

Vision - University of Victoria:

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P 1.

First of all, I want to thank the Selection Committee and Dean Miller for giving me a chance to visit the campus and to do a presentation here.

This is a great honor to me and I am very grateful.

The purpose of my presentation is to show you my vision and goal for this Department and my action plans to lead this department to reach the goal.

The action plans cover research, education and service.

In addition, I will also discuss my management style.

This presentation will take about 35-40 Minutes.

After that, I will answer questions.

P 2.

The future can only be built on top of past achievement.

This department has grown significantly in the past 10 years. The number of faculty members has increased from 22 in 1997 to 34 in 2007.

In approximately the same time frame, the number of undergraduate degrees awarded has increased from 65 to 116 while the number of graduate students has grown from 65 to 120.

Over the past decade, very strong and innovative research programs in diverse areas have been created producing excellent research results as well as outstanding graduate students.

The research funding level of the department has

increase dramatically in recent years and the amount is ranked 8th in the 23 PhD-granting CS departments in Canada.

This is great achievement.

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P 3.

However, there is always room for improvement.

P 4.

So, how should we further improve this dept?  
Before we address this issue, we need to know what we are facing.

The world we are facing now is more interdisciplinary and collaborative. The problems we need to solve today usually require techniques from several different disciplines, such as problems in bioengineering or bioinformatics. Therefore, communication and transition of ideas and results between different disciplines must be based on a language people can easily understand.

Visualization techniques are obviously the easiest and most efficient way to communicate ideas and results between different disciplines. That is why people say ‘a picture is worth a thousand words’.

Another important issue is Internet computing. Internet, one of the most important inventions of human being, has simplified and improved our lives in many ways. Through Internet, people from different countries or continents can work together as if they are in the same room. Information can be accessed anywhere in the world. 'Distance' is no longer a barrier in human collaboration. Because of these, human being productivity has increased dramatically during the past decade. Obviously whoever has a dominating role in the design and development of Internet infrastructure and Internet computing (including the handling of Internet problems such as spam, viruses/worms, digital copyrights, identity theft, electronic fraud, electronic warfare, etc.) will have a bigger share in the control of human lives and the world's order.

What we can see is, computing today has reached a

point that only those who know how to use internet computing as a core and visualization techniques as a communication means to integrate/combine different computation models and computation tools to solve multi-disciplinary problems in urgent areas such as SECURITY, GLOBAL INVESTMENT COMPUTING and PUBLIC HEALTH will excel.

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P 5.

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P 6.

P 7.

New level of success means better  
REPUTATION and RANKINGS.

A higher ranking would not only attract more high-quality students to this department, but also increase its chances in getting external supports.

P 8.

We need an ACTION PLAN for each of the RESEARCH, EDUCATION and SERVICE areas.

My action plan for research includes the following items. 1. ... 5. 6. Push for creation of technology centers in the college such as

Center for Visualization and Virtual Environment

Center for Internet Computing (Technologies)

Center for Bio-Informatics

The importance of these items is not necessarily sorted in this order, but I believe the first item is the most important thing the department should do.

I will (briefly) address these items in the following, starting with item 3 because information used for this item will be used by item 1 too.



P 9.

It is well known that the top CS Depts are much larger.

E.g., MIT's no 1 ranked CS program has 91 faculty.

Stanford's no 2 ranked CS program has 51 faculty.

CMU's no 3 ranked CS program has 48 faculty.

Berkeley's no 4 ranked CS program has 46 faculty.

Cornell's no 5 ranked CS program has 50 faculty.

And they all have large number of PhD students and annual PhD graduates.

P 10.

In Canada, Toronto's CS dept has 68 faculty, UBC's CS dept has 54 faculty, Waterloo's CS dept has 73 faculty, (McGill's CS dept has 31 faculty,) Alberta's CS dept has 45 faculty, Simon Fraser' CS dept has 47 faculty (Burnaby campus).

P 11.

The good thing is, one does not have to be large to be highly ranked.

Small CS depts can be highly ranked too.

E.g., Cal Tech's no 12 CS program has 15 faculty members only.

Rice Univ's no 19 CS program has 18 faculty members only.

In Canada, McGills' no 3 CS program has 31 faculty only.

P 12.

The key to improve rankings and reputation for smaller CS departments is

through growing selective areas of excellence.

(The areas of excellence of Cal Tech's CS dept are: vision/graphics, algorithms, networking.

The areas of excellence of Rice's CS dept are:

AI/robotics, graphics/geometric modeling, systems.)

We will continue to expand the strength of all our existing research areas, but we will put extra

resources into two or three selected areas that are most critical to the future of this department

(and have the best chance to excel nationally, e.g., vision/graphics, networking).

P 13.

One thing in common of all these top CS programs is, they all have good size of research funding per faculty member.

Each faculty at MIT has \$685,000 per year.

Each faculty at Stanford has \$730,000 per year.

The smaller depts, such as Cal Tech has \$500,000 per faculty per year.

Even Rice has \$350,000 per faculty per year.

P 14.

For this dept to improve in reputation and rankings, the most important issue would be to significantly increase the funding of this dept.

We will encourage faculty to write more high-quality research proposals each year (3-4), and explore our opportunities with other federal agencies such as Army, and private companies such as ....

We will use British Columbia's Parliament members' offices to build tighter connections especially with Army and other federal agencies, places with huge amount of cash to spend.

P 15.

Each faculty member should try to publish 4 journal papers and 4 conference papers in high quality journals and conferences each year.

We will create a list of top-tier journals and conferences and 2nd tier journals and conferences in various research areas and faculty members will be evaluated based on the quality of their publication.

We encourage faculty to publish half as many papers in top-tier journals and conferences than twice as many papers in second-tier journals and conferences.

P 16.

Larger startup funding is necessary to compete for excellent new faculty members. It is also necessary for new hires to quickly build up a strong research team to compete for Professional visibility and to compete for NSERC awards.

We should know that to build a larger research enterprise, we need to invest in research resources.

We will work with the College to increase the startup funding by at least 50%, if possible.



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P 17.

I will address this issue in the Education part.

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P 18.

The sixth item is to push for creation of technology centers in the college such as

Center for Virtual Environment and Game Design

Center for Internet Computing and Security

Center for Bio-Engineering and Virtual Surgery

P 19.

Technology centers (TCs) have several advantages that allow us to build stronger research ties with industry.

1. a TC can provide combined strength of several areas. Therefore, a TC can handle technical problems in a broader range.
2. the cost structure of a TC is low because faculty associated with the center usually are not paid by the center and the students working there are paid much less than professional engineers. So it is cheaper for a company to out-source its research projects to a TC than doing the projects itself.

This "TC" model has been working successfully at several places, including USC's Information Sciences

Institute, Johns Hopkins' Applied Physics Lab, and Georgia Tech's GTRI (Georgia Tech Research Institute).

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P 20.

The challenge universities are facing now is the same: a world that is more **INTER-DISCIPLINARY**, **COLLABORATIVE**, and **GLOBAL**.

Computer Science Depts of this century need to produce students who are more adaptable and flexible, besides being technically proficient.

This is true for both undergraduate and graduate education.

P 21.

My Action Plan for Undergraduate Education includes the following items.

The first plan is to increase the number of awarded undergraduate degrees in CS from 114 to 170 by 2013.

It has been a North America trend that the number of students attending CS is declining.

But the total number of students interested in this discipline is still very large nationally and in the province of British Columbia.

The Department should market its undergraduate program more intensely to the large number of prospective students in the province of BC and the West Coast area.

It should also build exchange programs with universities in China, Hong Kong, Singapore, Korea

and oil-rich countries to attract more foreign undergraduate students.

Need to redesign the website.

If we can let a student know more about our strength, we have a better chance to recruit that student into our program.

Providing an informative website is the cheapest and, yet probably the most efficient way, to recruit students.

P 22.

The curriculum will be revised to make the lower session more CHALLENGING and the upper session more COMPETITIVE and FLEXIBLE.

The purpose of revising lower session curriculum is to ensure the course arrangement is attractive enough to keep students in the program.

The purpose of revising upper session curriculum is to ensure CS graduates can compete with anybody in the job market and graduate studies.

I consider the job of a programmer a manufacturing job. A company would out-source a manufacturing job if at all possible. So, in addition to giving the students a good training on computer science in the traditional sense, we should also give them a chance

to specialize in one or two non-traditional areas (such as game design or web programming), in a sense, giving them something that can not be out-sourced to a foreign country yet.

This requires more application-oriented courses and courses in emerging areas.

P 23.

The department should take early action to keep track of students who are likely to be CS majors during the first two years.

The department should also develop more aggressive strategy to retain students in the program.

Of course, the best way to retain students is to keep the program competitive enough and attractive enough.



P 24.

Quality is also important.

Our next plan is to increase the quality of incoming undergraduate students.

The dept needs to attract more excellent high school graduates to its program. The first thing it can do is to raise funding for undergraduate scholarships in CS. Other actions include organizing province-wide promotion trips to high schools to talk to students directly, holding programming contests and providing more information about our program on our website.

P 25.

The department has put a great deal of effort into developing innovative and exciting interdisciplinary undergraduate combined programs.

Of the 11 combined programs, however, only 3 have significant numbers of students. Combined degrees provide good opportunity for both growth in student numbers and increased collaboration across the campus.

Questions, however, need to be addressed with respect to HOW MANY, WHICH, and AT WHAT COST.

The department should review all the combined programs to determine how to address the above three issues.

P 26.

In addition to increasing the width of the students' knowledge, we should also increase the depth and hands-in capability of the students.

Our students must be able to design, not just to implement.

They must be able to solve multi-disciplinary problems.

By looking at your course list, I can tell there is already such an effort in that direction.

We can do more by requiring the Technical Projects (i.e., CS499) to involve with at least one of the faculty's research grants so that the students and faculty can both benefit from this initiative.

P 27.

My Action Plan for graduate education includes three items:

1. Increase the number of graduate students (G-students)
2. Improve the quality of G-students
3. Improve the retention and graduation rate of G-students

For the first item, we will try to increase the total number of G-students by 20% (from 116 to 140) in five years, but with a favor on having more PhD students.

The goal is to graduate 10 PhDs (from 5 to 10) and 42 MS a year (from 28 to 42) by 2013.

This goal will be achieved by attracting more G-students into our graduate program through the

following steps:

- (a) PhD students have the highest priority to be supported
- (b) A PhD student with an MS in CS before joining the PhD program can not get an MS degree here if they change their mind after joining our PhD program
- (c) do not support MS students with Fellowships
- (d) Increase RA positions for PhD students by increasing our external research funding by 100% by 2013.

Again, a more informative website can also make graduate student recruiting more effective.

P 28.

We will improve the quality of graduate students by

(a) encouraging our good MS students to apply for our PhD program

(b) we will try to provide paid summer internships, 6-month or one-year internships to top CS juniors or seniors at top universities in China, India, Hong Kong, ... with dept fund.

Once a student is familiar with our department, especially when a student likes his/her research experience here, we have a better chance to recruit him/her back into our PhD program. I got this idea from the internship program of MicroSoft Research Center in Beijing (called MRCA). Their internship program not only created excellent research results (those students made significant contribution to the

research work of MRCA by publishing papers in prestigious conferences like SIGGRAPH, ... etc), but also provided them with an influx of excellent new employees because those students liked the internship experience and most of them joined MRCA after they graduated from their colleges.

- (c) our PhD student stipends must be competitive. We will make sure our PhD students are paid at least as much as our benchmark universities.

P 29.

We will

- (a) develop more exciting and advanced graduate courses
- (b) offer courses with more flexibility
- (c) institute mandatory annual progress reports
- (d) introduce professional development opportunities

I understand at UVic, all graduate CS courses were cross listed fourth year undergraduate courses.

So fewer advanced courses were available for advanced study.

We will make our graduate curriculum more exciting by introducing more regular courses (instead of topics courses) in the experimental CS areas and areas of current interest such as: Image based Modeling, Computer Animation, Virtual Reality, Embedded



Systems, Advanced Computer Networks, Neural Networks, Medical Imaging, Bio-informatics, etc. (note that the networking and image processing are emphasized differently in CS depts and ECE depts. ECE people tend to focus more on building hardware while CS people focus more on developing software. Another example is CAD. CAD people in ECE focus on circuit design while CAD people in CS focus more on geometric shape design.)

We will offer graduate courses with fewer than 10 students as resources allow. This is important for emerging areas because those areas might not be so well-known to the students yet and therefore might not be able to get 10 or more students to register for the courses.

We will keep a close eye on the progress of each graduate student, especially PhD student.

We will ensure each graduate student gets proper and close supervision.

Annual Progress Reports for graduate students will be enforced. If resources and time permit, we might even require reports every six-month or so instead of one year.

Graduate students, especially PhD students, should have access to professional development courses to complement the academic training they are receiving. These might include teaching, grant writing, research management, mentoring, etc.

The department will do it best to provide such courses to graduate students.

P 30.

Service is also a very important mission of us.

- (a) The Chairman of the dept should work closely with Graduate Advisor and Undergraduate Advisor to ensure every student gets proper advice for every thing related to his/her study in the department. We will ensure every student has an advisor, permanent or temporary. Progress of each (graduate) student will be periodically reviewed.
  
- (b) We will ensure each new faculty member gets proper mentoring from senior members in his/her research group. My belief is, we hire someone as a faculty member only because we want to keep him/her as a permanent member of our department. Therefore, if we hire someone, we should provide

him/her with proper guidance in his/her research and teaching.

- (c) We will keep a close relationship with our alumni. Alumni can provide us with first hand information on current job market direction and job openings. They can also help us with enrollment, industrial connections, and public image of the dept. We will contact our alumni periodically to provide them with recent activities and achievements of the dept, and also to gather information from the alumni. Some of these can be done through our website.
- (d) We will expand functions of the co-op program. A well-developed co-op program can help us on research collaborations, recruiting, funding initiatives and post degree professional development opportunities with local industry.

P 31.

To help faculty get involved more in professional activities and, consequently, increase visibility of the dept,

(e) the dept will provide administrative support within its power to faculty who are involved in professional activities such as conference chairman, program chairman, editor-in-chief, ...

(f) the dept will help faculty to seek financial assistance from the university or external sources to hold conferences and symposiums on campus or in Victoria or Vancouver area.

P 32.

I prefer a transparent, bottom-up approach.

I treat everybody fairly and honestly.

I like to do things by book.

Responsibilities of the dept chairman should be clearly defined and stated, so everybody knows exactly what the chairman can do and cannot do. Everybody should also know how business of the department is conducted and operated. For that purpose, The Department Operating Rules and Procedures will be reviewed and revised if necessary.

Policy making within the department will be as transparent as possible, through various committees (executive committee, hiring committee, graduate committee, undergraduate committee, equipment committee etc) and faculty meetings to reach

consensus on departmental issues.

The Department will ensure that each faculty member is provided with appropriate administrative and technical support. For that purpose, the administrative and technical support structures will be reviewed and revised if necessary to make sure the dept has sufficient support in both areas. This could include the creation of new positions, such as the position of an Associate Chair.

Every employee of the dept will be treated as a first-tier employee. We will improve the morale and effectiveness among the staff members by providing appropriate recognition and competitive salaries to all administrative and technical staff compared to our benchmark universities.

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P 33.

As far as my management style and leadership are concerned, I believe

"Only a department with strong cohesion has the full potential to excel"

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P 34.

I will ensure

"everybody is properly compensated" and  
"nobody is left behind".

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P 35.



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P 36.

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P 37.

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P 38.

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P 39.

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P 40.

P 41.

I believe the most important job of the University, the College, and the Department is to provide an environment that everybody can reach his/her full potential. I will do my best to make this department

- a department with a bracing atmosphere,
- a department with a strong sense of community,
- a department with intellectual vigor and most importantly, like I just said,
- a department that everybody can reach his/her full potential

P 42.

Together, we can make this department a top rank CS department in Canada and North America.

This ends my presentation.

I will be glad to answer questions.