would head over to the lake for a swim. We identified birds and plants while at the lake and thoroughly enjoyed a cool swim after spending all day working under the hot sun.

While at Meanook, I only worked in one *area*, but I actually took part in three separate projects concerning fish and amphibians. My main project was a study of the affect of fish on tadpole survival rates in experimental ponds. "Tad-spotting" had to be done twice everyday, traps had to be set once a week in order to process (weigh, and measure) the fish in the ponds, traps had to be set and checked everyday for tadpoles so that they could be "aged", invertebrate traps had to be set to determine the numbers of predatory "bugs" in the ponds, and there were other jobs as well, both daily and weekly, some to determine water quality in the ponds, some to determine survival rates of the tads and so on. My other main project, the RANA project, con-



sisted of checking pitfall traps for frogs and toads. Amphibians caught in the traps had to be identified, weighed, measured, clipped, and released back at the RANA pond. Finally, a third project, started near the end of my work shift tested the escape rates of wood frogs from the pitfall traps. Enclosures were set up and traps were checked every four hours through the day to see if the frogs had escaped.

Meanook was overall an absolutely wonderful experience. As with any research project, there was *some* lab work to be done: equipment to be cleaned, data to be entered, and samples to be tested but even that was made fun by the people working there and the atmosphere they created. I did learn a lot of facts and figures, characteristics and names but I also learned a lot about myself, about working on my own, and not being afraid to ask questions. I learned a lot too about the people I was working around, things I never would have known had I not been lucky enough to have this experience.

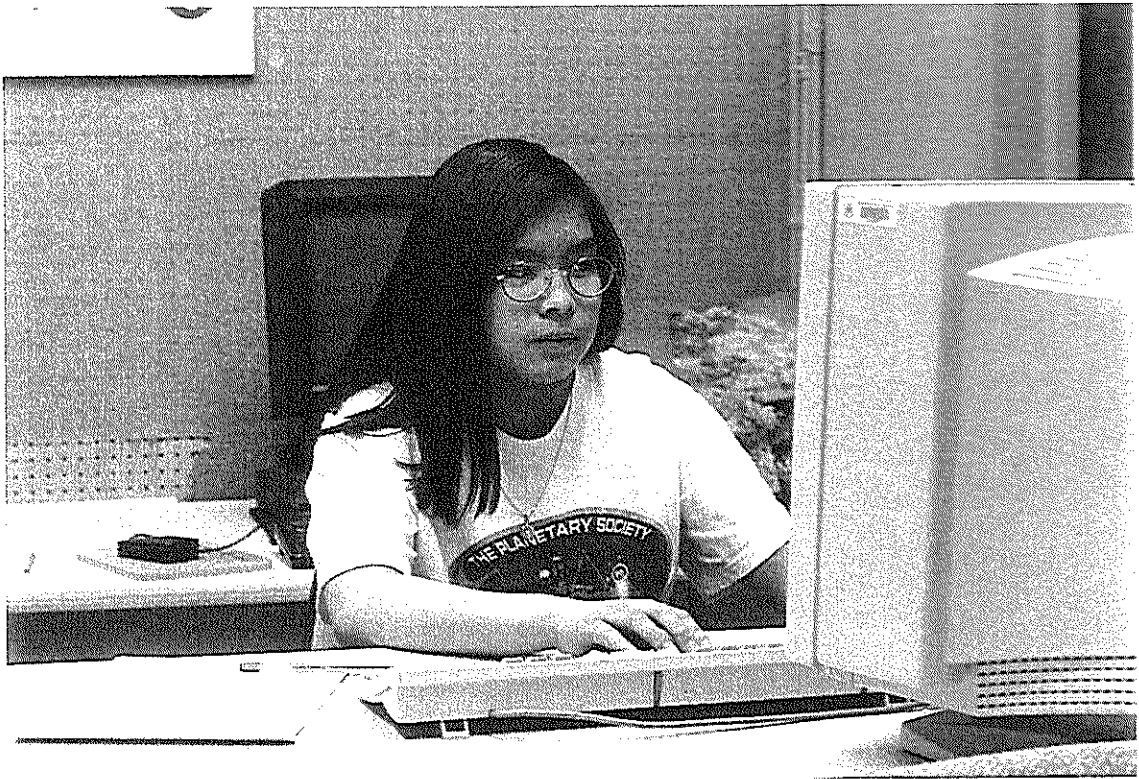
Stacey Hamer

Auroras Galore!

by Stephanie Wong

Hello, I'm Stephanie Wong. I worked in the Space Physics Lab under the supervision of Dr. Frances Fenrich. Here, the researchers are studying solar-terrestrial physics. In other words, they are learning about sun and how it affects geomagnetic activity around Earth. What makes it exciting is that this year the sun is at its solar maximum, a time where auroral activity is at a peak! I have seen a few these past weeks. My main project was to look for good backscatter regions in the ionosphere during a consistent Interplanetary Magnetic Field with data from the SuperDARN radar graphs. SuperDARN consists of a multitude of radar stations located near the auroral regions of Earth. Once I found good scatter, I would retrieve the data from a cassette tape and run a program on it. Looking at enough data sets, I could find patterns that could tell me about the polar cusp. The second thing I worked on was trying to find out whether data from the SuperDARN radars, CANOPUS radars and PIXIE instrument on the POLAR satellite correlate with one another. No one in the lab has compared these 3 data types in such a way before. Among other things I have done in this program was visit the Medical Microbiology and Immunology lab which is a big difference from this computer facility. My interests in computers and space exploration correspond to the Space Physics Lab perfectly!

I've met many interesting people in the WISEST program. This experience was very different than what we are exposed to at school. It shows us research at its finest. Six weeks at the university now



makes it much less intimidating when we enter our 1st-year at any university. Girls can do anything that other people can do and it is important to deliver that message to the world.

My Summer Experience

(What I did besides taking pictures)

By: Teresa Van Ember

First of all, I'd like to start out with a quote I had emailed to me the other day, since it seems to be very true;

**"To the optimist, the glass is half full. To the pessimist, the glass is half empty.
To the engineer, the glass is twice as big as it needs to be."**

As I reflect back on this summer, I realize how lucky I am to have been able to participate in the WISEST program. I remember way back in July when I sat in Dr. Frimpong's office and one of the first questions he asked me was "Have you ever heard of the oil sands?" Being the small town girl I am, of course I hadn't. This started this experience, and although I didn't know it at the time, my knowledge grew every day. I have gone from not knowing the oil sands exist to having the opportunity to fly up to Ft. McMurray and touring the Syncrude Mine Site.

The first place Dr. Frimpong sent me to work was the oil sands lab in Chemical Engineering. There, I was privileged to work with Tshitende Kasongo (A Masters Student) on his project. In this study, we were concentrating on the extraction of bitumen from oil sand. I learned how to use a centrifuge to separate water from fine particles as well as oil. My first task was to centrifuge the tailings of about 10 flotations that Kasongo had previously done. Later, we used this water that had been centrifuged to condition teflon plates with bitumen on them, which Kasongo used to measure the contact angle. I conditioned them by heating up the sample of water (both with and without clay) to about 75-80 degrees and keeping the teflon plates in it for 5 minutes. I also had the opportunity to measure surface tension of this water. Not only did I help perform these experiments but also learned all about the theory that goes along with it. In this lab, I also got to talk to a great deal of other grad students and masters students, not only about oil sand and their projects, but received a lot of advice about University that will help me in the future.

After two weeks, it was time for a change. Dr. Frimpong sent me to Syncrude's research facility in Edmonton, to work with another masters student, Houshang Ghazi. In the experiment, we were focusing on a different aspect that is important to the oil sand industry. We were studying the effect of air in a pipeline system while the pump is running (so we can get a homogeneous mixture). This will eventually show us how air in a slurry or froth will effect the efficiency of the pump. This experiment will continue as well with introducing solid into the system, which will show us even more how a slurry or froth will behave in a pipeline. Ghazi allowed me to conduct the same experiment on the PVC pipe loop, and explained to me the theory behind the experiment and equations we used. At first, it was all way over my head but I eventually began to figure it out and was able to understand what he was doing. Although my results were somewhat different, I enjoyed trying to point out sources of error, and getting an experience in an industrial setting such as Syncrude. I also had the opportunity



there to talk to some co-op students as well as some engineers and all sorts of different kinds of people. I realized that when doing research, it is important to do it as a team. I also got to experience what a meeting is like and got to see a couple of presentations. One thing I definitely noticed at Syncrude is that there are tons of safety regulations that exist when research is done in an industrial setting. I was very impressed at how they are able to keep their injury occurrences from happening frequently. Needless to say, I felt very safe.

Now my summer is just about over. I know I am going to take home with me many valuable experiences that will influence my future endeavors. I would like to thank Dr. Frimpong for finding me work, Kasongo and Ghazi for working with me, and Dr. Xu as well as Syncrude for letting me work in their labs. I would also like to thank Syncrude for sponsoring me and Silvia for giving me a tour up in Ft. McMurray.

As for all you girls I spent the summer with, thank you for being so open and friendly. I've gotten many fun memories to take home (bzzzzt, beep!) and I wish you all the best, especially with your future careers. I would also like to tell all the girls that lived with me at St. John's that I'm going to miss you, and I hope we can keep in touch. Hope you all had fantastic summers like I did.

"Don't be afraid to try something new. An amateur built the ark. Professionals built the Titanic." — Anonymous

Much More than Peas

Violet En

EEKS! That's what our supervisors must have thought when the two girls, who invaded their lab, told them that they could *not* grow *anything*! You see, my gracious lab partner, Julie Dien, and I had black thumbs, and this was not a good trait to have since we were working with plants. But with the help of Dr. Dennis Reinecke, and Dr. Jocelyn Ozga, our 6 weeks in Ag/For, lab 4-64 was truly an amazing experience. For me, the lab almost became like a second home. I would start work at 8:30am, and sometimes not leave until 9:00 or 10:00 – at night! But just knowing I was adding something to scientific knowledge was enough to keep me going. At the end, not only had we sprouted green thumbs (our plants grew!), we also developed knacks for other things – it must have been those plant hormones (Auxins, for those of you who must know ☺). In our first week, we decided to personalize our lab benches by making parafilm art. Soon, our names, flowers, and odd designs of parafilm adorned our workplace. A parafilm ring even found its way onto Dennis's finger.

WISEST, for me, was more than just measuring and weighing peas. Working in the lab was more like a fun-filled way to spend summer, and I'm sure most would agree, than simply a job. It was the people with whom we worked with that made this experience so wonderful for Jewels (Julie) and I. Jocelyn and Dennis put an immense amount of trust in us and even gave us keys to the lab and to the Ag/For building! Our research team soon became something more like family, and we called it *THE RESEARCH FAMILY*. When lab-life was taking a toll on us, Marilyn Johnstone brought us to the Muttart Conservatory. Later, Jocelyn drove us out to the University Farm where we picked saskatoon berries for a field study and ate them afterwards. We had even gone to Heritage Days together!

Working inside the lab proved just as fun. Often, our talks with Dennis and Jocelyn turned into conversations about sugar cravings, rowing, and giant Kit Kat bars. Dennis had even caught on to how Julie speaks! (Dennis about my beautiful peas in Julie's words: "those peas are definitely *happy*"-meaning they grew well) Who said scientists were all serious?

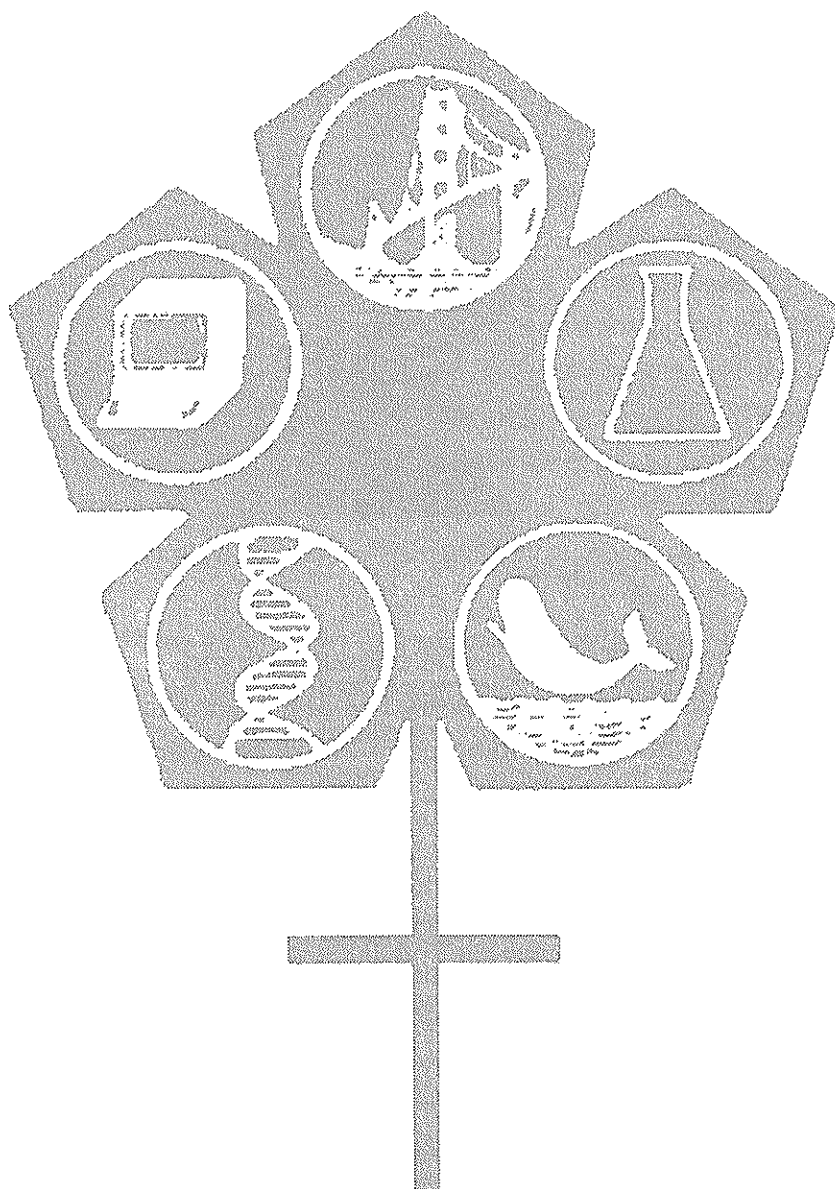
Outside of the lab entirely, were all of the WISEST activities. And this meant Tuesday Lunches where we found out that many of us were Students' Union junkies ☺. Our various trips on Wednesday afternoons also formed the social scene. Remember, Julie, Paige, Carlo, Ekua, and Candace, how we stuck our feet up to the camera at Comp Canada over video chat and laughed our hearts out? Amidst all the social activities



though, I'm sure all of us went through some serious learning.

Through WISEST, I have discovered what it means to be a Woman in Science – it is a world of discovery that is the leading edge in this fast-paced world. It was not so long ago that access to many scientific fields were denied to women, but now, we have every chance to meet any endeavor that we may choose to pursue; doors are now opened to us that were closed to many before. We now have the potential to achieve anything we want, because we have seen where our experience has taken us. Though we only played a small role in science, the knowledge gained and shared to each other is invaluable and is truly once-in-a-lifetime. Most of all, the friendships we have made this summer will never be forgotten. I know for myself, and for many others, that all the weird and funny things that happened during bag lunches and Wednesdays or just in our labs will be diligently stored and treasured in our hearts and minds (for the times we feel like taking a trip down memory lane ☺). Maybe they will even be written down so that we will never forget our time here, when 40 young women and men spent our grade 11 summer together.

AFTER THOUGHTS



WISEST

