February 10, 2012

To: Marlene Kenady  
Texas Tech University Graduate School

I would first like to thank you for giving me the opportunity to perform this external review of the ENTX Program at Texas Tech University. I am honored to be asked to perform this important function. I studied several documents made available for review, including the ENTX Graduate Program Review (2005-2011) compiled by Ron Kendall and Chris Salice, Science Advisory Panel reports, and the 2006 Program review. Texas Tech personnel were also very accommodating to requests for additional information such as grant proposal details (submitted and funded) and publication history for faculty and students. The review consisted of an initial meeting with the director (approximately 1.25 hours) followed by a facilities tour (1.25 hours). The review team had 1 hour scheduled to meet with faculty prior to breaking for lunch, but it was clear that more time was needed with faculty as that meeting ran late. Based on the initial meeting with all faculty members, the review team requested an additional meeting with junior faculty, which occurred after a 45 minute discussion with students. It would have been beneficial if the review team could have met after all of our meetings to discuss our findings. Perhaps more time could be allocated for future reviews.

My comments below focus on issues that I think could improve the ENTX program.

**General Summary**

It is clear that investments made in the Department of Environmental Toxicology have paid dividends for TTU. Dr. Kendall is to be commended for building a program of national and international recognition. Dr. Kendall is clearly passionate about the Program and infuses a great deal of energy into the Program. The core strength of the Department is its focus on applied environmental toxicology and chemistry (approximately 75% of faculty), though growth in human health and molecular toxicology is represented by recent hires at the assistant professor level (approximately 25% of faculty). It is clear that the Department embraces a collaborative approach to research and grantsmanship. I am impressed with the degree to which research papers and grants are co-authored by several faculty members. This high level of collaboration is unique among graduate toxicology departments and programs that I am familiar with, and should be commended.

A few key issues currently prevent the Department from becoming more competitive with some of the leading toxicology programs nationally (in no particular order UC Davis, Oregon State University, North Carolina State University, Duke University, Michigan State University):

- Researchers should have dedicated instrumentation that is not used for general education/coursework purposes. I am not aware of this situation existing in other leading toxicology departments or programs. It not only ties up valuable instrument time for research, but also puts unwarranted strain on the equipment. This issue was raised by both faculty and students and has been a problem for a long time.
- A seminar series consisting of regional and national speakers could give students exposure to impactful scientists and ideas, increase their networks, and lead to more external collaboration for ENTX faculty.

- A high degree of faculty turnover is destabilizing and prevents continuity. Effort should be put into retaining current faculty to establish continuity. A less centralized leadership structure could result in an increased sense of faculty contribution to decision making processes.

- Student stipends are not competitive for domestic students, and not all students are admitted into the Department with funding. Yet at the same time, ENTX trains more graduate students than any other graduate toxicology program of which I am aware. If the department took on fewer students (particularly fewer MS students), higher stipends could attract higher quality domestic PhD students.

Program Overview and Vision (very good)

The organization of the Institute and the Department is rather confusing to me. While on paper, the Institute appears to constitute a larger entity linked with the medical and law schools, it appears that in practice the Institute and Department are more or less synonymous, with the Department providing a tenure home for the Institute faculty and a degree program for students. It is unclear to me what function the Institute has beyond what the department does.

- The department has a nice blend of environmental chemistry, ecotoxicology and human health related molecular toxicology. The investments in human health toxicology are wise and should help the Program fulfill the original vision of integrating with the medical school. (As an ecotoxicologist, it pains me to say this, but there is much more extramural funding in NIH than in EPA+NSF combined in toxicological/biomedical research).

- A materials science component of the department adds an interesting applied dimension, but leaves students with that focus as outsiders in the department to some extent. It is unclear whether the Institute plans on fortifying this activity with future hires.

- I could be mistaken, but I got the impression that the department operated on a somewhat reactionary basis to emergent environmental issues/situations. The proposal writing of some faculty members seemed to reflect reaction to hot topics (e.g. oil spill), which is understandable to some extent. However, excellent programs stick to their strengths and become known for specific expertise, rather than hopping from topic to topic. My understanding is that the historic strengths of this Institute / Department are in applied ecotoxicology and wildlife toxicology, and these areas of expertise could reinforced by a more targeted effort on specific topics.

- The building of a laboratory for working with biohazards will add a unique dimension to a toxicology program. Staffing this laboratory with infectious disease expertise will be important. Currently, expertise in this area is not a core strength in the department in terms of faculty numbers, but could be strengthened as the program evolves.
• New animal facilities will benefit the department in terms of space and capacity, but faculty commented on their lack of consultation and input in the planning process.

**Curriculum and Programs of Study (Very good)**
As the department evolves and includes more human health/molecular toxicology, it may be beneficial to develop tracks or areas of specialization in these disciplines. This could provide students with more choice while decreasing demands on departmental instrumentation (for example, analytical toxicology should only be required for students on an environmental chemistry track, but many not be appropriate for students in molecular toxicology). I was surprised that students expressed the lack of an ecological toxicology and/or wildlife toxicology course. These areas are considered historic strengths of the department and should be maintained if possible.

In general, the Department offers many more courses than other programs/departments with which I am familiar. Our program for example has only 3 core and 2 elective toxicology courses, while the rest of the curriculum is divided between the Veterinary school (pharmacology, pathology), Biochemistry (biochemistry of gene expression), and Statistics (statistics). It is unclear whether the numerous course listings are intended to minimize the need for student travel to the main campus (which is disruptive and challenging because of parking issues), or to maximize contact hours within the Department.

**Faculty Productivity (Very good)**
ENTX has a talented, diverse, and highly collaborative faculty. My impression is that a premium is placed on quantity over quality in both publication and grant writing. Productivity in terms of publication number is solid, though faculty should strive to publish in higher tier journals (ES&T, Tox. Sci., EHP) more often, even if it means publishing fewer papers on an annual basis. A focus on quality over quantity could be beneficial on the grant writing front as well. The number of grant applications generated by faculty is impressive, yet many of the applications are for relatively small projects, and success rates are not high. It is possible that success rates could increase if the volume of applications is reduced such that each application gets the time and care it deserves in order to be successful. Chasing every last dollar can result in diminishing returns. Faculty teaching loads are appropriate for a graduate, research intensive department. Given that each faculty member is strongly encouraged to support 4-5 graduate students, teaching demands should be modest. Students were universally complimentary on the faculty’s dedication to teaching. Many commented that the faculty is readily available, accessible and helpful in both coursework and laboratory/research work. It is clear that the faculty is dedicated to the well being of the students and put a lot of care into their work.

**Quality and Quantity of Graduate Students and Graduates (very good/good)**
In general, it appears that ENTX gets a diverse and international applicant pool. Our meeting with the students provided a positive view of the student body. Students appear to take pride in their department and had much praise for the faculty. Students appear to do well in terms of publishing their work, and progressing into professional opportunities (though few in academia). Students are strongly encouraged to apply for financial support immediately upon entering the department, which may detract from their scholarly pursuits. While it is important to learn about grant proposal writing, it may be more beneficial to allow students to settle into their projects and specific direction before being asked to seek out funds. Some students expressed a desire for more teaching experience, while others seemed confused about the rationale for TA and RA assignments (some wanted to TA, but couldn’t, and others didn’t want to TA, but were forced to).
A transparent assignment process could benefit planning (and morale) for both students and faculty. We were informed of a “wall of shame” – a listing of students on departmental support for too long. This situation is likely not good for morale. It appears that the department is operating at or close to capacity with respect to student enrollment. Faculty seem a bit pressured to take on students that they are not prepared to support. The experience of both students and faculty may be enhanced by admitting fewer students and concentrating existing resources and opportunities on a smaller student population.

**Facilities and Resources (very good)**

Texas Tech has done a great job of converting existing buildings into very nice laboratories, and building is underway for animal care facilities as is the retrofitting of existing space to a BSL3 lab. Nonetheless, growth of the ENTX faculty will soon be constrained by the lack of lab space to grow into. It is clear that ENTX gets a lot of support from the TTU administration in the form of operating budget and graduate and teaching assistantships.

Support staff was universally praised by faculty and students, and library resources are reported to be much improved since the last review.

After meeting with the faculty, I got the impression that external pressure to increase graduate enrollment has led to a mismatch between the numbers of students admitted into the Department and the availability of research funds for faculty to support them. Some faculty expressed being in a bind between wanting to please the Director by admitting additional students into their labs, but also feeling pressure to not utilize department support to fund those students for too long. As stated above, the rationale for allocation of RA and TA positions does not seem evident. A decision-making partnership with the Director and significant input from the faculty is recommended to improve the process for awarding TA and RA positions that better meet the needs of students.

**Other comments/observations**

A formalized mentorship program for junior faculty could be helpful in terms of assisting them to write successful grant applications, and maintaining a feel for how they are progressing with respect to tenure and promotion. Faculty reported that the tenure and promotion process was unclear and a bit disorganized.

I was honored to have the opportunity to provide input for the ENTX program at TTU, and hope aspects of my review are valuable in strengthening your program. I am available for follow up regarding any aspects of this review.

Sincerely,

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