



Research and Internship Information Packet

Research is highly encouraged for all interested majors, and there are many opportunities for independent research in the biosciences at Rice, in the Texas Medical Center and at other off-campus locations in relevant disciplines.

Table of Contents:

1. Finding Research Opportunities
2. Research for course credit

1. Finding research opportunities

Information and helpful tips for finding research opportunities can be found in the BIOC 310 online website (<http://biosugresearch.rice.edu/>) and in the Advising Materials linked to the BioSciences Advising web page. Students interested in the biological and biomedical sciences find research opportunities through a variety of means including:

Reading faculty research pages and sending individual emails to professors whose research is of interest to them. Google faculty from the institutional web sites both at Rice and at TMC institutions. Usually, their contact information is easy to find on their web page so you can send them an email and express interest in their research and ask if they have openings for a student researcher.

Applying for funded summer programs at Rice, in Houston, or throughout the country. The Department sponsors two NSF internship programs and a Summer Research Institute for Rice students who are working on campus for Rice faculty in the summer:

- [NSF Research Experience for Undergrads \(REU\) in Multi-Scale Biomolecular Networks \(BioNetworks\)](#)
- [BioXFEL Summer Internship for Undergraduates](#)
- [CCL Fellowship Directory](#)
- [Amgen Scholars](#)
- [Association of American Medical Colleges Summer Internships](#)
- [NIH Student Programs](#)
- [NSF Research Experiences for Undergraduates \(REU\) Listings](#)
- BioSciences Summer Research Institute at Rice University (flyer attached in appendix)

Viewing opportunities posted on the BioSciences Opportunities Canvas Site:

The BioSciences Opportunities Canvas site offers research, internship, and career information and opportunities related to the biological sciences. It also serves as the portal for advising information for BioSciences majors. To join the site and mailing list go to catalog.rice.edu and then search for “BioSciences Opportunities.” Click on the site and click “enroll” (use your standard Rice netID and password, if prompted).



2. Research in the Biosciences for Course Credit

There are many courses offered within the degree majors affiliated with the department that allow research for course credit. Specific course information can be found on the advising web page in the BioSciences Advising Booklet and in the General Announcements. Some of the research courses require application, so once you have reviewed the materials, you can find those applications within this document in the appendix at the end.

Independent Research Courses in the Department of Biosciences (see course schedules and course catalog for more information and complete listings of courses)

BIOC 310 Independent Research in Biochemistry & Cell Biology
EBIO 306 Independent Research in Ecology & Evolutionary Biology
NEUR 310 Independent Research in Neuroscience
BIOC 401/402/412 Undergraduate Honors Research (application required, see appendix)
EBIO 403/404: Undergraduate Honors Research (application required, see appendix)

Research Experiences for Course Credit

BIOC 112: Introductory Biological Research Challenges
EBIO 204: Community Garden
EBIO 319: Tropical Field Biology (application required, see appendix)
EBIO 337: Field Bird Biology Lab

BA-MS-PhD Degree Track in Biochemistry & Cell Biology

Qualified Rice University undergraduate students can apply to enroll in the Biochemistry & Cell Biology BA-MS-PhD program track in the spring of their sophomore year. Course requirements for graduate studies are pursued at the same time as the upper-level undergraduate degree requirements. Laboratory research performed in 300, 400, and 800-level research courses is presented as the MS thesis in the summer following graduation and can serve as the initial phases of the PhD thesis work. As a result, the graduate careers of these students will be accelerated by an anticipated 1-2 years, and such students may be able to obtain their PhD degrees approximately 3 years after obtaining their BA and MS degrees. Criteria for selection include academic performance ($GPA \geq 3.5$), motivation, previous research experience, and personal qualities. The application is attached in this document's appendix and up-to-date information on this track can always be found in the Biosciences Program of Study in the General Announcements.



RICE NATURAL SCIENCES
Biosciences

Forms and Applications Appendix

1. Summer Research Institute Application
2. BIOC 401/402/412 Honor's Research Application
3. EBIO 403/404 Honor's Research Application
4. BA/MS/PhD in Biochemistry & Cell Biology Application



BIOSCIENCES SUMMER RESEARCH INSTITUTE (SRI)



What is the BioSciences Summer Research Institute (SRI)? A training program for Rice undergraduates who are interested in pursuing graduate level education in biology. The summer program features:

- A mentored research project in cutting-edge research laboratories in biochemistry, cell and developmental biology, molecular genetics, biophysics and structural biology, microbiology, neurobiology, signal transduction, cancer biology, plant biology, synthetic and systems biology, and metabolic engineering.
- A summer salary paid by the sponsoring faculty member for up to full-time (40 hours per week) research work (minimum total research hours for the summer will be 240 hours to qualify for the program). Note that the SRI does not have funding for stipends, your salary must be negotiated with your faculty sponsor.
- A final symposium where student participants present their research in a joint session with the Institute of Biosciences and Bioengineering visiting summer interns.
- Lunch meetings that feature a student journal club.
- Organized seminars and workshops in conjunction with students in other Rice summer programs.

Who is eligible for the SRI? Rice undergraduates who will conduct summer research on campus. Students interested in the SRI should secure their own projects in research labs and obtain faculty mentor support for participation in the SRI **before applying for the program**. Student researchers should be on-campus for the majority of the summer in order to participate fully in the SRI program.

To apply, please complete these steps:

- *Submit the online application, available here: [Rice SRI Online Application](#)*
- *Email a current copy of your Rice transcript and resume to: biosciences-summer-institute@rice.edu*
 - *Resumes must include your student ID number, along with ALL computer, lab, and field work skills, employment history, and academic honors*
- *Request a Letter of Support from your summer research mentor. This letter must be emailed directly by the faculty member to: biosciences-summer-institute@rice.edu*

Spots in the SRI are limited. Early application deadline is March 31.

Biochemistry and Cell Biology Honors Research Program Application for Admission

The student application and accompanying proposal should be submitted via email to Pedro Muniz. (pm20@rice.edu) and copied to the student's research professor. The research professor's recommendation should also be emailed to Pedro Muniz (pm20@rice.edu).

STUDENT INFORMATION

Please type information in white spaces below.

Name:				Matriculation year:		Graduation year:	
University address and telephone number:							
Email address:							
Permanent address and telephone:							
Name and department of proposed honors research advisor:							
Major(s) and minor(s):							
Approximate overall GPA (A=4.0, B=3.0, etc.):							
Grades in the following courses:				<i>Enter grades next to course numbers. If not taken, indicate with "NA.". Indicate "AP" if course was fulfilled through AP credit..</i>			
BIOC/BIOS		Additional BIOS/BIOC courses and grades received:		Chemistry			
201:				121 or 151:			
211:				123 or 153			
301:				122 or 152:			
302:				124 or 154:			
311:				211 or 251:			
341:				212 or 252:			
344:				215:			
352:		Mathematics		Physics			
		101:		125:			
		102:		126:			
		211 or 213:					
Research-for-credit courses taken:				<i>BIOS/BIOC 310, HONS 470, BIOS/BIOC 401, UNIV 201, etc..</i>			
Course name and number		Semester taken (e.g. F09)		Research professor name/department		Grade	
Previous research experience(s):				<i>Professor name, institution, dates, research topic</i>			
Special considerations:				<i>Are there any other experiences or circumstances that should be considered in this application?</i>			

Future plans:

List educational and career goals (for department info, not an admissions requirement).

DECISION OF HONORS COMMITTEE:

Approval/Disapproval

Date:

Reason(s) for committee decision:**ADDITIONAL APPLICATION MATERIALS REQUIRED**

1. Research professor recommendation for the honors program

Why do you believe the applicant would be a strong candidate for the honors research program?

What attributes have they shown in your research lab (independence, attention to detail, intellectual engagement, diligence, etc.)? Include any special considerations that may account for deficiencies elsewhere on this application. Please submit recommendations via email to pm20@rice.edu

2. Student research proposal

Include previous accomplishments in research area, abstract, specific aims, timeline for honors year



EBIO 403 and EBIO 404 are 5 credit per semester courses designed to give you hands-on experience with research. You should have a specific project worked out with your advisor that will test a hypothesis in some area of ecology, behavior or evolution. You may get help from your advisor, from grad students, post-docs, technicians, or other undergraduates in choosing and executing the research. You may work together with other undergraduates. In some cases your work will be publishable and you should participate in this process. In many cases the work done during your senior year will be a continuation of a project you began earlier (e.g., in EBIO 306 or as paid work).

The EEB Faculty coordinator for EBIO 403 and 404 is Scott Solomon, ses4@rice.edu.

Application

The Bachelor of Science Degree in Ecology and Evolutionary Biology at Rice University requires that prospective students take EBIO 403 and EBIO 404 (Honors Research) in the Fall and Spring semesters of their senior year. Research performed in EBIO 403/404 will culminate in a senior thesis. Students must contact and be accepted by an advisor no later than the Spring of their junior year. The application form (at the end of this document) and a copy of your transcript must be turned in to Pedro Muniz (pm20@rice.edu) in the Department of BioSciences Office, W100 GRB Hall by April 15, each spring semester.

How Many Hours a Week?

The official guidelines indicate that three hours per week should be worked for each hour of credit, in this case 15 hours a week. This counts lab work, fieldwork, reading, and writing. Some students will work more than this, but it should be their choice. In addition, research often requires pulses of intense effort followed by less intense work times, so you should aim for an average of 15 hours per week.

Official Requirements

You should spend most of your time on active, hands-on research. However, two written reports are required during the first semester. In addition, at the conclusion of the year, you are required to complete a final paper (in scientific journal format) and participate in the annual Rice Undergraduate Research Symposium (RURS) poster session. Your projects will be read at various stages by your advisor, and by a departmental committee. You should revise your work after comments from your advisor and before you give it to the committee. Turn in papers and posters to the committee as attached documents. In the fall, you will turn in the Introduction and Methods of your paper (we recognize that your methods could change later) and a brief report on your progress in the fall semester. In spring you will turn in a completed paper, and a poster which you will enter in RURS.

You will receive feedback on your work and progress by your advisor, by fellow senior research students, and by a departmental committee. You should revise your work after comments from your advisor and before you give it to the committee. Turn in papers and posters to the committee by uploading to Owl-Space.

Writing format

With your advisor choose a journal and adhere to its style and format . Put on the paper Note on the title page what journal style you are following. Ecology Letters, Proceedings B of the Royal Society, Ecology, Behavioral Ecology, Conservation Biology, Journal of Molecular Evolution, and Genetics are good possibilities. Writing guidelines have been appended to this document with recommendations for designing, executing, and writing up your research. Along the way, your advisor and the committee will assist you further in the design, data collection and analysis, and writing processes.

Poster format

Effective posters use figures and summaries to communicate, not long sections of text. The goal is to present your information in an eye-catching and straightforward manner. Try to gear the information on the posters to an audience who may or may not be familiar with your field. Rice's Center for Written, Oral, and Visual Communication (<https://cwovc.rice.edu>) can provide many resources to assist you in preparing a poster.

Grading

For 403 your grade will be determined by your advisor and by the committee and will be based:

- 70% on your advisor's assessment of your research
- 30% on your written material
 - 25% Introduction and Methods
 - 5% on your progress report

In 404 your grade will be based:

- 70% on your advisor's assessment of your research
- 15% on your final paper
- 15% on your poster

What else?

You should be in research because you want to be and might consider it for some part of your career. This is your chance to give it a serious try. In addition to the research you should participate in lab meetings if your advisor has them. You should consider participating in journal clubs either for credit or not. Your advisor can guide you here. We have departmental seminars on Fridays at 4 pm that you should attend when you can. In general you should participate in the intellectual life of your lab group and the department as much as you have time for. This is, however, extra, and will not affect your grade.

If research is not for me

What if I decide research is not for me and do not want to continue with EBIO404? This is fine. You will receive a grade for EBIO 403 only. Of course, you will not be able to graduate with a BS in EEB, but you can receive a BA.

Application for EBIO 403-404 Honors Senior Research

Name

Email address

Expected Graduation Date

Current GPA

Proposed Research Advisor

Proposed Research Topic

Will this research include a summer research experience (e.g., at Rice University, and/or through an NSF Research Experience for Undergraduates)?

Brief Description of the proposed research:

(forms can be returned to the BioSciences undergraduate program coordinator, Pedro Muniz, by email to pm20@rice.edu or to his mailbox in W100 GRB Hall)

Guidelines for Writing a Scientific Paper

Jenn Rudgers

General comments:

All scientific writing begins with a question about the natural world. The purposes of a scientific paper are to introduce the reader to the question you have chosen, explain how you went about testing the question, provide a summary of the data (this is your “answer” to the question), and discuss the implications of your discoveries. For these reasons, scientific papers follow a specific format of organization: Introduction, Methods, Results, Discussion, and Literature Cited. Specific guidelines for each section are outlined below.

Topic sentences are perhaps the most important component of lucid scientific writing. Begin each paragraph with a summary sentence that embraces all of the main ideas included in the paragraph. Ideally, putting the topic sentences from each paragraph together should give you a crisp, concise summary of the paper.

Scientific writing aims for clarity and logical flow. In contrast to writing assignments in the humanities, poetic language and creative composition rarely enhance scientific papers. Wordy sentences should be avoided, and removing the passive voice often reduces wordiness. In addition, in modern scientific writing, use of the first person (rather than the third person) is encouraged and often makes sentences more succinct. Avoid repetition of facts and thoughts; decide in which section of the paper the statements are most appropriate and do not restate them elsewhere. Finally, keep in mind the mantra “*What is the question?*”—commentary that significantly deviates from the main question(s) should be eliminated.

Common mistakes and additional advice.

- Most people find it easiest to begin with writing the methods and results, saving the introduction and discussion for last.
- The word “data” is plural. Thus, use “These data were ” not “This data was ”
- Avoid using long clusters of nouns such as “The Wild Horse Canyon herbivore exclusion experiment ” Instead, opt for including more prepositions such as, “At Wild Horse Canyon, excluding herbivores resulted in ”
- Scientific names are italicized and consist of two words, the first indicates the genus (and is capitalized) and the second indicates the species (and is always given in lower case), e.g., *Homo sapiens*.
- Write positively, employing phrases such as “these data show ” rather than using non-committal statements such as “these data could possibly suggest ”
- Do not ignore or discard results because they differ from textbook generalizations or because of variability and biases in the data. Use the discussion section to put forth your own ideas about why your results may be biased or differ from expectations.

Title. The title should convey information on the organism or system studied, the aspect of ecology or evolution examined, and what factors were experimentally manipulated. Use the fewest words possible. The best titles express the question or main result of the study. Avoid titles beginning with “ The effects of ” or “The role of ”

Introduction. The introduction should consist of several paragraphs that relate why the research was conducted and provide background material on the question addressed. Typically, the introduction also references previous studies to support arguments for why the question is significant and interesting. The introduction should build up to the question(s), which should be stated at the end of the last paragraph. (Think of a funnel with the narrow end being the question at the end of the introduction.) Start generally and finish with the specifics of the system. *Always* rewrite the ideas of other authors in your own words and cite them (e.g., (Janzen 1966)).

What to avoid: Do not *begin* the introduction with a *lengthy* description of the system or organism; save this detailed part for the Methods section. It is o.k. to describe relevant aspects of the study system toward the end of the introduction, *after* you have introduced the broader conceptual framework. Also, avoid using footnotes or direct quotations. Finally, the introduction is not a place for a lengthy literature review; therefore, keep it simple and short, providing only information essential to establish the motivation for asking the question.

Methods. The methods section should communicate sufficient detail to allow others to repeat the study. In ecology papers, the methods generally begin with a brief paragraph on the natural history of the species or ecosystems and a description of the site where the work was conducted, but you should include only the natural history that is relevant to the question. In shorter papers, and some papers in evolution, the relevant information about the system can be included in the latter part of the introduction.

The methods should provide information on what factors were manipulated (or of interest, but not manipulated, such as the site where the work took place) and how the manipulations or observations were executed; these factors are considered independent variables. The methods should also include a description of the data (including the sample size(s)) and how the data were collected; these are the dependent (or response) variables. Finally, data analysis methods should be described briefly in the methods; common statistical techniques can be referred to (e.g., t-test, ANOVA) without explaining how to perform them.

Please use the past tense and first person (*active voice*), where appropriate, although specific journals may have differing guidelines on this issue. When measurements are described, include the units (e.g., "We measured the height of elephants (m).") Avoid making this section unnecessarily long—explain only the essential steps in the research protocol.

Results. This section should state the results of the observations or experiments *without interpretation by the author*. The order of presentation should be the same as in the methods section (i.e., if observations on mice eating seeds were presented before an experiment to manipulate the diets of mice in the methods, the findings of the observations should also come before the experiment in the results section.) Keeping the methods and results sections parallel in this way makes it easier on the reader to match up what you found with what you did. Often, if several different observations or experiments were conducted, subheadings in both the methods and the results sections can help to organize the information. However, do not use subheadings if they are not allowable in your chosen journal format.

If figures or tables are included, these must also be summarized in the text of the results section. For example, do not just state "The growth curve is shown in Fig. 1." Instead, report "The number of individuals in the population increases exponentially under the condition of unlimited resources (Fig. 1)." Figures and tables should also have brief headings to explain what they contain, and remember to label axes with the variable name and the units of measurement. To support your statements, always report statistical test values and significance values, where appropriate.

Discussion. The discussion contains the author's interpretation of the results. Start by answering this question: Do the results resolve the question(s) you posed in the introduction? Then, address whether and how the results might be generalized to other systems or questions. Relate your results to accepted principles and ecological/evolutionary concepts. References to other studies will enhance the discussion.

You may also propose new questions or future experiments that arise from your results. However, avoid commentary that is not directly related to your overarching question(s).

Finally, end the discussion with a summary that states the take-home-message of the study and why it is important. For example:

We found that plots with a higher diversity of plant species had greater water availability than low diversity plots. Furthermore, plots of high diversity were less invaded by introduced honeysuckle. Therefore, conservation practices that preserve species diversity may sustain important ecosystem functions and reduce the invasion of communities by non-native species.

Literature Cited. References should conform to the format specified by the journal. References to websites are not typically included in scientific papers (except under rare circumstances). Your references should come primarily from reading papers in the primary scientific literature (not from websites, newspaper articles, textbooks, etc.)



RICE NATURAL SCIENCES
Biosciences



Advising for the Combined BA-MS-PhD Accelerated Track in Biochemistry & Cell Biology

Introduction

The BA-MS-PhD accelerated track is intended for talented students who are interested in an intensive research experience to prepare for a research career while working toward their Bachelor's degree and beyond. This track combines a Bachelor's program with advanced coursework and research toward a graduate degree. Students who successfully complete the requirements will receive a Master's degree the summer after completing their Bachelor's work. With departmental approval, these students can then enter the Biochemistry & Cell Biology (BCB) doctoral program in the Department of BioSciences.

This program is expected to be challenging for students who undertake it. Students considering the program should be aware of its merits and challenges.

Merits

Immersion in an active research environment complementary to the student's interests, including paid summer research

Accelerated completion of a Master's degree in BCB

Potential accelerated completion of a PhD in BCB at Rice

May augment future advanced training, including study for PhD at another institution, MD/PhD training, research fellowships during medical school or residency, or international PhD programs that require a Master's degree for admission

Challenges

Extensive time commitment – 2 or more summers of full-time research and additional course work will limit time for other activities (clinical shadowing/volunteering, study abroad, additional minors and majors)

No guarantee of completion – disqualifying conditions include, grades (<3.0 GPA), and thesis defense failure

Advising resources

Departmental resources – engagement with BioSciences' undergraduate and graduate programs will provide access to formal and informal mentoring and advising opportunities

Research Mentor – A faculty member who supervises the student's research and provides regular feedback on their progress

Advising Committee – A faculty committee that will meet with the student 3 times during the program to advise and evaluate student progress (including the Master's defense)

Frequently Asked Questions

Who should apply?

The program is intended for students who want to be actively engaged in research during their undergraduate career. In particular, those who are interested in graduate school or MD-PhD programs are encouraged to speak with Dr. Susan Cates in the BioSciences office, GRB W100A (mscates@rice.edu) to begin the application process.

What is the process, and what are the requirements?

The selection is made by the BA-MS-PhD in Biochemistry & Cell Biology Program Committee. Detailed information on requirements can be found at:

<https://ga.rice.edu/programs-study/departments-programs/natural-sciences/biosciences/biochemistry-cell-biology-ba-ms-phd/>

Do I need to find a lab for my research or does the department find a lab for me?

You are responsible for finding a lab that matches your research interest and a faculty member who is willing to mentor you through the BA/MS/PhD program. You are encouraged to begin working in a lab by the end of your freshman year or the during the summer before your sophomore year to ensure you can hit the ground running when you are admitted to the program.

How do I find a lab?

Finding a lab to pursue your research program can be challenging. The BIOC 310 website has excellent advice and resources:

<http://tinyurl.com/bios310start>

What do I do during the summers?

The program and your research mentor will support your summer research by providing a stipend while you are enrolled in summer research. The summer before your senior year you will also participate in a science-writing course, which help with writing graduate fellowship applications and writing your MS thesis.



When do I receive my degrees?

Your BA will be awarded the semester you complete the requirements and apply for your degree. The MS will be conferred following completion of the degree requirements, including the Master's thesis defense, which will occur the summer or fall semester following receipt of your Bachelor's degree. Conferral of the PhD will follow additional research, course requirements, and successful defense of your PhD dissertation.

What if I am not accepted?

Only a few slots are available. Don't be dismayed if you are not accepted — it is not a reflection of your perceived ability to perform research or succeed in science but rather a sign of limited resources. Please continue to take advantage of the research opportunities, seminars and other advantages of the BioSciences Department.

Can I do research off campus?

Currently the scale of the program requires we limit participation to students pursuing research in BioSciences laboratories.

What if I change my mind later?

You are under no obligation to continue in the combined BA-MS-PhD accelerated track. You can withdraw by notifying your research mentor, BA-MS-PhD committee, and Dr. Susan Cates.

Requirements for the BA-MS-PhD Degree Track in Biochemistry & Cell Biology

Qualified Rice University undergraduate students can apply to enroll in the Biochemistry and Cell Biology BA-MS-PhD program track in the spring of their sophomore year. Students who are good candidates for this program typically join a Rice BioSciences research lab to start research on a biochemistry or cell biology related project prior to applying. Upon acceptance, depending on course load, financial aid status, and other variables, program participants may then start taking required graduate course requirements at the same time as their upper-level undergraduate degree course requirements. Students pursuing this track should be aware that there could be financial aid implications, if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time (12 hours) status.

Laboratory research performed in 300, 400, and 800-level research courses is presented as the MS thesis in the summer following undergraduate graduation and can serve as the initial phases of the PhD thesis work. As a result, the graduate careers of these students will be accelerated by an anticipated 1-2 years, and such students may be able to obtain their PhD degrees approximately 3 years after obtaining their BA and MS degrees. Detailed information on this track may be found in the Graduate section of the General Announcements.

Criteria for selection include academic performance (GPA \geq 3.5), motivation, previous research experience, and personal qualities. Enrollment is limited, and the Biochemistry and Cell Biology BA-MS-PhD Track Committee will select applicants for admission.

BA in Biochemistry and Cell Biology Requirements:

All of the requirements for a BA in Biochemistry & Cell Biology are required for the BA-MS-PhD track.

MS in Biochemistry and Cell Biology Requirements:

The BA-MS-PhD Track Committee will advise students pursuing the BA-MS completion and will approve the formal course program of students during their final two years in the BA-MS program. Students who wish to pursue the BA-MS track must select the MS thesis advisor by the end of the sophomore year when they declare their major to provide the opportunity to begin a project that will form the basis of the MS thesis. For the MS, the following courses must be completed or evidence provided of successful completion of courses that covered the same material with a B- average (GPA \geq 2.67):

- BIOC 581/582 *Graduate Research Seminar* [1 credit hour each] (4 semesters attendance, 1 presentation)
- BIOC 583 *Molecular Interactions* [4 credit hours]
- BIOC 587 *Research Design, Proposal Writing, and Professional Development* [3 credit hours]
- BIOC 588 *Cellular Interactions* [4 credit hours]
- UNIV 594 *Training in the Responsible Conduct of Research* [1 credit hour]
- BIOC 800 *Graduate Research* [1-15 credit hours*]

*A minimum of 40 credit hours at the graduate level is required for the MS degree.

Elective Requirements

In addition to required courses listed above, students in the Biochemistry and Cell Biology BA-MS-PhD program must take at least six credit hours from the set of 500-level advanced BIOC electives. The full list of the 500-level Biochemistry & Cell Biology courses can be viewed in the Course Catalog.

Students in the BA-MS track are required to register for and participate in BIOC 581/582 both semesters during their junior and senior years and present their research at least once. Students generally enroll in BIOC 800 during the summer between the sophomore and junior year, BIOC 587 and BIOC 800 during the summer between the junior and senior years, and BIOC 583 and BIOC 588 in their senior year.

Students will be responsible for the content of these courses in their MS defense (which also serves as the Admission to PhD Candidacy examination).

Progress reviews with the MS thesis committee occur at the end of the junior year and the early spring of the senior year. The MS thesis will be submitted and public oral defense will occur in the summer following graduation at the end of the senior year with completion of the BA requirements. MS candidates continuing to the PhD must maintain a GPA ≥ 3.0 , complete a thesis, and make a public oral defense that includes a private examination by their MS thesis committee. Students who complete the MS requirements with a GPA ≥ 2.67 but less than 3.0 must defend their thesis to complete the MS degree, but will not be admitted to the PhD program.

PhD in Biochemistry and Cell Biology:

The following are required for admission to the PhD portion of the BA-MS-PhD track: Successful completion of the MS thesis and oral defense, which will serve as the admission to candidacy exam for all PhD candidates and a cumulative GPA ≥ 3.0 for the BA-MS degree courses. Students who are in good standing in the BA-MS track and have passed their MS final oral exam may begin their doctoral studies the summer following graduation with the approval of their PhD mentor and the Department Chair.

Course requirements for the first year of PhD study include:

- BIOC 581/582 *Graduate Research Seminar* (required in all semesters of residency)
- BIOC 599 *Graduate Teaching* (two semesters)
- BIOC 800 *Graduate Research*

Evaluation of Progress in the PhD Phase of the BA-MS-PhD Program:

The Graduate Advisory Committee evaluates each student's record and recommends any further course work based on the requirements and on the interests of the student. Thesis advisors may require additional courses. At the end of each semester, the department chair, in consultation with the faculty, reviews student performance in the formal course work. Students must maintain at least a B average (GPA ≥ 3.0), perform satisfactorily in their research efforts, and demonstrate outstanding motivation and potential for research. Evaluation during the PhD phase of the program includes:

- The MS thesis and its oral defense constitute the admission to candidacy examination
- Ongoing review of research progress by the thesis advisor; satisfactory research progress will be indicated by a grade of "S" in BIOC 800 each semester
- A yearly research progress assessment by the student's Research Progress Review Committee
- Presentation of research progress at least once a year in seminar format (BIOC 581/582) starting in the first year of PhD study and continuing until submission of the doctoral thesis
- Defense of the PhD thesis research and text in a final public seminar presentation and oral examination attended by the student's Thesis Committee

**APPLICATION FOR BA-MS-PhD PROGRAM
IN BIOCHEMISTRY & CELL BIOLOGY**

Please submit this completed information form, transcript, one page personal statement, and request two letters of recommendation to be sent to mscates@rice.edu:

Name _____ **College** _____

1. Indicate year at Rice: Fr So
2. Are you currently working in a laboratory? Where? Briefly describe your research program:

3. Provide a transcript and a one-page personal statement that indicates your interests, strengths, and aspirations, including why you are interested in BA/MS/PhD program.
4. Letters of recommendation from two individuals are required for this program. Please ask these individuals to send letters to mscates@rice.edu. Provide the names and affiliations of these individuals below:
 - a. _____
 - b. _____
5. I understand the requirements of this program, including research and coursework over the summers following sophomore, junior and senior years of study, and that the MS degree will be granted after the thesis defense held in the summer following graduation.

Signature

Date

Schedule for application process:

Application materials due: End of January (to request extension email, mscates@rice.edu)
Interviews with faculty: Scheduled during February
Decision date: mid March