Recommendations on the Organization of the Doctoral Programs in the Natural Sciences

February 2015

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The Graduate Center
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I. Introduction

On October 29, Chancellor Milliken informed CUNY presidents and deans that he had asked the President of the Graduate Center to submit recommendations concerning 'policies, administrative structures and strategies' that would address current challenges and foster the future growth of doctoral programs in what is called locally the 'bench sciences' (Biology, Biochemistry, Chemistry and Physics). Between November 11, 2014, and January 5, 2015, President Chase Robinson met with the leadership, faculty and students of 10 campuses, usually accompanied by Professor Laurel Eckhardt (Executive Officer of the PhD program in Biology) and Ms. Jane Herbert (Chief of Staff). A variety of material was also consulted, including reports, program reviews, student surveys, and CUNY and national data.

The challenges to ensuring that CUNY establish and maintain excellence in the natural sciences are many. Chief among them is improving upon its PhD programs in Biology, Biochemistry, Chemistry and Physics, which stand at the heart of any university's scientific enterprise. The report that follows is based upon such consultation and research as time has allowed. The future of the PhD programs having been clouded for too long, what is urgent is that we clear away uncertainty about governance and administration; identify strategies that will ensure in the middle and long term that CUNY and New York City are served by programs of genuine distinction; and implement, as soon as possible, specific changes that will set us on that path in short order.

The result of this consultation and research can be summarized in 7 recommendations.

1. The consortial model should be retained and strengthened.
2. The cap on cohort size for CUNY Science Fellows should be raised, subject to financial commitments from participating colleges and the Advanced Science Research Center (ASRC).
3. Recruitment and admissions to the 4 doctoral programs should be revamped to accommodate campus needs and leverage campus resources.
4. In order to attract higher quality applicants and concentrate student attention upon research, stipend levels should be increased to $30,000, and the ceiling on student teaching reduced to 4 contact hours per week.
5. During the spring and fall semesters of 2015, the Executive Committees of Biology, Biochemistry, Chemistry and Physics should undertake curriculum reviews, which focus especially upon first-year rotations and course offerings for those intending to pursue non-academic careers, and accelerate reviews of faculty membership.
6. The Graduate Center should strengthen its role in teaching and training in the sciences.
7. A CUNY-wide Oversight Committee for the Bench Sciences should be established.

II. General discussion

It is self-evident that fundamental and applied research in the sciences is crucial to New York State, New York City and the City University of New York. How, specifically, CUNY is to foster excellence in Biology, Biochemistry, Chemistry and Physics has been the subject of reports submitted in October 2004 and April 2006, in addition to regular program-specific reviews. This report, like its predecessors, documents CUNY's ongoing commitment to these 'bench sciences' and proposes 7 recommendations that are intended to address current challenges and accelerate future growth.

Unlike traditional modes of scholarship in the humanities and most social sciences, in which scholar-teachers carry out research individually, both the quality and quantity of *scientific* research are very closely tied to PhD training: research scientists in universities carry out their work *with* the graduate students enrolled in PhD programs. Insofar as all scientific research is now collaborative, this is true for all fields, but it is especially so for large labs that rely upon federal funding. To sustain a steady stream of research, such lab-based scientists must rely upon a steady stream of high-quality graduate students.

The size and quality of PhD programs are thus crucial to CUNY's scientific enterprise. And the higher the quality of CUNY's PhD programs in the experimental sciences, the greater will be grant activity, which has seen only a modest increase during the 'decade of the sciences' (see Appendix 1).

In 2008 several reforms were introduced in order to address concerns with quality. These included guaranteed 5-year funding packages, stricter admission standards, cohort caps, and limits on the teaching to be carried out by students in years 2-5; responsibility for student support (stipends, tuition remission and subsidized health insurance) was divided between the University, the Graduate Center (GC), faculty mentors and participating college campuses. The four programs continued to operate through a consortium centered at the Graduate Center, but City College and Hunter College were formally recognized as joint partners in offering the degrees.

The data are provisional, but they show that these reforms have been a partial success. The GRE scores of incoming students have risen (see Figure 1); attrition and graduation rates are mixed (see Table 1), but may show some improvement.

Figure 1: Average GREQ Percentiles of Incoming Students

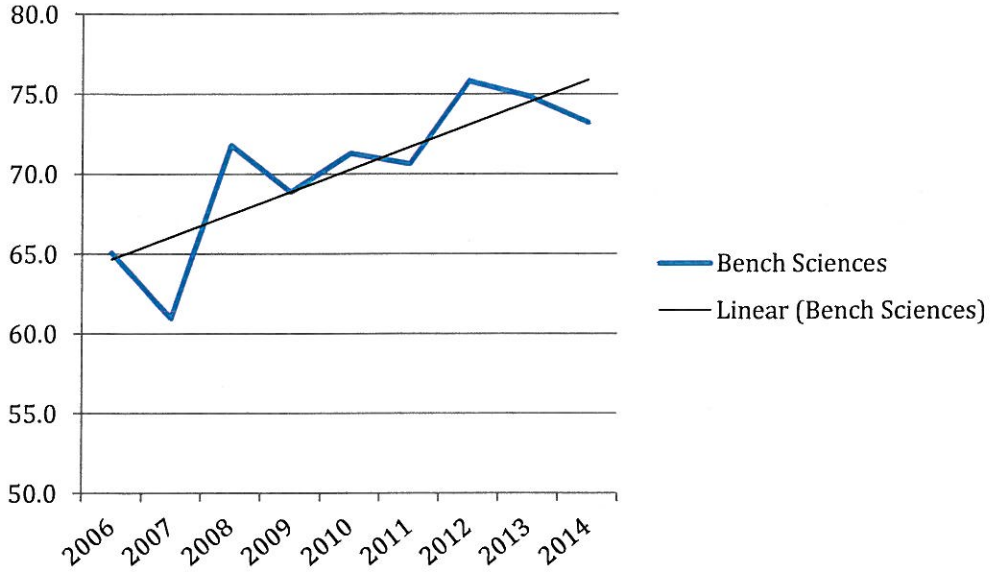


Table 1: Bench Science Attrition and Graduation Rates

Cohort by year of entry	3-year attrition rate	5-year graduation rate	6-year graduation rate
Fall 2005	22.4%	15.3%	34.1%
Fall 2006	9.1%	13.6%	34.1%
Fall 2007	17.4%	16.3%	29.1%
Fall 2008	19.0%	9.5%	41.7%
Fall 2009	15.2%	12.0%	n/a

Notes:
3-year attrition rate is the percentage of students who are no longer enrolled the beginning of the 4th year, but have not graduated.
5-year graduation rate is the percentage of students who earned a doctoral degree within 5 years.
6-year graduation rate is the percentage of students who earned a doctoral degree within 6 years.
Source: Cohort Tracking File.

It should also be said that the postgraduate employment of the first cohorts of students is promising (see Appendix 2), and that student satisfaction across all 4 programs is very high (89.7%), exceeding by 0.5% the GC average. The data show that 72.3% of students would recommend their program to others (Appendix 3).

The rankings of the National Research Council were released in 2010 on the basis of data collected in 2005-6; were they to appear now, there is no doubt that the 4 CUNY programs would rank higher, if only because of the introduction of 5-year guaranteed funding (see Table 2).

Table 2: National Research Council's Assessment of Research-Doctorate Programs Graduate Center Rankings by Cluster, 5th and 95th Percentile

Program (# of programs ranked)	Regression-based (R)		Survey-based (S)		Research Activity		Student Support & Outcomes		Diversity	
Sciences										
Biochemistry (159)	91	144	92	142	124	153	55	130	2	2
Biology (120)	30	63	55	100	41	99	106	117	3	10
Chemistry (178)	108	170	101	155	104	160	99	164	4	10
Physics (160)	54	123	125	153	121	152	109	149	8	31

Notes:
R-weight rankings: Sample of faculty in each field rated a sample of programs. Related those ratings to 20 program variables through a regression (R-weights for 20 variables).

S-weight rankings: Faculty identified program variables (out of 20) that they though were important to the quality of a doctoral program and NRC developed weights based on their selections.

R and S weights were applied to programs' values on the 20 variables to create R and S rankings.

While some progress has been made, there is a strong consensus that the project is ongoing, especially given CUNY's investments and New York City's emergence as a center of entrepreneurial science. Despite some considerable variation, it is fair to say that, relative to the Graduate Center's PhD programs in the social sciences and humanities, many of which have acquired national and international reputations over the last 20 years, or to the relevant science programs in research-intensive universities, the programs in Biology, Biochemistry, Chemistry and Physics continue to lag.

Beyond the need for additional resources and a strong sense of resolve, however, there has been no corresponding consensus about how this progress is to be achieved. In fact, wide consultation has surfaced an almost equally wide variety of views—both between and within programs and campuses—about current challenges and future opportunities. Diversity is one thing, outright disagreement another, of course; there is more of the former than the latter.

The reforms of 2008, which had the effect of imposing a strong measure of uniformity, were long-needed; their positive effects are discernible in the data. Even so, one of the clearest lessons learned in this review is how much the programs differ. Standards and centralized coordination must now be balanced with program flexibility and campus buy-in.

At the risk of oversimplification—but in the service of clarifying the diversity of views that have been expressed—one can summarize as follows:

I. All or some of the current PhD programs should emigrate from the GC to campuses that have sufficient resources, faculty and strategic resolve, with the degrees offered individually, jointly, or consortially at multiple campuses. The change, it is proposed, would more closely align doctoral granting authority with

the loci of laboratory science, improving admissions and doctoral training. The GC-based consortium would be downsized or dissolved. (Cf. III below.)

II. The current consortium should be preserved, but joint degree-granting authority should be expanded beyond City College and Hunter. The change would recognize the scale of participation and investments that have been made on other campuses, raising their visibility and stature, and facilitating placement in their labs.

III. New PhD programs should be established, some in collaboration with, and others independent of, the GC; these would operate alongside pre-existing programs. Scientific research is constantly evolving, and current and future needs of campus departments and the ASRC need to be accommodated.

IV. Whatever the administrative arrangements, the cap on student numbers (currently 90) needs to be lifted, particularly for Physics. Campus labs have surplus funding capacity, it is argued; and faculty, both funded and early stage, need more students to carry out their work. Since capacity is growing, so, too, will the appetite for students.

Scant support was voiced in favor of (i), which was widely regarded as impractical, inefficient and inappropriate for CUNY: approvals would take years; varieties of duplication would be costly; the quality and diversity that come from University-wide scale would be lost; and the potential for cannibalism (of faculty and students) would grow. (See Recommendation 1.)

Support for (ii) was deeply felt, if not widely spread; not surprisingly, it is concentrated in those campuses that contribute substantially to doctoral teaching, but are not recognized, along with City and Hunter, as partners in offering the degrees. (See Recommendation 1, and, on the question of approvals, Recommendation 7.)

Several new degrees are in various stages of discussion at some colleges and the ASRC. Since scientific research is protean, and considerable investments have already been made in faculty with emerging expertise, the time has come to construct a framework for evaluating proposals for new degrees that *complement* pre-existing programs (iii). Even if based upon generous external funding, such new programs will require institutional resources, and the potential for conflict with pre-existing programs should be minimized. (See Recommendation 7.)

Very strong support was voiced in favor of (iv). It follows that enrollment should increase incrementally, subject to the availability of funding. (See Recommendation 2.)

Another point, rather less often articulated than the need for more students, should be emphasized here. PhD students do not merely constitute a labor-pool for laboratories.[1] They are a collective investment in the project of creating, testing and transmitting

[1] It is regrettable that the Review of Chemistry (see Appendix 6c) reported that some students 'described being treated like employees instead of students while serving as TAs.'

knowledge, be it applied or theoretical; as such, students are a community of individual talents that should be trained, nurtured and educated. The PhD programs need to grow in size and, provided the case is persuasive, in number, but a commitment to fostering educational goals—of rigor, creativity and originality—must accompany that growth. Recommendations (5) and (6) speak directly to this imperative.

What is needed, in sum, are PhD programs that serve science, students and faculty by leveraging and balancing CUNY's scale with campus-specific strengths, resources and aspirations. The recommendations that follow thus call for increased investment, coordination and flexibility within the consortium.

III. Specific recommendations

1. *The consortial model should be preserved and strengthened.*

The consortial model allows for faculty at multiple campuses to contribute to PhD programs that are administered centrally and governed academically at the GC. As already noted, wide consultation surfaced relatively little support for the view that it should be diluted or abandoned. In fact, it is commonly observed that the consortium, despite its drawbacks, efficiently leverages what is arguably CUNY's single greatest differentiating asset: its scale. It is noteworthy that 79.5% of respondents to a recent survey of bench science students reported that the wide variety of potential supervisors was an important factor in choosing CUNY (See Appendix 4). This is one of many illustrations of a general pattern that emerged in our meetings: campuses have distinctive needs and cultures, which need to be cultivated, but the whole of CUNY science is greater than the sum of its parts.

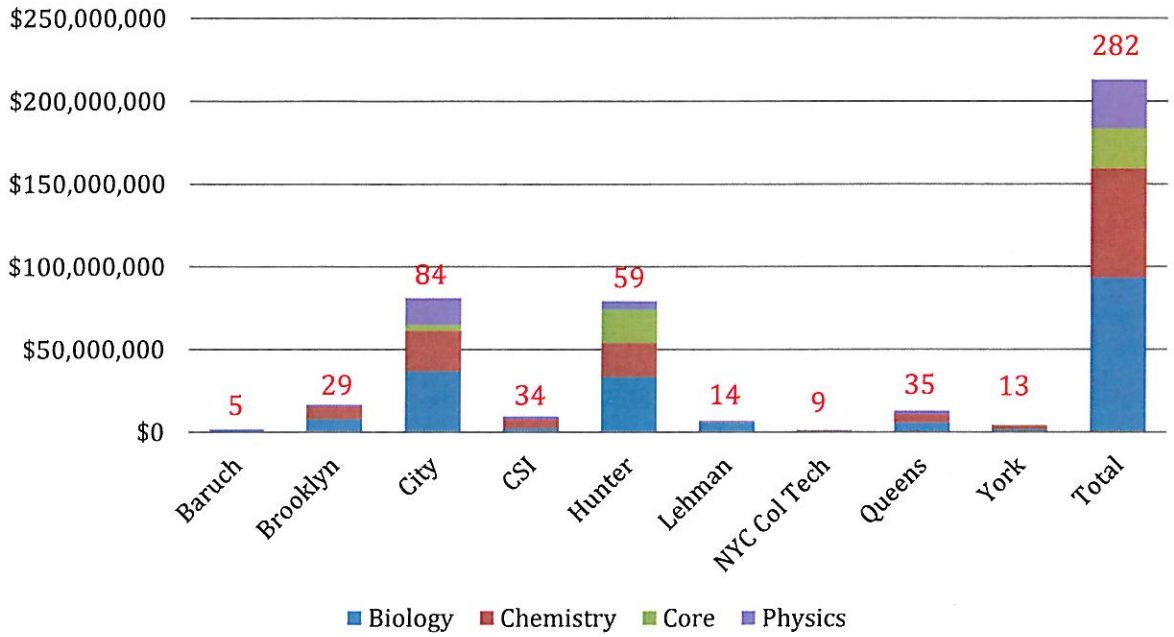
To judge from internal responses and the external reviews of individual programs, which frequently call for coordination, cross-campus partnerships and the like, the 'Report of the External Committee on Doctoral Education in the Sciences' (2006, see Appendix 5) was correct in endorsing the consortium. But CUNY has done too little over the last decade to *strengthen* the consortium.

Given the scale and scope of campus strengths and investments, 'strengthening' does not mean 'centralizing'. Instead, a variety of steps should be considered to improve procedures, communication, and the personal and institutional connections that constitute the consortium. Several of the recommendations that follow are intended to achieve precisely these goals.

One issue, which has both practical and symbolic effect, should be addressed here.

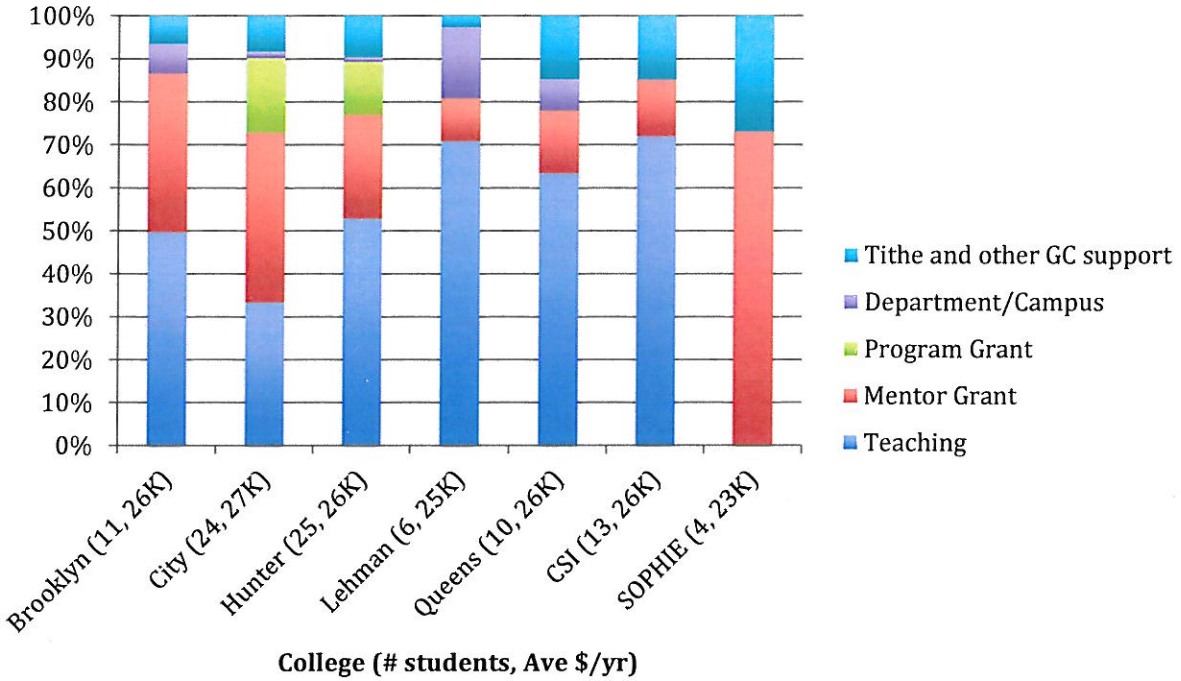
The data on grant funding shows a clear disparity between City College and Hunter on the one hand, and Brooklyn College, Queens College, and the College of Staten Island on the other (see Figure 2). The other participating colleges lag very far behind these three.

Figure 2: Total Bench Science Grant Funding at CUNY Senior Colleges 2008-2012
Number of Faculty



In most cases, this difference is also reflected in sources of student support (teaching vs. grant funds). And one can also see in Figure 3 that grant support for students at Brooklyn is similar to that at City and Hunter, but the number of students there is much smaller.

Sources of Student Support 2014-15
(for CSS Biology 2010-2013 entry = Years 2-5)



College (# students, Ave $/yr)

The data thus document how joint doctorate-granting authority is grounded in quantifiable measures. Put another way, long-term investments in hiring research-active faculty at City and Hunter were formally acknowledged in 2008.

This said, especially at a moment when investment is required, the question of doctorate-granting authority should be revisited. In support of campus aspirations to raise visibility, facilitate recruitment and foster grant activity, *it is proposed that the CUNY-wide Oversight Committee for the Bench Sciences (7) establish criteria and consider proposals from campuses seeking joint-doctorate granting authority.*

2. *The cap on cohort size for CUNY Science Fellows should be raised, subject to financial commitments from participating colleges and the ASRC.*

The reforms of 2008 established a cap of 90 incoming students. Although in some years matriculating numbers have been short of the 90 (the average is 88), in 2014 the cap of 90 was reached, with 9 students occupying a newly established 'neuroscience' track that is shared by Biology and Psychology. Three-year attrition rates for the 2008 and 2009 cohorts were 19% and 15%.

Conventional wisdom seems to hold that the 90-student ceiling is much lower than the unregulated enrollment numbers pre-2008. The fact is that the cohort size is slightly higher: the 2005-2007 average was 86 students.

Even so, in terms of enrollment, CUNY's PhD programs in Biology, Biochemistry, Chemistry and Physics remain small relative to leading research universities, where the student-faculty ratio is often 2:1. A collated list of faculty shows an overall ratio of 0.86

student per faculty member, a calculation that does not count faculty from affiliated institutions. It appears that the shortage of students is felt most acutely in Chemistry, Biochemistry and Physics. As campuses have hired over the last decade, the misalignment between student and research-active faculty has grown.

Here it is important to note that the demand for students is due to grow substantially. The primary driver will be the ASRC, which may draw to its labs as many as 15-20 students annually; other drivers (increasing appetite for neuroscience and theoretical science, for example) may also increase the pressure.

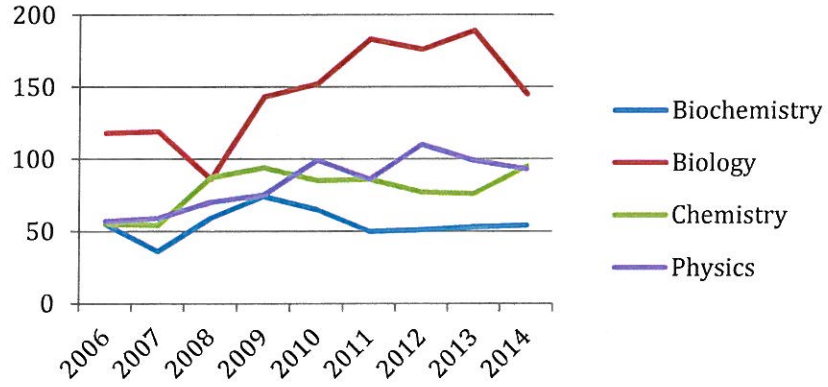
The growth in enrollment should be incremental because the costs, especially in combination with increased stipend levels (see below), will be considerable. Appendix 7 provides some sample costings at current or enhanced CSS levels, but less expensive alternatives are possible.

3. *Recruitment and admissions should be revamped to accommodate campus needs and leverage campus resources.*

Admissions to PhD programs should be highly competitive so as to attract a population of students that is academically talented, accomplished and diverse by a range of appropriate measures.

Application numbers are sensitive to broader economic trends, but the effect of the 2008 reforms is clear: in 2007, the 4 programs received a total of 268 applications, and in 2013 they received 417. But not only has growth peaked (387 applications were received in 2014), but it is also inconsistent: Biochemistry has remained flat (see Figure 4).

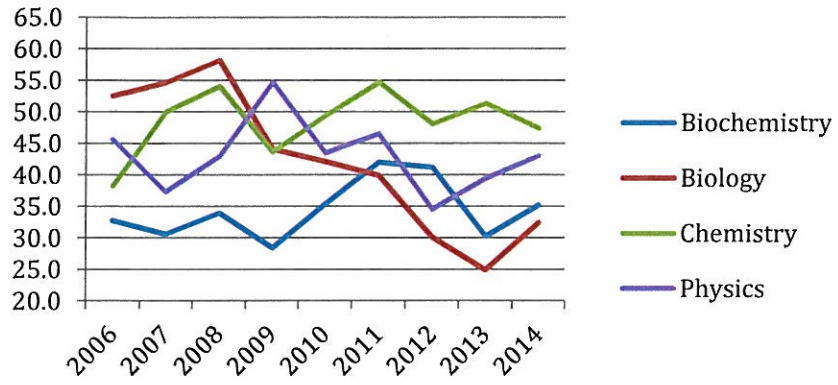
Figure 4: Bench Science Applicants by Program



Relative to other doctoral programs, acceptance rates compare poorly. In 2014 the GC average in the humanities was 18.6%, and in the social sciences 16.4%. Rates are higher for most of the sciences (a notable exception being Mathematics); those for Biology, Biochemistry, Chemistry and Physics range from 32.4% to 47.4%, with an average of 39%.

Trend data can be found in Figure 5 below.

Figure 5: Bench Science Admissions Rates by Program



Comprehensive national data are hard to come by, but data from the websites of a sampling of prestigious public and private graduate schools (e.g. Duke, Michigan State, University of Washington and UT Austin), show that acceptance rates in the bench sciences generally range between 20% and 30%.

If there has been some modest improvement in admissions performance since 2008, funding (see below) and coordination have been inadequate. The 'Report of the External Committee on Doctoral Education in the Sciences' (2006) called for a committee of 'research-active faculty, not executive officers or other administrators' to 'govern' the admission process, but this recommendation was not implemented. As pointed out in the Review of Biology, recruitment funds have historically been paltry; they have since been increased to about $25,000 (for all 4 programs), a sum that remains relatively modest.

In the absence of committed, sustained and coordinated recruitment strategies that directly engage research-active faculty on the campuses, investments in enhanced financial aid, faculty salaries and startups will be less than fully effective.

What is needed are:

- marketing and recruitment practices *that promote CUNY science, program breadth, and specific campus strengths* (e.g. enhanced websites; funded faculty recruitment attendances and visits; funded student visits to the GC and campuses).

These practices need to work in tandem with:

- admissions practices *that ensure overall program quality and diversity, and align with laboratory-specific opportunities on the campuses.*

A discussion paper concerning admissions is appended to this document (see Appendix 8).

To coordinate these enhanced efforts, the GC should appoint a Science recruitment and admission officer who, working under the direction of the Office of Admissions and PhD programs, will be responsible for implementing policies for promotion, recruitment, admissions and orientation.

Costs should be shared by the University, the GC, participating campuses, and also non-CUNY institutions where CUNY students carry out research, such as the American Museum of Natural History, the New York Botanical Garden, and Sloan Kettering.

4. *In order to attract higher quality applicants and concentrate students upon their research, stipend levels should be raised, and the ceiling on student teaching during years 2-5 lowered from 8 to 4 contact hours per week per semester.*

4.1 *Stipends*

The current stipend level is $25,000, although survey shows that average earnings are about $26,000. This stipend is some $5,000 to $7,000 lower than comparable programs in New York City. As such, it functions as a strong disincentive for candidates offered admission, and creates financial burdens for enrolled students, who in some cases must take on additional teaching obligations. It follows that stipends should be raised to $30,000, with regular cost-of-living increases thereafter.

The additional costs will not be inconsequential, especially when combined with the increased enrollment recommended above. The increase in stipend level will need to be incremental; awarding bonuses to incoming students might provide a fillip for admissions. In any case, the additional costs will need to be shared (see Appendix 7).

4.2 *Teaching*

Time to degree is a function of several variables, including student preparation, maturity, and the quality and attentiveness of supervision; but the burden caused by teaching assistantships, grading and the like is arguably one of the most important of these variables. Data show that the time to degree of CUNY bench science graduates lags that found in universities of very high research activity (see Table 3), and where, naturally, lab funding is more generous. The most innovative programs (e.g. in Comparative Biology at the American Museum of Natural History) are 4 years in length.

Table 3: Median Time to Degree in Years, 2008-2011

	CUNY Graduate Center	All Very High Research Activity Universities
Biochemistry	6.1	5.7
Biology	6.1	5.7
Chemistry	5.5	5.3
Physics	6.4	6

Source: NORC at the University of Chicago special analysis (2012).

The reforms of 2008 imposed an 8-hour ceiling upon teaching in years 2-5.[2] Survey data shows very considerable variation across the programs (see Table 4 and Appendix 4). Here it needs to be emphasized that the ceiling limits *contact* hours, each of which requires comparable time out of the class or laboratory. The average across the programs is 11.9 hours, but physicists report spending 15 hours per week in preparation, grading and teaching. This scarcely promotes concentration upon research.

Table 4: Teaching Hours by Program

	Number of Respondents		Among Those Teaching	
	Not Teaching	Teaching	Prep Hours	Contact Hours
Biochemistry	9	4	3.0	5.3
Biology	39	33	5.9	5.4
Chemistry	19	16	3.3	5.8
Physics	18	25	7.7	7.3
Overall	85	78	5.8	6.1

The deployment of Grad Bs, which allow for a maximum of 120 teaching hours per year, should be encouraged.

It needs to be emphasized that reducing contact hours, which in some cases will result in additional costs to faculty grants and campuses, does not signal a diminished commitment to teaching as part of students' professional development. Teaching training must remain an important component of the degrees, supported by the Graduate Center's soon-to-be-established teaching center.

5. *During the spring and fall semesters of 2015, the Executive Committees of Biology, Biochemistry, Chemistry and Physics should undertake curriculum reviews, which focus especially upon first-year rotations and course offerings for those intending to pursue non-academic careers, and accelerate reviews of faculty membership.*

Ongoing attention to the shape and content of the curriculum is one sign of healthy doctoral programs. It is recommended that the appropriate faculty committees concentrate their attention on three matters, forwarding their proposed changes to the GC's Structure and Curriculum and Degree Committees no later than November of 2015.

5.1 *Rotations*

The reforms introduced in 2008 prescribed that all first-year students follow rotations, which were intended to provide breadth of training and surface opportunities for research. To judge from comments, reviews and survey data, the pedagogical and

[2] The concept of introducing first-year teaching was raised, but it was expressly rejected in the 'Report of the External Committee on Doctoral Education in the Sciences' of 2006; it appears to be outside the norm of research-intensive universities, and is in any case incompatible with other academic goals.

research utility of these rotations is a matter of dispute, both in principle and in practice. 62.3% of student respondents reported that the rotations were useful, but they appear to suit the life sciences (e.g., Biology) far more than Chemistry and Physics, as the Review of Chemistry points out (see Appendix 6c).

5.2 *Credit and non-credit course offerings for those considering non-academic careers*

In academic matters, student survey data is generally positive and comparable with GC-wide results. There is a striking exception, however. While 73.5% of current students are considering non-academic careers, only 30.3% report satisfaction with the preparation they receive by their program for such careers, a figure that is nearly 15% lower than the GC average (see Appendix 3).

5.3 *Faculty membership*

Faculty membership should correlate closely with participation in teaching, supervision and grant activity. Outsized membership dilutes quality and disadvantages programs in national rankings and admissions.

Policies regarding appointment to doctoral programs vary from one to the next, but GC governance prescribes regular reviews of faculty membership.[3] The unpopularity of such reviews is overstated, and their effectiveness is understated. For example, in the fall of 2013, the Biology program undertook a review of its faculty, and of the 177 members reviewed, 47 (27%) were not renewed; only 3 of the non-reappointed faculty contested the result.

Recent discussions, undertaken by the Subcommittee (of the Doctoral Science Programs Steering Committee) on Criteria, are memorialized in a document (attached) that proposes criteria for faculty membership (see Appendix 9).

6. *The Graduate Center should strengthen its role in teaching and training in the sciences.*

Setting aside the question of rotations that needs to be resolved (see above, Recommendation 5), there is reason to think that the original design of a shared, first-year experience is at least partially endorsed by students: 76% of student respondents agreed that the first year helped create a sense of community for their cohort (see Appendix 4). The social and academic benefits of this first year could certainly be enhanced, especially (but not exclusively) through the use of technology that would allow for core courses to be delivered at the GC (e.g. in MCD), along with team-taught classes.

It is also the case that the GC has played too minor a role in fostering a robust academic culture—especially of interdisciplinarity—for those students and faculty in the 4

[3] See Governance of the Graduate School of the Graduate School and University Center, 3.5D ('a continuing review of the faculty of the University relevant to that program'), 6.1C and 6.1D (the latter prescribing generic criteria for 'nomination to, and continuance on, that faculty').

programs who wish to complement the lab-based work they carry out on campuses. The GC is underutilized as a centrally located resource for students and scientists.

The Graduate Center's role should not be limited to such support, however. Across the PhD programs at the GC, there is a positive correlation between the quality of a given program and the size of the GC-based faculty. In other words, within the distributed model that is the consortium, a strong *academic* presence is required at the center. As good an example as any comes in Mathematics, which has a long and distinguished tradition that is due, in large part, to the powerful collaboration of campus faculty and a relatively small, but very accomplished group of GC-based faculty.

For obvious reasons, much (but not all) lab science cannot be accommodated at the Graduate Center. By contrast, scholarship in a variety of theoretical fields, within Biology, Chemistry and Physics, can thrive. One faculty appointment has already been made, and discussions are underway for further appointments in Biology and Physics. Theory and experiment cross-fertilize, of course. In sum, the larger the presence of *scientists doing science at the GC*, the stronger the PhD programs, especially in Biology and Physics.

7. *A CUNY-wide Oversight Committee for the Bench Sciences should be established.*

In order to maximize the likelihood of success of the recommendations made in this report, foster innovation and excellence in both science education and research, and provide a forum for consultation for University approvals (when required), a University-wide body is needed. This committee would complement campus-based and GC governance bodies.

More specifically, the proposed Oversight Committee, which would report to the Chancellor, would monitor, through the use of appropriate metrics, the effectiveness of the measures proposed in this report; develop methods for calculating admissions cohort sizes (based on relevant data such as faculty membership numbers, grant funding for student support, etc.) and for establishing cost-sharing among the campuses, the PhD Programs, and Affiliated Institutions with respect to student recruitment, first-year funding, and professional development efforts/events;[4] and provide recommendations for approval (when appropriate) to the Chancellor regarding degree-granting authority and the creation of new degree programs.

Membership might include the following:

The President of the Graduate Center (ex officio)
The Vice Chancellor for Research (ex officio)
The President of the Research Foundation (ex officio)
1 CUNY President (or his/her delegate) (as appointed by the Chancellor)
2 Distinguished and research-active Professors (nominated by the science programs and appointed by the Chair)

[4] 'Affiliated Institutions' would include any non-CUNY entity with scientists serving as mentors or co-mentors to CUNY PhD students.

1 Executive Officer (rotating) from each of the 4 programs
1 External member (a distinguished scientist from outside of CUNY, as appointed by the Chair)

IV. Conclusion

The recommendations made in this report are based on available data. They are also relatively narrow in focus, addressing select features of only 4 PhD programs. An urgent need to remove uncertainty has thus precluded a more systematic and comprehensive review, which might have tackled, *inter alia*, the role of PhD students in advancing the immensely important undertaking that is *undergraduate* science teaching and research. It is hoped that the Oversight Committee, if constituted, could commission such research. It is certainly the case that the decisions to be taken by program committees (Recommendation 5) must rely on as much data as possible.

Given the competing pressures and obvious constraints upon resources, how is one to prioritize the recommendations? Much can actually be achieved in short order. The sums being relatively modest, stipend levels for incoming cohorts of 90 can be raised in short order; admissions policies and practices, faculty membership criteria, and curricular reforms can be framed and approved over the next two semesters; so, too, can criteria for recommendations regarding degree-granting authority and new programs. Hiring faculty at the GC and increasing cohort sizes are administratively more complex and financially more challenging, but initial steps can also be taken now, provided those challenges are met. Especially since faculty, student and campus leadership all share a nearly palpable resolve, there are grounds for optimism.

Appendix 1:

Research Foundation Sponsored Research (Expenses) for Fiscal Years 1995-2013

Appendix 1

RESEARCH FOUNDATION OF CUNY

SPONSORED ACTIVITY (EXPENSES) FOR FISCAL YEARS 1995 THRU 2013

	FY2013	FY2012	FY2011	FY2010	FY2009	FY2008	FY2007	FY2006	FY2005	FY2004	FY2003	FY2002	FY2001	FY2000	FY1999	FY1998	FY1997	FY1996	FY1995
ACTIVITY BY SPONSOR:																			
Governmental Grants & Contracts:																			
National Science Foundation	33,938,003	32,335,299	33,624,737	31,983,904	26,433,799	24,402,172	20,776,233	20,916,777	17,803,612	17,896,365	15,646,198	13,239,900	12,515,214	14,290,563	16,981,709	12,308,461	13,570,523	14,919,947	12,776,986
Department of Health and Human Services	39,952,876	47,812,461	53,234,383	51,701,283	40,582,284	39,996,706	42,034,350	40,036,397	41,375,615	42,127,026	39,331,647	33,396,561	26,079,689	24,857,776	20,611,386	18,312,097	20,779,340	18,159,731	18,088,274
Department of Education	24,439,348	32,413,036	31,402,022	32,192,851	26,116,577	21,283,063	19,932,857	21,888,372	23,395,064	26,039,175	26,725,061	21,379,867	18,044,605	14,469,676	11,424,338	10,440,318	12,448,884	13,320,673	13,998,750
Other Federal sponsors	36,097,624	29,354,007	27,094,555	25,187,236	21,850,170	27,464,040	21,950,619	17,648,438	18,042,279	17,704,929	13,209,992	12,636,032	12,996,119	12,897,180	15,137,136	12,356,798	10,555,434	11,168,854	11,589,037
State sponsors	50,487,185	47,220,928	49,385,306	45,269,377	50,872,372	48,612,277	46,055,066	45,154,461	41,554,682	40,053,756	38,357,680	30,820,227	29,273,336	30,568,861	35,837,680	35,814,329	33,282,393	34,787,007	35,725,855
Municipal sponsors	64,768,745	64,154,721	71,462,338	75,501,807	79,110,790	78,889,924	87,685,729	91,609,000	87,426,127	81,848,067	56,367,460	45,772,789	34,864,462	34,669,406	33,661,010	37,269,232	37,159,782	35,867,074	36,906,696
	249,683,781	253,290,452	266,203,341	261,936,458	244,965,972	240,648,182	238,434,854	237,253,445	229,597,379	225,469,318	189,638,038	157,245,376	135,773,425	131,653,462	133,653,257	126,501,235	127,796,056	128,223,286	129,085,596
Private Grants & Contracts:																			
PSC-CUNY	3,335,061	3,574,190	3,819,873	3,851,599	3,945,230	3,771,545	3,209,737	3,364,069	3,601,594	3,156,075	3,067,230	2,891,968	3,031,685	2,808,654	2,951,805	2,698,713	2,527,747	2,521,034	2,518,114
Private	73,933,408	71,515,516	62,307,345	57,931,049	55,231,747	46,736,858	45,923,772	48,769,808	41,184,687	51,567,542	75,785,167	47,084,216	37,296,863	-	-	-	-	-	-
CUNY Miscellaneous	41,499,579	42,113,441	39,275,574	36,803,822	34,476,089	34,949,123	32,738,778	26,549,962	23,781,081	21,301,707	18,310,819	15,872,022	18,171,432	-	-	-	-	-	-
Private (includes CUNY Miscellaneous)	-	-	-	-	-	-	-	-	-	-	-	-	-	50,123,664	46,773,936	43,512,134	43,402,251	45,779,071	46,822,099
	118,768,048	117,203,147	105,202,792	98,586,260	93,652,066	85,457,526	81,872,287	78,683,839	68,567,362	76,025,324	97,163,216	65,848,206	58,499,980	52,932,318	49,725,741	46,210,847	45,929,998	48,299,105	49,340,213
TOTAL	368,451,829	370,493,599	371,406,133	360,522,718	338,618,038	326,105,708	320,307,141	315,937,284	298,164,741	301,494,642	286,801,254	223,093,582	192,273,385	184,585,780	183,378,998	172,712,082	173,726,054	176,522,391	178,435,811
ACTIVITY BY PURPOSE:																			
Research	123,768,480	126,764,832	130,453,272	122,359,213	104,936,360	98,474,386	95,342,681	90,519,181	87,809,277	91,231,924	77,274,393	68,274,788	55,072,870	49,135,857	65,079,662	44,550,855	45,339,350	43,094,988	43,501,185
Training	91,945,903	90,424,744	91,841,839	95,204,593	97,581,287	100,987,819	119,269,200	127,729,942	120,561,355	114,226,175	113,031,044	74,857,787	55,396,839	56,280,528	54,971,363	57,473,045	54,924,426	55,795,411	55,817,156
Academic Support	97,547,447	102,583,076	97,547,254	98,446,915	91,532,401	84,890,766	70,934,991	66,372,249	63,535,122	72,068,187	71,999,818	59,384,134	62,932,787	62,322,372	55,884,852	50,457,857	54,138,942	56,847,669	56,934,207
Student Services	40,538,077	41,690,560	40,815,016	35,599,223	35,149,989	28,960,714	26,030,884	21,899,935	19,882,754	16,884,866	17,232,994	15,283,235	13,788,437	12,405,083	12,166,233	11,733,961	12,169,437	12,964,316	13,301,369
Other	14,651,922	9,030,387	10,948,952	8,912,774	9,418,021	12,792,023	8,729,585	9,415,977	6,376,233	7,083,490	7,263,005	5,293,638	5,082,452	4,441,960	5,276,888	8,496,364	7,154,899	7,820,007	9,081,892
TOTAL	368,451,829	370,493,599	371,406,133	360,522,718	338,618,038	326,105,708	320,307,141	315,937,284	298,164,741	301,494,642	286,801,254	223,093,582	192,273,385	184,585,780	183,378,998	172,712,082	173,726,054	176,522,391	178,435,811

Appendix 2:

Employment of Recent Graduates

Appendix 2

THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

Employment of Recent Bench Science Program Graduates

	Start Date	Grad Date	Title	Employer	Location
BIOCHEMISTRY					
	Sep-08	Feb-13	Scientific Writer	Regeneron Pharmaceuticals	Tarrytown
	Sep-08	Feb-14	Postdoc	Columbia University	New York
	Sep-08	Feb-14	Postdoc	The Feinstein Institute for Medical Research	Long Island
	Sep-08	Sep-13	Postdoc	New York University	New York
BIOLOGY					
	Sep-08	Sep-12	Assistant Professor	Wagner College	Staten Island
	Sep-08	Feb-14	Postdoc	Thomas Jefferson University	Philadelphia
	Sep-08	Sep-13	Adjunct Assistant Professor	Hunter College	New York
	Sep-08	Feb-14	Postdoc	U of Illinois at Chicago	Chicago
	Sep-08	Feb-14	Postdoc	University of Wisconsin	Madison
	Sep-08	Sep-13	Postdoc	Albert Einstein College of Medicine	Bronx
CHEMISTRY					
	Sep-08	May-13	Assistant Professor	Medgar Evers College	Brooklyn
	Sep-08	Feb-13	Postdoc	University of Southern California	Los Angeles
	Sep-08	Feb-13	Postdoc	Columbia University	New York
	Sep-08	Sep-13	Postdoc	New York University	Brooklyn
	Sep-09	May-13	Research Associate	Lehigh University	Pennsylvania
	Sep-09	Feb-14	Senior Scientist	Agilent Technology	Delaware
PHYSICS					
	Sep-08	May-13	Logistics Officer	United States Marine Corps	Washington
	Sep-08	Sep-12	Adjunct Assistant Professor	Queens College, CUNY	Queens
	Sep-08	Feb-14	Postdoctoral Fellow	Lehman College, CUNY	Bronx
	Sep-08	Feb-14	Postdoc	Columbia University	New York
	Sep-08	Sep-13	Adjunct Lecturer	College of Staten Island	Staten Island
	Sep-09	Feb-14	Postdoc	Berkeley National Lab	Berkeley
	Sep-09	Jun-14	Postdoc	Ecole Polytechnique	France

Source: Office of Institutional Research and Effectiveness, The Graduate Center, CUNY. Produced on 11/10/14.

Appendix 3:

2014 Doctoral Student Experience Survey - Select Bench Science Results

THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

Appendix 3

Spring 2014 Doctoral Student Experience Survey Results - Program Comparisons

			Overall		Training and Preparation					Academic				Career Planning			
Bench Sciences	N	Rate*	Program Overall - Satisfied Total	Recommend Program To Others - Agree Total	Proposal Writing - Any Training	Article Prep - Any Training	Independent Research - Any Training	First 2 Years - Any Research	Appropriately Trained Before Teaching - Agree Total	Program Curriculum - Satisfied Total	Program Faculty Teaching - Satisfied Total	Program Intellectual Climate - Satisfied Total	Research Experience In Program - Satisfied Total	Program Does Good Job Preparing Students for Academic Careers - Agree Total	Program Does Good Job Preparing Students for Non-academic Careers - Agree Total	I am Considering an Academic Career	I am Considering a Non-academic Career
Biochemistry	9	14.5%	100.0%	85.7%	100.0%	64.3%	71.4%	94.1%	28.6%	100.0%	100.0%	87.5%	100.0%	87.5%	66.7%	100.0%	77.8%
Biology	65	40.6%	89.4%	69.2%	83.1%	68.7%	75.6%	97.6%	46.3%	86.4%	90.8%	86.4%	87.7%	82.1%	32.1%	84.6%	72.3%
Chemistry	20	18.2%	85.7%	65.0%	63.3%	64.3%	80.0%	93.1%	59.1%	76.2%	81.0%	60.0%	95.0%	60.0%	36.7%	63.7%	81.9%
Physics	21	20.4%	90.0%	85.0%	39.3%	50.0%	64.3%	80.8%	42.9%	81.0%	85.0%	85.0%	87.5%	75.0%	53.6%	90.4%	66.6%
Bench Science Average	**115**	**31.0%**	**89.7%**	**72.3%**	**73.1%**	**64.1%**	**74.0%**	**93.6%**	**47.4%**	**84.5%**	**88.7%**	**81.6%**	**89.9%**	**79.2%**	**30.3%**	**82.9%**	**73.5%**
GC Average	**1,139**	**30.9%**	**89.2%**	**78.4%**	**60.1%**	**64.9%**	**71.6%**	**74.0%**	**43.1%**	**85.7%**	**89.7%**	**87.9%**	**80.9%**	**82.0%**	**45.1%**	**86.5%**	**61.7%**

*Percent of enrolled students who completed the survey. Other students began the survey but did not complete it.

Appendix 4:

2014 Bench Science Student Survey Results

THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

Fall 2014 Bench Science Student Survey Results

Respondents by Program

Biochemistry	13
Biology	72
Chemistry	35
Physics	43
Total	163

Home Campus by Program

	Biochemistry	Biology	Chemistry	Physics	Total
Baruch College	0	0	0	1	1
Brooklyn College	0	13	3	1	17
City College	5	16	9	15	45
College of Staten Island	0	5	4	3	12
Hunter College	4	14	6	4	28
Lehman College	0	7	0	0	7
Queens College	2	9	3	4	18
York College	0	0	1	1	2
Unassigned	2	8	9	14	33

Entry Year by Program

	Biochemistry	Biology	Chemistry	Physics	Total
Academic Year 2005-06 or before	0	0	1	0	1
Academic Year 2006-07	0	1	1	2	4
Academic Year 2007-08	0	2	0	0	2
Academic Year 2008-09	0	1	1	1	3
Academic Year 2009-10	3	8	3	4	18
Academic Year 2010-11	2	8	6	5	21
Academic Year 2011-12	1	9	2	5	17
Academic Year 2012-13	1	14	4	5	24
Academic Year 2013-14	3	12	3	7	25
Academic Year 2014-15	3	17	14	14	48

THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

Fall 2014 Bench Science Student Survey Results

Opinion Items

	Percent Who Agree or Strongly Agree				
	Having a wide array of faculty to choose among for my thesis mentor was an important factor in my choosing CUNY for my doctoral studies.	Academic fit with a particular faculty member at my home campus was the single most important factor in my decision to undertake research there.	The number of other doctoral students in Biochemistry, Biology, Chemistry and/or Physics based at my home campus influenced my decision to undertake research there.	Rotations aided me in finding a mentor for my thesis.	My first year experience helped to establish a sense of community within my cohort.
Biochemistry	91.7%	66.7%	58.3%	58.3%	83.3%
Biology	79.7%	79.4%	30.2%	55.6%	76.2%
Chemistry	73.3%	70.0%	13.3%	73.3%	73.3%
Physics	82.5%	62.5%	45.0%	67.5%	77.5%
Total	79.6%	71.9%	31.5%	62.3%	76.0%

THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

Fall 2014 Bench Science Student Survey Results

Teaching Involvement and Weekly Teaching Hours by Program

	Number of Respondents		Among Those Teaching	
	Not Teaching	Teaching	Prep Hours	Contact Hours
Biochemistry	9	4	3.0	5.3
Biology	39	33	5.9	5.4
Chemistry	19	16	3.3	5.8
Physics	18	25	7.7	7.3
Total	85	78	5.8	6.1

Appendix 5:

Report of the External Committee on Doctoral Education in the Sciences, April 2006

Appendix 5

Report of the External Committee on Doctoral Education in the Sciences at The City University of New York

April 2006

Background

In the fall of 2004, Chancellor Matthew Goldstein invited an external advisory committee of distinguished educators to review the consortial organizational structure of the CUNY Graduate Center, and to assess its effectiveness. The October 22, 2004 report of this advisory committee affirmed the efficacy of the consortial model but highlighted the inability of the Graduate Center or the CUNY Administration to support science programs adequately. The report made a series of recommendations and, with reference to the sciences, suggested that the University engage a team of high-level science faculty and administrators to evaluate doctoral education in the sciences. Their specific charge was to help CUNY think about creating a more rational basis for the way the University recruits, admits and trains graduate students in the sciences. Following this recommendation, Chancellor Goldstein asked Executive Vice Chancellor Selma Botman and University Dean for Research Gillian Small to work with the external committee of scientists. The team, which was led by Dr. Robert Silbey, Dean of Science at MIT, spent several days at the University and reviewed the existing structure for administering and supporting doctoral education in biology, biochemistry, chemistry and physics. The committee (see Appendix for biographies) was asked to consider how graduate education and training in the sciences could be improved in order to ensure that CUNY's doctoral programs would be competitive with comparable institutions, able to attract the best possible students to the University, and would offer an enhanced doctoral experience for those students who are admitted.

From February 22-24, 2006, a committee of four scientists [Norma Allewell (Maryland), Maureen Goodenow (Florida), Thomas Rosenbaum (Chicago) and Robert Silbey (MIT)] met with faculty, doctoral students, and administrators at CUNY to discuss CUNY's doctoral programs in the natural sciences [biology, biochemistry, chemistry and physics]. The schedule of meetings is given in the Appendix.

The City University of New York is a unique institution, whose important role in New York City and indeed in the United States can hardly be overestimated. Throughout its history, it has educated a large number of undergraduate students, particularly members of under-represented groups. The impact that these students have had is enormous. In the last decade, the CUNY undergraduate programs have become as strong as they have ever been and the doctoral programs have been strengthened. CUNY has tremendous strengths, not the least of which is being situated in New York City. With all this, CUNY does have its challenges: a budgetary process that is not easily described or understood, a complex administrative structure, an educational program that is dispersed over many campuses and a heterogeneous student body.

It is important to acknowledge that although we consulted with a broad spectrum of constituencies, we necessarily saw and heard from a relatively small number of people in a two-day visit, and our report is based on this limited experience. The senior leadership with whom we met is quite impressive and the dedication and ability of most of the faculty and administrators is equally so.

Summary of findings

In the last five or so years, CUNY has made extraordinary investments in the sciences, particularly with the cluster hiring initiative, by hiring excellent young research scientists into faculty positions with reasonable startup costs (although still not at the level needed to compete with other institutions in the New York area). In addition, there have been capital improvements, new laboratories and more are planned. This has resulted in a strengthening of the infrastructure for science at many of the CUNY campuses, but there has not been corollary attention paid to the doctoral programs, even though CUNY has managed to recruit a cadre of talented and dedicated students.

The doctoral programs in biology, biochemistry, chemistry and physics currently have a combined enrollment of almost five hundred doctoral students, making them an important

part of the educational programs of CUNY. These doctoral programs are highly prized by all the faculty and administrators with whom we met.

We believe that in order for CUNY to have excellent doctoral programs, resources must continue to flow to the high quality programs. City College and Hunter College are the strongest in this enterprise, but there is strength to be found throughout the system. To allow the gains of recent years to decline or even remain static would be costly not only in terms of the loss of investment and human capital, but also a loss to undergraduate education in the sciences at all the senior campuses. *We wish to emphasize the latter point: high quality undergraduate education in science requires that undergraduate students participate in high-level research.*

We list below some general strategies that the committee felt would be effective in improving the quality of the doctoral programs.

Strategies for improvement

I. The campuses should take advantage of the faculty retirements in the next few years that will allow for more junior faculty hiring. Replacing less research active faculty with research active faculty is the quickest way to strengthen the programs on the campuses.

II. Presidents of all the senior campuses should put together a strategic plan outlining a commitment of resources to support research in the sciences that defines the direction of their efforts. For example, research activities in the stronger campuses (City and Hunter) can consolidate their strengths with strategic hires in fields close to their existing strengths or enlarge their strengths by hiring in new subfields. The other campuses should hire strategically to build a critical mass in the fields that they already have strength, and should not aim to build up strengths in every area. Where appropriate, they should partner with

other campuses to promote interdisciplinary and interdepartmental research in order to utilize resources most efficiently. This will also increase the visibility and viability of scientific doctoral research in the CUNY colleges.

III. The admission and support of graduate students must be improved. Admissions decisions come too late in the year to be competitive with other institutions. Stipends are put together in a manner that can only be described as Byzantine and ineffective. Students have to pay different amounts of tuition depending on campus and the manner in which their stipend was put together.

IV. Develop joint ownership of the graduate program by the Graduate School and the individual College campuses.

In thinking about the above general ideas, the committee felt that there were some straightforward changes that could be implemented on a reasonable timescale that would improve the quality of the programs for students, faculty and the administration.

I. Admission and mentoring of doctoral students

a. A committee of research-active faculty, not executive officers or other administrators, should govern the admissions process for each program. The committee should be empowered to allocate a number of 5-year packages so that they can make offers to the best students in a timely fashion. The first year of funding should come from a central source, with subsequent years being covered by a faculty member in partnership with his/her respective college. The students should be accepted to CUNY, not to a specific campus (see point c. below).

b. Offers of admission should be made early, perhaps by rolling admissions, starting before the beginning of the calendar year.

c. Full support should be offered to first year students with no teaching requirement for the student. In this way, first year students can learn enough in the first year to make intelligent choices about research groups

and mentors (perhaps with rotations into various labs) as well as concentrate on making progress on their courses (and perhaps decreasing the time to degree). By the end of this first year, the student must identify a mentor who has the funding to fully cover the stipend for the next few years. Given the duration of federal grants, it is often impossible to guarantee grant-based funding for more than 2-3 years. However, the mentor and his/her college must partner to support the package developed when the student was recruited (see point a. above). The student will have an affiliation with the college of that faculty member (see point h. below).

d. Mentoring of doctoral students should be limited to research-intensive faculty supported by external grants, except in the case of junior faculty. [We understand that this goal may take some time to realize, but it is important to impress on the faculty the need to find external funding for their research, as in every other high level doctoral program in the country].

e. CUNY should provide tuition remission for all doctoral students.

f. Find ways to shorten the time to the Ph.D. degree: a shorter time will make both the graduate student and the mentor more productive. Raising the stipend and including health insurance so that students do not have to work at other jobs may be key.

g. Each doctoral student should have a faculty advisory committee that will meet at least annually with the student to develop goals, provide guidance and advice, and to monitor progress. A brief written report will document progress of the student toward completion of degree.

h. Students who are doing research on a particular campus should be given an ID card and the privileges of a student on that campus. We heard that the students do not have access to athletic facilities, health centers, etc on the campus at which their research group sits.

II. Faculty issues

i. Junior faculty should have more time to achieve tenure and promotion as is done in all other high-level doctoral programs (normally seven years). This will also facilitate continuity for doctoral students in their labs and permit development of research programs that can compete for extramural funding.

j. Faculty mentors of doctoral students should have an active research lab and a recent history of external funding (for mid-level and senior faculty) or a potential for such funding (for junior faculty).

k. Faculty mentoring doctoral students in research should be given teaching credit.

III. General

l. We recommend that Ph.D. degrees should be awarded jointly by the Graduate Center and individual campuses, e.g. Ph.D. in Biology from Hunter College and the Graduate Center of The City University of New York. This allows the campuses to showcase their doctoral programs for Federal granting agencies, for fund raising in general, as well as for ranking of CUNY on a national level.

m. Develop state-of-the-art videoconferencing to link campuses, including the Graduate Center, for teaching, so that students at all the campuses have easy access to courses no matter where they originate or are held. This will increase the pool of students for each course and avoid duplication of courses. Videoconferencing can also extend educational opportunities for faculty and graduate students by providing access to seminars and conferences across the campuses of CUNY. It will be important to include such facilities in the new Advanced Science Research Center to facilitate interactions with the other campuses.

n. The Graduate Center could play a redefined role in doctoral education in the sciences. It should focus on admissions, fellowship support, student services and institutional research. It should remain a center of intellectual

life, a place where faculty and students can come together for seminars and meetings. The graduate students with whom we met were pleased with the present resources of the GC. The recently appointed GC President appears committed to enhancement of doctoral studies in the sciences and poised to assist in the implementation of change.

Appendix

External Committee for Doctoral Education in the Sciences

Robert J. Silbey (Chair)
Dean of Science & Class of '42 Professor of Chemistry
Massachusetts Institute of Technology
Bldg. 6-123
Cambridge, MA 02139
(617) 253-8900
silbey@mit.edu

Dr. Silbey has been a member of the faculty of the Department of Chemistry of M.I.T. since 1966; he was chairman of the department from 1990 to 1995. He subsequently served as head of the Center for Materials Science and Engineering and in 2000 was appointed Dean of the School of Science. Dr. Silbey has written more than 250 papers, he is also coeditor of a standard textbook in the field, *Physical Chemistry*. He is a Fellow of the American Association for the Advancement of Science and is a member of the National Academy of Sciences. Dr. Silbey graduated magna cum laude from Brooklyn College in 1961, with honors in chemistry. He earned his Ph.D. at the University of Chicago. In 2004 Dr. Silbey was the commencement speaker and recipient of the honorary degree, Doctor of Science from Brooklyn College Professor Silbey's primary research concerns the theoretical studies of a) the low temperature thermal properties of glasses, b) energy and electron transfer and relaxation in molecular aggregates, c) the optical and electronic properties of conjugated polymers and d) in collaboration with Professor Field, the dynamics of highly vibrationally excited molecules.

Maureen M. Goodenow
Professor, Stephany W. Holloway University Chair for AIDS Research
Director of Research and Academic Affairs
Department of Pathology, Immunology, & Laboratory Medicine
University of Florida
(352) 392-3429
goodenow@ufl.edu

Dr. Maureen Goodenow, a professor and co-director of experimental pathology holds a prestigious endowed chair named the Stephany W. Holloway University Chair in AIDS Research. Dr. Goodenow, a molecular geneticist, is zeroing in on a viral gene believed to regulate the timing of AIDS symptoms. In a related study, she uses molecular biology techniques to investigate how differences in the virus determine the biological course of the disease. Dr. Goodenow is Associate Director of the University's Training Grant in Cancer Biology and served as coordinator of the Graduate Program in Immunology and Molecular Pathology. She served on many leadership committees, including the Dean's Committee for the reorganization of Basic Sciences and on the Dean's Faculty Research Advisory Board. She also serves on NIH special review committees for AIDS-related areas.

Norma M. Allewell
Dean, College of Chemical and Life Sciences
2300 Symons Hall
University of Maryland
College Park, MD 20742
(301) 405-2071
allewell@umd.edu

Dr. Norma Allewell leads and oversees the academic, administrative and financial activity of the College of Life Sciences at the University of Maryland. She received her doctorate degree in molecular biophysics and biophysical chemistry from Yale University, gaining her bachelor's degree in biochemistry from McMaster University. From 1991 to 1998 Dr. Allewell was a faculty member at the University of Minnesota where she chaired the Department of Biochemistry and became Vice Provost. Dr. Allewell's research deals with the molecular mechanisms of biological function and regulation of multisubunit proteins. Her current research, in collaboration with Dr. Mendel Tuchman at the Children's National Medical Center, deals with the biochemical basis of diseases of nitrogen metabolism. She is the past president of the Biophysical Society and is a Fellow of the American Association for the Advancement of Science. Dr. Allewell has served on many Howard Hughes Medical Institute (HHMI) panels for undergraduate programs in the biological sciences in addition to NIH and NSF panels. She has also been a member of the advisory board for the Brookhaven Protein Data Bank, the National Research Council (NRC) space studies board committee on space biology and medicine, and the NRC task group on institutional arrangements for space station research. She is a current member of the Board of Directors of the Federation of American Societies for Experimental Biology (FASEB) and the NSF Biological Sciences Advisory Committee.

Thomas F. Rosenbaum
VP for Research and for Argonne National Laboratory
The University of Chicago
(773) 702-1383
tfr@uchicago.edu

Dr. Thomas Rosenbaum is John T. Wilson Distinguished Service Professor and the Vice President for Research and for Argonne National Laboratory at the University of Chicago. He received his bachelor's degree in physics with honors from Harvard University, and both an M.A. and Ph.D. in physics from Princeton University. Dr. Rosenbaum oversees a combined research enterprise of more than $800 million. In addition to his responsibilities for research across the University and for Argonne, he chairs the Science Council, charged with the coordination and promotion of scientific research at the University and Argonne. Dr. Rosenbaum is an expert on the quantum mechanical nature of materials—the physics of electronic, magnetic and optical materials at the atomic level—that are best observed at temperatures near absolute zero (minus 460 degrees Fahrenheit). He conducted research at Bell Laboratories and at IBM Watson

Research Center before he joined the Chicago faculty in 1983. Dr. Rosenbaum directed the University's Materials Research Laboratory from 1991 to 1994, and the University's James Franck Institute from 1995 to 2001. He recently served on the National Research Council Solid State Sciences Committee and is Deputy Chair of the University of Chicago Board of Governors for Argonne National Laboratory. His honors include an Alfred P. Sloan Research Fellowship, a Presidential Young Investigator Award and the William McMillan Award for Outstanding Contributions to Condensed Matter Physics. Dr. Rosenbaum is an elected fellow and Centennial Lecturer of the American Physical Society.

External Committee on Doctoral Education in the Sciences

Agenda

Wednesday, February 22nd

	Committee members arrive
6:15 pm	Dinner with Chancellor Goldstein, EVC Botman, Dean Small

Thursday, February 23rd

9:00 am	Driver will take group from the hotel to the Graduate Center, 365 Fifth Avenue and 34th Street
9:30–10:30 am	President Bill Kelly Provost Linda Edwards
10:45–11:30 am	Science Executive Officers Gerald Koeppl (Chemistry) Richard Chappell (Biology) Lesley Davenport (Biochemistry) Sultan Catto (Physics)
11:45–12:30 pm	Group of science faculty from City College and Hunter College
12:30–1:30 pm	LUNCH with group of doctoral students
1:30–2:00 pm	Free time
2:00–2:45 pm	Group of science faculty from Queens College, College of Staten Island, Lehman College, Brooklyn College, York College
3:00–3:45 pm	University Faculty Senate Representatives
4:00–4:45 pm	President Christoph Kimmich, Provost Roberta Mathews, Dean Louise Hainline – Brooklyn College
5:00–6:00 pm	Committee members meeting
6:30 pm	Dinner with Senior VC Dobrin, VC Zavelle, VC Malave

Friday, February 24th

8:30 am	Driver will take group from the hotel to the CUNY Central Office, 535 East 80th Street & East End Avenue
9:00–9:45 am	President Gregory Williams, Provost Zeev Dagan, Dean Maria Tamargo – City College
10:00–10:45 am	President Jennifer Raab, Provost Vita Rabinowitz – Hunter College
11:00–11:45 am	President James Muyskens, Provost Evangelos Gizis – Queens College
12:00–12:45 pm	President Marlene Springer, Provost David Podell, Dean Gail Simmons – College of Staten Island
1:00–2:00 pm	LUNCH with EVC Botman and Dean Small
2:00–2:45 pm	President Ricardo Fernandez, Provost Anthony Garro – Lehman College
3:00–3:30 pm	Committee members meeting
3:30–4:30 pm	Chancellor Goldstein, EVC Botman, Dean Small
4:30 pm	Depart CUNY Central Office

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Allocations/Awards of Institutional Financial Aid to Science Programs, 2005-06
Preliminary Figures[1]

ALL ENROLLED STUDENTS

Program	Fund	Allocations/ Awards*	Program Total	Awardees
Biochemistry-Phd Program	Tuition Fellowship[a]	$74,372.00		15
	Tithe[b]	$0.00		0
	Science Fellowship	$192,000.00		16 (16 half)
	University Fellowship[c]	$76,150.00		24
	CUNY Tuition Fellowship[d]	$47,088.00		32
			$389,610.00	
Biology-Phd Program	Tuition Fellowship	$234,608.00		45
	Tithe	$145,200.00		63
	Science Fellowship	$432,000.00		36 (36 half)
	University Fellowship	$108,330.00		44
	CUNY Tuition Fellowship	$60,607.00		45
			$980,745.00	
Chemistry-Phd Program	Tuition Fellowship	$158,034.00		32
	Tithe	$103,900.00		51
	Science Fellowship	$336,000.00		28 (26 half, 1 full)
	University Fellowship	$130,900.00		49
	CUNY Tuition Fellowship	$79,294.00		55
			$808,128.00	
Physics-Phd Program	Tuition Fellowship	$137,649.00		25
	Tithe	$61,300.00		10
	Science Fellowship	$336,000.00		28 (28 half)
	University Fellowship	$109,975.00		31
	CUNY Tuition Fellowship	$23,633.00		15
			$668,557.00	
Laboratory Science Sub-Total	Tuition Fellowship	$604,663.00		117
	Tithe	$310,400.00		124
	Science Fellowship	$1,296,000.00		108 (106 half, 1 full)
	University Fellowship	$425,355.00		148
	CUNY Tuition Fellowship	$210,622.00		147
			$2,847,040.00	

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Allocations/Awards of Institutional Financial Aid to Science Programs, 2005-06
Preliminary Figures[1]

ALL ENROLLED STUDENTS

Program	Fund	Allocations/ Awards*	Program Total	Awardees
Computer Science-Phd Program	Tuition Fellowship	$114,700.00		25
	Tithe	$37,100.00		7
	Science Fellowship	$192,000.00		17 (16 half)[2]
	University Fellowship	$97,275.00		32
	CUNY Tuition Fellowship	$43,602.00		18
			$484,677.00	
Earth & Env Sci-Phd Program	Tuition Fellowship*	$56,177.00		12
	Tithe	$31,800.00		2
	Science Fellowship	$96,000.00		6 (4 half, 2 full)
	University Fellowship	$50,650.00		20
	CUNY Tuition Fellowship	$29,906.00		14
			$264,533.00	
Engineering-Phd Program	Tuition Fellowship	$247,668.00		52
	Tithe	$78,200.00		28
	Science Fellowship	$480,000.00		31 (18 half, 11 full)[2]
	University Fellowship	$138,200.00		32
	CUNY Tuition Fellowship	$71,630.00		49
			$1,015,698.00	
Mathematics-Phd Program	Tuition Fellowship	$137,336.00		27
	Tithe	$7,000.00		6
	Science Fellowship	$240,000.00		11 (2 half, 9 full)
	University Fellowship	$88,650.00		24
	CUNY Tuition Fellowship	$32,300.00		8
			$505,286.00	
Speech/Hearing Sci-Phd Program	Tuition Fellowship	$45,431.00		10
	Tithe	$16,000.00		7
	Science Fellowship	$144,000.00		6 (6 full)
	University Fellowship	$77,775.00		17
	CUNY Tuition Fellowship	$5,379.00		2
			$288,585.00	

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Allocations/Awards of Institutional Financial Aid to Science Programs, 2005-06
Preliminary Figures[1]

ALL ENROLLED STUDENTS

Program	Fund	Allocations/ Awards*	Program Total	Awardees
Other Than Laboratory Science Sub-total	Tuition Fellowship	$601,312.00		$126.00
	Tithe	$170,100.00		$50.00
	Science Fellowship	$1,152,000.00		$71.00
	University Fellowship	$452,550.00		$125.00
	CUNY Tuition Fellowship	$182,817.00		$91.00
			$2,558,779.00	
All Sciences	Tuition Fellowship	$1,205,975.00		243
	Tithe	$480,500.00		174
	Science Fellowship	$2,448,000.00		179
	University Fellowship	$877,905.00		273
	CUNY Tuition Fellowship	$393,439.00		238
Grand Total			$5,405,819.00	

Source: Excel table from Banner created by R. Nelson, 04-17-06.

Note: Tution Fellowship is the amount awarded to students. All other figures are the amounts allocated to programs. Since some of the allocated dollars were not awarded, an average ahould not be computed by dividing allocations by number of awardees.

[a] Tuition Fellowship includes in-state tuition from all awards, GTF's, Chancellor's Fellowships, Science Fellowships, Gilleeces, MAGNET's, etc

[b] Tithe amounts are overhead dollars recovered, from the Research Foundation.

[c] University Fellowships are the unrestricted financial aid funds apportioned to each doctoral program .

[d] CUNY Tuition Fellowship funds designated for in-state tuition for students in their first 10 semesters who were not otherwise receiving tuition fellowships and who were teaching as adjuncts or appointed to Grad A,B, or C titles.

[1] Excludes Gilleece Awards, MAGNET Awards, Tuition Stipends, other non-dissertation fellowship awards, and all dissertation fellowships.

[2] Counts of awards for the year may not match number of students receiving awards, because some students took awards for only one semester, and the award was subsequently made to another student in the following semester.

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Graduate A, B, and C Awards
Academic Year 2004-05

ALL ENROLLED STUDENTS

	Grad A		Grad B		Grad C		Total	
	Awards	Awardees	Awards	Awardees	Awards	Awardees	Awards	Awardees
Biochemistry					$28,732	2	$28,732	2
Biology	$24,330	1	$8,307	1	$13,477	1	$46,114	3
Chemistry					$13,477	1	$13,477	1
Physics					$7,622	1	$7,622	1
Laboratory Sciences Sub-total	$24,330	1	$8,307	1	$63,308	5	$95,945	7
Computer Science			$17,278	2	$70,533	6	$87,811	8
Earth and Environmental Sci.	$24,330	1	$8,307	1	$13,477	1	$46,114	3
Engineering - Biomedical					$13,477	1	$13,477	1
Engineering - Chemical					$13,964	1	$13,964	1
Engineering - Civil					$13,477	1	$13,477	1
Engineering - Electrical					$71,428	5	$71,428	5
Engineering - Mechanical					$27,928	2	$27,928	2
Mathematics			$16,614	2	$157,737	12	$174,351	14
Speech and Hearing Sciences					$13,477	1	$13,477	1
Other Than Laboratory Sciences Sub-Total	$24,330	1	$42,199	5	$395,498	30	$462,027	36
Sciences Total	$48,660	2	$50,506	6	$458,806	35	$557,972	43

Source: Grad A, B, C database, A. Ellis, 08-22-05.

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Admissions Fall 2005, Enrollment Fall 2005 and Spring 2006

	Fall 2005 Admissions					Total Enrollment	
	Applied	Admitted	Percent Admitted	Enrolled	Yield	Fall 2005	Spring 2006
Biochemistry	37	17	45.9	10	58.8	61	59
Biology	115	60	52.2	33	55.0	198	185
Chemistry	78	28	35.9	23	82.1	134	132
Physics	41	22	53.7	19	86.4	91	88
Laboratory Sciences Sub-Total	271	127	46.9	85	66.9	484	464
Audiology	10	8	80.0	6	75.0	6	6
Computer Science	84	52	61.9	26	50.0	133	123
Earth and Environmental Sciences	24	15	62.5	9	60.0	64	67
Engineering Total	113	65	57.5	29	44.6	191	185
Biomedical Engineering	*17*	*5*	*29.4*	*4*	*80.0*	*24*	*24*
Chemical Engineering	*31*	*11*	*35.5*	*10*	*90.9*	*33*	*30*
Civil Engineering	*16*	*10*	*62.5*	*3*	*30.0*	*25*	*25*
Electrical Engineering	*39*	*33*	*84.6*	*9*	*27.3*	*83*	*83*
Mechanical Engineering	*10*	*6*	*60.0*	*3*	*50.0*	*26*	*23*
Mathematics	85	78	91.8	35	44.9	114	111
Speech and Hearing Sciences	19	13	68.4	9	69.2	55	51
Other Than Laboratory Sciences Sub-Total	335	231	69.0	114	49.4	563	543
Sciences Total	606	358	59.1	199	55.6	1,047	1,007

Source: Semester admissions file and Show Registration files.

Appendix 6a:

External Review of the Ph.D. Program in Biochemistry, 2012

External Review
CUNY Ph.D. Program in Biochemistry

The CUNY Ph.D. Graduate Program in Biochemistry (GPB) was reviewed in 2012, based on documents provided by the GPB and a site visit conducted on May 10-11, 2012. The review committee consisted of Drs. Richard Ludescher (Dean of Academic Programs, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey) and Arthur Palmer (Robert Wood Johnson Jr. Professor, Department of Biochemistry and Molecular Biophysics, Columbia University). This report focuses on four key areas of concern to future development of the GPB, as identified by the reviewers: (i) faculty membership, (ii) critical mass on campuses, (iii) connection to campus programs, and (iv) student training and outcomes. These areas largely overlap with areas of concern noted in the GPB 's self-study.

Summary. The Ph.D. Graduate Program in Biochemistry at the CUNY Graduate Center operates as a consortium with GPB faculty drawn from the eight senior CUNY campuses. The GPB was restructured in 2008 and underwent major curricular reform in 2010. Reviewers identified several strengths of the GPB. First, the GPB takes seriously its training of graduate students and the curricular reforms of 2010 are having a positive impact on graduate student experiences. The GPB clearly "adds value" to incoming students, who in recent years have gone on to postdoctoral positions with prominent scientists. Second, CUNY has been successful in recruiting outstanding, particularly junior, faculty in Biochemistry over the past decade. Third, institutional support for the GPB is strong, as reflected in enhanced financial packages for students since the 2008 reforms. Reviewers also identified several weaknesses in the GPB. First, the GPB lists too many faculty mentors, many of whom are not well-funded, do not actively publish in the peer-reviewed literature, and have not mentored significant numbers (or any) doctoral students. Second, research-active faculty, and hence graduate students, are concentrated on only a few campuses, notably City College and Hunter College; consequently, the few students and active faculty at the other campuses are not well integrated into the overall research community. Third, despite significant institutional investment, the quality of incoming graduate students has not increased substantially since the GPB was restructured in 2008.

Membership. Currently 122 active and 8 emeritus faculty are members of the GPB. Although members are affiliated with every college at CUNY, the distribution is very uneven. Of the 122 active (non-emeritus) members in May 2012, nearly half are appointed at only two of the eight colleges: there are 31 (25%) faculty at City, 29 (24%) at Hunter, 16 (13%) at Brooklyn, 15 (12%) at Queens, 12 (10%) at Lehman, nine (7%) at Staten Island, and five (4%) each at John Jay and York. Although this number suggests an extensive and diverse graduate faculty, self-reports of the level of involvement in the GPB tell a different story. Only 29 (24%) of the members report that they contribute > 10% time/effort to the GPB, 17 report that they contribute 10% (14%), while 26 report a contribution of < 5%. Consequently, only 24-38% of the 122 members believe that they contribute a significant amount (10%

or more) of their time to the GPB. One can only conclude that the remaining faculty members are either not involved in graduate education or are involved through another graduate program.

Clearly defined criteria for membership in the program do not exist; once individuals have indicated an interest in the program they apparently remain members forever. The continuing membership of faculty who are not research active detracts from, rather than enhances, the program. Prospective students may be initially impressed by the promise of so many faculty mentors but will soon become disillusioned by the reality.

Critical mass. Students in the GPB are distributed unevenly among the seven colleges; this asymmetry is even more extreme that that seen among the faculty. Of the 68 doctoral students in the GPB in May 2012, 50 (74%) were situated at either Hunter (28) or at City College (22); the remaining 18 students (26%) were distributed among Queens (6), Staten Island (4), Brooklyn (3), Lehman (3), and John Jay (1) College and the Graduate Center (1). The numbers at City and Hunter Colleges are barely sufficient to provide a sense of scientific community for the biochemistry students on those campuses; the numbers at the other colleges are sufficiently meager to make any sense of a biochemistry community meaningless. Although students interviewed expressed appreciation for the opportunity to rotate in laboratories on campuses other than City and Hunter Colleges, those students who do join laboratories on other campuses are inevitably isolated from other students and faculty after the first year in the program.

Nonetheless, the reviewers recognize that outstanding science is being done at some of the campuses with relatively few faculty and graduate students. As just one example, three of the last four Horst Schulz Prize winners have conducted graduate research at College of Staten Island.

Instituting formal requirements for faculty participation in the GPG (*vide infra*) may bring the distribution of GPB faculty more in line with the distribution of students (as research-inactive faculty leave the program), but will not solve the student distribution asymmetry between campuses (and paradoxically may worsen it).

Interconnectivity. The central identity of the GPB is a consortium between the eight participating CUNY campuses. As noted above, the distributions of faculty and students between campuses is highly asymmetric and greatly diminishes the function and appeal of a consortium to both students and faculty. In short, faculty at many campuses have little incentive to contribute meaningful efforts to GPB because they have little chance of mentoring a graduate student. Similarly, prospective students have little incentive to be the only GPB student on a given campus, isolated from his or her peers.

Another structural limitation of the GPB consortium model, however, is the requirement that all courses are taught at the Graduate Center, while all research is

done at the member colleges. While attending classes at the Graduate Center during the first year may initially generate a sense of camaraderie and shared mission among each student cohort, the diaspora that accompanies selection of a lab following the second semester can only dilute and lesson any connections established during the first year.

Suggestions were made during the site visit aimed at (i) strengthening the interconnections between campuses (essentially strengthening the periphery), largely by employing technology to facilitate pedagogical and other interactions; (ii) strengthening the center by enhancing programs at the Graduate Center, including perhaps faculty appointments in theoretical biology; and (iii) replacing the consortium model, in order to focus resources on a smaller number of campuses.

Faculty interviewed were split between those favoring the existing consortium model and those suggesting that the graduate program, and resources, be focused on a smaller number of campuses. Few faculty felt that addition of GPB-associated faculty at the Graduate Center would strengthen the GPB and might instead undermine on-going efforts on the campuses. Faculty were in favor of enhanced technology linking campuses and improved web presence of GPB and CUNY.

Student outcomes. The quality of incoming students has not risen since 2008, despite the substantial resources invested since that time. The number of applications to the program peaked at 74 in 2009-2010 and has declined since then to 50 in 2011-2012. As a result, the acceptance rate has increased from 28% in 2009-2010 to 42% in 2011-2012. The yield of accepted students is very, and commendably, high, ranging from 43% to 67%. However, verbal and quantitative GRE scores of enrolled applicants hover in the mid-quartiles (50-70th percentiles) and have been essentially unaffected by 2008 and 2010 reforms. Although numbers are small and subject to statistical fluctuations, some faculty suggest that a decline has occurred over the past few years in the numbers of very highly qualified foreign student applicants.

The new curriculum of the GPB that came out of the 2010 review emphasizes required coursework in the first year of graduate study. The current distribution of courses covers both the core areas of biochemistry in Advanced Biochemistry I & II as well as topics ranging from the bioorganic chemistry to physical biochemistry to bioinformatics. Conversations with students in the program indicate that the current curriculum is comprehensive and well structured and that overall the quality of the instruction is good. Appropriately, a major component of the first year curriculum involves laboratory rotations. The curricular reform appears to be meeting its objectives.

Current students and recent graduates of the GPB largely expressed satisfaction with their educational experiences; most negative sentiments offered by past graduates reflected issues rectified by the 2010 curricular reforms. The majority of graduates of the GPB have taken positions in science-related areas. An impressive

fraction of graduates currently are postdoctoral scientists at leading institutions in the New York/New Jersey area, reflecting positively on the education and training received as graduate students.

Recommendations: The strengths and weaknesses of the GPB are evident to faculty, administrators, and the external reviewers. That the weaknesses have persisted despite extensive reforms and investments since 2008 and 2010 suggests that rectifying these weaknesses requires more than incremental changes.

Reviewers recommend, at minimum, that the GPB define a clearly articulated set of criteria for entrance into and continued involvement with the GPB. These criteria should include both evidence of continuing research activity (some number, say 2-4, of peer-reviewed publications within the last, say, 3 years, and/or an active extramural grant), as well as some level of participation in academic activities of the program (teaching all or part of a course, participation in seminar programs, mentoring incoming students, etc.). Faculty should be re-reviewed periodically to ensure continued compliance with program requirements.

Reviewers also note that recruitment of high quality graduate students is an imperative. The distribution of students to campuses other than the big two or three is unlikely to improve unless the student population increases, but the numbers of students cannot be increased without first improving the quality of the applicant pool. Funds for recruitment are limited (and even marginal increases would be beneficial), but even so, the GPB has its best opportunities to enhance the applicant pool through recruitment efforts in the region (low transportation costs) and internationally (using Skype and other technology), rather than competing with its neighboring institutions for graduate students spread across the nation. Aspects such as costs of application and extent of web-based and face-to-face (faculty conferences or seminars) recruitment efforts should be examined relative to competing institutions.

The central issue, however, is whether the weaknesses of the "distributed" consortium model can be rectified, particularly in light of national trends in science funding, or whether a new system should be contemplated. Reviewers do not consider that hiring a group of theoreticians, necessarily computationally oriented, at the Graduate Center would enhance the GPB, given the extensive interplay between theory and experiment in biochemical practice (often conducted within the same laboratory); nor would such an initiative alleviate problems associated with the consortium model. Although high bandwidth telecommunications can lower some of the existing geographical barriers, such virtual communities cannot yet effectively replace face-to-face daily interactions necessary to foster scientific community. While GPB faculty are divided on the issue, it appears likely to the reviewers that achieving both of the above objectives would be facilitated if the present model were replaced by a "flagship" campus model in which the GPB, and institutional resources, were focused on a smaller number of campuses. Such a major reform must, however, recognize and support existing research-active faculty

at the other campuses (perhaps through relocation or more effective use of technology to promote integration). Clearly, such a step requires dialog between major stakeholders in GPB and CUNY central administration.

Appendix 6b:

External Review of the Ph.D. Program in Biology, 2012

REPORT OF THE EXTERNAL REVIEW COMMITTEE OF THE BIOLOGY GRADUATE PROGRAM, CITY UNIVERSITY OF NEW YORK

TO: Dr. Anne Henderson, Associate Provost and Dean of the Sciences
Dr. Chase Robinson, Provost and Senior Vice President
Dr. William Kelly, President, Graduate Center, CUNY

From: Dr. J. Peter Gergen
Dr. Gerald S. Wilkinson

May 30, 2012

Executive Summary

This report is based on our review of several documents provided by the Biology Graduate Program and a series of meetings with administrators, faculty and students conducted on May 3rd and 4th of 2012. The documents provided by the Program were written well and represented the Program fairly. The students and Program faculty that we met were uniformly positive, but also seemed both candid and honest in sharing their concerns. By numerous indicators, the Biology Program is on a positive upward trajectory, with notable improvements in several areas since the inception of the CUNY Science Scholars Program in 2008. Based on our review we have several recommendations that should allow the rapidly evolving Program in Biology to further improve graduate student education, career development and research productivity. Recommendations and concerns on specific topics are indicated in bold in the body of the Report. Seven principle recommendations that we feel are of utmost priority include the following:

- Revise faculty roster to reflect active participation in the program.
- Review and revise as necessary the basis for campus allocations and rewards for program service and teaching.
- Review and revise as necessary the process for allocation of recruitment lines to subprograms.
- Increase graduate student stipends, but in a manner that involves close partnership between the Graduate Center, individual campuses and the faculty.
- Centralize delivery of core curriculum within each subprogram.
- Increase programmatic activities for career development and community building both within and across the four subprograms.
- Formalize institutional partnerships to provide the financial resources needed for competitive recruitment and program development.

Report

Overview

Because the CUNY Biology Program involves multiple academic and administrative entities, below we briefly summarize our understanding of how the program is organized and administered. Our intent in doing this is to share what we learned during our visit since some of our recommendations are related to the program structure. To supplement the information we received regarding faculty grant support and recent publications, we provide a brief summary of research productivity and impact based on a Web of Science search to provide an independent assessment of program activity and quality. After discussing issues related to program administration, we evaluate the program in relation to the student experience, especially in light of differences between subprograms, and make several suggestions for ways to strengthen this rapidly advancing program.

Philosophical prelude on the structure of the Biology Graduate Program

The CUNY doctoral program in Biology is comprised of four subprograms that from a student perspective currently operate semi-autonomously. Two of these subprograms, Molecular, Cellular and Developmental Biology (MCD) and Neuroscience (NS) represent disciplines that are included in programs in the biomedical sciences at most other institutions. Research productivity and therefore the culture of training programs in the biomedical sciences is highly dependent on extramural grant support of labor-intensive laboratory research. Support for this kind of research is most typically from the NIH. In contrast, the Ecology, Evolutionary Biology and Behavior (EEB) and Plant Science (PS) subprograms represent disciplines that typically are less reliant on NIH funding and expensive instrumentation and where major advances can come from intelligent use of natural resources, often driven by individuals as compared to teams of researchers. Although the above statement is a bit of an over-simplification and there are clear areas of overlap between each of these areas, the dichotomous nature of research in the biological sciences has posed a challenge for nearly all institutions that have graduate training programs in the biological sciences since the advent of molecular biology in the mid 1970s. The assimilation of these four subprograms into a single doctoral program in Biology currently serves primarily as an administrative function. However, this centralized administrative function is extremely important, if not essential given the multi-campus nature of each of the sub-programs, all of which include faculty from at least six different CUNY campuses. Importantly, this administrative structure, although complex and not without problems, provides a valuable framework for promoting interactions between these different disciplines. These types of interdisciplinary interactions are becoming increasingly important to the future of research in the biological sciences. In this light, the Graduate Program in Biology has the potential to play a major role in positioning CUNY as a real player in the future. In our review of the training program that follows below we will describe our understanding of how things are currently working and provide suggestions as to how the program may be able to take better advantage of its unique structure, both intellectually as well as administratively, to promote excellence in research and scholarship in the biological sciences in the 21st century.

Program organization and participation

According to the documents we received, the CUNY Ph.D. Program in Biology has 192 doctoral students and 247 participating faculty from seven CUNY campuses (Baruch, Brooklyn, CCNY, Hunter, Lehman, Queens, Staten Island, and York) and three nonacademic institutions (the American Museum of Natural History, the Institute of Basic Research in Developmental Disabilities, and the New York Botanical Garden). The four subprograms have the following numbers of faculty and graduate student according to the program website: EEB (62, 52), MCD (87, 81), NS (68, 42), and PS (40, 27), i.e. 261 faculty and 202 graduate students. Thus, the website numbers are similar to but somewhat larger than the information provided to us by the program.

While a Biology graduate program with about 250 faculty and nearly 200 doctoral students is large by national standards, participation in the program by the listed faculty appears to vary considerably. Some faculty are extremely active and dedicated members who participate in administrative committees, advise students and offer courses. However, many faculty (we count 104 in the list provided to us) do not appear to have recently taught a course or advised a student in the program. Some of these individuals have active research programs, as judged by having extramural funding, while 47 others appear not to have recently authored papers given that they were not included in the list of faculty publications, suggesting that they may no longer be research active. While faculty productivity varies at every institution, we think it would behoove the program to **regularly evaluate faculty participation and activity and update the program website to accurately indicate faculty that are involved in research and graduate education.** One way to do this is to **use publication addresses to identify papers published from a CUNY Biology Department**. Since these types of data are used by a variety of national ranking organizations, this would also insure that publications are reported consistently. Maintaining an accurate, informative and useful website is important. We concur with the Program's recommendation that this responsibility should be handled by the Program.

Program quality – extramural funding

According to program information, 169 of 221 (76%) faculty had external grant support over the past three years. This is a very good record of funding success given that core programs at both the NIH and NSF have recently been awarding grants to fewer than 10% of applicants. However, as noted above, a number of the faculty listed with grant support have not recently participated in the program and 30 faculty did not provide information. Of the 133 active faculty, i.e. those with advisees or actively teaching, 89 (67%) indicate some amount of external funding between 2009-11. This is still respectable, but the amount of grant funds associated with labs containing graduate students is less than reported. By our count, there is about $66M in grant funds listed for labs with students. Grant support is also not evenly distributed among the campuses. Hunter College reports the highest while Baruch College has the smallest. When expressed as a ratio of grant dollars/year/graduate student, Hunter is still the highest (over $200K/student), followed by CCNY ($160K), with Staten Island ($64K) and Lehman ($45K) having the least reported grant funds per student.

Program quality – publication number and impact

Grant funds do not necessarily reflect program quality since different areas of research cost different amounts of money. One measure of science quality is the publications that are produced by the faculty and students and the impact they have on the field. The program reports that 221 faculty indicated that they had published 1,388 publications between 2009 and 2011. To assess the impact of these publications we conducted a search using Web of Science for all articles published from any CUNY Department of Biology address between 2007 and 2011. This search returned 690 publications. We suspect at least part of the difference between these numbers is the absence of a CUNY address in some of the publications since several papers listed with student authors failed to include a CUNY address. This is clearly something that should be remedied in the future. Another possible explanation is that some of the publications, for example those in taxonomic journals, may not be referenced in the Web of Science. Nevertheless, it may still be instructive to consider some of the results from the search, particularly with regard to how the four subprograms compare.

Using Web of Science subject areas, we tallied the 690 publications by subprogram area and found the following distribution: 51% MCD, 29% EEB, 15% NS, and 5% PS. We also tallied all high impact publications using any publication with an impact factor equal to or greater than the *Proceedings of the National Sciences* (i.e. IF > 9.8). **This analysis revealed that 27 papers had been published in high impact journals over the 5-year period.** The journals included *Nature, Science, PNAS, Current Biology, Ann Rev Ecol & Syst, Cell, Dev Cell, J Cell Biol, Nature Cell Biology,* and *Neuron.* The distribution of high impact papers by subprogram area was 11 (41%) MCD, 7 (26%) EEB, 8 (30%) NS, and 1 (4%) PS. For comparison, the proportion of the 247 faculty in each area is 33% MCD, 24% EEB, 26% NS, and 15% PS. As noted above the number of active faculty is clearly less than 247, but we cannot determine exact numbers for each area. However, by publication number and impact, the MCD subprogram appears to be producing the most high impact papers while PS appears to be producing the least.

Increasing the number of high impact publications in all subprograms will elevate the stature of the program on a national scale and will facilitate student and faculty recruitment. It should be noted that average teaching loads in high-ranking Biology Departments across the country typically vary between 1 and 2 courses per year. Thus, the expected number and quality of publications produced at CUNY must be considered relative to the amount of time faculty must spend on teaching and administrative duties, which appears to us to be relatively high.

Program quality – student placement

Another dimension of program quality is the outcome of student placement. **Based on the information we received, the placement of many students who recently completed the program is excellent.** Of the 20 graduates from the past year who provided

information, one indicated that he accepted a faculty position at SUNY Farmingdale, while the other 19 indicated they were pursuing postdoctoral research at uniformly superb institutions. This is an excellent record of initial placement that should provide many future faculty opportunities. However, in response to questions about career goals a small sample of current students that we met said they were not aspiring to academic positions. Given the diversity of the CUNY student population, we suspect that many graduates would have opportunities for academic jobs and should be encouraged to pursue them. One alumnus suggested to us that it would be useful to have an alumni network so that graduates could easily keep in touch. This can easily be done with social media and would be a simple way for the program to communicate with alumni and track placement, since academic jobs often are often not obtained for 4 to 6 years post PhD.

Program administration and support

Despite being unusually complex, the administrative structure of the program appears to function well. By all accounts, the current Executive Officer, Dr. Laurel Eckhardt has done an excellent job and is respected by staff, students, faculty and higher administration – not a trivial accomplishment. Multiple faculty from each campus are involved either as a Graduate Deputy Chair, a member of the Advisory committee, or as a Subprogram Chair. Multiple students participate on the Advisory and Executive Committees and seem actively engaged in the operation of the program. Since we met with very few faculty who were not involved in one of these groups, it is hard to assess the degree to which other faculty are satisfied with how the program functions. We did, though, meet with first year, advanced, and recently graduated students, and all seemed satisfied with how the program operates.

The effort expended by faculty on administrative tasks, such as tracking sources of funds for all current students in the program, which is done by the Graduate Program Chairs on some campuses, seems high. If resources are not available to pay staff to do this work, then it is important for relevant administrators to recognize and thank faculty for the time they contribute on behalf of the program. Based on what we were told, we believe that deputy graduate chairs should be getting course release time for the work that they do. This needs to be made explicit so that those individuals receive appropriate recognition for their services. **Faculty recognition and reward is critical to insure that others will be willing to help in the future.**

During interviews with students and faculty we also learned that recognition of the Biology Program at the Graduate Center is rare despite the size of the program. For example, results of faculty and student research or announcements of events or awards, are not frequently posted at the Graduate Center or included in its publications. Faculty and students commented that this lack of advertising made them feel that their efforts and successes were not being recognized. Explanation for this pattern is obvious since participating Biology Faculty only visit the Graduate Center to teach while faculty from other disciplines are appointed to the Graduate Center where they maintain offices and host events. However, to the extent that the Graduate Center represents all students pursuing doctoral degrees at CUNY, **we strongly believe that the Center should make an**

effort to advocate for all fields. As noted below, we also think more events should be held at the Center to increase interaction among students and faculty from participating campuses.

An additional complex aspect of the program involves the CUNY Allocation System, which is used to reward campuses for allowing faculty to offer graduate courses that enroll five or more doctoral students. We recognize that it is a nontrivial problem to develop a mechanism to distribute funds in support of graduate education fairly among multiple participating campuses. We also suspect that the current system is not easily modified. However, we did encounter several problems that seem to be a result of this process and describe them here so that possible solutions can be considered.

1) **Development of new courses appears to be challenging in several ways.** We were told that faculty at some campuses cannot predict if a course will attract a sufficient number of students to justify offering it and consequently compete with each other for this opportunity. In addition, the current program structure does not appear to encourage course offerings in interdisciplinary areas, e.g. systems biology, bioinformatics, or biophysics. It seems to us that **the Executive Committee could facilitate development of new courses by inviting course proposals each year, reviewing them, and then providing feedback to improve coordination and minimize potential competition among faculty and campuses.** In addition, if members of the Executive Committee agreed that a course is needed, then **perhaps a one-time waiver of the 5 student minimum should be considered to give new courses an opportunity to get started.**

2) **Offering the same core course at multiple campuses is not ideal for training doctoral students.** We learned that several MCD core courses are offered at multiple campuses. Since these courses also serve MS students, of which there are many at some campuses, this system serves a variety of students and requires less commuting for students who are doing rotations at one of these campuses. However, presence/absence of courses at some campuses may influence where students choose to do rotations. Furthermore, core courses taught by different faculty on different campuses will invariably have different content and possibly diverge over time. Graduate core courses in Biology at many institutions are team-taught to insure that faculty teach in their area of expertise and to insure that all students get exposed to a variety of perspectives. For these reasons, **offering team taught core courses at the Graduate Center seems to us to be a better way to take advantage of and expose students to the breadth of expertise available collectively at CUNY.** It also provides a simple way for new faculty to participate in graduate teaching without having to develop independent courses. Careful scheduling will be needed to minimize travel and give students adequate time to spend in labs during rotations. **If team-teaching is not easily accommodated by the Allocation System, then we encourage the administration to develop creative ways to allow it to occur.**

3) The Allocation System appears to reward campuses more for offering classroom instruction than for sponsoring and completing independent research. It also appears that doctoral students spend a considerable amount of time taking courses. Since doctoral programs are compared on a national level largely on the basis of faculty and student

research productivity, it is important to consider if required coursework relates to and enhances future research. **Rather than distribute funds to campuses in relation to faculty effort every semester, perhaps the current system could be modified to reward campuses in proportion to the number of students who graduate from the program.** This would shift the emphasis away from classroom instruction and focus it on completion of the degree and might have the added benefit of providing incentive to campuses to help students reduce time to completion of their degrees.

4) **Funds that are returned to campuses for service to the program should be used to help support the program in some way.** At present, there appears to be no relationship between the support system on each campus and the program, although we admit that we were not given adequate information to evaluate this issue in any detail.

Finally, we were asked by the President of the Graduate Center, Dr. William Kelly, to consider the pros and cons of allowing some campuses to award a joint doctoral degree. While we agree that campuses should be recognized for hosting and sponsoring the faculty member who advises a student, allowing some campuses to award a joint degree but not others seems counter to the spirit of the CUNY Graduate Center. **From our perspective it seems more appropriate for all students to receive their degree from the Graduate Center but also include the name of the CUNY campus where they did their work.** This type of inscription would enable all campuses to get appropriate credit but also recognize that the academic program is run collectively by faculty from multiple CUNY campuses.

Admissions, recruitment and student support

Admission to the program has become more competitive over the past few years. Each of the four subprograms has an Admissions Committee comprised of the subprogram Advisory Committee minus the student representatives, and thus has faculty representation from most of the participating campuses. Each subprogram receives an allocation of a fixed number of recruitment slots for each year, although there is some flexibility to recruit more into one subprogram and less in another based on student quality. The admissions data provided to us indicates an increase in the number of applications, an increase in selectivity, a decrease in the proportion of accepted students that enroll and an increase in the quality of the students based on GRE scores over the last four years. The decrease in the proportion of accepted students that enroll is consistent with the idea that the Program is attracting applications from a stronger pool. The increased competiveness of the program is almost certainly a result of the CUNY Science Scholars Program that was instituted in 2008 that promises accepted students five full years of support at $25,000 with the first year provided by the Graduate Center with no obligation for teaching. The Biology Program has also organized a Recruitment Open House each of the last two years and reports a 70% yield of applicants that attended this event in the spring of 2011. This yield is significantly better than the overall yield of 43% for this year indicating that the event was successful.

The positive results described above are balanced by concerns that will need to be addressed in order to maintain this upward trajectory. We were stunned to learn that the budget for recruiting amounts to $500 per year for support of the Recruitment Open House. The Biological Sciences Program at Maryland budgeted $30,000 to recruit an incoming class of 29 students this year. Similarly, the Biochemistry and Structural Biology, Genetics and Molecular and Cellular Biology Programs at Stony Brook spent a total of more than $25,000 to recruit a total of 33 students that will start this fall. Nationally, some graduate programs choose to make offers without an interview whereas others wait until the applicant has come for an interview to make an offer. It is interesting to note that both approaches are employed by different subprograms within the Biology program at CUNY. Whether it is a recruitment visit or an interview, the generally accepted national standard is to bring the best prospective students to campus to sell the unique attributes and strengths of a program. **If the Graduate Program in Biology at CUNY is going to continue to improve it is imperative that resources are identified to sustain a vigorous outreach and recruitment process.**

It is notable that the number of enrolled students consistently falls short of the number of allocations, both for the entire Program as well as for three of the four subprograms. The failure to meet the recruitment goal is especially problematic for the Plant Sciences subprogram based on its small size and allocation of only four recruitment slots each year. The shortfall is predictable. As a case in point, for the entering class of 2010 the Program received an overall allocation of 39 recruitment slots and made 64 offers to recruit a class of 31 students. Based on the 56% yield of accepted students who enrolled the prior year these 64 offers should have yielded a class of 36 students, three slots below the allocation (it is further notable that Plant Sciences was the one subprogram allowed to admit a qualified student beyond their initial allocation during this recruitment year, otherwise the numbers would be even worse). These results indicate some underlying problem with the management of the admissions and recruitment process. **A well-managed process should result in some years where the Program as a whole falls a little short of its allocation, but also other years where the number of qualified students that are admitted and enroll exceeds the allocation**. As an example, Stony Brook utilizes a back-stopping approach whereby individual programs are allowed to make offers beyond their target that are based on the yield in prior years. If a program overshoots and enrolls a student beyond their target the Graduate School covers the additional expense for one year and the program's target for the following year is reduced by one slot. Recruitment in a competitive environment requires getting offers out early, which in turn means making offers to qualified applicants that may not be in the top tier without knowing for certain the status of the top tier applicants.

The institution of the CUNY Science Scholar support package in 2008 was a sea change for the Biology Program. As mentioned above, this package includes $25,000 from the Graduate Center to support the first year in the Program. This stipend level is somewhat less than in other graduate programs in the biological sciences in the northeast, and well below the $30,000 stipends offered by other programs in New York City. To be competitive it is clear that the level of stipend support needs to increase. However, **it is essential that any increase in stipends be done in a manner that works both for the Graduate**

Center as well as for the faculty and campuses that are obligated to provide support after the first year. A relatively small number of the students are supported by Graduate Assistant A appointments that provide $21,000 per year for teaching two 4 hour laboratory sections in both the fall and spring semesters. Many more students are supported as Teaching Adjuncts and receive only $17,500 for this same amount of teaching. These teaching loads are prohibitive to research productivity. Current faculty extramural support for Graduate Research Assistant positions, or for the supplements to the Graduate Assistant A and Teaching Adjuncts lines is budgeted for $25,000 and it will not be trivial to increase this to $30,000 in a single jump since most funds on current grants are likely already obligated. It is also problematic to increase stipends for newly recruited students without providing increases to more senior students. One mechanism would be to offer first year students a recruitment package that includes a mix of a guaranteed stipend and an additional recruitment bonus for the first year. For the first year the mix could be a guaranteed five years at $26,000 with a $4,000 bonus, and with a program wide increase in the stipends of all students to $26,000. The stipend level could continue to increase on a program-wide level in subsequent years at a more gradual and sustainable pace, and it would be up to the Graduate Center whether or not to adjust the recruitment bonus. There are certainly other mechanisms for dealing with this issue, but the importance of addressing this problem as a partnership involving both the Graduate Center and the Program faculty on the participating CUNY campuses cannot be over-emphasized.

The first year experience, core curricula and identification of a thesis advisor

As is the case for admissions, each of the four subprograms operates autonomously with respect to the required curriculum and the mechanisms by which students choose a thesis advisor. Clearly the bulk of the content of the first year courses will be different in the four different areas. However, there are also distinctions in the mechanism of delivery that seem to reflect institutional history. The EEB and NS programs offer their core courses in a centralized manner that involves use of the facilities in the Graduate Center. In contrast and at the other extreme, the Developmental Biology course in the MCD core curriculum is offered at four different CUNY campuses. Although offering this course at multiple locations has the advantage of providing some flexibility for the students and is clearly convenient for the faculty who are also teaching larger numbers of Masters students in these courses this approach is almost certainly not in the best interests of the doctoral program in Biology. **It is our feeling that the Program will benefit by having all of the MCD students taking their core courses together, possibly at the Graduate Center, with an option of using teleconferencing for some faculty lecturers.** Having subprogram core courses team-taught by faculty from the different CUNY campuses should also promote interactions between the campuses which should enrich the intellectual environment and may lead to productive collaborations.

A key issue for any program that involves multiple institutions is creation of a program identity. This issue is clearly recognized by the MCD subprogram as they have instituted a weekly career development class for their first year students at the Graduate Center. This excellent idea of establishing a weekly career development activity for the first year students should be expanded beyond the MCD track and include the three other

subprograms. Indeed, **bringing students in all four subprograms together on a weekly basis during the first year is likely to have a significant and highly positive impact on the identity of the Graduate Program in Biology.**

The mechanism by which students identify their thesis advisor also differs between the different subprograms. The MCD subprogram requires that the first year students do rotations in the labs of different prospective thesis advisors, and that these rotations involve at least two different campuses. This is the type of formula used successfully by most other graduate programs in this disciplinary area and does help to promote interactions between different research laboratories. The NS subprogram has been less dogmatic about rotations but appears to be moving towards the MCD model. In contrast, the EEB and PS subprograms indicate that they encourage, but do not require laboratory rotations for their first year students. This dichotomy again reflects a cultural difference between the more molecular versus natural science based graduate programs in biology. Some of the very best students in the doctoral program are in the EEB and PS subprograms and in some instances these students applied to CUNY to work with specific faculty members, in particular with affiliated faculty in the American Museum of Natural History and the New York Botanical Gardens. Given the value of these affiliations and the observations that the current system appears to be working for each of the different subprograms **we do not feel that it is important to standardize the rotation requirements across all four subprograms.** It will be interesting to see if increasing interactions between first year students in the different subprograms through the weekly career development course proposed above has an effect on how students in the different subprograms feel about the value of doing laboratory rotations.

The first year experience culminates with the First Exam in June. The format for this exam varies somewhat between the subprograms, but in each case the exam is based on reading materials that are provided to the students in early January. This structure for the most part seems to work, although we did hear from some of the students that the reading list sometimes contains papers that are based on material that has not been covered in the core courses. This may be due to differences in core courses offered at different campuses, which re-emphasizes the importance of consolidating the core curriculum for each subprogram.

Student life, research and career development

Students in the Biology Graduate Program are required to teach for two semesters. The advent of the CUNY Science Scholar support package allowed students to delay their inaugural teaching experience until the second year, which as mentioned above has greatly improved the first year experience. This delay also provides an opportunity to offer training to students before they move into the classroom as Teaching Assistants. The Biology Program initiated a half-day Teaching Workshop in 2010 that is complemented by having each first year student visit a class and observe the activities of an effective and experienced teaching assistant. These are very good first steps and with proper evaluation should lead to improved outcomes for both the graduate teaching assistants and the

undergraduates in their classrooms. The Program also provides a handful of other career development activities and Workshops.

Although students are only required to teach for two semesters, the impression we got from the students that we met is that most students teach almost every semester. This is almost certainly due to funding constraints. Given this heavy teaching burden, the research productivity and time to degree completion for the graduate students in the Program is even more impressive. There is no easy way to reduce the teaching burden without increasing the grant dollars that are available to provide student stipends, but as grant dollars depend on research productivity and much of this productivity is dependent on the work done by graduate students **it will be wise for the institution to consider investing additional funds in graduate student support using mechanisms similar to the Doctoral Dissertation Fellowships.**

The structure of the training program after the first year is fairly typical to that found in other doctoral training programs and includes research, a thesis proposal Second Exam and regular meetings with a faculty advisory committee. There are a few unique attributes of the CUNY program that impact the student experience that we feel are worth discussing with the objective of improving these experiences and student outcomes. One notable attribute is the extremely high cost of housing. Most of the students and faculty that we met do not live in Manhattan, but instead commute from Brooklyn, Queens, Staten Island or New Jersey. The University recently opened Graduate center Student Housing in Manhattan that is claimed to be affordable, but this is not a sentiment that is shared by the students. **We support the suggestion made by several students to have the Graduate Center create a centralized source of information on student housing opportunities, perhaps listing openings in off-campus housing shared by students or with landlords who have a history of treating CUNY graduate students fairly.**

A major attribute of the program that was already touched on above is the multi-institutional structure. On the one hand this provides enormous opportunity for prospective students with the wide range of institutional settings and resources. However, this also presents considerable challenges in identifying resources and prospective faculty advisors. The current Program identity is four loosely associated subprograms that do relatively little to promote interactions between each other, or between the different affiliated campuses. Except for the faculty deeply involved in Program administration there is little connection to the Graduate Center or the other CUNY campuses. Similarly, once students have identified a thesis lab and home campus there is very little that is done to keep them connected to students at other campuses, even students in the same subprogram. There are grass roots initiatives to address this issue, for example biweekly meetings at the Graduate Center by students in the EEB subprogram. **The Program could and should take a lead role in promoting interactions both within and between each of the four subprograms.** There are many ways to do this, the successful CUNY Science Scholar Orientation and subsequent Peer-Mentoring Workshop for the first year students both include poster presentations by more senior students that provide useful examples of this kind of activity. We suggest extending these efforts to include annual retreats for each of the four subprograms either at the Graduate Center or at one of the campuses on a

rotating basis, as well as a 'Grand Retreat' or one day symposium at the Graduate Center in which select students (and/or faculty – maybe a student-invited speaker?) give research presentations to all other students in the Program. These kinds of events provide invaluable opportunities to showcase accomplishments and are tremendously helpful for community building.

Financial support of the Program – a measure of institutional commitment

As mentioned above, we find it incomprehensible that the Program has a recruiting budget of $500/year. Further, the support for the central Program office is currently limited to one fulltime staff person, a part-time student assistant and an OTPS budget of $1,800. **This is an inadequate level of support for a Program of this size and certainly will not allow for further programmatic development**. To be competitive the recruiting budget should be on the order of $20,000 to $30,000 per year. There will also be additional expenses with having Program Retreat(s) and additional career development activities as described above. The total amount of money needed to enhance recruiting and programmatic activities might be too much for the Graduate Center or any one of the CUNY campuses to manage. However with contributions from each of the involved stakeholders, including the American Museum of Natural History and the New York Botanical Gardens at a level of approximately $250 for each student working at their campus (with the Graduate Center covering the total for all first year students) it would be possible to generate a pool of funds that should have a transformative impact on the CUNY Graduate Program in Biology. Indeed, the failure of any current stakeholder to make this level of investment in the Program should raise serious questions about their institutional commitment to graduate research and education.

Appendix 6c:

External Review of the Ph.D. Program in Chemistry, 2011

City University of New York
PhD Program in Chemistry
Report from the External Review Committee
May 2, 2011

The graduate chemistry program at the City University of New York (CUNY) faces unique challenges but also presents unusual opportunities. The chemistry program at CUNY is the only such Ph.D. program in the U.S. (and perhaps the world) that is a consortium of like departments from independent colleges. Successful melding of the graduate programs of independent colleges located in 5 boroughs of a city as large as New York is a tremendous challenge. CUNY faces other challenges that confront many chemistry programs as well, including how to recruit and support qualified graduate students. To its great advantage is CUNY's placement in the country's largest metropolitan hub, offering unique access to local and regional students and industries as well as to international students.

We are very appreciative of the time and attention that was paid by the faculty and the administration in advance of our visit and during our brief but informative two days at the Graduate Center (GC). In this report, we offer our observations about the program and provide recommendations for consideration. As is often the case in such reviews, we have undoubtedly focused too much attention on areas for improvement and too little on current strengths of the program, which are not insignificant, particularly in terms of an engaged and enthusiastic faculty and a unique and extraordinarily diverse graduate student population.

Faculty

1. Faculty Workload. Teaching assignments within the 21-hour requirement appear to be inordinately confusing and complicated, with awkward accounting schemes that do not always even add up to whole "effort" numbers, leading to inconsistencies in workloads, *pro bono* teaching, and other morale-impacting situations. There must of course be room for appropriately individualized expectations, but these must be developed within a greater context of clear understandings.

2. Executive Officer (EO) Workload. It is our understanding that one full-time and one half-time employee staff the department office. It appears that at this staffing level the office is unable to provide the critical services that the program needs, including website maintenance, coordination of student recruitment, provision of information to incoming students, and resolution of problems encountered by current students. While the EO receives some release time from teaching, the "replacement" salary is returned to the College, not the Department. Given the loss to the Department of teaching "horsepower," it is important to ensure adequate support for the Department's teaching mission when one of their faculty is selected for the position of EO. The EO currently is expected to maintain the website. This is an unrealistic and problematic expectation, especially given the key role an effective website can play in student recruitment.

3. Faculty Hiring. Our understanding is that individual campuses determine hiring needs and areas, individual faculty can apply for affiliation with the GC, and the GC does not contribute toward "start-up" packages. Faculty said that communication between colleges on hiring was improving but we inferred that it was not significant. We suggest a stronger consortium would result from more coordination of

hiring. This would make more efficient use of (expensive) research resources, reduce unnecessary duplication, and enhance collaboration through complementary hires.

4. Faculty Success. There was considerable discussion of faculty "quality" and research activity, raising, of course, interesting questions about how one judges such matters. Particularly at the institutions that have a shorter research history, we see value in identifying mechanisms for "bootstrapping" both new faculty members and more senior faculty who would like to enhance their research activity. Our proposal (below) for an increased pool of graduate students, achieved through reconfiguration of the rotation system and introduction of a teaching requirement for students during their first year could play a key role in this. An enhanced master's program (MS) and addition of PhD students from regional industries (also addressed below) would also play key roles in enhancing research opportunities.

Defining research activity is a difficult issue, and we do not feel comfortable attempting to reach any conclusions on the basis of a short visit and the provision of relevant information that should not be over-interpreted, including an extensive publication list and reports of grant support. The university should be cautious about practices that may inadvertently reduce the opportunities for faculty experiencing downturns in their research efforts to return to full activity.

Tenure expectations vary from school to school. Given the individual "personalities" of each college, this is to be expected, and caution will be needed as the drive for improved faculty excellence continues. Not all faculty will be working with the same resources, the same access to students, or the same expectations regarding teaching and service; it seems unlikely that a one-size-fits-all set of tenure criteria will be possible.

It is our understanding that there is a mentorship program for junior faculty, but that it is underutilized. We recommend that enhancement of this program be considered, and while we see no evidence for career plateaus at the associate level, we suggest consideration of expansion of this mentorship program to include those at the associate professor level.

5. Faculty Involvement in the University. Some faculty felt disconnected from the university and unaware of future plans. For instance, there was some confusion concerning the staffing of the Advanced Science Research Center. Some faculty believe that the Advanced Science Research Center will be staffed with "big name" senior professors, under whom would work a collection of associate professors. This "Germanic" system would be rather revolutionary in the US. However, Dean Henderson described the Advanced Science Research Center's role differently. The fact that faculty are uncertain how the Advanced Science Research Center will be utilized is a point of concern.

Increasing the Number of Chemistry Graduate Students at CUNY

1. Student Recruitment. It is not unusual for chemistry departments to enroll more students than there are faculty members. CUNY supports ca. 24 first year chemistry graduate students in each class. This is far too small to sustain the number of research active faculty, especially given the large number of junior faculty who are hired with the expectation that they will successfully compete for grant support. We recommend that the number of students be increased by 33% to 32 students per year. At first glance, this is an expensive proposition. However, to partially offset these costs we propose that students serve as Teaching Assistants during the spring semester and that this be coupled with a revised rotation system

(described below). It is our understanding that the Colleges commit before hand to how many new students they can support, but that there are more spots overall than students. Students will choose research advisors before the spring semester commences, leaving no reason for them to be supported as fellows and instead will TA in the college that their advisor is a part of. It is our understanding that there is a need for TAs in the colleges. Placing students on TA will make money that has been used to support them as fellows available to increase the number of first year graduate students. This proposal commits a larger amount of money to support first year chemistry graduate students. However, a larger number of successful students and in turn faculty will save the university money in the long run by having fewer advanced year students on TA and in the form of greater indirect costs generated by research active faculty.

Graduate student recruitment is a particularly acute problem at CUNY. There are 24 Assistant Professors in the chemistry departments at Brooklyn, City, Hunter, Queens, Staten Island, and York Colleges. These young faculty members need graduate students to develop successful research programs that are competitive for research funding. At the same time, established research active faculty members also need students to maintain programs.

The chemistry program currently accepts ~50% of the applicants and ~67% of the matriculated students are international. The program needs to increase its applicant pool and become less reliant on international students if it hopes to increase the class size and quality of its graduate students.

New York City is an attractive place to live to some people and this should be used to CUNY's advantage. There are two relatively inexpensive ways to advertise the graduate program to potential graduate students. The first is through a website. The current website does not convey a sense of excitement. Moreover, it is confusing and does the program a disservice in some respects. For instance, the description of financial assistance (http://web.gc.cuny.edu/chemistry/program/financial.htm) is unclear. It could be construed to imply that some students receive a stipend of $16,000 per year. Furthermore, why does the home page state "Applicants to the Program are asked to select one of these colleges as the location at which they intend to carry out their doctoral research" (http://web.gc.cuny.edu/chemistry/index.htm) when all students enter through the GC and carry out rotations before choosing an advisor? The website could be improved by making application procedures and financial support clearer. It would also benefit from being more exciting. There are no campus snapshots or photographs of people and facilities on the current website. In fact, there are no photographs of any kind! The website should advertise new developments (research and otherwise) such as new infrastructure (e.g. graduate student housing, Advanced Science Research Center), success stories (e.g. recent papers accepted in top tier journals, new faculty hires, recent graduates and importantly what their plans are).

The northeast is a densely populated region of the United States, with many universities and colleges. Another way to advertise the chemistry graduate program is to have an organized effort in which CUNY pays the expenses of faculty to present research seminars at other institutions. Many small colleges cannot afford to invite outside speakers. One way to organize this is to solicit seminar titles from CUNY faculty and compile this into a simple brochure that can be distributed electronically or via traditional mail to chemistry departments (and individual faculty) within a certain distance from New York City. It should be made clear that CUNY is offering to pay for its faculty to visit these schools. This effort should be coordinated through the administrative staff in the chemistry department at the GC (more below) and not

individual faculty. This way data can be collected on faculty visits and correlated with applications. However, one must be patient and consistent with this form of advertisement.

Qualified current graduate students should be offered the opportunity to make recruiting visits to their alma maters, in which they may present their research results and talk informally about life at CUNY, and they should be helped with making contacts and arrangements for these visits. This sort of recruiting visit can be highly effective.

It is often said that current graduate students are the best recruiting tool. It is typical for domestic applicants who are accepted into a Ph.D. chemistry (and other sciences) program to visit the university at no cost to the student. Admittedly, this is more challenging for CUNY because the GC is not where the students will carry out research and viewing facilities is important. Perhaps visiting students could spend two days in New York City using the GC as their home base and visit at least one campus per day? Regardless, it is important for prospective students to meet current students who are optimistic about their career potential, enthusiastic, and have positive opinions about the program, the university, and their research advisors. Some issues with respect to how the graduate program functions must be addressed in order to ensure such favorable testimonials (*vide infra*).

Finally, administration of the application process is not conducive to effective recruitment. Admissions are formalized, centralized, and expensive. We recognize the desire to attract increasingly talented students, yet we also urge a consideration of the GC's role in US graduate education. In trying hard to attract "tier 1" students, are the "rough diamonds" – the "tier 2" students that may be extremely well-served by the GC, being driven away? The $125 application fee is extremely high. Some programs waive the application fee entirely, others require the fee only if a student enrolls. Regardless, the domestic chemistry graduate student market is a competitive one and it is likely that CUNY is losing some applicants due to the high application fee. It is probably losing international applicants as well for the same reason. It is also our understanding that prospective students receive separate admissions and financial support letters. This too can be confusing. As mentioned above, the offer letter should contain (at most as a separate letter in the same envelope) a clearly explained financial offer.

Students should be asked to list faculty research, or at least research areas, of particular interest to them on their applications. This will provide for better planning regarding admissions, and also places a greater emphasis on research from their very first interaction with the GC.

Maintaining a presence of more senior students at the GC, as noted earlier under the Experience header, would reduce the sense of homelessness often cited by students, and viewed as an impediment to recruiting in general and minority recruiting in particular.

2. Expanded Academic Programs – MS; PhD for industrial chemists. CUNY's proximity to the chemical and pharmaceutical industry in the New York, New Jersey area provides an unusual opportunity to increase graduate student enrollment without additional cost to the university. Some companies will support the part-time graduate education of their workforce. These students are mature and driven to succeed because they have an up-close view of the benefits from obtaining their PhD. The faculty benefit from a larger pool of qualified students. CUNY obtains tuition and does not have to provide fellowship and/or TA support (beyond what is required for the degree). The anticipated number of student participants in such a program at any given time is small. This is one instance where it would be best for

faculty members to advertise the program by making personal contacts with scientists at individual companies in order to foster such partnerships.

CUNY could also consider establishing a research based MS program. This program would not conflict with MA programs offered by the colleges, which are not laboratory intensive. The idea of such a program is to provide true research training for students in order to prepare them for positions in industry. There is a need for MS level students in industry but this degree is often a consolation prize for students from PhD programs. There are a small number of Masters level chemistry programs in the country. Two successful examples are those at the University of Oregon (http://internship.uoregon.edu/) and at Illinois State University (http://chemistry.illinoisstate.edu/default.aspx). Such a program might play out at CUNY as follows. Students would enter through the GC and take courses and carry out rotations with the PhD candidates. They too would join research groups in the spring semester. The goal would be to graduate in approximately 2 years (including the summer between years 1 and 2) and to write a thesis on their research. Financial support would not be provided. Such a program might be attractive to some of CUNY's own undergraduates who want to gain advanced training and remain in the New York area. Although MS students would not produce as much research results as PhD students, requiring a thesis necessitates that they obtain original research results. Pairing MS students with faculty who have smaller research groups and less funding may be mutually beneficial. Such students may need more personal attention in order to quickly come up to speed in the laboratory but will provide a source of research staff for obtaining preliminary results needed for grant applications.

Benefits of such a program to the PhD program include the possible transition of strong students from the MS to the PhD track and increased enrollments in courses (pending a reconsideration of counting MS students toward enrollment minima). As a possible caution, it is important to determine whether such a program would have any possible ramifications regarding RUI or PUI status for institutions within the consortium. While not a deal-breaker, this could certainly complicate the equation.

Student Support

Complaints concerning how financial support is distributed were a common refrain. Students noted that stipend levels for people beyond their first year of study varied widely and depended upon whether they were TAs and even what their teaching assignments were. Anecdotally, two students described how one student had two sections of recitation while another had six. Other students described being treated like employees instead of students while serving as TAs. However, the stipend level, teaching load, and degree of responsibility were uncorrelated. A complex, multi-tiered support system detracts from what stipends are meant to do, which is to provide financial support so that students can focus on their studies. Anecdotally, we also heard of the possibility that students were being enticed to join certain research groups through the offer of higher than ordinary stipends. We urge the adoption of a set, single stipend that must be adhered to by all. Special grants and fellowships, of course, would be exempt from this – e.g., IGERT students are federally mandated to receive a rather generous allotment.

Students found it difficult to keep track of their financial support because they often receive multiple checks in a given pay period. On a positive note, (international) students received a substantial amount of money when they arrived in New York in order to defray moving costs. Our understanding was that students received multiple checks because they were supported by a variety of mechanisms (TA, research assistantship, etc.). Even more distressing was that some students experienced lapses in health insurance

when they changed from one form of support to another and/or changed campuses (as one does during rotations). Regardless of how many accounts student stipends are drawn from, this process should be transparent to them. If they are to receive an up-front payment, their offer letter should clearly explain this and what their subsequent monthly stipend will be should also be clear. A student should receive a single check per pay period and should never experience a lapse in health insurance. In the event that a student does experience this type of problem, there should be a staff person in the chemistry department office at the GC (not the Executive Officer) who can resolve it.

Some of the complexity in student support, we feel, stems from individual faculty determining the most cost-effective ways to support students, including their tuition and insurance costs. To the extent possible, faculty should be uniformly apprised of the most cost-effective way to pay for students – rather than individually trying to find creative approaches, the consortium should determine the best support methods and apply them uniformly.

Students will only be placed with faculty who have grant support allowing them to pay for them, with exceptions made for early career faculty. While we understand the sentiment behind this, it must be recognized that this may in essence represent a decision not to allow those faculty whose research has faltered the opportunity to get back in the saddle. With the high teaching needs of the consortium, the option of partially supporting students on continuing teaching appointments should be reconsidered, for those faculty who can present a compelling case that the placement of a student with them will lead to attempted competition for external funds. Such students should be viewed as opportunities to bootstrap a revitalized research program, not as boondoggles.

At the colleges with greater focus on teaching, there appears to be some belief that higher teaching loads for graduate students are good things. It appears to us that the *quality* (e.g. level of independence, and responsibility) of the teaching experience should be most important.

Students are currently supported by the GC for their first year, while they take classes and carry out their research rotations. Frankly, the first year experience seems thin. Restructuring the first year to include more abbreviated rotations and some teaching would add strength to their educational experience while also allowing recruitment of larger incoming classes of students, as discussed elsewhere.

Student Experience

The students we met with were generally positive about their interactions with their research advisors. However, they voiced a variety of concerns, some of which were mentioned above. A number of the problems pointed out by the students could be addressed by more efficient organization and administration of the graduate program. Students would also benefit from knowing that there was one person who they could ask for help in resolving administrative issues.

Academically, students like the broad range of research choices present in the CUNY consortium. They also appreciate being able to enroll in courses at neighboring institutions, but some were unaware that this opportunity exists. One concern that came to light was the difficulty in completing course requirements due to cancellation of courses in which fewer than five graduate students were registered. Specifying a minimum student enrollment is understandable in order to efficiently utilize faculty. However, we were also told that MA students who take these courses are not counted towards the five-person requirement.

Again, this is an administrative issue that should not affect students' ability to obtain an education. Even still, if the faculty agrees that certain core courses should be taught yearly, this should be the case even if fewer than five students are enrolled. Non-core courses that do not attract five students could be taught every 2-3 years. The faculty and/or executive committee should have the power to determine which courses have this mandatory enrollment requirement waived. We note that our suggestions for enhanced master's programs and expansion of the PhD program to include scientists from regional industries who wish to pursue advanced degrees should have as an added benefit increased enrollments in courses, making cancellations less likely.

Students and faculty commented that new chemistry students feel adrift when they arrive at CUNY because they do not have desks, and are not surrounded by faculty and experienced graduate students who spend most of their time at their respective college campuses. Each new student, particularly those from abroad would benefit from having one faculty and one student mentor. These would be assigned to the students before their arrival in New York City. The student mentor could assist in identifying a place to live, arrange to meet the person when they arrive in New York, etc. The chemistry department office could also assist by soliciting information from current chemistry graduate students who are looking for roommates and forwarding a list to the new students prior to their arrival. The faculty and student mentors will help the new student navigate CUNY and New York City prior to their joining a research group. The student mentors could be nominally compensated perhaps by creating a seminar or independent study course that all first year students would enroll in for which the student mentors would be TAs. The pairing of faculty and student mentors is delicate and will need to be carefully done, perhaps by the executive committee. Students responded with great enthusiasm to this idea, and we note that it could help build the sense of community that we have been told is lacking, given the unique geographical dispersal of the student population. (See under Recruitment for additional positive impacts.)

Students, anecdotally, may be choosing sub-disciplines – organic, inorganic, etc. – based in part on their perception of the rigor of the expectations for pursuit of a PhD. This is not a good situation, and we suggest reducing differences in requirements and experiences – course requirements, examinations, cumulative exams, written and oral presentations, etc. – between the sub-disciplines.

While data were lacking, it is our understanding that once students pass into Level 2, they are almost certain to eventually receive their PhD; attrition happens primarily at Level 1. When coupled with the current "five years of support will be provided" model, this would appear to lead to the expectation that, following movement to level 2, all GC students will be on track to receive their PhD, yet clearly there is a desire for more opportunities to "filter" students to the correct degree level, which may not be the PhD. Chemistry apparently does not currently include a candidacy examination as a requirement. They should institute such a requirement.

International students experience stress as they approach graduation, facing complex issues regarding visa status, etc. Provision of even a single resource person for the entire consortium (if one does not exist) who was an expert on immigration issues would be of great value at the Graduate Center. We do not know if there is an office for international students. If one does not exist, this becomes the responsibility of the graduate program.

Overall, students come to graduate school to obtain an education. Any time spent navigating a complex bureaucracy distracts them from reaching their objective. Improving the graduate student experience will

help attract more students, which will enable the program to be more selective in the students it accepts, which will translate into more successful research and training. Improving the chemistry department office staff at the GC would enhance the students' experiences. The department office should keep students apprised of issues such as course cancellations and deadlines for filing various forms by sending program wide e-mails. They should also keep individual students and faculty up to date on progress towards graduation (e.g. completing cumulative exams). Office staff can also assist new students who at times feel overwhelmed and disconnected when they arrive at CUNY.

Choosing a Research Advisor

Choosing a research advisor is an extremely important decision for a student. Rotations are common in life science graduate programs, but much less so in chemistry departments. Rotations are also usually research intensive. At CUNY rotations are meant to familiarize students with the research in their host laboratories but they are not expected to carry out independent projects during these periods.

Rotations are meant to aid students in making an educated choice of advisor. At CUNY, rotations also help provide exposure for faculty to the students. This is particularly helpful for less well-established faculty and those in smaller departments. The rotation system is not popular with a faculty unused to such a system, although some younger members recognize the aforementioned potential benefit. In contrast, students generally liked the concept of rotations. However, they also felt that they were unproductive when either a student was already sure which group (s)he wanted to join or faculty were not committed to providing a valuable experience.

In the current system, graduate students carry out 3 rotations on a minimum of two campuses during their first two semesters in graduate school. The first rotation is completed during the fall semester and a series of faculty research presentations on Fridays at the GC provide them with information to aid their selection of two other rotations. Two rotations are carried out in the spring semester, at the conclusion of which they choose their research advisors. As an aside, students expressed frustration over the issuance of grades in the spring semester for the rotations. It appears that in some instances, it was unclear which rotation advisor is responsible for providing a grade and the burden fell upon the student to resolve this issue. This is one of several administrative problems that need to be resolved (*vide infra*). During the fall semester students spend three of the five weekdays taking courses and attending faculty research presentations at the GC, leaving two nonconsecutive days to participate in research rotation activities. Fridays are available in the spring semester for participating in rotations. This significantly limits the amount of time available for carrying out experiments. Furthermore, fragmentation of the time in the laboratory places additional limits on experimentation.

The goals of the rotation system are to enable students to make educated decisions regarding their choices of thesis advisors and to maximize the opportunities that individual faculty have for making students aware of their research. We propose retaining 3 rotations, but shortening them to 4-5 weeks each so that they are completed by the end of the first semester. Students would choose thesis advisors prior to the start of the spring semester. Reducing the time spent in rotations should ameliorate objections by faculty and students. The shortening of rotations will be coupled to a modification in how first year students are supported in the spring semester, which in turn will affect how many students can be brought into the program.

Students regularly appear to circumvent the rotation requirement. We explored the possibility of devising an option, consistently applied and making sense, for students to opt out of rotations, but ultimately concluded that the risk of development of two "castes" of students was too high. Instead, all students should be engaged in the rotation system. We note that time spent on rotation work varies widely, and that there is often no expectation of research progress, and suggest consideration of revision and standardization of the process and its expectations in order to make it more meaningful.

Summary

The goal is to increase the quality and size of the graduate chemistry program. The suggestions for accomplishing this described above concern how to increase the size and quality of the student pool, as well as how to administer the program so as to provide the best possible educational experience. As is obvious from the references made throughout to other sections of the document, these issues overlap with one another and illustrate how a comprehensive approach is required.

Respectfully submitted by:

Marc M. Greenberg
Professor of Chemistry
Johns Hopkins University

Kenneth M. Doxsee
Professor of Chemistry
University of Oregon

Appendix 6d:

External Review of the Ph.D. Program in Physics, 2011

External Review Report for CUNY's Ph.D. Program in Physics

Marlan O. Scully and Yanhua Shih

I. Preamble

A two-day intensive program provided us opportunities to learn CUNY's Ph.D. Program in Physics from different angle of views, including the administration of CUNY, the executive committee of the program, faculty members from all local campus, alumni, graduate students as well. We were asked to write this report on site after our visit.

In general, we found the CUNY Graduate Center is interesting: It is at the right place and the right time to exciting things, everyone enjoys visiting and/or living in NYC. Furthermore, at this time, there is still an excellent faculty in residence; a few well-chosen hires and well-conceived programs would yield wonderful fruit.

Historically physics was nurtured and supported with obvious results: City College has had an excellent physics department in the past, with numerous members of the national academy, etc. Likewise Hunter has generated several Nobel Laureates and luminaries such as Mildred Dresselhaus. But in more recent times many faculty feel and we tend to agree that the upper administration has taken a negative[1] or at best uninformed[2] attitude toward physics.

Nevertheless our visit was excellent. The research presented was world class. The faculty is friendly and the students are eager.

We point out that the City University presents unique opportunities and difficulties. CUNY is the nation's largest urban public university and the physics program is composed of faculty from various campuses which are geographically separated. All the graduate courses are thought at the Graduate center and faculty teaching these courses travel to the graduate center to teach but there is relatively little interaction among faculty at the graduate center. None the less the program is well run and faculty do seem to know

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[1] [1] Witness the well-known horror story of the CUNY chancellor who took the opportunity (around 1996) to give the physics department a public tongue lashing on the occasion of physics Prof. Herman Cummins election to the NAS. This sad event was noted around the world.

[2] See the enclosed letter of Feb. 2010 concerning the Theoretical Science Initiative. This is a serious problem. We simply cannot understand how it's possible not to have discussed this physics initiative with the faculty, who indeed have members who are at the forefront of physics.

each other and of their work. However the daily life of a faculty member is mostly influenced by the local college and this is partially so in regards, to Laboratory space, teaching loads, etc. Given this disparate and inherent difficulties it is even more remarkable that the program as a whole is outstanding with research being done at the forefront of many fields and also the training of graduate students is outstanding. An executive committee sets general policy and the program is administered by the executive officer who is appointed every three years. Our general impression is that everyone is satisfied with the running of the program although we point out that it seems in the past there were quite a few contentious issues. In addition, it is clear that the executive officer is running the program evenhandedly and effectively. The Physics Ph.D. program is only fifty years old but it is very well known in the country: CUNY physics is on the map and that is something to be proud of.

Also, at the end of the first year students take what is traditional in physics, namely the qualifying exam. The qualifying exam is given twice a year but student are expected to take it at the end of the first year and the one given in January is mostly to give the students that failed another chance. It appears on all counts, both from students and faculty that the qualifying exam is very well done and fair to the students.

This report is organized as follows:

I. Preamble

II. . Ways to encourage excellent research and teaching

III. . Teaching load

IV. Graduate number and admission strategy

V. Coordinated Hiring

VI. The joint doctoral degree in Physics.

II. Encouraging Faculty Research

It is said that in physics "the best we can hope for is the begrudging admiration of our peers." That may well be true, however at home it should be different. We can and should encourage each other to excel and to do better than our best. Fellowships, awards and prizes, for example:

1) Fellowships in APS and AAAS etc.

2) Awards from local research awards and presentations to professional prizes and Guggenheim type fellowships.

3) Mentoring younger colleagues and supporting each other from winning tenure to vetting each other's research.

4) Providing opportunities and matching funds for collaborations between campuses.

5) Giving more credits to the research dissertation supervision courses, such as PHYS 9000.

Of course many of the faculty are fellows, etc. of societies and have won prizes but these should be better publicized and encouraged. We partially feel that opportunities for collaboration between campuses should be encouraged. We understand that there are a few such programs and also there are some university wide facilities. But we feel that a major increase in funding to encourage inter campus collaboration would have a great payoff.

III. Teaching load

The present contractual agreement that our union has arrived at with CUNY requires faculty to be responsible for 10.5 contact hours per week. The 10.5 hours are accounted for principally by teaching and administration, except for first year junior faculties. The incoming junior faculties receive some released time for research. The research activities of tenured and senior faculty do not count. The majority of the Colleges within CUNY treat an hour of a graduate course as equivalent to an hour of an undergraduate course. Thus, a research oriented graduate course of 4 hours (3 hours lecture + 1 hour consultation) is credited 4 hours for the faculty. (The hour of consultation could occur

either at the Graduate Center or at the campus of the faculty member.) Research oriented graduate courses require far more preparation time than a regular under graduate course. Furthermore, as the doctoral faculty is not housed at the Graduate Center, there is the additional time element required for travel from an individual campus to the Graduate Center to deliver the lecture. The faculties who teach at the Graduate Center are also those actively involved in research. The current counting method of 10.5 contractual hours at CUNY are, of course, far greater than the teaching requirements at other similar research universities. To account for the additional preparation and travel time, as well as to allow for a more reasonable and realistic balance between teaching and research, it is recommended that graduate courses, especially research oriented courses, be allotted 1.5 hours for each contact hour. In addition, the PHYS 90000 (dissertation supervision) may count more credits for research grant supported graduate students. But more generally, and we understand that there are contractual obligations, it is imperative that the teaching load be that of research universities. We understand that the teaching load assignment in practice varies greatly and is set by the local college adminstration. We understand that historically, some college presidents are and have been much more enlightened than others. We also understand that over the years there have been budgetary issues affecting the whole university. But we cannot stress enough the importance of an appropriate teaching load if one wants good departments and every president should be cognizant of the what teaching loads in the sciences are and should be in a research university. Regarding teaching core courses at the Graduate Center, grading of weekly "Problem sets" for homework is a universal practice in physics. We were shocked to learn that graders (i.e. more senior graduate students) are not routinely used in physics and that there has been resistance by the administration for the trivial amount of monies involved (less then $10K per year). The EO informed us that President Kelly supported this activity as a "one-time" only endeavor. This must have the highest priority, especially for the core classes that typically have about 20 doctoral students and at least a dozen more masters students from the campuses. We assure the administration that there probably is no other university that offers a doctoral degree in physics anywhere in the world that does not support graders for its basic graduate course.

IV. Graduate number and admission strategy.

In regard to Graduate student support the doctoral programs in the Biochemistry, Biology, Chemistry and Physics have gone through a major change. All first year students are supported by the The Graduate Center. Each student is provided with $24,000 stipend plus health insurance and tuition. There are no teaching or other obligations of the graduate student during their first year. This allows the students to

devote full time to their studies and in preparation for the qualifying exam. The campuses then pick up the support for years two to five and this is done by way of teaching and grants from the mentor. There are two issues in the admissions/student recruitment process:

1) The biggest issue right now is that the overall number of students (19) allocated to Physics Program is inadequate in the view of recent new faculty hiring and an increase in funding in Physics. There are instances, when faculty with grants (or other funding) or new (pre-tenured) faculty eligible for recruiting graduate students, cannot get a student due to the "shortage". It seems that there exists a disconnect between faculty requests and the actual number of available slots for students passed to Vice-Chancellor office by the colleges. There must be independent evaluation of the need on the year-by-year basis. As of right now, it is clear that Physics should be allowed to recruit at least 22-24 students per year.

2) The admissions process is further stymied by the fact that Admissions Committee cannot send more offers than the allocated number of positions given to Physics in a given year. Sometimes, 20-30% "overbooking" is allowed (usually at the last minute), while Physics overall acceptance rate is less than 50%. CUNY should be allowed to offer acceptance to the program according to the average acceptance rate over, say, three years (in the case of CUNY this means twice as many offers as the currently allowed positions). The issue of accidental over acceptance in a given year, can be solved by decreasing the number of Physics positions for the next year, so the three to five year average stays at the number of positions allocated to Physics.

V. Coordinated hiring

Faculty lines in the natural sciences are allocated 100% to the campuses and are thus filled according to campus needs and research thrust areas. The resulting impact on the total graduate program may then be rather small. However a coordinated hiring initiative across several campuses could have a significant effect on the visibility of the doctoral program, leading to large center grants, IGERTs, and the ability to attract the best students. The best example of this was the photonics cluster hire initiative during the last decade. The University administration can encourage coordination among the campuses by providing lines and start-up funds, as was done in photonics.

VI. The joint doctoral degree in Physics.

Historically the Ph.D. diploma of a student indicated that his/her degree is from CUNY. Since the reorganization City and Hunter College are now allowed to grant the doctoral degrees jointly with the Graduate Center. While this may at first seem only symbolic there is quite a concern on this matter. We are under the impression that Hunter and City were chosen because the presidents of these schools have always supported research and have invested in the faculty. That is commendable and we strongly urge the presidents of the other campuses to follow suit. We have the impression that if indeed they do they will also be given the right to grant a joint degree.

One of the reasons for given a joint degree is that it allows each campus to publicize its doctoral programs and that should be encouraged. One possible danger of this situation is that the system may encourage second rate citizenship of the faculty that are not at City and Hunter. Thus far this does not seem to be the case and we feel strongly that all qualified faculty should be treated on an equal footing.

Appendix 7:

Cost Forecast for Proposed Increases to CUNY Science Scholarships and Stipends and Cohort Size

Appendix 7

THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

Cost Forecasts for Proposed Increases to CUNY Science Scholarship Stipends and Cohort Size

1: Cost forecast for incremental increases in stipend only (Year 1)[1]

Year	Cohort size	Stipend Amount	Additional Stipend	Additional Cost
Current	90	$25,000	--	
1st year	90	$26,000	$1,000	$90,000
2nd year	90	$28,000	$2,000	$180,000
3rd year	90	$30,000	$2,000	$180,000
			Total Additional Cost:	**$450,000**

2: Cost forecast for incremental increases in stipend and cohort size (Year 1)[1]

2a: Stipend costs

Year	Cohort size	Stipend Amount	Additional Stipend	Growth in cohort size	Additional Cost
Current	90	$25,000	--	--	--
1st year	101	$26,000	$1,000	11	$376,000
2nd year	113	$28,000	$2,000	12	$538,000
3rd year	125	$30,000	$2,000	12	$586,000
			Total Additional Stipend Cost:		**$1,500,000**

2b: Tuition costs

Year	Cohort size	Growth in cohort size (estimated in-state/out-of-state)[2]	Estimated additional in-state tuition[3]	Estimated additional out-of-state tuition[3]	Estimated additional tuition
Current	90	--			
1st year	101	11 (4/7)	$34,520	$163,660	$198,180
2nd year	113	12 (5/7)	$43,150	$163,660	$206,810
3rd year	125	12 (5/7)	$43,150	$163,660	$206,810
			Total Additional Tuition Cost:		**$611,800**
			Total Additional Stipend and Tuition Cost:		**$2,111,800**

[1]Participating senior colleges will assume financial liability for years 2-5 of the CSS awards.

[2]Estimated numbers of in-state and out-of-state students are based on residency of current 1st year students.

[3]Tuition figures are based on 2014-15 rates, and would increase with tuition increases.

Appendix 8:

Proposal for Modified Admissions Procedures for the Biology, Biochemistry, Chemistry and Physics Ph.D. Programs

January 2015

Proposal for modified Admissions Procedures for the Biology, Biochemistry, Chemistry, and Physics PhD Programs

Admissions will operate slightly differently for each Program (or subprogram within a Program), adopting measures that work best for that Program/subprogram. Overall, the plan is for:

a. All faculty members to participate in recruitment efforts, particularly those members with funding for students. Recruitment events can happen Program-wide (info sessions, open houses, booths at conferences) and investigator-specifically (attending meetings/giving research talks, etc and talking to potential doctoral Program applicants).
b. Some Programs/subprograms will have a stated lab rotation policy: Model I (see below). A doctoral Program can have some subprograms with Model I and other subprograms with Model II (laid out below). The decision to adopt Model I or II is made by an elected "advisory committee" for that Program – consisting of both faculty and students.
c. Some Programs/subprograms will not require lab rotations in the first year (will allow immediate association with a faculty mentor) but will also make rotations an option to interested students: Model II
d. No faculty member guarantees entry into the Program but can note that he/she would be interested in working with the prospective applicant if he/she is admitted to the Program.

Admissions procedure Model I:

1. In Fall, all faculty in the relevant Program/subprogram must submit a statement about their ability and willingness to host a rotation student in Fall of the following year. This statement must include a brief statement of research area and funding status.
2. The Admissions committee should consist of campus elected, research-active representatives from the participating campuses, with representation higher for campuses with more doctoral faculty*.
3. The admissions committee will review applicants, looking for the strongest of these applicants (GPA, research experience, GRE scores) and ranking them on that basis.
4. In the application form, applicants will be asked to name two or more faculty with whom they might be interested to work as well as information on the area(s) of research that interest them. It will be explained in the application (and on the Program/susbprogram site) that all students undergo lab rotations, so admission is not contingent on a student's identifying a particular faculty member as mentor at the time of admission.
5. Doctoral faculty with an applicant of particular interest to them should send a letter to the Admissions committee by January 1 (application deadline),

stating their reasons for supporting the student's admission and whether or not that faculty member would take that student into his/her lab if the student were admitted, and after rotations, decided to go to that lab. In some cases, the CUNY doctoral faculty member may be a formal referee on the student's application.

6. The admissions committee will look at the top applicants (number determined by available slots adjusted to success rate for admissions) and ask whether each has indicated interest in at least one of the faculty members who has self-identified (see point 1 above) as willing and able to host a doctoral student and/or indicated interest in a research area covered by one of these self-identified faculty members. These students will be interviewed for admission. Similarly, those applicants for whom a CUNY faculty member has written a specific letter of support (see point 5 above) will be identified in the rankings. Those who are among those in the top list of candidates will be invited for interview. Those students who rank at the top of the list but who show no match (with field or faculty identified as available) will be put aside, at least temporarily, to look at applicants down the list who show a better match. Faculty-supported students (point 5 above) who fall below the Admissions Committee's criteria for admission will not be further considered.
7. By June 1, all faculty members who have pledged an interest in students (and any others who might have gained funds and/or been recently hired with graduate student support as part of their hiring package) must self-identify to the Advisory Committee of the relevant Program/subprogram. The Advisory Committee for the doctoral Program or subprogram will provide this list of faculty to entering students, encouraging both the students and relevant faculty to communicate in order to arrange a first lab rotation for each entering student.
8. A course, bearing credit and consisting, in part, of presentations by relevant faculty will convene in Fall so that entering students can identify two additional labs for their 2nd and 3rd rotations (Programs will decide how many rotations/year).
9. Lab rotations will be given course credit with letter grade and will carry Program/subprogram-agreed requirements for satisfactory performance.
10. By May 1st of the first year, students/faculty will provide a list of choices to the Advisory committee chair. Once a match has been found, a "mentor commitment form" will be filed with signatures from the mentor, student, relevant campus Department, and the campus-administration (guaranteeing years 2-5 of support for student with no more than maximum-allowed teaching as part of that support). A student will be judged as "not in good standing" if a match has not been made by the start of year 2 in the Program (5yr commitment package no longer guaranteed)

Admissions Procedure Model II:

1-3 as in Model I

4. In the application form, applicants will be asked to name one or more faculty (ranking their choices) with whom they would be interested to work. Applicants will be encouraged to contact the Program for a list of potential mentors for the coming year (identified as in point 1, Model I) and will be advised that a "match" with a suitable mentor, although not required, increases chances of admission.
5. Those applicants who fall in the top ranks (as defined in point 3, Model I) will be examined with respect to mentor choice. If a student has indicated a faculty mentor who has self-identified (point 1, Model 1), that faculty member will be given a copy of the student application and asked if he/she is willing to mentor the student. If the answer is yes, the mentor and campus administration will sign a pledge to support the student in years 2-5 (see point 10, Model I). The student will be notified that he/she has been admitted to work with that particular faculty mentor. The faculty mentor will also contact the student to help in recruitment of the student to the Program. If the student agrees to that mentor assignment, admission will take place.
6. If a student expresses an interest in reserving choice until after working with two or more potential mentors, it will be determined if both mentors are interested/willing and, if so, a "rotation" plan will be arranged. Final Mentor choice will take place no later than May 1 of first year in the Program as described in point 10, Model I.
7. As the Admissions committee goes down the list of excellent applicants, choices can include a consideration of proportionately meeting the needs of participating campuses (e.g. 2 students assigned to a campus that has asked for 4; 1 student assigned to a campus that has asked for 2). In this case, "asking for 4" means that 4 faculty members have self-identified as willing and able to mentor, and the campus administration is willing to back the commitment for support.
8. As with rotations in Model I, work in the laboratory of the students' mentor in year 1 will be given course credit and grade, with Program/subprogram developing agreed-upon requirements for satisfactory performance.

* Note that faculty membership must be undergoing strict reviews on an annual basis, with each faulty member being evaluated for re-appointment on a 3 to 5yr schedule.

Appendix 9:

Proposed Faculty Membership Criteria for CUNY Doctoral Science Programs

Proposed Criteria for CUNY Doctoral Science Programs

Proposed membership criteria for faculty

All interested CUNY faculty members (current and new) will be evaluated for inclusion to one (or more) of CUNY Doctoral Science Programs. Evaluations will take place every three years.

For current faculty members, the following minimum criteria are suggested as a guideline, although each discipline or sub-discipline may further refine them to make them more suitable for their purpose:

1) Publication of at least three peer-reviewed journal papers in three years. These should be in high quality journals (based for instance on journal impact factors and/or other objective criteria) and should be based largely on the contribution from the research program of the faculty member being evaluated. Publications with Ph.D. students from the faculty member's laboratory are particularly welcome. If a (sub)discipline highly values publications in some other venues (proceedings, etc.), the criteria should be adjusted appropriately.

2) External research funding should be available to cost-share (in a major way) at least one Ph.D. student per year over the 3-year evaluation time frame. The faculty members should strive to secure research funding for Ph.D. students. If the funding to cost-share students is not available, some other major research funding may be considered (example: being a PI of a major instrumentation grant, such as NSF's MRI grant; or having substantial funding that cannot be used for Ph.D. student support) provided the campus will pay where the PI cannot. The funding may come from different sources, but should be external and, preferably, competitive.

The underlying rationale is that the faculty member should provide a suitable environment for the development of Ph.D. students.

A faculty member who fulfills both of the above criteria is suitable as a member of the Ph.D. program. If both criteria were met at the time of the initial membership evaluation, but were no longer met at the time of the subsequent evaluation (performed every three years), the faculty member would retain the membership, but his/her status would be internally referred to as a "continuing membership", meaning that it is hoped that the membership criteria will be met during the next three-year period. In particular, a strong effort to secure funding should be made. However, if the criteria are still not met at the next three-year period, then the faculty member will lose the Ph.D. program membership status. Still, he/she can be affiliated to the program and be considered as an "associate" or "emeritus" (whichever is appropriate), with the possibility of continuing to teach and provide other service within the program, etc., but without the privilege of mentoring Ph.D. students. Faculty members who cease to meet membership criteria while serving as senior administrators (e.g., Provost, Dean, perhaps Department Chair also) will have their "continuing membership" period of either three years or until the end of their administrative duties plus one year, whichever is longer. The faculty members who cease to fulfill the membership criteria while mentoring a Ph.D. student will be given their "continuing membership" period of either three years or until the student graduates or otherwise leaves the program, whichever is longer. The faculty members whose evaluation is negative with respect to one or both of the above

criteria will receive an explanation of the negative evaluation and suggestions for improvement aiming at restoring their standing in the program. Each year, such faculty members will have an opportunity to re-apply if their publication and/or funding situation changes.

If a particular faculty member is at the borderline of meeting the membership criteria, the successful track record of mentoring Ph.D. students will help in reaching a positive decision, while the history of ineffective mentoring or the lack of prior cost-sharing of students may have an adverse effect.

It is understood that in special cases, a particular college may support the membership of a given faculty member even if he/she has no funding for Ph.D. students by providing funds for students. The teaching requirements for these students should not be greater than program norms.

Teaching in the Ph.D. program is not a sufficient criterion to justify membership.

New junior faculty members will initially be considered on the basis of their track record prior to joining CUNY. The second evaluation after three years will be performed to assess whether the faculty member reached (or exceeds) the membership criteria or at least is on a trajectory to reach them (based on some grant and/or publication success). If this is doubtful, the internal "continuing membership" designation will be assigned to emphasize that after another three years, the membership may cease.

Campuses that want to retain an active PhD program must be committed to providing adequate and continuing support to their faculty members. This includes adequate startup funds, support of needed core facilities as well as appropriate reduction of teaching load for faculty mentoring PhD students. Without campus support it may be too difficult for individual faculty to participate in the Ph.D. program.

Proposed criteria for students to be admitted to a Ph.D. program

Candidates need to take General GRE. Disciplines may establish a minimum score for admission in the program.

Students should have degrees in disciplines relevant to the Ph.D. program they are applying for. Otherwise, they should clearly have taken courses providing a good background for the Ph.D. studies they wish to pursue. GPA (overall and from the prospective discipline) should be at least 3.0 or higher (in cases where it can be evaluated; otherwise the transcript should be evaluated by a competent person familiar with a particular education system to determine the performance during the prior studies). In cases where the background is difficult to evaluate, Subject GRE should be evaluated, if available.

Masters degree in a relevant discipline (or other more advanced degree) is a plus.

Recommendation letters should not indicate major potential problems (attitude, integrity, etc.).

Prior research, especially documented by publication(s), is a plus

Appendix 10:

Campus Meetings

City College

I. November 11, 2014

160 Convent Avenue, Administration Building- 3rd floor, New York, NY 10031

Meeting with:

9:30 - 10:00 AM President Lisa Coico and Provost Maurizio Trevisan

10:00 - 10:45 AM Dr. Tony Liss, Dean of Science, joins meeting

10:45 - 11:45 AM Ashiwel Undieh, Associate Provost for Research, and selected faculty:

- Kevin Gardner, Einstein Professor of Chemistry and Director of the Structural Biology Initiative of the ASRC
- David Jeruzalmi, Professor of Chemistry
- Chris Li, Professor of Biology
- Stephen O'Brien, Professor of Chemistry
- Jack Martin, Medical Professor
- Parameswaran Nair, Professor of Physics
- Myriam Sarachik, Distinguished Professor of Physics
- Ruth Stark, Distinguished Professor of Chemistry

11:45 - 12:00 PM Debrief with President Lisa Coico and Provost Maurizio Trevisan

II. December 23, 2014

Graduate Center, President's Office, 365 5th Avenue, New York, NY 10016

Meeting with:

12:30 to 1:30 PM Dr. Tony Liss, Dean of Science

Lehman College

November 18, 2014

250 Bedford Park Blvd West, Music Building- Room 313, Bronx, NY 10468

Meeting with:

10:00 - 10:30 AM President Ricardo Fernández and Provost Anny Morrobel-Sosa

10:30 - 12:30 PM Science faculty join meeting:

- Gautam Sen, Dean of School of Natural and Social Sciences
- Joseph Rachlin, Dean of Research
- Eugene Chudnovsky, Distinguished Prof of Physics
- Haiping Chen, Professor of Biological Sciences
- Daniel Kabat, Chair of Physics & Astronomy
- Liesl Jones, Chair of Biological Sciences
- Gustavo Lopez, Chair of Chemistry
- Brian Murphy, Chair of Math and Computer Science
- William Latimer, Dean of School of Health Sciences, Human Services and Nursing
- Yuri Gorokhovich, Chair of Earth, Environmental and Geospatial Sciences

12:30 - 1:00 PM Debrief with President Fernández & Provost Morrobel-Sosa

Baruch College

November 18, 2014

Graduate Center, President's Office, 365 5th Avenue, New York, NY 10016

Meeting with:

2:30 - 3:30 PM Provost David Christy

Queens College

November 25, 2014
65-30 Kissena Blvd, Flushing, NY 11367

Meeting with:

1:00 - 1:30 PM	President Felix Matos Rodriguez, Provost Elizabeth Hendrey President's Chief of Staff Glenda Grace Robert Engel, Dean of Mathematics & Natural Sciences Richard Bodnar, Dean of Research & Graduate Studies Science faculty - Cherice Evans, Professor of Chemistry and Biochemistry - Harry Gafney, Professor of Chemistry and Biochemistry - William Hersh, Professor of Chemistry and Biochemistry - Sanjay Kumar, Professor of Chemistry and Biochemistry - Robert Lanson, Professor of Psychology - Andy Lu, Professor of Chemistry and Biochemistry - Allan Ludman, Professor of Earth and Environmental Sciences - Glendon McLachlan, Professor of Chemistry and Biochemistry - Susan Rotenberg, Professor of Chemistry and Biochemistry - Cathy Savage-Dunn, Professor of Biology - Wilma Saffran, Professor of Chemistry and Biochemistry - Michael Toner, Family, Professor of Nutrition and Exercise Sciences
1:30 - 2:00 PM	Chemistry & Biochemistry Faculty - Michael Mirkin - Susan Rotenberg
2:00 - 2:30 PM	Physics Faculty - Alexander Khanikaev - Igor Kuskovsky - Alexander Lisyansky - Lev Murokh
2:30 - 3:00 PM	Biology Faculty - John Dennehy - PoKay Ma - Alicia Melendez - Dan Weinstein
3:00 - 3:30 PM	Neuroscience Faculty - Robert Lanson - Joshua Brumberg - Jin Fan - Jeffrey Halperin
3:30 - 4:00 PM	Student - Yu Yun

Brooklyn College

December 8, 2014
2900 Bedford Avenue, President's Board Room, Brooklyn, NY 11210

Meeting with:

9:00 - 10:00 AM
President Karen Gould
Provost Bill Tramontano
Senior Vice President Joseph Giovannelli
Dean Kleanthis Psarris
Associate Vice President Alan Gilbert

10:00 - 11:00 AM
Science faculty

Biology:
Dan Eshel, Chair
Jennifer Basil Ecology
Nicolas Biais
Amy Ikui
Peter Lipke
Luis Quadri

Chemistry:
Malgorzata (Maggie) Ciszkowska (Chair)
Maria Contel
Alexander Greer
Ryan Murelli
Roberto Sanchez-Delgado

Physics:
Raymond Tung (Chair)
Gregory Boutsis
Guillermo Gerona-Navarro
Karl Sandeman

11:00 - 12:00 PM
Students:

Frieda Benun, Doctoral – Ecology, Evolutionary Biology & Behavior
Jimiane Ashe, Masters – Ecology, Evolutionary Biology & Behavior
Benelita T. Elie, Doctoral – Chemistry
Hadi Nasrollahi, Masters – Biology
Poornima Mohandas, Doctoral – MCD-Biology
Michael D'Erasmo, Doctoral – Chemistry
Danielle Hirsch, Doctoral – Chemistry
Naomi Lewski, Masters – Biology
Chase Budell, Doctoral – Biology
Glennon Bythrow, Doctoral – Biology
Belaid Malek, Masters – Chemistry
Niluksha Walalawela, Doctoral – Chemistry
Ashwini Ghogare, Doctoral - Chemistry

Graduate Center

I. December 11, 2014

Graduate Center, President's Office, 365 5th Avenue, New York, NY 10016

Meeting with the Executive Officers in the natural sciences:

3:00 to 4:00 PM Laurel Eckhardt, Biology
Brian Gibney, Cheistry
Igor Kuskovsky, Physics
Richard Magliozzo, Biochemistry

II. December 19, 2014

Graduate Center, President's Office, 365 5th Avenue, New York, NY 10016

Meeting with doctoral students:

3:00 to 4:00 PM Jason Bryslawskyj - Physics - Baruch College
Ryan Abrahams - Physics - York College
Inna Korzhovska - Physics - City College
Uğur Güney - Physics - Hunter College
Gayathri Devi Raghupathy -Biology - Hunter College
Adel Hussein - Bio Chemistry

Hunter College

I. December 17, 2014

Hunter College, 695 Park Avenue, President's Office, New York, NY 10065

Meeting with:

9:30 to 10:30 AM President Raab

II. January 5, 2015

Graduate Center, President's Office, 365 5th Avenue, New York, NY 10016

Meeting with:

2:00 to 3:00 PM Provost Vita C. Rabinowitz

Acting Associate Provost for Research Dr. Mark E. Hauber

Biology faculty

- Patricia Rockwell
- Thomas Schmidt-Glenewinkel
- Carmen V. Melendez-Velasquez
- David A. Foster
- Jayne Raper
- Benjamin Ortiz

Physics faculty:

- Mark Hillery
- Leon Cohen

Chemistry faculty:

- Hiroshi Matsui
- David R. Mootoo

College of Staten Island

December 17, 2014
2800 Victory Blvd, Building 1A, Room 404, Staten Island, NY 10314

Meeting with:

1:30 - 2:30 PM
- President William Fritz
- Senior Vice-President/ Provost Fred Naider
- Acting Dean of the School of Health Sciences Maureen Becker
- Acting Dean of Science and Technology Alfred Levine
- Dean of Humanities and Social Sciences Nan Sussman

2:30 - 4:00 PM
Faculty

Biology:
- Richard Veit (EEB)
- Frank Burbrink (EEB)
- Abdeslem El Idrissi (NS)
- Dan McCloskey (NS)
- Zaghloul Ahmed (NS)
- Alejandra Alonso (NS)

Biochemistry:
- Sebastien Poget
- Sharon Loverde
- Probal Banerjee

Chemistry:
- Alan Lyons
- Micael Kruk
- Nan Loh Yang
- Shuiqin Zhou
- Qiao-Sheng Hu

Physics:
- Li Ge
- Emily Rice
- Andrew Poje
- Anatoly Kuklov
- Vadim Oganesyan

Doctoral Students:
- Laurence Beaton
- Joe Filippazzo
- Paige Giorla
- Yang Liu
- George Poppe

York College

December 19, 2014

Graduate Center, President's Office, 365 5th Avenue, New York, NY 10016

Meeting with:

1:30 to 2:30 PM	President Marcia V. Keizs
	Provost Panayiotis Meleties

John Jay College

January 6, 2015

Graduate Center, President's Office, 365 5th Avenue, New York, NY 10016

Meeting with:

12:30 to 1:30 PM	President Jeremy Travis
	Provost Jane Bowers