

Information for supervisors of MB&B students enrolled in research courses

MB&B 470a, 471b, 478a, 479b

Alan Garen, Instructor in Charge

Single-term research projects under faculty supervision.

Brief description of the research courses

Most MB&B students carry out research for credit towards their degree. Research can be for 10 hours a week (MB&B 470a, 471b) or 20 hours a week (MB&B 478a or 479b). Any faculty member at Yale can supervise an MB&B student project, but the project must somehow involve analysis of molecules in biology to be suitable to count towards an MB&B degree. We interpret this requirement loosely, and faculty from many departments at Yale have served as research mentors for MB&B students.

Specific responsibilities

1. Sign the registration form for the research course - your student will bring you this form in the first week of the semester.

2. Provide the student with a suitable research project, and adequate supervision.

Typically, faculty members assign a postdoctoral fellow or advanced graduate student to carry out day-to-day supervision of the research. The faculty member must be available to carry out overall supervision and mentoring of the student, and to grade their work.

3. Schedule the student to present a brief lab meeting on their research in the last two weeks of the semester, and provide a grade to the instructor in charge of the research course for the student's performance.

- The student must make a 12-15 min. oral presentation of the completed work to the Research Supervisor and his/her research group.
- The presentation must be made within two weeks prior to the first day of reading week.
- The presentation will be graded by the Research Supervisor based upon the following criteria:
 - a. *Did the student demonstrate an understanding of the scientific background of the project?*
 - b. *Did the student provide a clear description of the original data generated during the semester?*
 - c. *Did the student correctly interpret these data?*
 - d. *Did the student identify an appropriate set of follow-up experiments?*
 - e. *Was the overall presentation well organized and clear?*

- The grade on the presentation will count toward 20% of the overall grade in the course. Grades at Yale College are: A, A-, B+, B, B-, C+, C, C-, D+, D, D-, Fail.

4. Read the research report the student will hand you at the end of the semester, and provide a grade to the instructor in charge of the course reflecting the student's research and the written report.

- The student must prepare a 12-15 page double-spaced research report (text of approximately 3500 words, not including bibliography and figure legends). This report must describe the basis for the laboratory work, summarize the data collected over the course of the project and describe any conclusions supported by the data.
- The report will be grade both by the research supervisor and by the instructor in charge of the research course. Since the instructor in charge of the research course is unlikely to be a specialist in the student's area of research, the report must be written so that a scientist with a general knowledge of biochemistry can understand and appreciate the specific scientific issues and any specialized techniques used in the research.
- The report must be submitted to the Research Supervisor and the Instructor in Charge **no later than the last day of the Yale College Reading Period.**
- The research report must include the following components:
 - a. Title Page.* Including title, the name and department of the faculty member in whose laboratory the project was performed, the name of the student, and the date.
 - b. Abstract.* A one paragraph summary of the research project, scientific context and primary conclusions. This abstract should be 250 words or less.
 - c. Introduction.* Scientific background for the research project including a summary of the literature in the field and a justification that leads into the experiments that were performed. If desired, one or two figures (original or taken from the literature and referenced) can be included in this section.
 - d. Methods.* A brief description or literature references to outline the experimental methods employed. Clarity and brevity in this section is critical. The methods section must be less than two pages (<750 words) in length, unless the research project is focused primarily upon methods development, in which case there is no specific limit.
 - e. Results.* Description of experimental results and variables investigated. Include tables, charts or figures to summarize the data.
 - f. Discussion.* Interpretation of the experimental data in relation to the scientific knowledge in the field and the question posed in the original hypothesis in the research proposal. If the project did not yield productive results, this should be indicated and possible explanations provided.
 - g. Bibliography.* A complete bibliography for the project. The bibliography of the research proposal may be used as a starting point. Each reference must be listed in the order of its appearance in the text and include title, authors, journal name, volume, year and page numbers.
 - h. Figure legends.* Captions that describe the contents of each figure.

- It is appropriate for the student to receive feedback on early drafts of the report from peers or other members of the laboratory. The oral presentation is an ideal opportunity for the student to receive critical feedback on the project. However, the report must remain the original work of the student.
- In those cases where a student has performed research on the same project over the course of multiple semesters, it is appropriate to edit and modify a previous report. The grade on the report will be reduced if errors or suggestions from the prior submission are not corrected in the updated report. The report should also clearly differentiate results obtained in the current semester from those obtained in earlier semesters.
- The following criteria will be used to assign the grade:
 - a. Did the student follow the guidelines of the research report?*
 - b. Did the student demonstrate an understanding of the scientific background of the project?*
 - c. Did the student provide a clear description of the original data generated during the semester?*
 - d. Did the student correctly interpret these data?*
 - e. Was the overall presentation well organized and clear?*
- The research report will be graded independently by both the Research Supervisor (35%) and the Instructor in Charge of the course (25%). The grade of the Research Supervisor will also reflect the quality of the student's research in the laboratory. Grades at Yale College are: A, A-, B+, B, B-, C+, C, C-, D+, D, D-, Fail.