Two Year Progress Report:
Non-Departmental Programs in the Faculty of Science

The self-study of the review of non-departmental programs was completed in September 2010 and the site visit was conducted December 6 and 7, 2010. The review team submitted its report on February 15, 2011, and Science’s response was received by the Associate Vice President Academic on April 25, 2011. The academic program review report was approved by Senate Undergraduate Council on May 10, 2011 and was presented to Senate on June 20, 2011. This Two Year Report was received by the Associate Vice President Academic on May 13, 2013 and describes progress related to the non-departmental undergraduate programs since the program review in 2010.

The specific programs reported on are the following:

- Biotechnology/Chartered Accountancy
- Biotechnology/Economics
- Science and Business
- Computational Science (regular and co-operative)
- Environmental Sciences/Ecology (regular and co-operative)
- Honours Science
- Three-Year General Science
- Joint Science-Arts Major (BSc)

Our self-study presented 23 program-specific and general recommendations for improvement. The consultants confirmed, and in some cases, amplified the issues through their probing discussions with students, staff, and faculty and presented their own set of 23 recommendations. We distilled a series of 24 initiatives from the combined 46 recommendations for improvement. A number of these initiatives have already been incorporated into the job responsibilities of a new full-time position in the Science Undergraduate Office – Science’s Student Success Officer – who was hired in August 2011 and charged with developing and implementing Faculty-level success initiatives, as well as participating in institutionally-developed initiatives from the central Student Success Office.

Biotechnology/Chartered Accountancy | Biotechnology/Economics | Science and Business

The dominant issues identified by the students in the Science and Business Programs centred on mentoring and networking. There were already a number of mentoring and networking initiatives in place at the time of the site visit, but clearly students wanted more. Initiatives #1, #3 and #4 dealt with enhancement of mentoring programs: improvement of the existing one for Biotechnology/Chartered Accountancy students and creation of a new one specifically for Biotechnology/Economics students. Related to the above, Initiative #2 was to ensure that a “What I Wish I Knew in First Year” (or a similar) event was regularly organized for students.
Mentoring and Networking

There already was a type of peer mentorship program available to Biotechnology/Chartered Accountancy students at the time of the site visit, whereby senior students were connected with more junior (first- and second-year) students. Also, the Science and Business Resource Centre (SBRC) had their Student Ambassador Program, which was launched in response to the 2004 self-study and program review. Also at the time of the site visit, there existed several successful events organized by the Science and Business Resource Centre, notably the annual student/alumni dinner and the annual Fusion Conference. The latter event brings members of all years together with like-minded students from several nearby universities; students are challenged by business-oriented case studies exposed to high profile speakers from the business community.

The new or enhanced initiatives following the 2010 program review are significant. A new Mentorship Program for Biotechnology/Chartered Accountancy, Biotechnology/Economics and Science and Business students was launched in Winter 2013 by the SBRC using program Ambassadors. First-year students are matched/paired with senior student ambassadors who act as “mentors”.

There is also a newly organized JobMine Event, which is focussed on second-year students preparing to go on their first co-op terms. At this event, scheduled in October, ambassadors address any questions that these students have with respect to JobMine and how the system works. This event is meant to supplement course material in PD1, by providing real-life examples from JobMine and tips from upper-year students who have repeated experience with the application process. Most 2A students attend this event. An additional career-oriented mentoring activity is carried out by upper-year ambassadors, who read through second-year students’ résumés, and then follow up with mock job interviews. This initiative is coordinated with the JobMine Event. In addition to mock interviews the Associate Director follows up with students individually to offer résumé critique and career development advice through this “mybusiness personal branding” exercise.

The “What I Wish I Knew in First Year” event caters to new first year students and is run every year in September by the SBRC and the student ambassador team. This event discusses several aspects of university life, including academics, university culture, on- and off-campus activities and extra-curricular involvement, addressing many of the questions that first year Biotechnology/Chartered Accountancy, Biotechnology/Economics or Science and Business students may have. The turn-out for this event has been progressively increasing over the years. In 2012, this event attracted close to 60 students.

Two other social events organized by the Science and Business Students Association (SBSA) include a “Beginning-of-Term” event and an “End-of-Term” event. Attendance is strong at these events and includes students from all three programs. Finally, program ambassadors host a dodge ball event, which is intended to restore a sense of balance for students during the hectic weeks of midterm exams and co-op interviews. This event has been organized twice so far.
Thus, there have been a number of recently implemented opportunities for enhanced mentoring and networking for Biotechnology/Chartered Accountancy, Biotechnology/Economics and Science and Business students. Participation has been satisfactory and these initiatives demonstrate signs of addressing past student concerns concerning mentoring and networking opportunities in these programs. In fact, these students enjoy more combined academic and social programming than students from any other Science program. Given the breadth of activity, a Coordinating Committee was established. This committee meets monthly and includes students from each of the three programs and one representative from each of the program committees (Ambassadors, SBSA and Fusion). Student representatives act as liaisons between the students, the program committees and the SBRC. This committee’s main purpose is to ensure that all events function smoothly and to solicit feedback from students on the various events.

Curricular issues
Comments from students in the program identified several curricular issues, most of which were in the process of being resolved at the time of the site visit. Initiative #5 indicated that the Associate Director of the Biotechnology/Chartered Accountancy, Biotechnology/Economics and Science and Business programs would continue to monitor content and learning outcomes of key courses in the Science and Business and Biotechnology/Economics program – the SCBUS 123, 223, 323 and 423 workshop courses. Discussions with the instructors in the various workshop courses have brought in a variety of positive changes in the workshop courses. A newly developed SCBUS 225 is taken by students in the Biotechnology/Chartered Accountancy program and has content and outcomes specific to that program.

Initiative #6 called for a review of the structure, content and anticipated outcomes of the Biotechnology/Economics program. Students expressed a need for enhanced mathematical / quantitative skills and incorporation of ethics into the program content, either as a stand-alone course or perhaps within one or more of the workshop courses. The curriculum of the Biotechnology/Economics program has not yet been changed to address these two student concerns. It is worth noting that, in the view of the program’s Associate Director, those students wanting extra mathematical skills are a very small minority. Discussions have recently been started with the Chair of the Department of Economics regarding changes to the Economics part of the Biotechnology/Economics program to confirm that the content and program outcomes are meeting students’ needs.

Science and Business recruiting and enrollment
There were more changes in the Science and Business program following the 2004 self-study than any of the other non-departmental programs. Generally speaking, the program’s curricular structure at the time of the 2010 site-visit was considered to be in need of only minor, if any, changes. The most significant comments on the program centred on declining enrollments and what could be done to make the program more visible and attractive to high school students. In response, Initiative #7 focussed on exploring the feasibility of an on-campus experience for prospective Science and Business students. The result was the Science and Business Shadow Program, held for the first time in November 2012. This program attracted 15
high school students, who were taken to a first-year Biology lecture, Chemistry lecture, as well as the first Science and Business Workshop (SCBUS 123), to expose them to what their first year in Science and Business might look like. High school students were also invited to participate in a workshop case study session. This shadow day is currently being considered for further expansion by including other selected Science programs. Based on current application numbers, the interest in the Science and Business program for Fall 2013 admission is encouraging.

At the time of the site visit, all “X and Business” program directors were meeting to discuss possible coordination of their recruiting efforts as well as sharing of certain components of their curricular structures. Initiative #8 indicated Science should continue to engage in this campus-wide discussion. Even though the institutional effort to coordinate the “X and Business” programs has not materialized into the goals mentioned above, the discussion did lead to establishment of “Director Talks” whereby the directors of each “X and Business” program delivered a talk on career development for “X and Business” graduates in the global context.

**Initiative #9** was to survey or bring together a focus group to explore possible barriers to more successful recruitment into the Science and Business program, with the ultimate goal of developing a strategy for the possible implementation into the next recruitment cycle. This issue was partially addressed, mitigating the impact of the co-op only option for the Science and Business on recruitment. Shortly after the program review, it was decided to once again offer a regular version of Science and Business for entry into the program, thus increasing the appeal of the Science and Business program to a broader range of prospective applicants. Students were once again admitted to a regular version of the Science and Business program starting in the Fall 2012 term.

Another effort related to recruitment is the continued production of the Science and Business Magazine. Every year the SBRC publishes two editions of the “scibus.ca” magazine – a Graduate and Alumni Edition in the winter, and a Students’ Edition (previously known as the High School Edition) in the summer. These magazines have been received with enthusiasm by current and prospective students. They showcase the program - what it has to offer, as well as what current students and alumni are doing. In January 2013, the 15th edition of the magazine (Graduate and Alumni Edition) was published.

**Computational Science**

The consultants noted the significant problem with this program, namely “…relatively few students, and numbers have been dwindling in recent years…” The consultants recommended three courses of action: “(1) termination of the program, (2) alternate modes of delivery (as an option or minor), or (3) advertisement and careful revision of the program structure and/or content.” Careful consideration of the situation led to the only practical solution - **Initiative #10**, which was to inactivate the Computational Science program prior to the next admissions cycle. Students currently enrolled in the program would be allowed to graduate from this program. Admission to the program was discontinued following the 2011-2012 academic year.
Environmental Science

The Environmental Sciences/Ecology program that was reviewed by the Consultants was discontinued at the end of the 2009-2010 academic year. In its place two new department-based Environmental Science programs sharing a common first year emerged: Environmental Science/Ecology Specialization (directed from the Department of Biology) and Environmental Science/Geoscience Specialization (directed from the Department of Earth and Environmental Sciences). Recognizing this, the Consultants’ recommendations led to Initiative #11 which was to have program advisors from Biology and Earth and Environmental Sciences meet with the Coordinator of Recruiting and Marketing, to review current plans to promote these new programs so as to attract healthy enrollments. Initiative #12 indicated that program advisors in Biology and Earth and Environmental Sciences meet with students to explore potential strategies to address their needs and interests.

There has been progress with Initiative #12. Advisors have met with the new incoming students each year to provide them with information about the Ecology and Geosciences specialization of the program, course requirements, deadlines for the coming year, and information about their home departments. Students were also told that the program advisors have an open door policy to consult with students on a one-on-one basis whenever needed. A questionnaire was sent out each year to all students in the program asking for their comments, suggestions, recommendations, and criticisms so that potential improvements to the program would be identified. Social activities have included a pizza night where a guest speaker met with students, followed by a wide-ranging discussion on adapting to university life, courses selection and other issues. The sudden passing away of our Coordinator for Marketing and Recruitment, Richard Vollans, in Fall 2011 put discussions (Initiative #11) about program promotion on hold. With a new coordinator now in place, we are able to follow-up with the required discussion.

Honours Science and Three-Year General Science programs

The Honours Science program is the largest non-departmental program in the Faculty of Science. The students enjoy the curricular flexibility built into this program but a number of concerns were raised related to a lack of an effective peer network (including mentoring) and career advice, as well as inadequate opportunities to conduct research and develop professional relationships with faculty in upper years of the program. Following the site visit, the consultants made four recommendations: (1) enhance opportunities for student-faculty interactions within the program; (2) enhance opportunities for peer-to-peer interactions throughout the program; (3) create a senior-level research-oriented course or workshop ‘capstone’ that all Honours Science students must take; and (4) introduce a mandatory annual meeting for all students with a program advisor. As a result, we identified several linked initiatives to further explore and address these concerns. Similar issues were identified in the General Science program, and therefore some of the initiatives related to that program were piggy-backed with those from the Honours Science program.

Several initiatives fall into the “community building” category. Initiative #13 was to encourage Honours Science and Three-Year General Science students to form student clubs or a joint club,
and to provide appropriate space. Science Society Executive members were invited to discuss this issue. Assuming success with the previous initiative, Initiative #14 was to assist the newly-formed club(s) to stage the first annual event bringing Honours Science and Three-Year General Science students and their Science instructors together. Initiative 15 (for Honours Science students) and Initiative 20 (for General Science students) related to development of peer mentoring programs.

The Faculty of Science created a new administrative portfolio, Associate Dean of Science (Student Relations), in September 2012 to enhance engagement with our students and pursue special projects related to improving the quality of the undergraduate experience. Together with the recently created Science Student Success Officer, students from the Honours Science program were approached on several occasions in 2011 and 2012 about whether a separate club was an attractive proposition. Honours Science and General Science students have always been able to participate freely in the Science Society, as well as in most of the discipline-related clubs under the Science Society umbrella. It is through the club events that students can also meet the professors who are invited to attend their events. The existence of an effective club clearly has to be desired from the student themselves and the students consulted were not markedly enthused at the idea.

To better appreciate the issues that are challenging our students, first and second year students were surveyed in Winter 2013 for their understanding of academic procedures and university support resources, their involvement in organizations outside of class, and opinions on how orientation could be improved. The results are being used to inform the events for orientation and the development of an online community for Science students. This site, called “SciSpace” will collate information on advisors, important dates, integrity, student clubs etc. as well as link to other resources on campus such as the Student Success Office and Career Action. The information will be organized into “Academics, Getting Involved and Next Steps”. Students are contributing to the content and design of this online community. For example, they are making videos on how to get the most out of lectures and lab and sharing their success strategies. Incoming students will have access to this site in the summer before their arrival so they can assess opportunities to get involved as well as transition into university studies more easily. The site will be useful to in-program students as well, particularly by aiding communication with academic units, the registrar’s office, student clubs and support resources on campus. Finally there is interest in expanding the activities of the current Science Student Help Team (SSHT), with some student mentors providing assistance at the team office while others make links with incoming students. The “links” would be made at orientation and provide a base for incoming students to make friends and learn about opportunities at uWaterloo. The possibility of providing an online access to SSHT via the SciSpace site is also being investigated.

The Career View Mirror project was a joint initiative between Science and the Centre for Career Action, in which Science alumni share information on their careers and key skills needed to be successful. There are 71 profiles as of April 2013. Although it is too early to know its impact in helping students visualize and assess career opportunities in Science (including for those students in Honours Science and the General Science programs). All signs are that this will
become a success. Along with Career View Mirror, discussions were held with the Centre for Career Action to devise ways of better tracking the summer and permanent employment paths of our regular students (Initiative 23), but there has been no progress yet on this initiative.

Several initiatives relate to program issues. Initiative 16 was to explore the feasibility of a capstone experience for Honours Science students. The Associate Dean (Student Relations) engaged students in discussion of this topic and to date, there has been no clear progress on this initiative after several false starts. It remains unclear as to whether Honours Science students see value in such an experience, given the diversity of interests, experiences and expectations represented in the student body. How to resource such an initiative is a separate but very significant question. Students will be surveyed in the near future to further explore this issue.

Initiative 17 was to assess the feasibility of developing and implementing a strategy to ensure that in the first year of their program, all first-year Honours Science students meet with an academic advisor, or at least become aware of certain serious situations when they should speak with an advisor. Given the number of students in the Honours Science program, all years combined, and the small group of advisors already working at full capacity in the Science Undergraduate Office, a mandatory annual meeting is not feasible. However, electronically-based strategies to communicate more effectively with Science students – “virtual advising” to assist in their academic decision-making – have been ramped up in the Science Undergraduate Office and the lessening of walk-in traffic suggests we are meeting with success. The Associate Dean (Student Relations) is working with the Student Success Office to develop a web portal to guide students in developing a success plan and help them access university support services. The site may also provide faculty-specific information on programs, seminars, defenses and weekly events and thus become a convenient venue for effective communication with Science students.

A number of initiatives were focussed specifically on the Three-Year General Science program, which enrolls the greatest diversity of students of any Science program: high achievers wishing to fast-track (albeit a minority as they tend to stay in an Honours program even if they do not complete it), struggling students on the verge of being required to withdraw, many part-time students, and a higher proportion adult and online learners. Because the academic requirements to remain in this program are less rigorous than for an honours-level program, there is also a perception by many students in this program that they are “third-class citizens” in the Faculty of Science.

Initiative 18 was to critically examine the structure of advisement responsibilities associated with the Three-Year General Science program, in order to better serve these students. Science hired its Science Student Success Officer in August of 2011 and a large part of his mandate is to engage the struggling students in the Faculty, many of whom are enrolled in the General Science program. Efforts are meeting with success and we are seeing students who previously would have been required to withdraw being able to continue studies. There has also been a sharing of advising for these students, formerly done by the Associate Dean of Science,
Undergraduate Studies, now also done by the Academic Services and Admissions Officer, thus allowing greater availability of service to these students. Science is about to launch a revised website (Initiative #19) aimed at issues relevant especially to the General Science program.

**Joint Science-Arts Major**

There were no issues identified with the Joint Science-Arts Major program. Initiative 21 was to have the Faculty of Science continue to support students in their pursuit of joint programs involving an Arts major.

**Other initiatives inspired by the review of non-departmental programs**

In addition to the Career View Mirror project and employment tracking (Initiative #23), the Faculty of Science was encouraged to develop department-level teaching awards in the units which currently had none (i.e. Earth and Environmental Sciences, Chemistry, Pharmacy). The unit heads were reminded of this early in 2013 to consider developing their own teaching awards (Initiative #24), which could also serve to identify nominees for the Faculty-level Excellence in Science Teaching Award (ESTA) competition. The Faculty of Science has also enthusiastically embraced the campus-wide Teaching Fellows initiative. The program in Science is managed by a Senior Teaching Fellow, and there is a Teaching Fellow appointed in each of the four departments and two professional schools.

**Conclusion**

The consultants recognized that significant challenges related to administration of non-departmental programs derived largely from limited staff resources, and they supported the provision of more resources. The Faculty of Science responded decisively: the hiring of a Science Student Success Officer, the creation of a new administrative appointment - Associate Dean of Science (Student Relations), and significant attention being paid to the layout of administrative space and student facilities in the new Science building, to be completed in late 2015. A number of priority issues remain, mostly those associated with peer mentoring and socializing in the Honours Science and Three Year General Sciences programs, and a “capstone” experience for Honours Science students.