

External Evaluation Report  
in response to  
" Lehman College Chemistry Department 2020 Self Study Report"  
July 1, 2021

External Evaluators:

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## Introduction

This report includes impressions, opinions, and recommendations of the external evaluators, Dr. Omowunmi "Wunmi" Sadik (New Jersey Institute of Technology) and Dr. Lisa C. Klein (Rutgers University), based on their review of Lehman College Chemistry Department, which was held virtually on April 14, 15, 16, 23 and 28, 2021. The evaluators' overall impression of the Chemistry Department is strongly positive, demonstrating strengths and aspirations in critical areas. The major strengths noted include (1) Dr. Andrei Jitianu, an effective chair who exhibits visionary leadership, and (2) the strong support from the university administration, including The Provost (Nwosu), Vice-Provost (Brown), and the Dean (Mills). (3) there is a clear commitment to excellence in undergraduate teaching and research in the face of rapidly growing enrollments, and (4) there is evidence of faculty success in obtaining external funding, which includes grants from the National Institute of Health (NIH) and the National Science Foundation (NSF). Noteworthy is the R01 grant from the NIH received by Professor Kurtzman. In addition, Professor Lopez is a co-PI on an NSF CREST grant that provides funding opportunities for graduate students in collaboration with City College. Spearheaded by chemistry faculty, the College recently received an NIH RISE that provides research opportunities for undergraduates and helps train them in research methodology. Altogether, the total grants received by the department faculty was \$12,915,577 between 7/11/2012 to 9/20/2019.

The External Evaluators' overall "take-away" is that the Chemistry Department is an active department with strong undergraduate enrolments, an expanding number of concentrations, and a mix of faculty with research interests across the spectrum of fields in chemistry. The evaluators noted that the growth in enrollment over the past decade is remarkable, from 4 to 150. There has been tremendous growth in the last eight years, with the number of majors growing over 300% from 35 in Fall 2012 to 113 in Fall 2018. In addition, the newly developed Chemistry BA with a concentration in Biochemistry is attractive to Pre-Health students. The redesigned Chemistry degrees consisting of two BA and two BSc degrees in Chemistry and Biochemistry concentrations have directly helped raise the College's profile as a whole and has specifically been linked with Lehman's recent ranking as #16 "best pre-med programs in the country." The Chemistry Department is a model for the campus, which aspires to expand and grow.

The Chemistry Department has survived the unusual circumstances of this pandemic year with determination to serve its students. However, with the unprecedented growth and success, the immediate challenge for the Department is how to keep the momentum going without compromising educational and research quality.

There is a clear need to create a Strategic Plan (SP) that aligns with the current mission of the institution. The Strategic Plan for the Chemistry Department should be informed by referring to the three broad national models of departmental or institution function: a research-centric model, an under-graduate centric model (liberal arts), and a teaching model with opportunities for doctoral research. The SP should benchmark what type of institution they aspire to be and how they will achieve that. The Department can identify public institutions that it aspires to equal. Public institutions that serve a similar community can be used to see if there are any changes or revisions to the curriculum that need to be made.

\*Lehman college and Departmental Participants are listed under the appropriate sections.

## **1. Assessment Protocols and Curriculum**

The curriculum meets all requirements for American Chemical Society accreditation. The ACS accreditation process is demanding and thorough. A periodic review of the course offerings and course content is carried out by the Chair, the Curriculum Committee, and Department, and this level of rigor is commendable.

The assessments of student learning and educational goals are followed with similar rigor to the requirements for accreditation. The Chemistry Department is a model for the concept of the "flipped classroom." One strong indicator of how closely the faculty follow the assessment paradigm is the outstanding improvement of the pass rate for the so-called gateway courses. The pass rate is 80% in the gateway course, which indicates the students are acquiring the background and fundamentals they need to make progress towards meeting their educational goals. Even during the pandemic, the Chemistry Department has maintained its educational goals.

## **2. Faculty Resources**

The Evaluators met with faculty in 2 sessions. The first session was for junior faculty (Burton-Pye, de la Parra, Deri, McGregor, Wallace), and the second session was for tenured faculty (Kurtzman, Lopez, Mallikaratchy, O'Connor, and Jitianu). The junior faculty were enthusiastic and committed to chemical education. They talked about innovations they made during the period of online teaching. The junior faculty should be applauded for their attempts to humanize their teaching under less than optimum circumstances.

The junior faculty commented that they look to their Chair for mentoring. The review process for tenure is largely transparent. The junior faculty know what is expected of them in terms of teaching, research, and service. All of them know that research requires funding and

that actively disseminating scholarship in the form of journal articles is expected. Therefore, the attitude about the tenure process was positive.

The senior faculty described their experience for the last year as a period of recalibration. Most mentioned the loss of momentum in their research. Some found new outlets for their scholarship, such as writing a review article instead of a journal submission. The experienced faculty made comments about teaching during the pandemic similar to those of the junior faculty. The ability of the students to adapt to online learning varied between traditional undergraduates who expect face-to-face and non-traditional students who like the flexibility of online learning.

The tenured faculty had a perspective on changes in the Department over the past ten years. They commented that the atmosphere had changed dramatically, and the verdict was that the students now consider their time at Lehman as an excellent undergraduate experience. There are more opportunities for undergraduates to join research labs. The students are presented with more options and role models, which improves their ability to see themselves pursuing a chemistry-related career. Programs offered by the College and facilitated by the faculty such as RISE and Bridge Pre-health are helping students to see success.

While the faculty felt that they were on their own in terms of adapting during the pandemic, they were supplied with smartpens, which, compared to the home institutions of the visitors, was a generous gesture. If there was anything good that faculty could say came from the pandemic, it was that some business processes that in the past required hard copies were changed to allow soft copies. Since faculty always complain about bureaucracy, this has to be seen as a silver lining.

In general, the faculty is enthusiastic and dedicated to serving the student population, which is majority female and majority underrepresented minorities. This population is reflected in the diversity of the faculty.

There has been a radical transition over the past ten years. The enormous increase in students majoring in chemistry is a credit to the faculty. In line with this success, it is clear that maintaining this success requires all faculty to be actively engaged in teaching. While research is critical to keeping the faculty members fresh and relevant in their scholarship, their primary role is to bring that scholarship into the classroom and inspire students.

### **3. Student *Demographics and Achievements***

*Demographics:* Lehman College is a primarily undergraduate institution serving the local community. Nearly 80% of the students come from the five boroughs of NYC, and another 10% come from Westchester County. Forty-nine percent of undergraduate students are first-generation, and nearly 60% of undergraduate students and 43% of graduate students reside in the Bronx. Lehman currently enrolls about 15,000 undergraduate and graduate students. In 2018 alone, the College awarded 3,194 degrees; double the number awarded two decades prior. Of the 11,978 undergraduates, 52.5% are Hispanics, 30.3% are Black, and 6.9% are Asian.

Further, 68% are women, and the average age is 26. Of the 2,152 graduate students, 34.7% are Hispanic, 31.2% are Black, and 6.7% are Asian, and the average age is 34. Lehman has the highest extended mobility rate (American Council of Education, measured as the fraction of students who come from families in the bottom two income quintiles and end up in the top two quintiles as adults, among all Hispanic-serving institutions.

*Meeting with students and recommendation:* The Evaluators met with undergraduate students (German Sosa Senu, Zazneen Zahin (Biology major), Alfusainey Samatec (Chemistry major), and Ezekiel Olumuyide (senior Chemistry major), and Jaamal Lake (Mechanical Engineering major). Students were asked about their impressions of the Department, their strengths, and areas that need improvement. All the students have taken several chemistry courses and have served as learning assistants. While the students often refer to themselves as TA's, it is important to distinguish between the graduate workers who are formally TA's and the undergraduates who serve as peer-mentors and undergraduate teaching assistants in classes. Several of the undergraduates have assisted in Chemistry courses for two years or more. Some of the students had also helped in the Biology and Physics departments, giving them a broader view of these other departments than Chemistry. The students expressed a positive impression of the program, citing the support they receive from faculty and staff. However, some concerns were raised with specific program requirements. These included (1) occasional lack of elective courses offered in particular tracks and (2) concerns with building infrastructure such as an unreliable elevator.

Overall, the students love being Chemistry majors and the research opportunity available to students. The best thing, in their opinion, is the support they receive from the Chemistry faculty and the individualized support given to each student. One student expressed the opinion that "the faculty listen, they just don't focus on academics. They give personal support." Two students mentioned Professor McGregor by name. One said, "When I was teaching Organic Chemistry, Dr. McGregor will create time for you. Not just the faculty, even the staff, the laboratory techs, and the secretary." Another opined, "Professors are always ready to listen to you. It feels like a family environment." Yet another noted, "professors are very approachable. This makes the other students want to help." One student compared the Chemistry Department to another science department where they had served as a student learning assistant. Peer-mentoring is widely available in Chemistry.

Here are the areas of improvement that were raised.

- Some students noted that people still have old ways of teaching. They requested that professors transition to using modern teaching tools and classroom technologies such as I-Clickers, and videos.
- Students suggested the Department offer more electives such as Pharmaceutical and Environmental Chemistry and have workshops and worksheets. One student noted, "I wish Chemistry had more electives I could take. I personally finished my Chemistry requirements in Year 3, but nothing else to do."
- Another idea is to create a journal Club where Chemistry faculty and students can meet to discuss papers. One student noted that the Department has colloquia, and sometimes the topics are interesting, but the Department colloquia do not really prepare a lot of people.

One noted that the colloquia topics are really boring, but a journal club can broaden the relevance to Chemistry.

- It was pointed out again that the elevators are not available to students. One noted, "in Davis, if the elevator works, it is slow."

### **Students Achievements**

The Chemistry Department hosts an annual Sweeney Lecture where departmental awards are given to students. Students have also won awards outside of the Department, both within the larger CUNY system and nationally. Examples include the 2019 Paul & Daisy Soros Fellowship for New Americans (Sana Batool), the 2019 ACS Division of Inorganic Chemistry Undergraduate Award in Inorganic Chemistry (Edruse Edouarzin), and the 2016-2018 Jeanette K. Watson Fellow, Watson Foundation (Hilliary Frank).

## **4. Facilities and Staffing**

The Chemistry Department occupies two buildings. There is a dedicated staff of four well-trained technicians (Amarante, Elhakem, Gafur, Girgis). Especially during the pandemic, the staff stepped up and provided help in training students, providing PPE, and maintaining the database of individuals cleared to return to research. In addition, the staff prepared videos for proper procedures and generally kept the buildings in working condition. Three labs with negative pressure were available to run some face-to-face labs in Spring 2021.

These four technicians, with some help from 2 gap-year seniors, exhibited great teamwork during the past 18 months. In addition to facilitating the academic program through the coordination of the labs, the technicians also assisted with purchasing and other financial matters. The work of the technical staff is commendable. Given the need to staff two buildings, an additional staff member would make it possible for the staff to better support the work of the faculty and the research students.

## **5. Leadership and Governance**

The Provost (Nwosu) and the Vice Provost (Brown) met with the visitors. While there has been some turnover in the senior administration over the recent years, there is a clear mission for the campus. In addition, Lehman College is well-positioned within the City College system as a Master's Comprehensive College.

The Office performs periodic program reviews. The Office has identified 12 focus areas selected on the basis of program effectiveness. Any new programs are considered on the basis of feasibility, need, and regional workforce requirements.

The Provost's Office is aware of the stature of the Chemistry Department and its excellent reputation within CCNY. Some highlights of the Chemistry Department noted by the 'Provost's Office was the Sweeney Memorial Lecture, the Louis Stokes Alliance, and their pioneering efforts in experiential online learning. Also, the 'Provost's Office noted the high success rate in

the so-called Gateway Course, specifically General Chemistry, giving credit to the Chemistry Department for its excellent pedagogy in guiding students through these courses on the way to their chosen majors and careers.

The Evaluators met with the Dean of the School of Natural and Social Sciences (Mills). The Dean is very aware of the activities in the Chemistry Department, having been its former Chair. The Dean has a pragmatic plan for the Department and sees the Department leading the way for the campus to recover after the pandemic. The Dean is realistic about the Department's aspirations to be an outstanding regional student-serving department aligned with the aspirations of the campus. While the expectation is that the chemistry faculty members have active research programs, the faculty tend to be strategic and emphasize research that engages undergraduates and prepares them for graduate and professional schools. Collaborations with research-intensive universities and institutions in the area are encouraged, and the faculty members take advantage of their geographic proximity to major medical centers. The Dean is adept at maintaining morale for young and experienced chemistry faculty members. In addition, the Dean aims to facilitate interdisciplinary activities in the School of Natural and Social Sciences, such as an environmental summit on Climate Justice.

## **6. Recommendations and Next Steps**

The Chemistry Department has experienced remarkable growth in its number of majors. Continued growth to a total of 200 majors is planned. When new resources are available, the following options should be considered:

- This growth needs support from the Dean and the Senior Administration. This support should be both financial and an increase in personnel.
- The steps to strengthen and sustain the Chemistry department should be incorporated in a Strategic Plan. A Strategic Planning Process should be initiated in the near future, involving input from all constituencies, faculty, staff, students, and alumni.
- Some strategic hires of faculty in the next few years seem to be in order. This can bolster the strengths in the Department in analytical chemistry and biochemistry.
- Benchmarking is a valuable exercise. The Department can identify public institutions that it aspires to equal. Public institutions that serve a similar community can be used to see if there are any changes or revisions to the curriculum that need to be made.
- As a next step, the Department can review what was learned during the pandemic. Any useful lessons learned during the pandemic can be implemented even when the campus returns to face-to-face classrooms. The pandemic has created the incentives to develop new teaching videos, you-tube channels of video-taped labs, and training materials. Some of these could be published in video journals such as Jove.
- The increasing enrollment should be supported with at least two full-time technicians. This will alleviate the need to split between two buildings and to cover all lab courses when someone is sick or on leave.

## ***Conclusions***

Overall, the Department has experienced tremendous growth in the last eight years. The Department has a visionary leader and enjoys the support of the upper administration. The faculty is enthusiastic and dedicated to serving the student population, primarily female and majority underrepresented minorities. The faculty and staff have the benefit of a collegial and collaborative environment. The students expressed a positive impression of the program, noting their support from faculty and staff.

The redesigned Chemistry degrees have directly helped in raising the profile of the College as a whole. The Chemistry Department needs to benchmark its program by creating a Strategic Plan and identify public institutions that it aspires to equal with respect to research and curriculum development. The increasing enrollment should be supported by additional hires in faculty and dedicated staff.

Signatures of Evaluators:



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Omowunmi Sadik, Ph.D.

Date: June 28, 2021



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Lisa C. Klein, Ph.D.

Date: June 28, 2021