

By Steve Denison

Based on my visits to the Amherst and Mount Holyoke Biology Departments, we may want to consider the following ideas in our strategic planning for Integrated Biology and Computational Biology/Bioinformatics. As both Amherst and Mount Holyoke both have new life sciences buildings, ideas for our planned building are also included.

1. Team-teaching.

Team-teaching of courses allows for faculty to bring in different expertise to a single course. For example, at Mount Holyoke College, Developmental Biology (a core course) is team taught by an animal physiologist and a plant physiologist. Genetics/Molecular Biology and Cell Biology are also team-taught at Mount Holyoke. At Amherst College, Introductory courses are team taught by two faculty members. The first two introductory courses are “Adaptation and the Organism” (basically an evolutionary biology course) and a cell biology/genetics course. All biology faculty rotate through these courses. Biochemistry is team-taught at Amherst by a Biology faculty member and a Chemistry faculty member. Thus team-teaching can extend across departments.

2. Small, high quality teaching labs with adjacent prep-rooms.

The Genetics/Molecular Biology (an introductory course) teaching labs in the new (less than one year old) Life Sciences Building at Mount Holyoke has benchspaces for only 12 students. There are three islands, each with four seats (Fig. 1).



Figure 1. Mount Holyoke Genetics/Molecular Biology Teaching Laboratory

Biodiversity teaching labs have several small island-style benches (Fig. 2).



Figure 2. Mount Holyoke Biodiversity teaching lab.

At Amherst College, each teaching lab has an adjacent prep room to facilitate lab set-up.



Figure 3. Amherst Introductory Biology Teaching Lab

I think we can also do a lot to attract students by having very high quality teaching laboratories. The Mount Holyoke organic chemistry teaching labs are a good example of this. The organic teaching labs have fume hoods on the benches– one for every two students. There are two labs (one with eight hoods and one with ten hoods) separated by an instrument room. The instrument room had equipment including two NMRs (300 and 400 megahertz). An adjacent room contained an atomic force microscope.



Figure 4. Mount Holyoke College Organic Chemistry Teaching Laboratory.

3. Enhanced Faculty Research.

Faculty research can be enhanced with additional faculty research space. At both Amherst and Mount Holyoke, each Biology faculty member has a research laboratory with space for three or four students and the faculty member. Each member of the lab has a desk with computer and research bench. According to Dr. Temeles (Biology Chair) of Amherst, most of the cost of the new building (\$22 million) went into research facilities. Figures 5, 6 and 7 below show faculty researchlabs at Amherst and Mount Holyoke.



Figure 5. Amherst Faculty Research Lab.



Figure 6. Amherst Faculty Research Lab.

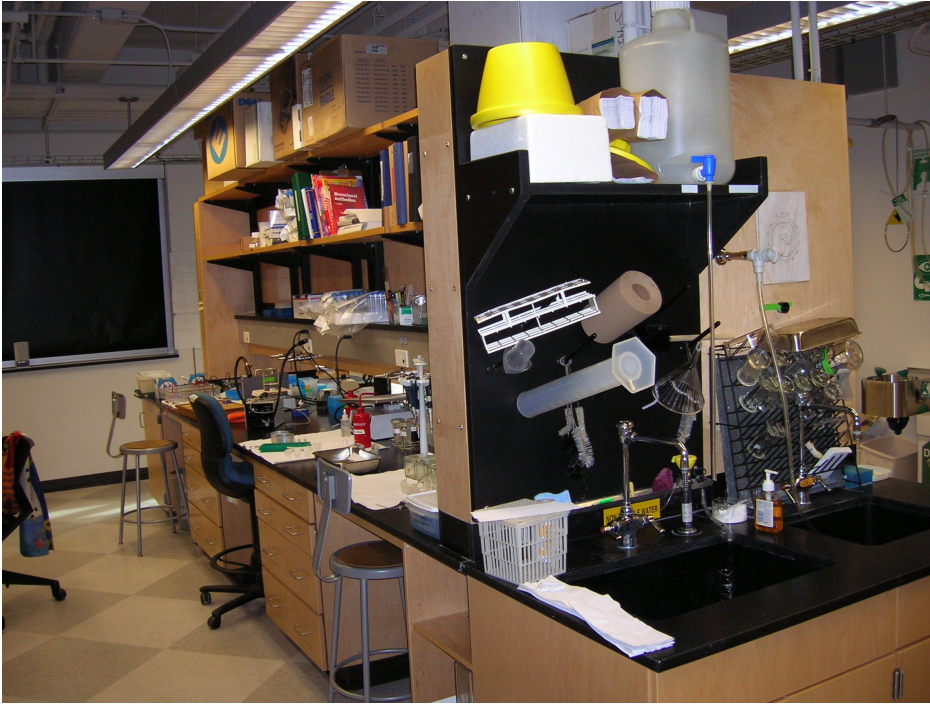


Figure 7. Mount Holyoke Faculty Research Lab.

Faculty research labs at both colleges have chemical stocks and prep rooms that are separate from the teaching labs. Research labs and faculty offices are separated from teaching labs with locking doors with key pad entry. Each floor also has a large walk-in environmental chamber. The research labs have smaller rooms adjacent to them for equipment such as confocal microscopes (Amherst and Mount Holyoke) and a machine for cell counting at Amherst (approximately \$100,000 piece of equipment).

At Amherst, it is common for faculty to have research technicians working in their labs. The technicians are funded by grants (usually NSF), but the Biology Chair has proposed to the administration that each faculty member receive funds from the administration for a full-time research technician.

Additional resources and support staff are available to help with faculty research. Both Amherst and Mount Holyoke have large animal facilities. The Amherst animal facility, used by both Biology and Psychology faculty, has a full-time technician.

Amherst also has two greenhouses used by an evolutionary biologist and genomics biologist. Mount Holyoke has one green house.

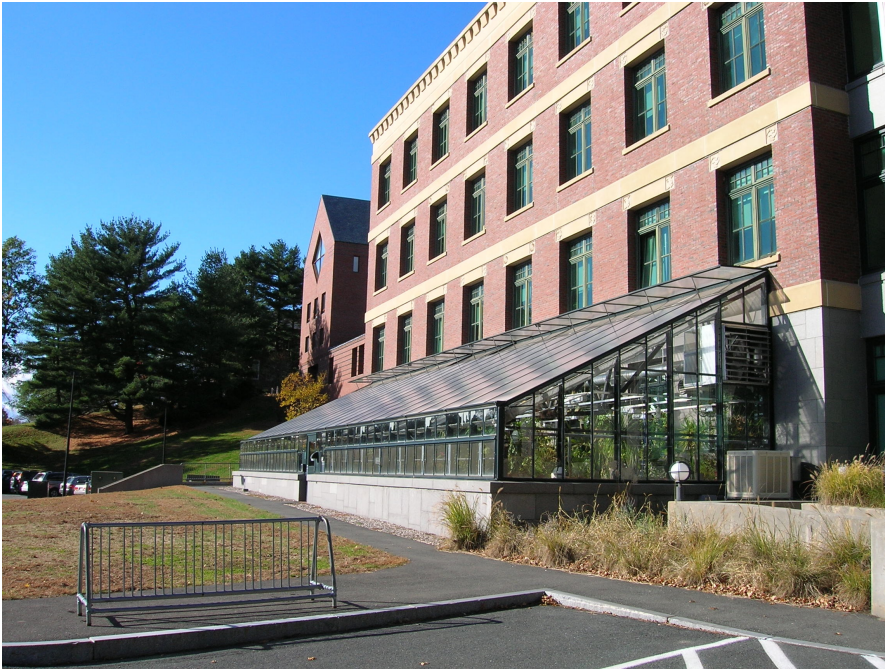


Figure 8. Amherst green house

Teaching lab support also provides more time for faculty research. The Mount Holyoke Biology Department has 10 – 12 full- and part-time lab support staff trained at the masters level. Teaching lab sections is one role of these staff members. Faculty teach 1 or 2 labs a semester and additional labs are taught by support staff.

Smaller teaching loads provide more time for faculty research. The teaching load at Amherst is 1 lecture and 2 labs a semester. A seminar course can take the place of labs. The teaching load at Mount Holyoke is three courses with lab per year, usually two courses with one lab each during one semester and one course with lab in the second semester. The idea here is to have one semester with less teaching.

More faculty in a department reduces teaching loads, providing more time for faculty research. The Mount Holyoke Biology Department has 12 full-time faculty. They do, however, have a large number of graduates – about 60 each year. Additional faculty can also provide for more diverse course offerings. Genetics/Molecular Biology is an introductory course at Mount Holyoke. They also offer three upper-level genetics/molecular biology electives: Eukaryotic Genetics, Microbial Genetics and Plant Molecular Biology.

More frequent leave can provide more time for research. At Amherst, faculty can take every 7th semester or every 5th year off with 80% pay.

4. Enhanced Student Research

Mount Holyoke supports 30-40 students to carry out full-time summer research. About 20 undergraduate students are supported by the college in summer research at Amherst and 25 additional students in sciences are supported by a Howard Hughes grant.

Student research would benefit from research space as mentioned above.

5. New faculty.

Amherst has just hired a genomics biologist. This is an area we should also consider.

6. Embedded course content.

Although Mount Holyoke has a genomics biologist, the genomics and bioinformatics topics are not taught in separate courses, but rather are embedded in other courses.

7. Common student areas in science buildings.

Both the Amherst and Mount Holyoke life sciences buildings have common areas for students to meet and study. These are several small areas with seating and tables at Amherst. The Mount Holyoke building has a larger area with coffee and sandwich bar (Figures 9 and 10). These areas were described as being very valuable and were highly recommended.



Figure 9. Common Area with coffee and sandwich bar in Mount Holyoke Life Sciences Building.



Figure 10. Common Area with coffee and sandwich bar in Mount Holyoke Life Sciences Building. Ground floor sciences computer lab and additional seating on every level are also visible.

8. Cooperative arrangements with other colleges.

Amherst and Mount Holyoke are part of a five-college consortium in the area. The other colleges in the group are Smith, Hampshire and University of Massachusetts Amherst. Students at any of these colleges can take courses at any other college. For example,

students at Mount Holyoke can take advanced courses in Genomics at U. Mass. We might want to consider if there are institutions or universities with whom we could have similar arrangements.