Review Team:
Dr. Michael Kahn, Washington State University
Dr. Sarah Schaack, Reed College
Anne-Marie Deitering, M.A., MLIS, Oregon State University, Curriculum Council Representative
Dr. Martin Storksdieck, Oregon State University, Director, Canter for Research on Lifelong STEM Learning
Dr. Joan Gross, Oregon State University, Curriculum Council Representative


Final Reviewer Report Submitted:

1. Overall Recommendation:

   □  Expand
   X  Maintain
   □  Restructure
   □  Reduce
   □  Suspend
   □  Discontinue
   □  Other

   The review committee recommends that the existing BRR program be maintained. In particular, these elements of the program should be preserved:

   • The current requirements for the number of research hours students must spend on the thesis project (480-700 hours) and the final product (thesis).
   • The existing structure, which integrates course work starting in the first year that helps students develop the skills they need to: identify and meet with potential mentors; understand research opportunities available to them; understand their role(s) as student researchers; develop writing and presentation skills needed to communicate their research; Build research into the student experience from the start.
   • The consistent monitoring of student progress by the program advisor(s).
   • The practice of having students and mentors review and sign a contract at the start of the research project.
   • The rigor of the core curriculum.
   • Admissions standards that make the program accessible to all OSU students, without regard to traditional academic metrics like GPA or standardized test scores.

2. Summary of Findings and Recommendations
There is value in having this kind of program in this university. The flexibility and interdisciplinarity meets the needs of a particular type of student and, to judge from the number and enthusiasm of faculty participants, may also provide the faculty with options not available in more traditional programs.

**Findings:**

1) The BRR program offers significant value to the university. It serves several important functions within the university, primary among them are:

   a. OSU has articulated a broad commitment to provide undergraduate research opportunities more widely and to more students. The BRR program is unique in requiring students to conduct interdisciplinary and independent research for a sustained period within their undergraduate experience, and BRR supports students with a robust structure that includes class curriculum related to research conduct and science communication, personalized advising, and one-on-one mentorship with active scientists. This research period culminates in a capstone thesis experience.

   b. The opportunity for the students to “major in” BRR (rather than have a research experience on top of a typical major) actually allows them to choose one of many standing interdisciplinary programs of study and thus design a curriculum specifically tailored to their individual interests while still completing a rigorous core set of classes across the sciences. This is particularly important to certain types of students who are self-starters, independent and invested in hands-on learning. Some of these students may find it challenging to succeed in more traditional majors.

2) In addition to the primary contributions of the program described above, it also appears to provide a number of other key advantages that are in line with the educational mission of OSU. These include:

   - Graduates of the program are well-positioned to succeed in a variety of graduate and professional programs after OSU. Students develop hands-on/practical skills in a variety of disciplines, experience with scientific and technical writing and in making presentation, participate in ethics training, and through their student-mentor collaborative work, develop a better understanding of the discovery process and producing scientifically valid results.

   - OSU has an articulated commitment to support students from traditionally under-represented groups in STEM fields, and this program serves a relatively high percentage of those students. Furthermore, the graduation rate for these under-represented minority students in BRR is impressive. The program is open to students that may otherwise not gain entry into the Honors College or may not have sufficient financial aid to complete the International Degree (two other mechanisms via which students can have a thesis experience that are available at the university level).

   - The structure of the program options provides a framework that allows OSU to create new curricular offerings quickly and flexibly. Students have the opportunity to study in cutting-edge fields before full programs can be developed, and the university can use these options as a test bed.
**Recommendations:**

1. **Maintain the current size.** The program should not grow much beyond its current size, unless additional resources are available to allow for the same level of advising and student support. Additional growth will tax the existing BRR staff too much to be sustainable and could negatively affect the success of the program.

   - Because of the uniqueness of the program and its benefits to the College and the University as a testing ground and to OSU students as an accessible pathway to rich learning experiences, we strongly recommend that this program be exempted from typical standardized metrics based on student credit hours or size used to evaluate program viability.
   - If it becomes necessary to cap enrollment in this program, the program should articulate criteria for admissions that are connected to student success in the program (mostly related to “soft skills”) and admit students based on those criteria. These criteria should not be tied to traditional standards of academic achievement.
   - It is important to realize that the true cost of the program is more than the direct support to the BRR staff and also should include the faculty contributions to individual students in the form of time and resources. That these allocation decisions are being made despite potential competing alternatives is a strong argument for continuation of the program.

2. **Increase funding available to offset research expenses for PIs mentoring students.** Current policy requires mentors to provide operating expenses for student projects. Several faculty mentioned their limited ability to take on students without some baseline level of support to cover research costs. The faculty noted that even small amounts of $500-1000 would provide significant help and would increase their likelihood of accepting a student. Given that students are paying for their research credits, there may be a way to couple this into a budget for students “taking” the research class.

3. **Provide additional academic support resources for students, especially in writing.** Both students and faculty commented on the development and support students need to successfully write an academic thesis. Students commented that the current writing course is focused primarily on proposal writing. Although they did find this valuable on many levels, they felt they needed additional support on writing the thesis/manuscript. This support could take multiple forms:

   - An additional course, or a course offered earlier in the course of study;
   - Develop sections of WR 327 specifically to serve College of Agriculture students or students engaged in undergraduate research; or
   - Writing consultants trained specifically in science writing, specifically in writing research article manuscripts.
   - Reflective practice built into the start of the thesis writing course (WIC) before students begin writing their own manuscripts.
   - Tutors qualified to help with advanced courses (in Math, Physics and Chemistry) in the CLC.
4. **More staff/faculty support.** The program relies extremely heavily on the two existing administrators/faculty. This seems unsustainable if the program is to grow, and may even be problematic in the event that one of the two are unavailable for any number of reasons. This process should start by identifying and documenting tasks currently being handled by the advisor and director that could potentially be done by someone else.

5. **Better visibility.** Many students and faculty commented on the difficulty they had finding out about the program. Word of mouth is a reasonable mechanism for current students, but it is important that there be access for students to learn about the program through multiple channels. The College of Agriculture website quiz was mentioned as a good mechanism to connect students with BRR, however the program should establish a plan to improve and expand marketing of the BRR program. One primary reason to improve marketing of the program is to connect students to BRR earlier in their studies; earlier entry into the program allows students to benefit considerably more from the flexibility and research.

6. **Build opportunities for students to interact as a program or cohort.** Students and mentors appear to exist largely as independent operators (or pairs of operators) within the program. A small investment of resources to support events or gatherings where students can interact would be beneficial. This would provide students with an additional network of support.
   - Students appear to be motivated and engaged with the program, and willing to do some of the logistical work to create events themselves.
   - A faculty seminar series that would bring students together after they have made significant progress on the core curriculum could serve program learning goals and provide a social outlet.

7. **Reexamine learning outcomes and assessment practices.** While some of the program learning outcomes articulated are effective, there are some issues. The outcomes should be examined to ensure that they are measurable using the learning activities or program elements that have been identified. Students should be asked to explicitly reflect on the program outcomes after their research experience. A longer term (five year?) feedback might also be useful.

8. **Clarity around credit and rewards for faculty participation.** Faculty, overall, were strongly supportive of the program and its mission. Several faculty mentioned issues with regard to credits they receive for their time and compensation (especially faculty outside the College of Agriculture who serve as mentors). There is clearly confusion around this issue. Our understanding is that research credits are assigned to units of the mentors – if correct this should be prominent in the description of the BRR program.

9. **Harvest the information learned from the experimental nature of the program.** Given the interdisciplinary and dynamic nature of most of the options, several respondents mentioned the need for careful oversight of the curriculum requirements in each track and the need for regular review. More importantly, the program could be used to better understand the needs of students who are interested in engaging in undergraduate research through more traditional undergraduate majors. Research and evaluation on the effectiveness of program elements might allow the university to extract which components of the BRR program could get scaled cost-effectively to more OSU students.
3. Detailed Findings

- The mission of the program, and its relationship and alignment with the mission of the academic college(s), and that of the University.

The mission of the program is: The BioResource Research Program in the College of Agricultural Sciences provides research-based, interdisciplinary education, in conjunction with a rigorous biosciences curriculum and opportunities for experiential learning and professional development, in fields related to biological resources and agricultural, environmental, food, and health sciences. BRR graduates can contribute successfully to their future career fields or graduate programs, and think critically to help solve the world’s bioresources-related problems.

The program is clearly meeting that mission. The program also demonstrated clear alignment with the academic missions of the college and the University. The connection with the University’s mission is on multiple levels as it not only epitomizes educational excellence, but also advances the research mission. Because students may be doing interdisciplinary research with mentors outside of the university, it meets the mission for outreach, supporting a “continuous search for new knowledge and solutions” in at least two of the three OSU signature areas.

- Recruitment and enrollment trends of students

Most students enter BRR as transfers from other programs in the university. Although some of this may be because students may not know they want to participate in research in the “BRR way” when they begin at the University, the more cited reason seems to be because it takes time for students to actually find the program. During the student interviews, most of the students would have liked to have found the degree earlier and started their research earlier.

- Admissions selectivity and other indications of selecting high quality students

BRR is open to all OSU students. We that this continue subject to the condition that the students perform up to expectations, as it offers a unique research experience that students may not be able to access via other avenues on campus (such as the Honors College). BRR also does an admirable job of attracting, keeping and graduating a diverse student body.

- Curriculum and assessment strength

The BRR curriculum is strong, consisting of a very rigorous required biosciences core, BRR-specific support courses that help students develop skills to succeed in the program, required 480-700 hours of research that culminates in a thesis, and a flexible degree options framework that allows them to create new curricular offerings nimbly. Based upon input from the students, the one area where the curriculum could be further strengthened is additional support and guidance on how to write the thesis. Student reported that the current writing class focused more on grant and proposal writing than thesis writing. The apparent issue is the difference between describing a plan of action and describing in addition the actions
taken to implement the plan, the results of those actions and the interpretation of those results. They did feel the writing course was helpful, but they also needed the thesis guidance and support.

- Mentoring and support

A key strength of this (and many similar programs around the country) lies in the “high-touch” mentoring and coaching that students receive, and that can be delivered in an empathetic and personalized manner. Current students and alumni were unanimous in their assessment of the personal support they received from key program staff and (partially) their research mentors.

- Quality of personnel and adequacy to achieve mission and goals

The BRR program is primarily managed by two people, Dr. Katherine Field who serves as its Director and Ms. Wanda Crannell, who is the Head Academic Advisor. BRR is currently able to achieve its mission and goals with the current level of staffing, and they have done an outstanding job with limited resources. Ms. Crannell provides notable service to the BRR students, helping them identify and connect with research mentors, as well as ensure students are progressing in their degree. She also serves as a mentor through various non-BRR clubs that support university minority students (MANRRS and SACNAS). It is unclear how much additional time these clubs require of Ms. Crannell, and how/whether that impacts her time commitment with BRR, however, her association with them may be one reason the BRR has such a diverse student body and been able to retain those students so effectively. The commitment to diversity and supporting minority students at OSU is very important to acknowledge, but the reviewers do make note of the time concerns that were raised in the review. It may be possible to structure some of the very intense mentoring and coaching into formal courses that deliver key services in less time-consuming ways.

As stated above in the recommendation number 1, it is clear that the program should not expand at the current staffing level.

Productivity:

- 4- and 6-year graduation rates for students

The graduate rates for BRR exceed those of the rest of the university and are very high for under-represented students.

- Publications or evidence of other scholarly work by students and faculty

As noted in the self-study, and demonstrated during the site visit (via interviews and the poster session), by graduation all BRR students have presented their work at a public forum or scientific meeting and written a thesis. Most have also written grant proposals and/or been a co-author of a publication in a scientific journal. This is laudable.

- Student satisfaction with their education and mentoring experiences
As evidenced by the survey data and in the student interviews, students are very satisfied with their education and mentoring experiences. Many of the students stated that they are not sure what they would have done without BRR, as they feel they do not “fit” in the “regular” degree programs.

- Viability of scholarly community within which students can interact

This is an area where the program can develop further. Please refer to recommendation number 6.

Outcomes and Impacts:

- Student learning and outcomes and assessment of learning

This is an area where the program can develop further. Please refer to recommendation number 7.

- Placement and success of graduates

Students have a very strong job placement record and acceptance into graduate programs. Their research and writing experience provide them with highly desired skill sets in the job market. In addition, the personal 1-on-1 advising structure and mentoring provided by Ms. Crannell, Dr. Field, and the research mentors helps guide students in post-graduation options and can provide strong letters of recommendations for students. Letters of recommendations based upon personal experience are very important in helping students succeed in job and graduate school placements after graduation.

There were a few comments in the student survey that requested some additional guidance on career options, especially since this is a “non-traditional” degree.

- Satisfaction of students and graduates with their education and their post-graduation employment success

The survey data indicates strong satisfaction amongst students for their post-graduation employment success.

- Community engagement activities

The BRR actively engages with the various scientific communities outside of OSU. This is evidenced by the participation of mentors from government agencies, the diversity of research of the students and outside connections with that research, as well as the College of Agriculture’s strong connection with the community via its agricultural research stations.

Conclusion and Recommendations for Improvement

Overall, the committee was very impressed by the organization and implementation of the BRR program. In its current format, we believe the program provides an important and unique opportunity for students and may, in fact, be a model that other Colleges at the University would want to consider adopting. The program will require more support if the College would like to see it grow, especially in terms of staff support and research support for students. We recommend the College continue to support and engage with BRR students, staff, and faculty to ensure the ongoing and future success of the program. We also
recommend that the College begin a systematic assessment of effective program elements, and contribute these findings into discussions around OSU’s Strategic Plan 3.0 goals around student success.