

Teaching and Learning Excellence Survey 2018-19 Biocore Response

1. Please summarize the decision-making process for curricular issues in your department. For example,
 - a. How is your curriculum committee (or equivalent) structured? How are decisions made about teaching assignments, the balance between low- and high-enrollment courses, the days and times courses meet, and the instruction mode, etc.?

Background: Biocore has a tradition of curricular innovations and is relatively agile in the decision-making process as it benefits student learning. The curriculum includes seven courses (four lecture and three labs) that integrate with and build on each other over four semesters. Each course is led by a Course Chair. Given the integrative and sequential nature of coursework, it is essential that curricular decisions are coordinated from the finest grain (at the individual class meeting level) to the ‘courser grained’ unit, course, and program level, across the four semesters sequence. Furthermore, Biocore fulfills introductory to intermediate biology course requirements for most (30+) biological science majors on campus. Therefore, curricular changes are often discussed and coordinated with stakeholders outside of the program and beyond Biocore (e.g. bioscience majors, L&S Honors and CALS Honors programs, Center for PreHealth Advising, Medical Admissions Office for SMPH). In addition, since all Biocore courses are automatic Honors, curriculum decisions are also made in recognition of the new all campus [Honors Outcomes](#) established by the University Honors Committee.

For **fine-grained decisions**, at the course and within course/unit level, decisions are made during pre-semester planning meetings and the weekly course meetings facilitated by the Course Chair with input from the unit instructors, graduate TAs, student Board of Directors (volunteer student representatives), and program administrators. These decisions include specific learning objectives, assessments, adjustments to due dates, communications regarding grading, assignments, pedagogical approaches, and general course revisions and alignments that are made before the semester and then finer adjustments that can be made easily during the trajectory of the semester.

For **courser-grained decisions**, at the course and program level, decisions are made during monthly course chairs meetings facilitated by the Biocore Associate Director with input from Course Chairs of each of the seven courses, the Faculty Director, and Program Administrator. These decisions include staffing courses, curriculum prerequisites and fulfillment (e.g. CommB, commensurate coursework), grading / assessment policies, course coverage and alignment of learning goals/outcomes, course changes, program recruitment, admission, and enrollment issues. Courses are staffed with faculty through search and screen process done by Biocore Faculty and Associate Director. Faculty are assigned to a course based on their content expertise, prior teaching experience, interest in team teaching, availability, and alignment with the Biocore teaching philosophy.

- *Course chair roles and responsibilities:* Faculty course chairs are volunteer leaders who have substantial experience with the course and with the Biocore program more generally. Faculty course chairs oversee the general operation of the course, attend all class meetings, facilitate and coordinate curriculum and assessments within the course, direct the graduate teaching assistants, serve as a teaching mentor for faculty who are new to the course, attend monthly course chairs meetings to advise and integrate curriculum across four semesters. (Note: Biocore does not have any Faculty FTE. All faculty who teach in Biocore come from other departments).
- *Student input into curricular decisions:* Along with typical mechanisms for course/instructor evaluation (e.g. course evaluation surveys), each Biocore course enlists the help of a student Board of Directors (BOD). The BOD is a group of 5-6 current students who are taking the course who serve as student liaisons between instructors and students. To help with fine grained course adjustments during the semester. They actively solicit input from their class peers that will improve learning. They meet weekly with the course instructional team for 15-20 minutes, present issues/ concerns, actively problem solve with instructional team, and report back to class through a weekly email or class announcement. In addition to BOD, the Biocore lab courses engage undergraduate TAs who support students and graduate TAs as they learn and navigate through the Biocore program. Biocore Peer Mentors are in their second year of Biocore and facilitate learning of first year students through group study. Together, the BOD, uTAs, and Biocore Peer Mentors all provide guidance and influence curricular decision making (directly or indirectly) from the student perspective.

b. Are you considering curriculum revisions or innovations in teaching, including enhancements to large enrollment courses? Please tell us more.

We consider all Biocore courses as moderate to large enrollment with 75-110 students.

- **CommB-** Revise and strengthen the CommB writing assignments in Biocore 381 in consultation with Writing Across the Curriculum program.
- **FIG-** In Fall 2019, Biocore will offer a new FIG course: [“Becoming a Scientist: Doing Biology Research”](#). This course will allow freshman students earlier exposure to research and a discovery mindset. Although FIGs is not a large enrollment course itself, the partnered courses are such that the FIG course students have a ready learning community in their large enrollment course.
- **Biology Education Research-** Develop lab instructional materials that introduce and help students strengthen their understanding of the process of science, science efficacy, identity, and comfort with uncertainty. This effort is part of a recently awarded NSF grant and will be coordinated with biology education research done by a Postdoctoral Research Associate in Biocore for Fall 2019.
- **Statistics Curriculum for introducing R-** Create developmentally appropriate curriculum and support tools for the introduction of R statistical software over 3 semesters of Biocore labs (382, 384, 486).
- **Pressbook “Process of Science Companion”-** Generate an online Pressbook open text titled “Process of Science Companion” that merges content and rubrics of the Biocore Writing Manual, Biocore Statistics Primer, and the Biocore Tools and Techniques Guide. The Process of Science Companion has been in the works for the last two years, but has been challenging to complete given lack of funding. In spring 2019, we received internal funding through a mini-grant offered via the Integrative Biology department (former MIU now Intro Biology Professional Development Grant). With this support, we intend to publish the PoSC within the 2019-2020

academic year. PoSC will be accessible to Biocore courses through Canvas, and will be made available to all Pressbook members (Unizin members only?) as an open text publication.

2. Please summarize any departmental plans to systematically engage faculty, instructional staff and graduate students in teaching-related professional development.

- **Biocore Pre-Semester Workshops-** Each semester, all Biocore Course Chairs, faculty instructors, instructional staff, graduate teaching assistants, and undergraduate teaching assistants participate in the Biocore pre-semester teaching workshop. TAs and uTAs are also required to attend an additional workshop at the Writing Center for CommB TAs if they are teaching Biocore 381, 382, 384 or 486—all of which are either writing intensive or CommB.
 - **Campus Workshops & Symposium-** All Biocore faculty will be encouraged to engage in the Inclusive Teaching series of 3 workshops offered by The Collaborative; and to attend the annual Teaching and Learning Symposium in May.
 - **FIGs-** The Biocore FIG course instructors will attend all workshops offered by the FIGs program.
3. What are your priorities or goals in the area of teaching and learning in the next two years and what challenges do you anticipate in accomplishing them?

Priorities

- **Increase and Stabilize enrollment:** In 2016, Biocore experienced a 30% drop in enrollment. Given a study conducted by APIR in 2018, the dramatic drop could not be explained by any obvious institutional, course, or programmatic change. That said, the Biocore administration has taken three major steps to raise Biocore visibility that we can attribute a recent rebound of 15% enrollment in Fall 2019 including
 - 1) Creation of [Biocore Peer Advisors](#) group of 20 current and former students ([see profiles](#)) who have established a presence at SOAR, interacted with professional advisors, run information sessions, developed sample 4-year plans for common bioscience majors including Biocore, and created/maintained a social media presence for Biocore.
 - 2) In 2017, Biocore started a **Targeted Freshman Recruitment**, sending personal letters to well-prepared incoming first year students prior to SOAR inviting them to consider Biocore and offering freshman pre-admission for qualified individuals.
 - 3) Creation of a new [Biocore Website](#) with the help of L&S Learning Support Services. With the creation of the Biocore Peer Advisor group, we have added new advising tools to our website as well as program information, a program video, an alumni page with testimonials, and other information for students and professional advisors. In 2018, we were asked to migrate our website from LSS to DoIT which has created additional work for Biocore staff since WordPress does not support some of the functionality we enjoyed with Drupal, and the approach to website changes/updates is DIY rather than individual consultation and

personalized help with website functionality/ troubleshooting. We need help here to keep focused on priorities rather than struggling with the technical challenges of website coding. With the reinstatement of technical help similar to what we enjoyed in LSS, we could add new components including career advising, regular newsletter, and alumni connections to the website.

- We aim to improve **recruitment and retention** among URM and first-generation college students balanced with high-achieving Wisconsin high school students searching for Honors. We recognize that Biocore is a desirable option for biology students searching for a high-impact, research-based program that offers small class size and faculty contact and support (in other words, a smaller learning community with access to the resources/network of our large institution- best of all worlds). In the last two years, Biocore staff have served as instructors in the WISCIENCE STEM Immersion program for URM and first gen students to establish learning objectives and approaches to introduce incoming students to college lectures and lab courses. In addition, we hope the new FIG course being offered and taught by Biocore staff in Fall 2019 provides another pathway for students to enter Biocore. According to enrollment reports and data digest available through RO and APIR, once URM and first gen students begin in Biocore they are just as likely to complete the program as all other students. Therefore, we are committed to continuing to develop these efforts further and would like to reorient current staff to this effort.
- **Biocore Outreach Ambassador** program works side by side with classroom teachers to improve science education in rural Wisconsin communities. As an extension of Biocore, the Outreach Ambassador Program was founded in 2004 to promote hands-on scientific investigation and exploration by elementary, middle, and high school students using curiosity and the same ‘how we know what we know’ approach that we use in our Biocore courses. ([See recent publication for details](#)). The BOA represents the Wisconsin Idea and engages future UW Madison students – many of whom go on to pursue biology related fields. BOA is a student organization that runs primarily on small grants (e.g. Evjue) but requires a great deal of time and effort to lead and coordinate from Biocore staff - particularly in recent years with increased requirements for training and liability administration work. We seek to stabilize the administration of this valuable program in the future with an additional staff member.

Challenges and Proposed Solution:

All three of these are priorities- to raise Biocore visibility, recruitment and retention, and stabilize outreach. We need additional staff time requiring additional personnel. In the last year, we hired an LTE office assistant (University Associate I) at 50% time combining funds from student hourly budget and a short-term grant. This additional staff proved to be invaluable for coordinating SOAR efforts, course administration, website migration, and Biocore Outreach Ambassador events. **In order to continue this work,**

and move it forward, we need additional program funding to support a 50% academic staff position in Biocore.

Reporting

- 1. If you haven't already told us, please describe innovations your department have embraced to enhance teaching and learning (i.e., new or significantly revised courses, engaging pedagogy, application of technology, academic and career advising, responding to achievement gaps).**

Most of the innovations are described in detail above. See bullets below for other innovations we did not describe above.

- Participated in **Engage eText Pilot** in Biocore 381 to replace 3 separate hard bound McGraw-Hill texts to decreased cost
 - Active participation in CETE bioadvisors group
 - **[Prairie Plant Companion Mobile App](#)**- Biocore collaborated with UW Field Day, the WID, and DoIT AT to develop the Prairie Plant Companion App which allows students and community members (anyone!) to easily identify plants that are grown in Southern Wisconsin.
 - **Commensurate Coursework Memos**- Biocore partnered with Genetics curriculum committee, the instructors of Physiology 335/ 435, and with the Integrative Biology curriculum committee to develop memos describing course equivalencies. These memos are intended to help guide advisors, students, and professional programs on Biocore coursework that is commensurate with other courses (e.g. Biology 151/152, Genetics 466, Physiology 335/435).
 - **Biology Education Research**- Much of the curriculum innovation work we do is stimulated by research and evidence-based practices in teaching and learning. Biocore staff and faculty regularly engage in education research projects that are reported in peer review journals ([see Biocore Publications](#)). On a smaller scale, Biocore welcomes graduate students and postdocs from the Delta program to engage in action research. These projects often form the seed of larger scale education research projects.
 - **[Biocore Prairie](#)**- In partnership with the Lakeshore Nature Preserve, Biocore directs, manages, and maintains a 12-acre prairie restoration on Picnic Point for use as a living laboratory and outdoor classroom. The Biocore Prairie plays a key role in our introduction and approach to Biocore emphases of 1.) research, 2.) group learning, 3.) communication, and 4.) integrative learning. The prairie is hugely valuable for Biocore courses and extends to many other courses across the university (e.g. Wildlife Ecology, Soils, Civil and Environmental Engineering, General Ecology, Microbiology, Entomology, Ornithology, and Landscape Architecture). Beyond courses, the prairie is the context for undergraduate and graduate research, it is used in outreach and citizen science (e.g. [Biocore Prairie Bird Observatory](#)), and for public enjoyment.
- 2. Describe your career development and internship collaborations, if any, with SuccessWorks.**

We consulted (in 2017) with Maureen Muldoon/ David Nelson about how to connect and ignite a new Biocore Alumni & Friends student group. The goal of BAF is to connect current students with Biocore alumni in careers that are of interest to students. We would like to re-engage in these conversations, but simply do not have time or personnel at the moment. This could be part of the 50% Academic Staff position described above under challenges.

3. We have data on many of your department's for-credit HIPs and other practices. But please help us better understand the following.

a. Research practices take different forms across our divisions. Using your definition please answer the following two questions.

i. How many undergraduates participated in for-credit or paid research projects that were offered by your department, excluding URS projects and theses numbered 680, 681, 682, 690, 691, 692?

Biocore offers research opportunities for undergraduates (in the form of Biocore 699) that align with research expertise within our Biocore faculty and staff, typically cell biology, ecology or animal/plant physiology. To get an idea of the range of topics students have researched, see past student research <https://biocore.wisc.edu/past-student-research/>

In the last academic year (2018-19) there have been 4 projects engaging 10 students in research (Biocore 699).

1. Prairie plant phenology- Alder Levin and Olympia Mathiapparanam (presented at Undergraduate Symposium, at the Prairie Enthusiasts Conference, Nelson Institutes Earth Day Conference, and [published in JUST](#))
2. Seed germination by endangered *Lespedeza leptostachya*- Anushri Katik-Narayan, Brandon Bruce, Olympia Mathiapparanam (presented at Undergraduate Symposium, at the Prairie Enthusiasts Conference)
3. Yeast mating response with mutant alpha factor pheromone- Madeleine Blazel, Anna Kosmach, Claudia Schmitt (presented at Research on the Rotunda and Undergraduate Symposium)
4. Native bat populations in the Lakeshore Nature Preserve- Cecelia Shortreed and Thomas Guerin (presented at Lakeshore Nature Preserve annual meeting and Undergraduate Symposium)

ii. How many course Sections were taught by faculty in your department that included original research, interpretation, and summation?

All of our Biocore lab courses (382, 384, 486) are focused on the process of science and doing original research. [See recent publication for a full description](#) of curriculum scaffold emphasizing the process of science.

Biocore 382 (Ecology, Genetics, Evolution lab)- 5 sections

Biocore 384 (Cell Biology lab)- 5 sections

Biocore 486 (Principles of Physiology lab)- 3 sections

Biocore 587 (Biological Interactions) is Biocore's capstone course where students critically read, dissect, interpret and summarize primary literature similar to a graduate seminar course. [See publication for full description.](#)

b. How many course SECTIONS were taught by faculty in your department that met the Ethnic Studies Requirement?

N/A

c. Excluding Communication A and B courses, how many course SECTIONS were taught by faculty in your department that were writing intensive?

Biocore 486 (Principles of Physiology lab)- 3 sections/ year

d. How many course SECTIONS were taught by faculty in your department that had significant collaborative assignments/projects, community-based learning or field work?

All Biocore courses have significant collaborative assignments/ projects. One of the primary areas of emphasis in Biocore is group learning and collaboration. Lecture courses use a cooperative group work structure where students sit in permanent groups through the semester and work together on in-class activities, group worksheets and assessments. All lab courses are project based where students work in research teams to pursue original research questions. In Biocore 381 all students are required to do a service-learning field activity that is based in the community (e.g. seed collecting at Goose Pond Sanctuary, work day at UW Arboretum or Biocore Prairie). Both Biocore 381 and 382 utilize the Biocore Prairie extensively in the course curriculum- as a site for research and for ecological education/ community / citizen science projects (e.g. Biocore Prairie Bird Observatory- bird banding, seed collection, brush cutting, weed management).

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