Faculty of Science Academic Plan
2010 – 2013
September 25, 2009

1. Introduction
This three-year plan is being drafted at a time of considerable uncertainty and change. The most important aspect of this uncertainty is the lack of information regarding the University’s budget situation for the planning period. A less important, but nevertheless significant, issue is the fact that the Faculty of Science will have a new Dean by September 1, 2010 and that individual may not agree with some or all of the current Dean’s priorities. Finally, the Faculty is in the early stages of its new relationship with the Department of Biomedical Physiology and Kinesiology (BPK) and, while all indications are that the move of this Department from the old Faculty of Applied Science to Science will be beneficial for all concerned, there are probably still issues that need to be worked through.

The Faculty of Science is in an extremely healthy state as far as its teaching and research programs are concerned. Each of its eight departments has areas of exceptional strength. More than 96% of the tenure-track (research) faculty hold external grant support. Historically, and also currently, the Faculty generates 50% or more of the University's annual research income. Over the last calendar year, at least one faculty member in each department has been recognized through a national or international award for research excellence, and in one case for teaching excellence. Three members of the quite small Department of Earth Sciences were so recognized and four members of Biological Sciences received significant awards. Our graduate students regularly receive “best paper” or “best poster” awards at conferences and our Ph.D. graduates have consistently done well in the NSERC Doctoral Prize competition. Our best undergraduate students are the equal of any in Canada --- at the most recent June convocation both of the Governor General's Silver Medals were awarded to Science graduates.

Over the last three-year period we have also made some important strategic choices. We succeeded in obtaining a LEEF Chair in the area of Salmon Conservation and built on this success by hiring three other outstanding scientists (two of them CRCs) in the area of Aquatic Conservation. Two of these, Isabelle Coté and Nick Dulvy, recently received Marsh Awards for Conservation Biology, for separate independent achievements, from the London Zoological Society. The success of this group is at least partly responsible for the creation of another endowed chair, the Liber Ero Chair in Coastal Studies, which we hope to fill within the next few months. We also succeeded in attracting a distinguished senior scientist to a LEEF Chair in Pharmaceutical Genomics. This individual, Robert Young, also received a national award this year and has assumed a leadership role in the Center for Drug Research and Development and in the regional biotechnology community.

Another very important initiative is our participation in the creation of a regional Genome Sciences Institute. The idea for this originated in the Michael Smith Genome
Sciences Center (GSC), one of the leading centers of its kind in the world. The thirteen senior scientists in the GSC are all supported by soft money derived mostly from grant and contract overhead and an uncertain contribution from the BC Cancer Agency, the administrative home of the Center. The intention is to build capacity in genomics and insure long-term stability by partnering with the three large BC research universities to form an institute that will have both a research and graduate training mandate. While UBC and the University of Victoria have made supportive noises, SFU, primarily through the Faculty of Science, has taken concrete steps to make the Institute a reality. In particular, we have offered half-time tenured or tenure track faculty appointments to four of the GSC scientific leaders and these offers have all been accepted. The individuals, in order of appointment, are Sharon Gorski (MBB), Angela Brooks-Wilson (BPK), Steven Jones (MBB) and Robert Holt (MBB). These are superb scientists and they have already had an impact through undergraduate teaching, graduate supervision and service contributions. The added strength in genomics that they provide has allowed us to develop a new B.Sc. program in this area. This program will be administered by MBB but will involve BPK, Biological Sciences as well as the Faculty of Health Sciences in its delivery. Another outgrowth of this initiative is a submission of a proposal for an NSERC CREATE program in Comparative and Integrative Genomics.

The GSI initiative has enjoyed strong support from the senior administration (President, Vice-Presidents Academic (VPA) and Research). The two most recent VPAs, John Waterhouse and Jon Driver, both made Strategic Initiatives monies available to the Faculty to fund the appointments discussed above. There is a slight element of risk associated with these appointments: Should the soft money that funds the other 50% of their salaries disappear, these scientists would have the option of becoming 100% SFU faculty. The willingness of the VPAs to assume this risk demonstrates their level of commitment to this enterprise.

Despite all these positive developments, it must be acknowledged that the Faculty has problems that will have to be addressed. Our six-year graduation rate of roughly 60% is unacceptable and must be improved. This will be discussed further below. Until this year almost all of our courses have had spaces available at the end of registration. Nevertheless, students complain about course accessibility. This year, the situation has changed rather dramatically. A number of Biology courses and an alarming number (31) of Kinesiology courses are oversubscribed. This seems to be due to increasing enrollments in the Faculty of Health Sciences. As far as the introductory biology courses BISC101 and BISC102, that are required in many programs and are also popular electives, there is no simple solution: We do not have the laboratory space required to accommodate more students.

Finally, budgeting at the Faculty level has been painful at best for the last two fiscal years. By scraping together every last dollar from vacant positions, we have been able to maintain an adequate TA budget and a minimal non-salary operating budget. However, in the current fiscal year there is no provision for contingency, a situation that is obviously not sustainable over the longer term.
2. The Planning Process
Departments were asked to submit their three-year plans by the end of July and all were in hand close to that deadline. Almost all of these plans were essentially complete before the appearance of the VPA Planning Newsletter 2, dated July 31, 2009. It is therefore not surprising that the Departmental Plans focus more on the potential of a 2% annual increase in budget rather than on a 3% annual cut and are therefore more expansionary than can be realistically expected. All of the departments propose some hiring of faculty, either replacements for departed colleagues or for growth. Most of these requests are entirely justified and I consider my role to be one of setting priorities and authorizing/recommending searches when information on the budget becomes available.

The Dean’s Advisory Committee met for a half-day retreat on September 15, 2009. The Chairs presented the departmental plans to their colleagues for consideration and discussion and I presented a summary of the draft Faculty three-year plan. This plan was then modified in light of the discussions at the retreat and circulated to the Departments, the other Deans and the Vice-President, Academic.

3. Undergraduate Program
By their very nature, Science major and honors programs tend to have a common core that extends at least to the 300 level and, in most cases, into the 400 level. Therefore, consideration of “learning outcomes” is an essential ingredient in their design. It should also be noted that four of our departments (Biomedical Physiology and Kinesiology, Chemistry, Earth Sciences, Statistics and Actuarial Science) have programs that are subject to accreditation by professional organizations and their content and delivery methods are therefore constrained.

Programs in Science tend to be dependent on one another and the Faculty has therefore traditionally used a block-scheduling template (all Calculus courses at 8:30, Physics at 9:30, etc.) that avoids course conflicts between required courses in all programs. Therefore, students who take advantage of the published program templates should be able to navigate through their programs with ease. A few years ago, we made direct admission to programs available to applicants. Those students who opt for this are sent a copy of the recommended first year course selection and directed to the appropriate departmental advisor. Most departments in Science have the recommended course selections by semester posted on their websites. We will make sure that in the near future all of them do.

There has been a great deal of discussion at many levels of how we need to do things differently and streamline our program delivery. In this context, it should be recognized that the University Curriculum Initiative has generated a certain amount of bloat in our course offerings. For example, during the last three semesters, including the fall of 2009, the Faculty of Science has offered 16 B-Science courses with a total enrollment of 2,714 students or 271.4 AFTE. All of these courses were designed in response to the Curriculum Initiative and not one of them can be used toward B.Sc. degree requirements in Science, although some Science students might
take them for pleasure. Their main purpose is to give students in FASS and elsewhere an accessible, non-technical way of fulfilling their Breadth requirements. Four short years ago, this number of AFTEs would have generated more than $1,000,000 in base funding and allowed the Faculty to hire sufficient additional tenure track faculty so that no sessional appointments would have been necessitated by these courses that serve no useful purpose as far as Science students are concerned.

Below, I will summarize new initiatives department by department but first will discuss issues that affect the Faculty as a whole.

**Recruitment and Retention**
As mentioned above, retention and graduation of students remains an important issue. Over the last three years, we have implemented two new Faculty-level initiatives to help with retention and success of first year students and participated in a third organized by Student Services. First, we have implemented “early intervention” in our gatekeeper first year Calculus and Physics courses. Students potentially at risk of failure are identified early in the semester through diagnostic tests and invited (indeed bribed) to participate in extra remedial tutorials. Those students who did so had a significantly higher success rate than those who didn’t. In Physics in 1087, roughly 85% of students in the first Physics course were eligible to continue to the second course, a significant improvement over the historical average of 75%. We plan to continue this program indefinitely and are hoping to secure long-term financing for it through Advancement.

Second, we introduced a system of “universal mentorship” of all new students by faculty members. We paired each new student with a faculty mentor and asked the faculty member to invite the student in for a chat at least two times a semester. Results to date have been mixed: Perhaps 50% of the students took up the offer and it’s likely that they weren’t the ones most in need of mentoring. We will continue to try to improve this program. Finally, Science has been part of the Success Semester Program almost from the beginning and will continue to participate.

Next year we expect to offer our Grade 12 entrants a “cohort program” based on very successful models at Alberta and Toronto. Those students who wish to have a cohort experience will be offered several combinations of core courses, e.g., Bisc101, Chem121, Math154 and Phys101. They will be required to register in the entire suite and will be assigned to the same tutorials and lab sections in groups of perhaps 20. Even though they will still be in large lectures, they will spend a significant fraction of each week together as a group. At both Alberta and Toronto these cohort groups have had a much higher success and persistence rate than the average. We have formed a committee to implement this and the Registrar has enthusiastically offered her support.
The Faculty has a standing Recruitment and Retention Committee chaired by our Coordinator of Recruitment and Retention, Stephen Price. This committee is working on an integrated recruitment plan that is in the final stages of development.

(ii) Surrey Programming
Now that funding for the fit-out of Podium 2 at Surrey Center has been obtained, we are optimistic that we can roll out the Senate-approved B.Sc. program *Exercise and Nutrition in Health and Disease* (ENHD) created by the Department of Biomedical Physiology and Kinesiology. This should have a steady-state enrollment of 200 FTE at the undergraduate level and a faculty complement of seven tenure track and three teaching faculty. It should also be possible to offer Biology and Chemistry labs at Surrey and there will have to be some hiring associated with these. This will be a very exciting development for Science at SFU Surrey.

Other departments are at various stages of planning for SFU Surrey: Physics is discussing the possibility of offering Medical Physics, in partnership with the BC Cancer Agency, at Surrey and Chemistry is considering a program in Nuclear Medicine.

All of these programs are, of course, conditional on the Province funding new undergraduate spaces at the Surrey campus.

(iii) Inter-Faculty Programming
The Faculty of Science already partners with other faculties in the delivery of a number of interdisciplinary undergraduate and graduate programs such as Biomedical Engineering (Biomedical Physiology and Kinesiology and Engineering Science) or Management and Systems Science (Mathematics, Statistics, Computing Science and Business) and more are planned. A new program in Genomics (MBB, Biosciences, BPK and Health Sciences) is in the final stages of development and should begin to roll out in 2010. New partnership programs with the Faculty of the Environment will also undoubtedly emerge.

(iv) Departmental Initiatives
**Biological Science:** Reduce program from four streams to three, “Ecology, Evolution and Conservation”, “Cells, Molecules and Physiology” and “General”. Will partner with the Faculty of the Environment in the teaching of conservation biology courses in order to reduce redundancy.

**Biomedical Physiology and Kinesiology:** Surrey program and a new program “Behavioral Neuroscience” in partnership with Psychology. Biological Science is likely a future partner in this as well.

**Chemistry:** Reequip Analytical and Physical Chemistry labs and revise curriculum in accordance with recommendations of recent external review.
Earth Sciences: No significant changes planned since the Geology and Environmental Geoscience streams already meet accreditation standards.

Mathematics: Will continue to fine-tune the early intervention program in first year calculus courses.

Molecular Biology and Biochemistry: Recently revamped the existing program. New interdisciplinary program “Genomics” almost ready.

Physics: Recently created a new stream “Biological Physics”. Will continue to work towards increasing the enrollment in Engineering Physics.

Statistics and Actuarial Science: Will carry out a complete review of the Statistics program. Will propose a new five-year Grade 12 to B.Sc+M.Sc. cohort program for gifted students.

General Science Program: The General Science Program is administered by the Dean’s office. It has not been revised in some time and has not attracted many students. We will strike a committee to examine its structure.

All units will explicitly examine to what extent their programs are consistent with the VPA goals articulated in the Academic Vision document of June 2009. I note that all Science Departments participate fully in COOP and that all heavily involve undergraduates in research, often as early as their third semester at SFU.

4. Graduate Program
In 2007/08, the annualized graduate headcount in the Faculty of Science (including BPK) was 574. Since then, several Departments (BPK, Mathematics, Physics) have succeeded in recruiting more graduate students and the current population is probably close to 600. This translates into 3.7 graduate students per tenure track faculty member, a reasonably healthy number. There is some capacity for graduate student growth. The Faculty has made four half-time tenure track appointments of BC Cancer Agency and Genome Sciences Centre scientists. These individuals are exceptionally strong researchers and should increase our supervisory capacity in MBB and BPK substantially. There are also some excellent new appointees in Chemistry, Mathematics and MBB who will undoubtedly be building research groups. The departments that have extra capacity with the existing faculty complement, in my view, are BPK, Mathematics, MBB and Physics.
I should note that every Department in Science provides guaranteed twelve-month funding for every graduate student as long as progress is satisfactory. The intention is to continue this for the foreseeable future.
I will now briefly review new departmental initiatives for the next three-year period where these exist.

CREATE Programs: Faculty members in Science are leading three of the University’s proposed interdisciplinary graduate programs that have been approved
by NSERC to proceed to the full proposal stage. These programs are *Comparative and Integrative Genomics*, led by N.C. (Jack) Chen, Molecular Biology and Biochemistry, *Medicinal Chemistry*, spearheaded by Bob Young (Chemistry) and *Modeling of Complex Social Systems*, led by Peter Borwein (Mathematics). These programs all involve faculty members from across the University as well as external collaborators. They will be mounted only if NSERC funding is obtained.

**Biological Sciences:** The Department plans to expand graduate training in cell biology and neurobiology and to partner with BPK, FHS and Psychology in an interfaculty graduate program in neuroscience. Similarly, there are plans to involve BPK, Chemistry, FHS and the Faculty of the Environment in the very successful Master of Environmental Toxicology program. Finally, Biological Sciences is a partner with MBB and FHS in the new graduate program in infectious diseases ILIAD.

**Biomedical Physiology and Kinesiology:** BPK has recognized that its graduate enrollment is anomalously low and aims to increase its graduate cohort to 55 Ph.D. and 56 M.Sc. students. This is an ambitious 81% increase and it will be interesting to see if these targets can be met. This semester, the Department has recruited 14 new graduate students which is a very encouraging sign. If the ENHD program in Surrey is funded, there is obviously some room for growth at that campus.

**Chemistry:** Chemistry's initiatives are focused on program quality and two new programs that are in an early planning stage. The quality control initiatives include an increase of the minimum entrance GPA from 3.0 to 3.33 and the introduction of a Ph.D. candidacy exam. New programs include a potentially very important (for society) initiative with the Faculty of Education for a Master in Science Education. As well, the ramp-up of 4D Labs to full capacity makes a graduate program in Materials Science with Physics, and perhaps Engineering Science, an attractive option.

**Earth Sciences:** With the introduction of a Ph.D. program in 2005, the graduate enrollment in Earth Sciences has increased steadily to its current level of 52. Given that there are only thirteen research faculty in the Department, this is probably close to capacity. An interesting new development is an international graduate exchange program with the University of Torino (Italy), led on our side by John Clague. This program has recently been funded under an EU-Canada Partnership program.

**Mathematics:** The Mathematics graduate program has recently grown quite a bit. A major feather in the Department’s cap is the appointment of a 2008 Ph.D. graduate to a tenure track position at Oxford. At this point, there are no new initiatives proposed.

**Physics:** No new initiatives aside from the Materials program and involvement in the Master of Science Education program planned. The Department is continuing to
work on recruitment strategies and on increasing the number of externally funded scholarships.

**Statistics and Actuarial Science:** Probably the most interesting new initiative is the proposed five-year High School-to-M.Sc. program in Statistics. Excellent Statistics majors will be identified after their second year and offered a fast-track cohort program to an M.Sc. in a three-year period. The M.Sc. degree is the preferred credential by prospective employers and there should be good uptake for this program. Other new initiatives include joint graduate programming with FHS leading to the M.Sc. degree in Biostatistics and in Quantitative Health Science and a Ph.D. program in Actuarial Science.

5. Research and Faculty Renewal and Growth
All of the Departments in Science, with the exception of MBB, have vacancies due to past retirements or resignations or through VFEIP. Although the positions vacated through VFEIP have been repatriated to the VPA office, the Departments quite naturally feel that they have some ownership and, in all cases, would like to have them back. In this section, I will describe the departmental situations, indicate their priorities and discuss the Faculty priorities. In the current fiscal year, the salary fallout from vacant faculty and staff positions was all used to fund TA-ships, non-salary operating and sessionals. Obviously, if the 20010/11 budget is the same or lower and the TA budget is to be protected, there will be little or no faculty hiring. Nevertheless, I feel it may be useful to have a hiring plan in place that could be implemented when times are better, as they eventually will be. I also believe that it is unwise to make firm decisions in anticipation of provincial budget cuts. The current government is most unpredictable and precipitous action on our part has served us poorly in the past.

I should emphasize again that all of the Departments in Science are very strong in research and have some faculty members who are leaders on an international scale. It would therefore be a tragedy if one of them were singled out for a disproportionate cut.

**Shrum Chair in Science:** Steve Thompson’s (Statistics and Actuarial Science) five-year term as Shrum Chair ends in July 2010. The first four Shrum Chairs were identified through a competitive process in which all departments were invited to bring forward a nominee and, after the usual public presentations and interviews, the preferred candidate was selected by a committee consisting of the Dean and the Chairs. In three of the four searches, we succeeded in appointing our first choice and, in each case, appointed a truly stellar individual. All of them were brought in from outside the University. Clearly, this recruitment strategy has been a success and I would normally propose that we continue to use it. However, the Shrum Endowment is under $2,000,000 and therefore produces less than half of the Chair’s salary and benefits at the current payout of 4%. My first choice, this time around, would be to offer the Chair to Dr. Marco Marra (FRSC, SFU Honorary Degree Recipient), Director, Genome Sciences Center. Dr. Marra is a
distinguished researcher who already has close ties to SFU and who has long been a “person of interest” to the Faculty. This would be a half-time appointment with the other half financed by the BC Cancer Agency according to the terms used for our previous appointees. Should Dr. Marra decline the offer, I would propose to leave the Chair vacant until the University’s financial situation improves.

**Biological Sciences:** This department has outstanding strength in the areas of Evolution and Behavioral Ecology and Conservation Biology and a strong group in Plant Molecular Biology. It has an emergent program in Neurobiology and established professional programs in Environmental Toxicology and Pest Management. It will lose two faculty members (Hartwick and Plant) through VFEIP by September 2009 and has also lost three faculty members (Beckenbach, Dill and Harestad) through early retirement. As well, a large fraction of the tenure track faculty has a reduced teaching load for a variety of reasons. However, Biosciences has benefited through a number of recent targeted hires: LEEF Chair (Reynolds), associated spousal hire (Côté), two Tier II CRCs (Dulvy and Palen) and the Thelma Finlayson Chair in Biological Control (Cory). None of these are replacement hires. It is difficult, therefore, for me to put an immediate priority on hiring in Biological Sciences. I do agree with the Department’s priority of hiring in neurobiology and toxicology, especially since these hires are associated with the broadening of these programs through interfaculty collaboration.

There is an informal proposal of 75% salary support from Dr. Julio Montaner (Centre of Excellence for HIV/Aids) for a targeted hire in the area of infectious diseases. If this becomes a formal offer, Science and FHS will consider funding the remaining 25%. The natural home for the individual in question would be Biological Sciences.

**Biomedical Physiology and Kinesiology:** BPK has very strong programs in Neuromechanics and Neuroscience, Cardiovascular Physiology, and Chronic Disease. The Department has six vacant tenure track positions: Milner and Lear (resignation), Bawa and Goodman (VFEIP by September 2009), Marteniuk (retired) and MacKenzie (EER, salary required to January 2011). This clearly affects not only the Department’s research program but also its ability to staff the highly successful accredited undergraduate program with the required 75% continuing faculty. Searches for the Milner and Lear positions have been authorized and are in progress. One further search in each of the next two years is a very high Faculty priority.

The approved “Exercise and Nutrition in Health and Disease” program intended for SFU Surrey will require new FTE funding from the Province. If this is approved, there will have to be a further 10 hires (7 lecturers, 3 tenure track) for the Surrey campus over the next four years, as well as one hire each in Biosciences and Chemistry for labs in these areas.

**Chemistry:** This department has exceptional strength in Materials (complemented by corresponding strength in Physics) and in Chemical and Structural Biology and Medicinal Chemistry. The undergraduate program in Chemistry is accredited by the
Canadian Society for Chemistry and the Department therefore must offer a broad range of courses and needs faculty with the appropriate expertise. It is therefore not possible to focus all hiring on the areas of greatest strength. Chemistry has a number of unfilled positions: Jones and Gay (retirement), Hill (seven year unpaid leave, not expected to return) and a large number of faculty with reduced or zero teaching load: Pinto (VPR), Holdcroft and Eikerling (50% secondment to NRC), Voadlo, Branda and Gates (CRCs), Young (LEEP), Andreoiu (UFA) and Pomeroy (long-term disability). Its reliance on sessionals and limited term faculty is therefore quite unhealthy. For this reason, some hiring in Chemistry will have to be a priority. The Department’s first priority is a replacement for Hill in the area of materials followed by a main group inorganic chemist, as recommended in their recent external review report. I support these priorities and hope that resources will permit the first of these searches to start in 2010.

Earth Sciences: Earth Sciences has very strong research programs in Environmental Geoscience and in Geology although the Department breaks these groups down further into seven research groups. Each of the two umbrella groups has national and international award winners. As mentioned above, their main undergraduate streams are accredited and the Department therefore needs an appropriate mix of expertise. Earth Sciences lost one faculty member through VFEIP (Mustard) and naturally wishes to replace him with someone capable of assuming his teaching responsibilities. I am sympathetic to this. However, I expect that the Department will have to delay refilling the Mustard position for a year or more because of more urgent Faculty priorities.

Mathematics: This department has three outstanding research groups: Applied Mathematics, arguably the strongest group in Canada, Discrete Mathematics, certainly competitive internationally, Algebra and Number Theory and a smaller Surrey-based group in Operations Research. There is currently one vacant position (Lee, resignation) and another one is anticipated: Rustum Choksi has accepted a position at McGill and will test the waters during a one-year leave of absence. Should he decide to stay at McGill, replacing him will become a priority since he is an integral member of the Applied Mathematics group. Mathematics has put a great deal of energy and resources into remedial work associated with their first year calculus courses. This “early intervention” program is managed by a limited term lecturer. I will be requesting that this position be made continuing since there is undoubtedly a long-term need for this program. This change of appointment will be essentially cost-neutral. Otherwise no other continuing appointments are anticipated in the short term.

Molecular Biology and Biochemistry: MBB concentrates its research program in three areas: Macromolecular Structure and Function, Molecular and Cellular Genetics, and Genomics and Bioinformatics. It is undoubtedly one of the strongest departments in its fields of interest in Canada. This was certainly the opinion of its most recent external review committee. Since that review, the Department has gained strength through (i) the maturation of its more junior faculty members, (ii)
the appointment to half-time positions of three very strong scientists from the Genome Sciences Centre and (iii) the appointment of two very promising junior scientists, one of them a spousal appointee associated with an FHS hire. We might request a fourth half-time GSC hire to take effect in 2010 but otherwise no new positions are anticipated. The five-year appointment of the limited term lecturer associated with SFU Surrey ends in 2012 and we will undoubtedly request that this position be made continuing at that time or earlier.

Physics: The Physics Department has had one of the strongest Condensed Matter and Materials Science groups in Canada for decades. More recently it has created research groups in Biological Physics and Soft Matter, recently characterized by a very distinguished external review committee as the strongest in Canada, and a significant group in Elementary Particle Physics and Cosmology. A smaller group in Atomic, Molecular and Optical Physics rounds out the research contingent in Physics. There are two vacant faculty positions (Clayman, retirement and Boal, EER, salary required to July 2010) and a third is expected in 2012 (Plischke). The retirement of Boal and Plischke threatens the preeminence of the Bio/Soft Matter group and replacement of at least one of them by a theoretician in this area is the Department’s highest priority, one that I support. The other two replacement hires, if approved, would be in Materials Science Theory and Nano/Bio Experiment.

Statistics and Actuarial Science: The most recent external review of this department characterized it as “being on track to be the strongest in Canada”. The Department has a very strong program in Interdisciplinary Applied and Methodological Research and a highly regarded and successful program in Actuarial Science. The Actuarial Science program is significantly understaffed, in particular if the proposed Ph.D. program is implemented. Some time ago, then Vice-President Academic John Waterhouse approved a targeted hire in Actuarial Science and we expect to make this appointment in 2010. This will improve the situation. Since the aforementioned external review, the Department sustained a serious setback with the untimely death of one of its stars, Randy Sitter. Replacing him with an established researcher, perhaps an Associate Professor, is a very high priority for the Faculty. The Department has a second vacancy through the retirement of Larry Weldon. The departmental plan calls for refilling his position with an Actuary. I support this proposal.

Faculty Hiring Priorities for 2010

Note: These are for replacement or expansion positions that are not yet approved by the VPA or Board. I leave the assignment of priorities for subsequent years to my successor.

At this point, the Faculty of Science has 14.5 vacant faculty positions, not including the positions that were lost through VFEIP. The request for four replacement hires and the revenue-neutral conversion of a Limited Term Lecturer to Continuing is therefore quite modest.

2. Replacement of Ron Marteniuk in BPK.
3. Replacement of Ross Hill in Chemistry.
4. Conversion of Limited Term Lecturer to Continuing in Mathematics.
5. Replacement of David Boal in Physics.
6. Targeted appointment of Martin Hirst (Genome Sciences Center) in MBB, if VPA Strategic Initiatives funds are available.
7. Surrey appointments, if FTE growth at SFU Surrey is funded by the Province. 
   Aside from the appointments directly associated with the ENHD program, there will have to be a modest number of appointments (2) in supporting departments.

6. Facilities
The most pressing issue as far as facilities are concerned in 2006 was the rehabilitation of the Chemistry space in Shrum. This is now under way and we look forward to having state-of-the-art teaching and research facilities early in 2011. While Chemistry had the most serious problems, it must be said that the other laboratory science departments would also benefit from a retrofit and redesign. Currently, the major problem on the Burnaby campus is a shortage of office space in Mathematics and Statistics. It seems that this will be resolved when the Chemistry rehabilitation is complete and the space formerly occupied by MITACS becomes available.

Lack of suitable teaching and research space at SFU Surrey continues to hamper our growth on that campus. However, the fit-out of new space on Podium 2 at Surrey Center will allow us to offer the new program Exercise and Nutrition in Health and Disease if funding for the extra FTE’s is obtained. It should however be noted that the students may still have to travel to Burnaby for Chemistry labs but, ideally, not for Biology labs.

It should also be mentioned that there will have to be some substantial investment in new equipment for teaching labs at Burnaby. This was highlighted in the recent external review of Chemistry which characterized some of that Department’s labs as “third world”. Clearly, refurbishing teaching labs ought to be an ongoing process so that we don’t reach a stage where a large sum of money is needed on essentially an emergency basis.

7. Advancement
The Faculty has had one major success in the Advancement area, the funding of the Liber Ero Chair in Coastal Studies. This Chair will be fully endowed in the amount of $5,100,000 by the end of the 2011/12 fiscal year. We have also obtained a commitment of at least 50% funding for the Physics Observatory from a single donor and obtained smaller donations for a number of other projects. The current priorities for Science Advancement are:

1. Earth to Ocean Centre: $3,500,000 of the total cost of approximately $17,000,000.
2. Salmon Chair: $1,500,000.
3. Observatory: $1,500,000.
4. Science in Action: $100,000.
5. Endowment for the Mathematics and Physics Early Intervention Program: $2,000,000.
6. Chair in Actuarial Science: $4,000,000.

8. Outcomes 2013
The Director, Academic Planning and Budget has directed me to discuss how the Faculty's three year plan aligns with the Outcomes 2013 section of the Vice-President Academic’s SFU Academic Vision, Outcomes and VPA Goals for 2013 Document. I will attempt to do so below.

The University will facilitate admission, support and success for students of all ages.

Admission is, of course, not a Faculty prerogative or responsibility. I have already discussed, in the section on Recruitment and Retention, the initiatives that we have undertaken and are planning to improve the students’ experience and their chances for success.

SFU respects and values diversity in scholarship; academic units define their own research and pedagogical strengths and plan accordingly.

All of the Departments have areas of outstanding strength, as described in this document. These were created over the years through careful planning and rigorous faculty search procedures.

SFU faculty members will create a culture of critical inquiry and their transmission of research skills and research results will add value to each student’s education.

All tenure track faculty use their research to enrich their teaching both in the classroom and in face-to-face meetings.

Students will know the learning purposes and opportunities for each program, can find straightforward information on program requirements, and can plan and complete their programs in a timely way.

On admission, each prospective student receives a letter from me as well as a suggested suite of courses for semesters one and two. They are also directed to departmental advisors. All Departments will have templates of course sequences on
their web sites by 2013. If students enroll in courses as directed, they will be able to graduate in a timely fashion.

**Students will learn through a wide variety of pedagogies that expand the traditional classroom experience and extend learning into local, national and international communities. They will participate in a wide variety of experiences that develop long-term skills in learning, analysis and communication.**

We have a variety of pedagogies including lectures, labs, tutorials and field work including international field trips. Science also has a large COOP programs and almost all tenure track faculty employ undergraduate students in their research labs.

**SFU graduates will understand the importance of being ethical, responsible and informed citizens, through engaging in complex contemporary issues and examining questions from different perspectives.**

The Semester in Dialogue originated in the Faculty of Science although only one faculty member is formally associated with it. Faculty members regularly address societal and complex contemporary issues. The very popular lecture series *Darwin and You* is only the most recent example.

**Academic units will make their teaching and research relevant to the broader community.**

See the previous entry.

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8. Worst Case Scenario

The *VPA Planning Newsletter 2* dated July 31, 2009 directs the Faculties to contemplate the consequences of a 10% budget cut over the next three years, subject to the condition that the TA budget not be reduced. For the Faculty of Science this translates into a budget reduction of $4,000,000 in round numbers. This number should be compared to the Faculty’s “discretionary” expenditures in fiscal 09/10 of $3,433,633 on Teaching Assistants, $1,573,000 on Non-Salary Operating and $1,050,128 on Sessional Instruction for a total of $6,056,761. It is clear that if any budget reduction scenario is to protect the TA budget and, if we continue to allow faculty and others to have telephones, a reduction of $4,000,000 cannot be managed without significant layoffs.

Before discussing how one might proceed with reductions, I would like to argue that the Faculty of Science runs a very tight ship and is extremely lean already. A few
numbers, obtained from the Instructional Research and Planning web site, might help to establish this point. The interfaculty comparisons are for fiscal 2007/08, the most recent data available. The numbers for Science and the old Applied Science have been adjusted for an imaginary transfer of Kinesiology to Science on April 1, 2007 and the enrollment data use AFTE, not the contentious WAFTE, although the use of the latter would further improve the Science numbers relative to other Faculties. In fiscal 07/08, the research income of the Faculty of Science accounted for 54% of the University income.

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<tr>
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<th>FAS</th>
<th>FASS</th>
<th>BUS</th>
<th>Science</th>
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<tbody>
<tr>
<td>Budget/AFTE</td>
<td>$10,621</td>
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<td>$8,187</td>
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<td>AFTE/CFL</td>
<td>16.9</td>
<td>26.38</td>
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<td>Support staff/CFL</td>
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<td>0.45</td>
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<tr>
<td>Research $/CFL</td>
<td>$72,618</td>
<td>$27,605</td>
<td>$12,186</td>
<td>$158,542</td>
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</table>

The low ratio of support staff to CFL is particularly noteworthy, given the large research budget.

Fiscal 2007/08 was by no means an anomaly --- a running five-year average would paint the same picture. I would argue that these numbers show that Science is a cost-effective high-return operation and that it deserves some consideration in the event of budget cuts. I will now discuss how we might manage a $4,000,000 budget reduction, assuming that it occurs in successive amounts of $1,400,000, $1,300,000 and $1,300,000. The TA budget will be left untouched since in Science it is entirely used to support graduate students.

In fiscal 2010/11, I would eliminate the Faculty of Science Electronics Shop for a saving of $300,000 and lay off two of the four technicians in the Machine Shop for a further saving of $120,000. I have already pointed out above that the Science Breadth courses, that are invariably delivered by some of our best teachers, serve no purpose as far as degree completion in Science is concerned. They would not be scheduled again until our financial situation improves. I would also try to persuade all faculty members to voluntarily teach an extra course per year or every four semesters until the state of emergency is lifted. If there is buy-in on this proposal, and I think there is a good chance that there will be, we will have eliminated the need for sessionals, except for FAN which is a cost-recovery operation. Obviously, there could be no faculty hiring at all.

In fiscal 2011/12, my successor will have only extremely painful options left. Since the decisions will not be mine to make, I will only list some options. The only savings to be realized through layoffs are in the support staff group and in the teaching faculty. My sense is that support staff in the Departments are working to capacity. As
an example, the CIO’s Task Force on Commodity IT recently did a complete survey of IT support in the Faculty of Science and concluded that we are understaffed in this area, something that I could not convince our former CIO was true. Naturally, I would take advice from the Chairs on the matter but I believe that layoffs of departmental support staff would bring our research and teaching operations to a grinding halt. Complete elimination of the remainder of the Machine Shop would only save another $120,000, and the Non-salary Operating budget can probably sustain a maximum cut of around $200,000, leaving another $1,000,000 to be found. In 2007/08, the Faculty had 31.3 Lecturers. The most experienced Senior Lecturers cost around $110,000 in salary and benefits. Laying off ten and thirteen of the best-paid teaching faculty in the last two fiscal years of the period, respectively, would complete the budget reduction, at a tremendous cost to our undergraduate teaching program.

Another possible approach is to eliminate a department, if the Board of Governors declares fiscal exigency. I have argued that every department in Science is very strong, both in its research and teaching, and to eliminate any one of them is unthinkable. There may be some reduction in budget attainable through transfer of some faculty members from Science to the Faculty of the Environment (FENV), if that Faculty were to agree to use some or all of its budget for growth in that way. If a Department of Environmental Science were created in FENV, that might make such a transfer an attractive option for individuals who have been closely associated with the Environmental Science undergraduate degree program. I estimate that there is a maximum possible budget reduction for Science of $600,000 available through this mechanism.

In my view, there are few savings to be realized from program changes. Most of the departments in Science run very economical undergraduate and graduate programs in terms of course offerings. Several external review committees have commented negatively about the cross-listing of graduate and fourth-year courses that some departments do and I agree that this is far from ideal. However, it’s further evidence that Science is frugal in its teaching program.

In summary, a 10% cut over three years would transform the Faculty and severely impact its teaching and research programs. The added workload on the remaining faculty, the loss of services through closure of the Technical Centre and, perhaps, other layoffs of staff would make us less competitive for research funding and make the University’s ascension into the G13 an impossible dream.