

Lehman College

Department of Biological Sciences

2024 External Review Report

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Introduction

A review was conducted of the Department of Biological Sciences (DBS) at Lehman College of the City University of New York. The external review team included Gregorio Valdez, Ph.D., Brown University and Thomas Leustek, Ph.D., Rutgers University. In preparation for a site visit of the Lehman campus the reviewers were provided with a self-study document on March 8, 2024, prepared by the department and consisting of an informative and detailed history of DBS within Lehman College and the CUNY system as well as detailed program planning information. The on-site-visit was conducted on May 8, 2024. Groups of faculty including departmental leadership, tenure/tenure track faculty, lecturers, and college laboratory technicians (CLT) participated in a general discussion and answered questions posed by the reviewers. In addition, the review team had the opportunity to meet with undergraduate and graduate students.

The review team also met with Lehman College administrators including Provost Jorge Silva-Puras, Esq., Associate Provost Karin Beck, Ph.D., and Dean of Natural and Social Sciences Pamela Mills, Ph.D.. They provided the review team with insight into the role of DBS in the context of Lehman College's institution-level priorities. They also provided the review team with areas of emphasis that are addressed in this report.

Lehman College and the Department of Biological Sciences

Lehman College is an intellectual, economic and cultural center, and a hub for economic mobility in the Bronx and surrounding community. The student body reflects the cultural and economic diversity of its community. It is the only school in the CUNY system to earn Federal designations as both a Minority-Serving Institution and Hispanic-Serving Institution and it has placed competitively in a number of different college rankings for economic mobility of its students. Lehman College offers both undergraduate and graduate degree programs. Lehman College is a teaching focused university that prioritizes faculty scholarship. The Lehman College student body has grown rapidly in the past decade and college administrators indicated that further growth is planned as part of the "90 by 30 Challenge" in which Lehman College aims to award 90,000 degrees by 2030. In addition, Lehman college administrators spoke of their plan to achieve R2 designation in the Carnegie Classification of Institutions of Higher Education.

Executive leadership indicated that DBS is a valuable and key department at Lehman College, and will be integral to its continued success including attainment of the "90 by 30 Challenge" vision and R2 designation. They acknowledged that investment in DBS is crucial and necessary.

Undergraduate Program

DBS offers bachelor's degrees in Biological Sciences including; a B.S. with four track options and a B.A. intended for students pursuing K12 teaching certification. The bachelors programs cover the gamut from biomedical to organismic and bioenvironmental studies. A fourth, more specialized track, focuses on neurosciences.

The current curriculum is the outcome of planning based on a 2013 self-study focused on more clearly defining the pathways toward specific career tracks in the life sciences and the need for greater access to experiential learning opportunities. The B.S. degree was created at that time. The review team found the current curriculum to be well designed and up to date. Interviews of

undergraduates majoring in biology revealed that they are highly satisfied with and appreciative of the education they are receiving. The students spoke highly of their teachers and mentors, and the advice they have received from DBS.

The reviewers were told of several interrelated challenges. The biology undergraduate major has experienced remarkable growth during the period from 2013 to 2021 with enrollment more than doubling and currently totaling greater than 450. Biology is now the sixth largest major at Lehman College. Of the most popular majors, nursing and psychology have experienced growth rates comparable to biology. Increased enrollment in key undergraduate majors is attributed to an increase in the number of students choosing Lehman College for their undergraduate studies, driven in part by the CUNY Chancellor's focus on science education, as well as increased student interest in pursuing careers in the biomedical sciences. The number of biology majors and students who depend on required courses offered by DBS is certain to increase further as a result of the "90 by 30" initiative.

In keeping with the hands-on nature of the subject of biology DBS offers a robust selection of required laboratory courses. Lab courses require greater individualized instruction than lecture courses do. In addition, DBS offers many "service courses," namely courses that are graduation requirements for other majors. For example, nursing majors are required to take Anatomy and Physiology, which is offered by DBS faculty.

Discussions with departmental leadership as well as CLTs pointed to a shortage of staffing necessary to offer enough sections, especially of service courses, to students who require those courses for graduation. These high enrollment courses often must turn away students. Despite the inability to offer enough course sections DBS reports that the number of CLTs on staff today is the same as in 1999, long before the surge in student numbers began. The review team asked, but did not receive clarification about the impact of such course roadblocks on-time-to-graduation, which is a key metric of program quality. USNews¹ reports that Lehman College has an overall graduation rate of 27% after 4 years, which is quite low compared with other 4-year higher education institutions. While the review team acknowledges that "time-to-graduation" is a complex metric with many influencing factors, it is worth examining how course roadblocks in DBS influence the overall graduation rate.

Recommendations to Maintain and Improve Undergraduate Teaching: The review team felt that DBS should be commended for maintaining a successful and high quality major and service courses with the resources available to it. However, considering that large increase in students attending Lehman College combined with plans to increase the number of degrees Lehman College awards, it seems unreasonable to expect DBS to maintain program quality without additional human resources. Therefore, it is imperative for Lehman College administration to take immediate action to remedy the staffing shortage by approving additional CLT hires. Lehman College administration must also plan for staffing necessary to maintain program quality during the "90 by 30 Challenge" ramp-up in students.

Another challenge impacting the biology major is physical space available to DBS, which limits class size. There are few lecture halls that can accommodate large audiences. Larger numbers of students could be taught by online instruction. However, quality online instruction requires specialized infrastructure and a didactic approach to maintain student engagement. And online instruction generally is not preferred to in-person instruction. In addition, the review team heard about a shortage of sufficient physical space in the form of research laboratories, faculty offices, and common spaces that negatively impact scholarship, extramural funding, and graduate student performance. These follow-on impacts of physical space limitation are addressed later in this report. College

¹ <https://www.usnews.com/best-colleges/lehman-college-7022>

administration reported that infrastructure planning is underway, but that new buildings are at least 10 years distant. Therefore, the review team recommends that Lehman College, in collaboration with DBS, engage in a serious planning effort to utilize, apportion, remodel and prioritize existing space. It is imperative to do so because it seems like physical space issues may jeopardize plans for increasing student population and attainment of R2 designation.

Graduate Programs

Doctoral Program: The CUNY Graduate School and University Center are the hubs for accepting as well as for providing courses to all PhD students at Lehman College DBS, other CUNY schools and affiliated institutions that include the New York Botanical Garden (NYBG). The CUNY University Center also offers research training workshops. Students choose between four tracks: Molecular Biology, Cellular and Developmental Biology (MCD); Neuroscience (NS); Ecology, Evolutionary Biology, and Behavior (EEB), or Plant Sciences (PS). There are currently 12 PhD students in DBS, with 6 students in PS, 4 in MCD, and 1 in EEB. Lehman College DBS in close collaboration with NYGB remains the primary destination for students specializing in PS among all CUNY institutions. In addition, DBS serves as the de facto administrative site for students in the PS PhD program carrying out their thesis work at both DBS and NYGB.

Doctoral students receive a \$35,000 stipend per year fellowship in addition to tuition and health insurance coverage. The Graduate Center provides stipend for the first year and supports health and tuition for all five years. The students' advisor is responsible for covering the stipend for years 2-5. The other mechanism that financially supports Graduate students beyond the first year is the graduate assistantship A (Grad A) line. This is a 12-month appointment that requires the student to teach one to two laboratory sections per year. In return, a Grad A line can cover a significant portion of the student's stipend. However, fewer Grad A lines, not commensurate with the number of active research labs in DBS, are awarded every year.

The doctoral students expressed appreciation for the support provided to them by their mentors and DBS. Doctoral students were also thankful for the opportunity to hone their teaching skills. They did express a strong desire for gatherings aimed at building a stronger sense of community among DBS doctoral students. They also expressed interest in having a dedicated space outside of laboratories to meet as a group, use to prepare for talks, prepare manuscripts and thesis, and to interview for jobs.

Recommendations for Doctoral Program: The number of graduate students is too small to both advance the research and teaching mission of DBS. The review team recommends increasing the number of doctoral students in DBS. To accomplish this goal, the review team concludes that the number of Grad A lines should be increased in line with the number of research labs in DBS. We suggest increasing the Grad A lines because we conclude that it is unrealistic to expect faculty to fully fund doctoral students' stipends from years 2-5 given the teaching and service expectations for faculty in addition to the current funding climate for research in the US. Regarding students' requests, we recommend developing opportunities to onboard and maintain a sense of community for doctoral students in DBS. PhD students from DBS have gone on to good positions around the nation and have been just as successful as students graduating from top tier programs. We believe that these

additional investments and efforts would ultimately increase the research reputation and ranking of DBS, Lehman College and CUNY.

Master Programs: The master programs are organized and administered by DBS. Three different Master degree tracks are offered; 1) The 5-year BS-MA track for Lehman undergraduate students; 2) MA track; and 3) MS track. These Master's tracks at Lehman College are structured in a similar fashion as counterparts at other institutions. Students in the MS track carry out an independent thesis project at DBS, NYBG or Albert Einstein College of Medicine. This track provides partial financial support for approximately 5 students carrying out their thesis project at Albert Einstein College of Medicine. Master students can also receive financial support from serving as teaching assistants. However, these opportunities appear to be rather limited.

Three observations raise concerns about the viability of the Master's programs. First, there has been a significant drop in the number of students enrolling in the Masters programs. This can be partly attributed to students seeking other career opportunities during the pandemic. Second, many students fail to graduate. Third, the average time to graduation appears to significantly exceed the two-year expectation for the MA and MS programs. The latter two issues can be partly attributed to student's need to hold demanding jobs to support themselves and families due to the lack of financial support from DBS to spend most of the time on their coursework and research. The students explained that additional financial support is needed for these programs to be successful.

Recommendations for Master Programs: DBS is doing a commendable job of helping master students overcome the many obstacles they face (ex.: need to hold a full-time job) to complete their coursework and research thesis. Arguably, DBS is doing more than many schools in which students pay tuition and receive no financial support even though such schools likely have the financial means to support master students, and particularly MS students. Nevertheless, DBS should continue to look into reducing the long time to graduation and high drop-out rates. It is rather concerning that some MS students are taking over 5 years to graduate. While the review team recognizes that MS students cannot devote most of their time to their coursework and research, efforts should be made to identify avenues to reduce the average graduation time. It is arguably more critical to do so for an older MS student population with additional career aspirations. Thus, the review team recommends DBS works on: 1) reassessing research thesis expectations that include putting less emphasis on wet lab (in person) and more on computation-based projects. Their independent research projects could also be a hybrid of wet and computation-based work. These types of projects may allow students to accelerate their thesis work as they could work from home and even while in transit to a job; 2) identifying additional funding opportunities to support MS students. We recognize this is a very difficult task that may be easier to accomplish in collaboration with colleagues at both Albert Einstein College of Medicine and NYBG. We do believe DBS is already engaged in these efforts to better support MS and other master students.

Infrastructure and Maintenance

Animal Care Facility: The review team was asked to specifically comment on the Animal Care Facility (ACF). The ACF is a small laboratory in Davis Hall that is currently lightly used by two faculty members. A DBS faculty member manages the laboratory. For ACF to be used more widely would require hiring a manager with expertise in surgical procedures who would be able to manage the

facility as well as train and supervise novice undergraduate and graduate students. Currently, this level of service is not available, which limits the usefulness of ACF.

At many R1 and R2 institutions, a core animal care laboratory is very important for animal research focused faculty to obtain extramural funding because it provides the opportunity for translation of in vitro studies into live animal models as well as for instructional uses. From interviews of DBS faculty it was clear that the ACF is critical for the research of only two research faculty. However, it was not clear whether a full-service ACF (further investment in ACF) would catalyze more research that would lead to additional extramural funding with funds earmarked to support the ACF.

Recommendations on Animal Care Facility: The difficult decision on whether Lehman College should increase funding for ACF can be summarized as follows. First, at the current level of funding ACF appears to be sufficient to support the limited animal research in DBS. But this current level of funding will not provide the services that would attract greater use. Addition of a staff line to run the ACF may attract greater use, but this is not a certainty. Nor is an increase in the ACF operating budget certain to increase extramural funding, although it would provide faculty with greater opportunity to attract extramural funding, an opportunity that would not exist if the ACF were eliminated. It is more certain that offering a full-service ACF would increase the output of trained students.

The 10-year plan for the future of ACF detailed in the DBS self-study document (pgs 64-66) seems like a reasonable compromise approach. The advantage of the 10-year plan is that, if successful, the cost of ACF will ultimately be shared between Lehman College and DBS, presumably with DBS funding their portion through fundraising. The 10-year plan does require continued baseline funding of ACF by Lehman College while DBS undertakes fundraising activities.

Lehman College administration must weigh funding for ACF against other infrastructure expenses important to DBS research and training programs. If the decision comes down to a choice between different expenses it is the opinion of the review team that priority should be given to continue the diversity of biological disciplines that currently exist in DBS. Larger universities often divide biological subdisciplines into separate departments. However, given Lehman College's size there can be only one "biology" department with diverse subdisciplines represented that give students sufficient choices to pursue their interests. By this the review team means, funding for ACF should not come at the expense of maintaining the diversity of biological disciplines in DBS.

Greenhouses and Maintenance of Other Infrastructure: The review team was led on tours of greenhouses located on the roof of Davis Hall and the Science Building. It was explained that neither greenhouse is fully functional because of temperature control systems failures, broken windows, and missing portions of the roof. It was not clear to the review team why these issues have not been resolved given the centrality of the greenhouses to teaching and research at Lehman College.

Recommendations on Greenhouses: The review team strongly recommends Lehman College make a concerted effort to fix the greenhouse infrastructure problems. While we recognize that an initial significant financial investment will be needed to fix both greenhouses, this investment will put DBS in a stronger position to recruit new plant biologists, fortify ongoing collaboration with NYBG and serve as a much better teaching and training environment to students.

Laboratory Research Space Renovation: The review team learned that it can take longer than a year after new faculty hires arrive at Lehman College to prepare fully-functional laboratory space. We deem this a major problem as it impairs the ability of new hires to immediately begin to build their research program. New faculty are often given priority when applying for extramural sources of funding. The expectation of federal funding agencies is for junior faculty to demonstrate that they can drive a research project to completion as independent investigators, demonstrated in the form of peer-reviewed publications. Also, experiential learning is considered the gold standard for training of biologists. Individual faculty, in their functional laboratory space, offer the opportunities for meaningful experiential learning of both undergraduate and graduate students. Thus, the inability to start a research program immediately upon arrival at Lehman College is a short- and long-term net financial and academic loss for the faculty, DBS, Lehman College and students.

Recommendations to Speed Laboratory Space Renovation: We suggest that DBS leadership holds monthly meetings with the Dean in preparation for faculty searches to identify potential laboratory spaces and to prioritize the renovations needed to make the space functional. The review team also recommends that Lehman College leadership put more effort into advocating for the city/state to set aside funds to build the other half of the Science Hall building. Construction of this building would generate much needed teaching and research space, a major need to accommodate the growing biology community at Lehman College, and set the stage of Lehman College's aspiration for R2 designation and realization of the "90-by-30 Challenge".

Faculty Hires for Plant Sciences Ph.D. Program

The faculty in DBS play an extremely important role in teaching and attracting students interested in all aspects of biology, such as nursing, science communication (teaching), plant, microbial, and biomedical research, and medicine. There are 20 full-time faculty with 14 conducting research and the other 6 dedicated exclusively to teaching. DBS also has ~40 part-time adjunct instructors. DBS research faculty teach 18 hrs/year, mentor and advise students, and serve the institution in various ways. They also perform, manage, publish and submit grant applications to support the research activities in their laboratories. The undergraduate and graduate students we met shared positive impressions about the teaching and mentoring of faculty at Lehman College, and DBS faculty specifically.

Among research faculty in DBS, 9 are full, 2 associate and 3 assistant professors. The 11 senior professors (full and associate) have a demonstrable track-record of high productivity and accomplishments and the 3 assistant professors are already establishing themselves in their respective fields. However, there is serious concern that Lehman College may lose its spot as the go-to institution within CUNY for plant biology research. There are currently only 5 plant biologists (4 full and 1 associate professor soon to be promoted to full) in DBS. The lack of assistant professors studying plant biology could result in Lehman College losing this expertise, collaboration with NYGB, investments in the greenhouses, and the prestige it has built over decades.

Recommendations for DBS Faculty to Meet the Teaching and Research Needs of Lehman College: The recruitment of new assistant professors studying plant biology is essential for DBS and Lehman College to continue to maintain its collaboration with NYGB and pecking order as the top destination

for plant science at CUNY. This need is more critical given that all plant biology professors are either full or associate professors. The review team recommends the Dean and DBS develop a plan this year to hire at least two assistant professors working on plant biology. These hires should be made as soon as possible to provide ample time for them to establish their research labs and become integrated with the larger plant biology community in CUNY and NYBG before the next wave of retirement hits DBS. These new plant biologists should have expertise (ex.: biochemistry, medicinal chemistry, bioengineering, and development biology) to forge links with colleagues at and outside of Lehman College.