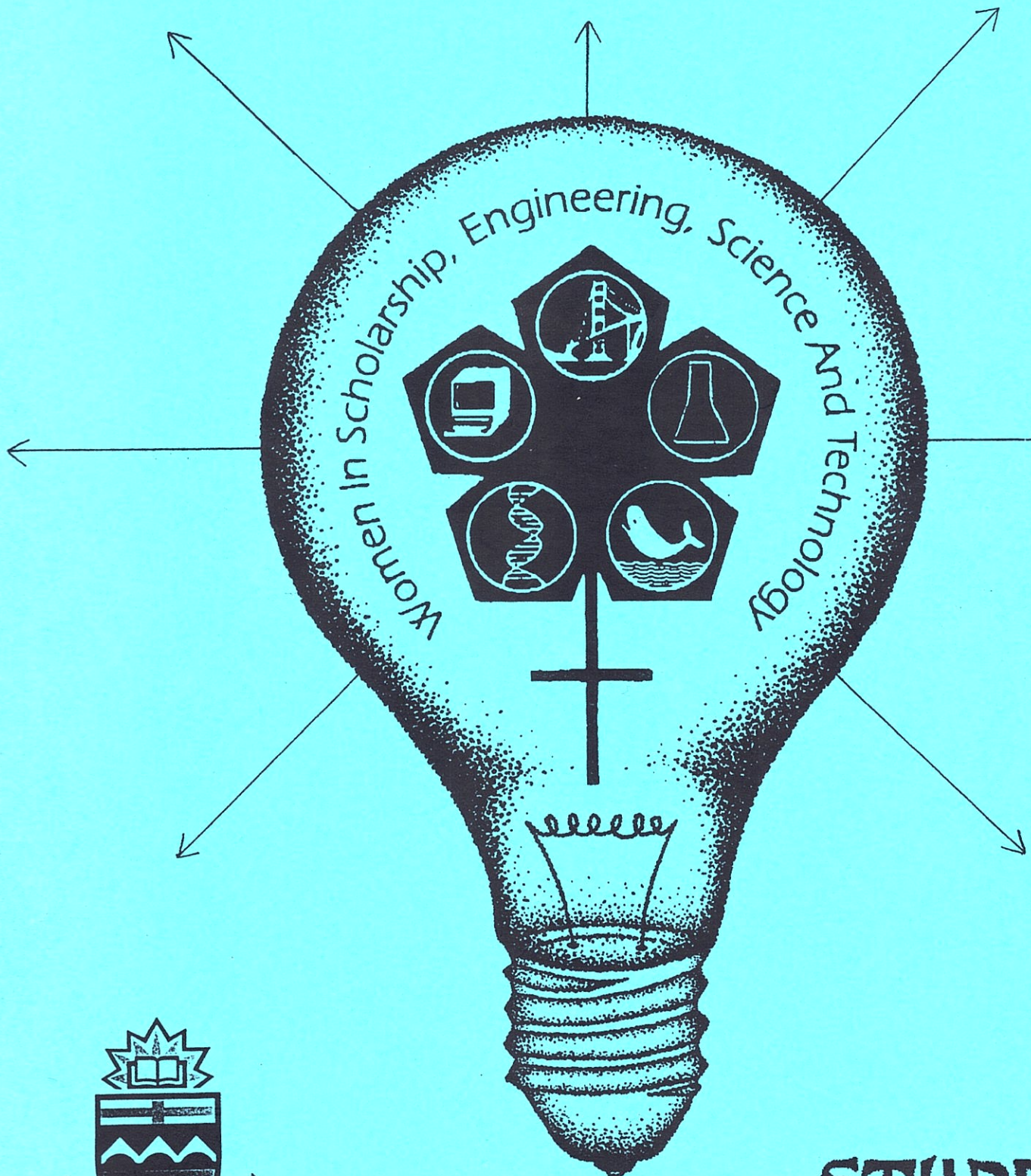


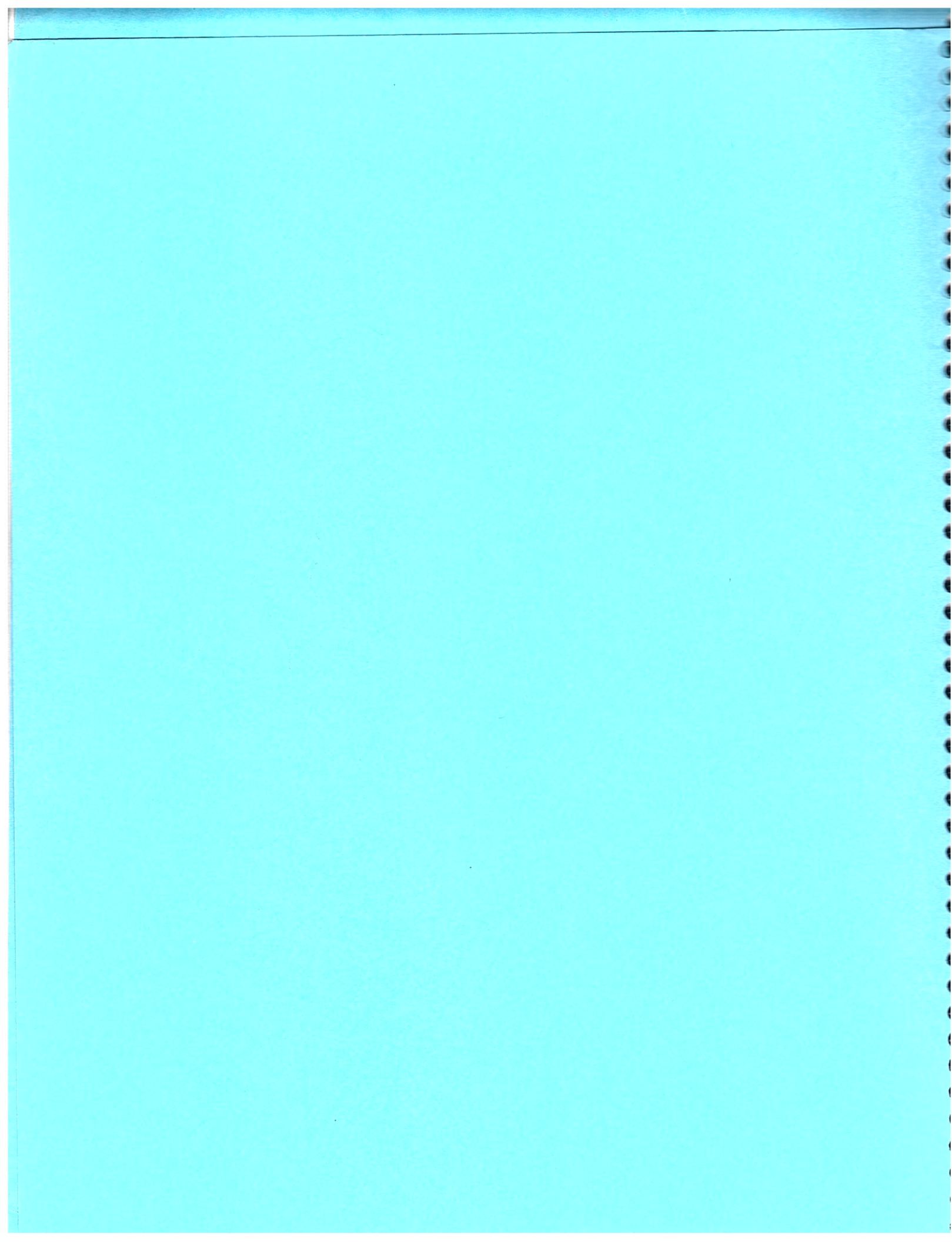
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SUMMER RESEARCH PROGRAM 1998



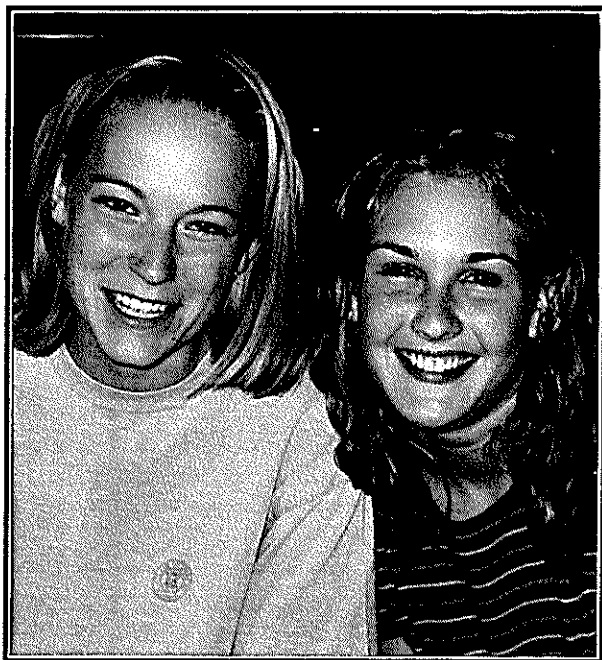
Front cover design
by Lynn Reich

STUDENT REPORTS



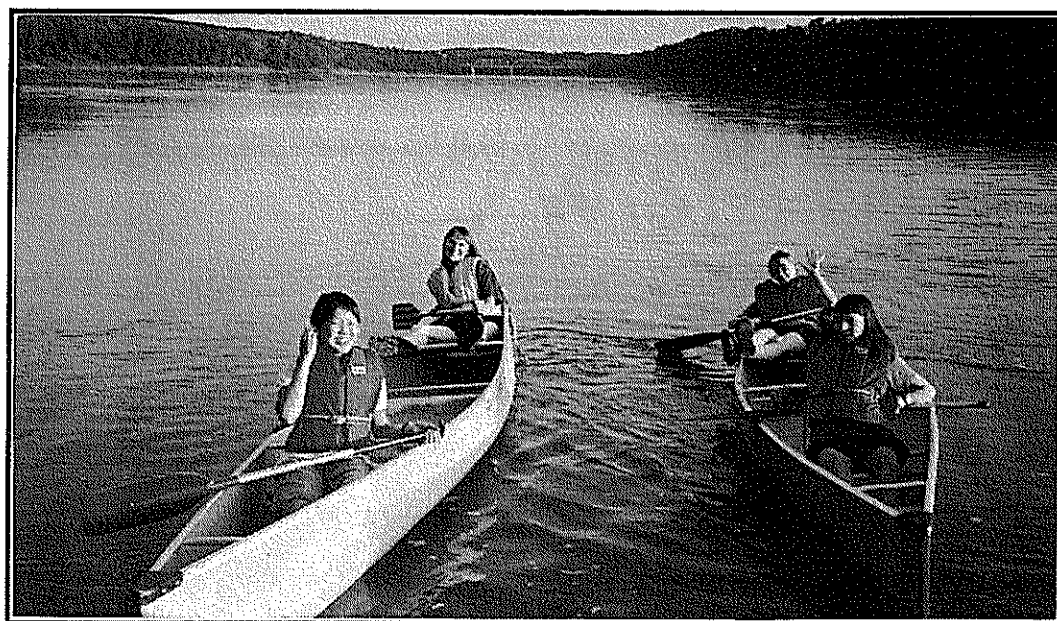
WISEST

Women in Scholarship Engineering, Science and Technology Summer Research Program 1998 Student Reports



"This has been an amazing summer that I won't forget; the lab experience I have gained will definitely be a great asset to myself in the future."

"After my WISEST summer, I am much more confident in pursuing the sciences and engineering."



"When I first applied for this program I never thought I would have as much fun as I had or experience as much as I did."

Contacting WISEST is now easier than ever.

WISEST

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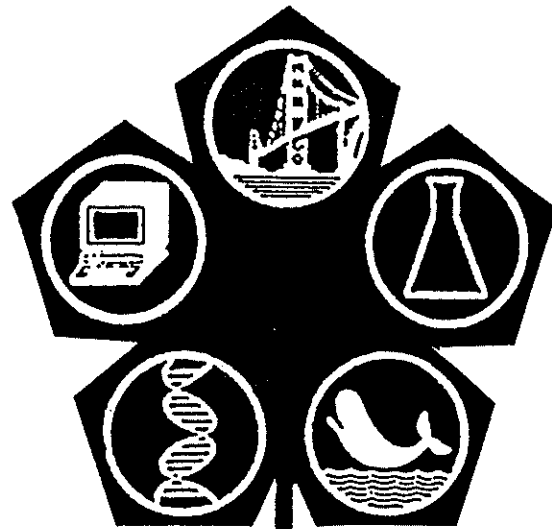
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behold the future



WISEST

Women in Scholarship, Engineering,
Science and Technology



Grace Ennis, Dr. Sandra Zohar, Rana Ahmad, Dr. Margaret-Ann Armour

The Summer Research Program is one of the initiatives of WISEST: Women in Scholarship, Engineering, Science and Technology. WISEST was the brainchild of the late J. Gordin Kaplan, the first Vice-President (Research) at the University of Alberta. The group was formed as a Task Force in 1982 and is now a standing committee of the Vice-President (Research and External Affairs).

It has a mandate to investigate the reasons why so few young women are choosing careers in the sciences and engineering, to take action to change the situation, and to work to increase the percentage of women in decision making roles in all fields of scholarship. The current board membership is thirty scientists, engineers, scholars, educators, and students from the University of Alberta, the Alberta Government, the school boards and the private sector.

In the summer program, which began in 1984, students from grade 11 spend six weeks during July and August working as members of research groups at the University of Alberta. The girls work in Science, Engineering, Agriculture, Forestry, Pharmacy and Pharmaceutical Sciences, Medicine and Oral Health Sciences, with boys working in Nursing or Agriculture, Forestry and Home Economics. From their responses to questionnaires at the end of the program, we know that the young people who participate find the experience broadens their knowledge of fields of research about which they had little awareness. Thus, it influences the choice of courses which they will take at the university and of careers that they may pursue.

The teachers and school counselors are very supportive of the WISEST Summer Research Program: in making information available to their students, encouraging them to apply for positions, and in completing many teacher reference forms. We at WISEST recognize that the success of the program is very much dependent on the teachers' help in publicizing the program. We encourage all teachers to share this booklet with grade 11 students in their schools to help ensure continued participation.

This program would not be possible without the supervisors and their technicians, undergraduates and graduate students, and research associates. Their commitment of time in training, supervising and encouraging the students is invaluable. We are very pleased to add our thanks to those expressed by the students in their reports.

Funding was received from: the Alberta Heritage Foundation for Medical Research, the Edmonton Glenora Rotary Club, the Margaret-Ann Armour Fund for Rural WISEST Students, the Summer Career Placements Program of Human Resources Development Canada, the STEP (Summer Temporary Employment Program) of Alberta Advanced Education and Career Development, Syncrude Canada Ltd. (Edmonton Research Centre), Dow Chemical Canada Inc. (Western Canada Division), Weyerhaeuser Canada Ltd., The Winspear Fund, Chieftain International, Inc., Glaxo Wellcome Inc., the Vice-President of Research and External Affairs at the University of Alberta, and the Faculties of Science, Engineering, Pharmacy and Pharmaceutical Sciences, and Medicine and Oral Health Sciences.

It was a busy six weeks for the students as they worked in their labs and took part in the Wednesday afternoon sessions and various optional social activities. This year's Wednesday afternoon sessions included a campus tour, an informal discussion with people who have chosen non-traditional careers, a tour of the Alberta Research Council, a visit to another research lab at the University of Alberta, presentation of their research posters, and a visit to the TELUS corporation in Edmonton. A new addition to the program this year is the student's presentation of their research work through scientific posters. At the poster presentation session, members of their research teams and the students had the opportunity to see and ask questions about the research work. We would like to thank the numerous people whose participation made these sessions such good opportunities for learning.

A special effort was made to assist the rural WISEST students who found accommodation for the summer with friends, relatives or the University Student Housing, Lister Hall. The "Big Sister", Roxanne McCallum, was there to offer support, direction and at times, entertainment for these out of town students.

In addition, several social events were planned to give the students an opportunity to get to know one another better. These included: dinner at "Earl's" before attending a Shakespearean play in a nearby amphitheatre, an evening at the Edmonton Space Science Centre, an Open House Tea for parents, friends and corporate sponsors, a picnic and a pizza party after our two field trips. Every Tuesday at noon, students were encouraged to bring their bag lunches for an informal gathering at the Students' Union Building.

Each year a booklet, such as this, about the WISEST Summer Research Program is made available to students, teachers, supervisors, sponsors and other people who express an interest in learning about the Summer Research Program. To this booklet the students have submitted their final reports which describe their work in the research labs. They have also contributed pictures and summaries of the various activities which were sponsored by WISEST during the program. These personal observations are the heart of the booklet as they illustrate the quality of the research and the variety of the projects that the students undertook. Lynn Reich's artistic submission for the booklet cover was chosen from many creative entries to the "Cover Design Contest"; the other submissions have also been included.

We have been fortunate also over the years to have the services of Paul Dolphin, who has helped record, with photographs, the people and activities of the program. His competent assistance in the production of this booklet is greatly appreciated.

We have very much enjoyed getting to know all of the young women and men who spent the summer exploring non-traditional fields such as science, engineering and nursing. We were happy to have all of you in the program, and strongly encourage you to tell your friends and schoolmates about your experiences. We wish you the very best as you pursue your education and work towards fulfilling lives.

For up to date information about our various WISEST activities, visit us at our website which can be found at: <http://www.chem.ualberta.ca/~wisest>

Best Wishes from the WISEST team:
Dr. Margaret-Ann Armour - Vice-Chair WISEST
Dr. Sandra Zohar - Director, WISEST
Grace Ennis - Program Co-ordinator WISEST
Rana Ahmand - Program Administrator WISEST

*Many thanks
to the following supporters
for their financial contributions to the
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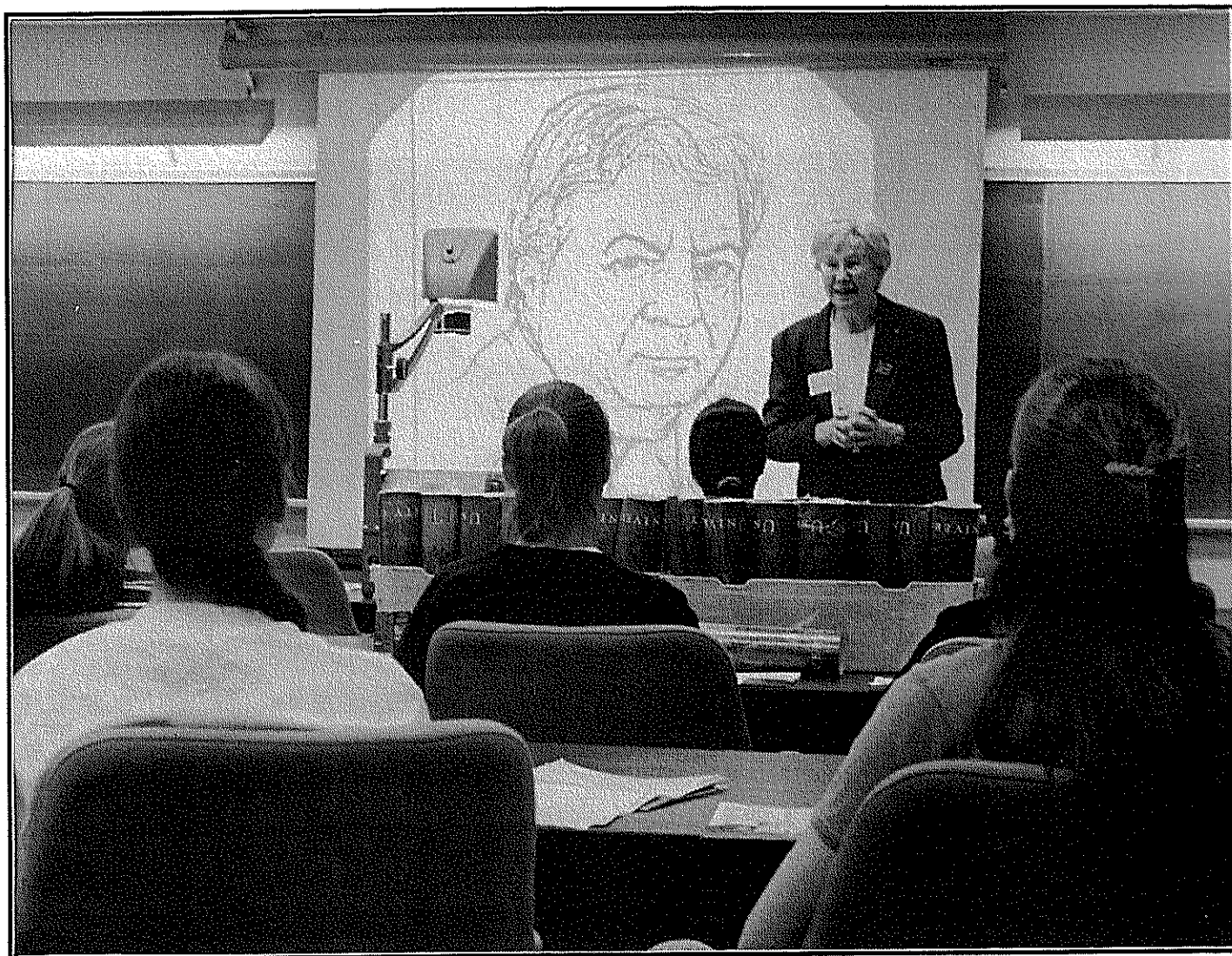
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WISEST Class of 1998

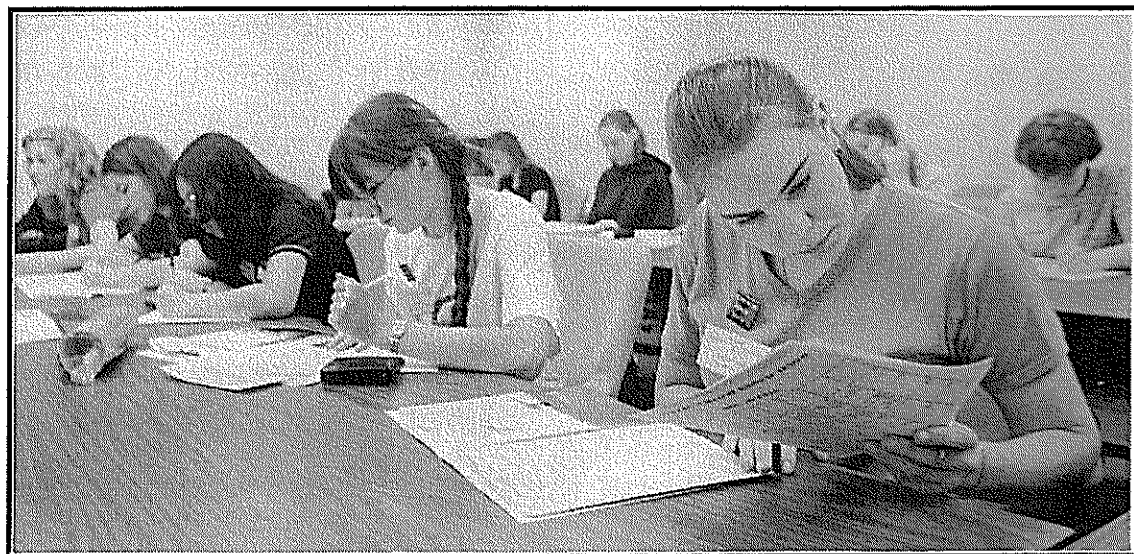




The Welcome Session of WISEST by Anita Chan

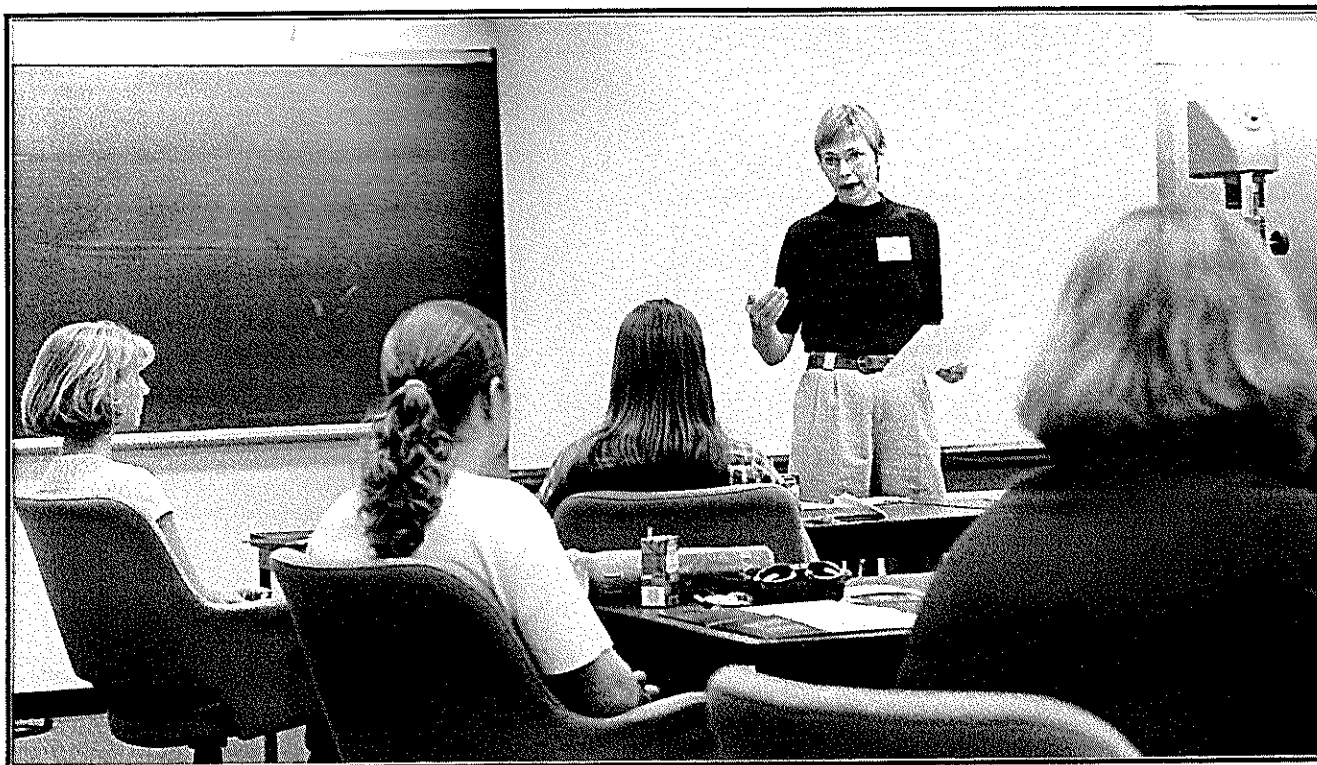
July 3 was quite an exciting day for everyone. It was the day when we finally got to meet the staff of WISEST as well as the lucky participants of the 1998 WISEST Summer Research Program. We assembled in E3-25 in the Chemistry East Building and talked nervously to each other, hoping to spark an interest among the new faces. I was especially relieved that I was able to communicate even though I only had my wisdom teeth taken out four days ago. As one knows, first impressions are extremely important, particularly during the teenage years. Personally, I found everyone to be friendly and could not wait for the chance to get to know one another.

During the morning, Dr. Margaret-Ann Armour gave a speech about the founder of WISEST, J. Gordin Kaplan, and details of the program previously unknown to us. Grace and Rana also filled everyone in on the expectations of the program. Dr. Richard E. Peter, Dean of Science, was nice enough to come and welcome us to the University of Alberta. We were presented with pins and key chains, which were accepted graciously by all of us. We also received a folder filled with forms that we were required to fill out. After the paperwork, we were off to lunch at HUB Mall.



By lunch time, many of us had already become friends. We had taco salad as we chatted about school and the summer that awaited us. (Unfortunately, I could not eat the taco salad. However, I heard it was delicious!) When our social gathering was over, we went back to E3-25.

In the afternoon, Dr. Armour presented a Safety Seminar to ensure we would be safe working in the lab. She is an amazing speaker; all of us were captivated by her. Then, our supervisors came one by one to take us to our work areas. It was kind of scary since we did not know what to expect. Nonetheless, we all survived the crucial first day and looked forward to getting hands-on experience in scientific research for the next six weeks.



Wednesday Afternoon Sessions by Karen Paziuk

Each Wednesday afternoon from about three o'clock until four thirty, the WISEST students would meet in the Chemistry East building. Every week, there was a different activity, and each week proved to exceed our expectations and bring us closer together as a group.

Our first Wednesday was a tour of the U of A campus. I think that everyone appreciated this since most of us had difficulty even trying to find the Chemistry building that day. It was a good way to begin the program because within one week, we all looked like we belonged on campus and we were even able to help other "lost souls".

Our next session was once again in Chemistry East, where we met with men and women who are in non-traditional careers. We broke into small groups so that we would have a better opportunity to ask questions - even though it took half an hour for anyone to work up the courage to ask anything. This was a very informative and interesting session because the speakers were open to any question, and they even told us how their career choices affect their personal lives.

The following Wednesday we visited the Alberta Research Council in south Edmonton. Here, we were given a tour of the main building where they produce metals, plastics, and ceramics that are specifically made for different companies. We also split into two groups to tour three different labs. It was interesting to compare research facilities at the university with those funded directly by the Alberta government. Finally, we all looked forward to our "picnic" dinner of Subway subs, and no one will forget those cool fluorescent cups.

Our last Wednesday of July was spent in a research lab of our choice. It was good to get out and see different labs, not to mention different buildings, on campus. This experience opened our eyes to opportunities in science, different from the research we have been working on.

August 5 was a highlight of our WISEST experience because we gathered with our supervisors and other lab members to display our research posters. It was great to read other people's posters to get a "real" idea of what they are doing. Before when we would ask other people about their research, we tried to understand, but no one really had a clear idea about what they were talking about. After the poster presentation, we could ask each other questions and actually understand the answer. After the poster session, we had a group picture taken outside of Athabasca Hall, where the WISEST office is located.

Our last Wednesday in the program was spent at TELUS. We took the LRT downtown, and were met by TELUS representatives. TELUS gave us a tour of the areas that involve engineering, not to mention a good workout walking between three of their buildings. We also participated in a video conference over the internet with a man in an office across the hall. Many of us had fun playing around with the delayed movement of ourselves on the screen. A definite highlight of this day was the social afterwards where we had pizza and said our final goodbyes. All in all, the WISEST program was a great experience that not only built opportunities for us, but it also built friendships.

TELUS field trip by Meiti Yang

It was yet another sunny and hot afternoon. However, we were going to do something different that day. Most of the students involved in the WISEST Summer Research Program, Rana, Grace and Sandra met at the LRT station, and together we took a train to TELUS.

Upon entering the TELUS building downtown, we were welcomed by the cool, air-conditioned rooms. A student in the co-op program was already waiting for us. We were taken to a conference room, where we received an outline of the rich program waiting for us in the afternoon. Firstly, we were shown how equipment was installed and checked. Someone asked why it was so expensive to install a phone line. A TELUS employee replied that the equipment would have to be paid for sooner or later; he also stated proudly that "all the equipment here is top-notch". Next was the Advanced Intelligence Network Demonstration. We were shown how a network was set up. Apparently, when someone calls a 310-XXXX number, the phone call is routed through various locations before it finally ends up at a pizza place or government.

The next section of our tour was perhaps one of the most interesting. We were shown into 2 different rooms, and there was a video phone connected to the computer in each room. One of the computers dialed the server in Toronto and we connected over the network. Hence began our video-conferencing session. We did not know what to say over the phone, but it was fun all the same. For most of us, it was the first time we experienced video-conferencing. After that, a slide show was presented on Telehealth communication. At the moment, TELUS is marketing its video-conferencing technology. Perhaps in the near future, patients do not have to go to clinics or hospitals out of town for check-ups, or for any medical attention. They simply have to go to a centre in town where there is Telehealth communication equipment and where a technician is present. With video-conferencing, the doctors will be able to conduct check-ups and determine remedies for illnesses. There are laws and issues about using video-conferencing to perform surgeries, but the technology is currently being used to train surgeons, or share expertise or knowledge while performing a surgery.

At the end of the WISEST tour of TELUS, there was a pizza party. Some employees at TELUS talked to us about how they entered the field and answered some of our questions. It was also the last social WISEST would have and many students exchanged email addresses and notes.

The Campus Tour

by Christina Elliott

Due to the unfortunate onset of much rain, the campus tour was mostly held indoors. Although a bit confusing due to the winding halls and connecting buildings of the University, it was successful in showing us, some of whom were completely ignorant of the location of anything besides SUB and HUB, the main layout of the campus. Our Student's Union guide, Saul, pointed out everything from the large cell hanging from the ceiling of the Biological Sciences building to the dentistry and pharmacy sections. We toured through the hot and humid greenhouse, wondering just how many students actually could stand to use the benches in there for studying, and saw CAB and the Cameron Library. Our experience ended at Athabasca Hall where a few of us were disoriented, until we realized that the front doors open onto the second floor.



LAB TOURS...ANTHROPOLOGY SKELETAL ANALYSIS

by Evan Cheung

Have you ever seen real human bone before? I have. On Wednesday, July 29, ten WISEST students and I visited an anthropology lab which specializes in skeletal analysis. The reason I chose this lab was because I find the study of human anatomy very interesting and the investigation of dead bodies even more intriguing. In the lab, Sabine Stratton led us step by step through the procedure used for the classification of bones. She told us the first three questions to attempt to answer about a case are: 1) Is it a bone? 2) Is it human? And 3) How many individuals are represented? Not only did we get to look at the human bones, we also got to play with them. This tour turned out to be a fun and interesting trip and by the smiles on everyone's faces when we left, I think it's safe to conclude that everyone had a great time! Now that we have looked at human bones, I think our next tour should be "the morgue".



Small Group Discussions with people in non-traditional careers. "What do you wanna be when you grow up?"

by Queenie Lung

This is a question to which many of us have no answer. It was relieving to know even people with doctorate degrees have no idea what they want to be when they "grow up". The small group discussions on Wednesday, July 15, was a valuable experience for me and I am sure all of the 1998 WISEST summer research students. It helped us to realize that the confusing steps in life were not engraved in stone. Change is a possibility at every step. We encountered women who have studied for many years to achieve their degrees and then shift into different disciplines to study something new. It was settling to know that it was common for people to change their mind about their future occupation, even at such a later stage in life.

We also learned the non-traditional careers attained by women are becoming more traditional. Employers now look at women and see their abilities rather than their sex. They are also becoming more lenient and understanding toward the family life of women. More men are also finding non-traditional careers and have become more supportive of their wives and the career they have chosen. The once before male dominated world is changing as the title "housewife" is diminishing and the title "househusband" is growing more common.

The experience attained in the small group discussions was useful. Thank you to all the inspirational speakers and to the members of WISEST for making these sessions possible. They have opened our eyes to realize life never works out the way we plan and they have given us knowledge of where women stand in our world today.



WISEST trip to the Alberta Research Council. Thoughts and Memories by Dana Sjostrom

Every Wednesday afternoon, the WISEST group gathers and experiences some science orientated field trip. One such field trip took us to the Alberta Research Council. We had quite a bit of time to get excited about this trip, as our bus tried to pick us up at Commonwealth Stadium, which was difficult, because we were at Stadium Car Park on campus. But soon enough, we were aboard the bus and heading down to South Edmonton.

When we arrived at ARC, we received our day passes and split up into groups. The friendly tour guides chauffeured us to various departments and I'm sure thoroughly wet our scientific appetites.

The biological wing gave us a look at bacterial cultures and some fancy diagnostic machinery. The microscope held samples of *E. coli* and other staph-like bugs that are always present in our bodies. We left this lab with pleasant thoughts of bugs.

Our quest to know more brought us to various other labs that reminded us of what science really is capable of. There is a device that simulates the environmental conditions of a well deep in the ground. There are million-dollar instruments that are only manufactured in places like Switzerland and there are budding ideas that aren't yet patented within the walls of ARC. Those budding ideas were the reason for card-only entry on most doors, and was also the reason for our none-admittance to some areas.

Some of the more immediate issues we dealt with included having to wear heavy lab coats in a steamy lab, which fortunately was not holding 15,000 litres of fermenting *E. coli*. Another pressing matter was those bulky safety goggles that we're all so familiar with. A bit of pride was held with those of us suffering from myopia or astigmatism, as we are bypassed in the goggle department. Those aspects of science are the ones we hold most dear, and I hope will not discourage too many of us in the future.

Thanks to the ARC staff for a great afternoon of scientific exploration.

Shakespeare in the Park

by Rilayna Rakoz

On July 16, 1998, the mosquitoes residing in Hawrelak Park had a feast of WISEST blood. The students who went to the play *Comedy of Errors* certainly felt like they were donating blood. Why was our cultural outing scheduled for the one week of summer when there were tons of mosquitoes searching for sustenance? I'm not sure.

I did enjoy it immensely though, and I did find a common theme running throughout the evening's outing. It's a small world. This simple cliché seemed to pop up all over the place. The night began, for some, at Earl's. Five girls went out for supper; Erin, Tricia, Renee, Meera, and Claire. Amazingly enough, they soon discovered that they knew some of each other's friends. Erin was friends with one of Meera's buddies, as well as one of Claire's. The girls had never met each other before WISEST.

For others, the night began with a walk to Hawrelak Park. This was when the mosquito's banquet began. We danced our way to the Heritage Amphitheatre amidst sounds of slapping and cursing. After spraying ourselves with complimentary OFF, we settled down into our seats. More girls joined those coming from Lister and Earl's (don't know where the guys were!). Conversations started up as we waited for the show to start. Again, two girls knew the same people. This time it was Claire and Angela. Angela's cousins live in the same town as some of Claire's relatives, and their families probably know each other somewhat. What a small world!

Then the play began. It was an abrupt start, no calling for quiet, the nuns just go up on stage and started singing. The basic plot is that a family has been torn apart while at sea. They were caught in a storm, and shipwrecked. Two sets of twin boys, (master twins served by servant twins) were split up, as well as the husband and wife. Three ended up in one city, and three in another. The father from Syracuse has set out to find his lost sons, and the sons from Syracuse have set out to find their fortune. Eventually the entire family ends up in Ephesus, and the twins from Syracuse are soon mistaken for their brothers in Ephesus. They fall right into their brother's lives, without even knowing it. All sorts of problems ensue. The wife of one calls her husband's twin in to supper, thinking it is her husband. Then her servants lock her true husband out of the house. Many errors occurred, and it was definitely comedic. The mosquitoes got to the actors too, as they soon started complaining about them in Shakespearean. Of course, it has to be a small world for twins who do not remember each other to suddenly drop in on the other's life, for a husband to find his wife and long lost sons.

My point is this. During the summer, the WISEST students found they had a lot in common (at least I did). Common interests, common dreams, and even common acquaintances. If it is truly such a small world, then we should be able to find one another at some point in our lives. I truly hope that we can all drop in on one another unexpectedly.

Shakespeare in the Park: by Amanda Fraser

Over the 6 weeks at WISEST, one event was more enjoyable than most, "Shakespeare in the Park". It began with supper at Earl's on campus then proceeded to Hawrelak Park to see *Comedy of Errors*.

The group from Earl's met with those who wanted to enjoy the theater but did not go to dinner. We all walked to Hawrelak Park together and made our way into the very large outdoor theater. We sat to the left of the stage but we were very close to the actors. I had not been to "Shakespeare in the Park" before and I quite enjoyed myself. The play had a terrific cast and humorous improvisations. "Shakespeare in the Park" was another fantastic way to meet other girls from WISEST.

Learning Experiences at the Space and Science Centre by Kelsey Hoffman

On July 30th, about half a dozen WISEST Students along with Sandra and Rana, loaded onto bus number 128 for a sure "learning" experience at the Space and Science Centre.

It was a rather uneventful ride to The Centre, but once we arrived and met up with others that provided their own transportation, things picked up. We paid for admission and received buttons, that...well...some needed instructions on how to put on.~_^

We then went on to discover the exhibits throughout The Centre. There was the Sports Exhibit that included a climbing wall. As some moved almost effortlessly across the wall, other persons-who will remain nameless-got onto the wall and then wondered, "Okay, now what?". In the "Space" section (hence SPACE and Science) there was a kind of arcade game. The point of the game was to "safely" land a space ship. Although most of the scores would be like this: Crash landing, mile radius crater, no survivors, but... "Yes, I still got five points!". The Children's section in The Centre seemed to be the most interesting area. In this section an almost cartoonish oversized keyboard was being played by the feet of various WISEST students. The keen listener could almost make out the strains of the Spice Girls' song "Stop" coming from the keyboard. In this area there was also a bubble basketball game that was amusing many, until Rana felt the WISEST students were a little too old to be in the "kids" area.

But alas our time at the Space and Science Centre drew to an end. As some WISEST students discussed what to do next - stay and catch a flick in the Imax or leave - Inderpal amused himself by putting all his change into this funnel thing and watching his money spin down it. I guess he wasn't just wasting his money. I'm sure it was a real learning experience; just what he was "learning" isn't too clear to me.

Zaki, Anita and I decided it was time to leave after being witnesses to Inderpal's behaviour. We scouted our way back like fearless explorers only occasionally asking, "Are you sure this is the right way?". The response always being, "Yeah!...Pretty sure...". As the three of us came closer to the buses, we notice one was leaving, "Do you think that's our bus?". Racing to make it, Anita flagged down the bus, and we boarded. But Anita, don't you flag down taxis and not buses, isn't that what the bus driver said? .~_+

Tuesday Bagged Lunches

by Meera Shah

Rana was the leader of the group. Every Tuesday, after meeting near the information booth in SUB, she would take us to one of her secret spots. At first, everyone would arrive right on time for the lunches, and we would all stand there feeling really uncomfortable because we didn't really know anyone else. The Lister girls were always an exception, because their LATE night chats and parties seemed to bring them a little closer. So as we followed Rana to her secret spots, everyone would timidly listen to the Lister girls reminiscing on events from the night before.

Eventually, with the help of Rana's "Get to know each other game", everyone began intermingling. After hearing too many, "hey you", or "you, with the blond hair", or "girl in pharmacy", we also played a name game. That Tuesday, I learned all the names, but by the next week, everyone was sitting in different places, so my name game memory didn't work.

Rana's secret places consisted of the really comfortable couches in Athabasca Hall Dining Area and shady areas under the trees in quad.

As for attendance, some of the members were really dedicated to Tuesday bagged lunches. Others were no shows, and some just came too late, so they missed out on all the fun.

The lunches ended with a potluck, consisting of only junk food. We all seemed to find our own niche on the comfy couches, nibbling on our favorite junk food, on our last Tuesday together.

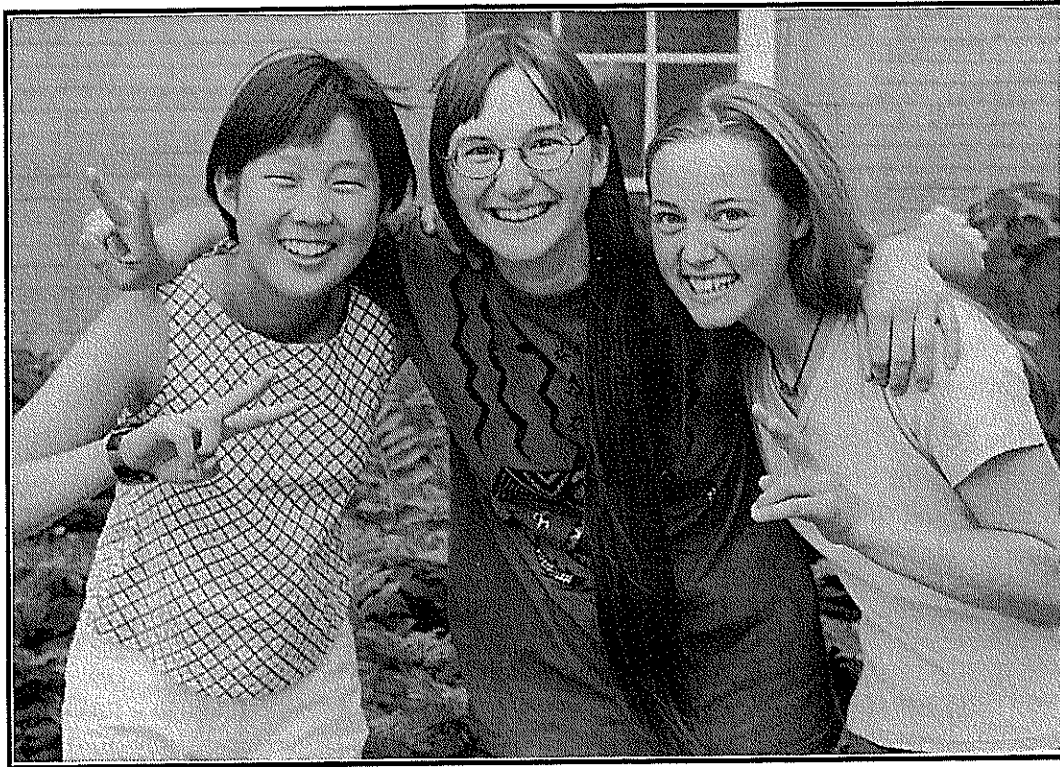
Tuesday Bag Lunches with Rana

by Anita Chan

Every Tuesday at noon, everyone in the WISEST Summer Research Program had the opportunity to meet with Rana at SUB. We would then either go outside to enjoy the sun (not to mention countless of mosquitoes!) or go to Athabasca Hall to eat and talk. This was a terrific way to get to know one another as many of us do not get this chance to do so during work hours. I had a great time talking to my friends and hanging out with them. It was a nice change in comparison to working in the lab.

Our last Tuesday Bag Lunch session ended with a bang with a potluck. There were chips, cookies, fruit, and boxes of Tim Hortons donuts/timbits just to name a few of the items available for us to feast on. I never expected so much junk food! Then again, what do people expect from teenagers? Anyway, the potluck was a success and all of us went back to work with full stomachs which were previously empty.

I really enjoyed these relaxing times over the past six weeks, I will remember these Tuesday Bag Lunches as a part of my WISEST experience.



Life at the Meanook Biological Research Station by The WISEST people at Meanook: Terra B, Emma C, and Vivian W

Our six weeks at the Meanook Biological Research Station could be summed up into just one word: AWESOME! But that would be such an understatement. So we decided to write the *Meanook Book*, but that wouldn't fit in the WISEST book, so here are some highlights. We had experiences at Meanook that are unforgettable, not only the work (that we can hardly believe we get paid to do), but also the people and the whole environment made this summer the best summer ever!

THE WORK

There are several projects taking place at Meanook, many of which we have stuck our noses in. Emma worked with fish and amphibians, Vivian worked primarily on Water Chemistry, and Terra worked with birds. However, we all got a chance to work on all the other exciting projects that were happening.

One such project involved the rate of methane gas emissions from wetlands, for which we went fluxing. Fluxing involves going to a swamp on a hot sunny day, while using syringes to collect air samples from columns placed over an area of swamp. These columns controlled the temperature and measured the rate of photosynthesis. It was complex, but fun all the same.

We also helped a masters student finish his vegetation analysis (veg). He did very detailed veg, including herbaceous plants. We learned many new plant names. Come for a walk with us, and we will name you the plants, birds, amphibians, and fish. We might even collect some water samples for testing.

***Inside hint:** While doing veg in cow pastures, beware of where you sit...

THE PEOPLE

Meanook is bursting with really cool, and exciting people. There are many people conducting research in a variety of areas, coming from a variety of places. Their hometowns span from Germany to Virginia, with several stops in between. Because of all the great people, Meanook is a place where we feel comfortable and happy. Everyone is extremely patient and encouraging. They have kept us informed and always helped us understand new situations. It is hard to sum up the people at Meanook, because they are all unique.

***Inside hint:** There is a distinct dialect at Meanook, a real smorgasbord, including that southern state's "y'all", the cowgirl "twang", and the French-Canadian "Oui, eh?".

THE STATION

Volleyball, basketball, soccer, canoeing, horseback riding, Ultimate Frisbee, weekend movies, campfires, and purple hair dying...these are just a few of the evening activities. Everyone was always welcome to join in the games, no matter how much talent, or lack of talent you have. These events helped make our experience so special.

***Inside hint:** Never have your back to the Frisbee, during Ultimate Frisbee!

We each had our own room. These rooms were in trailers that could hold up to 12 people. We were provided with a bed, a desk, a closet, and a window.

***Inside hint:** Try to get a room in a trailer with a bathroom.

There is also a main house, with a lounge and a kitchen. The food at Meanook is delicious. We make our own breakfast and lunch, while supper is provided by a wonderful cook, Mary. Mary is from Ghana and sometimes cooks African food.

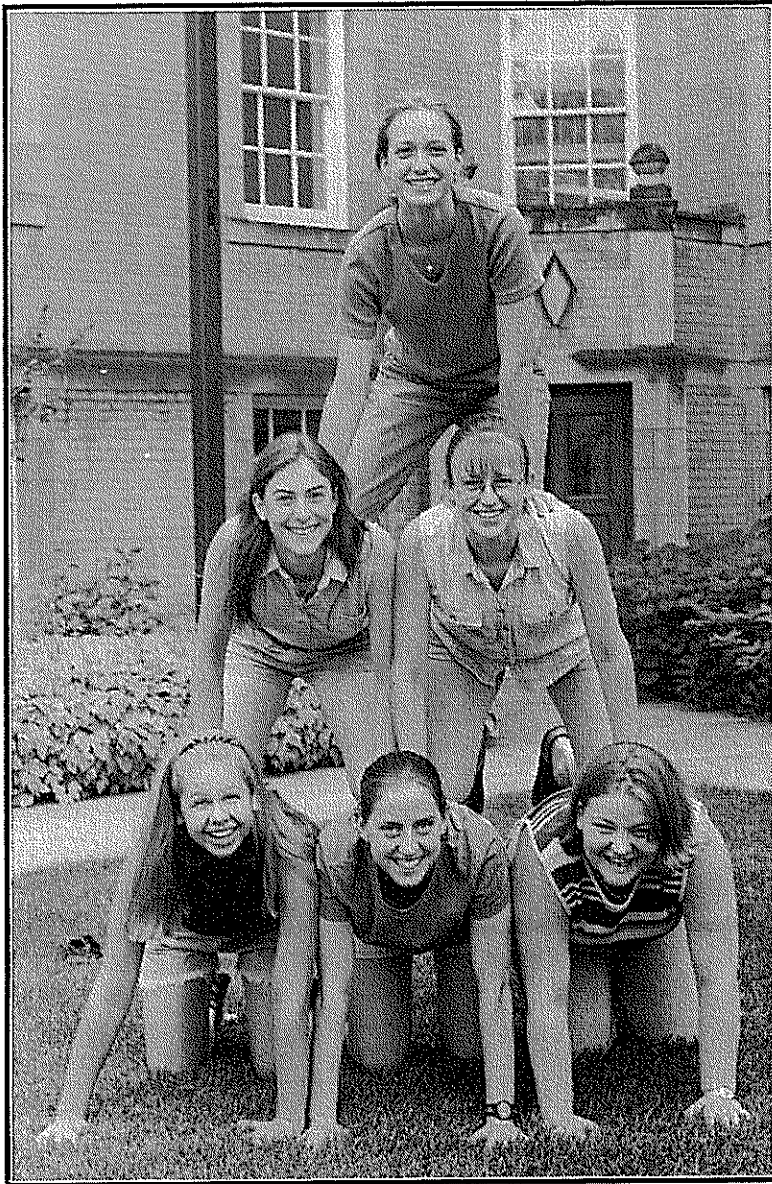
***Inside hint:** Mary's plantain and homemade buns are THE BEST!!

All the Meanookies pitch in after meals, to clean both the kitchen and the dining room. In addition, every weekend each resident does an assigned chore.

***Inside hint:** Don't pick the washroom duty.

CONCLUSION

As you can tell, we had a really great time at Meanook. There was plenty to see and do, both at work and at play. Perhaps some of us will return soon. Thanks to **WISEST** and **ALL THE MEANOOKIES** for a **WONDERFUL SUMMER!!!!**



Living in Lister

This year six girls lived in Lister Hall. Tricia Lukat, Rilayna Rakoz, Sarah Scott, Jenny Fricke, Amanda Fraser and Erin Spence lived on Second Henday.

Lister Hall began as a very large, unknown, and scary place but as the six weeks passed it became familiar and comfortable. The people became like family and we could not imagine not being around each other.

In Lister, the most undesirable, uneventful, and tedious things we once did at home seemed fun and enjoyable. Watching paint dry or grass grow with the people we met could have been considered a high point of the whole stay, just because we were spending time together.

We all learned a lot this summer. To explain in the simplest way: we had a multicultural experience. We met people from all over Canada, Colombia, Mexico, Italy, France, Ireland, Japan, Taiwan, and Korea. Our minds have been broadened with a very small understanding of Spanish and the ability to dance a very tame merengue.

For six short weeks, life was good!

Life at Lister by Rilayna Rakoz

A summer in residence is quite an experience. You quickly make friendships which are heartwrenching to leave behind. I am going to miss my Colombian, Mexican, Japanese, Korean, Italian, French, Irish, and Canadian friends very much. Thank goodness for e-mail!! My address book has quadrupled in size.

Things started out slow. When the six of us; Jenny, Tricia, Sarah, Erin, Amanda, and Rilayna, first sat down together, there was dead silence. We were unsure of ourselves, and the uncomfortable situation we had been put in. I can remember thinking "What a fun summer this is going to be!" We can't even make small talk. But things got better, much better.

We bonded while watching *Days of our Lives*, *The Young and the Restless*, *Jerry Springer* and screaming along with *Scream* and *Scream 2*. There were so many movies viewed by us and our new friends, that we could start a movie store, if we owned them all. We also tested our skills out on the basketball court, the beach volleyball pit, and the soccer field. Some went swimming or to the steam room, others lifted weights, but we all found someone to join us in our activities. That is the great thing about Lister. No matter what you want to do, you can almost always get someone to do it with you.

The summer has been full of Spanish phrases entering and exiting the brain, the steps to a Merengue getting all tied up on the neuron pathway from brain to feet, playing cards in an attempt to win an ice cream, borrowing Safeway carts, getting tips about university and how to survive it, cleaning pores with an avocado face mask, sleeping till five PM, heading to WEM to take in a movie, steaming ourselves like lobsters, tanning ourselves till we get darker than Sam, cultural experiences like Shakespeare in the Park, Klondike Days, and a Taste of Edmonton, sporting events like the Hamilton vs. Eskimos blow out (38-10 for them), but most of all, it has been filled with friendship.

I cannot believe that the six weeks is already up. When I first started, I thought six weeks would take forever to go by, but the time has slipped through my fingers so fast. Like sands through the hourglass, these are the days of our lives.

Big Sister by Roxanne McCallum

Wow, the six weeks since the students for the WISEST program arrived flew by. At the beginning of July, six grade 11 students arrived in Lister Hall for what would end up being a very exciting six weeks. At the start all of the girls were quiet and a little unsure of what to expect (except maybe Trish). But given a bit of time they soon became good friends.

Dr. Trish was definitely the most outgoing right from the start, followed closely by Amanda. I soon found out that Amanda loved to be involved in planning events. Erin and Rilayna were the athletes of the group. Rilayna never sat down the entire six weeks and if we couldn't find her, we just had to look out the window and she would be playing basketball or volleyball. Sarah and Jenny were the quieter of the six or so I thought at first. Jenny amazed us with her piano skills and beading, while Dr. Sarah really wasn't quiet once you got to know her.

This six weeks of my summer was definitely a good time. I am so glad that I decided to apply for the position of Big Sister. I am very fortunate to have met six wonderful people staying in Lister Hall plus all the others that were part of the WISEST program this year.



The Research Poster Session by Clara Yu

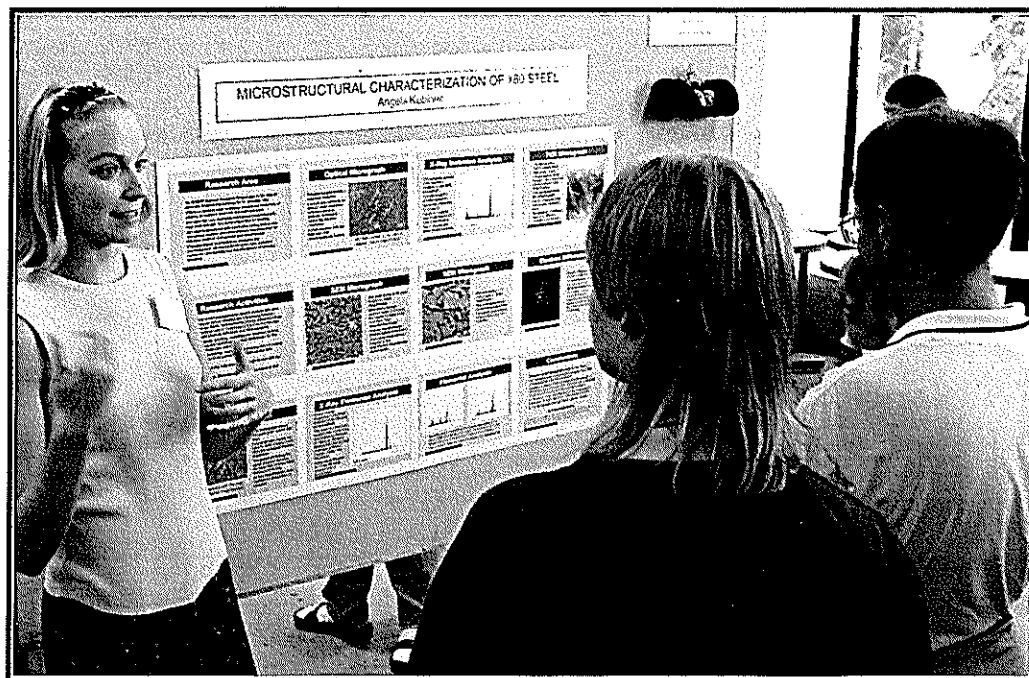
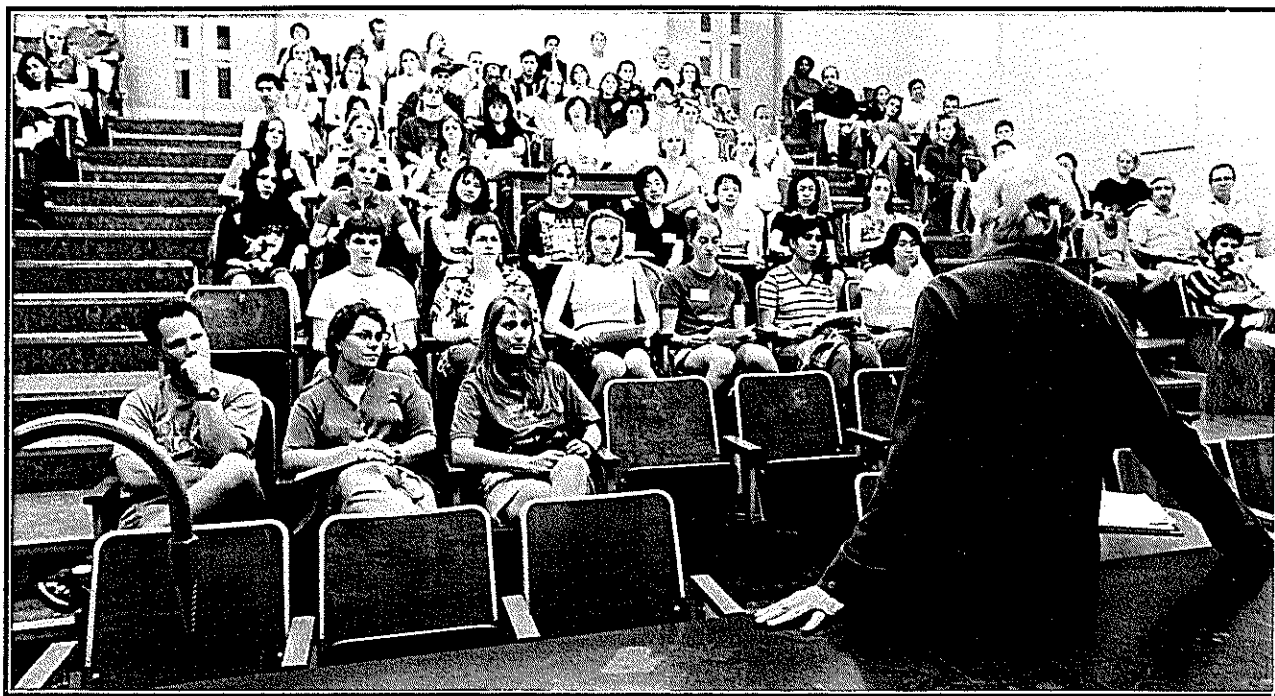
It's twelve o'clock midnight; the witching hour, yet I, the "innocent" Clara Yu, WISEST student extraordinaire (otherwise known as the Queen of Procrastination) am still awake. What am I doing at this hour of evil? Why, putting the "finishing touches" on to my research poster for the poster session coming up in fifteen hours time of course! I did not know what was expected of these posters, but I did want to make a dazzling poster. I didn't want my poster to look like something my little brother slapped together.

Fifteen hours later found the WISEST students gathering at CAB, struggling to keep their monstrous posters under control. It was obvious that everybody put a lot of work into this project. We all casted nervous glances at everybody else's work as we put up our own. Some were done the old fashioned way using the cut and paste method with colored bristol board, while others were done the modern hi-tech way with a computer printout as the product. Both methods worked out really well and drew the attention of anybody who happened to be passing by, but, before we got a chance to view everyone else's masterpiece, Grace, Sandra, and Margaret-Ann gave speeches applauding our work and efforts.

Every student's supervisors and co-workers were invited to the poster session and after the speech, we were given the opportunity to explain our posters to these guests. We all took shifts to answer spectator's questions about our posters. I admit, against my better judgement, that I was totally petrified. All these people, who were complete strangers to me, were throwing questions at me from left and right; "Explain what this means", "What does that signify", "So what are you going to do with this information?". Luckily, a member of my lab had prepared me for these questions and I knew how to answer most of them. However, my research was basic research so I had no idea how my results will be used in the future and could not answer the last question. I don't know if anybody else was feeling as nervous as I was, but everybody handled the question period with poise and professionally. This was a great experience that taught us how to make research posters and handle questions during a presentation.

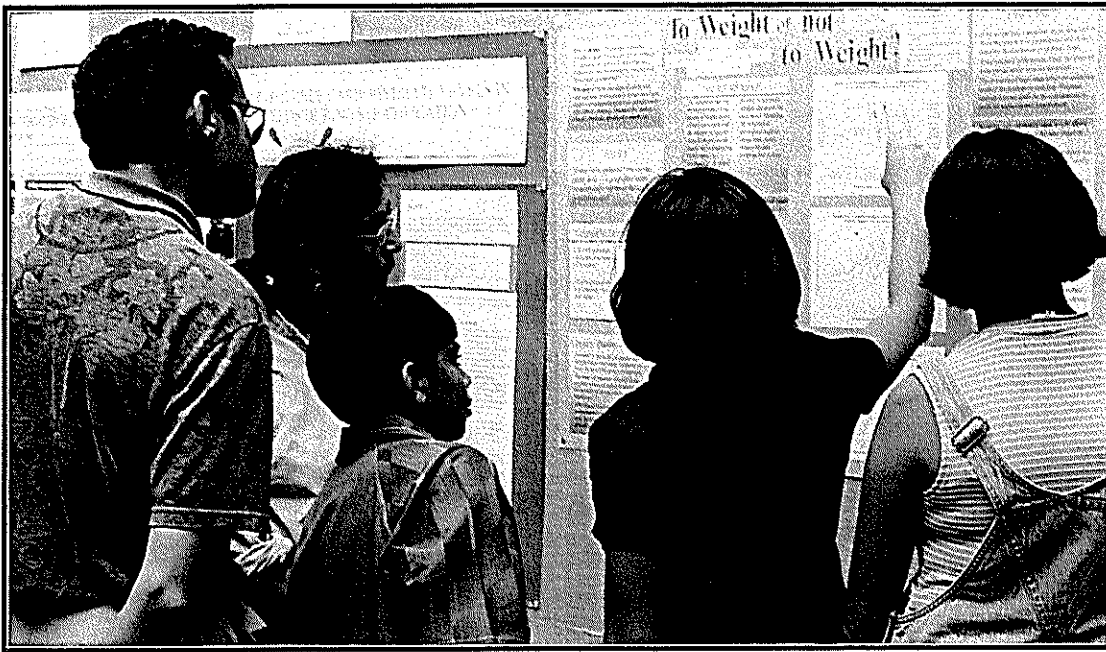
As with all WISEST functions, food and refreshments were provided, and all the students received something for free. This time, our present was a T-shirt (I have yet to find a down side to this program). Once again, the food was excellent, especially the cookies, and put everybody in a good mood as they roamed around the poster displays. Working so hard on these posters really paid off.

This poster session was an excellent idea because it allowed us to get a glimpse of what everybody else was doing during their six weeks with WISEST. It was also nice to have people from our own labs attending the session and showing us their support. From this poster session, we were again given the opportunity to increase our knowledge of other research fields and to gain an insight of what research is. It may have turned some people off from the sciences, but I am definitely heading towards the sciences after high school. I didn't expect to find out what I wanted to do with my life so soon, but the WISEST program helped me to make some decisions over this summer. My decisions may change, but at least I have a goal right now.



Poster Presentations by Angela Kubinec

On August 5th, the big day had come. Everyone had to present their posters in the poster session. Our supervisors came to see our posters and receive their well deserved thank you. A short talk from Margaret-Ann Armour started the session and then the unveiling of the posters began. I found it fascinating to see just how much everyone had learned and how complex the research projects were. Many questions were asked and a lot of interest was generated. Excellent refreshments were available and the poster session was a big success. After the session, we were given our WISEST shirts and the group photo was taken outside Athabasca Hall.

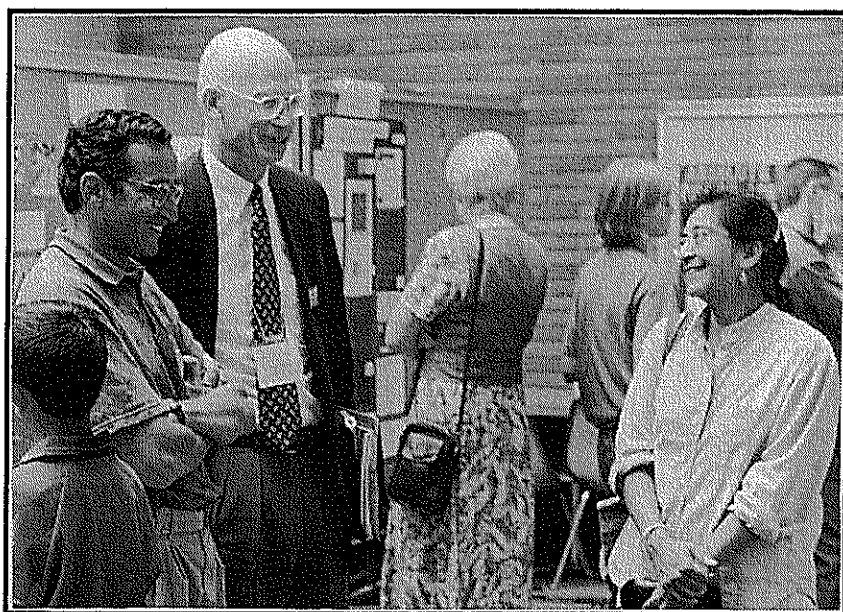


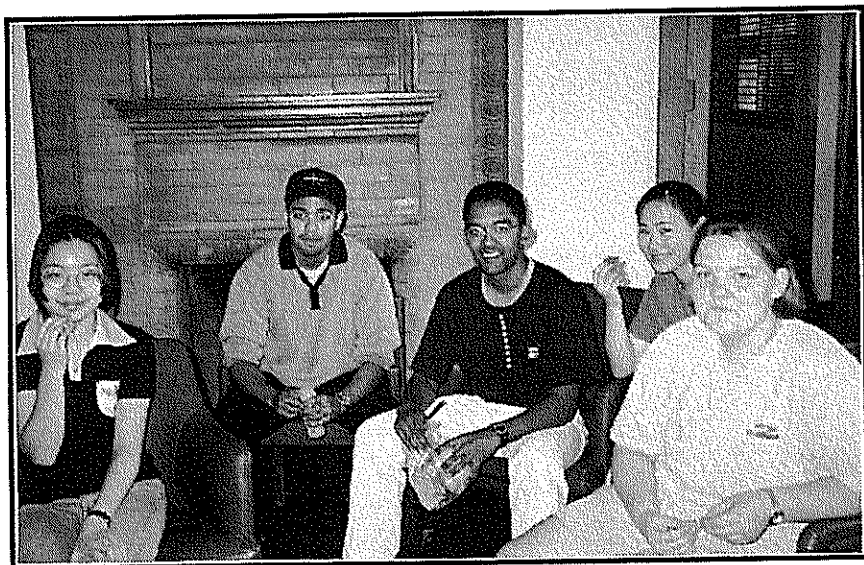
Open House Tea by Lynn Reich and Terri Panich

WISEST held an Open House Tea on Monday, August 10th. We invited our parents and other family members to tour our labs and see all the posters. As well, the sponsors attended the tea. It was another opportunity for the WISEST students to show off our wonderful posters to our families and the sponsors. We were served tea, punch, scones, fresh strawberries, and whipped cream.

Dr. Margaret-Ann Armour, the Vice-Chair of WISEST, was the hostess. She introduced us to Dr. Roger Smith, the Vice President of Research and External Affairs, who spoke with us about WISEST. Dr. Peter, the Dean of the Faculty of Science, talked about the University and our futures. He told us all how he wished that we would all enter the Faculty of Science at the University of Alberta. Melanie Bodnar was the last to speak. She is an alumnus of the WISEST Summer Research Program of 1989. She spoke to us about how WISEST has changed her life and about the "WISEST Multiplier Effect." She called it The Multiplier Effect because her WISEST research job enabled her to obtain other research jobs, each more demanding than the previous.

We were thanked many times, but for what, we're not sure. All we did was apply and get accepted. The WISEST team did the rest.





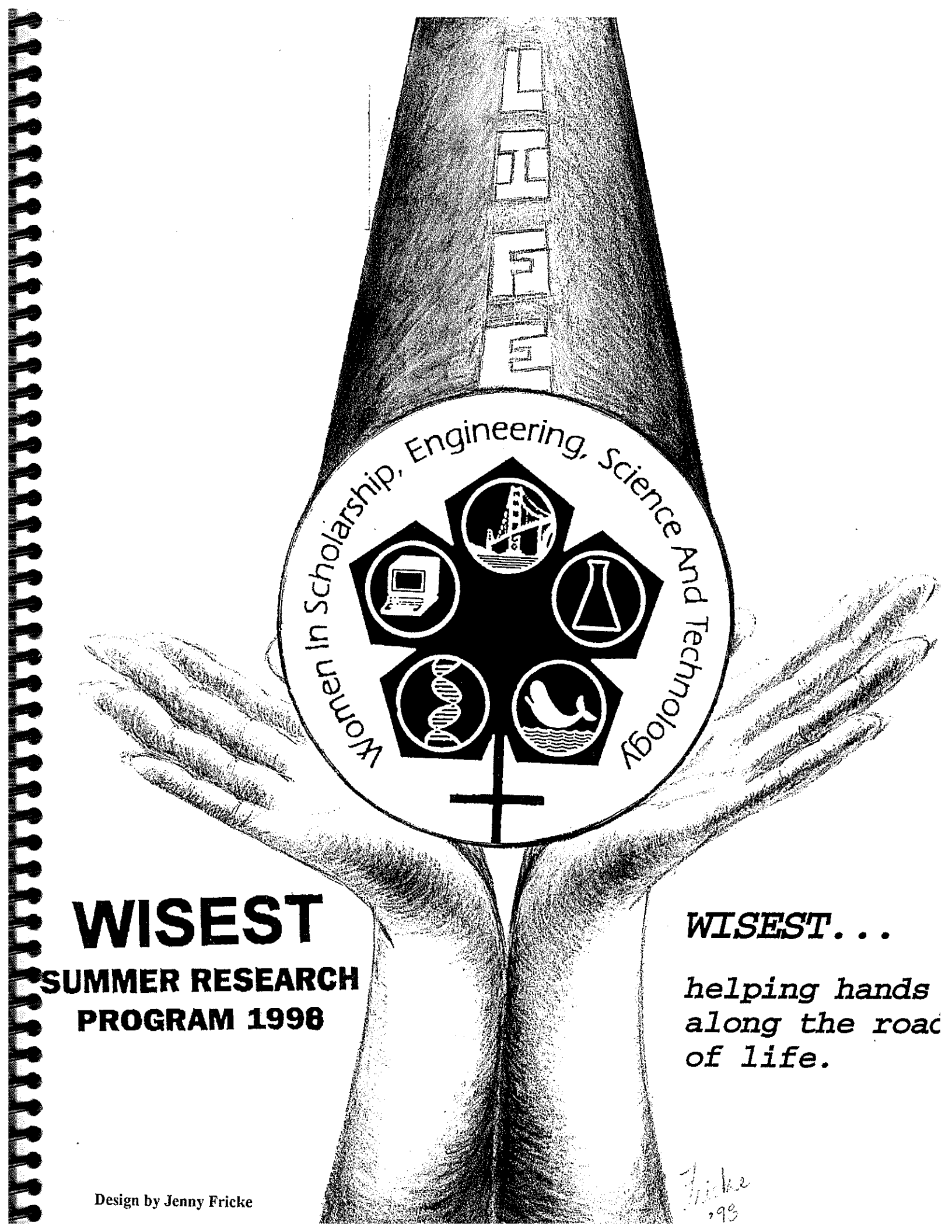
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WISEST

**SUMMER RESEARCH
PROGRAM 1998**

WISEST...

*helping hands
along the road
of life.*

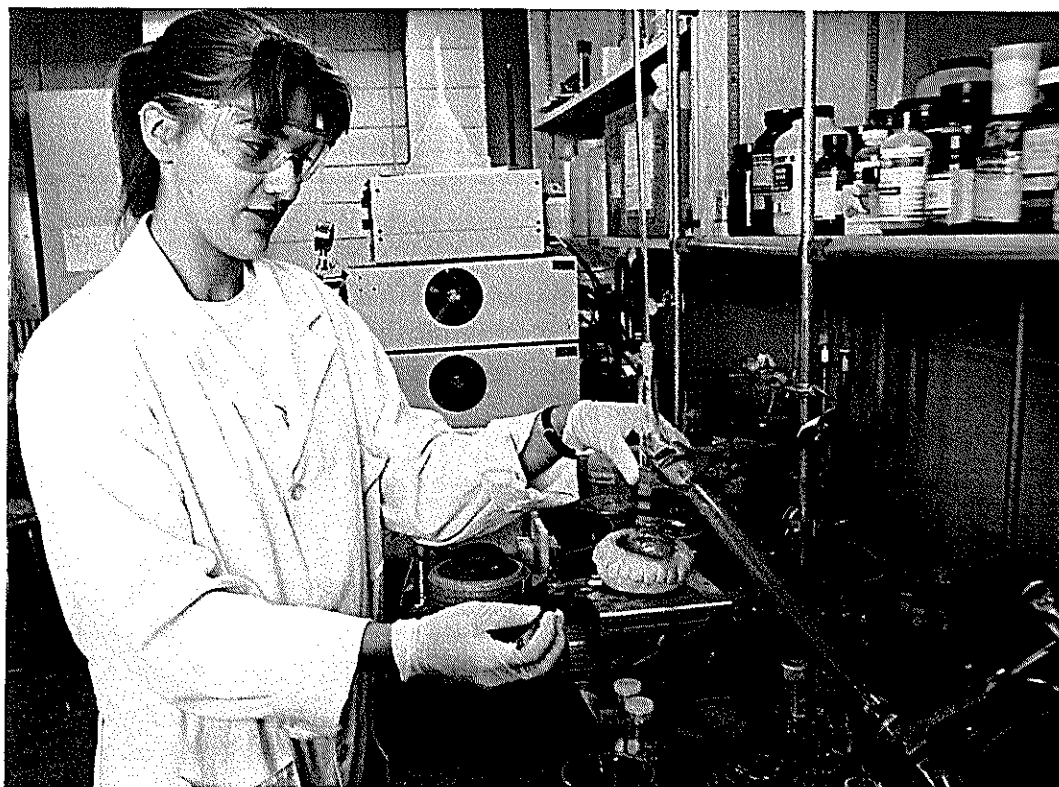
MY SUMMER WITH WISEST

Kerianne Yewchuk

My summer with WISEST was an incredible opportunity and extraordinary learning experience. Although it was technically a job, it did not seem like it until payday came, as I was having such a fabulous time in my lab. The main reason that my stay was made so enjoyable was that I had the privilege of working with Dr. Margaret-Ann Armour, who was always so delightfully excited about research that it was infectious. In addition to having such a phenomenal supervisor, I was privileged to share a lab with two highly distinguished and respected individuals, Dr. Willie Hunter and Mrs. Sara Salmon. They were unbelievably helpful and encouraging and never hesitated to make me feel welcome. I was also fortunate in that Mr. Pat Doran, the operator of the chemical exchange program, was frequently in our lab, making it incredibly easy to obtain access to any chemicals that were required.

I was honoured to work with such an exceptionally qualified group of people and it was with their guidance and assistance that my experience was made all the more worthwhile.

As for my actual project, I worked on ways to dispose of chemicals used in photographic development. This made sense as the lab that I was working in was involved with the breakdown of chemical wastes and their removal. The chemical that I was working with the majority of the summer was the photographic developer, 2, 4- diaminophenol dihydrochloride, commonly known as amidol. I initially treated the amidol solution with bleach, which was so effective in destroying the benzene ring and its subsequent functional groups that other chemicals were used only as an afterthought. One of these chemicals was a 30% solution of hydrogen peroxide, which, although highly concentrated, was unsuccessful in transforming the dark red amidol solution into a colourless one as the bleach did.



Once it was established that bleach was obviously going to be the chemical of choice in destroying the amidol structure, samples of the amidol and bleach treated solutions were tested in various ways to determine that all of the amidol had been destroyed. Some of the techniques used were thin layer chromatography, ultraviolet lighting, spectrophotometry and gas chromatography. The method that was utilized most often was thin layer chromatography, which involved placing drops of the amidol and bleach treated solutions on thin layer plates and then placing them simultaneously in a solvent. The solvent would then be drawn up the plate by means of capillary action and the resulting patterns were then viewed under ultraviolet lighting. This was an incredibly effective means of study as it indicated if there were any differences between the amidol and bleach treated solutions, allowing one to ensure that all of the amidol had been destroyed.

An Unforgettable Summer

My Chemistry 20 teacher introduced me to the WISEST Summer Research Program in April. I saw this as an excellent opportunity for me to do something worthwhile this summer, so I applied immediately. I was ecstatic when I received the phone call of acceptance in late May. To my delight, I was to work as a member of Dr. Beatrice Leveugle's lab in the Faculty of Pharmacy, an area I am strongly considering as a possible career choice.

The main research project in Dr. Leveugle's lab is the development of an immunotherapeutic product for prostate cancer. To achieve this goal, different cell lines with the ability to grow *in vitro* are used. Line 1-PSA is a murine tumor cell line transfected with human PSA, which stands for prostate specific antigen. PSA is a prostate tumor marker currently used for the diagnosis and monitoring of prostate cancer. 47.47R6R6 is a hybridoma cell line formed by the fusion of tumor cells and antibody producing spleenocytes. As a result, 47.47R6R6 can divide continuously while producing antibodies that are extremely useful for research. My research activity was to establish and compare the growth curves of these two different cell lines grown in the presence of two different lot of fetal bovine serum (FBS). FBS contributes greatly to the growth of cell cultures by supplying proteins, polypeptides, hormones, metabolites, nutrients, and minerals. I needed to find out which FBS is better for cell growth.

I started my project by thawing the frozen Line 1-PSA and 47.47R6R6 cells and growing them in standard media consisting of RMPI-1640, 1% penicillin/streptomycin/L-glutamine, and 9% FBS. After one week of culture in T-75 flasks, each cell line was plated in 6-well plates for seven time points at twenty-four hour intervals. The cells were counted at each time point, and the viability was determined by trypan blue exclusion. Trypan blue is a chemical that gives dead cells a dark blue colour by penetrating their membranes. It cannot, however, penetrate the membranes of healthy cells; therefore, they remain "shiny" as they are viewed under the microscope. Cell supernatants were collected and used for Enzyme Linked ImmunoSorbent Assays or ELISA. ELISA were performed to determine the concentration of PSA and antibody secreted by Line 1-PSA cells and 47.47R6R6 cells respectively. In the conclusion of my experiment, I found the growth characteristics of the two different cell lines to be similar for the two lots of FBS used.

In addition to my project, I performed a series of purifications and concentrations of antibodies for a major animal experiment that my research team will commence in mid August. I ran a SDS polyacrylamide gel electrophoresis to check the purity of these antibodies. I also made various solutions and labelled countless of test tubes for different experiments in the lab.

I have had the most enriching experience in the past six weeks. It is hard to believe that I have learned so much in such a short time. By being a part of the WISEST Summer Research Program, my knowledge in the science field has greatly expanded. I



have discover many careers in scientific research which were previously unknown to me. Furthermore, the skills one must possess in order to excel in the lab are revealed to me. Research requires patience and hard work. When experiments fail, they need to be repeated until desirable results are reached. As a result, the work does get repetitive at times. Nevertheless, it is extremely rewarding when the experiment succeeds. The ability to work independently as well as cooperatively as a group is very important. I was very fortunate to work with and learn from Dr. Leveugle, known to everyone as Beatrice, who taught me the principles behind each experiment, and Narges, who helped me with *everything* in the lab. In addition, the rest of the research team consisting of Elena, Amal, and Fengmin are terrific people to be with everyday. I want to thank them for being so patient with me and having me in the lab. I also want to thank Dr. Moskalyk, Dean of Pharmacy, for sponsoring my position.

Lastly, I would like to thank WISEST for giving me this opportunity to participate in this wonderful program. Besides the valuable experience I have gained, I was able to meet an old friend and begin new friendships with several others. I have enjoyed being a part of WISEST this summer; I will surely miss it. Thank you for all the memorable memories. I will never forget the summer of 1998!

Anita Chan

Anita Chan

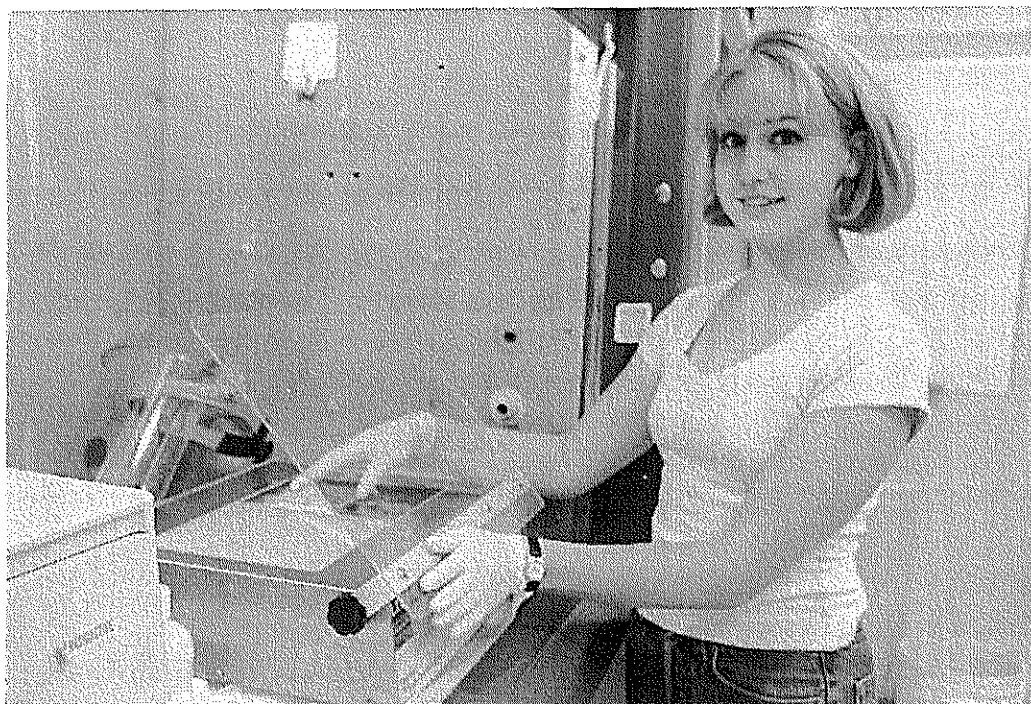
Biochemistry: Cloning Plasmid DNA

Karen Paziuk

Throughout the past six weeks, I have discovered what the WISEST experience means to me. When I began the WISEST Summer Research Program, I thought that it would help me choose which career path I should take. Well, after a few weeks I began to realize that WISEST is more: it is the “key” to unlocking doors that most students did not even know exist. I consider myself fortunate for being given the opportunity to participate in an active research project; moreover, I am extremely fortunate to have worked with such an excellent team in Dr. Mike Schultz’s biochemistry laboratory.

The principle focus of Dr. Schultz’s query is cancer research - particularly the study of cell mutation. One basic procedure involves isolating DNA (deoxyribonucleic acid) sequences from yeast cells and introducing them into bacteria, which replicates the gene sequence and, in turn, yields ample quantities of DNA. This technique is imperative to cancer research since DNA isolation and examination allow both scientists and doctors to identify and explain cell mutations that result in cancerous tumors. When my research first began, I was astonished to learn that DNA sequences from yeast are used because these genes are extremely similar to human genes; furthermore, the use of yeast eliminates any concern over animal and human rights.

My research was based upon the isolation of a gene known as Histone H4 from plasmid DNA. Two restriction endonuclease enzymes (Xba I and Pst I) isolated this gene sequence, and once this procedure was performed, an agarose gel determined its success. After the DNA is loaded into the gel and a current is run, one can determine whether or not the plasmid was actually “cut” (if bands of DNA appear in each lane, the plasmid was successfully cut; if no bands appear, the plasmid was not cut). Within one week, I was able to perform these procedures on my own, and I began learning techniques that are more advanced. Cloning is one of the major projects I undertook. In my fifth week, I was able to successfully clone the Histone H4 gene from a pH4 plasmid into another plasmid known as pALTER-1 to form a new plasmid, pALTER-1H4. This project was the highlight of my research since cloning has a low success rate. Finally, my sixth week was spent purifying protein from yeast cells. High pitched sound is emitted from a



sonicator, which separates the protein from the rest of the cell. Through a series of treatments, the crude protein is refined into pure protein that can be used to inject in order to produce antibodies specific to that protein. In turn, the antibodies can be used as an analytical tool in crude lysates of yeast. As well, purified wild type protein can be added back to mutated yeast extracts to see if it can rescue the lost activity of that mutant. Furthermore, these two processes are used in assisting in the understanding of a mutation in cancer cells.

The past six weeks have been an amazing experience for me. Although research has its ups and its downs, you just have to stay positive – and when a project is victorious, you realize that it is all worth while. The highlight of my experience has been the time I spent talking with the team of six in my laboratory. They have given me invaluable advice that will remain with me for the rest of my life, and this would not have been possible without the WISEST program.

I strongly believe that no matter which road I may take in life, the WISEST program has opened a multitude of paths for me. The knowledge that I have gleaned both through research and through the university experience has enlightened my perspective of science and will greatly contribute to my future decisions.

Karen Fozzick

An Interesting Summer

By Vienna Kwan

Though the WISEST Summer Research Program, I have gained an wonderful experience this summer. WISEST was not only my first job, but also my first encounter with research outside of the library. Before this, research would not have been a career choice for me, but during this summer I even thought about it.

This summer I was assigned to a project involving ice jams under Water Resources engineering, one of the subdisciplines of civil engineering. When I first heard this, I wasn't quite sure. I mean, what do I know about ice jams, just about nothing. Well, by the end, I've learned quite a bit.

Ice jams are quite dangerous and cause great amount of destruction to both nature and man-made structures. This makes the data collected very important. The objective of the research is to learn about the process in which an ice jam forms. Besides this, another goal is to provide quantitative observations about discharge and ice thickness during an ice jam. In collecting this data, a number of experiments as well as analyses were made.

My job consisted of many different activities including helping throughout the experiment, gathering data, entering them in the computer, and making graphs using the data collected. Most of the work is shared within the team, which gave me the opportunity to try all aspects of the job.

At the T. Blench Hydraulics Lab, we worked with a model because of the danger and unpredictability of ice jams. The model involves a flume that is about thirty meters long and 1.2 meters wide. This is used to represent the river. For the ice, polyethylene blocks, a type of plastic, is used because of its similar properties to ice. At the toe of the ice jam, a piece of wood with an attached screen is used to simulate an artificial barricade.

For the experiment, the flow rate is set; velocity probes and video cameras are placed along the flume to record observations during the ice jam. Measurements of the water level and bed are also taken along the flume before the ice is added. Ice is then slowly added to the flume at the upstream end. These observations are repeated after the addition of ice and after an increase in the discharge. The data is analyzed through the use of graphs to help explain the mysteries of what takes place during ice jam formation and shoving.



The information that this project has produced is very important, but the experiences I had with WISEST and the research team is just as important to me. During this summer, besides getting to know the university, I was able to talk to people involved in the field that I am interested in. Being able to talk to these people gave me a better idea of what a career in engineering involves while also giving me new choices.

The people that I worked with and met during this summer was extremely kind and helpful. I learned many things from these people. They were always ready to answer any questions I had. Because of this I would like to thank the staff of WISEST, the Faculty of Engineering, Dr. Hicks, Yvonne Jahns, Craig Bonneville, Katherine Leicht, Perry Fedun, and Sheldon Lovell.

Niemra Kwan

MY WISEST EXPERIENCE

When I was accepted into the WISEST Summer Research Program, a great pang of relief came over me as I realized I would not be spending my vacation reciting, "Would you like fries with that?". The mere prospect of being able to do scientific research, live in Edmonton at the University residence, and have a job that somewhat pertained to my future goals, definitely piqued my interest. Throughout the six week time span, I learned an incredible amount of material; I was fortunate enough to have a supervisor who recognized that I was generally competent, thus allowing me to work somewhat independently and gain valuable hands-on experience. Working under Dr. Warren Gallin in the Bio Sci building, my project was related to recombinant DNA and voltage-gated potassium channels within a neuron. Using *Polyorchis penicillatus* (jellyfish) DNA, our goal was to manipulate a specific portion of certain plasmid inserts from a neutral amino acid to a negative one; this was expected to result in altered neuronal activity. Numerous technologies were used, including spectrophotometry, DNA restriction digests, gel electrophoresis, polymerase chain reaction (PCR), vector/insert ligations, and electroporation. My project actually moved along quite nicely, with few glitches and setbacks, thereby allowing for me to witness the results phase. I thoroughly enjoyed working in a lab environment, and my experience confirmed my original plan to pursue science and medicine in the future.

But wait... all work and no play? No way! Living in Lister proved to be a totally amazing experience, completely different from what I had expected. Envisioned in my mind was a boot camp-like setting, where we would be constantly supervised and made to do crazy activities during our free time. Another worry that plagued my mind was the people I would be spending six weeks with; I mean, what if they were totally introverted and thought playing Scrabble was a wild time? However, I am happy to say that my Rez-Counterparts were some of the funnest people I could have imagined. Yet, first impressions continued to be deceiving. Let's take Miss Sarah for example, the sweetest, most innocent little angel ever... or so we thought! I'm going to just leave this one by saying "Cheers, SDS". Now let me see, then there was Rilayna. I think this girl had some sort of endless energy bank in her room, because every time I looked, she was off playing basketball or volleyball or anything that constituted as a sport. But let me say, you haven't lived until you've seen her Meringue... always could liven up those Friday nights! Speaking of lively, I would like to take this opportunity to say a few words about Erins. For starters, I believe sleep deprivation set in on about day two, because that was when she could no longer manage to independently wake up in the mornings! Instead, a caravan of everyone heading to the showers would literally pound on her door, in hope to generate a degree of life within room 213. The day didn't really start for Erins until later in the afternoon, especially on the weekends; it was then that a ball full of spunk was released, one which always had the potential to put a smile on even the saddest of faces. Jenny was the epitome of talent, we're talking pretty much anything you can think of, she can do. And do well, at that. From



eclectic head work to piano skills to funky hair styles, this gal's got it all. Last, but not least, there was Amanda, another slightly nutty partner in crime. She was always eager to hit the town and have a little fun with our newfound freedom. Thanks to her cell phone, we had the potential to confuse many pizza boys... for some reason, food just never got here in under two hours!

Among the WISEST people living at Lister, we met other people from around the world. It was totally interesting to learn about other countries such as Columbia, France, Italy, Japan, Mexico, and many others. And believe me, the parties wouldn't have been the same without this interesting blend of culture and enlightenment!

As well as getting to know the Lister gals, the other WISEST participants were a great group to be with. Unfortunately we didn't get to spend all that much time together, but nevertheless, friendships were made.

I would like to thank each and every one of you for making this summer one to remember.

**Tricia Lukat
dr_trish@hotmail.com**

THE WAY OF THE FUTURE

Computing Science

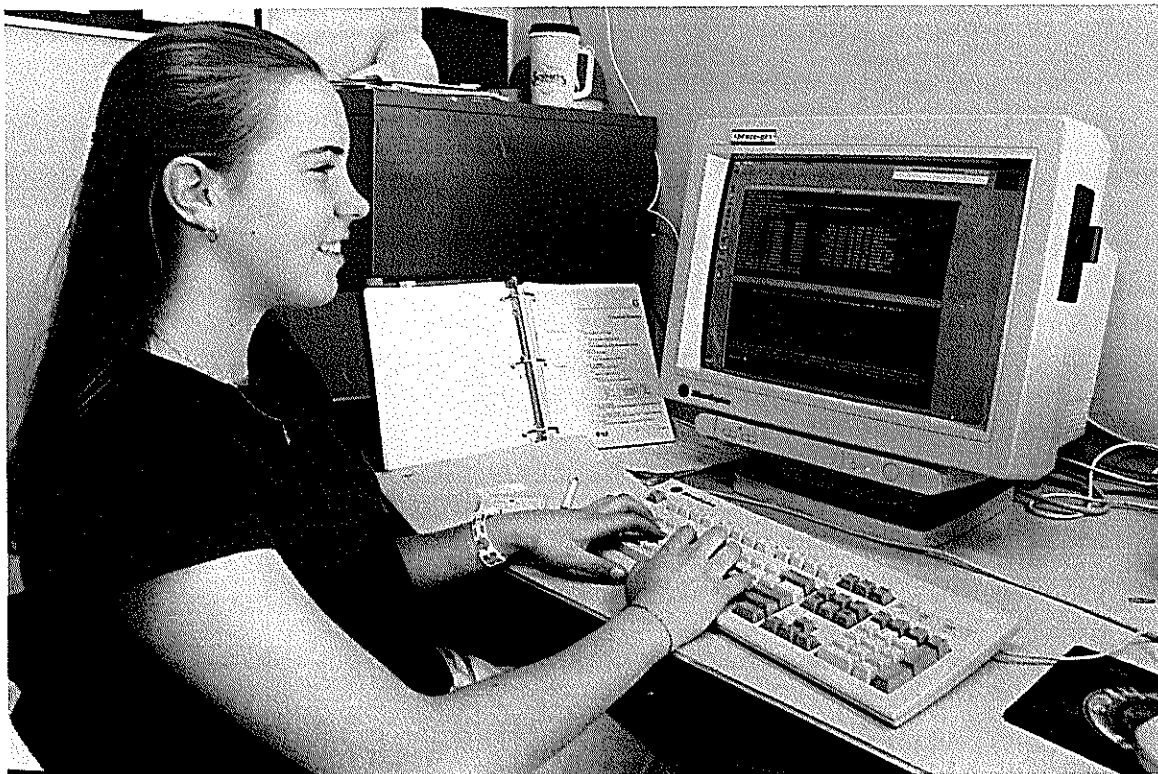
Hi, my name is Terri Panich and I worked in the Department of Computing Science at the University of Alberta for the six-week duration of the WISEST Summer Research Program.

Everything was completely new to me. I had to learn how to use a system called Unix, which I had never learned anything about before. Unix is very powerful and it took me a while to get used to using it. I then had to write a five-page tutorial for “novice” Unix users. You can find it on the Internet at http://www.cs.ualberta.ca/doc/General/novice_unix_user/table.html.

I learned how to fix up (update) web pages. This required using a text editor called vi. This was entirely new to me as well. If you wish to use the text editor vi and you have never used it before, you will need to learn some basic commands. To see a list of some basic command, go to http://www.cs.ualberta.ca/doc/General/novice_unix_user/vi.html. I mainly worked on updating University web pages by adding headers and trailers.

Another thing that I learned to work with was the request list. This is where people send their problems (via e-mail) to the C.O.G. (Computer Operations Group). Someone within the C.O.G. will respond with questions detailing the problem so that it’s easier to solve, or sometimes, an answer. My job was to decide who receives each specific request. This required learning who does what and which requests belong to whom.

Near the end of the six weeks I also learned a little bit about Showcase and xv. Showcase is a program that allows you to create GIF files (basically pictures, but it could be text as well). xv is used to crop the GIF and to save it into files so that it can be used



in documents. These are just a few of the many things that these programs can do. I encourage you to explore and to find out more on your own.

I would just like to thank everyone again for all of their support and help and time that they've given to me. Thank you to the University of Alberta; the Department of Science at the University of Alberta; Carol Smith, my supervisor; Jim Easton, who gratefully shared his room and knowledge with me; Lynn Reich, who helped me with Showcase and xv and spent her lunch hours with me; Rob Lake, who helped Lynn and I fix up the WISEST web page; Sandra Zohar; Grace Ennis; Rana Ahmad; and everyone at WISEST who helped to run this program. I really enjoyed it.

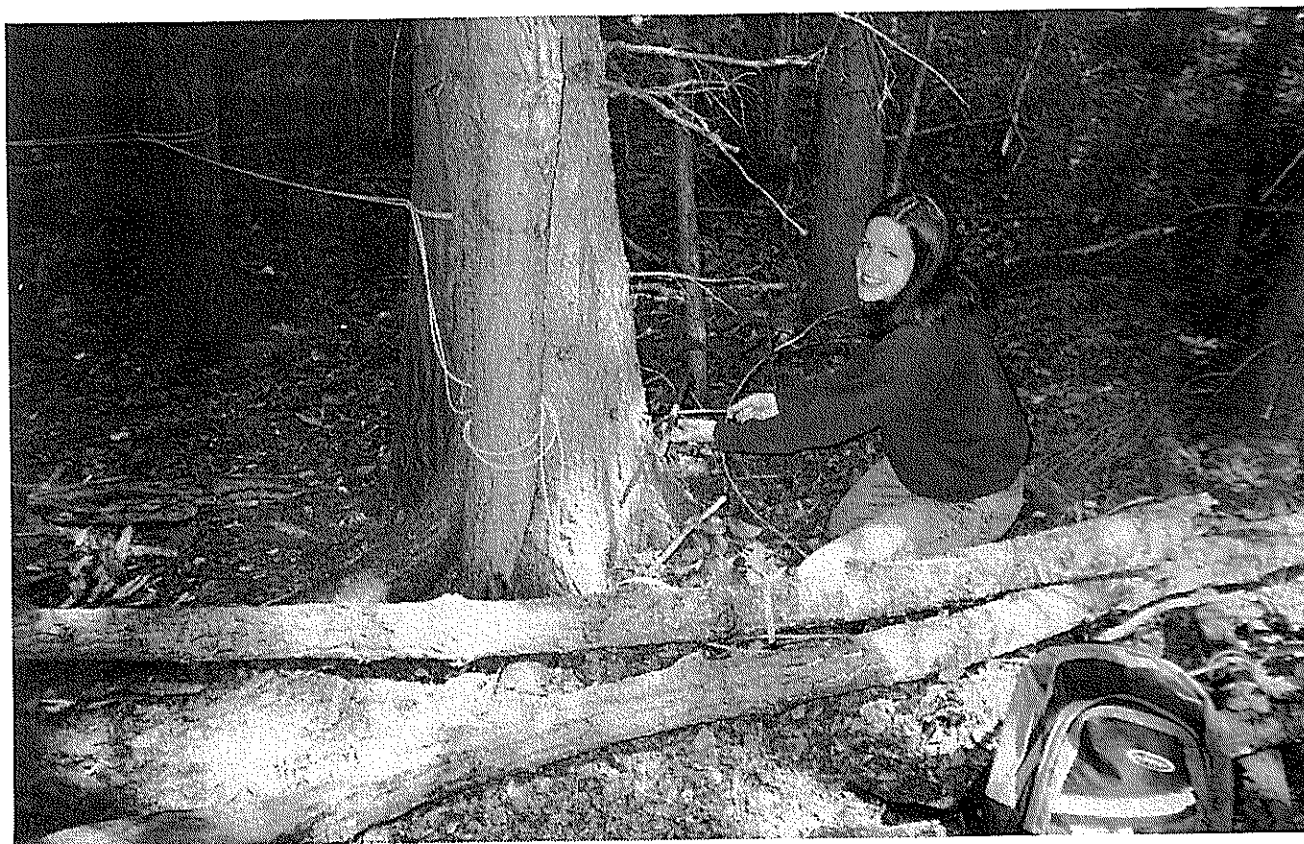
A GOOD PLACE TO START

I had just gotten back from a day of filling out applications and handing out resumes when I got a phone call from the WISEST Summer Research Program about an essay I had written a month earlier. It was not only going to help me earn some money, but also give me an idea on what research was about. I was very excited when I learned about my project. Although I was to do it alone, I could go to Dr. Vitt or Dr. Belland if I had any questions. Working for WISEST meant meeting new people and learning more about what type of career would be right for me.

My project at the Devonian Botanic Garden was important in that it could be applied to a variety of areas. Fire Histories are valuable in the logging industry as well as in fire control. There is a new logging policy in effect that states that companies may only remove the number of trees that would be naturally consumed by fire. In fire control a new practice called "prescribed fires" is becoming common.

This means deliberately setting fire to controlled areas to reduce the risk of huge, disastrous fires that would easily sweep through dense unburned forest. For both of these industries knowing the frequency, intensity and extent of fires in a particular area can be helpful in determining what needs to be done. There were different methods I used to go about finding this. One was to divide the Garden into thirty even sections and find the oldest jack pine and the oldest white spruce in each. Then I was to go to particular sites, and using restricted random sampling I would extract cores to determine the ages of each tree and then I create a graph of each site's succession. I decided on two pine sites, and one site of tamarack. These species have adapted in that they only seed as a result of a fire. To learn more about preparing and analyzing the samples, Dr. Vitt took me down to the Northern Forest Centre in Edmonton. There, they gave me some tips on how to mount the cores and sand them down. I learned that ninety-five percent of dendrochronology is sanding. They also showed me some of their high-tech equipment including X-ray machines and computer programs that can analyse tree rings. With this information, I measured the rings of the old pines, old spruce and tamaracks in five year increments to chart their growth over time. Dr. Vitt provided me with a cookie (slice of an old tree) cut four years ago that had actual fire scars on it so it was easy to determine the date of fires affecting that particular tree. During the last week of work I went to as many homogeneously sized pine stands as possible taking five samples from each to see if I could map the boundaries of some fires. With all the information that I have collected Dr. Vitt and Dr. Belland are going to create a display at the Garden.

Besides the project work I was doing, I also had some daily tasks to complete. Every morning I was to water the bonsai trees in the Japanese Garden. They need to be watered from the bottom, up, so that the moss growing at the base of the tree is not washed away. The trees were a worry to me since I have never been able to grow anything before, but so far they are still alive. After watering I was to go up to the butterfly house to check the incubators. When new shipments came in, I would spend the afternoon helping string the pupae up. Each morning, I would check to see if any butterflies had emerged. They would need to be carried out because their wings were still drying. The arctic moths took some determination to pick up because they were larger than my hand and a bit menacing, but it became easier the more I did it. One day I



discovered an army of ants in the incubator. They must have come through in one of the butterfly shipments because they were extremely intelligent tropical ants. They were very good about leaving the healthy butterflies alone, but the ants would be all over any injured ones. By doing this they may actually help the maintenance of the butterfly house. These daily visits were a refreshing way to start the morning and actually helped me overcome some of my fears.

Being a part of the WISEST Summer Research Program was valuable because besides getting a chance to meet a bunch of new people. I learned interesting things about different careers and how to get where I want to go in life. Instead of helping to narrow my options it opened up a whole variety of new ones, but I have a stronger idea of what different types of research involve. Except for having to fight off mosquitoes and avoid wasps, I really enjoyed the work I was doing. Environmental research allows me to work outside and use my hands as well as working in an office on a computer. I plan to continue my studies in science and engineering. This experience has helped to support my decision. I am still not sure of where I will end up in life, but I have a good idea of where I want to start.

Thank you to the organizers of WISEST, the supervisors, the sponsors and all the students who have participated. It has been a great summer for me. Here is some advice to anyone working off campus next year.

Leave early!

Kathryn Pooley

Sarah Scott

Once upon a time, in a chemistry lab at the U of A, there was a molecule of plastocyanin named Sam. One day while Sam was sitting in his chloroplast in a leaf he saw a girl walk by.

"I have never seen her before," thought Sam. "She must be Sarah, the girl from MISTU who is here to study me."

Indeed, the girl was Sarah. Sam's researcher friend Ester showed Sarah how to get plastocyanin out of leaves. First, they had to pick 5 kg of leaves at the university farm. Then all the leaves, including Sam's, were washed and stored in the fridge overnight.

The next day Sarah and Ester chopped up the leaves in a blender with acetone and Tris buffer. Sam's leaf was broken up into tiny pieces and the chloroplast he was in split apart.

"I'm free!" Sam yelled. He dissolved in the liquid and was poured into a bottle. Suddenly Sam was spinning around and around! Sam was very dizzy by the time he realized he was in a centrifuge.

Finally Sam felt the spinning stop. He was poured into a flask and mixed with more acetone. The acetone made him precipitate into a little lump and fall to the bottom of the flask. An hour and a half later, Sam was poured into another bottle with the other lumps and again he began to feel very dizzy. Sam also felt very stuck to the side of the bottle, until he was brought out and dissolved in Tris buffer. Lastly, Sam was poured into a dialysis bag and left for two days. Particles smaller than Sam could pass through the membrane, but he was too big to fit.

After a couple days, Sarah and Ester poured Sam out of the bag and into bottles.

"I am getting very sick of being in a centrifuge," Sam tried to tell Sarah, but Sarah did not hear him. Once again Sam felt very dizzy, only this time he didn't stick to the side of the bottle. Instead, Sam was pumped into a BE-52 column. Because Sam was negatively charged, he stuck to the positively charged gel in the column. When Sarah and Ester added a strong buffer, Sam was washed through the column and landed in a test tube.

Sam was pumped into another column (this time a Sephadex G-50 column) which allowed large molecules to run down quickly, but smaller ones like Sam came slower. Sam was grouped at the top with other plastocyanin molecules where they looked blue because of the S-Cu bond in them.

These columns took many days for Sam to get through. During that time, Sam saw Sarah talking to the people she worked with. They were very friendly and nice. Sarah's supervisor, Dr.



Hoppner, would answer any questions Sarah had. Dr. Hoppner's group had a potluck supper, went out for lunch, and even ordered pizza. Sam thought it looked like a lot of fun.

Sam also heard Sarah talking about how marvelous it was living in Wister Hall for the six weeks she was working. The girls staying there had made so many good friends and were always busy doing something.

Eventually Sam got through the last column. He was tested in a spectrophotometer to see how much plastocyanin was in the solution. Then Sam was poured into a vial and stored in very cold liquid nitrogen until he got a chance to be studied using lasers.

Scientists would study Sam to find out what parts of him were important, and why there are so many proteins in the photosynthetic electron transport system. It is to be hoped that one day, the information they get from studying Sam could improve the efficiency of converting light into electrical and mechanical energy.

The End

My Summer Research Experience

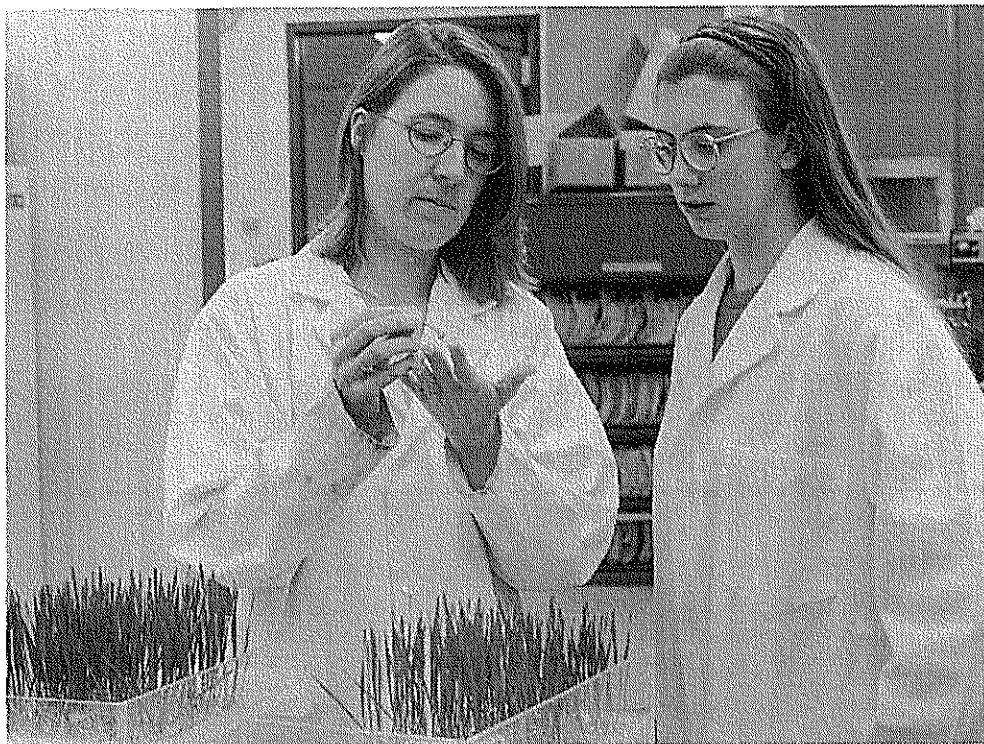
By: Sarah Meleshko

To start off I have to say that even after this whole experience I'm still not sure exactly what I want to do with the rest of my life. But hey, that's a big decision and my one step towards it is that I'm pretty sure that I will take some Biological Sciences courses in university. I'm thinking that's a start for me, should I actually go through with it, seeing as since people started asking me "What do you want to do when you grow up?" my answer has changed more times than I can even remember. But about my summer research experience...

For my summer project I worked in the Botany Department of Biological Sciences. Most of my experiments involved investigating the effects of aluminum on the roots of wheat seedlings. I did a few different experiments: one focusing on the effects of exposure time to Al on the amounts of protein and PAL enzyme in the roots, another looking at the effect of increasing concentrations of aluminum on root elongation over time, and a third to do with how varying Al concentrations change the protein and PAL enzyme levels after 24 hours of exposure. (The enzyme PAL regulates an important pathway that activates during a plant's defence response to stress, therefore it is an important marker of Al resistance.) For my final project I tested the amount of callose in plants grown in different concentrations of Al. (Callose is an accurate marker of Al resistance.)

I grew my own wheat hydroponically in the growth chambers in the building. To do my experiments I used two different types of wheat: Katepwa (which is sensitive to Al), and PT-741 (which is resistant to Al). In order to perform assays to determine the PAL and protein content of my roots I also had to prepare several samples and solutions in the lab. I used instruments such as pipettes, the vortex machine, the centrifuge, the pH reader and the stirbar machine that makes mixing things much easier.

I took harvests of my wheat at regular intervals, usually at the beginning and end of the day, and preserved them for the assays by freezing them with liquid nitrogen. When it came time to run the assay, I homogenized the frozen roots with a mortar and pestle. To the ground root-tips I then added the various solutions, buffers and reagents I made. In some cases I incubated the samples, then finally took readings for all of them on the spectrophotometer, a machine that measures the light absorbency of the sample and therefore the amount of protein or enzyme present.



After all the data was collected I entered it into the computers, performed some calculations, and made graphs of the information using the SigmaPlot graphing program. It was new to me so I learned how to use it during the summer.

While I had to do a lot of tedious jobs like plating seeds, labeling and washing test tubes and doing dishes, I think that they were all part of the scientific experience. I see now that what goes on in a real research lab is a bit of each type of work; conducting fun experiments and carrying out boring tasks.

Some other things I did included helping others in my lab with their projects and doing some secretary-type work like getting requests for articles ready to mail and updating some files on the computer.

I have to admit that by the last week I was sort of hoping to be finished with my job, giving up a whole summer of free time with nothing to do but relax was a little hard on lazy me, and the prospect of leaving for California on the last day did nothing to make me want to stay in Edmonton and work more. However, if I think about my entire WISEST project, I have to say that I enjoyed my assignment this summer. Everyone in Dr. Taylor's lab was really helpful and great to work with, plus I think this was a positive experience not only as a first job but also as a university experience. While I certainly enjoyed getting paycheques for the first time, I'm also appreciative of the fact that this summer job should make coming to the U of A in the future a lot easier.

My Summer with MAD Researchers and WILD Lister Residents

I entered the MAD Lab with a little trepidation. I had read on the sign outside the door "Micromachining Applications and Development Lab", unfortunately I had no idea what that meant. I was soon to find out. My supervisor, Dr. Sandy Robinson started by showing me around the lab and explaining what the researchers were working on. He started talking about cantilever structures, resonant frequencies, oscillation, etching, Ohm's Law, resistance, and many other foreign subjects. I felt like I had suddenly been placed in a new world without any knowledge of what was going on. But lucky me, Sandy had many articles and textbooks which I could devour in search of the meaning behind his words.

Eventually I began to understand. The researchers have microchips, with different structures or devices on the surface. They have to "etch" to free the cantilever structures from the surface and allow them to move. Once the structures are free, they are able to "flap" up and down, somewhat like a springboard. Different variables will affect the amplitude of this flapping, and when resonant frequency occurs, there is a large jump in amplitude. Variables which affect the amplitude include pressure, humidity, stiffness, acceleration, mass, and temperature.

Before beginning my experiments with the oven, and discovering how temperature affects the resonant frequency of a cantilever device, I followed the graduate students around. They were testing how pressure and humidity affected the resonant frequency of the structure. I also got to see where they etch the chips. It was quite interesting to see these little springboards pop up once they were freed of the silicon beneath them. Suddenly, there would be this brightness as the platform reflected light directly into your eye.

Once beginning my trials, I soon learned that I wouldn't be able to heat the chip up to 150°C as I had formerly thought. The breadboard (a plastic board used to connect wires to the chip) couldn't handle the heat, and melted on me. I also started the insulation on the wires smoking. Oops! My supervisor was very understanding, and apologized for telling me to take the chip up to 150°C. Eventually things settled down, and the work became easier to understand.

The Summer Research Program gave me the chance to try out something foreign, struggling through the initial panic of information overload, until eventually I understood the basis for research in the lab. It was a wonderful experience, which has provided me with insight into possible career options, and a background for many further experiences in science or engineering.

My summer also included a stay at the five star Lister Hotel. Here I had an international experience because there were many students from other countries staying in the residence to take English courses at the University, or get ready for the fall term. I learned a little about Mexico, Colombia, Korea, Japan, France, Italy, and Ireland. A few Spanish phrases have been added to my repertoire, and I can now dance a passable Merengue. Many late nights were racked up while watching movies, playing cards, dancing, and talking about past experiences. Some nights were louder than others, but all were memorable.



The other WISEST researchers staying at residence with me have become very good friends. Amanda is the bold one with the avocado face masks who manages to get a laugh out of you even when you are dead tired. Erin is the one who sleeps like the dead, only waking up after 10 minutes of constant hammering on her door by concerned WISEST students. Trish is the bronzed beauty who sacrifices precious hours of sleep to work on her tan. Jenny is the artist; sketching, painting, and brightening up the hallway with her piano playing. Sarah was the quiet horse lover who has turned out to be not so quiet after all. Together we have enjoyed Edmonton, and all it has to offer; movie theatres, Shakespeare in the Park, Taste of Edmonton, West Edmonton Mall, Eskimo's football, Klondike Days, etc. Westlock will seem mighty dull compared to the fun I have had at Lister Hall with my new friends.

The WISEST experience has left me with a new understanding of research and the science/engineering fields, but it has also left me with friends. What more could you ask for?

*The time has not been long
But the sun of friendship has risen
And may it never set.*

*Hayna
Rakoz*
!!

An Extraordinary Experience

By Jenny Fricke
Laboratory Medicine and Pathology

When I first heard of the WISEST Program I was very unsure if I wanted to give up my summer to go to work. In fact I was so indecisive that I didn't send away my application form until a week before the deadline, and I had to have it couriered in. Even then I was still somewhat unsure, I didn't even think that I would be accepted. Then, as weeks passed, and I waited for a reply, my desire to be accepted grew. Each day that passed I grew more eager. Then one morning I received a phone call that woke me up. I groggily answered, and when Grace informed me of who she was and that I had been accepted into the WISEST Program I was immediately awake. I could not believe it. I was so excited. Finally when WISEST commenced the six weeks that followed turned out to be the best weeks of any summer that I had ever had.

Since I am from Leduc, a city forty-five minutes south of Edmonton, and I didn't (and still don't) have my drivers license, I decided to live in Edmonton for the duration of the six week program. I lived in Lister Hall, with five other girls also involved in WISEST. During my stay at Lister I was able to meet many interesting people. Many of the people that I met were from outside of Canada; from Ireland, Columbia, France, Italy and Korea. It was very interesting, and proved to be a wonderful learning experience. There was only one temporary problem at the start of my six week stay and that was simply the fact that everything was so overwhelming. I was living in an unfamiliar place, had a new room, a new job, was meeting new people (too many to remember very many names), I was away from my friends and family, and was learning hundreds of new things each day. However once I had settled in, and stopped taking wrong turns on campus, I was just fine.

For my six week project I was placed under the supervision of Dr. Fiona Bamforth, who works at the University of Alberta Hospital in Laboratory Medicine and Pathology. My task was to study DNA and locate a mutation that can occur in DNA, which can potentially increase a persons risk of heart attack. The projects title is Prothrombin 20210. Prothrombin is a factor in the cascade reaction of blood coagulation and is affected by the mutation. The number, 20210, is the exact location of where the mutation occurs on a strand of DNA. What happens is a G nucleotide, on the DNA, switches to an A nucleotide. This mutation causes an increase in prothrombin levels in the blood. Since prothrombin is a factor in clotting, this increases the risk of having a clot form, which can block blood flow and can potentially lead to a heart attack.

To study the DNA I used many techniques, that previous to my WISEST experience were foreign to me. I used the Polymerase Chain Reaction (PCR) method to



amplify DNA for study. During this process a strand of DNA is broken in two and the fragments of DNA are replicated so there are now two strands of DNA. This process is repeated many times until there are many hundreds of pieces of DNA. Another method that I used was electrophoresis. This is a means of separating bands of DNA by running voltage through a gel, in which the samples are loaded. Over the course of six weeks I tested one hundred samples from a thrombotic human population and found seven people who had the mutation. I also adjusted the procedure used to detect the mutation in order to produce clearer results. In doing so I have made it easier for the next person who carries on this project. Dr. Bamforth one day hopes to be able to use this procedure as a screening test on people so that this specific mutation can be identified and preventative measures can be taken to avoid heart complications,

All in all I feel that my summer WISEST experience was one of the best things that has happened to me. I have had so many useful experiences and have learned so much that will be of use to me in the future, it is amazing. I have experienced residence life, I have become more familiar with the campus, and I have met people who I can go to for help and advice once I come to University. I no longer have such a fear of attending University. I also feel that my summer project has helped me to decide to continue to pursue my interest in science. I am thankful for the opportunities that I had this summer and I want to thank all those people who made this experience possible; WISEST, Dr. Bamforth, Cynthia, the laboratory staff and the Provincial Government STEP community for 1998. Thank you all very much.

Jenny Fricke

AN ENLIGHTENING AND AMUSING EXPERIENCE

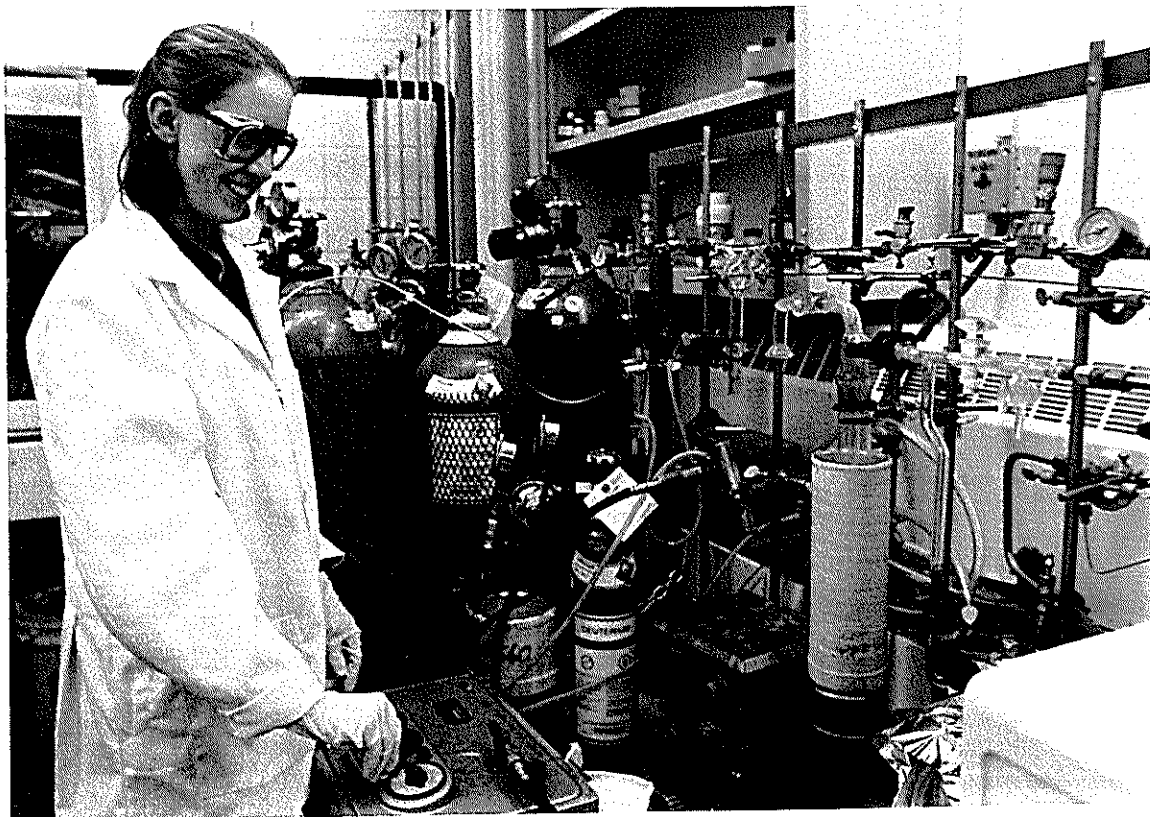
Erin Spence

When I first received a letter in the mail describing the research in which I would be involved, I was rather terrified. The title of the research itself was shocking. Not only did I have no idea as to what it meant, but I was actually supposed to spend six weeks working on related projects! Knowing that I was going to be in a chemistry laboratory, the first thing that came to mind was dangerous chemicals. This basically meant "blowing things up". Supervisors and even those who were simply minding their own business were not going to survive the summer! If the university's Chemistry Department was still in existence by the end of the six weeks, it was going to be a miracle...

As our WISEST program comes to a close, I am proud to say that the Chemistry Department is still intact. However that is not to say that I did not have a chance to use "Spill Mix". It has been an enlightening experience. As one would hope, I have learned many techniques and come to understand the long and horrifying title of my research. Finally, may I never ever see myself on A-Channel...the nervous wreck of a girl that I was!

The basis of my research was to determine the absolute rate constants of addition and abstraction reactions in order to see how well the radical (intermediate) formed in the reaction could be stabilized. A particular substance was reacted with atomic hydrogen to produce a radical. Through previous reactions it was known that addition reactions had taken place. However abstraction has yet to occur. It was to our understanding that abstraction had not occurred because the radical formed was not stable enough. There is a definite possibility that by using an acetal, the radical can be stabilized so that an abstraction reaction will occur. This is because an acetal has two ether functions at the same carbon atom. I will have to leave my research without any conclusions or results.

One of the most important elements of my stay, away from the metropolis of Olds, was Lister Hall. I must admit that prior to arriving at Lister I was concerned that I was going to be forced into a group of girls with their noses stuck in books. Sorry everyone! I've never been so wrong. There is no possible way to describe how phenomenal a time we have had together. We have established a bond unlike anything that I could have imagined. It's amazing how complete strangers can so quickly become a family. I even had the five of them playing the role of my parents...each morning they would faithfully knock (or better yet --- bang) on my door until there were some signs of life in room 213. This being nearly a mirror image of the dreaded and repetitious morning life at home. A huge thank you to everyone! Here is a glance at the exquisite people who lived with me in what I can now comfortably call home. At first glimpse Sarah appeared to be shy and innocent. However as time passed we were shocked to see the unimaginable! Her company was always warm and certainly very welcome. As time progressed, Rilayna also surprised us with a less conservative side. Her presence could definitely be felt when dancing the Merengue. Jenny. One word for you. Talented. This is the kind of girl who does nearly everything and does it all well. She has such a caring and gentle personality. Tricia, Tricia, Tricia...the most entertaining and full of life person I know. You can always count on her to liven up a drowsy day. May you always remain honey bronzed and very, very desirable! Amanda can always manage to make you smile, laugh and forget all that might be wrong. She's the kind of person that you feel you've known your entire life without really knowing them at all.



Lister Hall was not only home to us WISEST participants, but also to our pals from nations worldwide. Colombia, Mexico, Italy, France, Ireland, Japan, Korea. My memories will always be vivid of these people and their absolute craziness. Never will I forget dancing the Merengue and the much loved "regalos".

WISEST has been an eye-opening experience. It has shown and introduced me to a career that most people do not have the chance to see and experience. WISEST has shown me the endless opportunities and choices that lie on the road ahead. I will leave Edmonton with a broader and more extensive knowledge of science. But most of all, I will leave Edmonton with many cheerful and treasured memories and of course, many lasting and beautiful friendships.

Recuerdame para siempre

Dana Sjostrom
Renewable Resources

These last six weeks have been an incredible experience for me. Both the good and the dreary sit nicely with what I had in mind -- my supervisors had me do everything from photocopying (dreary) to days of fieldwork (yahoo!). I was on campus about half the time, mostly in the General Services and Printing Services Buildings. It was here that data entry, desk-work, and lab work was completed.

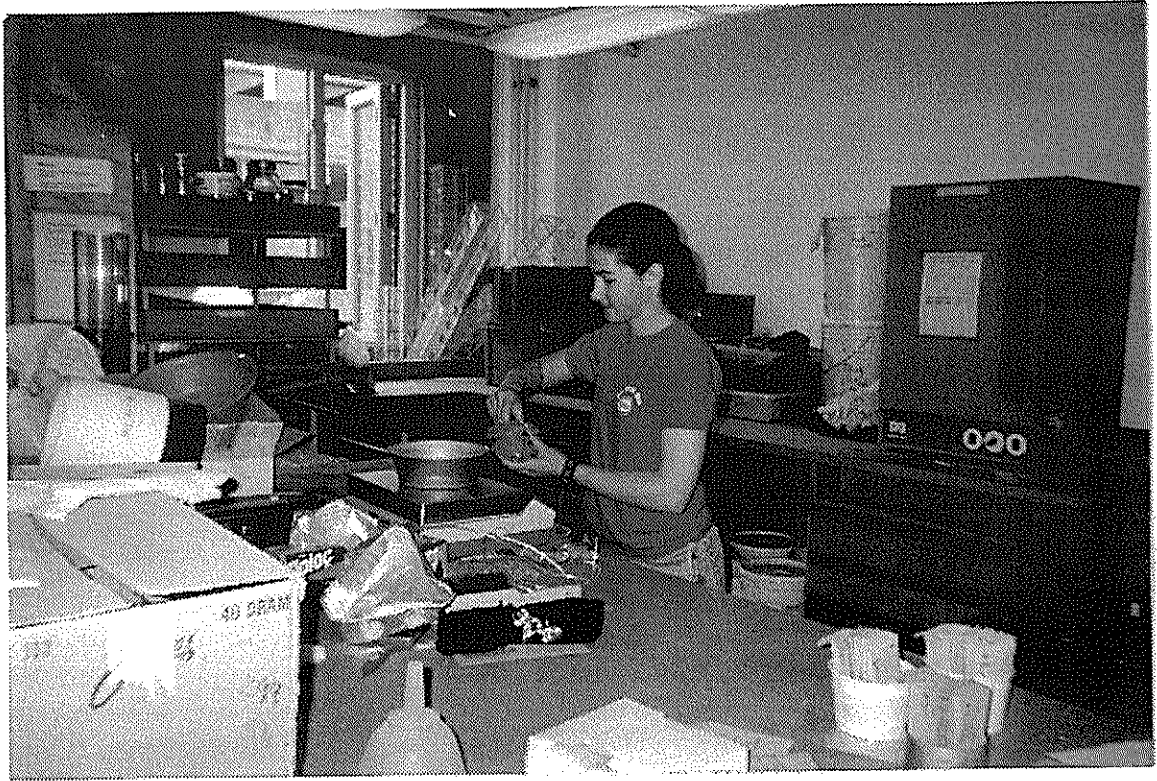
The on-campus lab work took place in the "Dirty Lab." This name came to be through the copious amounts of seed and soil that make it through the doors. In this lab I was given the task of cataloguing the incredible amount of seed held in the vortex-like cupboards. The seed was largely native grassland type seed that grow in Alberta's prairie; the other bit consisted of introduced species that also grow locally. This work is preparing the samples for germination tests, to see how efficiently the collective seed was to grow if planted somewhere. This seeding may take place on the right of way after a pipeline is put in, or on a land reclamation project after strip mining.

The field work I was a part of deals with the seeding done after a gas line was put in the Southern Alberta area. The pipeline is close to 900 kilometres long, and we had a number of sites stretching from the Pincher Creek area to the other side of Brooks. For a week at a time, Kelly Ostermann, the graduate student working on this project, would whisk me away to a secluded world of small town motels and scorching prairie heat. I loved every minute of our ten or twelve hour days, and Kelly made a great trail-boss. She never runs her crew too terribly hard, and feeds us great food. I found at the end of our day, I appreciated the cool dip in the lake or the nice hot shower more than I ever had in my life.

The work part of the field work had me busy taking various readings and collecting many samples. The vegetation clippings we did on the second trip filled the entire canopy of the truck! A penetrometer was used to determine the degree of compaction the soil has undergone, and an auger was used to take soil samples from 0 to 60+ centimetres. A machine called an MCI took density and moisture readings at a four inch depth. A radioactive probe in this device takes these readings, and as well the MCI attracts rattlesnakes.... we were wondering if there was a connection. The four inch depth is hammered with an incredibly heavy instrument called the MC hammer. This hammer demanded the greatest physical exertion, it gets to be very heavy after drilling 60 or so holes with it. Fortunately, I only did ten holes in one stretch. The vegetation clippings that I mentioned also needed to be collected, and took up an amazing amount of space. The most difficult job (in my opinion) was the plant identification along each transect. By the end of the trip many names, both Latin and common, were rolling around in my head. The amount of detailed information stored in the heads of those grad students is almost never-ending. Telling a *Stipa* from a *Poa* is about as complicated as I got.

At one of Kelly's sites near a town called Longview, we had a very unexpected group of guests. We spotted a Nova helicopter flying over the pipeline, so we all stood up and waved. (Nova is the company that put in the pipeline, they are a huge gas line corporation in Alberta). The helicopter then did a very large turn around and landed to say hello. With helicopters costing almost \$1000 every hour, we were very surprised that they wanted to chat. The group of them were flying the entire pipeline, just checking for leaks or hotspots in the line. Since the pipe is buried beneath the ground, they look at any anomalous vegetation patches and draw conclusions from what they see. It brightened our afternoon, in any case!

I also got the chance to visit the Ellerslie sites that a few other students are working on, largely centering on the native versus introduced plant species in Alberta. The field we went to had been planted with various native seedlings in the spring, and are now being measured against the weed patch that is aggressively muscling over them. Many small wildflowers are drowning in the thistle, and are now nothing more than tiny brown skeletons. The Wild Blue Flax and *Gaillardia* in bloom were very beautiful amid the weed patch, and I'm sure serve as inspiration to all the tiny Geums that we found. The highlight of the day was finding a huge plant called Scentless Chamomile, which is very beautiful with tonnes of white daisy-like flowers, but is classed as a noxious weed in Alberta. Apparently, this is a very aggressive



plant that causes farmers quite a bit of grief. Overall, I would say that the weeds in this field are winning by a landslide.

My experience with WISEST was great -- the people that I worked with were so insightful and showed me many interesting aspects of both university and personal life. These lessons will surely influence how I approach my university years and greatly educated my previously limited knowledge of this institution. Thanks again to all who worked with me, and especially Kelly, Christine, Wilf, Quinn, Allan, Pola and Tanya. You guys made it as great as it was. Dr. Naeth has a great group of graduate students under her wing. I would as well like to honour the crew (you know who you are) that I was working with by saying..... man did indeed want day off and liquid meal, which was fine as long as nothing happened to my incredibly beautiful bike while he got up in the middle of the night to close the door.....

I know that nobody reading this understood that interlude -- but it will have a touching effect on me for quite some time. I'll treasure the memories I am now left with, and look forward to starting my university education quite soon.

CRAWLING WITH ENTOMOLOGY

Christina Elliott, Biological Sciences

Bugs! These seemingly insignificant and sometimes inconvenient invertebrates provoke much interest among entomologists and their fellow researchers. Between studies of population demographics, searches for varying types of carabid and staphylinid beetles, and the fecundity of forest tent caterpillars, the world of entomology in the Department of Biological Sciences at the University of Alberta is much more than what little boys are made of; it is a study of global ecology and forestry and the very life cycles that affect the growth of our food and the protection and preservation of our natural resources.

This year, the population of water striders at George Lake, a field site an hour north of Edmonton, is at its lowest point in fifteen years. Instead of collecting and marking three or four hundred of the family Gerridae every week to analyze the population fluctuations, only an average of ten striders per period are present. It is the speculation of Dr. Spence that this could be due to the extreme UV index this year, which is higher than usual. Strangely though, not many parasites are present in the gerrids either, leading to the conclusion that an outside force must be causing the problem. Each week those striders which are present are marked with a different colour of paint between their wings and eyes, as not to disturb regular functions. I, a humble gerrid catcher, armed only with a long handled net, was overwhelmingly relieved that these organisms cannot fly at will. Every gerrid from Experiment Pond is collected using nets, to hopefully receive the most accurate data possible.

Both urban and rural pitfall traps are often being set up to catch beetles and sometimes spiders. The beetles, mostly of the staphylinid and carabid types are separated into vials and are later pinned and identified, hopefully displaying huge variety in the individual species. The traps consist of antifreeze in a plastic container placed flush with the ground with a piece of wood overtop. While being collected, the collector is thoroughly eaten alive by mosquitos while emptying the contents of each trap into cheese cloth and replacing the trap in its original position.

To discover the fecundity of forest tent caterpillars, eggs which are reminiscent of marshmallow crumbs (if there is such a thing) must be scraped of their protective covering of spumaline and soaked in bleach to be seen better. Then, with a microscope and an ultra-thin felt, the eggs had to be counted on each of the bands. The mass and diameters of the bands were also measured, establishing a relationship between the physical characteristics of each egg mass and the number of eggs present, therefore allowing for the number of eggs to be predicted without the time consuming efforts of counting each and every one. It was also discovered that the sites from which the caterpillars were collected had a great effect on the egg production - the fecundity was much larger where the insects were able to feed on aspen, obviously their preferred food. This led to the conclusion that more forest tent caterpillars will be present in areas with large numbers of aspen trees.

Assessing trees comes with the territory when studying the effects of FTC on aspen. Buds were clipped from various trees in the spring to see if the nutrient content of the remaining leaves would increase, therefore causing the caterpillars feeding to grow larger. Other trees were



defoliated using both caterpillars and manual clipping to see if non-natural methods of destroying leaves provoked a similar chemical response from the aspen as did regular defoliation. The caterpillars themselves were first separated from the leaves, frass (poop) and silk, and then were dried to get an idea of biomass and growth capabilities. Currently the trees are being further assessed by counting the number of leaves and buds present, to assist in both results in this years experiment and to help predict the outcome of the trees in coming years. This is tremendous fun until the support pole of the ladder sinks farther into the soft ground and sends you into cardiac arrest.

The weekly field trips with the WISEST group also helped to further my knowledge on many research topics and let us all meet others in areas which we may be interested in. The trip to the Alberta Research Council, for example, gave insight into large-scale research for giant corporations and showed how research is used not just in universities for degrees, but in practical applications all over both the province and country. The tour of another lab gave both the chance to broaden our research experience beyond just one field and to socialize with other WISEST members about common interests. I found the oncology lab to be fascinating with its high-tech and sophisticated machines for separating cells and marking them to be tracked. Overall, my WISEST experience was full of new people, places, ideas and knowledge that maintained my interest and helped me to see how satisfying research can be.

A Written Report About Nothing

Clara Yu

What did I do over the six weeks that I was with the WISEST program? As a member of Generation X, it doesn't really matter what I did, or how exciting and wonderful it was, because the answer is simply, and always will be: Nothing. Don't act so surprised. It's not like there's no other seventeen year old who would give the same reply. What did you expect...a one and a half page report? Wait, that *is* what I am required to do. What the...!? Fortunately for me, I am taking English I.B. (30X) and have conquered the art of extending anything from one sentence to at least three paragraphs, a very useful skill when writing commentaries at school. I guess you could call it "expanding my ideas".

When I arrived for the orientation for WISEST, I was so nervous and did not know what to expect. After all, my so-called brain turned to mush after my last final exam and if anybody wanted to start a discussion that did not concern television or movies, I would be giving the smile-and-nod routine. However, that was not the case. The subjects of discussion I came across over the six week period were generally subjects I understood. If I did not understand something, there was always someone who would explain it to me, allowing me to learn more about the details of research. I would also like to add that before we even got a chance to meet anyone, except for Grace who was greeting people on the first day, we were bombarded by free stuff, posters, pins, food (really scrumptious food) and drinks. Even the Dean of Sciences provided us with free keychains and pins. Hey, if they were going to be nice to me, there's no doubt about the quality of work I was going to put out.

WISEST wasn't always fun and games. We had to complete a poster to describe our individual projects and/or research by the end of the program. For my research project, I was looking at the ethanol-soluble carbohydrate levels in Loblolly pine seeds during stratification. I spent many excruciatingly frustrating hours cracking teeny weenie pine seeds to remove the megagametophytes and embryos. Then I had to perform carbohydrate assays (three chemical replicates of two biological replicates). The fun parts were working with the liquid nitrogen and the concentrated sulphuric acid. They were certainly brave throughout the whole ordeal! From my research, I was able to learn so many research and safety procedures as well as increase my scientific vocabulary. The poster business was not a concern for me until a short period before it was due. Luckily, the people working at the lab I was assigned to were nice enough to give me helpful pointers on how to produce a spectacular poster. These people were lifesavers to me. There were so many instances when I nearly destroyed any hope of getting any results for my experiment at all by adding the wrong solutions to the wrong dilutions or vice versa, but they were able to rescue my experiments time and time again. However, I am still haunted in my dreams by voices saying, "*did you remember to vortex?*" and "*do the lab dance and your results will come out perfectly...*". Because of their kindness, the blessing of a long weekend, and after working on my poster every waking moment of that long weekend, I was able to produce my first research poster. The display of everybody's poster at the poster session could not be described by mortal words. Everybody's poster was so professional both in content and in organization. They were definitely well beyond the work of most grade twelve students. I say "most" because I have to consider those Doogie Howsers out there.



The following paragraph is dedicated to all the opportunities WISEST has given to me. Besides the opportunity to get FREE STUFF, I got to meet great people from other schools whom I definitely would never have met or got to know if not for this program. From all the social events that we had and from the people I met at my lab, I gained an insight on my education, and began to have a completely different outlook on my future. I also got the opportunity to become familiarized with the campus, various laboratories, lab equipment, experiment processes and making research posters. First year biology and chemistry labs will be so sweet! After this experience, there is no doubt in my mind that I will be pursuing a career in the sciences instead of the arts. If, for some strange reason, I decided to pursue a career in an other field, I will still have an easier time finding my way around campus. I still remember getting lost on my way to the Biological Sciences building from the bus stop, which by the way, gave me plenty of exercise. University is definitely different from my high school world.

To conclude this informative paper, I must give credit where it is due by thanking Grace, Margaret-Ann, Sandra and Rana for coordinating all our events and research as well as anybody who funded the program. Without these ladies, the WISEST program would not have been the success it was this year. Again, special thanks go to everyone from my lab for giving me the opportunity to work in their lab, and also for taking the time out of their busy schedules to explain their research to me, to guide me through my own research, and to teach me so much more than they had to. As anybody could tell from this paper, my stay at the University was one of the most educational experiences in my life. I give it two thumbs up and would suggest it to any grade eleven student.

So back to the original question: What did I do and learn over the six weeks that I was with the WISEST program?.....Nothing.

Clara Yu

6 WEEKS WITH WISEST

AMANDA FRASER

Thursday, July 2nd, move in day. It had only been 8 days since I finished school and I was being plunged into, what I thought, would be summer school. 6 weeks learning about science, day after day of lab work, like the chemistry class that wouldn't end. Thank goodness it wasn't like that at all.

I met Roxanne right away. Roxanne was our big sister. I was to live in Lister and my brother told me not to worry, if the girls were weird, I could come home every weekend. The first night I was in Lister was the most tense night of my life, for that first few minutes anyway. I was instantly put at ease when I saw the girls weren't snobby and didn't have their nose stuck in a book. We had a group meeting and right away we were spilling our life stories, where we lived, what we liked and didn't like, comparing averages (boy those girls are smart) and taking the steps to get to know one another.

Friday, July 3rd, first day of WISEST. The girls and I went out for breakfast before we headed over to E3-25. Nervous was an understatement. This was the first job I had ever had and the first time I had ever lived on my own. The day went smoothly. Everyone was friendly and I met more people than I can remember. After a quick safety seminar I was whisked away by Dr. Peter Sporns. As I arrived at my lab I was given a quick tour with the promise of a more complete one on the following Monday. Dr. Sporns informed me that Friday afternoons were a time to socialize, not work, so I met the rest of the people in my lab talking over free sandwiches and peanuts at the faculty club.

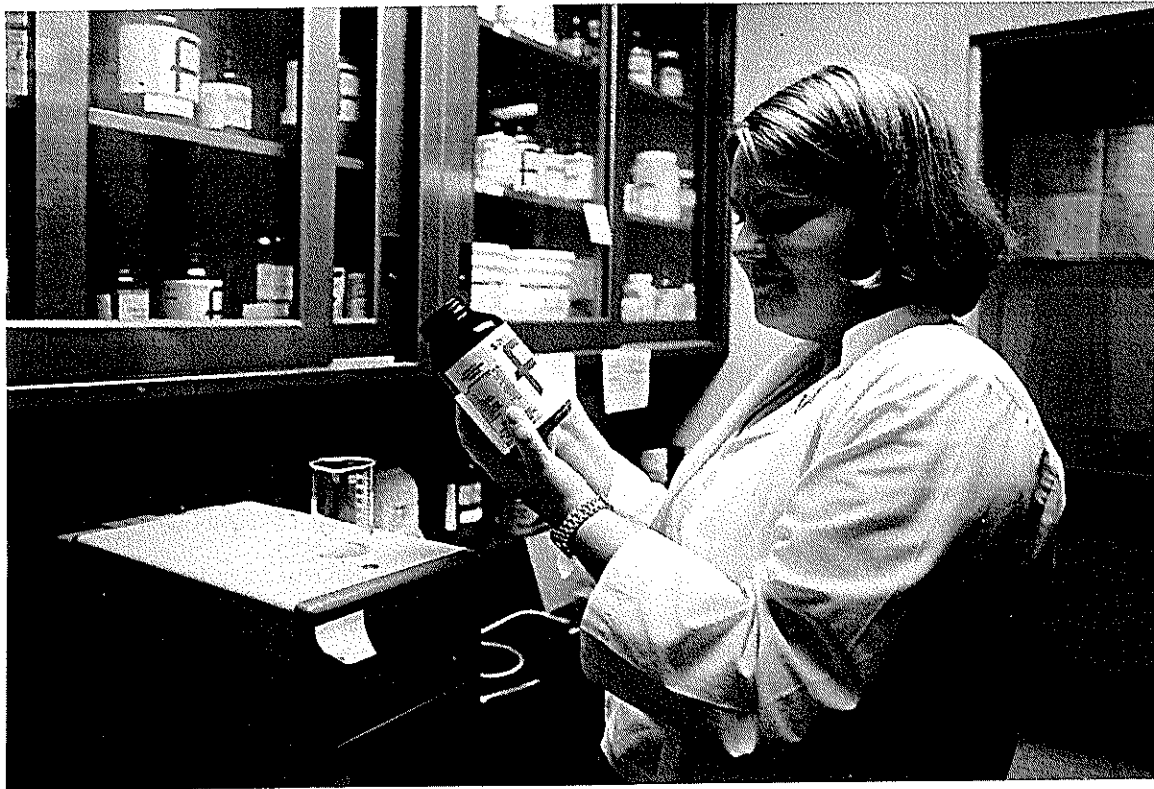
Work over the next six weeks was, well it was work. I met Darcy Driedger on Monday, July 6 and we had a quick quiz on how much I knew about science. I should have brought my notebooks. Darcy explained to me that he was writing a paper and needed me to test a direct ELISA (enzyme-linked immunosorbent assay) kit for him. The kit would require making solutions, using pipettes, waiting and using machines I had no idea how to use.

I was using the kit to test for potato glycoalkaloid(GA) concentrations. GA are nasty little toxins found in all potatoes and some tomatoes. These little devils have the ability to make a person extraordinarily sick and have been know to kill people. They give potatoes their bitter taste.

The first kit I tested did not work. I had a long ways to go in regards to technique, precision, and knowledge, before the kit would produce any usable results. As time went on the kit performed more like it should and started giving me some of the numbers I was expecting. It didn't give me the numbers I wanted exactly, and it didn't have the reproduction I wanted, but every once in a while those numbers would come within 10, and I would feel proud. Working with the same kit for six weeks is tedious, but rewarding when it gives you the results you desire. Unfortunately, the final conclusion that I came to was that ELISA does not work very well and the kit lacks precision.

I wanted to use this paper, not only to talk about the work I did, but the people I met. The summer was about so much more than working in a lab and getting paid. It was about meeting people and building the kinds of friendships you only hear about, the kind that last. These are the friends that I hope to travel with (Erin, keep Easter open), see often, watch get married and have kids, party with, laugh with, see graduate, and share in their happiness when they succeed at life.

My first impressions of the girls at Lister are hard to remember, because now I know them so well. Roxanne is warm and friendly, helpful and understanding. Trish is hyper and ready to have fun, always smiling and eating those scotch mints. Jenny is quiet but instantly likable, she is perfect and it makes me happy just to be around her. Sarah is shy but she came out of her shell, we certainly have seen she has many sides and I have yet to see one I don't like. Rilayna is open and funny, certainly one of the most courageous



people I have ever met. I think Erin was happy being Erin, she is impossible to dislike. She may be the best person I have ever met, a person I admire, a person I want to be like. When you put all of these girls together you have a combination that is strong, smart, beautiful, fun, humorous, understanding, caring, sacrificing, and magnetic, you never want to leave them behind.

I didn't only meet the other girls from WISEST, I also met the people of Henday. Roxanne introduced me to Alison and I instantly liked her because she is full of life and brimming with excitement, well, normally. Then I met Steve, bound and determined to eat those spitz as fast as he could, but one of the nicest guys you'd ever meet. After that, I met the Colombians, a group of about 10. These were the friendliest people. They were so open and honest and incredibly fun to hang around with.

I wanted to tell you all about each of them in the detail they deserve, but we only have 1 and 1/2 pages. These people mean more to me than they'll ever know. I wanted to thank them for their friendship, but thank-you isn't a strong enough word. I feel like they made me more complete. I hope that we can keep in touch like we promised each other we would.

I now realize that this six weeks has been the most important of my life. It seems to be a starting point for everything that will happen to me in this lifetime. I come from a town of about 1000 people, I bet we could house the whole town in Lister Hall, so this experience was the most amazing thing. With only a few days left I understand that the time I spent with these people went by much too quickly and I will miss these people more than I want to admit. They have changed my life and helped me make myself better. They helped me learn that life isn't just about working and learning, but interacting and having fun. The summer was educational, not because of what I learned about science, but because of what I learned about life.

My Summer Experience at WISEST

Angela Kubinec

My summer with WISEST was spent with Dr. Douglas Ivey in the department of Materials Engineering. As his research assistant, I was actually working under Udit Sharma, a grad student researching X80 steel. When I first arrived I did not understand all the jargon and technical terms, so my first days were spend reading textbooks. My comprehension was hindered from a few interesting conversations I had. Some of the grad students at first mistook me to be a fellow grad student who had studied engineering for 4 or more years! Needless to say, I don't understand what we were talking about.

When I first started to actually work on the project, it was simply preparing steel samples for the Transmission Electron Microscope (TEM). This involved making very thin samples by a lot of grinding and polishing. It was difficult to find those small thin samples when you ever lost them!

Udit was very good about giving me a variety of things to do, so he also got me measuring grain size measurement on micrographs. This was an exercise where I used math and calculating. After many questions, the calculations was completed.

I also got to prepare samples for the Scanning Electron Microscope (SEM). This process was a little different because a bulk sample was hot mounted in Bakelite and then the surface was ground and polished until there were very few scratches. After that etching was necessary to observe anything interesting. I made several different etchants, including 5% nital, 4% picral and viella's reagent. Each etchant brought out different characteristics, but the 5% nital worked the best.

The SEM was very interesting because it was able to magnify the steel more then 6000 times. This gave me a very different view of the steel. As well energy dispersive x-ray analysis allowed the elements present to be analyzed. Tina Barker is the SEM technician and she helped give me some great pictures.

The TEM samples were going to be the best for analyzing the X80 steel microstructure. Unfortunately they were not so easy to prepare. Once the grinding and polishing had made the sample as thin as possible, chemical jet polishing was the next step. The jet polishing was very fascinating because liquid nitrogen was used to cool the sample. I enjoyed using the liquid nitrogen! A chemical stream then thinned the sample from both sides until a tiny hole had formed. Even though the sample was so thin it had a hole; it was not thin enough. Ion milling was still needed. Ion milling was a very slow process so the sample sat in the ion mill for hours, but once out, the sample was ready for the TEM!



The TEM was an interesting machine that showed magnifications of over 25000X. I was able to see single grains of X80 steel. It was fascinating to see how different the exact same steel would look at varying magnifications. The TEM machine also had electron diffraction, which was very interesting. Dr Ivey would observe the diffraction pattern that resulted from sending a beam through a grain and by analyzing the pattern of dots, could identify the element and structure. The patterns made were very cool. My only problem was that the dark room and humming noises the machine made just about put me in a trance!

My WISEST experience was a wonderful opportunity that I greatly appreciate. This memorable summer I enjoyed was my first job, my first paycheck and my first time living in a city. Not only was I able to familiarize myself with the university atmosphere, but I also spent a summer away from home. That was a learning experience! WISEST has given me a chance to learn more about engineering, lab work, and the university. The best of all is that I have had a wonderful summer!

Angela Kubinec

Wiser Through WISEST

My WISEST experience differed from what the others were doing. Instead of getting a feel for labs, I got a feel of offices, libraries, computers, and hospitals. I worked for Shyamala Nagandran in the Department of Family Medicine. I interacted with many people, and helped them with their different projects. Below is a summary of how I got wiser through WISEST.

My first week, I was thrown into a week of internet searching on medical informatics. The University of Alberta was preparing a curriculum on the subject, and my job was to find information on it, and see what other universities in Canada were doing. My results? Well, medical informatics is using computer technology in medicine. The computer would organize and manage the medical information in respect with medical education, research, patient care support, and administration. Medical information is made easier and faster to manage and use through computers. Some University's curriculum contains courses on things like those that "Introduction to Medical Informatics" and certain activities conducted by students using medical informatics. After the week, the words MEDICAL, INFORMATICS, and INFOSEEK haunted my dreams after such extensive hours on the net.

For two weeks, my primary supervisor went away on holidays (and did not take me ☹). Therefore, I worked for Olga Szafran. She is the research coordinator for the department. She was preparing to propose a study on describing Aboriginal women's health experiences, and if patterns of their status characteristics emerge, which affect these experiences. My job was to do literary searches on relevant statistics. After long hours on the libraries, encounters with sleeping students, and many rendezvous with photocopy machines, my task for Olga was accomplished.

During these two weeks, I also compiled results for a previous survey using SPSS. SPSS is a program for the computer that makes it easier to summarize results. Carla and Alex, two other summer students hired for the department, were preparing the mailout for the survey they compiled. This included two days of helping them stuff envelopes, seal, and stamp. With over 1000 envelopes to send, I was more than grateful when there was a little gizmo to wet the envelope for sealing. That gizmo saved my tongue from papercuts, and . . . well, you all know how horrible envelopes taste like!!

With Shyamala being the computer specialist for the department, I also did some system work. There was a main server computer in her office which "served" many doctors across the province. Its like one computer's information can be accessed from the computers throughout the province, by many people. I come into this by being the one to delete old files no longer needed, and added new residents on to the server. It was a redundant job, but was very crucial to be done precisely. For a mistake would cause many problems for many people, and is a little harder to go back and fix than on normal computers. So with sweaty, nervous hands, I typed. It is not known yet if I made a mistake, and I hope it stays that way!



My favorite project of the six weeks was when I shadowed a doctor. I spent a day with Dr. Annette Davidson in the palliative care unit at the Grey Nuns Hospital. Palliative Care deals with the dying, and tries to give physical and emotional comfort to the patients. I met three of the patients on the unit. All had pretty severe cases of cancer. And they did not look like how a person with cancer looks in Hollywood movies. In movies, they just look pale and bald. But in real life, one's body is affected so much more. One had lesions all over her body, another had big growths on her neck, and another was delusional with where she was. They all were really young, around their 50's, and really depressed with the cards life had dealt them. I really enjoyed this experience. It taught me how death becomes a part of a doctor's life, and how the love and care good doctors give to their patients can make such a difference, and impacts the patients' lives greatly.

My experience in WISEST showed me a bigger picture of the working world. All the great people I have met this summer have also made this time worthwhile...it just wouldn't have been the same without ya guys!! I began this summer as one of the new summer student; eager yet nervous that I would say something really immature!! Now, as I leave, I feel not only a part of the staff in the department, but also a part of the University of Alberta's campus.

Renee Nicolas
Medicine

Eeek! A rat!

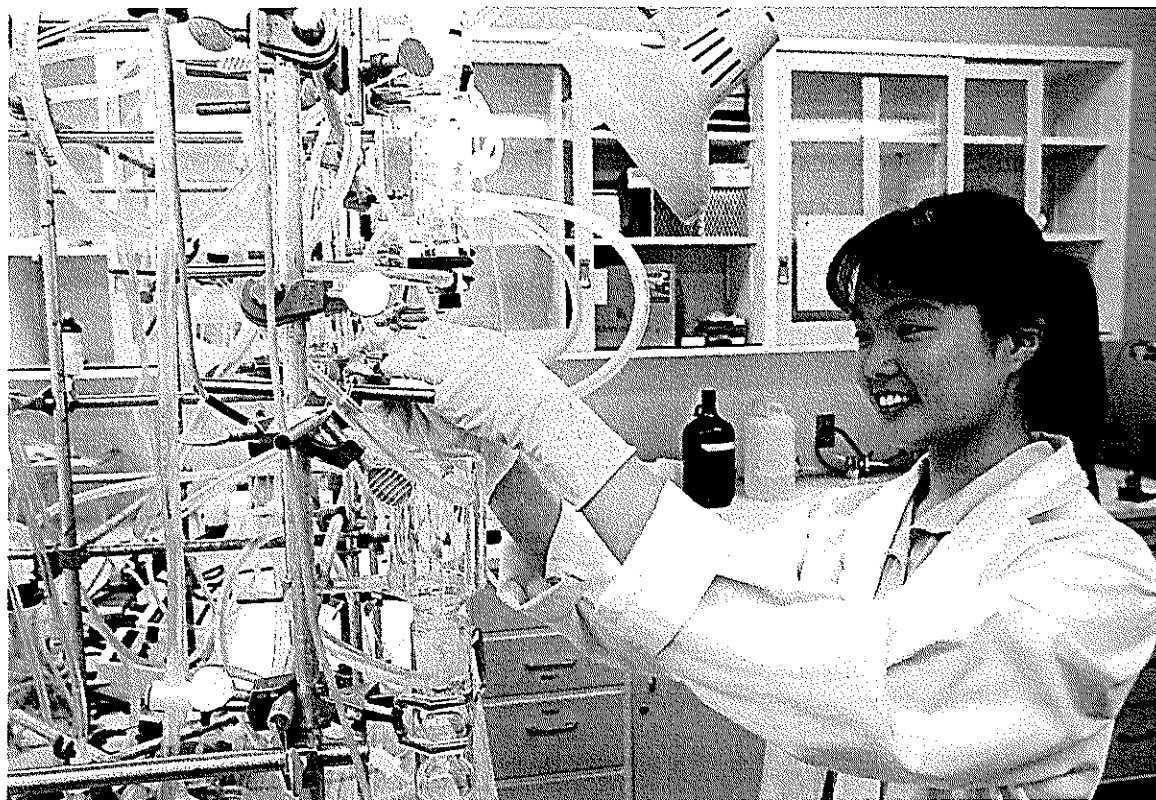
I knew the day I received the call confirming my acceptance into the WISEST Summer Research Program, my life would change for the better. The program would be the beginning of many good things to come. I have heard of many WISEST alumni who have benefited from the program and the experience they have gained has helped them tremendously. With the opportunity to work in a lab, I have acquired the advantage of experience that is often required to apply for future laboratory positions.

It was rewarding working in the department of Medicine and Oral Health Sciences. I was both excited and terrified when I received the letter telling me I would be finding the effects of estrogen on the rat heart. I had never worked with a rodent but I knew I was fearful of them. I was also uneasy because one mistake could cost the life of a rat. After identifying my phobia of the rat, I was surprised to find I was curious to work with one. However, I didn't think I would be trusted with such an extreme project and I was sure I would be involved only with clean up. I was fine with this because I thought I would be able to watch and learn about the project from afar.

I entered my lab feeling very welcome and I quickly discovered that I was wrong about my duties of dishes and clean up. My supervisor and his research team encouraged me to participate in the experiments so that I could have hands on experience. At the beginning of the summer, I was hesitant to work with the rats but the encouragement from the people in my lab helped me become more courageous. Throughout my first week I learned how to handle live rats and to appreciate the sacrifices they make for science.

I was introduced to different surgeries performed on the rat, such as ovariectomies and the implantation of estrogen tablets. I learned the procedures to dissect a rat for its heart and how to attach the heart to a biventricular heart perfusion apparatus. I found the hearts of the rats who had received estrogen had an astounding protective effect that helped strengthen the heart after ischemic injury. The aorta was also removed and cut into small fragments. I was taught how to mount them onto an isolated tissue bath to test the effect estrogen has on the elasticity of arteries. This knowledge could help to prevent atherosclerosis, which is a disease that constricts blood vessels and can lead to heart failures.

In school, I had already encountered various systems in the body including the circulatory system. This summer I have discovered several different aspects of the heart and estrogen that were unbeknownst to me. I learned new medical terms dealing with the heart and the general effects of



estrogen on the body such as mood swings and the growth and development of animals. It fascinates me that estrogen can help strengthen the heart to prevent heart disease and promote faster recovery after heart injury. One day this research will help to save many lives as it holds possibilities to future cures to heart disease. The experiments run in my lab astounded me and they have given me the idea of research as another possible future occupation. I would like to extend my deepest gratitude and appreciation to Dr. Dan Pehowich, Craig Wilson and Jody Levasseur for taking the time to teach me this summer and to the members of WISEST for organizing the program. I would also like to thank Glaxo Wellcome for funding my project and all the people who participated in the program this summer for giving me life long friendships. Thank you everyone for giving me a fun summer filled with enlightenment.

Best Wishes,

Queenie Lung
Summer 1998

SIX WEEKS EXPERIENCE AND FUN!

(BY MINA GHOREISHI)

I couldn't believe when Sandra called me and told that I had been accepted into the WISEST Summer Research Program. I got very excited, and the following morning, almost everybody at school knew that I had been accepted; from my friends, to teachers, and even principals!

It was the first job that I had ever had and more importantly the first research experience! I was a little bit nervous at the orientation session, but after one hour, I noticed how comfortable I was in that friendly environment provided by Ann Mary, Grace, Rana, and Sandra, whom I'd like to thank.

I had the privilege to work under Dr. Macdonald at Renewable Resources department. The main goal of the project that I was involved in, was to minimize the effects of forest management on genetic diversity of trees (esp., Lodgepole Pine and White Spruce) from west-central Alberta. We had to collect needle samples from the populations, which I did once, and document natural patterns of genetic variation in them, using electrophoresis.

We ground the frozen samples in a buffer to form a homogenate which we loaded after onto the starch gels for the process (electrophoresis). After the migration of the enzymes, we sliced the gels and stained them for the presence of specific enzymes. When the process was done, we interpreted the



banding patterns as the genotypes (genetic makeup) for each sample. Here I'd like to thank my supervisor and my other research team members who made this opportunity possible for me.

Beside the wonderful research experience that I had this summer, I got a chance to visit other labs on the campus, meet new people with the same interests as me, form new friendships, and visit other research places beside university. It also gave me confidence in my ability to do things and made me feel more comfortable on campus, which I think will definitely help me when I return to the university after grade twelve.

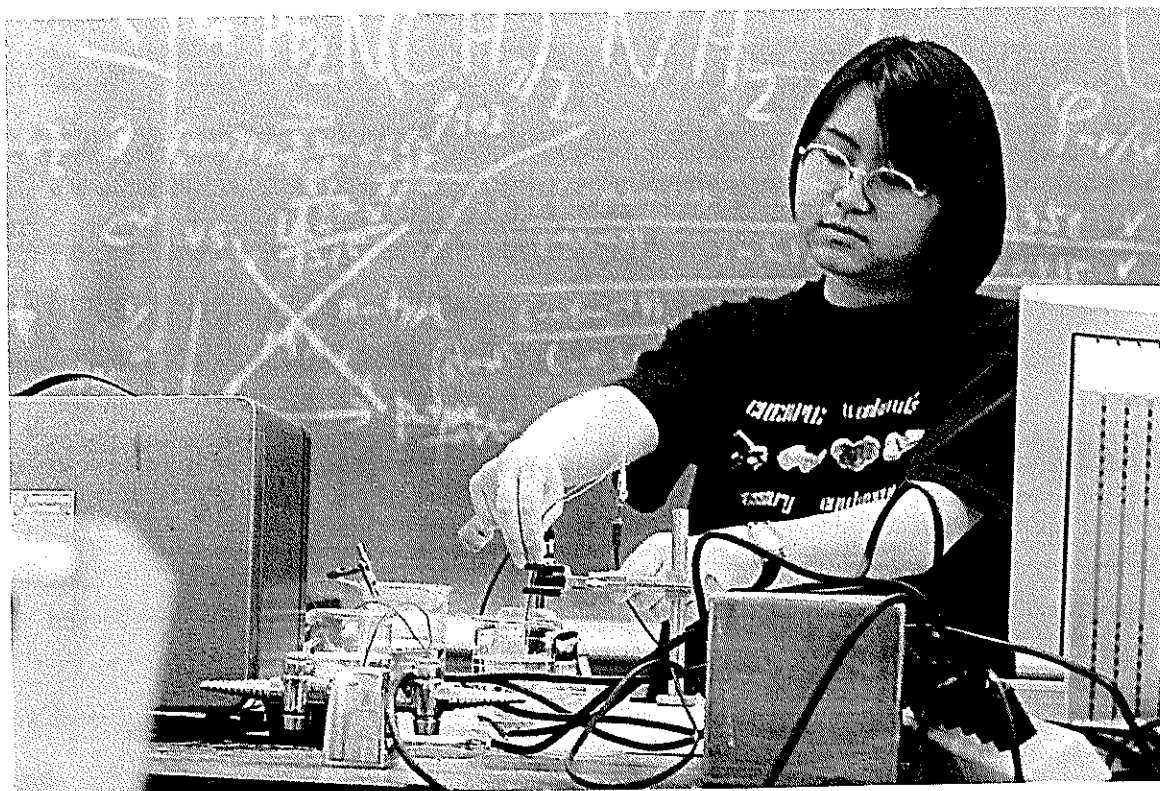
Finally, I learned through that unique opportunity at the WISEST Summer Research program, that there is always so much more to be learned and that research makes sense.

A section of an endless journey

The first day — an endless list of safety rules listed by Dr. Margaret Ann Amour to abide by. Also the very first time that as a WISEST student, I had an opportunity to step into a research lab that I would work in the summer. My fellow lab mates in the department of Chemical and Materials Engineering were a little intrigued by a new student at first, but after the introductions and with the help of a friendly supervisor, the ice was broken. Thus, began a busy, frustrating yet fulfilling summer.

From the very beginning I did not know what to expect to happen in my job. It is the unknown that makes life so much more interesting and research so worthwhile after all. The first week was spent reading a materials engineering textbook. My supervisor assigned chapters about basic corrosion theory and electrochemical corrosion theory. Then, I was introduced to Dr. Ning Cui who was going to be directly supervising me; naturally, my research project was about pipeline corrosion, which explained why I had to do so much reading on corrosion. During the next few days, Dr. Cui explained the purpose of the project, which was to investigate the relationship between pitting corrosion and banding density of materials. Also, I learnt how to mount, polish and examine samples from pipelines.

After the first few training sessions, there were endless numbers of experiments to conduct using the Gamry 100 Potentiostat equipment. Until now, I still cannot decide which is more frustrating, polishing samples or obtaining test results that simply refuse to match. When the test results finally did match, it was extremely gratifying and time to heave a sigh of relief. There was definitely much to learn; Dr. Luo explained the concepts involved in corrosion. Qi Yang, a graduate student at the lab, explained the uses of Microsoft Excel, showed me the uses of equipment and answered my questions on crevice and pitting corrosion. Dr Ping, who, like me, just joined the team, explained how similar a battery cell was to an electrochemical corrosion cell. She even answered my questions about current and voltage, for example, the difference between AC(alternate current) and DC(direct current). Even the jokes my lab mates cracked meant something; they made me realize how many research papers are published everyday.



In between the endless experiments that I had to run, were the wonderful field trips that were planned by the WISEST committee. There were always food and people welcoming us with open arms. The field trips were just as educating as lab experience, I found. Being sponsored by Syncrude, I had a chance to visit their labs and talk to many people, such as the manager and the president of the Chemical Engineering Society. Combined with all the events planned by WISEST, I learnt that there are many opportunities available to those with good networking skills. A Bachelor of Science degree can be extremely versatile, because one can find a job in almost any kind of environment, be it industrial, or educational. Chance also plays a part in events. Being at the right place at the right time is obviously an asset. If there had not been a poster session this year, I would not have a poster to present at the Metallurgical Conference that I will be attending in Calgary.

Research is a road less taken by most; unlike most paths it may not seem tempting at first, neither is it smooth, but there is always something waiting at the end of the road. Thank you, WISEST, for letting me catch a glimpse of that.

Written by: Meiti Yang

MY NEW SET OF KEYS

Although my Wisest experience began with filling out applications forms, writing essays and a long period of waiting, the bulk of it centered around my new University of Alberta - Science key ring. I received this key ring from the Dean of Science on July 3rd, orientation day.

That day, my initial nerves were diminished when I received the first key to my office in #415A. In excitement, I added it to my key chain. Here I was, a grade 11 girl with my own office and window, while other graduate students were sharing their offices opening to the rotunda of CAB!!

Not long after, I ventured up to the mathematical sciences offices, where I was equipped with 6 other keys. Each key led to another aspect of my WISEST work experience.

At first the key to my office was the only useful one. My work began with reading User's Manuals for my computer, a UNIX machine. I spent the first few days learning the commands, and basically becoming familiar with the machine and my very own university email address. After I felt comfortable with the system, I began reading. I read first year Statistics textbooks in order to learn the basics of what I would be doing. Eventually I attempted to read and understand the articles written by my supervisor, Dr. K.C. Carriere. While I could not comprehend the bulk of the mathematics formulas, I understood the general idea.

Eventually, the key to the computer room became a useful one as I began spending time with many graduate students. They spent time teaching me how to use statistics software such as SPSS and Splus.

As I began spending more and more time practicing tricks with my key ring, my supervisor found more things for me to do. I learned that research is a broad field and does not only involve experiments. In the process, much interacting, learning and filing has to be done. My key to the library came in handy when I started photocopying articles for my supervisor. I used my key to the supplies room when faxing the articles.

Once I finished the not so difficult task of photocopying, I ventured to the University Bookstore to buy my supervisor a reference manager. No, I didn't get a key to the University Bookstore!! Using this new software and a key to a new office with a better computer, I filed hundreds of statistics articles.

Shortly after, my supervisor needed a poster to take to a conference. In order to produce a high class poster, I read her paper and attempted to understand her research. With a significant amount of help from my father, Dr. Carriere and her graduate student, Douglas Dover, I figured out how to make and send the poster on powerpoint from my computer to be plotted in the computer sciences department. The only keys which I used at this point was the key to my home to use powerpoint and my dad's key to his office to use his computer.

The topic of research, which I also used as the topic for my poster, concerns budgeting and allocation of health care funds. In Manitoba, two-thirds of the population live in Winnipeg and in general, they have a high quality of health care. Generally, the rural areas have a poorer quality of health care. It would only make sense to give the poorer areas more money, as to improve their quality of health care. However, when population size is taken



into consideration, it turns out that more money is allocated to the wealthier areas in Winnipeg with a larger population and a better quality of health care. Poorer areas such as those in rural Manitoba receive fewer funds and thus, their quality of health care becomes poorer. Recently, statisticians have suggested that in order to allocate funds in proportion to need for an improvement in the quality of health care, population size should not be taken into consideration. In this case, wealthier areas in Winnipeg receive less funding, while poorer areas in rural Manitoba receive the funding that they need. Therefore, an "unweighted" analysis provides more rationally distributed allocations. Statisticians are now attempting to implement this system in provinces throughout Canada.

I continued using the key to my office to check my email, store my bicycle helmet and sometimes even to think about statistics and its role in my future. I realized that no matter what key or career I choose, statistics will always be a part of it.

The day is coming soon when I will return all my keys to the secretary, and my work will be finished. I think the things that I will remember the most are the people that I have met and the many, many lessons that I have learned through my first work experience.

Meera Ghah

A CRASH Course In My Summer of Computers

The tools that a computer can provide are essential to survival in almost any career. That is why I believe that I immensely benefited from participating in the WISEST program in the area of Computing Sciences. I did a number of things over the summer. For instance, I created graphics, displayed information via the internet, created programs and scripts to reduce work load, sent electronic mail, manipulated graphics and images, and scanned images and documents onto my computer. As well I got a chance to explore the University campus, make new friends, have fun and get paid for it, play Virtual handball and go on educational and enlightening field trips.

Before I could start anything, I needed to learn the operating system the computers were running on, UNIX. The shell is the main screen where commands are typed in, to execute different programs or tools. One such command is *xv*, which is used to crop and enhance an image. Then there's *vi*, which is used to create HTML files for the internet. Next is *snapshot*: which captures a selected portion of the screen as an image and *pnm* tools, which are used to paste, crop, scale the size, limit the colours, or concatenate images. There's *showcase*, which is used to create graphics. And lastly the *ed* commands, are used for writing scripts and editing files and *elm* is used to receive and send electronic mail.

After learning about UNIX, my project was to update and perfect the U of A Chinook web pages. Chinook is a checker program designed at the U of A, that can beat almost any master checker player. To accomplish this I made HyperText Markup Language documents for the internet. To reduce the amount of work in transforming the raw score files into HTML files, I made up scripts using *ed* commands, the scripts ran through all the files making all the changes. As well, I created a checkerboard and three dimensional checker pieces using *showcase* tools, which were used to show the final positions of each game. Lastly, I created a larger checkerboard and pasted the pictures of master and grandmaster players on it, then I created an image map, which allowed me to link each picture to the person's biography page.

As a side project, I created my own home page that tells a little about myself. It includes my involvement with WISEST, links to the projects that I worked on, my future plans concerning the University of Alberta and some of my interests.

As a part of updating the U of A web pages, I took pictures of buildings on campus with a digital camera, and with some assistance, I downloaded them so that they could be added to the on-line campus map. I also learned how to use the scanner so I could scan pictures to add to my web pages.

My experience with computers has taught me that, at times they can be the most frustrating thing to try to work on, however, they can be very



beneficial. For some people, computers can be confusing and complicated, but as I have found, with a little patience you can easily learn how to utilize any computer. My summer with WISEST has benefited me in that, I got to see and learn about various sciences. Also I learned more about University and decisions that I can make in the future. After doing the lab tours, I discovered exactly what I want to pursue as a career, geology.

Rob Lake, thanks for sharing your computer expertise and for your time and patience. Terri Panich, thanks for being an awesome friend and for the entertaining emails. Thank you Charlotte Po, for sharing your helpful computer knowledge. Rana, thanks for the lunches and for your time and effort. And a special thanks to everyone at WISEST, for accepting me into the Summer Research Program and letting me participate in this wonderful experience.

One thing is for sure, this is the best job I've ever had, and I know that this summer will benefit me tremendously.

Later ya'll.

Email me at: graperevenge@hotmail.com

Lynn Reich
Lynn Reich

My Summer in Neuroscience

Kimberly Gunderson

When I found out that I would be spending my summer doing research at the University of Alberta I was excited, but at the same time I had no idea as to what it was going to be like. All I knew was that I would be doing something that very few high school students ever get to do, and I felt very privileged to be one of them. I did not really know what to expect research to be like when I started, but over the summer I came to really enjoy it.

My summer was filled with meeting new people and getting to know my way around campus. The people that I met over the summer really did make my WISEST experience that much better. Not only did I get to meet others from around the province the same age as myself, but many people that work around campus. It was now possible for me to walk somewhere on campus and know someone there.

Most of my summer was spent working in Dr. Tessa Gordon's lab in the department of pharmacology, division of neuroscience, studying peripheral nerve regeneration. I was not given a specific project to work on over the summer, but rather spent my time helping out various members of my lab team while at the same time learning what their job was in the lab, gaining exposure to many different facets of research.

Over the summer I prepared tissue for being stained on microscope slides, had experience working with the animals used in the lab, and was involved with data analysis (using image analysis software). More specifically I dehydrated nerves and embedded them in paraffin or araldite (depending on whether they would be used for light or transmission electron microscopy). After we made the paraffin blocks, I learned how to cut the sections and then placed them on microscope slides for staining. I also got the opportunity to visit the electron microscope lab and develop pictures taken with it. As part of my animal work I learned how to suture and to remove tissue from the animals (which I later froze using liquid nitrogen). Finally, I spent time mapping *in situ* hybridization sections using *Image Pro Plus*. Overall, I got the opportunity to learn about and participate in the various aspects of the research in the lab which helped to give me an overall impression of what it is like to work in a medical research laboratory.

Over the course of the summer I learned a lot, not only about the peripheral nervous system and regeneration, but also about the research process, and what it is like to work in a lab. At the beginning of my time in the lab I spent a lot of time reading about topics related to the research being done. Working in the lab gave me the hands on experience that you simply do not get enough of in school. Instead of just reading about procedures, and the end results of years of research, I had the opportunity to see and actually participate in the process.



The WISEST Summer Research Program not only offered me the opportunity to work in a lab for six weeks, but also gave me the chance to meet others who share the same interest in science. This helped me to learn about different science career choices. Over the course of the summer I found it interesting to talk to other WISEST students and finding out what they were doing for their summer, and also to talk to other researchers. People seemed very eager to talk to you about what they were studying, and what their preliminary findings were. WISEST gave us the opportunity to see different applications of science, from the research to industry.

In conclusion, my WISEST Summer Research Program experience allowed me to further explore what I love about science, and reaffirmed my decision to enter a science driven career. The program gave me the chance to explore a career that I probably would have not considered before. By learning more about neuroscience and research in general, I was able to narrow my career focus and learn more about myself in the process. I consider my time with WISEST to be time well spent, and I feel that I retain much from the program, which will help me in my future endeavors.

Kimberly Bunderson

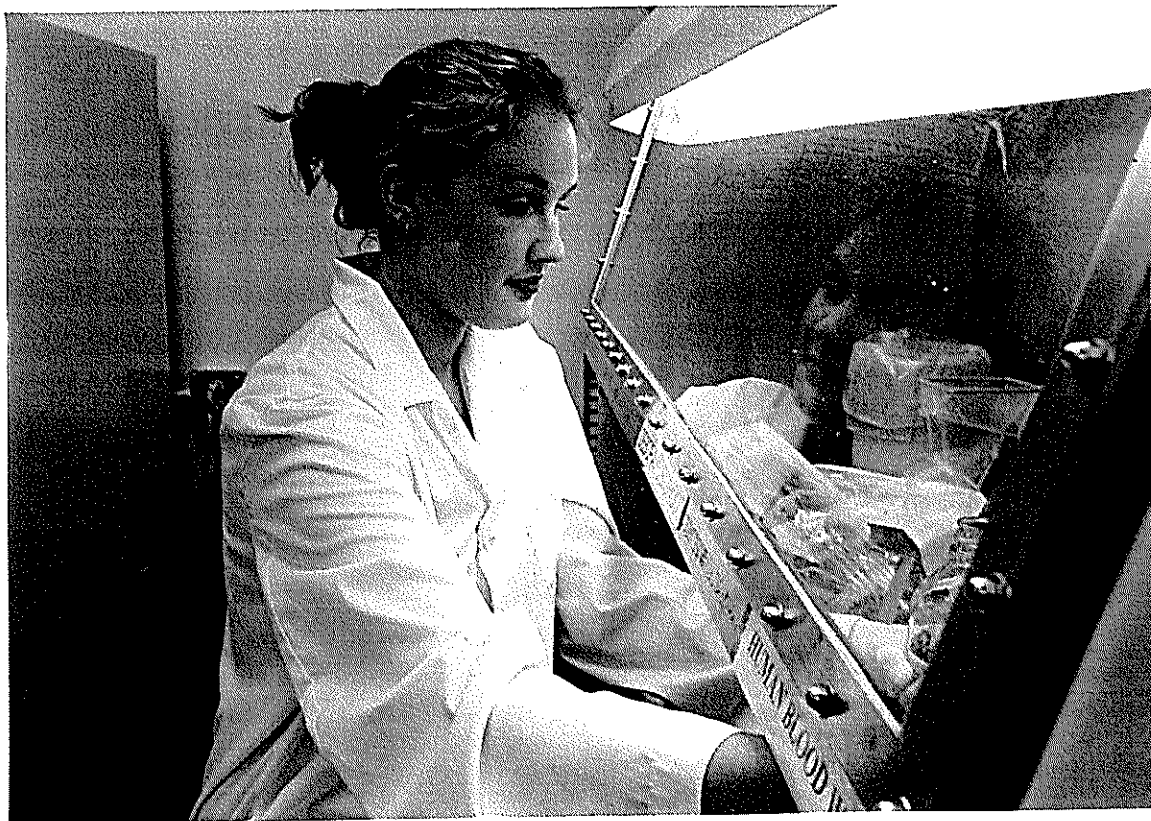
MY WISEST EXPERIENCE 1998

Claire Ference

The last six weeks that I have spent here at the University of Alberta in the WISEST Summer Research Program have made the summer of 1998 such a memorable one. I am completely overwhelmed how, in only six weeks, I was able to learn such an enormous amount of information and play a significant role in a research project. Through my experiences this summer, I have not only been exposed to the world of science at a much more advanced level than I would ever receive in a high school classroom, but I have also developed many new friendships and grasped a sense of the university atmosphere. I can now proudly say that I know my way around campus. Another wonderful experience was the thrill of getting my first really big pay cheque!

I spent my time this summer doing research in a lab in the Department of Pharmacy and Pharmaceutical Sciences under the direction of Dr. Deborah James, a most knowledgeable and also warm and caring individual. Her son, Bryce, who will also be entering grade 12 this September, was my co-worker. As a team, we all worked so well together and we also had a lot of fun, not only working on the research project, but outside of work, as well. Basically, what my project involved was testing to see if the NR 8383 cells (alveolar macrophage cells from a rat's lung) produced the protein POMC, a protein which is produced in the pituitary gland during the "stress-adaptation response" and which serves to mediate many of the events involved in response to stress-asthma. The way I went about detecting whether the cells produced the POMC protein was firstly, I had to maintain a rat alveolar cell line in culture in an incubator. Once I had enough cells, through a long process requiring the addition of many substances to the cells and centrifuging them often, I was able to isolate RNA from the cells. With this RNA, I would then prepare cDNA through a process called the Reverse Transcription Reaction, and then I would move on to amplifying the POMC-specific cDNA using the Polymerase Chain Reaction Process. Once all of this was complete, I would run a gel to see if any POMC protein bands appeared. Unfortunately, I never had any successful gels in which a band appeared for the rat alveolar macrophage cDNA, which would mean POMC was produced. Research means much repetition, time and patience. It was necessary for me to keep repeating the entire process many times, and six weeks was just too short of a time span to see actual and definitive results. The experience, though, was incredible. I learned a lot about cells and how to use all the laboratory equipment. I am certain this will all be useful to me in the future, even though I think Pharmacy may not be my immediate career choice.

I am so thankful for being a participant of the WISEST Summer Research Program, and I am very honoured to have been given this opportunity. From this experience, I am confident that many doors will be opened for me. I have also made many new friends. I have so much in common with so many of the participants and I look forward to our continued friendships.



I would like to say, "Good luck!", to everyone who has participated in the WISEST Summer Research Program; and I hope that everyone has had the same wonderful experience that I was so fortunate to receive. Maybe one day soon, we will meet again here at this very same university, only this time we will be bona fide university students!

Claire Jermac

WORK, LEARN, AND HAVE FUN!!

WOW! What a summer!! As I look back through all the things that I have done through the past six weeks, I cannot believe how much I have learned and experienced. Not only that, I also met a lot of new friends.

During the six weeks that I have been working in Dr. Linda Reha-Krantz's lab, I learned many things that a normal grade 11 student would not learn. I was taught how to pipet, make dilutions, make phage lysates, and many other lab techniques. My project in the lab is to study how different mutations in the T4 DNA polymerase can affect it's function in replication. DNA polymerase is an enzyme that replicates DNA and acts as a proofreader. In order to do this project, I learned how DNA replicates, how T4 bacteriophage infects a normal E.coli cell, and how to characterize phage lysates.

This is certainly one of the most memorable summers I ever had and I will always treasure the memory of it. Six weeks is not a very long time, but somehow getting up 7 in the morning and taking the long bus ride just to get to the lab had become my normal routine. The gang at the lab are fun to be with. With them around there's never a dull moment...there are always laughter in the air. I am sad to leave the lab and all the people in it but at the same time I feel a weird sense of joy because they have given me a great experience, and for that they will always be a part of me, my memory, and my heart.

"Work, work, work. How boring!" I thought to myself at the beginning of the summer. At that time, I never thought that I could actually work, learn, and have fun at the same time. But now everything is different because I know that it is possible! Throughout the summer, Wisest planned many activities that made the lives of the research students more fun and enjoyable. From the lab tours to the Open House Tea, not once did I see a boring face on a student. This is an enjoyable summer indeed!!

It is always a hard choice when it comes to choosing a career. Wisest opened many doors to fields that I have never considered before and that makes me realize I have more varieties to choose from. Right now I am still considering what field I want to go into after high school. I had always wanted to be a genetic engineerer, maybe I can do that. Or maybe I can study something totally different, like law. Who knows? One thing I do



know is that no matter what career I choose, I will always apply something that I have learned this summer.

Time flies when one is having fun...no wonder this summer seems shorter than ever. There are many people who I would like to thank for making my summer so much more enjoyable. First of all, I would like to thank everyone at Wisest for allowing me to share this memorable summer with them. Then I would like to thank Dr. Linda Reha-Krantz for letting me work in her lab. I would also like say thanks to the Alberta Heritage Foundation for Medical Research for sponsoring me, without them I would not get pay ^_^ . And last but not lease, I would like to deeply thank Winston Poon, Jiao Yang, Hannah Cheung, Zerrin Ozum, and the rest of the gang at the lab for being there when I needed them. Those guys are really "As Good As It Gets!".

I can't believe six weeks had passed by already...summer is ending...school is starting...well, at least I'll have my wonderful memories... :)...

Eva Cheung
Department of Biological Science

Kelsey And The Chickens

When I first came to the University Research Farm, I had no idea what I was going to be doing; and touring from stinky barn to even stinkier barn, I thought am not going to last six weeks here, I mean the chicken poop is collected into something as deep as a wading pool!! But last I did, and now I'm wondering where the time has gone after coming to the end of my six weeks here.

The experiment I was working on didn't start until two weeks after I arrived, so I worked in other parts of the farm. I would get to collect eggs from chickens in cages (the easy ones to get) and also from right underneath the chicken (a perfect opportunity to get pecked!). The eggs were collected then were packaged to be sent to Lilydale, just think, you may be eating eggs that I risked my arms for ^_^! There was also the day that I helped weigh chickens, it was like a rodeo event getting the chickens into cages to be weighed. There was also my favourite activity, that dang it only got to do once, scrap chicken poop into a wheelbarrow.

I worked on the kill-floor a few times as well. While on the kill-floor I would get to weigh various internal organs of the chickens. For some kills, samples would be taken from the organs, I got to cut some of the samples and put them into little bags. A memorable kill-floor experience was one where I plucked off the ovaries of the chickens (it was just like picking grapes ~_^).

I saw some interesting skills demonstrated for me. One was watching a summer student learn how to bleed a chicken. It's NOT as bad as it sounds, it's just taking the blood from a chicken as one would take blood from a human. Another interesting skill that I saw demonstrated almost daily was the culling of a chicken. Culling can be construed as chicken mercy killing, in that if there is something wrong with the chicken, then they are culled.

There was also the day when the rare breed chicks hatched and were brought to my barn. They are so cute! Anyway, I got to be one of the lucky few who counted each chick and placed them into there new home. Then a few days later, I assisted in burning off the tip of the beaks of the cute defenceless bundles. It was for there own



good! If the beak isn't burnt off, then there is a greater chance that these chicks will become cannibalistic, and who wants that!?!

I did, though, work on a project. Everyday I would go into the barn and feed the chickens and then bag, tag and freeze the dead or culled chickens. It was always the highlight of my day to obtain to opportunity to pick up a decomposing chicken that had swirls of color, that shouldn't really be there....

The experiment that I worked on was one that involved the stocking density of chickens and gaining the the best feed conversion. Simply put, how many chickens can be cramed into a space and raise for meat for the least amount of expense.

My experience on the farm was very different from what I thought I would be doing when I applied to WISEST, but it's been a great experience. Although, I probaly learned a bit too much about chickens...

One activity I also did was help take down a fence, and taking down fences is what we are all doing by being involved with WISEST, whether it's figuratively or literally...in my case.

halsey hoffman

A MEMORY TO TREASURE



When we look at "modern humans," we begin to understand what has happened to their health. We have strayed far from our evolutionary diet. Nutrition involves everything that concerns people and their food, so that it deals with food supplies and population and with food distribution and preservation. As well as with the functions of the nutrients and the effects of too little and too much (1). Our prehistoric ancestors served as the "laboratory subjects" for many of the foods we eat today. Testing the viability of everything that grew or moved on the earth's surface.

I worked in the department of Agriculture, Food and Nutritional Science under the guidance of Dr. Linda McCargar and masters student Heather Deegan.

My research project involved analyzing dietary and blood work data. Upon my arrival in Nutrition, my supervisor, Heather Deegan was conducting an iron study. This study is focused on Edmonton-area teenagers and was comprised of 7-11 adolescents. As the weeks progressed and a 'certain poster' was to be made, we thought it would be a good idea to get some of the WISEST students involved in the study. This way the students could learn more about my project and learn something relevant to their own health.

Adolescents are an interesting group to study, seeing as they face enormous changes from childhood to adulthood. Changes which include growth and social, psychological and physiological development (2). Females are a special concern since they experience a large amount of blood loss through the onset of menstruation. Eating habits are continually changing and dietary intake must maintain a balance for optimal health. Students are currently healthier and consume most of the requirements of their age group than before (3).

Participants filled out three questionnaires, and had their weight and height measured. One questionnaire was on General Health and another was on Knowledge and Attitudes towards beef. A third form was a 115-item self-administered Food Frequency Questionnaire. Each student also provided a sample of blood which was analyzed for ferritin, transferrin saturation and hemoglobin. These factors would give us an accurate understanding of their iron status.

During my work, my supervisor coordinated special events for us to attend. Each Wednesday afternoon we would attend a research seminar, in which a different researcher would present their project. One morning we spent at the U of A farm and observed pig surgery. Another morning was spent in the physical education department assisting with VO_2 max measurements and other tests of physical fitness. I was taught how to use medline and how to search for journals and various books in the Scott Library.



Tuesday afternoons were dedicated to Rana and the group, Wednesday sessions were always insightful, and the trips we went on were able to surpass our expectations. My typical day at work was in my office, room 4-04, working on the computer and assisting in various small projects.

Throughout the last six weeks I have learned much more than I had expected. This was the first job for most of the WISEST students, and the drift from a school environment to the workplace was a big deal to me. The unbelievable support and dedication on the part of my supervisor allowed me to adjust to the University. Who would have known that the summer would pass by so quickly. Being one of only two male students was awkward at first, but it never seemed to be an issue as the program progressed. There was always one speaker that would refer to the WISEST group as 33 women students, and that would always make Zaki and I wonder what the future had planned for us.

Even though this chapter in our lives has closed, it will give us an opportunity to use the skills we have learned in the future. Some of us will never see each other again, while some of us will see each other once we arrive at the University or even before, but the people we met and the friends we made will never leave our thoughts.

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2. Anderson JSB. The status of adolescent nutrition. Nutrition Today March/April, 1991.

3. Joffe A. Radvic SM. Health Counseling of Adolescents May 1991:344-51. Coffin Lewis, MD. Children's Nutrition 1981:55-71.

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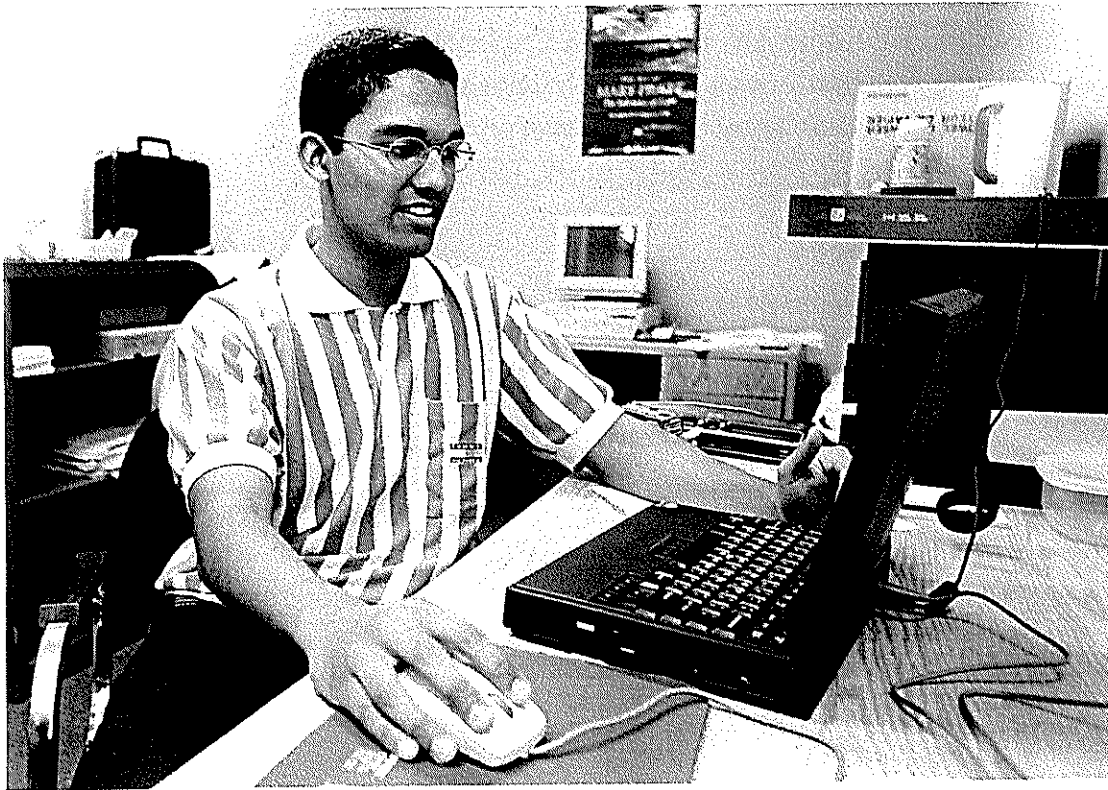
6 Weeks That Will Last Forever

For the past 6 weeks this summer, I had the opportunity to work with Dr. Jane Drummond and her research team in the Faculty of Nursing. When I first found out that I was accepted to WISEST and that I would be working in the Faculty of Nursing, I didn't know what to expect. This was to be my first summer job, and it was in a field that was "non-traditional" for males. Nevertheless, I accepted the job right away.

The first project that I participated in was not a research project. Rather, it was a project that Dr. Drummond was conducting in order to evaluate the primary health-care component of the Head Start programs in Edmonton. Head Start is an early intervention centre-based program for preschool aged children. I was involved in processing the data collected from the Head Start sites and incorporating this data into the final evaluation report that was written for the Capital Health Authority. The data I worked with consisted mainly of demographic and absenteeism/illness statistics from the Head Start sites.

The next project that I worked on was a research project for Health Canada. This project began three years ago and was designed to evaluate the effects of two family centred interventions on family functioning. These interventions were developed by Dr. Drummond and her colleagues at the University of Alberta. My first responsibility was to check the reliability of the data that was collected and merged in one database to the raw data that was gathered over the course of the interventions. The data set for this project contained 977 variables!

I then focused on one specific research question that was designed to assess whether children and parents receiving the family centred approaches in addition to Head Start exhibit greater advances in child and family functioning domains related to



enhanced resiliency. One of the interventions that was administered to the experimental group was the Cooperative Family Learning. This approach was designed to enhancing a family's problem solving abilities and fostering the growth of the family as a unit with the ability to adapt to the challenges of everyday life. The second experimental group received the Natural Teaching Strategies intervention. This intervention focuses on enhancing the caregiver's ability to interact and communicate with the child. I then hypothesized that the Cooperative Family Learning approach would have the greatest effect on family functioning domains as defined by the subscales of the Family Assessment Measure. The results that were gathered from the overall FAM score did not support my hypothesis, but the scores for individual subscales that I hypothesized would definitely be influenced by the CFL did indeed support my hypothesis.

My experience with Dr. Drummond's research team has been a positive one. I have learned a lot about research, qualitative analysis, and, above all, the importance of always maintaining a positive outlook on challenges in life. This last point is the one that the Dr. Drummond and her research emphasises, focusing on the philosophy of the glass being half full, not half empty. Its unfortunate that the WISEST program only lasts for six weeks, but then again, the memories will last forever; after all, the glass is half full, right?

By: Zaki Taher

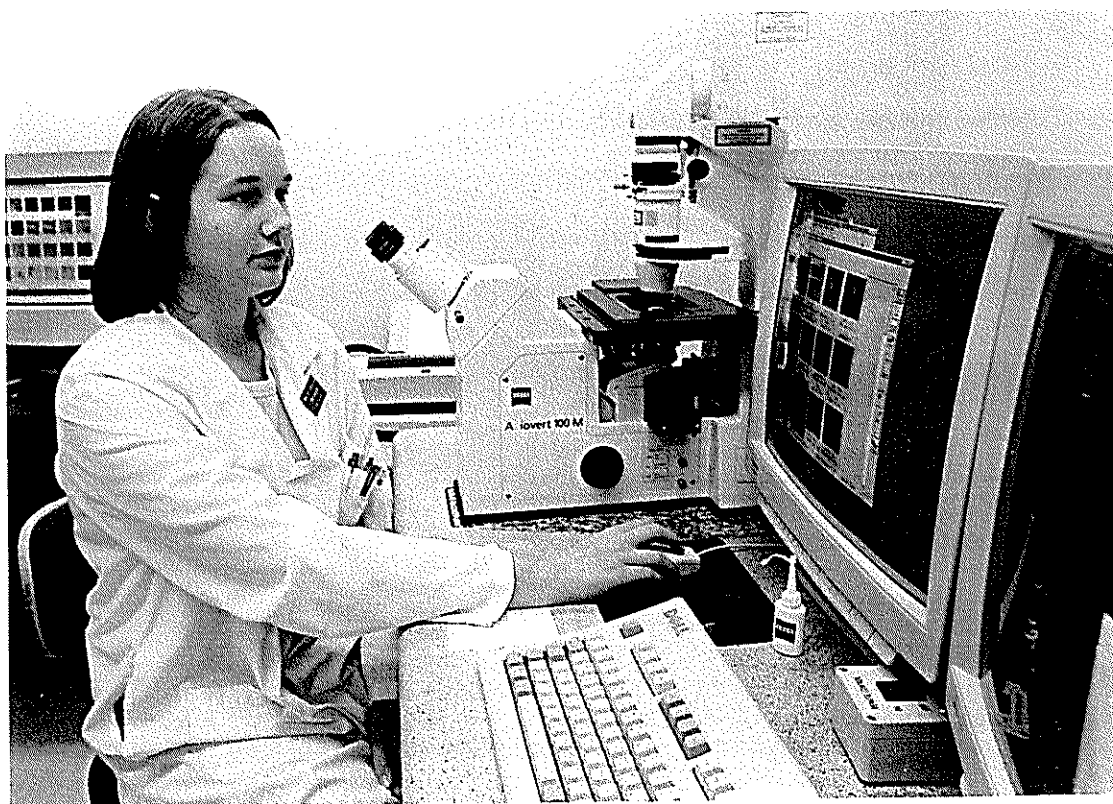
My six week WISEST experience has been phenomenal! I had the opportunity to work under Dr. Pilarski in Experimental Oncology at the Cross Cancer Institute. At first I was worried because I didn't know anything about multiple myeloma, but as soon as I met everyone in my lab I knew I would be fine. Within a week I was able to work independently with machines and microscopes that cost half a million dollars!

Multiple myeloma is a cancer of the plasma cells found mainly in the bone marrow. When plasma cells stop growing and dividing in an orderly manner they form a mass of tissue called a tumor. Malignant tumors will continue to grow and invade healthy tissue until they are surgically removed, destroyed by radiation therapy or cause eventual death. Malignant tumors also produce excessive amounts of normal immunoglobulins or antibodies that interfere with regular body functions.

Research in Dr. Pilarski's laboratory involves studying the molecules involved in the motility of both normal (benign) and cancerous (malignant) lymphocytes throughout the body. It is apparent that receptors play a large role in the motility of cancer cells and detailed examination of a receptor for hyaluronan mediated motility (RHAMM) allows the research team to determine how different isoforms of this receptor affect the growth and spread of myeloma.

The aim of my research project was to determine how antibodies use receptors to adhere to cancer cells or migrate through the body. I incubated human CEM cells, a malignant cell line of pre-T cells, with a series of unconjugated antibodies known for their involvement in the motility of cells. Each antibody detects a different receptor, the $\beta 1$ integrins and CD44. By staining the cells with a conjugated dye, Alexa 488, each antibody bound to a receptor was 'flagged' or 'marked'. Confocal microscopy is a really interesting technique used to produce clear images of stained specimens. By using one of four lasers to excite the dye of the stained cells I can determine the location of each antibody in the cell. I also used flow cytometry which measures the intensity of the stain and therefore the concentration of the receptors.

I performed many procedures where I stained CEM cells both inside and outside. The permeabilization of the CEM cells showed tags within the cytoplasm. The staining of the cells was patchy, or dotted, which suggested localized distribution of the tagged receptors. Within each of the different panels of $\beta 1$ integrins and CD44 there were notable differences in the location of the staining. This showed that the antibodies within each panel recognized different forms of the receptors, and these forms appeared to be differentially distributed in/on the cell.



TOP SEVEN REASONS TO BE A WISEST STUDENT

7. It is a great stepping stone into University
6. You get paid
5. You get to meet interesting people
4. Lab coats never go out of style?!
3. You never have to say "would you like fries with that?"
2. You get free stuff
1. You can work with materials your mother would never let you touch at home

My WISEST experience would not have been as enjoyable without my friendly lab workers. I would like to thank Dr. Linda Pilarski, Dr. X. Sun, Mary, Brian, Jennifer, Sheryl, Nadia, Darlene, Julie, Eva, Karen, Agnes, Juanita and Jen for making me feel like one of the group. Even after weeks of endless questions and problems you guys (gals) were great. Thanks.

Meghan Pehowich
WISEST '98 ☺



My WISEST Experience

I had an interesting summer this year working with the WISEST program. I was lucky to be one of three girls chosen to work and stay at the Meanook Biological Research Station. Working at Meanook gave me the chance to get a feel for different areas of biological science. I was able to work on two projects, and also helped other graduate students. One day I went with the fluxing group, and another time I learned to shake and filter microphyte samples.

I worked as a member of Dr. Cindy Paszkowski's research team on the Researching Amphibian Numbers in Alberta (RANA) project. My first day was spent helping Brian and Jeff weed around and repair the fence and reset pitfall traps. I worked with the frogs/toads every second day. My job was to collect frogs into plastic bags from 42 traps around a small pond. I would take these frogs to the lab and classify, weigh and measure them and also indicated whether they were moving towards or away from the pond. One rainy day I caught 176 frogs/toads, and the least amount caught was 26. In total, over 500 were caught, averaging around 70 every second day. A majority of the amphibians caught were Boreal toads and Wood frogs. I loved frog days because I could work outside and the frogs were so cute. One time I set a bag with a large adult Boreal toad beside the fence, and when I was picking up bags to take them to the lab, I found the bag hopping down the trail, and had to chase it down!

I also was a part of Dr. Bill Tonn's research team. He worked with the ecology of fathead minnows. One job was to dissect the minnows taken from four South Calling Lakes and surrounding ponds. I weighed the fish and measured its standard and tail length. I would use a dissecting microscope to take out the otoliths, four tiny bones found near the brain. I would also weigh and remove the gastrointestinal tract and gonads. I also helped to monitor the ponds by checking and recording nests found on the nestboards and keeping the water levels balanced. The ponds usually needed pumped every day, and three times I got to drive a quad down so I could move the pump to another pond. That was fun! I would also feed the fish in the ponds and in the tanks that were up near the labs. Another thing I did was measure the Young-of-Year (YOY) from 1995-1998. I arranged the samples by their dates then measured the standard and tail length of 15 fish per sample. Thanks to Greg Sandland I was able to use digital calipers so it went pretty fast! I also had my own project that Andy Danylchuk designed. The purpose was to examine the effects of population density on the growth rate of fathead minnows. I caught and measured 150 YOY from the ponds and put 30 in one barrel and 60 of the same size in another barrel. In a third barrel I put 30 large, and 30 smaller minnows together. I ran the experiment for 2 weeks, then measured them again. It was fun working with the little guys!

My favorite thing about working this summer was staying at Meanook. It was just like a summer camp, staying in trailers and having great food and meals. Everyone was great and let us hang out with them even though we were just high school students. I love sports so when we played 4 hours of volleyball my first day, I knew I would have an awesome summer! Evenings were always fun with sports like soccer, ultimate frisbee, basketball and volleyball, or just watching movies, playing Nintendo or talking. I got to go canoeing, horseback riding and also went to Narrow lake one hot afternoon. My last day was great when I got to watch Shelly get drenched with a garden hose after she had soaked me with two water bottles! I had a great summer and want to thank the WISEST staff for letting me be a part of their program. I've made many friends and learned so much, I can't wait to go to university now! Thanks again for an awesome summer!



My Wonderful Summer

Terra Birkigt

This summer was the best summer of my life. I worked at the Meanook Biological Research Station, a really cool place. I did many interesting and neat things there.

I worked on Dr. Susan Hannon's research project that monitored the breeding success of American Redstarts. I spent most of my time outside doing fieldwork. I got to put leg bands on American Redstart chicks, do fledge checks, corvid surveys, and vegetation analysis. It was fabulous.

The leg banding was so neat. First I carried a ladder through thick bush to the nest. Then I stood on the ladder and took the chick down from the nest. I would weigh and measure it, and put the leg bands on its tiny legs. In one of the nests I banded, there was a huge cowbird chick. Cowbirds lay their eggs in the nests of other birds leaving the host parents to care for it. Cowbird chicks grow faster and get more food (because of their size) causing many problems for the redstarts. In this nest the cowbird was so huge it almost smothered the other chicks. We do not put leg bands on cowbird chicks but we weigh and measure them.

Of all the wonderful things I did this summer, I would have to say that fledge checks were my favorite. We went out to the nest ten days after the chicks had hatched to see if they were still in their nest. If they were, we would come back the next day. If they were not we stayed near the nest tree and waited for the parents to come back to feed them. When the parent returned it would fly around the nearby trees for several minutes before going to the fledgling and giving it food. We would wait there for up to an hour. If we did not see the fledgling by then, we would come back for the next few days. If we saw one, then we would call that nest a success. The other fledglings were probably around, too. I had only worked on the project for a short time but it still gave me a satisfying feeling to see the successful fledglings.

We had a cool video camera that was attached to one nest that had a cowbird in it. We wanted to see what happened during a cowbird fledge, if the redstarts would live and fledge too or if they just were not strong enough to. We were not able to see the cowbird fledge, but we did get to see something just as informative. A Sharp-shinned Hawk or a Cooper's Hawk swooped down and snatched up the cowbird and redstart chicks from their nest. Then it came back and cleaned itself in front of the camera. It was quite a sight to see.

Corvid surveys were interesting. We drove around all the roads at Meanook, travelling at 30 km/h looking for crows, ravens, blue jays, other predators and cows. Cowbirds live near cows. When we saw any of these we would mark what it was and where we had seen it on a map.

I did a lot of vegetation analysis (affectionately known as veg). Some people don't seem to enjoy it, but I think it is pretty neat. I did veg on the areas around the nest trees, measuring the distances between trees and identifying some of the plants. I think it is so neat to be able to look at all the plants around you and be able to know what each one is, something I can not do yet, but I have learned many of them. I also did veg on random plots. We chose where to do veg by drawing distances (e.g. 200 m East, 350 m South) out of a hat. These spots acted as controls. We measured the distance by pacing it out and using a compass to go in a straight line in the right direction. Random plots sometimes cause problems. In one plot we would have been in the living room of one of our neighbors. Often we ended up in what seemed like the exact center of a stinging nettle or rose bush



patch. I did a third type of veg to categorize the woodlots. It was similar to the random plot veg. We measured the distance in the same way and usually ended up in the most awkward places. Veg was a lot of fun.

When we finished all the veg, I did a bit of data entry and then the part of the project that was done at Meanook was over. The two major problems that appear to affect the reproductive success of American Redstarts are predation and Brown-headed Cowbird parasitism. It was a great project to work on, and I am very happy I had the chance to. Thanks a million Dr. Hannon, Cindy, Conrad, and April.

When my project finished I helped other people do theirs. There are many projects happening at Meanook and I tried many of them out. First I helped some other birders finish their veg. They did more detailed veg than I had done before, so I got to learn more herbaceous plants, which was neat.

I also helped a master's student who was looking at epiphytes (the algae that grows on macrophytes).

I had the chance to work with fluxers for a few days. These people measure methane gas emissions from wetlands with very complicated machines. They can do all sorts of neat things like measuring the rate of photosynthesis of plants. I used syringes to get their methane samples when I helped them. It was really cool.

I also worked with Vivian in the Water Chemistry Lab. It was neat to test the samples for different things and use some of their machines.

I had a marvelous time living and working at Meanook. I will never forget it. My stay there really showed me how amazing and interesting biology is. I had a great summer with my two new friends, Vivian and Emma. Thank you everyone at WISEST and everyone at Meanook for making my experience so wonderful.

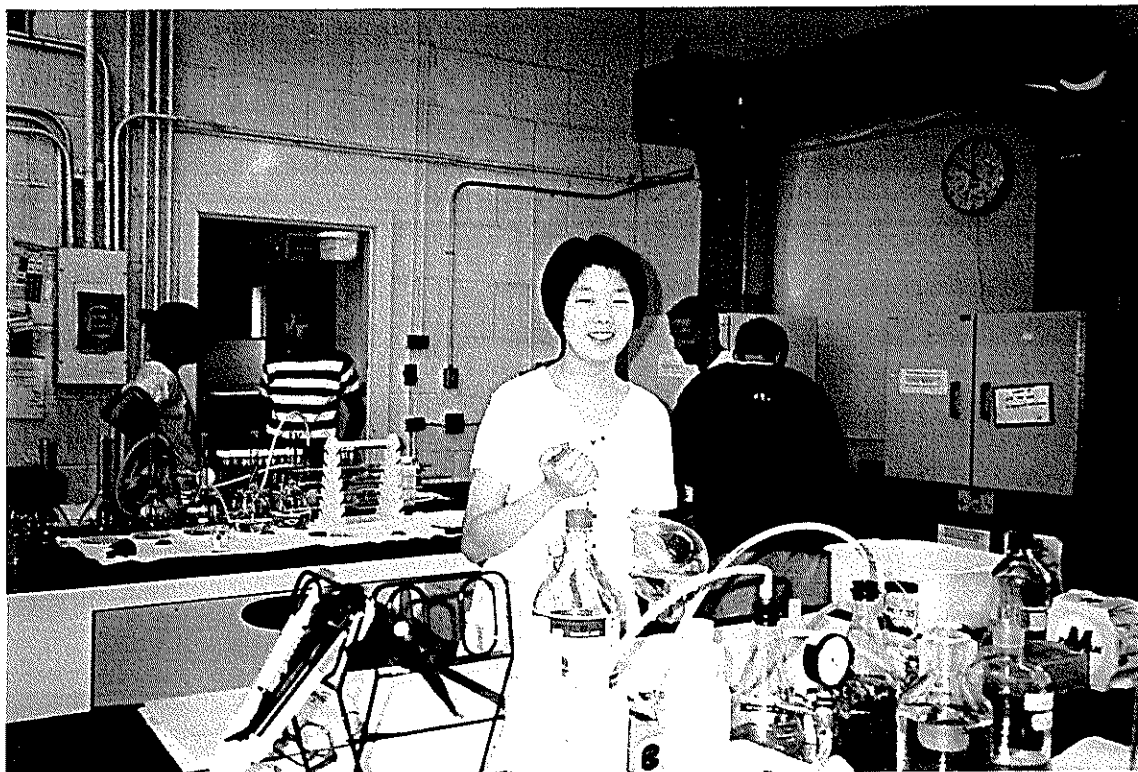
Water, Plants, Birds and Fish: An Unforgettable Summer

Vivian Woo

Convincing me that I would have a great summer at the Meanook Biological Research Station, didn't take very long. Although overwhelmed with information on my first morning, I was able to learn quickly and comfortably as a result of the patience and encouragement of many experienced individuals. The laboratory dealt with Water Chemistry (Limnology), meaning the analysis of water samples taken from northern Alberta's bodies of water. We tested for the presence of phosphorus, nitrogen, nitrates/nitrites, and several cations (ie. Mg^{+} , Na^{+} , K^{+}). As well, conductivity, pH, alkalinity and light absorbency levels were measured. Doing these analyses involved many instruments, for example the spectrophotometer, whose names I could hardly pronounce in the beginning, let alone operate. Yet, gradually I was able to adapt to the operations and procedures in the lab; labeling and organizing samples, and identifying what tests needed to be done with them. In addition, I found that complete organization and detailed procedures must be adhered to, to maintain precise evidence. By continuing with this precedent I became more disciplined with work tactics. From the laboratory I gained experience in independent work, which increased self-confidence in my chemistry abilities.

Not only did this opportunity provide me with confidence, but with the opportunity to meet and talk with researchers bringing in their samples. From these encounters I discovered what goes into recovering those 2 litres of sample water. For that reason, I grew to appreciate all the effort and capital (i.e. using helicopters to get to certain lake areas) invested into the water that I was testing. Absolutely AMAZING!!

The Meanook Biological Research Station is also a sea of exciting projects. More than once I was able to take part in intriguing research outings. A few separate times I helped a masters student and a bird researcher finish their vegetation analyses (an important aspect of bird research). From these experiences I learned quite a few plant and bird identities. This information was especially neat, since being a "☺ city slicker ☺" I knew hardly any initially. Now when I go for a walk in the forest, I can actually identify certain organisms. Also, I took part in a field day expedition with a group affectionately known as the Fluxers. This group collects methane gas emissions from northern Alberta wetlands. Their purpose is to discover the affect of methane emissions on plant photosynthesis. This type of effort was especially interesting, as I could see its pressing application to humanity. As well, a couple mornings I was able to help Emma with her amphibian project, capturing, measuring, weighing and identifying frogs and toads. This was great because I was able to handle living organisms. Emma also taught me how to dissect a minnow. An interesting aspect of this task, was discovering tiny bones in the head which when analyzed revealed the age of the fish to the very day. As you can see, I was able to gain experiences in both raw collection of data and data analysis.



Near the end of my stay at Meanook, I helped another masters student with chlorophyll tests. She had collected macrophytes (seaweed) from several lakes by means of diving, and was then testing for the presence of epiphyton (a type of paraphyton - the stuff that grows on water plants and rocks, to make them slippery). For this analysis, we had to work in a dark room, under green light so as not to overexpose the chlorophyll.

My Meanook experience proved extremely helpful in swaying me to the exciting sciences, and broadening my perceptions of this colossal area. There seems no end to the possibilities of research, in particular, in the Biological Sciences. As the summer draws to an end, and my term at Meanook is completed, I look back and see that this was definitely a summer worth remembering... I discovered two very awesome friends (Terra & Emma - Thanx guys!), I met interesting and inspiring individuals, and I found a direction for the future. Thank you to all those who were a part of this unforgettable experience! Much appreciation and gratitude goes to the WISEST program, its sponsors, and the Meanook Biological Research Station.

