Project 2

Su Ling Chong
August 12, 1988

Department of Computing Science
The University of Alberta
Edmonton, Alberta T6J 2H1

PROJECT 2

Su Ling Chong

INTRODUCTION

This report is written as part of the WISEST project, on the last two weeks of the six weeks program. WISEST is a program which is funded by the government to encourage both males and females into non-traditionals occupations. It is a six weeks program that ran from July 4th till August 12th of 1988. Of the sixty applications that were received, only twenty- six were chosen. The coordinator of the program this year, was Furugh Ardakani. Dr. Armour, however, is the chairperson of the Women in Scholarship, Engineering, Science and Technology program.

I was placed in the department of Computing Science. My supervisor's name is Ursula Maydell, who is not only a professor but an associate chairperson for the year of 88/89 as well. The people I got acquainted with are Carol Smith (program analyst), Jim Easton (computer analyst), Mike MacGregor(a graduate student who is working on his Ph.D), Hareton Leung(same as Mike), Terry Lai(a graduate student who has just received his Master's degree), May Wong (another WISEST student who is also in Computing Science), and most of the people working for this department on the 6th floor of GSB. The hours are from 8 to 4 but I sometimes stay longer (especially during the last week).

I was informed earlier that my project would be the simulating the a network project. Professor Maydell decided that I should allocate the first four weeks of my time to simulating the performance of the ACR/NEMA Protocol, and the other two weeks doing this report. However, time and Murphy's Law did not permit it to turn out like so. As a result, the last two weeks were spent both writing up the report and trying to obtain one more simulation result before anymore complications could result.

This report is separated into two sections. The first is written in the first person format, while the second part is written in a passive voice in a formal report format. The first sections is about the things that I have learned throughout the six weeks, while the second is about my research project. The first sections deals with my first real job, a more knowledgeable me, working with Frame Maker, learning about "learn", the different ways of communicating, the shell difference, being exposed to the Sun(dre), and filling my spare time with the funnies. The second section, as previously mentioned, is about my simulation of the performance of the ACR/NEMA Protocol.

1. My First Real Job

Did I think this was going to be easy? Definitely not! From the first day of my 6 weeks in the WISEST program, which is an acronym for Women In Scholarship Engineering, Science and Technology, I did not know what to expect. I only knew that I would get quite an experience out of working in the Computing Science department, in the General Services Building (GSB). I was provided with an office which I shared with a computer analyst, Jim Easton, and I was also provided with a UNIX computer to work with. It was a Pembina with a very stiff keyboard. So began my job.

My daily routine consisted of arriving at the building every morning, ten minutes before eight , and leaving at ten after four, with an early departure on every Wednesday at three o'clock. I usually come in Saturdays so I can start new simulations.

1.1. An Enlightened me

After almost 5 weeks of "cluelessness," meaningless computer terminologies I had learned in school actually started to make some sense to me. Sophisticated computer terms are used here as often as if they were the common everyday language. I can even tell the difference between the name of a machine and the name of a system. For instance, Cavell, Pembina, Cadomin, Manning, Jasper, Sundre, Sunever are all names of machines. UNIX, MTS, and the Sun Unix are all names of the different type of systems. However, what a "system" actually is, I am still not quite sure. To make matters worst, there are also names

1800/128, 180/13, 90/6, which all have a load of 2.096e+6 bits, 500/35, 210/15, 112/8, 84/6, 60/4, which all have a load of 3.360e+7 bits, 280/20, and 140/10, which have loads of 1.728e+8 bits. The differences of the image delay and packet delay were plotted and compared. Next the averages and the maximum call set-ups times[1] in milliseconds of the ACR/NEMA were also taken. Almost all of the simulations were ran in Manning, a MIPS System, for it was the fastest machine available that can handle the job load.

8.1. Interpretations of the different data obtained

Regarding the image delays in table 1 and 2, a tremendous difference in speed was noted. For instance, in reference to the inter-arrival times of 112/8, on the ACR/NEMA, there were approximately 8 seconds of delay on the average and 47 seconds maximum. On the TOKEN RING, however, there were only 2 seconds of delay on the average, and a maximum of only approximately 6 seconds. Also, for the inter- arrival time of 280/20, the ACR/NEMA Protocol has an average delay of 122 seconds and 536 seconds of maximum delay. The TOKEN RING, however, once again took less time: an average of 13.6 seconds and 52.6 second maximum. Both the figures 1 and 2 and table 1 showed a the widening of the gap as the image get bigger. This is also obvious in both the figure 3 and 4 graph and table 3. However, this data also gives evidence to both the ACR/NEMA Protocol and the TOKEN RING reaching a limit of some sort. These conclusions, however, are not positive, for the simulations were incomplete. On the other hand, adequate amount of simulations were conducted to show the direction from the results obtained.

9. IT'S ALIVE!! (Overall Impression)

This has been one of the most beneficial summer I have ever had. I not only get to experience what a real job would feel like, but what the research end of things are like as well. Consequently, this has also been the most frustrating summer I have ever experienced. When Mike mentioned that one needs a lot of patience, he was not joking, as I gradually found out. It is very difficult to explain, for there are various

* load is referred here as the size of the image.

[1] ** the call set-up times referred to the time it takes to establish connection.

types of patience. This type, however, is the most demanding on one's physical and mental health. I consider myself quite successful in getting out of it with only my brain reprogrammed to speak, eat, and sleep computer, my fingers constantly reaching out for a keyboard to type on, and my rear forever glued to a chair. The worst part is that I have even started to enjoy the constant beep of a computer, the dinging of the elevator in GSB, and the deafenening hum of the air conditioner in my office.

However, other than that, it has been a very enjoyable summer for me. I have become comfortable with the campus, as well as with all the people here. If someone had approach me 6 weeks ago and told me that they were working on their Ph.D, I would have looked upon them with awe, now I realized that some of them are just like me, except of course, a lot more knowledgeable. I would never have guessed that some of them can act so immature or even joke around like me.

With the Frame Maker that I have tried, I realized that computers are pretty efficient tools. The Vax, however sophisticated, are still fairly slow. This experience has convinced me even more that I should attend a university ,and maybe even try to obtain a doctorate degree.

Although it has been fun simulating the ACR/NEMA Protocol, there are times when I felt like it has been a waste of time. One of the things I hated most was to finally obtain a result that has been running for 3 to 4 days, only to find out that it has reached the time limit set but still has not received all the messages(images) that were required. Another just as hated is when a result is finally obtained, it turns out to be the wrong ones. Similarly (I am convinced that the computers do not like me), when I have just came in on the weekend, especially to run a simulation, what sometimes happened is that the system would crash (died). This meant that any program that was running during that time will be gone. Yet another wasted effort! It seemed like for the past 6 weeks, I have often asked myself why these things have to happened to me, and why do they occured at that time. There are also times when I felt like throwing the computer out the window, but since it was not mine to do as I pleased, I restrained. Lastly, my most hated occurence is when a simulation has been running for 3 to 4 days, but no file of that result can be found! Weird? I am starting to believe that these computers have a mind of their own.

WISEST Summer Research

Mechanical Engineering

Gail Thornton
August 16, 1988

Gail Thornton
August 16, 1988

WISEST Summer Research
Mechanical Engineering

To review my experience in the WISEST program is indeed a difficult task. When recalling the activities, people, and personal growth, it is too abundant for any paper. Nonetheless, a summary must be offered to reflect the success of the program for me.

My research project was in the Department of Mechanical Engineering involving the wear and fatigue of oil field components. These components included sucker rods, scrapers, and rollers. I learned about the setup and use of the complex materials testing machines, measuring devices and measuring machines. This data acquistion was followed by calculations for data reduction. When that was completed, a final presentation was made manually or using computer word processing or graphics. Of the six types of testing I was involved in, I performed several of these tasks for each. This gave me a chance not only to practice and perfect certain skills but to understand and gain interest and desire for further knowledge in each of the areas of testing.

As well, I participated in actvities other than the assigned research project. Similar work was performed in grader blade testing. However, I had a chance to experience things even further removed. In the computing field, I learned about robotics and the internal workings of the computer. Using an air wrench and an acetylene cutting torch, and welding are examples of my unforgettable

activities. Fortunately, due to the open atmosphere, I had the opportunity to learn about many different things occurring in the Mechanical Engineering building.

The people that surrounded me at work enhanced the learning situation. The emphasis was to see and learn as much as possible in the time spent there and everyone was willing to help if available. Nonetheless, the work that I performed was important real research not simply busy work to fill in time. High responsibility was placed on me as the majority of my work was, after review, passed on not only to my supervisor but to the people employing the university for research and consultation. I compliment all those that I worked with in their ability to make me feel comfortable and capable in a working situation. I must emphasize that it is due to these people that WISEST has been such a positive experience.

Finally, I wish to state the personal impact the experience has had. I realized that I am capable of performing complex technical tasks that I never before would have thought I could. As well, I had some once in a lifetime opportunities that enforced in me an outgoing approach to learning. Pride and responsibility are both important ideals that the program reinforces. I had an excellent work experience not only in the practical sense but in an internal sense that forces me promote this program not only for me but for the experience that someone else could and should have.

In conclusion, I wish to restate several important concepts. The research aspect offered a chance to learn about the realities of experimentation and analysis, as well as, the specifics of the testing I was involved in. The activities other than research allowed for learning opportunities in the total work setting. The people emphasized aggressive pursuit of learning due to its once in a lifetime nature. Personally, the experience the program has offered me has encouraged some positive changes. Undoubtedly, the WISEST program has been a success for me and I hope for greater success in its future.

Wisest Summer Project August 12, 198

My summer project for this summer was supposed to be semi-conductor research. When I arrived the semi-conductor apparatus was acting up so it was not suitable to take readings with. So for the first 2 1/2 weeks I was engaged in research into the diffuse reflectivity of wood. I ran the apparatus and entered the data into the OSBORNE computer, and constructed graphs. During my 3rd week I cut a brass block with a diamond saw for preparing samples for the semi-conductor machine. Over the long weekend the diffusion pump was unplugged but the mechanical pump wasn't. This resulted in oil being sucked into the sample chamber of the apparatus. Dr Wiechman returns and sets us, an undergrad & me, to making samples and putting leads on them. The sample holder is being sand blasted. Attempts at making samples prove unsuccessful for the next two weeks. The chamber is clean and the apparatus reassembled but leaks developed in the chamber. I make two new switches which seem to be working well enough. The major leaks are stopped but the vacuum remains poor. I do two runs on the old sample. We find out that the wafer we have been making samples from is not GaAs but Si. We make samples from the correct material

WISEST 1988

Ann Chan
Department of Botany

Supervisers: Dr. David Cass, Ph.D
Sheila Bokenfohr, B.Sc.
George Fabi, B.S.

Projects: Growth of corn protoplasts
Bacterial infection of canola

WEEK 1

-Sectioning of poppy gynoecia in paraffin using Spencer 820 Microtome: 10-15 um ribbons
-Placing ribbons on slides: thin layer of Haupt's Adhesive, 4% Formalin, line ribbons (3 or 4), heat for 45-60 sec (temp. must be below 56 degrees celcius, approx. 50) so that the sections will flatten out
-Staining slides with safranin and fast green

1.	xylene	30 min
2.	xylene	30 min
3.	xylene/absolute EtOH	30 min
4.	absolute EtOH	30 min
5.	95% EtOH	30 min
6.	70% EtOH	30 min
7.	safranin	24-48 hrs
8.	water (wash)	2 min
9.	fast green	15 sec
10.	clearing solution	2 min
11.	absolute EtOH	5 min
12.	xylene/absolute EtOH	5 min
13.	xylene	15 min
14.	xylene	15 min

-mount slides with clear mount between slide and cover slip, heat overnight until it hardens and is ready for microscopy
-Basic microscopy: bright field, phase-2, Nomarski, filters
-Tour of the green house: simulations of different climates
-Dark Room: photo developing (time frames for developer, stop bath, fixer), shadow casting, focusing
-Mounting gynoecia on wooden blocks using heated paraffin, labelling

WEEK 2

-collecting poppy buds from green house
-Isolating gynoecia from buds under microscope
-Paraffin fixation

1.	tissue in FAA fixative	4 hrs
2.	dehydration series #1 to #5	30 min @
3.	100% TBA w/3 changes	8 hrs to overnight @
4.	1:1 TBA:paraffin oil w/3 changes	1 hr @

5. paraffin infiltration
   a) Fill vial half full of paraffin. Solidify.

b) Place tissue from #4 on top of solidified paraffin. Add enough of #4 solutioin to cover tissue.
c) Place in oven for infiltration
d) Change paraffin 3 times 30 mins @

6. embedding tissue in embedding tray
a) Coat tray with photoflo
b) Fill tray half full with paraffin. Place tray on hot plate.
c) Pour excess paraffin off tissue in vial. Arrange tissue in tray. Top tray with paraffin.
d) Label tissue in tray

Notice: tissue must sink during procedure #1-#4. If not, they then have to be aspirated in the vacuum oven

-Microscope Photography: loading film (Kodak Plus-X Pan) onto film canister, loading film into camera, recording subjects and magnification, shooting poppy gynoecia, corn pollen grains, cheek cells

-Plastic Sectioning: cutting glass knives using Bromma LKB 7800 Knifemaker, mounting boats on knives using nail polish, cutting plastic blocks the right size for sectioning with Reichert Om U2 microtome, corn pollen sections thickness up to 2.0 um

WEEK 3

-Developing negatives: unloading film from film canister and reloading in developing box, developer, stop bath, fixer, rinse, photoflo, hang dry

-Dark Room work: developing photos with Kodak F3 photographic paper using different exposure times and shadow casting techniques, also different developing times

-More Plastic Sectioning: staining with TBO (drops on slide and heat for 10 sec, wash off and mount with cover slips)

WEEK 4

-Staining with	periodic acid(1%)	10 min
	wash w/water	5 min
Staining with	Schiff Reagent	10 min
	wash w/water	5 min

Staining with TBO (see end of WEEK 3)

Notice: Above procedures must be performed without cover slips on slides

-Scanning Electron Microscope (SEM): 3-D images of poppy gynoecia including ovules, placenta, and integuments

-Plastic Sectioning: 0.5 um

-Stages of mitosis in poppy gynoecium: metaphase & telophase

-Trial with new stains: ferric acid and orange-G,but concluded as nonsuitable for plastic sections for the reasons of insufficient color contrasts, decaying of plastic tissue, and humanly unacceptable odor.

WEEK 5

-Photos of different stages of mitosis with Scanning Electron Microscope (SEM), by a former graduate student, with truly amazing 3-D image.
-Corn pollen bursting techniques: collect pollens, place in test tubes, add corn medium, spin until cloudy on top and settled on bottom, pipet out cloudy fluid and place on slides, search for protoplasts (alive if clear; dead if solid) which are spherical and about 40 um in diameter.
-Corn medium: 10.0 ml salt solution
1.00 g glucose
0.460 g manitol
-Preparing DAPI fluorescein stain for corn pollen tubes; stains DNA.
-Sectioning of canola pollens with Ultracut E microtome: more automatic and conventional than the Reichert Om U2 microtome. Also new technique: using wax on block to produce ribbons.
-Microscope photography with internal camera (instead of top loading camera) using Kodak Ektachrome (color) film

WEEK 6

-Preparing green FDA flourescein stain (lasts for 2 hours only) for viability count of canola pollens (alive if bright; dead if dull).
1. 0.005 mg of flourescein diacetate in 1.00 ml of acetate
2. Dilute with 50 ml of canola medium
Also tested on corn pollens but results were not favorable.
-Tour of biochemical lab: Leminar Flow Hood, cell counting device etc.
-Resin (plastic) embedding of poppy gynoecia

The six weeks at WISEST was spent as follows:

2 weeks at Garneau professional Building with Dr. Joan Ford

3 weeks at Clinical sciences building with Prof. Olive Yonge

6 days with Dr. Judith Hibberd

1 day with Dr. Sharon Richardson

Periodical searches, filing and literature reviews were done for Dr. Ford, Data collection and periodical searches were done for Prof. Yonge Periodical searches were done for Dr Hibberd and Richardson. Also, assistance was given in the use of the computer. A new perspective of the university in general was established and knowledge of research in particular increased substantially.

-= Moira Lee =-

WISEST Summer Job

For six weeks this summer, as a participant in the *Wisest* program, I worked in the Clinical Sciences Building for two doctors from the Faculty of Nursing. While working for the first four weeks with my first supervisor, *Dr. J. Morse,* I was involved in several projects. My main task was to do periodical research for her and other researchers in her office. This entailed going to several of the University of Alberta's libraries (Health Sciences, Rutherford North, Rutherford South, Cameron, as well as the Law Library). Usually, I would be given references from various periodicals and would then search for other articles mentioned in them. As well as doing this research work, I helped with other projects being undertaken. I helped to make graphs and maps, dubbed video-cassette tapes, did a large amount of photocopying, and learnt how to use several programs for the Macintosh microcomputer.

During the last two weeks, I worked for *Dr. T. Davis,* my second supervisor. While working for Dr.Davis, I essentially did the same type of work as I did for Dr. Morse, however, there was a greater emphasis on library research. I spent many days (mainly in the Health Sciences Library) locating and photocopying articles that Dr. Davis needed. Furthermore, I extensively used the Medline and Psyclit Compact Disc ROM databases to search for additional articles in areas pertinent to her research. This allowed her to locate other articles which might have otherwise remained undisclosed.

As a result of the six weeks of work I did this summer, I have learnt many new things, the most impotant of which is, how to locate various periodicals and other publications in the University's Libraries. I am certain that this will be an invaluable aid to me in the not-too-distant future. As well, I now realize that Nursing research is similar to any other type of research and that beforehand, I had a limited idea about the type of work nurses do. Even though Nursing is at the back of my list of possible future career choices, I can say with a fairly large degree of honesty that I enjoyed working for the last six weeks in the Department of Nursing and that in the future, I will attempt to be less prejudiced when dealing with those professions that I do not know a great deal about.

-Mark Prystajecky-

Microbiology
Jeanine Khemlulla

My WISEST Summer

The summer started off kind of slowly - I found the introductory meeting boring. The morning dragged as people were shown one by one to their supervisors. This could perhaps have been better organized. I was soon introduced to my supervisor in the Microbiology department - Dr. Stemke. He scared me. He began be telling my about his research; it sounded very interesting and the professor was careful to make sure I understood what I was talking about. He then went on to say how important precision was in the lab. Instructions had to be carefully followed, precisely, of course, tasks had to be done efficiently and correctly. And everything had to be labelled with the date and MY NAME. So that if anything went wrong, he'd know who to blame. (Though he didn't say it in quite those words) With those words, he asked me if I'd ever ~~spent~~ worked on an IBM computer. Though I hadn't, he soon set me to formatting disks. Boring. In the afternoon, he told me to go around the lab, open all the drawers & cabinets and figure out what & where everything was. I had never seen so much glassware! It was amazing. Though I recognized much of it, there were many machines making funny noises. Megan, a university student also working in the lab, was kind enough to tell me what everything did. And so many fridges! 4 of them and a walk in 37°C room and a walk-in 4°C room. I was in awe. Thus ended my first day.

I soon discovered there was no glassware to wash. Instead, it was sent out to be washed. Guess who got to put it back in its proper place? However, I enjoyed the task. I actually remembered where most things went! And I got my first task - make up LB broth - medium for growing bacteria. Megan showed me how and stood by while I tried. It was great. The week continued as such. I did easy things, asked a lot of questions and got in the way. I felt like a bit of a nuisance But it was fun. However, it was not to last.

My first day of the second week, he asked me to prove I could pipet - a technique that was demonstrated to us once in grade ten. I had tried it only once. And all of a sudden I had to be a whiz at it. He didn't seem to understand that I was just a kid! Needless to say, I spent most of the morning perfecting (attempting?) the skill. By the afternoon, he had another challenge - Enzyme Assay. 200 test tubes with - maybe - some enzyme in them. My job was to determine if the enzyme was present and how much. He ran through the steps quickly, expecting me to understand. He then reminded me that this had to be done quickly (speed is of essence in an enzyme assay) and my pipeting had to be very accurate (remember my new-found skill?). Let's just say that if it hadn't been for Megan, I would have died. Even so, we screwed up and had to start again.

The summer progressed that way. It was challenge after challenge. As I mastered new skills, I became more confidant in my ability to do them properly. I think by now I could do an enzyme assay in my sleep. However, though I learned a great deal, I still think that, to a certain degree, he expected too much. I still don't pipet as well as Megan does. That takes practice. More than six weeks worth. But he tended to forget.

I must say, though, that I am glad I got so much responsibility. It was interesting and I learned a lot. It was real scientist work. I would rather be doing something challenging than washing beakers.

It was a great summer. Thanks!

Jeanine Rhemtulla

Winnie Sia — Department of Chemistry

The following is the brief description of my achievements in the past six weeks.

During the first one to two weeks, I worked with phenol-sulfuric and Biorad which are colorimetric methods for the determination of sugars and protein respectively. My job was to do a standard curve by using different volumes of the same sugar or protein solutions for which, when added with phenol-sulfuric ~~and~~ or Biorad, the darkness of the color of the solution increases proportionally with the amount or volume of the sugar/protein solution. Then, by using "Spectrophotometer 20", I measured the absorbance in 490 nm or 595 nm wavelength and the readings obtained would contribute to the standard curve. Analysis of the curve is then done as to the linearity, slope and y-intercept of the line. The real purpose, though, is the determination of the amount of sugar or protein present in an unknown sample.

Once I had the basic techniques for the colorimetric methods developed, I focused my attention onto a new project - enzyme isolation. Although this project has the basic techniques and procedure — mixing with buffers, centrifuge, remove supernatants or pellets, transfer pellets etc — it is amazing to see the variety of projects built around the same project. We did

enzyme isolations on bean sprouts and pea seedlings, both of which contained the enzyme that was of interest. This enzyme, which had only been found exclusively in mammals ~~of blood~~ which accounts for blood group, was recently found in mung beans. The existence and the function of the enzyme still remain as a mystery. Numerous isolations were done on bean sprouts with a variation each time. For instance, bean sprouts were sprouted on different days so that on one day, when collecting the bean sprouts, they would be at different ~~stages~~ of development. Enzyme and protein assays were done on the isolated enzymes to see ~~if~~ in fact ~~not~~ the stage of development at which the enzyme activity increases dramatically. As well, we separated bean sprouts or pea seedlings into different "body parts" and isolations were done on each to see which one has an indication of producing the enzyme. Also, there were other experiments with the usefulness of Triton X-100 as the detergent. Other possibilities of detergents such as CHAPS, octyl-glucoside, and Zwittergent were also tested.

What I basically do is to perform the enzyme isolations in order to produce the ~~protein~~ substance containing the particular enzyme of our interest. Then protein assays, which is the same as BioRad ~~#~~ (mentioned previously), were done to find out the amount of protein present. Enzyme assays, using radioactive C^{14}, were

performed by a grad student in the lab with whom I work closely. Once the results from both assays were obtained, analysis was made. Attention was paid to any particular trend arised in the results.

Certainly, there are numerous details of the research which haven't been mentioned yet. However, some of them are worth being mentioned.

First, enzymes react much more slowly at a lower temperature, leading to the result for the procedure to be carried out in the cold room, which is a big chemical fridge at 4 °C. Somehow I survived the cold and no influenza diseases have successfully conquered my white blood cells yet.

Secondly, one of the most enjoyable aspects of researches is the friendship established with the people in the lab. The professor, grad student, lab technicians were all very willing to teach me new things as I experienced more and more. They have also been supportive of my decision making and their guidance has been invaluable. We also take leisure breaks to go golfing. As for me, an inexperienced golfer and researcher, I picked up a few tips on golfing, too.

As it is, for the past six weeks that made my summer (this year) memorable, not only had I acquired the basic research skills, I also learned that golfing is one of the necessities in life!

August 12, 1988.

TO: Furugh Ardakani, Program Co-ordinator or whoever it may concern.

FROM: Paul Sabharwal. One of the WISEST students assigned to the Department of Family Studies.

SUBJECT: The new things I learned and experienced in the six weeks during which I was under this program.

When I first applied for this job as a WISEST student I was fairly well-informed of the programs objectives and its implications for me, as a part of it. I knew that it was going to be a very useful, informative and an especially fun and wild experience. Believe me, the above words fall short of the experiences I have had in the past six weeks. The following paragraphs will illustrate this fact.

The first week which I spent working in the Family Studies Department was particularily interesting, hectic, and puzzling even though it was very confusing. I usually spent my free time during lunch hours wandering in and around various buildings on campus. I got lost in the middle of many of the gigantic buildings and once I even got lost in the 'Government Publications' section of Cameron Library. The Campus Tour which we had on July 6th was fairly well organised but I hardly grasped much of the Campus structure in that tour because I was too confused already. As a result, I frequently took refuge in my own office(for which I had my own key) and worked even through lunch time.

In the following week, on Monday, one of my two supervisors, Dr. Brenda Munro, took me on a tour of the four main libraries on campus; Cameron, Rutherford, Health Sciences and the one in the Education Building. She introduced me to the catalog system of the libraries on the computers. At first it seemed awkward that every book was given a number and you had to locate the book by knowing the number. However, I managed to grasp a few of the main points about locating a book in any of the libraries. Anyway, on Wednesday, in the same week we were given a library tour by Sandy Campbell and suddenly every aspect of the library system seemed to fall into place in my mind and from there onwards I experienced virtually no trouble in locating any of the libraries or the books in them. Even now, when I visit one of the libraries and I see a person who is totally lost trying to figure out how to operate one of the computers I feel glad that I had a chance to learn it beforehand. I am pretty sure that I won't have any such difficulty when I enter the University of Alberta.

Moreover, I also know where most of the buildings are as well.

The next four weeks were fairly calm and relatively organised. I began to work with a lot more zest, now that I was comfortable and accustomed with the atmosphere of the University. My working hours became more or less regular and I really began to enjoy myself, although, I had already begun to miss the confusing and puzzling hours I had spent in the first two weeks of my job. On Wednesday, July 20th we were introduced to Tracy Bodner who informed us adequately about Career Placement and Job Prospects and also briefed us on the career placement services offered by the University, located in the Students Union Building (SUB). I had no idea that such a service existed and that many of the job interviews were also conducted by this service. I even visited the office in the Students Union Building and found it extremely homely and the people their to help really did their job. It was essentially one of the most interesting things which came to my attention while on campus.

During these weeks I learned how to operate Apple IIc computers and Apple Macintosh computers and I learned how to operate a photocopying machine, with or without copicards. Furthermore, I did some printing for one of my supervisors, Dr. Diane Kieren, on one of the word processors located in our department. I made a fairly large amount of photocopies and I also did a considerable amount of editing. I also had to do some research for both of my supervisors by either going to the libraries and selecting books and then making photocopies or making notes and reports from various books. I was also given a research project to wrap-up. The project was an undertaking designed to reveal and investigate the problems experienced by diabetics and their families as a whole. I read and studied most of the data which was collected and it gave me a fairly good idea about the methods and strategies used to conduct a research of this kind, or any research for that matter.

One of the sessions we had on July 27th about people in non-traditional jobs was also very useful and it further endorsed the fact in my mind that women and men must enter non-traditional jobs in order to break down those barriers which prevent progress and development. It is extremely important that the potential for any person to perform any job adequately and excellently be recognised, whether male or female. One of my supervisors, Dr. Diane Kieren, also gave me a tour of the Home-Economics and Textile Department which was extremely useful in explaining the above point and in showing me that stereotyped traditional areas such as food-research and textile-research can be as scientific and sophisticated as Engineering or any other area. For this reason, I hope to take one of the courses offered by the Department of Family Studies in the near future. The tour which you organised of the Mechanical Engineering building was very interesting and I am seriously considering a career in that direction.

Thus, as you can see, I had a very fruitful, pleasant and fascinating work experience here at the University. I would like to stay in contact with the program and its progress. I hope you will be sending me more information about various conferences and other events. My present address is given below. I will be changing my address soon and I will mail it to you.

Thankyou for everything you did to implement this program and especially for introducing us to the University and its diverse atmosphere.

Paul Sabharwal

Terra Mahood

Over the past six weeks, I have been working in the Electrical Engineering department of the University of Alberta through the Wysiet program. The program was excellent & I learned a lot; from computer programming to circuit board design. The people I worked with were great! They gave me confidence (~~and knowledge~~) by allowing me to do things I'd never done before.

I worked with many programs, including Altera, Tang, Smartworks, and Workstar. I was given a tour of the Machine Lab and shown how many of the machines work. One of the many projects I worked on was a Light Chaser, a set of ten small lights that flash in different order and directions. I first had to learn about Basic Logic, that I did by reading. Then I created a chip which I designed into a board. One of my supervisors thought that my design was great and wanted to use it for his ties (He makes ties with flashing lights). Unfortunately it never worked.

I also did some Word Processing working on plans for the Fringe Festival. Although I did work hard, there was also a lot of fun involved. One week, when all my supervisors were on holidays, and everyone in the office was ~~playing~~ (~~Tetris~~), painting the Machines lab, I played a wide variety of computer games. Also, everyday at noon, we went to the North Power Plant to watch the Flintstones.

EXPERIENCES IN ENVIRONMENTAL ENGINEERING

Kathy Sprysak

Wisest Student

August 15, 1988

Throughout my six weeks at the Newton Research Centre, I participated in two main research projects in the area of environmental engineering. The first project involved the ability of carbon particles to remove trace contaminants from drinking water. The second consisted of ozone experiments; research was being done for the utilization of ozone as an alternative to chlorine in water purification. These two projects were the basis of my research throughout the program.

My first project consisted of water treatment through the use of carbon. In starting the experiment, a representative sample of carbon was required. This was accomplished through a riffle splitter. A twenty-five kilogram (forty litre) sack of carbon was split in half, again and again, until a four litre sample was obtained. The representative sample for the experiment was taken from those four litres of carbon.

After obtaining the sample of carbon, it had to be crushed. For the experiment, all of the carbon particles had to be the same size. This was necessary for the "surface effect" for carbon adsorption; the smaller the carbon, the greater the surface area, and the shorter the equilibration time. The carbon particles were crushed by a spex-ball mill. Then it was sieved through a two by four hundred mesh. After a common size of particles had been obtained, the carbon was washed in Milli-Q-Water, dried in an oven, and cooled in a dessicator.

When the carbon was removed from the dessicator, various amounts of it were weighed into little one hundred sixty millilitre bottles. A solution of buffered Milli-Q-Water (pH = 7.3) containing two thousand two hundred micrograms per litre of chloroform ($CHCl_3$) was prepared. This buffered solution was then delivered into the one hundred sixty millilitre bottles (head space free), was capped with Tethlon® liners, and was allowed to equilibrate for seven days on a roadary tumbler to insure mixing.

After the equilibration time was complete, the samples were centrifuged at one thousand eight hundred revolutions per minute for a total of thirty minutes. This was done to settle out the carbon particles. Then an aliquot of the solution from those one hundred sixty millilitre bottles was pipetted into a forty millilitre vial (head space free) and was stored at four degrees Centigrade. The samples were later analyzed on a Tekmar purge and trap gas chromatographer, which separated the trace chemicals present in the solution through a print out of different peaks.

The analysis provided the concentration of chloroform in the liquid phase in micrograms per litre. After finding the concentration, the amount of chloroform on the carbon was calculated in micrograms per gram. The following formula was used:

$$CHCl_3 = \frac{\text{Initial Concentration} - \text{Final Concentration}}{\text{Mass of Carbon}}$$

A log-log plot of the solid phase concentration versus the liquid phase concentration provided the slope of $^1/_n$ and an intercept of 1 (K), which were Freundlich parameters. K gave the direct measure of the carbon's capacity to remove trace contaminants (eg. $CHCl_3$). The Freundlich parameters led to the use of the Freundlich equation:

$$\frac{x}{m} = KC^{1/n}$$

x: purity of adsorbate effectively adsorbed on carbon

m: amount of carbon

C: equilibrium liquid phase concentration

K, 1/n: constants

The calculations and graph made up the isotherm for that particular experiment.

The main purpose of this experiment was to test the ability of different sizes of carbon particles to remove contaminants from drinking water. Research from this area may lead to slight changes in the operation of pilot plants in Alberta.

My second project dealt more with the microbiological aspect of environmental engineering. I participated in a series of experiments involving the effect of chemicals on bacterial growth. It also dealt with the resistance of old and young bacteria.

The objective of the first experiment was to test the efficiency of ozone to kill the bacteria Escherichia Coli (E. Coli). After exposing the bacteria to the ozone, the other test would be to determine the medium that it grew best on.

The bacteria E. Coli was subcultured in tryptone soya broth (TSB), an excellent medium for bacterial growth, and it was allowed to grow for sixteen to twenty-four hours in an incubator. Then the bacteria was washed with a phosphate buffer solution and centrifuged to separate the liquid from the bacteria. A solution, heavily concentrated with bacteria, was then made. A plate with nutrient agar was streaked with the bacteria from the TSB tube as a purity check. Five millilitres of the bacteria solution was pipetted into a bottle with one hundred millilitres of ozonated phosphate buffer and was shaken, to insure an even distribution of bacteria in the bottle. From there, five millilitres of the solution was pipetted into a one litre flask, also containing ozonated phosphate buffer.

After the bacteria had been added to the big flask, ozone water was added. The designated reaction time was two minutes. Then the sodium thiosulfate was added to stop the reaction. A series of dilutions of the bacteria-ozone solution was made by pipetting different amounts into thrity-five millilitres of peptone water. Then the bacteria was filtered and put onto plates with different types of media. Some were placed in an incubator, while others were

put in a water bath. All the E. Coli was left to grow overnight. Colonies of bacteria were counted the next day. This experiment was repeated several times, and consistent results were obtained.

After experimentation with ozone, the next experiment involved the resistance of old and young bacteria to chlorine. The procedures were basically the same. Bacteria was subcultured into a TSB tube and allowed to grow for five to six hours. The bacteria was washed, centrifuged, and put into one hundred millilitres of phosphate buffer. Then the young bacteria was put into a large one litre flask of phosphate buffer. The procedure was exactly the same for the old culture of bacteria, with the exception of a longer time for growth. Then chlorine was added to both flasks with a two minute reaction time. Sodium thiosulfate was added to stop the reactions. Dilutions of the bacteria-chlorine solution were made, filtered onto plates, and put into the incubator overnight. The end result was that the old bacteria was found to be more resistant to the chlorine than the young bacteria. A similar experiment was done using ozone instead of chlorine, and the results were the same.

Research is still being done there on ozone, the alternative to chlorine. It has proven to be an effective killer of bacteria. Ozone is preferred to chlorine because it is easily destroyed; therefore, it does not remain in the

water. In the future, it is possible that ozone may be used instead of chlorine.

In conclusion, I feel that my six weeks at the Newton Research Centre were very well spent. The knowledge I gained from the experiences are invaluable. Along with meeting new people and developing new laboratory skills, I was able to learn about a field I did not really know that much about. In closing, I would like to thank the coordinator, Dr. Armour, and all the others who organized this program for giving me a chance to work in the research field.

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On the UNIX system, I descovered several methods of inter-office communication. My favoite was "talk". "Talk" connects two terminals and allows the users to communicate by typing to each other. This was very useful since I had a friend who was also in computing science! "Mail" is another method of communication. It has a distinct advantage over "talk" in that "mail" can be used anytime, but "talk" can only be used when the other party is logged onto her terminal. "Mail" is a great way to just drop someone a line. It is nearly the same as "talk"(it is utilized the same way), except the reply must be mailed back. Also similar to "talk" is "write". The main difference is that in "talk", the othe party sees every character as it is typed, but in "write", the RETURN key must be hit in order for the message to go through.

Another area of UNIX I touched on was the "news". UNIX is an open network. People all over the world can communicate through the terminals. "News" is a series of articles submitted from different people all over. My personal favorite is the recreational humor. This "news" is filled with jokes, pet peeves, and lighthearted banter. Often people reply to the jokes and stories. It is really interesting to read a conversation between someone in New York, and someone in California.

Besides all I have learned, I had time for relaxing, and having fun. On the second day, Marion ordered Mike, my "roomie" to teach me how to play Mac games. I loved it, but try as I might, I could not beat Mike in high scroes. I also learned how to play hacky sack. Each lunch hour, everyone changed into shorts and T-shirts, and we all headed out to Quad for some "serious goofing off". I also was involved in a marathon game of Memory, one of the Mac games. It was twenty games to see who was actually "the best".

Overall, I had a great time during my six weeks. I learned so much about the computing systems on campus. Besides learning, I had ample time to explore different areas. The people were wonderful. They were willing to help, and at the same time, they made me feel like an equal. I used to think that "office people" were a bunch of "stuffy" people, but not anymore. This whole experience has taught me so much, given me new perspectives, and opened many new doors for me. I will never forget it.

Dept. of Chemistry
Dr. Kratochvil

08 12 88

For the past six weeks, I have been working in the Dept. of Chemistry with Dr. Kratochvil and his research group. In that time I was given the opportunity to watch and take part in the activities that go on in a research laboratory. Some of the experiments that I helped with were Titrations, Chromotography, Glass Blowing, Neutron Activation Analysis, and Diode Array Spectrometry. For all of these and the other experiments, I was always well informed with what was going on and given the opportunity to ask questions so that I totally understood what was taking place. The people were always friendly and eager to help me in any way possible.

In between the time I spent with the research group, I spent a lot of time assembling together a sampling file for Dr. Kratochvil. I found this to be very beneficial in that it helped me to become familiarized with the libraries on campus and it gave me a feel for the amount of time that goes in to simply researching and reading.

Overall, I cannot begin to fully explain how this program has helped me. It has exposed me to areas of chemistry that I didn't even realize existed. In doing so, it has also helped me to realize that the world of careers has a lot more to offer than what I simply know of now. Knowing this, I look towards the future with a positive attitude and with an understanding that I will find the job that best suits me even if I have little or no idea as to what area of science I would like to enter now. I think that I am very fortunate to have learned this because it has put to rest many of the fears I had about still not knowing what I would like to do in the future.

I hope that WISEST will continue to grow so that some day every student will have a chance to experience everything I have in my short time here. It is definately something I will remember and use for the rest of my life.

THANK YOU!!

Melissa A. Maximchuk

Melissa A. Maximchuk

A Summary of Six Weeks

May Wong
August 12, 1988

Department of Computing Science
The University of Alberta
Edmonton, Alberta T6J 2H1

For the past six weeks, I have been working in the Department of Computing Science. When I came in on the first day, I knew nothing. Today, six weeks later, I can say I know "lots".

During my first week, my supervisor, Catherine, was on holidays, but she arranged for someone else to look after me. Marion started me off by welcoming me and telling me a bit about the work done here. Then she gave me a key and said it was the key to my office. That really brew me away. I didn't expect anything like that in my wildest dreams. It made me feel important.

With Marion's help, I began to get to know the Macintosh computer. I had never used one one before, so it was rather different, but not hard. The Mac is very easy to use compared to some computers I have used in the past. I spent the first week just becoming familiar with its different applications.

I experimented with three applications. My facorite was MacPaint. It is like an artist's easel, and has many different "tools". I spent a good part of my first week just drawing things. Another applicaion I used was MacWrite. This is what I used when I did my project, so I spent a lot of time on it. The final applicaion I used was MacDraw. It is similar to MacPaint, only it has a grid. This grid is useful for making charts and tables. I only had the chance to make one chart.

The Instruction Support Group which I was working with puts out a manual for the instructors every year. Each year, the manual must be revised. My project was to do the revisons for the 88/89 year. All these revisions wree done on the Mac, using MacWrite. Although the job was fairly easy, it was rather tedious. Each time I handed what I thought was the finished copy, Catherine or Marion kept finding things to change. It was a bit frustrating at times, but it made the finished project all the better.

My project allowed me to have some experiene with two different kinds of printers. One is the Image Writer, and the other is the Laser Writer. The Image Writer is a much lower quality than the Laser Writer. Another thing I found with the Image Writer is that the paper kept slipping off the knobs. As a result, several of my pages were off center and crooked. Often the printer jammed, and I found three pages of the manual printed onto two inches worth of paper. With the Laser Writer, I encountered none of these problems.

In the first week, I was also introduced to UNIX. It is a very high tech computing system. Included in it is a learn program. I have gone though parts of it, and found it fascinating. It is so

different from "the stuff at school". Here, everything is one such a large scale, and so advanced. I felt really priviledged to have the opportunity to work on it. Most of the time, I could figure out what Iwas doing, but when I got stuck, thee was always someone willing to help.

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WISEST

Summer '88

Tannis Kozens
Dept. Chemistry
Supivisor Dr. M.A. Armour

I really enjoyed my summer in the WISEST program. It was a once in a lyetime opportunity that I'm glad I had a chance to take hold of it. I would not exchange my experiance for anything.

When I arrived the first day was was very nervous. I went to the introductory meeting & then I got to go & meet my supirsor, Dr Armeus. She explained to me what I would be doing for the first week. After completing this I was then given my own research project.

I did alot of background work before I started. Dr Armeus was a great help to me whenever I got stuck. She'd give me suggestions & I'd try them. Mostly I worked on Thin-Lay Chromatography & Column Chromatography. I seperated purple dye into blue & red. Black into Yellow, blue, & Red. I also extracted B-carotene & chlorophyl from Spinach. During my first week I learnt how to recrystalize, reflux, and many

other things.

At the end of my last week my supervisor asked me if I'd like to work another week. This made me feel good because it was then that I knew she felt I was a capable worker. I also hope that next year I'll be able to get a job in the Chemistry department.

This program helped me even for the future. I realize now that I'd either like to go into Medicine, Pharmacy, or Chemistry. I hope that this program will continue, and help many other people realize that they can do or become anything they want to. This was my biggest ~~lesson~~ lesson from this summer that I'm a capable individual as long as I work hard & want to achieve a goal.

My W.I.S.E.S.T. Experience

The W.I.S.E.S.T. Summmer Research Program has proved to be an invaluable experience. Although I had attended the conference in May and knew W.I.S.E.S.T. to be an extremely beneficial and educational organization, I was a little unsure of what to expect from its research program. My expectations of what I had hoped I would gain from this program, however, were surpassed. The past six weeks have allowed me to fully realize what a career in chemistry would involve.

The first week was spent learning the experimental procedure that would be used for the research and getting used to the laboratory and equipment. On the first day, I was exposed to a number. expensive machines. I learned the basic theory behind the Nuclear Magnetic Resonance (NMR) with the help of Dr. Tanner and a book he had lent me. As well, Dr. Tanner showed me how to use the gas chromatograph (g.c.) and how to get the gases needed for the g.c. to function properly. The rest of the week was spent learning the procedure that would be used to do a reaction. I had to find out which toluenes would be suitable as substrates for the reaction and this involved giving injections into the g.c. and analyzing the data. When it was established what the substrates would be, I began to do my first reaction. The reactions involved using the scales to measure the amount of each substrate that would be used, using a vacuum to degas the tubes, sealing the tubes with a torch, and measuring viscosities; all which I had to learn. It was when I analyzed my first reaction that I experienced one of the many aspects

of science, the failure of an experiment. We learned that one of the substrates, because of an OH group, was reacting too quickly thus preventing the others from reacting sufficiently. We thus had to repeat the reaction using different substrates. By the end of the second week, we realized that this new set of reactions were not going to be successful either.

At the beginning of the third week, we realized that the unsuccessful reactions were due to the fact that in proccessing the sample so that it could be analyzed by the g.c., we were also altering the sample (the toluene dissolved). We thus had to come up with a new experimental procedure to prevent the distortion of the sample and this involved using less water. It was also at this time that Dr. Meinzter, my supervisor, returned. He started me on a new set of reactions which were finally successful and he explained in more detail of what we were trying to show. It was during this information session with him that I learned the reasons behind the experimental procedure. I learned that we used p-dichlorobenzene to measure how much the other substrates reacted, that we used N-bromosuccinide (NBS) to prevent reversal out of the cage (to scavange the HBr) and that we measured viscosities to measure the strength of the solvent cage. As well, I learned about the paper we were contesting, about our own paper and the procedure that one goes through before a paper becomes published. I also found out about free radicals, ρ values, σ^-, σ and σ^+ values and much more.

The remaining three weeks were spent doing more reactions, solubilities and cleaning. We discovered a major flaw in the paper we were contesting. They used NBS to scavange the HBr,

however, we showed, through the values that we were getting that it did not do a complete job of scavanging and we believe that this is becauses the HBr was not consistent throughout the whole solution. We thus proceeded to do another set of reactions using ethylene oxide which was a liquid and better able to mix in with the solution and thus, theoretically, better able to scavange the HBr. As well, I learned to measure solubilities. This involved a filter and a Rotovap (a machine that will evaporate liquid). The cleaning part was not very popular among the people working at the laboratory. Perhaps it was because I was exhilarted by my ~~laboratory~~ this new experience, but I did not find this job so dreary. It was interesting how many ways there were to clean equipment. I cleaned by placing dirty equipment in a mixture of boiling water and a caustic "soap", I cleaned by using acetone or dichloromethane to rinse off glassware, I used sulfuric acid with chromate, then ammonia and then water to clean reaction tubes, and there was also the standard method of soap and water.

The last day of the six weeks was not sad but promising. Dr. Tanner was kind enough to take both Dr. Meintzer and myself out to lunch. Dr. Tanner also extended my job for another week and Dr. Meintzer alluded that I might be able to come back and work there next summer. As well, many of the other W.I.S.E.S.T. participants and I exchanged phone numbers and have made plans to meet in the future.

This experience has been extremely worthwhile. Not only did I learn and experience scientific research (for which I am extremely thankful for not many have this chance), I also enjoyed myself. I not only learned organic chemistry but I also learned that

research work was not dull nor tedious, for the people and their enthusiasm, make it exciting. Dr. Tanner has certainly made it exciting for me and it can be felt throughout the whole laboratory when he is not there. The other W.I.S.E.S.T. research participants, also taught me new things for they would show me their laboratory or explain what they would be doing. As well, they helped make you feel more comfortable for then you did not feel that you were the only "stranger" on campus. The Wednesday meetings were also helpful, however, information regarding a postphoned meeting should be given more clearly. I unfortunately missed a meeting I wished to attend because my friend's *professor misunderstood the message and told us that the postphoned meeting was that week when in reality, it was the next week. The meetings, the other W.I.S.E.S.T. participants and my research work with Dr. Tanner and Dr. Meintzer have all played a part in helping me to decide with regards to my future career in science, specifically, chemistry.

I would like to thank Dr. Tanner and Dr. Meinzter for patiently teaching me all about research and for making me feel comfortable.

Eve Tsai

* My own professor was away to speak in Washington at that time and thus I was unable to confirm the change with him.

Karen Bodra

Mechanical Engineering August 16/88

The majority of my six weeks was centered around performing various corrosion experiments on oil well sucker rod specimens. These experiments involved preparing the specimen, immersing it in the solution and starting the program on the computer. I also had to organize all of the data on another computer and make print-outs of the various experiment results. I was ~~iearnp~~ impressed by the amount of responsibility I had to take on.

Inbetween the experiments, I did a lot of other things. I learned how to weld; I operated some of the huge machines; and I learned how to develop film.

All of these things helped to make my summer ~~so~~ very interesting. I felt that the summer program was a very valuable experience.

Kathy Bowers

SEPTEMBER 16th, 1988

WISEST - COORDINATOR
c/o Dept. of CHEMISTRY
UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA
T6G 2G2

Dear F. Ardakani,

Thank you very much for allowing me the opportunity of this interesting educational experience.

Enclosed is the report and brief summary of my work this past summer which you requested. Once again, I am sorry about the delay in getting it to you. Thank you for being so patient.

Sincerely,

Kathy Bowers
WISEST STUDENT

KATHY BOWERS

26th Aug. 1988

WISEST-COORDINATOR
C/O DEPT. OF CHEMISTRY
U OF A
EDMONTON, ALBERTA
T5B 0X8

Dear F. Ardakani,

The summer experience has been very rewarding. Thankyou for the opportunity.

I regret to inform you that I am unable to prepare a report for you at present as we are busy preparing to leave for a weeks vacation in a day or two. However I will send you a report in early september. Sorry about the delay.

Sincerely,

Katherine Anne Bowers

September 14, 1988

Report on
Amisk Lake Summer Research 1988

By Kathy Bowers

Amisk Lake is a small deep, hyper-eutrophic lake in North-Central Alberta. In the past few decades the inceasing Phosphorus concentration has led to large summer algae blooms. At the end of the summer, when the bloom is over the dead algae sinks to the lake bottom where it is utilized as food by oxygen fixing detritivores (i.e bacteria). This process of decay is responsible for the recycling of much of the nutrient pool of the lake, but it is also the main cause of the low oxygen concentrations in the lower depths of the lake (i.e. the hypolimnion). To increase oxygen concentrations in the hypolimnion of Amisk Lake, oxygen is being injected into the North basin of the lake at a depth of approximately 34 metres. No oxygen is being injected into the South basin, which will be the experimental control.

Dr. Ellie Prepas and her research team from the University of Alberta are studing the responses of various aspects of the ecology of the lake to the increasing oxygen levels. The following are under study in Amisk Lake: Water Chemistry, Phytoplankton, Zooplankton, Benthos [Invertebrates that inhabit the bottom sediments], and Fish.

I assisted many of the technologists and graduate students in their research, for example: collection of water samples, zooplankton, and benthos; echo sounding to establish the distribution of fish; and cleaning of laboratory equipment.

I helped with the use of the following equipment: Schindler zooplankton trap, Eckman benthos dredge, zooplankton tow net, water sampler bottle, Y.S.I. Oxygen meter, thermister (for vertical temperature profiles), the hydrolab water chemistry instruments and also prepared phosphorus readings and chloropyll filtrations.

I found the work enjoyable, educational, and interesting. The research station was remote but the personnel were exceptionally amiable.

I look forward to the possibility of returning for further duties next summer.

Kathy Bowers
WISEST Student

This summer, on the wisest program, I did many things. My professor, Dr. Kopecky was trying to figure out a procedure that would produce 2,2'-diacetyl,-4,4'-di-t-butyl biphenyl. He wrote out many experiments and I would proceed through them. I would do tests on the products and analyse what ~~it~~ was left with at the end of an experiment. The tests included; NMR, ~~TTMS~~ (TLC (thin layer chromatography) column chromatography and infrared spectrums. These tests determined if the substance that we got out of the experiment was what we wanted. We didint, however, get the product that we wanted, and the summer wasn't long enough to complete the experiment with the changes Dr. Kopecky was proceeding with.

On my own free time, I produced mosquito repellent ~~dis~~ which I followed from a lab book. This was a challenging experiment but it successfully turned out.

Working at the University of Alberta was very rewarding. I felt like part of the university and got along great with the people. I learned many things about the university, chemistry and people. I can't really begin to say how wonderful this experience was for me. I hope in the future I will have many more opportunities like this program. But also, that many highschool students will be involved

in this program also. I hope the WISEST program will go on for years to come.

Lisa Kieser.

For: WISEST
from: Sandy Palland

LIMNOLOGY LAB (ZOOLOGY)

During the past six weeks I experienced many new and rewarding experiences at the limnology research lab. My jobs mostly consisted of doing tests on the water brought back from the lakes. One of the tests I did was color. This was to determine the color of the lake. The color would become lighter or darker depending on the amount of rain and also on the amount of lime put in the lake. The liming of the lake was to kill all the algae, ~~in the~~ which produces harmful substances when there is too much.

The other test I did was turbidity. This was to test the amount of suspended matter in the water sample. After the lakes were ~~limed~~ limed the turbidity would drop, meaning there was less suspended matter.

I also did filtering of water samples, which were acidified with nitric acid, for atomic absorption. I had to filter over 200 samples before they would be tested for dominant ions. The samples were tested for calcium, magnesium, sodium and potassium. I was also able to go down to the atomic absorption machine for a day and run the ~~test on the~~ it. samples through it.

I will be staying at the lab for two more weeks and I will hopefully be able to go out into the field and sample some of lakes. I am really looking forward to it. ~~and~~ It was a very enjoyable summer.

FOR : Furugh

FROM: Wendy Allsopp

WISEST SUMMER REPORT

My experience as a WISEST student was made valuable by the terrific men and women I was involved with in the botany department. The graduate students and technicians I worked with this summer have given me new confidence in my skills and capabilities as a future scientist. Their positive image towards women in science was an inspiration.

I feel that my field experience, in Valley-view, Alberta as well as in Elk Island National Park, was the most valuable. Field research proved not only to be challenging and interesting but also alot of fun. The experience of studying nature without a textbook ~~by~~ but with my own eyes, hands and mind is one I treasure. It was also gratifying to see

groups of men and women working together in teams; it was evident that everyone had something positive to give to the research team.

My future studies after high school will most likely involve the University of Alberta. The fact that I feel very very comfortable with campus surroundings will no doubt help me in future studying years. My experience with university labs will also be a tremendous asset as a university student. In the lab this summer I learned how to operate a variety of lab equipment as well as learning new scientific procedures. The role models I was exposed to demonstrated positive attitudes needed for scientific teamwork.

The summer proved to be an exciting time where I made new friends. I have been encouraged to pursue my career goals in the biological sciences. I wish to thank everyone involved with WISEST for giving me the chance to be a part of this program.

WISEST

This summer I worked in the department of Chemistry under Dr. M.A. Armour. I was in a lab with seven other individuals all working on different projects. I was working with aldehydes & ketones and performing aldol condensations (reacting together an aldehyde and a ketone).

The first week I was here I performed the first four experiments in the Chem 250/350 lab manual in order to familiarize myself with some of the techniques that I would be using in my project. For the following five weeks I worked solely on my project, which went really well. I got excellent percentage yields and nice crystals. In my spare time, I worked on a little bit of column chromatography.

I really feel that I have learned a lot from this program. Firstly, I learned what it was like to have a real job; the responsibilities, pressures, and also accomplishments. Secondly, from the seminars I gained a feeling of the possibilities available to me in terms of career choices, course choices,

and institution choices. Thirdly, I realized that I really can do anything I set my mind to. And if I work and have a lot of desire I can perform miracles!! Lastly I developed a lot of new and lasting friendships.

The final item that I would like to mention is the helpfulness and friendliness of the people at the University. Donna Kenecker, Dr. Armour, & Chantell Sedgwick are just some of the few who have made my time enjoyable. In particular, I would like to express gratitude to Dr. Armour for her friendliness, generosity, and, especially, the points she made about doing what you want in life. Those points really gave me a lot of respect for her.

So, I really enjoyed my time here and Dr. Armour had better be prepared for someone who will bug her for a job again next year!!

Thank you
Melonie Smith

Summer Research Program

by

Cathy Lam

July 5, 1988

6:30 A.M.: → Leave U of A; head for Valleyview
→ There are eleven people involved in this field trip
→ Valleyview is approximately 500 km north of Edmonton; very close to Grand Prairie

Near noon: → Stop by a gas station for breakfast but we are all too sleepy to eat anything (Personally, I feel very out of place because I do not have any idea what I am doing here in the first place.)
→ The weather is just terrible; it would not stop raining!! Most of us are having coffee and hot chocolate.

Around 12:30 P.M.: → Arrive at Valleyview (what a small town it is; it looks like no one lives here)
→ We check in the Horizontal Motel; Wendy and I share one room; it is a very huge room.
→ We are all very hungry so we decide to eat our lunches outside of the motel; it is raining very hard right now

1:00 P.M. → Head for the Peatlands

1:30 P.M. → Arrive at the peatland sites
→ All of us divide into different groups and there are 4 groups
→ I am with Dr. Vitt; our jobs are collecting water sample and recording all the names of Vascular plants and mosses which exist in the surrounding area

The three objectives of this peatland research are: 1. profile of the peatland sites
2. water chemistry
3. variation of vegetation

→ This land is very unique and is extending with a very great distance.
→ I am very eager to explore and learn as much as I can
→ Dr. Vitt and I spend about 6 hours in the peatlands. We take water samples and record different types of vascular plants and mosses. Dr. Vitt have to collect some of the vascular plants and mosses because he is not too certain if the species names are right.

During the expedition, I noticed that as Dr. Vitt and I walk further into the peatlands the trees are almost dead. We presume they are caused by the flooding of water and fire. We reach the water track and the water level is quite high. From this point, my boots are already filled with water. It is not the greatest moment for me. My feet are very cold because the water is cold and my socks are very, very wet. (I am going to drown for sure.) The vegetation is different here compare to before. Very few plants and mosses. (Personally, right now, I just want to get out of this place and go where there is warmth and that I will not be drown.)

On the way back, Dr. Vitt and I met one of the group who are doing the coring. Luckily they have the A.T.V., Roxanne and I

drive back with the A.T.V. (That's one of the bumpiest ride!)

We arrive back to the motel about 8:30 P.M. I take a long shower and try to rest for about 2 minutes.

9:00 P.M. → Supper time (I have Chinese food. It tastes so good; the best thing that happens all the long!)

10:00 P.M. → I have to go over to Dr. Vitt's room to do the water testing for P.H. and conductivity. Dr. Vitt shows Wendy and I how to do the plant pupping. It takes up about one hour to finish everything. (I am very exhausted right now. I want to go to bed!!)

10:45 P.M. → There is nothing better than the bed!!! Good night!

July 6, 1988

6:00 A.M. → Horrible day (It is raining very hard outside)

7:00 A.M. → Breakfast time; I am still very sleepy right now. Oh well, another day of peatlands analysis is not looking too good!!!

Basically, we are doing the same thing like yesterday: water chemistry, vegetation analysis, and coring.

Today is not the greatest day. The instant I step outside, I am already wet. How

we go again!!

We will not be able to do many sites today. It is raining so hard and the wind is beginning to blow at our direction. I am very wet and my boots are so heavy, which are being filled with cold water. (I just hope I will get out of this place alive.)

About 12:05 P.M. → Dr. Vitt is very hungry; He finds a place so that we could sit down and eat our wet lunches.

After the lunch break, we try to go a little bit further down. However, it is impossible for us to do because the weather is getting worse. We decide that we should heading back.

4:00 P.M. → We all decide it is time to go back. Although we did not have a chance to do many sites, we determine to do as many sites as possible for tomorrow.

About 5:00 P.M. → Arrived at the motel (I feel quite tire but determine not to fall asleep after supper.)
I have to take a very long hot shower to bring myself back again.

6:00 P.M. → Supper time; Italian food this time. The food is delicious

7:45 P.M. → I have to go over Dr. Vitt's room to ~~do~~ test the PH and conductivity of the water samples.

About 9:30 P.M. → I have finished all the work and have made my lunch for tomorrow.

About 9:45 P.M. → I am relaxing and watching television for awhile and then off to bed. See you tomorrow!!!

July 7, 1988

6:00 A.M. → The day is looking pretty good; I can see the sun is starting to rise; still a little bit chilling outside.

7:00 A.M. → Breakfast and get ready for work. I heard that this is our last day. (I am looking forward to home so badly!)

8:00 A.M → I will go with Barbara, one of the graduate students, to sprofile some more sites.

I have never experienced with this great distance walking before. Now I have tried and I don't think I will ever want to do it again. (I am so tire that I start to hear different tunes in my ears, and my eyes begin to play tricks on me.)

I will not report all the details about my work for today. As hectic as it can be, I have learned more vascular plants and explored some more new sites. We have to cross the water track again. The greatest thrill for me today is that I have a chance to drive the A.T.V. (First, I refused to drive because I was too afraid that I might

crapp into the trees. However, Herb encouraged me and told me that I should try it. I did and it was so exciting and very scared. (Thanks Herb!)

About 4:00 P.M. → Got back to the truck (all wet as usual) I have to change my clothes right away because I have am all wet and we will be leaving soon.

About 7:00 P.M. → Everyone returns now.
→ We decide to go and eat first, before depart for Valleyview; all of us are very, very tired!!!

July 8, 1988

About 2:00 A.M. → Finally arrived to Edmonton. All I can say right now is I want my bed very badly.

10:00 A.M. → I am actually made to the 11 of a herbarium on time. However, I don't think I am quite myself today, half awake and half asleep. Nevertheless, I am willing to do something or at least help someone.

Basically, for today, we have to put everything away and get ourselves organize

12:00 P.M. → Lunch break

12:30 P.M. → Wendy and I are testing ~~doing~~ the P.H. and conductivity for the water samples

1:20 P.M. → Dr. Vitt takes Wendy, Roxann, and I to the Limnology Lab, where we will be testing the water samples for ammonia, sulfate, phosphates, and nitrate.

Helping Wendy to prep the plants

4:00 P.M. → Home time.

July 10, 1988

Dr. Vitt was gone for his vacation !!

8:30 A.M. → I am not quite sure what I am supposed to do !!? Barbara, a~~the~~ graduate student, instructs us, Wendy and I, to have 1 mL of HCl into a 25 mL beaker. Then pour certain amount of cations contained into the 25 mL beaker. The only problem is that the instruction is quite hard to understand. Therefore, Wendy and I are not too certain what to do. (I think I will ask her again.)

→ I learn how to use the electronic pipet, an equipment which my school never has it yet.

9:00 A.M. → Have to go up to the zoology lab to test the water samples.

→ The first thing we will do is filtering all the water samples. The filtering will take a whole day and maybe ~~be~~ half day of tomorrow since there are so many water bottles which ~~ha~~ are needed to be filtered. Hopefully tomorrow we will

get all the samples finish.

I meet a girl from the WISEST program. She is very friendly and she talks to us during lunch break.

4:00 P.M. → Time to go home.
→ We still have so many water samples which are needed to be filtered.

July 12, 1988

9:00 A.M. → Take the samples from the bottles and test them with the NH_3 machine. This way, we will be able to know how much NH_3 is in the water samples.
→ The machine which I am working with is quite complex. The whole process goes very slowly because the water sample is being mixed with other reagents. When each sample has done, the computer draws a line graph on a piece of paper. The neat thing I have learned is that how the machine takes in the samples, analyzes them, and then provide us this data full of information.

July 13, 1988

9:00 A.M. → I have to measure the reading result from the NH_3 machine. Print the result into the computer. From this, one will be able to see how much ammonia is in the water.

→ Do the phosphorus testing

July 14, 1988

9:00 A.M. → I have a chance to use the stereoscope. (Hopefully this is how one spells it!)

→ Learn how to dilute the solution

July 15, 1988

9:00 A.M. → Last day to do the water samples.

→ I spend the whole day doing the nitrate. It's okay at the beginning but then about 2 to 3 o'clock, I fall asleep because the whole process goes very, very slowly.

Oh well, time flies very quickly. I have a great time and in the Limnology lab. I have learned so much and gained so many new ideas while I am up here. I will try to come back to visit everyone someday.

Third Week

→ I am back to the Botany department with all the results from the water testing.

→ I meet Louise, who is in charge of the herbarium. Right now, I have nothing to do so Louise asked me if I would like to glue the labels of the mosses onto the envelopes. I said yes because it does not take very long.

→ Next, I transfer the plants species into U of A new envelopes.

→ I have to go in the field again but only for one day. We will be going to Elk Island to get the profile of the site.

→ The field trip was okay, much better than the last one because it was nice and sunny; however, it was quite hot and we got tire very easily.

→ This area is not peatlands but it is called wetlands. It's still very wet because from the result of the melting glaciers.

→ Very interesting site; there were so much wild raspberry and gooseberries around. Great time picking all these berries.

Fourth Week

→ Spend most my time in the herbarium, helping Louise

→ I have to do the map transferring unit for one of the technicians.

→ Filing all the plants species to their proper folders in the herbarium cabinet

→ All of us, the Wipet students, have a chance to go to the map library and experimenting with the stereoscope. Fascinating little piece equipment. It is being used for looking through the aerial photographs, which were taking by the planes up in the air. The

neat thing about this equipment is that one will be able to see a large section of landscape including houses, trees, rivers, roads, and many more little details.

Fifth Week

→ More filing ~~has~~ to be done

→ Painting the bird houses → It's great (We have a chance to enjoy the sunshine and being eaten alive by mosquitos.

Sixth Week

→ Try to finish all the filings which are needed to be filled.

→ It was great at the luncheon on Friday.

The report will end right here. Although this report is just a short, simple one, I have learned so many new things which I have never think of before. It is unfortunately that our supervisor is not here with us for the whole time; however, with the help of the technicians and a graduate student, we managed to keep ourselves busy most of the time.

For me, this Wisest program has brought me a tremendous advantage. I have a chance to know the campus, the library system, and meeting new people. Importantly, I have truly experienced what it is like being in the U of A. This program helped me to have some ideas which career I might like to

perpue ~~into~~. It is a summer of educational experience!

CONCLUSION

THE HARDNESS OF THE METAL WAS HIGHEST AFTER 30 MINUTES AT 400 DEGREES CELCIUS. AT 200 DEGREES CELCIUS THE TIMES WERE ALL TOO SHORT, AS EVEN AFTER FIVE HOURS THE HARDNESS HADN'T PEAKED. AT 600 DEGREES CELCIUS IT WAS JUST THE OPPOSITE, ALTHOUGH 15 MINUTES MAY HAVE BEEN THE PEAK ITS NOT FOR SURE, THERE NEEDED TO BE SOME SHORTER TIMES (MAYBE FIVE OR TEN MINUTES) TO SEE IF THE HARDNESS WAS STILL DECREASING WHEN IT REACHED THE FIFTEEN MINUTE POINT OR IF IT HAD BEEN INCREASING, AND THAT THE HIGHEST POINT WAS AT FIFTEEN MINUTES.

I REALLY ENJOYED WORKING ON THIS PROJECT. I NOT ONLY LEARNED ALOT BUT HAD ALOT OF FUN DOING IT. IN FACT I'M NOW CONSIDERING GOING INTO METALLURGY WHEN I COME TO UNIVERSITY. IT WAS A FIELD I HADN'T REALLY THOUGHT TO MUCH ABOUT BEFORE THIS SUMMER, I DON'T EVEN THINK I EVER REALIZED JUST WHAT IT WAS. NOW I THINK I HAVE A BIT OF AN UNDERSTANDING OF WHAT ITS ALL ABOUT, AND I LIKE IT, I REALLY FOUND IT AN INTERESTING TOPIC. I WOULD LIKE TO THANK YOU FOR GIVING ME THIS PROJECT, AND FOR ALL THE HELP YOU GAVE ME WHILE I WAS GETTING STARTED. I'VE HAD ALOT OF FUN THIS SUMMER AND AM NOW LOOKING FORWARD TO UNIVERSITY MORE THAN EVER. THANK YOU AGAIN- MAYBE I'LL SEE YOU AGAIN SOON, AS A STUDENT.

Botany Summer 19

My experiences this summer at the University will always remain in my memory. I have met so many people and have experienced so much within the six week program. Over the last six weeks I have gained new friends among the people I worked with., Hopefully, friends that will last a long time. I found the university to be a very relaxed and comfortable atmosphere. Time seemed to stand still yet pass so quickly. We were given alot of freedom to learn and work at our own pace. While in the field we were totally emersed in nature, experiencing all that wildlife has to offer, including the hardships. We learned to appreciate the beauty of the wilderness as well as the origin of the forest. These memories will be something I will always remember.

While working here I was also able to experience a great deal of lab work which will be very valuable to me in the upcoming year. I was exposed to equipment I had never seen before and was trusted and given responsibility. I learned skills that I never associated with botany and discovered many different possible careers unknown to me in the past. I found that everyone working here; the professors, the graduate student, the technicians and the wisest students worked together successfully throughout the summer. Everyone made us feel welcome and part of the team. They encouraged us to explore the campus and sent us on assignments to various libraries.

Working on campus this summer has

everyone working here; the professors, the graduate student, the technicians and the wisest students worked together successfully throughout the summer. Everyone made us feel welcome and part of the team. They encouraged us to explore the campus and sent us on assignments to various libraries.

Working on campus this summer has eased alot of uneasiness I had towards the university. I feel comfortable and capable of attending university in the fall of 1989. I am considerably more acquainted with the university and this will be a great asset to me in the future.

I came here at the beginning of the summer as a student from grade 11 overwhelmed by the university and all that it had to offer. I was unsure of my future plans and unsure of what I wanted to enter when I attend university. I am leaving here with more of an idea about what the sciences are like and the roles women must play within the sciences. I feel confident in attending this university in the future. I am leaving this wisest program with fond memories and with a variety of different experiences and gained knowledge. I am leaving here a better person from the experience.

Roxanne Friesenhan