

Program Review, Department of Botany, Weber State University

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Introduction

We had a visit of one day (March 20) to the College of Science and, particularly, the Department of Botany. In the morning we met with Dr. Andrea Easter-Pilcher, Dean of the College of Science, who shared with the review team her ideas and guidelines for the review process, and with Dr. Sue Harley, Botany Department Chair, who gave us an introduction to the Department and its academic goals. After a tour of the facilities led by Sonya Welsh, Laboratory Manager in the Department of Botany, we had a discussion meeting with the Botany faculty and with Mary Owen, the department's administrative assistant. The faculty interviewed included three senior faculty members (the Chair, Sue Harley, and two professors: Stephen Clark and Barbara Wachocki), as well as three assistant professors: Bridget Hilbig, Heather Root, and Katharina Schramm.

After lunch with a group of students, alumni, and community members, we had an early afternoon meeting with support staff, including Miranda Kispert, Science librarian; Jane Stout, College of Science Advising Office; Greg Nielsen, Career Services advisor for the College of Science; and Michael Hernandez, Geosciences faculty and advisor for Geospatial Analysis programs applied to large-scale botanical research. The afternoon was completed with a second round of interviews and discussion with the Botany faculty (Sue Harley, Barbara Wachocki, Kat Schramm, and Sonya Welsh), and a final discussion and preliminary reporting with the Dean of the College and the Chair of the Department.

Prior to our visit, the Department furnished the members of the review committee with a series of documents providing detailed information on the evolution of the Botany Department, including the very comprehensive Self Study of the Botany Department, as well as an Executive summary. Both reports were authored jointly by all the departmental faculty members and made available at the campus website: https://www.weber.edu/assessment/2018_2019_Documents/Btny_pr1819.html.

Program Strengths

In general, we were very impressed by the program and its academic strengths. Botany at Weber has a very strong emphasis on field studies in general, including field botany, vegetation dynamics, soil-plant interactions, ethnobotany, and historic vegetation change. Students are trained in the use of herbaria, geospatial analysis, plant identification, and field botany. The students are offered a summer course on field botany that includes extensive travel in the region and the development of familiarity with the regional ecosystems. At a time in which most universities are concentrating their curricula on lab-restricted experimental and molecular studies, we believe that the emphasis on ecosystem-level training fills a niche that is very important—especially in the American west and southwest—but has a dwindling offer for students interested in studying botany with that approach. Agencies such as the National Park Service, the Fish and Wildlife Service, or the Bureau of Land Management actively hire young biologists trained with as field botanists. Many State-level agencies throughout the region also have a similar demand for trained staff capable of doing research, ecosystem management, and conservation work in the field.

The facilities of the Department are outstanding. Housed in a new building, with modern and well-equipped laboratories, the students have extraordinary resources to learn, including new state-of-the-art microscopes and an outstanding teaching greenhouse with a remarkable live collection of extremely rare plants, of great value for the teaching of plant evolution. The campus has also an excellent library system, with advanced online access, that allows both students and researchers to access publications with ease and efficiency. In particular, the Botany support librarian —Miranda Kispert— has created remarkable web resources for undergraduate student research.

The proposed new Botany curriculum is well organized, clearly explained, and covers in a balanced way the three major sub-disciplines of Botany: (1) Molecular, Cellular, & Developmental; (2) Anatomy, Physiology & Organismal; and (3) Ecology & Evolution. The approach follows the scales and levels of organization of life on Earth, going from the molecular and cellular level, to the level of whole organisms, and to the level of multi-organismal assemblages and whole ecosystems.

It is important to note that, despite the exciting nature of the new Botany curriculum, the Self-Study prepared for WSU's Five-Year Program Review of the Botany Department, which guided our review work, was made with information derived from the implementation of the old curriculum. For this reason, the report we used for our analysis was sustained by data reflecting the old study plan but not the proposed new curriculum. Technically, our review report reflects the academic results of the old curriculum, especially in what concerns our analysis of strengths and weaknesses. However, since the Department has such detailed plans for the new curriculum, we believe that Botany's new academic plan needs to be assessed as part of our review process. The new curriculum is the result of an outstanding academic effort to bring the teaching of Botany at WSU to the most current science, and opens a possibility of putting the Botany Department of WSU within the most up-to-date Botany Departments.

The Department of Botany has a good reputation for quality students and much support within the college from the College advisor, the Librarian, and the GIS program in Geosciences (who has many Botany students enrolled in GIS training). Technical skills in GIS are critical for the future employment of field botanists. The courses in field botany and GIS have overlapped in scheduling, although that problem will be resolved in the future with the hiring of an additional faculty member in Geospatial sciences. A good knowledge of Geographic Information Systems, and adequate training in the use of specialized geospatial software, are essential elements at present for competitive and successful field botanists.

Program Weaknesses

Our evaluation of the program was overall very positive, so perhaps it is a tad too strong to mention “weaknesses” of the program. There are, however, some points that merit attention. The first point has to do with the Department's herbarium. The current curator of the herbarium, Dr. Stephen Clark, is retiring in a few months and the university will have to start a search for a replacement. Judging by what we saw, the herbarium, though small, seems to be well curated and harbors a really interesting collection of plants, with an emphasis on the flora of Utah and surrounding regions in the American Southwest. The herbarium, however, has not been databased and, because of this, it does not form part of regional or international consortia, such as GBIF or SEINet. The only way somebody can consult the WSU herbarium is by physically visiting it, a fact that restricts the number of people that interact with WSU's plant collection data. There are more than a dozen plant data portals distributed among the US, and many dozens more internationally, all in turn interconnected and sharing data among hundreds of herbarium collections. By not having its information databased, the WSU herbarium is missing the many opportunities that belonging to this larger scientific network can offer.

In terms of evaluation of teaching performance, the evaluation of success in teaching is largely based in the quantification of acquired skills; i.e., the grades and exam results, as is well explained in the Department's Self-Study. There are no set systems to gather student's own feedback on the courses, the curricula, or the perceived quality of the teaching process. After discussing this aspect with the Department's faculty, we do agree that student's feedback is often biased or guided by the student's individual interests and personal frustrations, and that student's evaluations have to be taken with patience and equanimity, and are not necessarily objective. However, some form of obtaining feedback from students could enrich the organization of courses and provide professors with some idea of what aspects of their classes/course are the most engaging.

Although a beautiful teaching facility, and also eye-catching in its architecture within the school of sciences building, the greenhouse needs attention. The glass panes are thermally inefficient and demand a lot of energy to keep cool in summer and warm in winter. We were informed that around one third of the energy consumed in the building is for the operation of the greenhouse, a fact that also attempts against sustainability goals for the campus. The potential retrofitting of the heating system, a better air management system (possibly relying on passive ventilation for cooling) and the replacement of glass panes with thermally efficient material such as polycarbonate would allow a better and more cost-effective operation and meeting the challenge storing and maintaining the impressive collection of live plants. This is critical to fix, as the greenhouse serves important teaching and outreach functions for the college and the department.

Finally, in terms of the proposed new Botany curriculum, a note of caution must be made. The Department of Botany at WSU is strongly bimodal in its age-class distribution. Three of the faculty members (Harley, Clark, and Wachocki) are senior professors, all of them approaching the age of retirement. The other three faculty members (Hilbig, Root, and Schramm) are Assistant Professors, not yet tenured. Steve Clark is retiring in June this year, and both Sue Harley and Barb Wachocki will retire in three years' time. This will generate, in a very short time, a transfer of responsibilities between the two cohorts requiring the advancement to tenure of the younger researchers, plus the need to hire replacements for those that are retiring. At the same, the Department will be implementing a new curriculum that will pose new challenges and new demands on faculty. In our opinion, all this implies that the Department of Botany is going to be facing a large amount of institutional change during the next 3–5 years that will require careful planning. Despite these challenges, we believe that the three junior researchers that will carry the Department into the future and implement the new plan are really exceptional and seem to be quite capable of successfully meeting the new demands.

Final comment

As can be seen from the previous section, the transition that the Department will undergo in the next three years rests largely on the work and initiative of the junior faculty: Bridget Hilbig, Heather Root, and Kat Schramm. These three young researchers have impeccable academic credentials and WSU is fortunate to have them as part of the campus faculty. However, they seem to be also eager to maintain their research productivity added to their teaching responsibilities. Thus, they are feeling pressure to maintain an active research agenda, obtain external funding, teach courses, contribute to service requirements, and obtain tenure. Their wish to do remarkable work is worthy of praise, but may not be sustainable in a teaching-intensive institution with a 4/4 load. A balanced distribution of research and teaching is needed for these young researchers during this complex transition period.