

## **An Outline for Academic Planning in the Faculty of Science, 2014-2019**

The McMaster Faculty of Science is known for its innovative programs, cutting-edge research, leading faculty, and aspiring students. It has earned a strong reputation as a centre for academic excellence and innovation.

The Faculty's vision is "to be the leading Faculty of Science in Canada and among the world's best in strategic areas of strength through innovation, creativity, and excellence in research, education, scholarship, and service." The Faculty "values individuals who strive for excellence, think creatively and critically, act responsibly and ethically, and are respectful of others in a collegial atmosphere that is enriching, inclusive, diverse, and open".

To maintain our reputation and ensure that we continue to improve in a manner that reflects our most fundamental values, it is very important to plan for the mid to long term at the level of the Faculty and at the level of the individual units, defined as Departments, Schools, Institutes/Centres, and Interdisciplinary Programs. Faculty-level planning will focus on a series of overarching priorities that are part of, and in addition to, the priorities of the University as a whole. It will identify strategies for achieving our priorities over a range of periods and, wherever possible, identify "next steps". Lastly, Faculty-wide planning will involve the development of unit level plans; specific unit- and area-level priorities will be articulated through the plans at that level.

To ensure planning is successful, and to minimize the stress on faculty, staff, and students, it will be very important to describe the planning process to all members of the Faculty and to provide regular updates on the progress to date. Planning will be informed by consultation with faculty, staff, and students in all of the units within the Faculty as well as with leaders of other faculties and the university as a whole.

Finally, for the planning to be effective, it is critically important that the plan not "sit on the shelf". It must be consulted and studied to inform and help guide Faculty- and unit-level resource allocations, development of new initiatives, proposed reorganizations of administrative units, and proposed disestablishment of some low priority programs and initiatives. At the same time, the plan must be a living document that allows the Faculty to deal effectively with unforeseen challenges and seize new opportunities.

### **Why now?**

Academic planning in the Faculty of Science is overdue. Professor John Capone, then Dean, initiated a planning process in 2011, but owing to his departure from McMaster, the process stalled. It is critical that the process begin again.

Moreover, McMaster University will move to a new Activity-based Budget Model (ABM) in 2014-15. While the new model will not in itself lead to any sudden or dramatic change, it will provide the Faculty with more latitude in defining its future and, at the same time, a higher level of responsibility for sound financial management to ensure continued academic and research excellence.

In addition, all universities across Ontario, and indeed all across Canada and in many other parts of the world, are facing difficult economic times. We need to plan to ensure we are using our limited resources in the most effective manner possible. The Government of Ontario is encouraging the province's universities to consider a system of differentiation that may well influence future resource allocation; the Faculty of Science must do its part to ensure McMaster is well positioned in this process.

Careful Faculty-wide planning will be critical to the successful renewal of faculty expected over the next five years. As discussed below, while recognizing there is no mandatory retirement, the demographics of the Faculty suggest that a considerable number of our colleagues will leave their positions over the next five years. Academic and financial planning will be necessary to inform the most appropriate allocation of faculty positions in the near future.

Finally, a new Dean was appointed in July 2013 and there is a clear expectation stated during the appointment process that “Strategic planning will be a major goal for the new Dean, who will work towards setting a new course for the Faculty early in his/her tenure.”

## **Faculty of Science Priorities**

The Faculty of Science recognizes three overarching academic priorities that are part of, and in addition to, the priorities described in the President’s *Forward With Integrity* (FWI) letter.

- Providing high quality, innovative, and meaningful undergraduate programs that provide opportunity for: small class experiences; “hands on” research experiences; experiential learning; open communication between students and faculty; and exposure to ideas and debates from a range of different disciplines, professions and the general community
- Providing high quality, innovative, and meaningful graduate, professional and PDF programs that promote excellence within specific research and professional disciplines but that also offer support and instruction for personal development and acquisition of skills relevant to both academia and the broader community
- Enhancing research intensity by developing support systems aimed at raising the national and international research profiles of all sectors of the Faculty; attracting additional research funding from both government agencies and industry; and acquiring new infrastructure and facilities consistent with leading research intensive universities.

In order for the Faculty to successfully support these academic priorities, it will be essential that the Faculty develop and follow appropriate approaches, guidelines and practices to guide its actions. To be successful, the Faculty must:

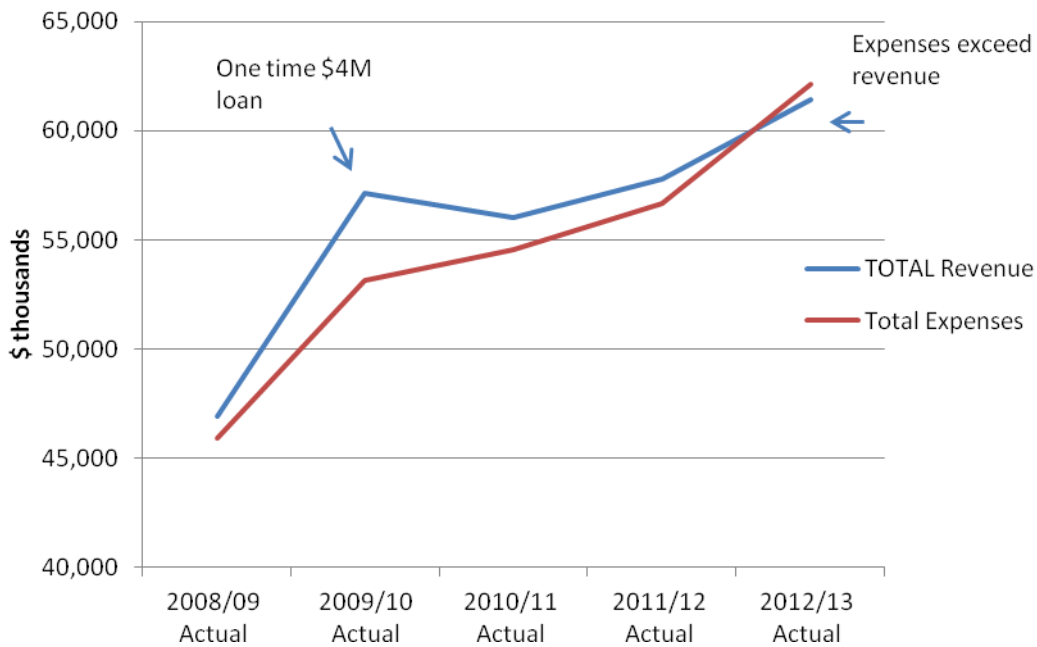
- Ensure accountability, financial sustainability and opportunity for future growth in a manner consistent with our excellence-based mission
- Enhance excellence, reputation and outcomes by attracting and investing in high quality faculty, staff and students, and by balancing faculty workloads with respect to research and teaching to ensure excellence in both of these areas
- Create a supportive, cooperative, and collaborative Faculty-wide environment based on transparent administrative processes.

# Financial and Human Resource Context

## Revenues and Expenditures

As mentioned above, all universities in Ontario are struggling with the issue of how to offer high quality research and teaching programs while facing strict financial constraints. Revenues to the Faculty of Science have increased substantially over the past five years, but expenses have grown at an even higher rate to the point where in 2012-2013, the Faculty is in deficit by approximately \$700,000 (Figure 1). Our current projection for 2013-14 estimates a deficit of \$1.6 million, although this may be reduced by somewhat unpredictable occurrences such as sick leaves, maternity leaves, delays in filling vacancies, etc.

**Figure 1. Faculty of Science revenues and expenses over the past five years**



The ABM team projects future allocations to the Faculty of Science (Table 1) will increase at a lower rate than compensation increases, and thus, we face the possibility of annual deficits leading to the accumulation of a significant and growing debt over the next five years. This puts the Faculty in a particularly difficult position as the current Central Budgeting guidelines will not allow the submission of budget that shows an annual structural deficit (in-year expenses that exceed in-year revenue).

**Table 1. Projected Revenue from Activity-Based Budget**

	2014/15	2015/16	2016/17	2017/18
Allocation	\$56.98M	\$58.35M	\$58.63M	\$59.05M

The financial constraints we face stem largely from the fact that our revenues flow primarily from undergraduate tuition and provincial grants (BIUs) associated with our undergraduate enrollment. The basic BIU rate has not changed for many years and increases to the current tuition rate have been capped

at approximately 3% annually. In contrast, costs of running our programs are increasing. Total Compensation accounts for 92% of the total expenditures within the operating budget of the Faculty and the annual increase in Total Compensation (averaged over the past five years) amounts to 5.3% or \$3.1 million. The non-compensation expenses in our budget flow to various expenses such as hydro, water, maintenance, etc., and these costs continue to increase as well.

Our financial forecasting points to four key points. First, it will be paramount for the Faculty to generate more revenue if it is to continue to offer high quality programs and engage in cutting edge research. The stagnation of the BIU and tuition rates suggests little help from that direction and it will be necessary for the Faculty to turn to advancement to garner new resources. Currently, a very small proportion of the Faculty of Science budget stems from endowments. It is crucial that we work much harder to demonstrate to potential donors the significance of what we do and the importance of their contributions. Of course it must be remembered that endowed gifts generate approximately 3% to 4% per annum, and thus, even an extremely generous gift of \$5 million generates only sufficient funds for the salary and benefits of only one senior faculty member. Advancement activities can also lead to expendable gifts or blended expendable/endowed gifts that, while often small in size, can help us set up new programs. The seriousness of our financial situation makes it clear that, while we must be more engaged with advancement activities, such activity alone will fall far short of solving the problem: the Faculty must generate income from other sources. Additional resources may stem from new teaching (e.g., Professional Masters), possible expansion of undergraduate programs that have capacity, and new research programs (e.g., NSERC Industrial Research Chairs).

Second, it is imperative that the Faculty allocate its limited resources in a manner that allows us to best pursue a mission of excellence in our research and teaching programs. Given that our limited resources will not allow us to excel in all areas, we should carefully review our teaching and research programs to determine whether some should be dropped or substantially revised. It will also be important to ensure that we focus our resources on academic issues related to teaching and research. Administration is obviously necessary for the functioning of the Faculty and its component units, but it is imperative that we keep our administrative costs as low as possible and focus our resources in the classroom and the research labs. We must avoid a “business as usual” attitude. Changes to academic programs and research programs, and an insistence on minimizing our administrative costs, may call for substantial administrative reorganization both within and across units.

Third, while the new budget model will not bring any sudden changes to our funding, it will allow us to be masters of our own fate. The new model flows the majority of the income generated by the Faculty back to the Faculty and requires the Faculty to be responsible for its share of University-wide costs. As opposed to the old “historical” budget model, the new system provides us with a better opportunity to study, predict and ultimately alter our revenues and expenses in a manner that best supports our academic priorities. Also, each Faculty contributes to the University Fund and, while much of the fund will be used in the next few years to ensure the “hold harmless” feature of the ABM, we will be able to apply for allocations from this fund to support our academic priorities.

Finally, we must be financially responsible. We cannot possibly forecast all the financial changes that will inevitably ensue over the next five years and, lest we create an even more difficult financial situation in the future, we will need to be somewhat conservative and expect the unexpected.

## Space

Under the new ABM, each Faculty is responsible for the operating costs of its space allocation and thus we may be able to improve our teaching and research programs by freeing up some resources tied to our infrastructure. Our projected occupancy costs are close to \$9M/yr and a careful analysis that leads to

shedding of unused space, or the more effective use of space, should result in costs savings that can be applied to our teaching and research needs, more effective programs, or both.

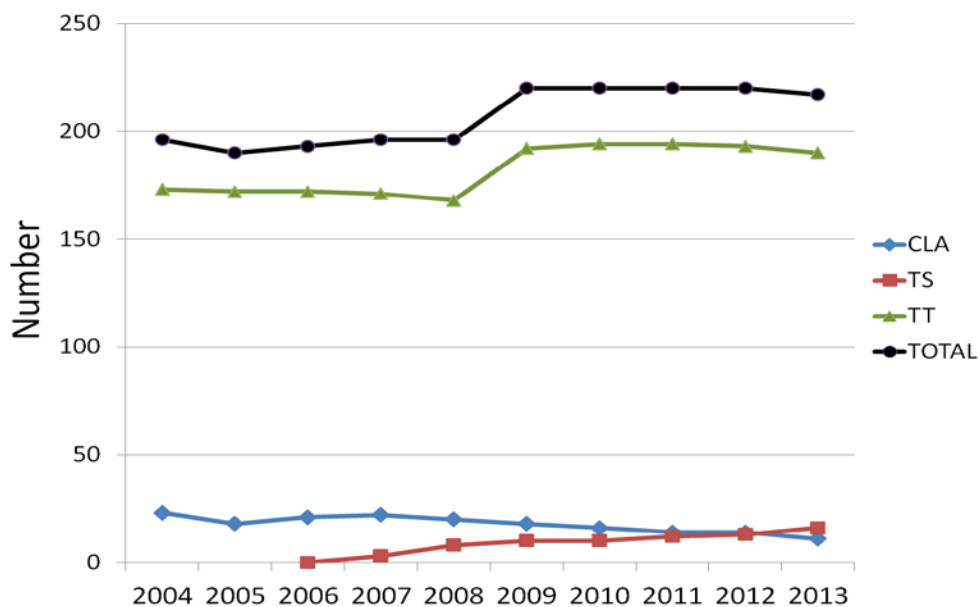
Apart from direct financial considerations, space plays a critical role in our teaching and research programs. Much of the space we occupy was built over 50 years ago and was designed for the teaching and research activities of the time. We have clearly changed some of the ways we teach and we need to ensure our space fits with our current activities; for example, the large tiered lecture halls of the 1960s and 1970s are not particularly conducive to the blended learning of the 2010s, which involves more student-instructor discussions and more student discussion groups. Wherever possible, we must match our pedagogical approaches with the most appropriate facilities. Similarly, our modern research methods often call for allocation and sharing of space different from practices in the past. The development of central facilities and flexible PI space is now common in many research intense universities, and again, we must work to ensure the design and allocation of our research space meets our needs.

Given the importance of space to our academic programs, the Faculty needs to update its space inventory. The importance of this is obvious. We can only ensure appropriate use of our space if we know what we have and how it is used. We should also consider developing guidelines that will act to ensure efficient use and allocation of space; guidelines should speak to Faculty-controlled space as well as our efficient use of space controlled by the Registrar. Finally, the Faculty may want to consider providing unit-level incentives. While we can probably all agree that shedding unused space and making effective use of existing space are responsible approaches, we may be less likely to follow such a path if units do not see a tangible benefit at the level of the unit.

## Faculty Complement

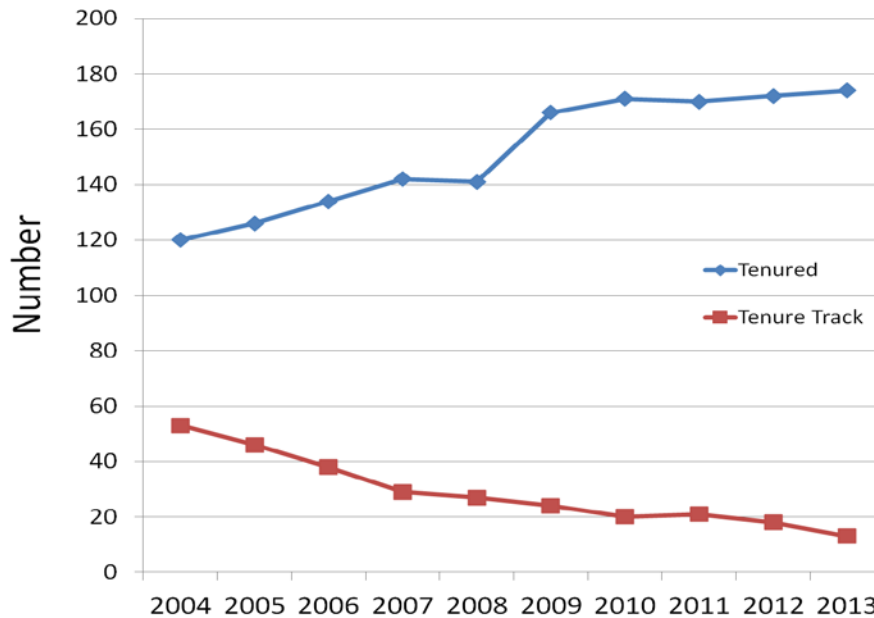
Apart from a sudden increase in 2009 when the Department of Kinesiology joined the Faculty of Science, the total complement of the Faculty has shown little change over the past 10 years (Figure 2).

**Figure 2. Total complement of faculty 2004 to 2013 by type (CLA, Teaching Stream [TS], Tenure Track [TT])**



However, the makeup of the complement has changed. The number of Teaching Stream and colleagues with Permanence has increased while the number of CLA appointments has dropped. The past 10 years has also seen a constant increase in the number of tenured colleagues and a corresponding decrease in the number of tenure track colleagues; this reflects a relatively small number of new appointments over the past several years (Figure 3).

**Figure 3. Numbers of number of tenured and tenure track faculty 2004 to 2013**



The age distribution of faculty members (Table 2) suggests that, although there is no mandatory age of retirement, it is reasonable to expect some of our colleagues will retire over the next 5 years; 25% of our colleagues are age 57 years or older, 16 colleagues are currently over 65 (Table 3).

**Table 2. Age distribution of faculty in the Faculty of Science**

1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile
45	51	57

**Table 3. Number of faculty 65 years of age or over in 2013 and reaching 65 in 2014-2016**

	2013	2014	2015	2016
<b>Faculty over or becoming 65</b>	16	4	2	7

Nevertheless, although we expect some retirements, and thus some faculty renewal over the next five years, it is very difficult to predict the number of new appointments that the Faculty will be able to make. This unpredictability stems, in part, from the difficulty in predicting the number of colleagues who will retire. Given mandatory retirement was abolished only seven years ago, it is difficult to use past history to estimate retirement rates under the new policy. The number of retirements per year since 2007 has been volatile and not easily predicted by the offering of retirement packages (Figure 4).

**Figure 4. Number of faculty retiring from the Faculty of Science since 1992**



Rather than using age to predict retirement rates, it may be more appropriate to study the number of colleagues who have, or soon will, qualify for the Rule of 80/85 and thus can retire with an unreduced pension. Forty-eight colleagues (approximately 25% of our complement) are eligible for full retirement packages in 2013 (Table 4). Given very few of these individuals has signaled an intent to retire in the near future, it seems unlikely that this is a useful indicator of future retirement rates.

**Table 4. Number of faculty qualified for full pension in 2013 or who will qualify in 2014-2017**

2013	2014	2015	2016	2017	TOTAL
48	5	5	6	5	69

Apart from the actual number of retirements, the other issue that obscures our predictions of faculty renewal is the financial situation discussed above, i.e., even if we could accurately predict the number of retirements in the future, the financial restrictions we face make it clear that it will be extremely difficult to maintain the current complement.

Again, our current projection for 2013-2014 is an in-year deficit of \$1.6 million, and given the flat revenue predicted out to 2017-18 and the historical annual compensation increases of approximately 5.3%, the in-year deficit is predicted to increase with time and lead to a large accumulated debt. Of course the average difference in salary and benefit costs of retiring faculty and junior hires will reduce costs, but the savings will be very small relative to the 5.3% increase in total compensation. It is very clear that we cannot plan to match the number of retirements with an equal number of new hires; we may well face ratios of one new hire for every two to five retirements over the next five years. This rather grim scenario serves to underscore our need to allocate our scarce resources in a manner that best serves our overarching academic priorities, trim or eliminate expenses not directly related to our academic mission, and generate additional revenue.

Finally, while the number of hiring opportunities will be limited, only 15% of our tenure track and teaching stream colleagues are female and we must work to ensure we always take full advantage of the

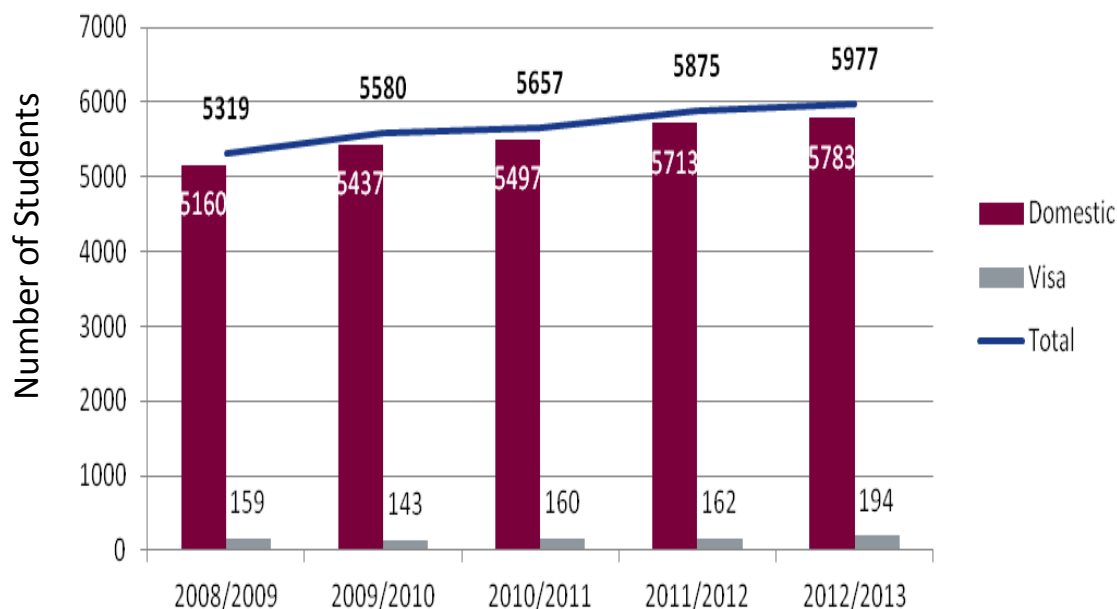
abundant literature and advice on how to ensure a diverse faculty complement. The Faculty of Science is fully committed to creating an inclusive community as described in the “McMaster University Statement on Building an Inclusive Community with a Shared Purpose”.

## Undergraduate and Graduate Context

### Undergraduate enrollment

Undergraduate enrollment has increased fairly steadily over the past five years; total enrollment is now approximately 12% higher than in 2008 (Figure 5). Only 3% of the undergraduate students are international. The fact that total enrollment has grown while the Level 1 enrollment has remained fairly stable over the past five years (Figure 6) may be explained by current overall retention rates being higher than in the past. Data available from the Office of Institutional Research and Analysis (IRA) show a continuous increase in Year 1 to Year 2 retention rates from 79.0% in 2007 to 88.7% in 2011.

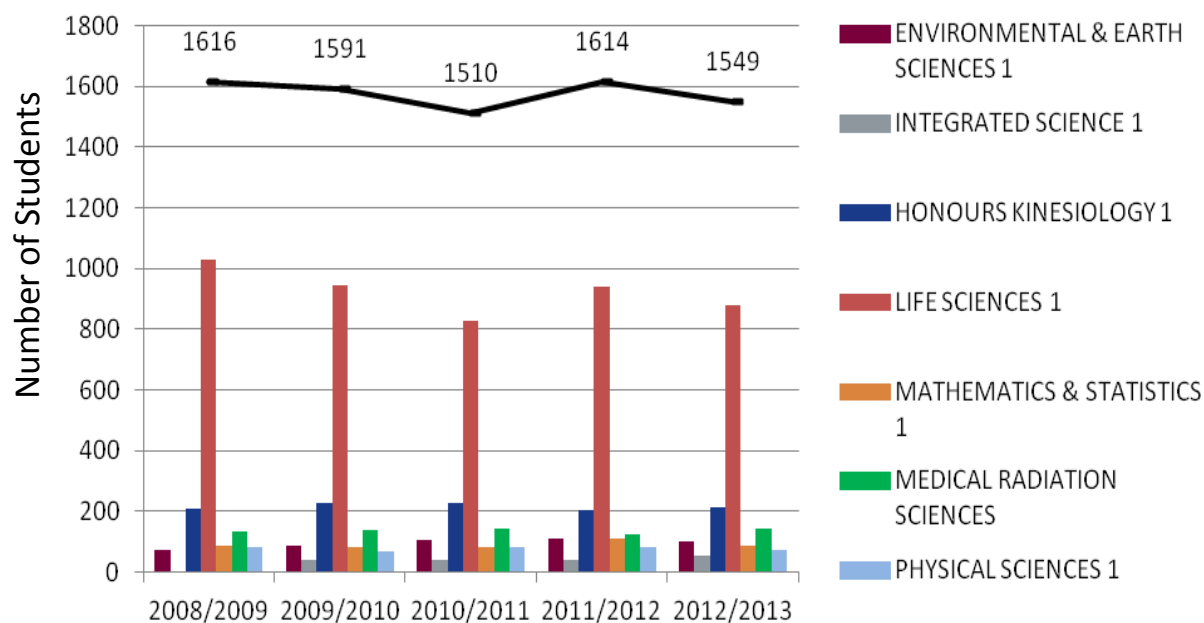
**Figure 5. Total undergraduate enrollment across time (headcount)**



Enrollment in Level 1 Life Sciences gateway is much higher than in the direct entry or other gateway programs, although there is some evidence of a decrease with time because of Faculty adjustments in the Life Sciences 1 enrollment target. Level 1 enrolments in the other programs appear more or less stable (Figure 6).

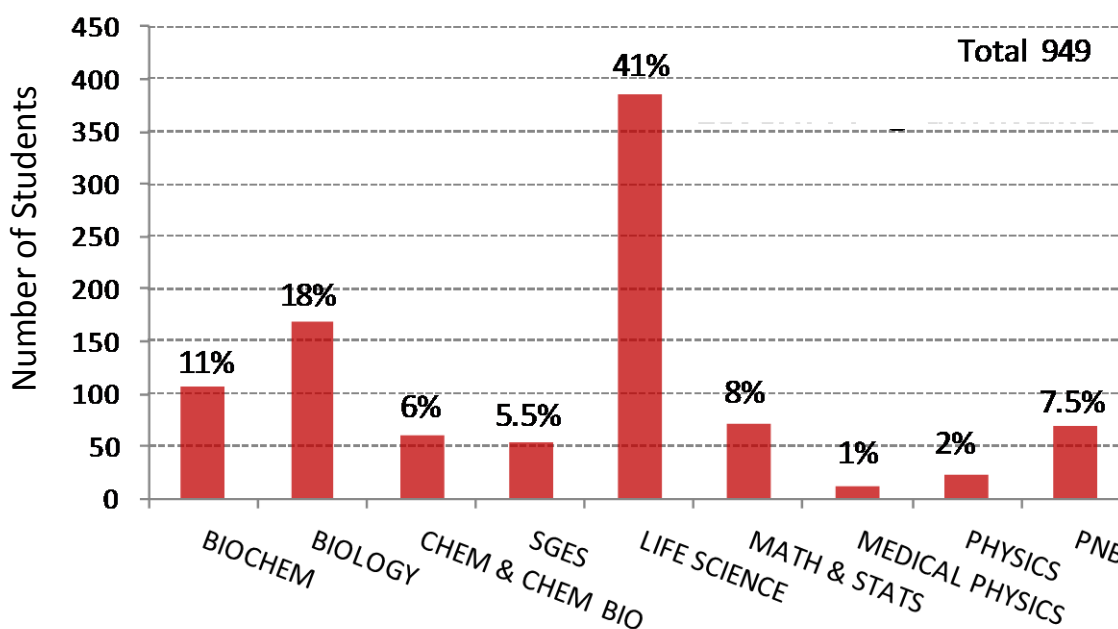


**Figure 6. Undergraduate enrollment cross time and program (headcount)**



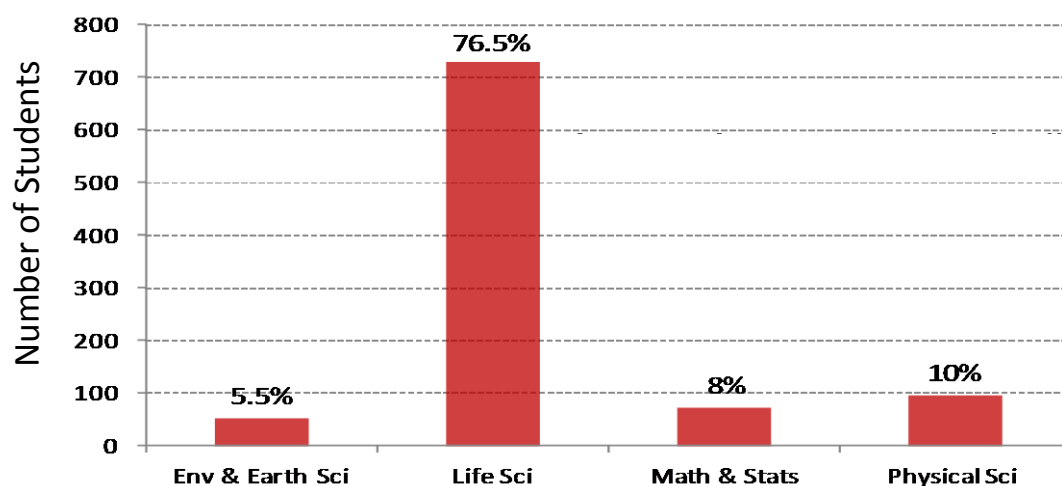
A large proportion of the students progressing from a Level 1 gateway program to a Level 2 Program (data taken over three years 2011-2013) enter the Life Science Program (Figure 7).

**Figure 7. Number and percentage of students in Level 2 programs that develop from the Gateway programs (mean data from 2011, 2012 and 2013)**



Approximately 75% of Level 1 gateway students enter into Level 2 programs under the Life Sciences umbrella (Figure 8).

**Figure 8. Number and percentage of students going from Science Level 1 gateway programs to Science Level 2 programs mapped to gateway umbrellas**



These data point to important factors that the Faculty needs to consider. First, there are serious imbalances in the student:faculty ratio across the units and many programs are heavily dependent on CLAs and Sessional Lecturers. Given the importance of having our students taught by full-time tenure track and teaching stream colleagues, the Faculty should consider a recommended target ratio of full-time equivalent (FTE) Science students and courses taught by such colleagues. The decrease in CLA appointments and a corresponding increase in Teaching Stream appointments over the past several years (Figure 2) is a positive sign; certainly many of our colleagues in the Teaching Stream are outstanding teachers. In addition, colleagues in the Teaching Stream are often the pedagogical experts in our units and they can pass their context specific knowledge on new teaching techniques, such as blended learning, to tenured faculty who may not have the time to study the pedagogical literature. Similarly, such colleagues often lead community engagement activities and thus help protect the research time of others.

The Faculty should also consider the academic implications of further growth in undergraduate enrollment. Growth attracts funding but growth in high enrollment programs may well result in a lowering of the student experience. If we plan to grow, we should aim to grow in those programs that have existing capacity, i.e. where growth will not unduly increase the student:faculty ratio

The Faculty may also want to consider increasing the number of international students. Having students from different cultures and experiences mix in our classrooms and laboratories is an enriching experience for both domestic and international students and may help our students be better equipped for globalization. An increase in international students can provide additional financial resources although some resources will be needed to help international students make a successful transition to McMaster.

Finally, the data suggest the Life Science program will continue to have very high enrollments and we must work to ensure we offer a high quality program despite the challenges stemming from these high enrollments. The program is a collective Faculty responsibility and we must work across units and within disciplines to ensure we offer the best possible program.

It is important to realize that the Faculty has taken steps to even out the enrollment across all the programs. In particular, it has used high entrance standards in an effort to control the growth of the Life Science programs and the number of students entering the Life Science Gateway has decreased over the

past 5 years (Figure 6). Entry into the other Gateways has remained more or less constant. A related issue is the Level 1 to Level 2 retention rate; 2011 data from IRA indicates the retention rate of students in the Mathematics & Statistics, Physical Sciences (soon to be Chemical & Physical Sciences), Environmental & Earth Sciences and Life Science Gateways to any program in Science are 64%, 78%, 79% and 90%, respectively. There is also evidence that considerably more students initially in the non-Life Science Gateways are moving to the Life Science Programs in year 2 than the reverse.

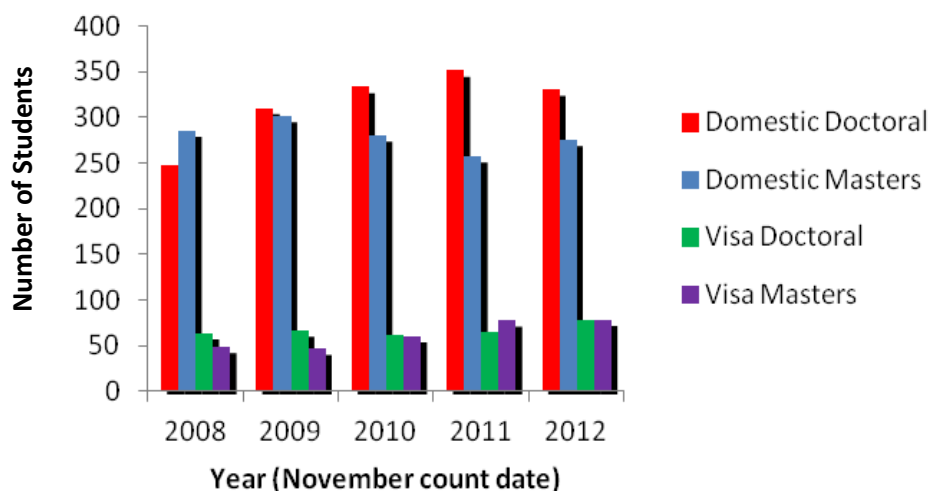
This information underscores the importance of ensuring that Level 1 students are exposed to the best possible experience across all the disciplines so that they will be encouraged and inspired to consider entering programs other than Life Sciences. The Faculty, in part through the Level 1 Review, will continue to make adjustments. In turn, the units must also embrace the challenge imposed by existing enrollment patterns and work to find creative solutions. Some have already made some progress but more is needed.

### Graduate enrollment

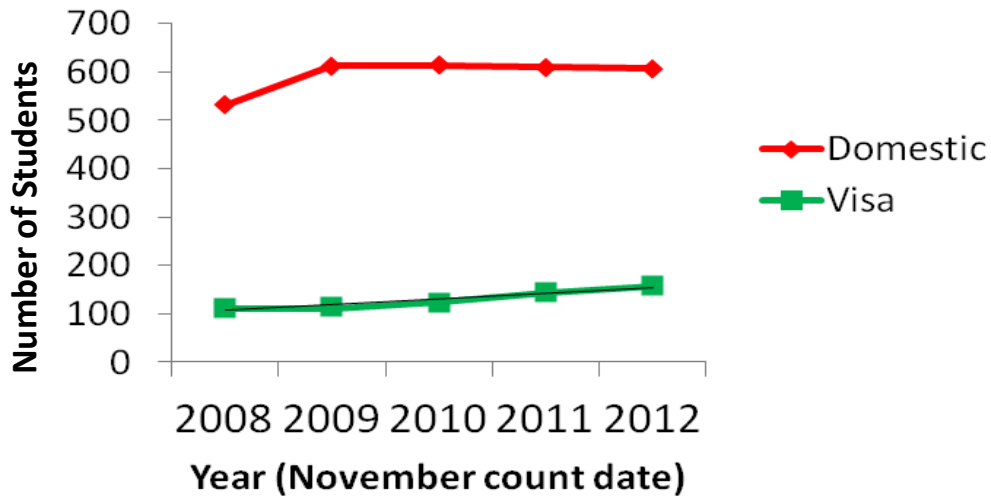
High performing and motivated scientists with deep research skills and experience are needed in all sectors of society, and as such, the education and development of our graduate students is, in itself, a key responsibility of our faculty. Graduate students play a critically important role in the Faculty’s research programs and it is not a stretch to state that, without strong graduate programs, most of our research programs would simply fail. In addition, graduate students play an equally important role in our undergraduate programs. By serving as TAs and “lab mates” to undergraduates in independent research courses, graduate students gain valuable teaching experience and provide much instruction and guidance.

Graduate enrollment in the Faculty grew considerably in the middle part of the past decade. However, while growth in BIU eligible PhD students has remained more or less positive (Figure 9), the enrollment of all BIU eligible students has flattened and may be in decline. At the same time, there is an apparent increase in the number of non-BIU eligible graduate students (Figure 10); both of these trends put further financial stress on the Faculty.

**Figure 9. Graduate enrollment by program type and citizenship**

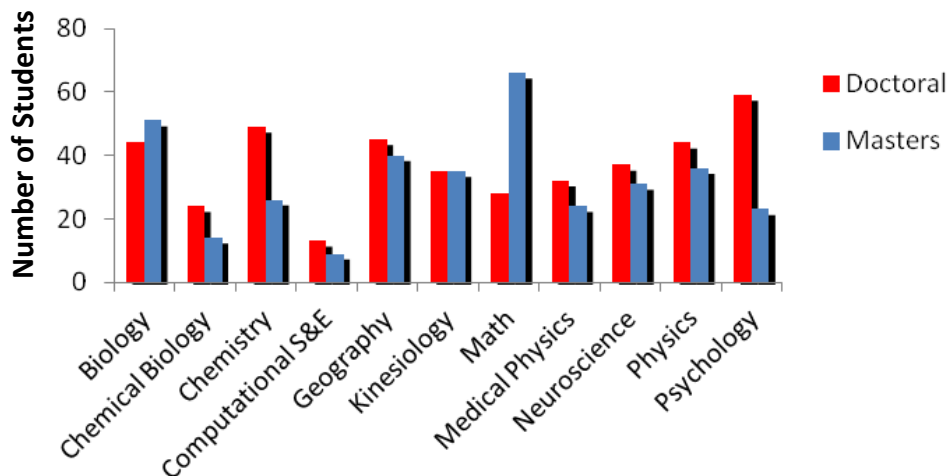


**Figure 10. Graduate Enrollment by citizenship**



The growth in the mid to later part of the past decade coincides with the provincial governments “Reaching Higher” plan that facilitated an increase in the number of spaces available for BIU eligible graduate students. It is important to recognize that we have fallen short of our targets, and that the government has not released information that would allow us to predict how funded spaces will be allocated to universities across Ontario when the Reaching Higher plan ends. In the face of these uncertainties, the prudent approach is to continue to try to reach our growth targets going forward, capturing as many of the currently available funded spaces, and trusting that any subsequent policy decisions will reward our continued commitment to growth. Enrollment across the disciplinary and interdisciplinary programs shows solid engagement with graduate programs across all the units (Figure 11).

**Figure 11. Total graduate enrollment by type and discipline or area**



It is worth noting, however, that there is an apparent disconnect between the TA support offered to students enrolled in any unit's Graduate Program and that same unit's need for TAs to support its Undergraduate Program. This is particularly problematic for Interdisciplinary Undergraduate Programs not directly linked to a Graduate Program. The Faculty should review and, wherever appropriate, amend this situation.

When considering ways to capture more BIU slots for the future, the Faculty may want to consider developing new Professional Masters programs in areas relevant to our interests. Such programs can help fill societal needs and can be important for generating revenue for the Faculty.

One obvious barrier to increasing our graduate enrollment is the availability of graduate funding. Simply put, we are in competition for high quality graduate students with many other Canadian and international institutions and the funding packages provided to students doubtless has an effect on their decisions. Given our financial constraints, simply providing more resources will be difficult; however, we may be able to free up some existing resources by working to attract more graduate students who have major scholarships and ensuring our students who are applying for scholarships are provided with as much help and guidance as possible. The Faculty of Science may want to consider offering financial incentives to those units that maintain relatively high numbers of scholarship students.

While important, funding is unlikely the sole factor preventing further graduate expansion; other factors, such as limits to research space and/or operating funds, likely inhibit growth. It would be useful for the Faculty to study and understand these limitations and, where there is capacity for growth, devise an appropriate incentive strategy. For example, owing to a concern of losing grant support in the future, colleagues may support fewer graduate students than they are currently capable of supporting; a system of support for faculty who lose funding for one to two years might encourage all to operate their research groups at full capacity. Similarly, it would be helpful if allocations of research space were flexible so that expanding research groups could make effective use of space originally allocated to research groups that have declined over time.

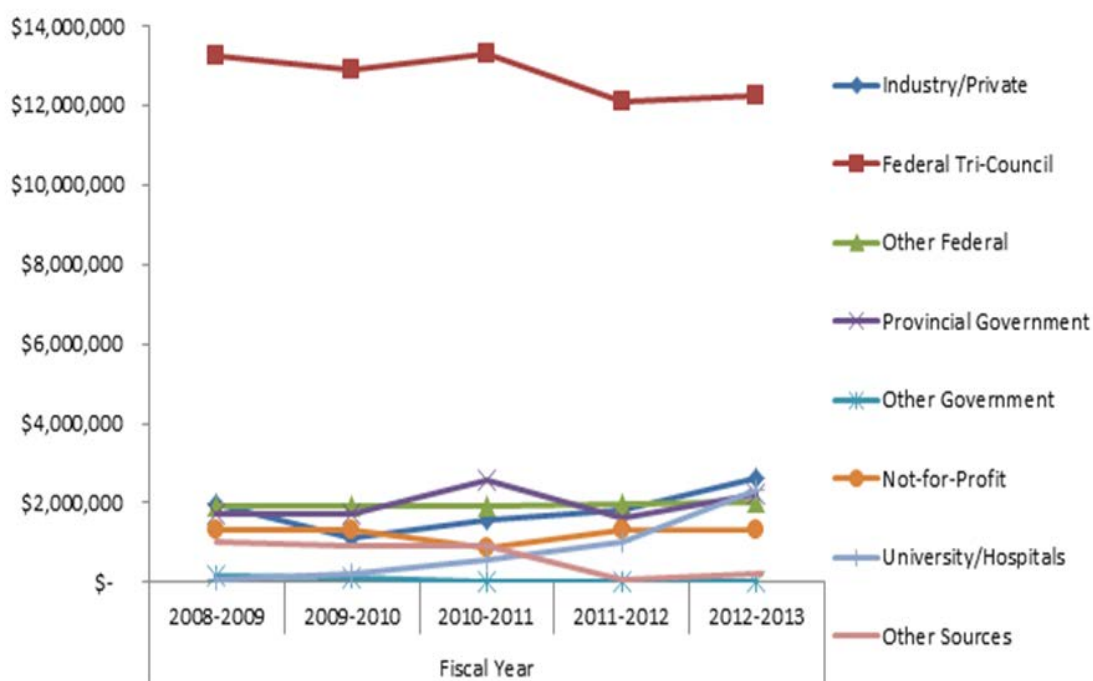
Like most Ontario universities, McMaster has particular difficulties in attracting international graduate students; this stems primarily from the government not providing any funding for such students and from the students being faced with higher tuition fees. There is no obvious "fix" to this problem and we must continue our support to McMaster's lobbying efforts to encourage the government to provide support. Perhaps financial incentives offered to units with high proportions of scholarships can be used to help attract and fund more international students.

## **Research Context**

As mentioned above, McMaster's Faculty of Science is known for its cutting edge research; this is a history of which we should all be proud. However, in planning for the future, we must recognize that funding for scientific research in Canada has changed dramatically over the past decade and we must work to maintain our strong legacy in research by ensuring we secure adequate funding.

The various programs within Tri-Councils provide the majority of our research funding (Figure 12) and it is imperative that we continue work to secure funding from these programs. This is because, not only are the Tri-Councils our largest suppliers of direct research funding, the amount of funding we receive from other federal programs (Canada Research Chairs program, Canada Foundation for Innovation, Federal Indirect Costs program) is based directly on our success with the Tri-Councils; success with Tri-Council funding has a "multiplier effect". Thus, it is worrisome that our funding from the Tri-Councils has remained flat for several years and is now appearing to decline; we need to turn this around.

**Figure 12: Research funding by source, 2008 to 2013**



One of the more substantial changes within the Tri-Councils over the past few years has been the growth of “partnership” programs. New funding is often directed at the partnership programs. In contrast to NSERC Discovery, SSHRC Insight grants, and CIHR operating grants, to be eligible for partnership programs, researchers must first secure support from external sources such as industry or other agencies. Partnership programs are helpful in that they can deliver considerably larger amounts of support than traditional programs and promote knowledge translation and mobilization, but the need to secure external funding can add work and “headaches” for the individual researcher. One of our clear challenges for the future is to develop processes within the Faculty of Science that help alleviate the extra work of applying for partnership programs and to strengthen relationships with both MILO and ROADS as a way to identify potential partners. Better ties with MILO should also provide more opportunity for commercialization of research. It is very important to point out that, while there is a clear need to increase our funding support from Tri-Council Partnership programs in general, we must recognize that some fields of research are less likely to attract partnership funding and we should not conflate funding in any research program with the quality of the program.

The majority of our research funding flowing from the Tri-councils highlights another challenge. Our funding from industry, other federal programs, non-governmental organizations and other sources remains low. To ensure we compete successfully with other research intense institutions, it will be important to increase the level of support from sources independent of the Tri-Councils. Again, as with Tri-council partnership programs, securing such support takes more effort than applying for Discovery or other operating grants and we must work to reduce the barriers and “hassles” associated with securing such funding.

It will be important to better engage colleagues who are uninitiated with this broader array of funding and it will be particularly important to mentor our youngest colleagues, those who are just beginning their research careers, about funding opportunities from NGOs, industry, non-Tri-Council government

agencies, etc. It is important to note that some of our colleagues have worked through the barriers and hassles and have been extremely successful in attracting large sums of research support over the past few years. In addition to congratulating these individuals, the Faculty should seek their advice in its attempts to help other colleagues prepare winning proposals. One possibility is to pair colleagues interested in developing partnership support with colleagues who have successfully garnered such support and are willing to guide others through the steps. The Faculty should consider approaching the Science Research Advisory Group (SRAG), chaired by the Associate Dean (Research & External Relations), to consider expanding its mandate to develop and deliver a program along these general lines. In addition, partnership grants and other forms of industrial funding are frequently interdisciplinary in nature and the Faculty, through SRAG, should consider ways to encourage more cross disciplinary and faculty collaboration. Multiple viewpoints may more readily lead to the recognition of further research projects and areas of application than by a solitary researcher or a group working within one discipline.

A related, but somewhat different issue is the need to develop and support research infrastructure. The development of the CFI programs has proven to be of immense importance to Canadian research and we must ensure we make the most of what that agency offers. We have had much success with CFI in the past and we need to work with ROADS and our successful colleagues in preparing more winning proposals for the John R. Evans Leaders program (previously the Leaders Opportunity Fund [LOF]) and particularly for the new Innovation Fund program (previously the Leading Edge Fund/New Initiatives Fund [LEF/NIF]). We must also develop mechanisms to ensure our research platforms are used to their full capacity and that we have appropriate business models in place that ensure sufficient operating support to keep them operating without debt. In some cases, we can provide access for industry and research groups external to McMaster to help defray the operating costs but we must work to ensure that our colleagues and students “come first” and that use by external groups is, at the minimum, a full cost recovery operation.

Finally, it is our responsibility to transmit the excitement and importance of our research to the broader community. We do this in part through our undergraduate and graduate programs but, as a publicly funded institution, we must also engage the broader community with what we do. This engagement is not only a responsibility, it is an opportunity for us to transmit the importance and excitement of scientific research to governments, policy makers, potential donors and the general public. We have many fantastic research stories in Science at McMaster. We need share them for the benefit of all.

## **Planning Process and Committee**

The Faculty is embarking on a formal Academic Planning Process in order to remain strong and prepare for the future. As stated above, this process will identify strategies for achieving our priorities over a range of periods and, wherever possible, identify “next steps”. Faculty-wide planning will include the development of unit-level plans. We are committed to consulting and communicating with faculty, staff, and students throughout this process. This document is one of the first of many steps in that process. Lastly, once the plan is finalized, we are committed to using it to inform and guide decisions as we move forward.

A Faculty Planning Committee has been struck; this Committee will advise the Dean throughout the entire planning process; a tentative schedule for the various components of the process is provided at the end of this document. The Committee will start their work by familiarizing itself with the University and Faculty wide priorities and the details of the general contexts and backgrounds described above. It will also be informed of the basics of the ABM and relevant procedures at the level of the Faculty. The Committee will study and discuss the Benchmark Data (described below) and other data it believes necessary; and consider the manner in which the unit level plans will be studied and evaluated.



After all of the unit level plans have been studied, the Committee will revisit the Faculty-wide priorities, and develop overarching strategies and propose initiatives designed to help the Faculty achieve its priorities. The Committee will also prepare draft feedback on each of the unit level plans and will advise the Dean on possible reallocations of resources, including faculty appointments, at the level of the unit.

The Dean will then consult with the leader of each unit individually and discuss the initial feedback on the unit's plan as well as more general strategies and initiatives proposed at the level of the faculty. Subsequent to this consultation, the committee will prepare and release a Draft Plan. The draft will be discussed with individual unit leaders, at Faculty Council and at a General Faculty meeting. Subsequent to the General Faculty meeting, the committee will prepare final responses to each of the individual units' plans, and prepare and publish the Final Plan.

The Faculty Planning Committee will be comprised of the colleagues in the list below:

Robert Baker, Dean (Chair)  
Michael Farquharson, Associate Dean (Academic)  
Bruce Milliken, Associate Dean (Graduate)  
Gianni Parise, Associate Dean (Research & External Affairs)  
Kim Dej, Department of Biology  
Phillip Britz-McKibbin, Department of Chemistry & Chemical Biology  
Laura Parker, Department of Physics & Astronomy  
Nicholas Kevlahan, Department of Mathematics & Statistics  
Rob Wilton, School of Geography & Earth Sciences  
Kathleen Blackwood, Director Finance & Administration  
Dylan Bailey, Administrator Faculty Affairs

The five Departments identified in the list above are those that do not have a colleague serving as an Associate Dean; selection of the five individuals was done by the Dean in consultation with the Chairs and Directors. The breadth of coverage of different subject areas is designed to help inform the committee; no member is to "represent" their area or Department and all are expected to work in the best interest of the entire Faculty. When the plan from a given department is discussed in detail, the individual(s) from that unit (including the Dean and Associate Deans) will be asked to leave the room.

A request for unit level plans is attached (Appendix A). The request will be sent to all Departments and schools; a modified request that asks for a more restricted plan will be sent to Directors of Interdisciplinary teaching and Institutes/Centres (Appendices B and C). Leaders of all units are encouraged to discuss and, where appropriate, collaborate on the preparation of their plans.

**IMPORTANT NOTE:** The Faculty Planning Committee will study the unit level plans and the benchmarks in the light of FWI and the Faculty's priorities, and make recommendations to the Dean about the allocation of resources and possible reorganization within the Faculty. Given the difficult financial times, coupled with the fact that, despite changes in enrollment and other costs drivers, the unit-level budgets have remained static for some time, it is very important that units do not assume that the Committee will recommend that resources should be allocated as before. Depending on circumstances, the Committee may recommend any given unit should see a reduction in resources while others should see some increase. It is also possible that the planning committee will recommend the reorganization of a unit(s) so as to best support our academic priorities. *Thus, it is of the utmost importance that the plans be prepared with care and be persuasively argued.*



## **Development, Checking and Distribution of Benchmarks**

To inform the Planning process, the Dean's Office is currently developing a set of benchmarks which, once finalized and reconciled with the units, will be made public to the Faculty. The Planning Committee will study the data, and Chairs and Directors are expected to refer to the data in the development of their plans. A description of how they will be used is attached (Appendix D).

## **Scheduling of Planning Process**

1. Discussion of Planning Process at Faculty Council (10 October)
2. Discussion of Planning Process at General Faculty Meeting (31 October)
3. Striking of Planning Committee (4 November)
4. Release of Unit-level instructions (target of 12 November)
5. Release of Benchmarks (target of 14 November)
6. Deadline for Unit-level plans to be submitted (17 January 2014)
7. Meetings of Planning Committee (January to February)
8. Consultation with Unit leaders on initial response to unit level plans (February to March)
9. Release of Draft plan (target of 15 April )
10. Consultation on Draft Plan with Unit leaders and Faculty Council (April to May)
11. Consultation on Draft Plan at General Faculty Meeting (29 May)
12. Plan Publication (mid-June)

## Appendix A

### Academic Planning Template for Departments and Schools

#### Faculty of Science

As part of the Academic Planning in the Faculty of Science, each unit (Departments, Schools, Institutes/Centres, and Interdisciplinary Programs) within the Faculty is required to submit an Academic Plan for the period 2014 to 2019 that follows the format described below.

Each Department's or School's plan will be restricted to a maximum of 10 pages (1" margins, 12-pt font, single-spaced, no appendices) and be organized according to the three major headings below. Plans are due in the Dean's Office on **17 January 2014**.

**1. Overview.** Briefly describe the program's role, stature, and position within the discipline/field (internationally, nationally), and within the Faculty, University, and broader community. Please address the following points.

- a) What aspects of research, graduate education, undergraduate education and community engagement distinguish this unit from its peers in Canada? What areas need improvement?
- b) Over the past five years, what has the leadership of the unit done, and how have resources been used effectively to enhance strengths and correct weaknesses?

**2. Priorities:** What are your priorities for the program for the next five years? Where applicable, please explain how these support and advance the Faculty's and McMaster's priorities and in relationship to:

- Providing high quality, innovative, and meaningful undergraduate programs that provide opportunity for: small class experiences; "hands on" research experiences; experiential learning; open communication between students and faculty; and exposure to ideas and debates from a range of different disciplines, professions and the general community
- Providing high quality, innovative, and meaningful graduate, professional and PDF programs that promote excellence within specific research and professional disciplines but that also offer support and instruction for personal development and acquisition of skills relevant to both academia and the broader community
- Enhancing research intensity by developing support systems aimed at raising the national and international research profiles of all sectors of the Faculty; attracting additional research funding from both government agencies and industry; and acquiring new infrastructure and facilities consistent with leading research intensive universities.

Where applicable, please explain how your priorities relate to the Faculty and your unit's need to develop and follow approaches, guidelines and practices that will:

- Ensure accountability, financial sustainability and opportunity for future growth in a manner consistent with our excellence-based mission

- Enhance excellence, reputation and outcomes by attracting and investing in high quality faculty, staff and students, and by balancing faculty workloads with respect to research and teaching to ensure excellence in both of these areas
- Create a supportive, cooperative, and collaborative Faculty-wide environment based on transparent administrative processes.

### 3. Plans for achieving priorities:

- a) Describe your strategies and timelines for achieving your stated priorities with the current level of resources your unit receives from the Faculty and within the contexts described in “An Outline for Academic Planning in the Faculty of Science, 2014-2019”. “Current level of resources” should be interpreted as the mean of the unit’s expenditures over the past two to three years and not the amount indicated in your initial budget. In describing your strategies, you may wish to consider factors such as the type and quantity of resources required (faculty, staff, facilities, operating funds), the sources for these resources (internal redeployment, resource development/advancement other), and organizational changes required to implement your plans.
- b) How would your plans change if your current level of support was to increase by 3%? How would they change if they decreased by 3%?
- c) Detail the Strengths, Weaknesses, Opportunity and Threats (SWOT) that relate to your plans for achieving your priorities.

**IMPORTANT NOTE:** The Faculty Planning Committee will study the unit-level plans and the benchmarks in the light of FWI and the Faculty’s priorities and make recommendations to the Dean about the allocation of resources and possible reorganization within the Faculty. Given the difficult financial times, coupled with the fact that, despite changes in enrollment and other costs drivers, the unit-level budgets have remained static for some time, it is very important that units do not assume that resources will be allocated as before. Depending on circumstances any given unit may see a significant reduction in resources while others may see some increase. It is also possible that the Planning Committee will recommend the reorganization of a unit(s). Thus, it is of the utmost importance that the plans be prepared with care and be persuasively argued; wherever possible, support assertions with hard data.

## Appendix B

### Academic Planning Template for Interdisciplinary Graduate and Undergraduate Programs Faculty of Science

As part of the Academic Planning in the Faculty of Science, each unit (Departments, Schools, Institutes/Centres, and Interdisciplinary Programs) within the Faculty is required to submit an Academic Plan for the period 2014 to 2019 that follows the format described below.

Each Interdisciplinary plan will be restricted to a maximum of 5 pages (1" margins, 12-pt font, single-spaced, no appendices) and be organized according to the three major headings below. Plans are due in the Dean's Office on **17 January 2014**.

**1. Overview.** Briefly describe the program's role, stature, and position within the discipline/field (internationally, nationally), and within the Faculty, University, and broader community. Please address the following points.

- a) What aspects of the program distinguish it from similar programs in Canada? What areas need improvement?
- b) Over the past five years, what has the Director done, and how have resources been used effectively to enhance strengths and correct weaknesses?

**2. Priorities:** What are your priorities for the program for the next five years? Where applicable, please explain how these support and advance the Faculty's and McMaster's priorities and in relationship to:

- Providing high quality, innovative, and meaningful undergraduate programs that provide opportunity for: small class experiences; "hands on" research experiences; experiential learning; open communication between students and faculty; and exposure to ideas and debates from a range of different disciplines, professions and the general community
- Providing high quality, innovative, and meaningful graduate, professional and PDF programs that promote excellence within specific research and professional disciplines but that also offer support and instruction for personal development and acquisition of skills relevant to both academia and the broader community
- Enhancing research intensity by developing support systems aimed at raising the national and international research profiles of all sectors of the Faculty; attracting additional research funding from both government agencies and industry; and acquiring new infrastructure and facilities consistent with leading research intensive universities.

Where applicable, please explain how your priorities relate to the Faculty's and your unit's need to develop and follow approaches, guidelines and practices that will:

- Ensure accountability, financial sustainability and opportunity for future growth in a manner consistent with our excellence-based mission

- Enhance excellence, reputation and outcomes by attracting and investing in high quality faculty, staff and students, and by balancing faculty workloads with respect to research and teaching to ensure excellence in both of these areas
- Create a supportive, cooperative, and collaborative Faculty-wide environment based on transparent administrative processes.

### 3. Plans for achieving priorities:

- a) Describe your strategies and timelines for achieving your stated priorities with the current level of resources your unit receives from the Faculty and within the contexts described in “An Outline for Academic Planning in the Faculty of Science, 2014-2019”. “Current level of resources” should be interpreted as the mean of the unit’s expenditures over the past two to three years and not the amount indicated in your initial budget. In describing your strategies, you may wish to consider factors such as the type and quantity of resources required (faculty, staff, facilities, operating funds), the sources for these resources (internal redeployment, resource development/advancement other), and organizational changes required to implement your plans.
- b) How would your plans change if your current level of support was to increase by 3%? How would they change if they decreased by 3%?
- c) Detail the Strengths, Weaknesses, Opportunity and Threats (SWOT) that relate to your plans for achieving your priorities.

**IMPORTANT NOTE:** The Faculty Planning Committee will study the unit level plans and the benchmarks in the light of FWI and the Faculty’s priorities and make recommendations to the Dean about the allocation of resources and possible reorganization within the Faculty. Given the difficult financial times, coupled with the fact that, despite changes in enrollment and other costs drivers, the unit level budgets have remained static for some time, it is very important that units do not assume that resources will be allocated as before. Depending on circumstances any given unit may see a significant reduction in resources while others may see some increase. It is also possible that the planning committee will recommend the reorganization of a unit(s). *Thus, it is of the utmost importance that the plans be prepared with care and be persuasively argued; wherever possible, support assertions with hard data.*

## Appendix C

### Academic Planning Template for Research Institutes/Centres

#### Faculty of Science

As part of the Academic Planning in the Faculty of Science, each unit (Departments, Schools, Institutes/Centres, and Interdisciplinary Programs) within the Faculty is required to submit an Academic Plan for the period 2014 to 2019 that follows the format described below.

Each Centre's plan will be restricted to a maximum of 5 pages (1" margins, 12-pt font, single-spaced, no appendices) and be organized according to the three major headings below. Plans are due in the Dean's Office on **17 January 2014**.

**1. Overview.** Briefly describe the Institute/Centre's role, stature, and position within the discipline/field (internationally, nationally), and within the Faculty, University, and broader community. Please address the following points.

- a) What aspects of the Institute/Centre distinguish it from similar centres in Canada? What areas need improvement?
- b) Over the past five years, what has the Director done, and how have resources been used effectively to enhance strengths and correct weaknesses?

**2. Priorities:** What are your priorities for the Institute/Centre for the next five years? Where applicable, please explain how these support and advance the Faculty's and McMaster's priorities and in relationship to:

- Providing high quality, innovative, and meaningful undergraduate programs that provide opportunity for: small class experiences; "hands on" research experiences; experiential learning; open communication between students and faculty; and exposure to ideas and debates from a range of different disciplines, professions and the general community
- Providing high quality, innovative, and meaningful graduate, professional and PDF programs that promote excellence within specific research and professional disciplines but that also offer support and instruction for personal development and acquisition of skills relevant to both academia and the broader community
- Enhancing research intensity by developing support systems aimed at raising the national and international research profiles of all sectors of the Faculty; attracting additional research funding from both government agencies and industry; and acquiring new infrastructure and facilities consistent with leading research intensive universities.

Where applicable, please explain how your priorities relate to the Faculty and your unit's need to develop and follow approaches, guidelines and practices that will:

- Ensure accountability, financial sustainability and opportunity for future growth in a manner consistent with our excellence-based mission
- Enhance excellence, reputation and outcomes by attracting and investing in high quality faculty, staff and students, and by balancing faculty workloads with respect to research and teaching to ensure excellence in both of these areas
- Create a supportive, cooperative, and collaborative Faculty-wide environment based on transparent administrative processes

### 3. Plans for achieving priorities:

- a) Describe your strategies and timelines for achieving your stated priorities with the current level of resources your unit receives from the Faculty and within the contexts described in “An Outline for Academic Planning in the Faculty of Science, 2014-2019”. “Current level of resources” should be interpreted as the mean of the unit’s expenditures over the past two to three years and not the amount indicated in your initial budget. You may wish to consider factors such as the type and quantity of resources required (faculty, staff, facilities, operating funds), the sources for these resources (internal redeployment; resource development/advancement; other), and organizational changes required to implement your plans.
- b) How would your plans change if your current level of support was to increase by 3%? How would they change if they decreased by 3%?
- c) Detail the Strengths, Weaknesses, Opportunity and Threats (SWOT) that relate to your plans for achieving your priorities.

**IMPORTANT NOTE:** The Faculty Planning Committee will study the unit level plans and the benchmarks in the light of FWI and the Faculty’s priorities and make recommendations to the Dean about the allocation of resources and possible reorganization within the Faculty. Given the difficult financial times, coupled with the fact that, despite changes in enrollment and other costs drivers, the unit-level budgets have remained static for some time, it is very important that units do not assume that resources will be allocated as before. Depending on circumstances any given unit may see a significant reduction in resources while others may see some increase. It is also possible that the planning committee will recommend the reorganization of a unit(s). *Thus, it is of the utmost importance that the plans be prepared with care and be persuasively argued; wherever possible, support assertions with hard data.*

## Appendix D

### Comparative Data for Academic Planning

#### Faculty of Science

The President's *Forward with Integrity* letter of September 2011 lays out a series of fundamental principles that will serve to guide the goals and development of McMaster in the near to long term future and describes a series of priorities related to: Student Experience, Community Engagement and Research. The document calls for a "full and radical" assessment of our work in these three areas and notes the importance of "avoiding the temptation of self-satisfaction".

To assess fully our academic initiatives, and to guide our planning, it is essential to develop data that will allow us to measure and benchmark our activities in light of our Departmental/Unit, Faculty- and University-wide goals. In April 2011, then Dean John Capone prepared a document entitled "Comparative Data for Discussion of Strategic Faculty Renewal and Growth Planning" in which he indicated the data would be used to "better inform hiring decisions". The Dean's Office has built on the original 2011 data and developed a draft set of "benchmarks" or "metrics" that will both help us assess our past performance and inform the planning of our teaching and research programs.

It is obvious that which metrics are studied will have a significant impact on our assessment and planning. We have selected common metrics designed to capture the nature and range of our teaching and research activities and also allow for meaningful comparison. The principles describing how the data will be used are listed below:

- Data will inform but never dictate planning decisions.
- Data will be generated by the Dean's Office and submitted to units for verification.
- Wherever appropriate, indicators will be based on multi-year averages to reduce "noise".
- Analysis will focus on the entirety of the data as opposed to departmental differences on any particular metric.
- Data will be developed for some programs (iSci, Life Science, etc.) separate from any given Department or School but only relevant data will be collected, e.g., no graduate or research information will be recorded for the examples listed.
- When developing unit level plans, units are expected to refer to the common data but are free to provide additional quantitative and/or qualitative indicators.
- The assessment of unit level plans will be based only partly on the described data. Assessment will also be based on written proposals, consultation, fit to the Faculty level plan and other information available to the Dean's Office.
- To assess progress and inform future planning, data will be updated yearly.

The benchmarks are listed in the attached table and are listed under four general categories: Faculty/Staff Resources, Undergraduate Education, Graduate/PDF students, and Research. Technical definitions and method of calculation will be provided with the data.



## Benchmarks

### Resources

Courses PER Tenure/Tenure Track  
Courses PER Teaching Stream  
Courses per CLA  
% Courses at Level 1 & 2 taught by TT and TS  
% Courses at Level 3 & 4 taught by TT and TS  
% women of TT and TS total  
Median Age  
Teaching Units per Administrative and Technical Staff  
TT and TS per Administrative and Technical Staff

### Undergraduate

Number of UG courses per level  
Average Score for Course Evaluations  
% of Large Classes (>100) with a "small class" Component  
% of courses that are "small" (<25) or offer a "small class" experience  
Number of Students in individual project course relative to TT and TS  
Number of students with USRAs relative to TT  
% of TT and TS who have won external, university wide or Faculty wide UG teaching awards

### Graduate

PhD enrollment relative to TT( Dom and Visa)  
MSc/MA enrollment relative to TT ( Dom and Visa)  
Average time to complete PhD  
Average time to Complete Master's  
% of Domestic students with external scholarships  
% of Visa students with external scholarships  
Average aggregate score from CGPSS  
Graduate courses per TT  
Number of PDFs per TT

### Research

% of Full TT Profs with FRSC or other major, generic award  
% of TT with Tri-Council operating grant  
Average individual NSERC Discovery Grant relative to National Average  
Total Tri -Council "Partnership" funding per TT  
Total CFI (LEF and NIF only) funding  
Total non-Tri-Council and non CFI Gov't ( Fed and Provincial)  
Total funding from NGO's  
Total CFI (LEF and NIF only) funding  
Total non-Tri-Council and non CFI Gov't ( Fed and Provincial)  
Total funding from NGO's  
Total funding from Private Firms/Industry  
Total all Operating Research funding  
Invention disclosures