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MEMORANDUM

ATTENTION Senate
FROM Jon Driver, Vice-President, Academic and
Provost, and Chair, SCUP
RE: Faculty of Science: External Review of the Department of Molecular Biology and
Biochemistry (SCUP 12-40)

DATE September 26, 2012

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At its September 19, 2012 meeting SCUP reviewed and approved the Action Plan for the Department of Molecular Biology and Biochemistry that resulted from its External Review.

Motion:

That Senate approve the Action Plan for the Department of Molecular Biology and Biochemistry that resulted from its External Review.

encl.

c: L. Quarmby
C. Cupples

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MEMORANDUM

ATTENTION Jon Driver, Chair, SCUP
FROM Gord Myers, Associate Vice-President,
Academic and Associate Provost
RE: Faculty of Science: External Review of the Department of Molecular Biology and Biochemistry

DATE September 25, 2012
PAGES 1/1



Attached are the External Review Report on the Department of Molecular Biology and Biochemistry and the Action Plan endorsed by the Department and the Dean.

Motion:

That SCUP approve and recommend to Senate the Action Plan for the Department of Molecular Biology and Biochemistry that resulted from its External Review.

Following the site visit, the Report of the External Review Team* for the Department of Molecular Biology and Biochemistry was submitted in May 2012.

After the Report was received, a meeting was held with the Dean, Faculty of Science, the Chair of the Department of Molecular Biology and Biochemistry, and the Director of Academic Planning and Budgeting (VPA) to consider the recommendations. The Department prepared an Action Plan based on the Report and these discussions. The Action plan was then submitted to the Dean who endorsed it.

The Reviewers commented that:

"MBB is a strong, highly regarded department in research and in undergraduate Education."

"The Department's research funding is one of the highest per faculty member at SFU... .."

"The MBB Department is strong. For the most part, the challenges that have emerged are due to the Departmental priorities over the past ten years related to the management of rapid growth and achievement of research success. As a consequence, our recommendations are mainly organizational."

The Reviewers made some 20 recommendations covering the agreed Terms of Reference.

SCUP recommends to Senate that the Department of Molecular Biology and Biochemistry be advised to pursue the Action Plan.

Attachments:

1. External Review Report – May 2012
2. Department of Molecular Biology and Biochemistry – Action Plan

*** External Review Team:**

Dr. Gillian E. Wu (Chair), York University
Dr. William L. Crosby, Windsor University
Dr. George A. Mackie, University of British Columbia
Dr. Rolf Mathewes (Internal), Simon Fraser University

CC Claire Cupples, Dean, Faculty of Science
Lynne Quarmby, Chair, Department of Molecular Biology and Biochemistry

EXTERNAL REVIEW

Simon Fraser University

The Department Of Molecular Biology And Biochemistry

April 11-13, 2012

Review Team:

Professor William L. Crosby, Windsor University

Professor George A. Mackie, University of British Columbia

Professor Gillian E. Wu, York University

Professor Rolf Mathewes, Simon Fraser University (internal resource)

The review team was grateful for the organization undertaken by the University and the Department. We were particularly thankful for the work of Ms. Bal Basi in the VPA's office Dr. Bruce Brandhorst, the Chair of MBB and Dr. Rolf Mathewes, the internal resource faculty member. Their and everyone's efforts resulted in a smooth, efficient three days.

MBB is a strong, highly regarded department in research and in undergraduate education. The staff, students and faculty are, as a whole, enthusiastic about the Department and its activities. Throughout our interviews we met with engaged, cheerful groups with generally positive messages about MBB. The high morale is the result of Dr Bruce Brandhorst's leadership and care over the past ten years; SFU's support of the growth of MBB; and the quality of the individuals, faculty and staff, in the Department.

Since its foundation, MBB has built its research by focusing on model organisms and genomics. The Department's research funding is one of the highest per faculty member at SFU, and in spite of the challenges that will come with the anticipated loss of external salary awards, we found no reason to doubt the continuance of research at the highest level and standards. SFU's aggregate of model organism researchers allows them to take advantage of the tools the model systems' community has in genomics, genetic networking and in centralized resources (mutant stock centers, databases, plasmid stocks etc.). This situation puts SFU's and thus MBB's bioinformatics, genomics and protein researchers in an advantageous position. SFU's MBB researchers have access

to and have developed close contacts with UBC, the Genome Sciences Centre, the BC Cancer Agency, and colleagues at Trinity Western University.

The undergraduate programs are generally strong and provide an excellent education in Molecular Biology and Biochemistry. The Honours program in particular provides an extensive research opportunity, important for students anticipating a research career.

The Department has done remarkably well since the last review. New faculty members have been hired and have secured internal and external funding. Adjunct faculty membership has been expanded with the resulting collaborations enhancing the research profile of MBB. The undergraduate (UG) program has grown and the programming extended. A number of the previous review team's recommendations were implemented successfully. Others were not, and some of those recommendations we will re-recommend. There is a great deal of potential energy. Members are engaged in MBB, in the broader University as a whole and in neighbouring research centres.

We have divided our recommendation and accompanying comments into three sections: **I Curriculum and Learning; II Governance and Administration; and III Strategic Opportunities.** The individuals and groups with whom we met are listed in Appendix 1.

I. Curriculum and Learning

The review team felt it was presented with a full picture of the curriculum and learning programs in MBB. The review team was particularly appreciative of the reports, power point presentations, and results of surveys provided by the Undergraduate and Graduate Committees as well as the undergraduate and graduate students.

Our comments and recommendations are divided into UG and graduate areas

The Undergraduate Program

The review team emerged with positive views of the undergraduate program in MBB. The program would comply with national norms for breadth of scientific content, depth of coverage and laboratory experience in Biochemistry and Molecular Biology. The undergraduate students with whom we met praised the

program and felt it served their needs well. Faculty members were perceived as open and supportive. The major frustrations centred on the sequencing and/or availability of critical pre-requisite courses.

The review team considered some of the questions raised for it in the Terms of Reference. In addition, it identified a few shortcomings in the design and execution of the UG program. The following paragraphs highlight these issues and our advice to the Department and Faculty.

A concern of the review team that was also voiced by many is the lack of defined learning outcomes for the courses individually and the program as a whole. Likewise, there was little articulation of an over-arching vision for the program's outcomes both for graduation and for each of the four years. Clarification of the expected learning outcomes will allow the UG Curriculum Committee to identify the program's strengths and any gaps (that may exist). In particular it will allow the fourth year programming to be structured such that UGs will be able to identify courses needed for their interests and career goals, and allow faculty to fine tune the fourth year course offerings to the desired program goals and learning outcomes.

Recommendation 1: Define an over-arching vision for the MBB UG program as a whole. Define the key competencies to be attained by the graduates of MBB

As requested in the Terms of Reference, the review team considered the possibility of instituting an UG program in "genomics/bioinformatics". The review team does not believe that a separate undergraduate degree program in this area is desirable. In fact, a joint program with Computer Science that serves genomics/bioinformatics is already in place (JMA CS-MBB). Nonetheless, new courses or refining of current courses for the JMA CS-MBB UG program are appropriate and should be supported.

Recommendation 2: Continue to incorporate genomics and systems biology concepts into MBB course offerings in a way that supports the greater Departmental vision for its program.

The review team is concerned that an apparently significant number of UG students are spending more than four years (excluding co-op placements) to

obtain a 120 credit degree. Faculty members and advisory committees offered some reasons for the time delay: 1. Some students take reduced loads in order to work to pay for their program; 2. Some students mistakenly believe that twelve credits per semester constitutes a full load; 3. Some advisors promote partial loads although it is certainly not official policy; 4. The summer semester does not necessarily offer the complement of courses needed; 5. The recommended first year load for prospective MBB students exceeds 30 credits.

Beginning with their first advising session, students should be made aware of the course load that leads to timely completion of a degree. Although SFU is a full trimester university, the summer course offerings for MBB students are not always supportive of a four-year degree. In particular, MBB 331, a “gateway” course, is not currently offered in the summer semester. Based on comments by faculty members and students, the review team believes that MBB 331 could be offered successfully as an Intersession course. It could also be team-taught.

Recommendation 3: The Faculty of Science and the Department should ensure the students are fully advised of the year-by-year course load and program content required to graduate in four years. The Department is encouraged to consider the sequencing of prerequisites and to offer Summer term/Intersession courses to enhance student flexibility and timely completion of UG programs. Finally, team teaching in summer/intersession would lessen the impact on faculty members’ research programs.

The number of MBB fourth year course offerings surprised the review team. Although not every course is given regularly, the number of potential courses is far larger than necessary. The review team was lead to believe that these upper level courses have come into being as a result of individual faculty member’s research interests as well as their need to maintain a certain teaching load, rather than as a concerted attempt to define Departmental program objectives. While offering the fourth year student many choices in principle, in practice, the choices are sometimes made for the student by the schedule of course offerings, rather than by their interests.

Recommendation 4: Realign the fourth year offerings with the program competencies and learning outcomes, including consideration of a fourth year ‘capstone’ course. The Department is encouraged to identify two to

three broad theme areas, not formal streams, but nonetheless areas that coincide with the over-arching program vision for MBB and thus serve to assist students with their choices.

The Terms of Reference asked the review team to consider whether MBB should “develop MBB introductory courses” or “work with other Departments in the Faculty of Science to create and oversee an SFU Life Sciences Core Curriculum”. The context for this request is the concern of MBB (and other programs, notably those in Health Sciences) that BISC 101 (General Biology 4 credits) lacks some critical subject matter required for MBB majors in their second year. The review team advises against “silo-ing” first year Biology into multiple, competing streams. Rather, the review team endorses the concept of a Life Sciences core curriculum to serve the first two years of multiple programs. Such a common Life Sciences curriculum would encompass the Life Science Departments in the Faculty of Science and serve the B.Sc. stream in the Faculty of Health Sciences, as well as other programs.

Recommendation 5: MBB should fully engage in the development of a Life Science Core Curriculum that would encompass the first two years of the current Life Science programs in the Faculty of Science (Biol, MBB, BPK). This initiative will require the involvement and support of Faculty and Departmental governance structures.

A Life Science Degree Program: The review team understands that there is no “General Science” degree program that would serve students seeking a broad biosciences education. The review team believes that the creation of a Life Sciences Core Curriculum as proposed in the “Terms of Reference” presents additional opportunities to MBB, the Faculty of Science and SFU. Specifically, it would permit students to delay choice of a major until second year. Moreover, it would facilitate creating a degree program with greater breadth and less specialization than MBB. In this context, changes to the MCAT examination scheduled for 2015 will oblige pre-medical students to obtain grounding in Sociology and Psychology as well as in Biochemistry.

The GPA required to remain in the MBB program is 2.5 and there are limited opportunities for students who fail to achieve this grade. Consequently, the GPA cut-off is not enforced and some students continue into the upper years of MBB where they struggle. The General Science double-minor program (GPA 2.0) is an

alternative program for such students. However, the review team felt that the “General” and “double-minor” moniker of the program was unlikely to be attractive to students and potential employers. The review team encourages the Faculty of Science to consider restructuring the current offerings of the General Science program into a B.Sc. in the Life Sciences. Given the current broad course choices in the General Science degree program likely no new courses are needed, and only some “revamping” of current offerings being necessary. The review team considered a B.Sc. in the Life Sciences to be attractive to many undecided secondary school students.

Recommendation 6: The Department and Faculty are encouraged to embrace the opportunities presented by a broad-based Life Sciences degree program as a destination for those students who may be undecided in their academic direction, and at the same offer an academic destination for those students whose academic performance falls below the desired minimums set by MBB. This initiative might be profitably first piloted at the Surrey Campus as a way of building upper-year offerings at that location

Graduate Program and Research Training

There is general awareness that in the sciences, graduate students generate much of the data that result in the publications and grants of the faculty and Department. Thus the quality and activities of graduate students is of prime importance to all. The Department currently enrolls approximately 90 graduate students, a larger number than at many peer institutions. Although detailed data were not provided, the review team was told that former graduate students have been very successful at obtaining external awards and post-doctoral placements. At the same time, the review team was also led to believe that there is considerable variability in the quality and achievements of the MBB graduate students. Worryingly, the review team also sensed tension and disengagement between the faculty and the graduate students in MBB.

Thus the review team carefully considered all phases of graduate education in MBB. The review team concluded that the MBB Department lacks a coherent strategy to recruit outstanding trainees as a Department. Other aspects of the graduate program are also sub-optimal. Together, they contribute to variable quality and longer than desirable times to completion. Indeed, research in the

Department would certainly be better served by somewhat fewer (e.g. ~60) graduate students of higher quality and more post-doctoral fellows at no greater cost than at present.

Graduate recruitment in MBB was a stated concern of all faculty members. The review team learned that potential students must obtain an agreement of admission and funding from a faculty supervisor before applying to the Department. We fail to see the value of this arrangement (other than saving potential students the application fee). International students may not be aware that this method of admission is in place, and thus some excellent international students will not apply. Younger, or less well-known faculty are disadvantaged as most potential graduate students are likely to apply to the prominent faculty members. Moreover, excellent students who make inquiries may be lost to MBB if a contacted faculty member's lab is full, or if funding cannot be guaranteed. Put differently, the current practice for recruiting graduate students into MBB is highly variable and at worst, approaches anarchy. It has the undesired effect of making some graduate students feel "indentured" to their faculty supervisors.

The Department could adopt "Strategic Enrolment" practices for its graduate program (i.e., what kind of student is sought; how many are sought; and what will be done to ensure a positive outcome). Creative approaches to recruitment could include videos on the Departmental website; use of social media; and targeting certain markets/demographics (e.g., peer comprehensive universities in Western Canada; selected institutions in Latin America, PRC and India). The Department's graduate students could be a huge asset in this regard but are not currently as well engaged with the departmental faculty as is desirable. An online application process is being implemented by SFU, which will certainly impact MBB's application process. To cope with on line applications as well as to improve its current practice, MBB should strike a Departmental Graduate Admissions Committee to assess all incoming applicants to ensure that minimum standards are met. Dossiers of eligible applicants would be circulated to all potential supervisors. Acceptances would be issued by the Department/University on behalf of faculty members who ultimately would provide financial support.

A number of initiatives would enhance students' progress through the Departmental graduate program. A mentoring program for new graduate students would improve morale and encourage engagement in departmental activities. In consultation with its students and the Dean of Graduate Studies, the

Department should develop a set of guidelines for best practices in supervision and set transparent procedures for assignment of TA or RA positions. Finally, timelines for degree completion should be developed, implemented and enforced

Recommendation 7: A major reform of MBB's graduate program will improve the quality of its students, will enhance its engagement with its graduate students, and will ensure that standard benchmarks are regularly achieved.

The review team was presented with years-to-degree data: the M.Sc., three years; the PhD, six years. The reasons given for these years-to-degree times include project expectations, student activities and lack of career paths after graduation. Spending extra years in graduate school was seen by some as being useful and required. However, the only example we could envisage where extra years might be useful was the situation when an academic-bound PhD student is completing final papers - although such a student could defend his/her PhD and then finish the papers as a post doc in the same lab before moving on. For a M.Sc. student bound for career path other than academic research, a three-year M.Sc. is a disadvantage to all concerned.

The review team discussed the year-to-degree issues with faculty, the Chair and the Dean of Graduate Studies. We encourage the Department to enforce graduation timelines as a principal tool for reducing the numbers of lower-echelon of students who are performing below par, at the expense of Departmental time, attention and effort.

The M.Sc. years-to-degree could benefit from clear, written, expectations for the program with timelines. Key competencies for degrees should be clearly detailed. The degree expectations document would be given to every student allowing him/her to map out their career plans, and to understand fully what is expected in terms of research activity and program responsibilities. The review team considered the requirement of a publication for the M.Sc. degree and would like to suggest that in some fields, a publication may be overly optimistic, and may be one of the hurdles resulting in the longer time to degree.

For the PhD, an overall "PhD Degree Expectations" document fully describing the requirements, the expectations, and the timelines for PhD students and supervisors with key competencies defined would be very helpful. To our eyes,

the current documentation could benefit from a revision that would include an over-arching vision and clear depictions of expected outcomes of courses, research, and publications.

Recommendation 8: For both the M.Sc. and PhD degree, revise, expand and document the Degree Expectations. Models for such a document exist at other Universities. This Degree Expectations document should include the over-arching vision of both programs, the time-lines and accomplishments expected, the key competencies to be achieved, and clear direction and justification of the course requirements.

Recommendation 9: Define and enforce PhD candidacy examination timelines to occur on or before completion of the sixth term of a M.Sc. registered student, coupled with the administration of agreed-upon minimal standards for that examination which must be completed *prior to* admission to the PhD program.

Recommendation 10: Departmental support for graduate student and faculty social gatherings will enhance faculty and graduate student engagement. The Department is encouraged to include voting graduate student representation to the Departmental Council and appropriate Committees. With rights comes responsibilities, and the *quid pro quo* will be responsible graduate student participation in appropriate academic and social activities, including the Seminar Series, and Academic Council.

II. Governance and Administration

The review team appreciated the opportunity to review the Departmental governance structure and operation, noting that the 'Self Study' document provided in advance of the review painted a somewhat more 'negative' impression than what the review team observed during the course of its visit and review.

The Department has benefited from highly dedicated leadership by its past Chair (Dr. Brandhorst) whose service in this regard spans fully a decade. His leadership has been one of unwavering commitment and loyalty to a vision of the

best interests of the Department in the midst of considerable growth and evolution of the broader SFU life sciences program during this time. The review team also noted that the supporting Staff in the Department are, on the whole, extremely happy to work in and be part of the Department's mission and objectives.

The review team was given full access to information pertaining to past governance practice in the Department, and was grateful for the frank discussions engaged with both the Head as well as Senior Administration officials in this regard. The review team became aware of select aspects of Departmental administration that presented some apparent inconsistencies that, on the whole, may benefit from improvements in practice. Accordingly, the review team recommends the following adjustments that are anticipated to be of constructive benefit to the Department.

The review team noted that several positions have evolved (enlarged, for the most part) in their duties and responsibilities, to which the Staff have responded admirably and responsibly to help ensure that the objectives of their positions are fully met. Where appropriate, modifications to job descriptions should be accompanied by a review of their responsibility profile, so that a fair and equitable ranking of the positions can likewise be maintained. The review team points out that annual performance reviews - even in the absence of any evolution in job descriptions - is a valuable communication tool between the Department and its Staff for purposes of airing concerns, identifying emerging needs or implementing educational/training opportunities on the part of Staff, to name but a few.

The review team learned that grant-supported research staff - some in quite senior positions - do not qualify for institutional benefit plans. This struck the review team as inequitable and incompatible with the University's goal of enhancing its reputation and research profile. There are clearly resource implications of providing benefits, yet such charges are eligible expenses in most cases and can be recovered from researchers' grants (e.g., CIHR permits full benefit packages to be charged to its grants).

Recommendation 11: The Department initiate a procedure for annual reviews of Staff work descriptions and their performance in those positions, in order to ensure that the position descriptions are up-to-date and fairly reflect the evolution and output of each position in the

Department. Policies are established in cooperation with the University administration, to improve equity in benefits and support for grant-supported research staff in the Department.

The review team was made aware of issues that would augment the experience of both UG and graduate students.

Recommendation 12: TA assignments among the Graduate Student cadre be undertaken so as to ensure that assignments are well-aligned with teaching needs – particularly in those large and busy lab sections where continuous oversight of lab activity is both an instructional as well as a safety issue.

The review team was made aware that the organization, responsibilities and decision making of committees within the Department were at times ill-defined and sometimes inconsistent. Moreover, the review team also perceived that the Department as an entity was not fully engaged in the governance and policy implementation initiatives currently operating at the Faculty and the broader University levels. A number of suggestions in this regard include:

1. Adjustments to Departmental committee content – specifically, the advisability of striking a Priorities & Strategic Planning Committee, to assist the Chair and the Department-at-large in identifying strategic issues and opportunities both within and beyond the Department and its SFU context.
2. Adjust the leadership of the Departmental Undergraduate Committee so that the Departmental Undergraduate advisor and a Tenured Faculty member serve as co-chairs.
3. Regularize the schedule and increase the frequency of Departmental Council meetings (e.g. monthly, on a flexibly identified day/week of the month) in order that a regularly scheduled forum for emerging issues and their resolution be in-place and available for the broader Department. Regular meetings would in no way supplant the need for occasional 'special' Council meetings where such was required.
4. Include standing Graduate Student representation on Departmental Council (perhaps linked to a specific office and Officer in the Graduate Student Society).

6. Establish a Departmental 'Executive Committee' comprised of the Department Chair, Chairs of the Standing Committees of the Department plus the Chair of the Graduate Student caucus as a useful 'sounding board' and advisory support to the Chair.

Recommendation 13: The overall governance of the Department be reviewed and Departmental Committees be struck to govern the Department efficiently, and appropriately. Greater emphasis be placed on the delegation of administrative decision-making among the various Departmental Committees in cooperation with their itinerant Chairs, in support of establishing a broad-based institutional memory in key aspects of Departmental administration. The Department is urged to ensure that, as much as possible, its operation and policies be consistent with those operating at other levels of the Institution.

The review team was impressed by the extent of engagement of the adjunct faculty with MBB. The flow of information from the Department to its associate and adjunct members appears to occur with variable efficiency. Moreover, associate members appear to be effectively disenfranchised on the issues, such as management of the graduate program, that affect them most closely. There is a risk that this valuable cohort could become alienated from the Department.

Recommendation 14: The Department involves its Associate members more closely in graduate education and research. The Department should identify the topics/questions/issues and Committees where Associate Members would have voting privileges.

Committed meeting room space was seen as an issue by all. The Department has grown to the point where a flexible priority commitment is justified for Room SSB-8114. Lockable storage space is much needed for undergraduate student society functions to be effective and ongoing.

Recommendation 15: The Faculty and University Administration is urged to allocate some flexible priority to Room SSB-8114 for use by the Department for both administrative and scientific meeting activities, and to procure functional, secure storage facilities for undergraduate use proximal to the Departmental precinct.

The review team noted the commendable fundraising initiatives being proposed and undertaken by the Department. However, the review team believed it unlikely that the efforts would fully achieve their desired results.

Recommendation 16: The Department is urged to engage with the Institutional mechanisms for advancement that include provision for identifiable gifts to be directed to the Department.

Departmental governance has worked well in the recent past thanks to the dedication of the Chair and a small group of individuals. Looking forward, and in the face of changing Departmental leadership, the review team suggests that the time is opportune for the implementation of select structural and procedural changes as outlined above, in the anticipation that these would be of demonstrable benefit to the Department.

III. Strategic Opportunities

The convergence of multiple internal and external developments suggests very strongly that the time is ripe for the MBB Department to rethink some of its practices and to undertake more strategic approaches to help it address these changing circumstances. The following section outlines internal and external challenges and opportunities as well as potential departmental responses.

Challenges and Changes

The MBB Department has emerged in the past decades from its roots and has grown very quickly. Faculty members from other departments were recruited into MBB while numerous new recruitments were made, almost all at a junior level. All members of the Department, junior and senior, have enjoyed considerable success in research. The pace of growth has been remarkable; moreover, the success with which the Department has evolved is highly praiseworthy. Thus, the Department has now reached its mature size and can anticipate little if any further growth. Second, a new Chair will assume leadership of the Department this autumn. Third, major changes have or will alter the practices of the Department's primary external sources of research funding. How these play out will affect the type of research that is performed, the number of trainees that can be supported and how faculty members interact with each other. Fourth,

students' expectations and styles of learning, both undergraduate and graduate, are changing rapidly. Admissions policy, pedagogy and supervisory practices will have to adapt.

Research Funding

The MBB Department has colonized a research niche focused on largely non-human, non-mammalian model organisms and this research profile has thus far served it well. However, the CIHR as a major research funding resource to the Department is faced with constrained resources and a mandate that is more directly aligned to serving the health of Canadians. Thus, it will increasingly focus its programs and funding on human health. Moreover, CIHR also intends to revamp both its funding programs and its system of peer review.

To take advantage of this sharpened focus, MBB will be obliged to adapt along the following lines. First, applications will require much more attention to “packaging”; i.e., clearly addressing questions of human health even in applications employing appropriate model organisms. Second, “big picture” thinking and proposals will likely need team approaches to be successful. MBB members will be obliged to enlist their colleagues both inside and outside MBB in order to assemble a team capable of competing at the national level (see the section on “Strategic Initiatives” below). Third, funding programs and sources continue to evolve. A current example is CIHR’s revision of its funding programs. The department must prepare for these changes, identify their exposure and risks, and develop plans in the event some funding sources are discontinued.

Recommendation 17: The VP Research should monitor the evolution of CIHR’s planned reforms and ensure timely, accurate communication of the new programs to Faculties and Departments.

Recommendation 18: MBB, in cooperation with other units, should institute internal mentoring and review processes to ensure the competitiveness of future NSERC team and CIHR applications.

Strategic Initiatives

MBB has an exceptional opportunity to engage in interdisciplinary partnership programs that would produce outstanding research and attract highly motivated

trainees. The joint CIHR-supported program in Bioinformatics is an excellent example of what can be achieved. Such programs share several characteristics: they often straddle interfaces between existing disciplines and units; the training requirements may not readily be satisfied by existing courses or styles of research; consequently, governance of such programs rarely fits a departmental model and thus requires compromise. The reviewers believe that the Dean of Graduate Studies is best placed to prepare a consistent framework for governance and standards so that such program opportunities can be readily identified, initiated and sustained. Some exciting potential training initiatives are outlined below.

1. **Genome Sciences.** Over time, MBB has developed expertise in most aspects of genomics that place it apart from any comparable unit in Western Canada if not the entire country. By further engaging with the sister Departments in Science, the Faculty of Health Sciences, BCCA/Genome Sciences Centre and suitable units at UBC, MBB could become the hub of an unparalleled Genomics Program that could attract both funding and highly motivated trainees. The review team understands that the Department is involved in developing an undergraduate program and a possible certificate program, yet both seemed stalled for a variety of reasons - perhaps for want of a determined internal champion. The Reviewers believe that MBB should take a strategic decision to focus on an interdisciplinary graduate program in this area.

2. **Infectious Diseases and Immunology.** Several individuals in MBB constitute an obvious fit to this area which is currently under the purview of the Faculty of Health Sciences. Recruitment in Infectious Disease and Immunology would enhance the current strong, but small, research group.

3. **Engagement with Fraser Health Authority.** The FHA provides a source of clinical material for research, co-op placements for trainees and future employment for graduates, to name just a few. The Department should consider appointing an interested faculty member as its liaison, working with the Dean of the Faculty of Health Sciences.

4. **Alternative Degree Programs.** The Surrey campus offers an opportunity for the Faculty of Science, Faculty of Health Sciences and MBB to explore integrative programs at both the undergraduate and graduate levels. In the latter instance, there may be student interest in a non-thesis, (i.e., courses and projects) “applied” Masters-level programs in areas such as bio and health informatics. Partnerships with other institutions in such initiatives (UCFV; BCIT; Surrey Memorial Hospital) make sense and would be the responsibility of the upper administration to initiate.

Recommendation 19: Members of MBB are encouraged to reach out to other units, Faculties and Institutions to form interdisciplinary partnerships serving research and advanced training that will enable them to sustain excellence as well as enhancing their national/international reputation.

Research Infrastructure

The Department benefits from a strong record in this area that impressed the review team. With funds from the Dean’s Office, MBB currently funds all or part of four staff positions dedicated to research infrastructure or service, including IT. MBB has also organized a multi-user imaging facility to house CFI-funded equipment with expert technical support. This facility is also used by research groups outside the Department and serves as a model for shared infrastructure. The reviewers encourage the Office of the VP Research and the Department to identify similar opportunities, to pursue funding from CFI and NSERC, and most of all, to think “big” (or at least “bigger”).

Business Plan

The Department is strongly encouraged to develop a business plan for deployment of current and future financial reserves in support of agreed-upon Departmental priorities. The incoming Chair would assume the lead role initially but would engage a working committee to assist the Chair. The year-over-year accumulation of reserves has not gone unnoticed and is increasingly vulnerable in the absence of a plan for its use.

Recommendation 20: Develop an internal business/strategic plan that will enable MBB to best deploy its available resources and respond to opportunities.

Concluding Remarks:

The MBB Department is strong. For the most part, the challenges that have emerged are due to the Departmental priorities over the past ten years related to the management of rapid growth and achievement of research success. As a consequence, our recommendations are mainly organizational. They will require focus and commitment on the part of faculty members, the Faculty of Science and the University as a whole. We hope these recommendations are constructive and provide clear direction for the Department. As a team, it was our pleasure to recognize the many successes presented by this strong Department, and to engage with the individuals who have made it possible.

EXTERNAL REVIEW – ACTION PLAN

Section 1 – To be completed by the Responsible Unit Person e.g. Chair or Director			
Unit under review	Date of Review Site visit	Responsible Unit person,	Faculty Dean
<i>Molecular Biology and Biochemistry</i>	<i>April 11-13, 2013</i>	<i>Lynne Quarmby</i>	<i>Claire Cupples</i>
Note: It is <u>not</u> expected that every recommendation made by the Review Team be covered by this Action Plan. The major thrusts of the Report should be identified and some consolidation of the recommendations may be possible while other recommendations of lesser importance may be excluded. Should an additional response from be warranted it should be attached as a separate document.			
1. PROGRAMMING			
1.1 Action/s (description what is going to be done): 1.1.1 Undergraduate: A. MBB will define an overarching vision for its program. As part of its participation in the SFU-wide effort to define learning outcomes for its courses and program, MBB will define key competencies for graduates of its program. B. The MBB program will continue to have a set of required MBB core courses that provide foundational knowledge, while offering considerable choice and flexibility in its advanced courses that provide to students the opportunity to specialize and develop skills in critical reading of the literature, communications, and critical thinking. The appropriate mix and timing of courses will be assessed and adjusted. Guidance will be provided to students about thematic course selection. C. MBB will promote efforts to inform its students of the importance of taking a full course load and will make adjustments to its course schedule to facilitate the timely progression of students through they program. D. MBB will participate with enthusiasm the creation of a Life Sciences Core Curriculum. MBB will promote the inclusion of genome sciences at all levels of its program. E. MBB supports the proposed creation of a Life Sciences B.Sc. program that is flexible and appealing to students as an alternative to departmental major/honours programs. 1.1.2 Graduate: A. MBB will create a statement of expectations for graduate degrees, including anticipated time lines and expected accomplishments and competencies to be achieved. We will explore mechanisms to insure that students and supervisors understand their mutual responsibilities and are making progress in achieving their expectations. B. MBB agrees that the average completion time for its MSc students is too long and that the recent upward trend for PhD students is troubling and should be reversed. Mechanisms will be explored and adopted to reduce completion times, though			

arbitrary termination of financial support for students making good progress is not contemplated. The MBB self study report documented the high success rates for MBB graduate degree completion and for post-graduation placements, indicating the success of the program.

C. MBB already has defined and enforced timelines as well as standards for its PhD candidacy exam, but will consider requiring its completion by MSc students prior to their transfer to the PhD program. MBB will review its standards for admittance to PhD candidate status.

D. MBB will develop strategies for improved recruitment of excellent students. It will endeavor to help excellent applicants find an appropriate supervisor able to provide sufficient long-term research assistantship support. MBB will continue to prescreen potential applicants to discourage applications from those unlikely to be accepted into the program.

E. MBB will explore ways to admit excellent applicants into the graduate program without being committed to a specific senior supervisor, allowing them to rotate through labs before selecting a suitable supervisor.

F. MBB will continue to have graduate student representation on relevant committees and working groups. It will continue to invite graduate student representation at MBB faculty meetings where graduate student issues will be considered. If a Departmental Council is created, it will include graduate student representatives.

G. MBB will explore ways to enhance the engagement of graduate students.

1.2 Resource implications ((if any):

Negligible costs for the changes under the control of MBB. There will be substantial time involvement for faculty in defining learning outcomes and developing new programs. A mechanism for funding a pilot scale rotation-based graduate program would need to be found, presumably involving the department and the Deans of Science and Graduate Studies.

1.3 Expected completion date/s:

Changes under the control of MBB will be implemented over the next 3 years; some cannot begin until after completion of the current 2 year planning cycle for teaching.

2. RESEARCH

2.1 Action/s (what is going to be done):

- A. MBB has initiated a pre-review process for grant applications to help insure the competitiveness of its applicants (the program is inclusive of Associate and Adjunct faculty)**
- B. MBB will continue to proactively take advantage of its research strengths**
- C. MBB will explore ways to take better advantage of its partnership with the Genome Sciences Center at the BCCA. Genomics impacts nearly all of the research in MBB, so having this relationship with the GSC is clearly beneficial.**
- D. MBB will consider other strategic partnership opportunities.**
- E. MBB will develop a Business Plan to more effectively and strategically deploy its financial resources and specialized facilities, while maintaining and improving its infrastructure.**
- F. MBB looks forward to the results of assessment and equitable re-allocation of space and other resources currently ongoing under the direction of the Dean of Science.**
- G. MBB agrees that the VPR should monitor changes at agencies such as NSERC and CIHR and communicate them to departments for response. MBB would like to see more transparency about SFU-controlled opportunities such as the CRC and CFI programs.**
- H. MBB agrees with the ERC about challenges related to research grant funding and will monitor and adjust to changes.**

2.2 Resource implications ((if any):

For proposed changes by MBB, substantial faculty time will be involved especially for the pre-review of grant applications. Hopefully, the payoff will be improved success in external grant funding.

2.3 Expected completion date/s:

For changes under the control of MBB, some are being implemented this year, and others should be completed (or continuing) over the next three years.

3. ADMINISTRATION

3.1 Action/s(what is going to be done) :

- A. MBB is blessed with some excellent staff. MBB agrees that its staff should receive regular feedback on their performance and that job descriptions should be updated to reflect changes.**
- B. MBB agrees that grant funded research staff have very important roles and should receive SFU benefits. MBB urges SFU to explore ways to insure that SFU students and research staff receive full benefits allowed by granting agencies.**
- C. MBB will continue to base assignment of TA duties on the needs of the courses to which they are assigned, while respecting the terms of the TSSU agreement and financial commitments to students.**
- D. The MBB Undergraduate Curriculum Committee has directed instructors of lab courses to insure that safety issues are included in the lab manual and that students receive appropriate instruction and oversight in the safe use of equipment.**
- E. MBB will consider creation of some of the several new committees proposed by the ERC and more authority will be delegated to committee chairs.**
- F. MBB will have scheduled monthly faculty meetings starting in the next academic year.**
- G. Associate members of MBB already serve on committees that oversee facilities located in MBB (e.g., microscopy and cell sorting). Associate members will be consulted about issues of concern to them, especially graduate studies.**
- H. MBB strongly endorses the recommendation that it have priority usage of SSB 8114 as a meeting room and that lockable space be provided to the MBB Student Union.**
- I. MBB will work with advancement officers in the Faculty and at SFU to promote opportunities.**

3.2 Resource implications(if any):

Costs associated with the recommendations under the control of MBB are negligible but will take time and effort. Provision of benefits for grant-funded research staff have cost implications, most or all of which would presumably be funded by research grants.

3.3 Expected completion date/s:

Actions will be initiated within the next 3 years, and most will be continuing.

4. WORKING ENVIRONMENT

4.1 Action/s(what is going to be done) :

- A. It was gratifying to hear that the ERC found a mostly happy and cooperative departmental community. We will endeavor to maintain that harmony.**
- B. We will build upon the regular social events that already occur (sponsored by the department or student organizations) and we will consider initiating a summer social event.**
- C. New faculty members are welcomed into the department and mentored. They are invited to attend weekly meetings of newer faculty and participate in monthly luncheon chalk talks. Most MBB faculty are on campus during normal working hours and have extensive interactions with their students, staff, and colleagues.**

4.2 Resource implications(if any):

A small fraction of the MBB non-salary operating budget already supports programs that enhance the working environment of the department. This could be increased modestly for worthy events.

4.3 Expected completion date/s: Over the next three years.

Some increased work burden and possible small increase in operating costs to promote improved social interactions.

5.NA..... (OTHER)

5.1 Action/s:

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5.2 Resource implications(if any):

5.3 Expected completion date/s:

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The above action plan has been considered by the Unit under review and has been discussed and agreed to by the Dean.

Unit Leader (signed)  Professor and Chair	Date <u>Aug. 2, 2012</u>
Name	Title

Section 2 - Dean's comments and endorsement of the Action Plan :

General: The report submitted by the External Review Committee is very complimentary about the quality of the faculty and staff in the Department of Molecular Biology and Biochemistry, the overall strength of the department's undergraduate and graduate programs, the excellence of faculty members' research and the environment of the unit. Likewise, the response of MBB to the report is positive and constructive. The department accepts most of committee's recommendations concerning operational issues, and provides reasonable, cost-effective proposals for making incremental improvements in the areas of undergraduate and graduate programming, research infrastructure and funding, departmental administration and overall working environment. Both the department and the appraisers agree on ways in which MBB can work with the Faculty of Science, the Faculty of Graduate Studies and the Office of the Vice President Research to enhance the success of the department as a whole and of its individual members.

Programming: The Faculty of Science whole-heartedly accepts the recommendations of the appraisers around the development of a core life science program in first and second year, and the provision of a so-called "General Science" degree program for those students who either do not meet the GPA requirements for admission into majors in our life science departments or whose career goals are less focused. The enthusiastic support of MBB for this proposal and its commitment to participating in the design and implementation of the proposed programs are most welcome. The development of learning outcomes for courses and programs will follow naturally from the inter-unit collaborations essential to such an initiative, and is aligned with SFU's goals for the NCAA accreditation process.

Many in the Faculty of Science would like to see a rotation option available for entering graduate students who have not yet chosen a supervisor. A program of this type is difficult to implement in the Canadian funding context – i.e. in the absence of government funded training programs – but we have started to explore the possibility of funding a pilot program through fund-raising.

Research: The terms of reference asked the appraisers to consider how MBB might capitalize on its relationship with BC Cancer, given that three (soon to be four) of its faculty members are cross-appointed with the Agency. The appraisers have chosen to address that issue only peripherally, as part of the section on Strategic Initiatives. MBB has responded in kind, with only passing mention of BCCA. The Faculty and the University have put significant resources into the BCCA relationship, and the area of cancer biology/genomics/bioinformatics, particularly in the context of personalized medicine, is a hot one with the potential to attract significant funding and prestige to SFU. I strongly encourage MBB to be proactive in seizing the opportunities that the relationship presents for research and training as a strategic priority.

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