



## Program Assessment Report (PAR)

**Biochem + Molecular Biology (BMB) Masters Degree**

**REPORT PREPARED by: Long, Weiwen**

**ACADEMIC YEAR COVERED BY THIS REPORT: 2021-2022**

### I. PROGRAM LEARNING OUTCOMES

1. Graduates will be able to demonstrate mastery of a fundamental body of knowledge in biochemistry and molecular biology 2. Graduates will be able to apply biochemical knowledge towards problem solving 3. Graduates will be able to demonstrate the ability to communicate scientific knowledge effectively

### II. PROCEDURES USED FOR ASSESSMENT

#### A. Direct Assessment

1. Graduates will be able to demonstrate mastery of a fundamental body of knowledge in biochemistry and molecular biology  
Direct Measure The BMB MS Program Director distributes the "BMB MS Program Assessment Annual Report of Student Progress (ARoSP) " form to each faculty advisor for each MS student that has worked in their lab. The faculty advisor will complete the ARoSP and indicate how the student has progressed on the learning outcome. Item 1 of the ARoSP pertains to this outcome. The Program Director collects, analyzes and prepares a report of the ARoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "ARoSP form.pdf" under "Supporting Documents"  
Direct Measure The BMB MS Program Director distributes the "BMB MS Program Assessment Final Report of Student Progress (FRoSP) " form to each faculty advisor for each MS student that has graduated. The faculty advisor will complete the FRoSP and indicate how the student has progressed on the learning outcome. Item 1 of the FRoSP pertains to this outcome. The assessment item focuses on the finished student product (i.e.,thesis). The Program Director collects, analyzes and prepares a report of the FRoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the

department annual faculty retreat. See file "FRoSP form.pdf" under "Supporting Documents" Direct Measure Students further demonstrate their mastery of this outcome by their presentations of their work in the BMB Brown Bag Seminar Program. For every MS student presentation, all BMB faculty attending the presentation complete the "BMB MS Program Student Presentation Evaluation" form. The forms are collected and data compiled by the BMB office staff. The Program Director analyzes the data and prepares a report of the presentation evaluations to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "BMB MS Program Student Presentation Evaluation Form-final.pdf" under "Supporting Documents" 2. Graduates will be able to apply biochemical knowledge towards problem solving Direct Measure The BMB MS Program Director distributes the "BMB MS Program Assessment Annual Report of Student Progress (ARoSP) " form to each faculty advisor for each MS student that has worked in their lab. The faculty advisor will complete the ARoSP and indicate how the student has progressed on the learning outcome. Item 2 of the ARoSP pertains to this outcome. The Program Director collects, analyzes and prepares a report of the ARoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "ARoSP form.pdf" under "Supporting Documents" Direct Measure The BMB MS Program Director distributes the "BMB MS Program Assessment Final Report of Student Progress (FRoSP) " form to each faculty advisor for each MS student that has graduated. The faculty advisor will complete the FRoSP and indicate how the student has progressed on the learning outcome. Item 2 of the FRoSP pertains to this outcome. The assessment item focuses on the finished student product (i.e.,thesis). The Program Director collects, analyzes and prepares a report of the FRoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "FRoSP form.pdf" under "Supporting Documents" Direct Measure Students further demonstrate their mastery of this outcome by their presentations of their work in the BMB Brown Bag Seminar Program. For every MS student presentation, all BMB faculty attending the presentation complete the "BMB MS Program Student Presentation Evaluation" form. The forms are collected and data compiled by the BMB office staff. The Program Director analyzes the data and prepares a report of the presentation evaluations to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "BMB MS Program Student Presentation Evaluation Form-final.pdf" under "Supporting Documents" 3. Graduates will be able to demonstrate the ability to communicate scientific knowledge effectively Direct Measure The BMB MS Program Director distributes the "BMB MS Program Assessment Annual Report of Student Progress (ARoSP) " form to each faculty advisor for each MS student that has worked in their lab. The faculty advisor will complete the ARoSP and indicate how the student has progressed on the learning outcome. Item 3 of the ARoSP pertains to this outcome. The Program Director collects, analyzes and prepares a report of the ARoSP findings which is presented to the BMB Assessment Committee of the Whole

(BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "ARoSP form.pdf" under "Supporting Documents" Direct Measure The BMB MS Program Director distributes the "BMB MS Program Assessment Final Report of Student Progress (FRoSP) " form to each faculty advisor for each MS student that has graduated. The faculty advisor will complete the FRoSP and indicate how the student has progressed on the learning outcome. Item 3 of the FRoSP pertains to this outcome. The assessment item focuses on the finished student product (i.e.,thesis). The Program Director collects, analyzes and prepares a report of the FRoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "FRoSP form.pdf" under "Supporting Documents" Direct Measure Students further demonstrate their mastery of this outcome by their presentations of their work in the BMB Brown Bag Seminar Program. For every MS student presentation, all BMB faculty attending the presentation complete the "BMB MS Program Student Presentation Evaluation" form. The forms are collected and data compiled by the BMB office staff. The Program Director analyzes the data and prepares a report of the presentation evaluations to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the annual faculty retreat. See file "BMB MS Program Student Presentation Evaluation Form-final.pdf" under "Supporting Documents"

## **B. Scoring of Student Work**

1. Graduates will be able to demonstrate mastery of a fundamental body of knowledge in biochemistry and molecular biology. The scoring is done primarily by the M.S. student's advisor (Items A. and B., directly below) or the entire BMB faculty (Item C., directly below), as follows, on our assessment forms A. The BMB MS Program Director distributes the "BMB MS Program Assessment Annual Report of Student Progress (ARoSP) " form to each faculty advisor for each MS student that has worked in their lab. The faculty advisor will complete the ARoSP and indicate how the student has progressed on the learning outcome. Item 1 of the ARoSP pertains to this outcome. The Program Director collects, analyzes and prepares a report of the ARoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). See file "ARoSP form.pdf" under "Supporting Documents" B. The BMB MS Program Director distributes the "BMB MS Program Assessment Final Report of Student Progress (FRoSP) " form to each faculty advisor for each MS student that has graduated. The faculty advisor will complete the FRoSP and indicate how the student has progressed on the learning outcome. Item 1 of the FRoSP pertains to this outcome. The assessment item focuses on the finished student product (i.e.,thesis). The Program Director collects, analyzes and prepares a report of the FRoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). See file "FRoSP form.pdf" under "Supporting Documents" C. Students further demonstrate their mastery of this outcome by their presentations of their work in the BMB

Brown Bag Seminar Program. For every MS student presentation, all BMB faculty attending the presentation complete the "BMB MS Program Student Presentation Evaluation" form. The forms are collected and data compiled by the BMB office staff. The Program Director analyzes the data and prepares a report of the presentation evaluations to the BMB Assessment Committee of the Whole (BMB ACW). See file "BMB MS Program Student Presentation Evaluation Form-final.pdf" under "Supporting Documents" 2. Graduates will be able to apply biochemical knowledge towards problem solving. The scoring is done primarily by the M.S. student's advisor (Items A. and B., directly below) or the entire BMB faculty (Item C., directly below), as follows, on our assessment forms A. The BMB MS Program Director distributes the "BMB MS Program Assessment Annual Report of Student Progress (ARoSP) " form to each faculty advisor for each MS student that has worked in their lab. The faculty advisor will complete the ARoSP and indicate how the student has progressed on the learning outcome. Item 1 of the ARoSP pertains to this outcome. The Program Director collects, analyzes and prepares a report of the ARoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). See file "ARoSP form.pdf" under "Supporting Documents" B. The BMB MS Program Director distributes the "BMB MS Program Assessment Final Report of Student Progress (FRoSP) " form to each faculty advisor for each MS student that has graduated. The faculty advisor will complete the FRoSP and indicate how the student has progressed on the learning outcome. Item 1 of the FRoSP pertains to this outcome. The assessment item focuses on the finished student product (i.e.,thesis). The Program Director collects, analyzes and prepares a report of the FRoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). See file "FRoSP form.pdf" under "Supporting Documents" C. Students further demonstrate their mastery of this outcome by their presentations of their work in the BMB Brown Bag Seminar Program. For every MS student presentation, all BMB faculty attending the presentation complete the "BMB MS Program Student Presentation Evaluation" form. The forms are collected and data compiled by the BMB office staff. The Program Director analyzes the data and prepares a report of the presentation evaluations to the BMB Assessment Committee of the Whole (BMB ACW). See file "BMB MS Program Student Presentation Evaluation Form-final.pdf" under "Supporting Documents" 3. Graduates will be able to demonstrate the ability to communicate scientific knowledge effectively. The scoring is done primarily by the M.S. student's advisor (Items A. and B., directly below) or the entire BMB faculty (Item C., directly below), as follows, on our assessment forms A. The BMB MS Program Director distributes the "BMB MS Program Assessment Annual Report of Student Progress (ARoSP) " form to each faculty advisor for each MS student that has worked in their lab. The faculty advisor will complete the ARoSP and indicate how the student has progressed on the learning outcome. Item 1 of the ARoSP pertains to this outcome. The Program Director collects, analyzes and prepares a report of the ARoSP findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). See file "ARoSP form.pdf" under "Supporting Documents" B. The BMB MS Program Director distributes the "BMB MS Program Assessment Final Report of Student Progress (FRoSP) " form to each faculty advisor for each MS student that has graduated. The faculty advisor will complete the FRoSP and indicate how the student has progressed on the learning outcome. Item 1 of the FRoSP pertains to this outcome. The assessment item focuses on the finished student product (i.e.,thesis). The Program Director collects, analyzes and prepares a report of the FRoSP findings which is presented to the BMB Assessment

Committee of the Whole (BMB ACW). See file "FRoSP form.pdf" under "Supporting Documents" C. Students further demonstrate their mastery of this outcome by their presentations of their work in the BMB Brown Bag Seminar Program. For every MS student presentation, all BMB faculty attending the presentation complete the "BMB MS Program Student Presentation Evaluation" form. The forms are collected and data compiled by the BMB office staff. The Program Director analyzes the data and prepares a report of the presentation evaluations to the BMB Assessment Committee of the Whole (BMB ACW). See file "BMB MS Program Student Presentation Evaluation Form-final.pdf" under "Supporting Documents"

### **C. Indirect Assessment**

1. Graduates will be able to demonstrate mastery of a fundamental body of knowledge in biochemistry and molecular biology Indirect Measure An indirect measure of the outcome is obtained by student completion of the "BMB MS Program Student Questionnaire". The BMB MS Program Director distributes the exit questionnaire to each graduating student. The Program Director collects, analyzes and prepares a report of the Exit Questionnaire findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "BMB MS Exit Questionnaire.pdf" under "Supporting Documents" 2. Graduates will be able to apply biochemical knowledge towards problem solving Indirect Measure An indirect measure of the outcome is obtained by student completion of the "BMB MS Program Student Questionnaire". The BMB MS Program Director distributes the exit questionnaire to each graduating student. The Program Director collects, analyzes and prepares a report of the Exit questionnaire findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "BMB MS Exit Questionnaire.pdf" under "Supporting Documents" 3. Graduates will be able to demonstrate the ability to communicate scientific knowledge effectively Indirect Measure An indirect measure of the outcome is obtained by student completion of the "BMB MS Program Student Questionnaire". The BMB MS Program Director distributes the exit questionnaire to each graduating student. The Program Director collects, analyzes and prepares a report of the Exit questionnaire findings which is presented to the BMB Assessment Committee of the Whole (BMB ACW). The BMB ACW meets annually to review the assessment data and the director's report before the start of the academic year as part of the department annual faculty retreat. See file "BMB MS Exit Questionnaire.pdf" under "Supporting Documents"

### **III. ASSESSMENT RESULTS/INFORMATION:**

Outcome 1. Graduates will be able to demonstrate mastery of a fundamental body of knowledge in biochemistry and molecular biology. Assessment tools ARoSP, FRoSP, and MS Program Student Presentation Evaluation (See V. Supporting

Documents) Outcome 2 Ability to apply biochemical knowledge towards problem solving. Assessment tools ARoSP, FRoSP, and MS Program Student Presentation Evaluation (See V. Supporting Documents) Outcome 3 Ability to communicate scientific information effectively. Assessment tools ARoSP, FRoSP, and MS Program Student Presentation Evaluation (See V. Supporting Documents)

Summarized findings for Outcome 1 Based on analysis of the data from the assessment tools (A-RoSP and R-RoSP forms) and discussion of the data by the BMB faculty (as the BMB ACW at the Annual BMB 2022 retreat), there was agreement that our students continue to make excellent progress regarding this outcome overall and in each of the five Outcome 1 subcategories assessed. Summarized findings for Outcome 2 The assessment data and the BMB ACW discussion indicated that all Outcome 2 subcategories have been achieved and that the majority of students are performing with a high level of proficiency for this outcome. Summarized findings for Outcome 3 There are four subcategories for this Outcome. The BMB ACW agreed that all four Outcome 3 subcategories were achieved. Enhancements (e.g., abstract requirement) to the weekly BMB Brown Bag research presentation program are to be continued. The BMB M.S. Program Student Presentation Evaluation form data has provided us with quantitative data that clearly demonstrates a marked improvement in presentation skills by every graduating M.S. student (based on comparison of evaluations of their initial departmental presentation as compared to their thesis defense talk). See V. Supporting Documents.

Overall, the assessments indicate excellent performance by our students for each of our three outcomes. Further, as observed in prior years, our graduating M.S. students continue to be successful in being offered immediate employment in research positions ranging from academic to industrial research settings. The program has achieved an outstanding reputation with our graduates well-trained to join research groups. The balance of our graduates plan to enter Ph.D. programs.

#### **IV. ACTIONS TO IMPROVE STUDENT LEARNING**

Describe how and with whom the results were shared Data from the completed the A-RoSP, F-RoSP, and student presentation forms was analyzed by the Program Director in preparation for consideration by the BMB Assessment Committee of the Whole (BMB ACW). The BMB M.S. program director coordinates the assessment process through the distribution of the A-RoSP/F-RoSP forms and subsequent analysis of the resulting data. At the annual BMB Faculty Retreat held in the Fall 2022, the entire BMB faculty participated in the assessment process acting as the BMB Assessment Committee of the Whole (BMB ACW). Dr. Weiwen Long (Program Director) presented the formal report on the M.S. Program using the collected assessment data and led the discussion of the program. The entire BMB faculty (BMB ACW) evaluates, discusses and makes program recommendations during the annual BMB retreat. What changes were made to the curriculum based on the

assessment? Following the program discussion by the faculty at the 2022 BMB retreat, the one action item of improvement for the coming year was for the Program Director to ensure that all second year students have their initial committee meeting before Fall semester of year 2. This will help ensure all students are on track in their thesis research. Given the overall excellent rating for all assessment categories the BMB ACW did not recommend curriculum changes (thesis or non-thesis track) based on the yearly program assessment data. Monitoring of the program through our assessment instruments will be continued as in past years. The new abstract writing requirement initially implemented for 2017-18, which had a goal of enhancing student writing and communication skills, continues to be highly successful and will be continued permanently. The assessment plan was fully implemented for the 2021-2022 academic year. No changes were made to the assessment plan.

## **V. SUPPORTING DOCUMENTS**

Additional documentation, when provided, is stored in the internal Academic Program Assessment of Student Learning SharePoint site.