Graduate Program Review
Texas Tech University

Program Reviewed: Chemistry and Biochemistry

Onsite Review Dates: March 9-11, 2015

Name of Reviewers

Internal:
Please include name, title, and Department

External: Curtis Shannon, Hunt Professor and Chair, Department of Chemistry and Biochemistry, Auburn University
Please include name, title, and Department

I. Academic Unit Description and Strategic Plan

Please evaluate the following by marking an X in one of the blanks for each item:

Vision, Mission and Goals
___ Excellent   X___ Very Good   ___ Good   ___ Needs Improvement

Strategic Plan
___ Excellent   X___ Very Good   ___ Good   ___ Needs Improvement

Please comment on the positive components and suggested areas of improvement.

The Department’s plans are reasonable and its goals are achievable if the College and University allocate appropriate resources.

The benefit to the Department of a new Masters program in Chemical Biology is not clear. A concern is that resources could be spread too thin, leading to further declines in the Ph.D. program and graduate student productivity.

The Department must support graduate students in good standing for 12 months per year and four years. This may require a slight reduction in the total number of graduate students for a few years, but the increase in recruiting and retention of excellent graduate students would be worth it.

The faculty must take steps to increase external funding. An average of two proposals submitted per year per faculty member seems low. Less competitive senior faculty should focus on collaborative funding in parallel with attempting to revitalize their single PI projects.

The department must allocate space and graduate students in a more strategic fashion. Specifically, unfunded faculty should not be allowed to have more than one department supported graduate student at a time. The allocation of space should be based on current research needs and should be more flexible. As new faculty are hired, lab space should be renovated.
One of the most impactful moves the Department could make is to hire external department chair. I will speak to this in more detail later in this document.

II. Program Curriculum

Please evaluate the following:

Alignment of program with stated program and institutional goals and purposes
___ Excellent  X___ Very Good  ___ Good  ___ Needs Improvement

Curriculum development coordination and delivery
___ Excellent  X___ Very Good  ___ Good  ___ Needs Improvement

Program learning outcomes assessment
___ Excellent  X___ Very Good  ___ Good  ___ Needs Improvement

Program curriculum compared to peer programs
___ Excellent  X___ Very Good  ___ Good  ___ Needs Improvement

Please evaluate the following by marking an X in one of the blanks for each item:

The strong demarcation along traditional ‘divisional’ lines, especially among the senior faculty, is one of the most rigid I have seen in many years. Whereas most departments are moving away from divisions, except perhaps as convenient subgroups for assigning teaching loads, TTU seem somewhat hidebound in this respect. In my opinion, this state of affairs is a major barrier to progress. Teaching assignments at the graduate and advanced undergraduate level should reflect faculty research expertise, not traditional divisions. Hires should be made on the basis of research and what that faculty member will teach should be debated and decided after the offer has been accepted. Cross-divisional teaching should be discussed at a faculty meeting (or several).

Entering graduate students need better career mentoring. A more formal orientation process should be developed which possibly also includes short lab rotations.

There needs to be better communication between chemistry and biochemistry cultures.

III. Faculty Productivity

Please evaluate the following by marking an X in one of the blanks for each item:

Qualifications
X___ Excellent  ___ Very Good  ___ Good  ___ Needs Improvement

Publications
___ Excellent  X___ Very Good  ___ Good  ___ Needs Improvement

Teaching Load
___ Excellent  X___ Very Good  ___ Good  ___ Needs Improvement
Please comment on the positive components and suggested areas of improvement.

The quality of the faculty overall is excellent and this should be acknowledged by the administration (including by paying them a more competitive salary). Publications from the department generally are of high quality. The rate of publication is reasonably high and the citation record is also pretty good.

Productivity should be rewarded and encouraged by increasing salaries to regionally competitive levels. Current salaries are among the lowest I have seen in recent years, particularly at the associate professor level. I can understand why many faculty members feel demoralized by poor compensation in comparison to other chemistry departments and within TTU itself. Shameful.

It appears to me that the department’s two buildings have not been as well maintained as they should have been. The buildings appear to be near the end of their useful lifespan. Weak infrastructure compromises research. In addition, hood capacity for synthetic research (a strength of the department) is sub-par. The departmental instrumentation is outstanding and the university (and some wealthy donors) should be applauded for this. Fingers crossed that the physical infrastructure does not compromise the longevity of this instrumentation.

IV. Students and Graduates

Please evaluate the following by marking an X in one of the blanks for each item:

Time to degree
___ Excellent   ___ Very Good   ___ Good    X___ Needs Improvement

Retention
___ Excellent   ___ Very Good   X___ Good    ___ Needs Improvement

Graduate rates
___ Excellent   ___ Very Good   ___ Good    ___ Needs Improvement

Enrollment
___ Excellent   ___ Very Good   ___ Good    ___ Needs Improvement
Demographics

___ Excellent  ___ Very Good  ___ Good  ___ Needs Improvement

Number of degrees conferred annually

___ Excellent  X___ Very Good  ___ Good  ___ Needs Improvement

Support Services

___ Excellent  ___ Very Good  ___ Good  ___ Needs Improvement

Job Placement

___ Excellent  ___ Very Good  ___ Good  ___ Needs Improvement

Student/Faculty Ratio

___ Excellent  ___ Very Good  ___ Good  ___ Needs Improvement

Please comment on the positive components and suggested areas of improvement

At this time, it appears that external funding may be slightly below the level required to fully support the 90+ graduate students in the department. Every effort should be made to minimize the number of six-year students. Weak students should not be advanced to candidacy. More effective use of dissertation committees could help in this respect. Students making poor progress should meet with their committees more frequently.

I will echo my earlier comment on better mentoring of graduate students here. I would invite the faculty to consider running one of the ACS pFLAGS workshops in the department.

No international graduate students were present at our meeting, suggesting poor interaction between these two groups. The reasons for this are not clear, but steps should be taken to improve the esprit de corps of the graduate students.

Non-research active faculty should not be allowed to have more than one unfunded graduate student at one time.

V. Facilities and Resources

Please evaluate the following by marking an X in one of the blanks for each item:

Facilities

___ Excellent  ___ Very Good  ___ Good  X___ Needs Improvement

Facility Support Resources

___ Excellent  ___ Very Good  ___ Good  X___ Needs Improvement

Financial Resources

___ Excellent  ___ Very Good  ___ Good  X___ Needs Improvement

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**Staff Resources**

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Please comment on the positive components and suggested areas of improvement

As noted, the buildings are old, poorly maintained, and may be nearing the end of their useful lifetime. While the instrumentation, glass facilities and machine facilities are excellent, housing them in 40+ year old buildings is not sustainable for the long term. Serious discussions at the Provost level involving input from DCB stakeholders about long term building needs should be scheduled within the next year. A new building will be needed within a decade and getting this on the university's long-term schedule would be a major step forward. In the meantime, a greater presence of DCB faculty in shared space is essential.

Three-year limits on spending out startup accounts are a bad idea, especially the current one size fits all model.

The financial health of the College seems marginal and there should be more openness in discussing how this is going to impact the departments moving forward.

There seems to be a history of poor communication from the upper admin to the dean and the department levels. In light of this history, the new Dean is encouraged in the strongest possible terms to redouble efforts to improve communication up and down the chain of command. Many of my discussions lead me to conclude this is not happening now.

**VI. Overall Ranking**

Please provide summative conclusions based on the overall review.

The good news is that, despite significant challenges, the Department is one of the highest performing units within the college. I recommend that the Dean play to his strengths and support the department as it attempts to bridge a period of retirements, poaching of good faculty and the financial challenges of the ‘Great Recession’. There is a core of outstanding scholars in the department, and the instrumentation and recent startup packages are encouraging signs of institutional support. That said, morale is low due to aging building infrastructure, poor salaries, the quality of graduate students, and competition for very limited resources at all levels.

Please provide summative recommendations based on the overall review.

1. In my opinion, the move that would have the greatest immediate effect on improving the quality of the department would be to hire an eminent scholar (at the full professor level) from outside the university to be the next department chair. While it may have been necessary as a short term, interim solution in this case, having an associate professor as permanent appointment would be a major roadblock to instituting the many changes necessary to improve the quality of the graduate program moving forward. My comments in connection with hiring a full professor should not be construed as criticism of the current chair. Rather, healthy departments are administered by scholars who can serve as an example to junior and mid-career faculty, negotiate effectively with the administration, and represent the department well within the TTU community. A related question is why none of the full professors felt compelled to step up when Carol Korzeniewski moved back to the faculty. Perhaps they are not convinced they can be effective in
the current environment. I raise this point simply to indicate to the TTU administration the urgent need to promote effective communication channels at all levels.

2. The quality of the graduate students was an issue that was raised multiple times. Several steps can be taken that would be helpful in this regard: (1) guarantee a 12 month, four year level of financial support to students in good standing; (2) increase graduate student salaries; (3) increase efforts to recruit local domestic graduate students.

3. Orientation and mentoring of new graduate students should be prioritized and should include providing information on the importance of funding, publications, conference talks etc. on being able to get a good job. Choosing a research advisor is an important decision and should be made on the basis of unbiased information. Lab rotations might be appropriate as well. Faculty members who are not research active should be limited to one departmentally supported student at any given time.

4. Research instrumentation, glass shop and machine shop facilities are all very impressive. Initiatives to build on this success should be continued. On the other hand, the buildings are aging and planning for new research space should begin now. In the meantime, the dean should help chemistry faculty gain access to other more modern research space on campus.

5. Communication between the upper administration, dean, and the department needs to be improved. A recent history in which there was significant turnover at all levels of administration has lead to a situation in which information flow is not occurring as well as it should be. The new dean should prioritize improving information flow. It is critical that faculty are consulted and involved in the process.

6. Research active faculty need to redouble their efforts to garner external funding. One immediate step would be to increase the total number of proposals being written. 1.4 proposals per year is not a sustainable model given the current funding rates and the size of the graduate program. Over the course of a few years, the number of proposals being submitted should double. At the college level, assistance should be provided in identifying collaborative opportunities for unfunded faculty members seeking to reinvigorate their programs (in other words, faculty members who would not be competitive for single PI grants). Teaching faculty should be encouraged to seek funding for research in STEM teaching.

7. The department appears to be severely balkanized along traditional divisional lines, and in my opinion, this is a major roadblock to progress in a number of ways. First, it impacts the way in which graduate students are assigned among faculty and how they interact with each other. I believe students should either be admitted into a general pool or recruited directly into a specific faculty member’s group. On this latter point, untenured faculty should be encouraged to give talks at local colleges. Second, I see the ‘divisional mindset’ as potentially leading to increased friction between traditional chemistry and biochemistry cultures. This is unacceptable in a mid-sized department such as TTU’s. Another strategy to consider is the idea of cross-teaching courses, especially at the lower division level. For example, in my department, I recently assigned an outstanding teacher (an organic chemist) to teach our major’s general chemistry course. We are currently having conversations about taking further steps in this direction, such as using one of our bioanalytical chemists (who had interviews at a medical school and a department of biochemistry) to teach a core biochemistry class. This might not be a solution for every department, but having these sorts of discussion are going to be increasingly important, especially if hiring decisions are made on the basis of research area.

8. The Dean and Department need to collaborate on how future hires are going to be conducted. There is a tradition of trying to be all things to all people in many chemistry departments. On the other hand, many administrators
are focused on investing their resources in a more strategic manner. A challenge with strategic hires, cluster hires and the like, is balancing the focus on targeted research areas (often driven by administrators desire for ROI) with the goal of hiring the best individual from a given applicant pool. There are some clear strengths in the department, and I trust that the faculty and dean, working together, can find a way forward that leads to hiring excellent scholars in areas that can be externally funded in a sustained manner.

9. The upper administration appears to have adopted a strategy in which financial difficulties are to be mitigated by increasing enrollment, including at the graduate level. While this may be appropriate in certain disciplines, I am not sure this is a viable solution in chemistry/biochemistry, where the cost to educate each student is relatively high. Thus, I would urge caution in implementing the new masters program in Chemical Biology. In my view, while this will increase the total number of tuition paying graduate students, there is also a potential risk of cannibalizing resources going to the existing Ph.D. program (including faculty time). I remain skeptical that very many students admitted into this program will transfer to the Ph.D. program. For most of these students, I believe this program represents a second or third chance to get into medical school. Also, how are the Masters students going to be supported? If the number of TA slots if fixed, this is going to present some serious challenges in sustaining two graduate tracks.

10. The rigid limit on spending out start-up accounts seems poorly conceived. While allowing these accounts to be carried forward indefinitely would be a disincentive to seeking external funding, allowing young faculty to hold back funds until they are externally funded would seem to me to be entirely reasonable.