

The College of Natural and Mathematical Sciences
DEAN's RESPONSE - 2024 Academic Program Review
Department of Biological Sciences
UMBC

SUMMARY

The external reviewers (i.e., Al Uy and Frank van Breukelen) are highly esteemed members within their respective scientific disciplines. Their qualifications include years of experience, expertise, and leadership appropriate to conduct a formal Academic Program Review of the Department of Biological Sciences.

In general, the department is under strong leadership and positioned for significant growth in research and reputation. The dedication of its faculty to student success and inclusive excellence are at the foundation of meeting the academic program's educational goals and outcomes. The challenges of faculty size, research infrastructure support, and space described in the report are not aligned to the reality of the situation, especially in comparison to the other departments in the college (*vide infra*). This observation highlights the need for improved communication between the department, college, and provost's office.

The external reviewers' report appears to be an outlier versus past Academic Program Reviews for Biological Sciences and the other departments in the college. It is my belief that the report echoes the disheartening and accumulating demoralizing effects of a pandemic, an extensive flood, and an outdated building. The specific comments below are intended to clarify and not impugn.

SPECIFIC COMMENTS

The Dean supports the strategic hiring of faculty members in accord with the recommendation of the department chair and its faculty. Even though the number of Biological Sciences majors is shrinking from a high of 1821 (fa'15) to 1447 (fa'24), the size of the faculty in the department is at an all-time high with 20 tenured, 8 tenure-track, and 9 non-tenure-track faculty. Two more faculty are starting in January of 2025. The department has benefitted from two hires from the Natural Sciences Pre-Professoriate Program, no loss of lines during the last retrenchment, and four lines from the UM FIRST program. Far outpacing faculty growth and retrenchment losses in the other departments in the college.

The college has made significant investments in the support of faculty success. Examples of these initiatives include an Entrepreneurial Skillset Training program for all incoming faculty, Entrepreneurship Opportunity for Associate Professors in CNMS, Eminent Scholar International program (a new program funded by the college), NSF Career Award workshops, NIH RO1 proposal training and consulting, and the Natural Sciences Pre-Professorial Fellowship Program. The Dean's Office continuously looks for opportunities to promote and support the department, its faculty, and students. For example, the Department of Biological Sciences has been included in numerous college initiatives. Examples are as follows:

- *Natural Sciences Pre-Professorial Fellowship Program* – benefitted from two additional lines from this program.

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- *NSF-IUSE (PI, CNMS Dean)* – A grant entitled “Collaborative Research: A Model of Institutional and Community Transformation for Teaching and Learning Quantitative Reasoning in the Biological Sciences (The IUSE Initiative)” provided funds to improve transfer student success and research faculty support.
- *NIH RO1 Training and Consultation* – Dean’s Office provided funds (\$250,000) for an external consultant to improve RO1 proposal submissions. The majority of those funds have gone to faculty from Biological Sciences.
- *NIH UM FIRST (PI, CNMS Dean)* – A collaborative grant with UM-SOM to improve faculty diversity. The program provided salary and benefits (three years at about \$1.5M) and start-up funding (\$2.4M) for four faculty – all in Biological Sciences. The start-up funding saves the department approximately \$800,000 (based on a 33% contribution) for use in other areas.
- *NIH STEM BUILD (PI, CNMS Dean)* – A ten-year research grant (>\$30M) to help students in the middle of the achievement curve achieve academic success in STEM. The majority (over 85%) of students were Biological Sciences majors.
- *Merck Data Science Fellowships (PI, CNMS Dean)* – Two (out of three) graduate student stipends and over half of the 30 undergraduate fellowships have been awarded to faculty in Biological Sciences to support undergraduate researchers.
- *G-RISE (PI, Brewster)* – The G-Rise program is administered under CNMS, which provides significant administrative support for the program.

It is important to emphasize that the major beneficiaries of these programs are the faculty and students of Biological Sciences.

The academic curriculum is under the purview of the department and its faculty. The department embraces assessment as an active participant in the college’s Student Learning and Assessment Advisory Committee to improve student learning outcomes and quality of its undergraduate and graduate programs. To support the teaching and research missions of the department, the Dean has been providing annual funds, example include:

- On March 1, 2022, the department chair sent the following email to the Biology Faculty. *“The department has received \$160K in one-time funding to purchase equipment to upgrade our graduate and undergraduate laboratories. The equipment has been selected to replace old and outdated equipment and to provide new equipment that will expand the scope of work in our laboratories. A notable inclusion is \$50,000 for a cryostat that was requested for the Applied Molecular Biology laboratory. This instrument will be available for use by others by arrangement with Cynthia Wagner and will allow researchers to generate thin tissue sections for a variety of purposes. Thanks go to Dr. LaCourse for his generous support for these critical teaching laboratories. Feel free to share your thanks with him.”*
- In an earlier email (April 29, 2022) the department was offered a new autoclave but opted for a cryostat instead. *“I know you were interested in buying a new autoclave for our department, but I'm realizing that the cryostat you provided funds to buy for the teaching*

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lab was likely to draw a lot of attention from the animal researchers. Both Chuck's and Weihong's cryostats are dead, leaving none in the ILSB. Therefore, if you still want to spend those funds, buying a cryostat for the ILSB would be a better use of funds. We are managing with the three autoclaves in the building."

- On November 29, 2023, The Dean's Office approved the purchase of teaching materials for Biological Sciences. From the chair, *"Thanks for our meeting today and for agreeing to cover the cost of significantly expanding our collection of teaching models and equipment. The A&P instructors, TAs and students will very much appreciate this! It will dramatically improve the experience of the students in those labs. "*
- The external reviewers suggested using technology, such as virtual dissecting tables, for modernizing the curriculum. On the approved item list (FORM G, 11/16/2018) of furniture and equipment, the dean included two Anatomage Tables (\$120,000). Practical pedagogical concerns negated the purchasing of these items.

This fall (2024), the Dean's Office authorized:

- Elimination of an old (prior to my tenure as dean) debt (\$70,000)
- Purchase of two (2) new autoclaves (\$100,000)
- Update or repair three (3) temperature- controlled rooms (\$45,000)
- Modern laboratory equipment for the teaching labs (\$50,000)
- Underwriting the Biological Sciences Abroad program (\$25,000)
- The Dean's Office has requested formal quotes to refurbish three teaching laboratories in Biological Sciences until Schwartz Hall is renovated.

Furthermore, the Dean's Office has allowed its staff members to teach classes important to Biological Sciences curriculum.

The college also initiated the establishment of a university-level high-performance computing center over a decade ago, which the OVPR is now in the process of implementing. The college has provided funds to support the high-performance computing center initiative, which will benefit faculty in the Department of Biological Sciences.

The college established a Science and Math Advising Resource Team (SMART), under the directorship of Michelle Bulger. This team is dedicated to the professional advising of students with declared majors in biology, chemistry, and biochemistry only. The expansion of SMART (three full-time advisors) and increasing the number of T/TT faculty has significantly reduced the service/advising workload on the faculty in Biological Sciences.

The Dean has been encouraging the development of new degree programs, tracks, and/or certificates (e.g., neuroscience and marine biology) to attract more students. It is hoped that the growth in the number of faculty would accelerate the development of new programs. In general, the college works with departments to find support opportunities (e.g., earmarks, donations, and

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funding opportunities) to launch approved programs and initiatives. Any additional base funding is premised on the overall growth of the college and its budgets.

The new Interdisciplinary Life Science Building benefitted the department with a state-of-the-art vivarium, tissue culture facilities, and dedicated laboratories for animal researchers. The Interdisciplinary Life Sciences Building (ILSB) is administered by the college as a university resource. Its construction was premised on promoting active learning and supporting animal researchers. To that end, the ILSB has (a) no college's administration space, (b) no departmental ownership, (c) no lecture halls, and (d) no transfer of existing/active courses to the ILSB teaching laboratories. The research space in the ILSB is presently at 100% capacity.

That said, research faculty from Biological Sciences occupy greater than 75% of the research space. Upon its opening, four faculty (three senior researchers) moved their programs into the ILSB, which freed up significant office and laboratory space in the Biological Sciences buildings. Also, all the new research faculty hires have been provided space in the ILSB. Contrary to the information provided to the External Reviewers, the college funded a full-time, dedicated technician to operate the new mass spectrometer in the ILSB. Also, nine additional circuits have been added to the ILSB to support critical research infrastructure (e.g., -80°C freezers) and the power has been switched to an alternate feeder to the building.

The teaching laboratories in the ILSB are a shared resource. Novel interdisciplinary laboratories without a home department are giving priority access. Presently, the teaching labs support courses from Biological Sciences (BIOL100L and BIOL273L), engineering (ENCH225L, ENCH337L, and ENCH485L), SCI101L (supports 'L' requirement for computer science majors), and a SEA-CIRTL summer course (The Secret of Microbes). Many of these classes have multiple sections. When labs appear empty, the labs are being prepared for the upcoming class. Contrary to the External Reviewer's report, the teaching labs have not been left empty for five years. According to the Office of Facilities Management, the average teaching laboratory utilization in the Biology Building is 23%.

Unfortunately, users of the vivarium have experienced issues that impaired the progress of their research programs. The Dean's Office has invested heavily into mitigating the problems and facilitating the success of its users, especially junior faculty. These efforts include:

- Bringing in consultants from Jackson Laboratories to review the ILSB and its practices.
- Having UMB veterinarians review the ILSB vivarium.
- Providing personnel (e.g., graduate student stipends) and research support to support faculty affected by the issues.
- Supporting a P&T extensions of one-year for junior faculty affected by the issues,
- Not charging per diems to support users of the facility.
- Allowing the Biological Sciences vivarium (in Schwartz Hall) to remain open indefinitely.
- With the partial support of the OPR, hired a full-time Director of Veterinary Management, who started on November 1st.

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It's interesting to note that some of the faculty believe the report from Jackson Laboratories was kept secret. The Jackson Laboratories report was (a) reviewed in a meeting with all members of the vivarium users group and department chair in its entirety, (b) a copy was provided to the department chair and the ILSB manager, and (c) a hard copy was available for months in my office for review and discussion (and nobody showed up). Other instances of lack of information included not knowing the distribution of DRIF (i.e., 10% department and 3% college) and the Special Sessions & Special Programs tuition disbursements (i.e., up to 25% net tuition revenue), which are readily located on the web or through inquiring from the Dean's Office. This observation highlights the need for improved communication between the department, college, and provost's office. More importantly, it appears to have an underlying issue of trust.

The needs of Biological Sciences are given full and equitable consideration by the college. Additional funding (e.g., teaching assistantships) and faculty lines are dependent on available funds. Although outside its purview, the college is a strong advocate of improving the physical infrastructure of Schwartz Hall.