

BioResource Undergraduate Program Review
Response to Reviewer Report
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As director of the BioResource Research (BRR) undergraduate research-centered interdisciplinary major, I found the Program Review extremely helpful, and am grateful to the reviewers for their commitment to doing a thoughtful and thorough job.

The reviewers were very positive about the benefits of BRR. They commented that it fits well with OSU's articulated commitment to provide undergraduate research opportunities. They strongly supported the inclusive admissions policy of BRR, and noted that the number of underrepresented minority (URM) students graduating from BRR is high. They praised BRR's flexibility that allows new curricular offerings to be created quickly, giving undergraduates the opportunity to study in cutting-edge fields before full programs are developed. They commended BRR's high-impact educational practices, citing BRR's notable graduation rate as one outcome, and specifically recommended that because of its value and uniqueness, the BRR program continue to receive support, exempt from typical standardized metrics. They noted as well that faculty members continue to allocate their resources to BRR students, which is a strong argument for continuation of the program.

This is a response to the reviewers' report; an action plan will follow. Many of the suggestions, especially those communicated in person during the discussion at the end of the review, gave us new ideas and approaches to address our problems and needs from a fresh point of view. Other recommendations involve issues the BRR adviser-instructor and I have long wanted to address, but our limited resources, both financial and in terms of time, have prevented us.

Below are the reviewers' specific recommendations, with responses:

1. *Maintain the current size.*

I concur in general; with our current staffing, we are stretched. Still, even without active recruitment, the number of students interested in BRR keeps growing. One of BRR's central features is that it is inclusive, proving the value of this kind of program for a broad variety of students. As an inclusive program, we don't believe we should impose admission criteria that would necessarily limit the experience to only those students we have identified as being the most likely to succeed. Furthermore, after many years, we know that we still can't predict who will do well in BRR.

We are still actively seeking ways in which we can bring BRR's advantages (student research experience, supportive programs for URM students) to a wider audience. For example, we have submitted a Letter of Intent for a USDA Experiential Learning Grant proposal that would target URM students from within and outside OSU and provide them with a research experience. We favor building our capacity through additional resources; BRR could maintain the strengths and uniqueness of a small program with up to about 100 students.

2. *Increase funding available to offset research expenses for PIs mentoring students.*

Would this be an appropriate target for a fundraising effort? I would like to see dedicated CAS fundraising to support BRR student research expenses, and also to provide scholarships.

3. *Provide additional academic support resources for students, especially in writing.*

I have added two elements to the BRR curriculum in the past to provide more writing support, and am actively seeking ways to do more. One, BRR 200, is not a "writing course", but instead comprises formal instruction on research and the practice of science, experimental design, hypothesis testing, controls, and related topics. Working in teams, students identify topical research problems and formulate

experimental approaches, and then write individual research proposals. Students generally take this class when they are beginning to search for a research mentor and project. They are required to write a research proposal during the first term after they start their research. BRR 200 was intended to support the students in this process and in starting research, and was added to the BRR curriculum about four years ago in response to our strong perception that it was needed.

The BRR Writing Intensive Curriculum (WIC) course is BRR 403, Thesis. For the ungraded writing portion, students complete lab notebooks and reports, a project proposal, and a progress report. They work with their Research Mentors on these, preparing multiple drafts. The culmination of the WIC course is the actual thesis. During the term that students write their theses, I hold formal meetings of BRR 403. We discuss and review parts of a scientific paper, writing scientific manuscripts, genre and audience expectations, conventions, and the like, and students bring sections of their manuscripts as they write them, for peer review and shared reflection. I started the formal meetings of BRR 403 several years ago; when I took over as program director, BRR did not provide writing support outside of what comes from each student's research mentor, and I felt it was needed.

To continue to strengthen support for thesis writing, I am introducing more detailed analyses of journal articles earlier in the curriculum. Although BRR students are required to access primary literature and utilize library resources from the start, nowhere in our BRR courses had we specifically analyzed and discussed journal articles. Since the review, I have already added this to the curriculum of BRR 200, as a way for the students to start thinking about their own future manuscripts. I will continue to explore more and better ways to support thesis writing, in particular pursuing the Review Committee's suggestions.

We entirely concur with the need for tutors qualified to help with advanced courses in Math, Physics and Chemistry. Other majors as well as BRR have noted that while the Mole, Vole and Worm Holes and the Academic Success Center provides good help with lower division courses, many students are very challenged by upper division courses, and don't get this needed support. If the University is not willing to provide this help, perhaps the College of Agricultural Sciences could serve its students by providing a TA for tutoring.

4. *More staff/faculty support.*

In order to accurately support the amount of effort it takes to run BRR with our current number of students, and allow for the enrollment to continue to grow along with the College, while maintaining the high impact educational practices and strong outcomes praised by the review committee, BRR would require:

- a minimum of 1.5 FTE of instructional/advising time (counting the time the instructor-advisor currently devotes to MANRRS, SACNAS, LSAMP, and other OSU-wide diversity initiatives).
- 0.4 to 0.5 FTE devoted to the faculty director position, preferably split between two people.
- a 0.49 FTE GTA; we currently have a 0.49 FTE GTA, but paid by a grant, and when that grant is over, we will still need this GTA support.

This would also provide coverage when one of the current staff is unavailable. In addition, suitable advancement for the existing BRR academic and professional faculty would ensure their continued participation.

The reviewers suggested that we could increase our efficiency by adding some of the work done with individual students, particularly by the adviser-instructor, to the courses. This is a great idea. In response, I have already added material on how to find a research mentor to the curriculum of BRR 200. In our summer planning meetings, we will continue to seek ways to streamline faculty time in this way.

5. *Better visibility.*

Even without good visibility, BRR enrollment is growing at a rate greater than the growth of OSU as a whole. However, we'd like for every student who could benefit from BRR to know that it exists. Also, because BRR is unique, it could make a very good publicity and marketing tool for the College. Current staff/faculty don't have time to add additional projects. Since marketing is outside our area of expertise, we would require help from experts in the College of Agricultural Sciences and the University as we enlarge the capacity of the program.

6. *Build opportunities for students to interact as a program or cohort.*

Current staff/faculty don't have time to add additional projects, but we strongly believe that this is important. In the last three years, we have added regular social events and a Poster Session. With additional staff/TA support, we could organize student activities and a seminar series.

7. *Reexamine learning outcomes and assessment practices.*

Like most of the rest of OSU, I am still learning how best to do assessment. As a result of the Program Review and my assessment work for BRR, I am currently rewriting and simplifying the Program Learning Outcomes and formulating specific assessments where they are missing. However, this is another additional project added to the responsibilities I have.

8. *Clarity around credit and rewards for faculty participation.*

We are discussing ways to increase recognition for faculty mentors. This could include, for example, letters of appreciation, copied to each mentor's department head. We have always allowed students to take some of their research credits in their mentor's department if this was needed. As outlined in recommendation #2, we will seek ways in which financial support to mentors could be made available to cover the cost of student research. We will address this recommendation in depth during our summer planning meeting.

9. *Harvest the information learned from the experimental nature of the program.*

I am very interested in pursuing this as a line of research, and am actively seeking collaborations to do so. Increasing the scope of our assessment practice will allow us to begin to collect data. However, current staff/faculty don't have time to add additional projects to BRR responsibilities.