

CEDAR CREST COLLEGE
Reese Laboratory Research
Fall 2008

RESEARCH ADVISOR INFORMATION

Advisor: Dr. Amy J. Reese
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Office hours: Weekly lab meetings. Individual and sub-group meetings by appointment.

INFORMATION YOU MIGHT FIND USEFUL

I. Course Website: <http://www2.cedarcrest.edu/academic/bio/areese/>

1. This site contains links to my courses and schedule (to help you find me), general information about Reese research (to understand how your project fits in), Reese research and 122 students present and past (because it's fun to maintain lab history), and a list of various useful science links (good links are hard to find).
2. The site also has my CCC photos over the years (check for yourself!), my CV (for formality purposes), and FUNGAL factoids about me for your hours of boredom.

II. Course Prerequisites:

1. **BIO 243:** Successful completion of Principles of Biology BIO 121 and BIO 122 and my permission.
2. **BIO 353:** Successful completion of Principles of Biology BIO 121 and BIO 122, Junior Colloquium (BIO 350) and my permission.
3. **BIO 354:** Biology thesis (BIO 354) is not required and is separate from the research. The BIO 354 thesis component requires successful completion of four credits (up to two may be taken concurrently) of BIO 353 and my permission.

III. Course Descriptions:

1. These research courses involve student participation in my research program. They may fulfill a research requirement for some science majors.
2. **BIO 243:** I usually design these research projects. They may be parts of current projects, general lab projects, or other exploratory lab projects. One credit of research is recommended at this stage.
3. **BIO 353:** These research projects are generally BIO 350 proposals that are being carried out in the laboratory, adapted as needed and guided by my. Taking two credits of research is most common, but one may be appropriate in some cases.
4. **BIO 354:** The thesis is optional and may be at the conclusion or concurrent with a final semester of a BIO 353 research project. For this course, you would write a thesis detailing the all of all your Bio 353 work and present your final project to the College community in the form of a biology department seminar talk or poster.
5. **HONORS:** If you are also doing an Honors thesis, you would register for both BIO 353 and BIO 354 for zero credits while registering for Honors thesis for credit. The Honors component of your project must also reflect cross-disciplinary information.

IV.Objectives and Goals:

1. The objectives of research in this lab are to prepare you for the work of graduate school, technical, pharmaceutical, laboratory or other related science work and to expose you to the questions of scientific research and the mechanisms of scientific experiments, analysis and communication.
2. The goal of your research in the lab is for you to design, carry out, interpret, trouble-shoot, and communicate scientifically sound research on microbiology-related project with my guidance and the constructive feedback from the laboratory group and the Cedar Crest College Department of Biological Sciences.
3. As a member of my research lab, you are responsible for:
 - a. an independent laboratory research project
 - b. communication with me about your laboratory work
 - c. project notebook and sample maintenance
 - d. attendance of research meetings
 - e. presentation of research progress both informally and formally
 - f. participation in laboratory up-keep and clean-up
 - g. reading preparation and presentation of literature as discussed
 - h. maintenance of protocols relating to your research project
 - i. constructive interactions with labmates

V. Course Outcomes:

1. You should develop critical thinking laboratory skills in the design and analysis of your experiments. This ability will be assessed through the evaluation of progress reports, lab participation, presentations, and lab notebooks.
2. You should learn to apply your general lab and research skills to new problems and concepts by reading and sharing learned material from current research literature and by discussing your project and that of others with me and your lab mates.
3. You should learn to select, follow, and adapt basic protocols for the methods required by your research projects. You must consider appropriate controls and how to draw conclusions from your experiments.
4. My hope is that you will be exposed to the intrigue of scientific research and that you will feel a part of a research team.

VI.Areas of research and current Reese lab project assignments:

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|----------------------------|--|
| 1. Catherine Bradshaw (Jr) | Investigation of <u>Rhodotorula</u> |
| 2. Rachel Dutko (Sr) | Genotypic analysis of soil samples for <u>C. neoformans</u> & other fungal organisms |
| 3. Brittany Fikes, (Jr) | Using RNA interference to alter regulation of cell wall alpha glucan in <u>C. neoformans</u> |
| 4. Christie Hay (Sr) | Using over-expression methods to study the role of alpha(1,3) glucanase (chrom 4 & 14) in <u>C. neoformans</u> |
| 5. Carrie Olson (Sr) | Investigation of <u>Rhodotorula</u> by production of an antibody to its capsule |
| 6. Sherri Rennoll (Sr) | Using over-expression methods to study the role of alpha(1,3) glucanase (chrom 3 & 7) in <u>C. neoformans</u> |
| 7. Sarah Smith (Sr) | Phenotypic and genotypic analysis of local <u>C. neoformans</u> from local soil samples |
| 8. Brittany Symbol (Jr) | Genotypic analysis of a fungal sample from a superfund cave site |

VII. Attendance & participation:

1. I expect you to consider research as another one of your courses. Put lab work time into your schedule as you would a class or (hopefully) your study time for a particular class. I expect 353 students spend a minimum of six hours per week working in the lab, attending lab meetings, or reading papers in order to obtain an average grade. Lab effort is important. Project progress is even better.
2. Plan on attending lab meetings and let me know if you will need to miss them. I expect you to participate by questions, sharing your work, or presenting/discussing journal articles as relevant to that day's lab meeting. The meetings are to facilitate our communication since we can't all work in the lab at the same time.
3. This semester we will have three joint lab meetings at the normal time (beginning Friday at 1:15) with the Walther lab. These will be opportunities for more senior lab members or those with more completed projects to present formal presentations.
4. We may also schedule individual or sub-group meetings for those working on similar projects as needed throughout the semester.

VIII. Progress reports:

1. The purpose of the bi-weekly progress reports is to help you monitor and follow your work, to establish lab accountability, and to incorporate feedback. If done on the computer, these could be the basis of a Bio 354 thesis (methods & results sections).
2. The progress report is available on the Reese lab website, from me, and in the lab and can be mostly completed on the computer (which will aid in later report writing) or by hand. You can also satisfy the report questions by answering the questions below.
 - a. What experiments were you working on and what did accomplish in the last few weeks?
 - b. What methods did you use for these experiments? Were there appropriate controls?
 - c. What were your results and what did you interpret from them?
 - d. Did you have to do any troubleshooting?
 - e. What are your plans for the next few weeks?
 - f. How did you contribute to overall Reese lab citizenry?
 - g. What were the strengths or skills gained?
 - h. How many hours did you spend in the lab this past two weeks? When?
 - i. Were there any suggestions or comment from lab meeting?

IX. Final Reports:

1. At the end of the semester, please complete a progress report that summarizes your work for the semester and that lays out what you will do in the following semester.
2. From sophomores, I expect an abstract summary of your work and future plans. For students who have been working on their projects longer, a mini research paper with standard sections of an abstract, materials & methods, and results & discussion are expected. Reports that include of Introduction & Background and References are even more complete.
3. A final report is not necessary that semester if you:
 - a. do a BIO 354 thesis
 - b. do a PAS grant proposal
 - c. do a BIO 350 Junior Colloquium proposal

X. Primary literature paper reviews:

1. student leaders. I will provide suggested papers, but you are also welcome to propose papers that you have come across that you'd like to discuss as a group.
2. In addition to these formal paper readings and presentations, you should be reading appropriate literature for the background and methods associated with your specific research topic. I recommend you track the papers you read in a notebook. Again, this will be useful if you do a thesis later on. You may find it useful to answer the following for each paper:
 - a. What paper did you read?
 - b. What questions were the researchers asking (or perhaps why did you read it)?
 - c. What method did they use to address the questions?
 - d. What type of data did they acquire?
 - e. What conclusions did they make? Were they supported by the data?
 - f. What questions were you left with?
 - g. How does the paper relate to your research project?

XI. Lab presentations:

1. Throughout the semester, you will be asked to present various types of updates of your research project. These may include more formal or "semi-formal" 15-30 minute powerpoint presentations, 5 minute "chalk-talk" presentations, or weekly updates.
2. If you are a senior or student with significant progress, you will have the chance to formally present your research to both the Reese and Walther labs. These presentations should be fifteen to twenty minutes in length and include 1) background information of the project, 2) details of experiments performed to date, 3) results for experiments completed, and 4) future directions of the project.
3. If you do not present a formal talk to the combined labs, you will be asked to give either a powerpoint or chalk-talk progress presentation to the lab during the semester.
4. After presentations, presenters should expect questions from the other lab students and me. This is practice for other departmental or conference presentations and will play a role in your satisfactory semester progress grade component.

XII. Lab citizenship and protocols:

1. Part of being in a lab group is working with the rest of the group, learning from other students, helping teach other students, keeping the lab safe, and keeping the lab running efficiently. Contributions can be recorded in the lab progress reports.
2. In addition to doing your own dishes whenever possible, you may be asked contribute tasks toward general lab maintenance. These tasks might include any of the following
 - a. monitoring general lab aliquots and replenishing as needed
 - b. monitoring sterile cabinet supplies
 - c. monitoring, cleaning & filling water baths
 - d. stocking DNA gel buffer and monitoring the electrophoresis station
 - e. dealing with issues of tip boxes
 - f. disposing of waste materials
 - g. making of media for the lab
 - h. lab housekeeping duties
 - i. general dishwashing & cabinet stocking
3. A work study student will keep the lab orderly and do several of the tasks listed above.
4. You will be responsible for contributing 3 protocols to the lab during the semester. These will be related to your project.

XIII. Laboratory resources:

1. In addition to the links off of my website, there are a number of resources in the filing cabinet by our research area, particularly in the top drawer.
2. The cabinets were reorganized and relabeled. We will catalog the locations of things.
3. I am also working on a Reese lab manual.

XIV. Laboratory samples & notebooks:

1. How you label, store, and track your samples is as important as your notebook. Putting just your initials on a plate is not enough (you should have the date, the type of plate, the type of sample, and maybe even the notebook page #).
2. You are required to keep a lab notebook, with separate entries for each day of lab work. As is research tradition, this is property of the lab. At any point during the semester, I might need to check notebooks for what students are doing and how. Points will be deducted if I need to check your notebook and cannot find, or follow it.
3. If you would like to maintain a copy of your notes to take to graduate school etc., I recommend that you keep a carbonless laboratory notebook. When you leave the lab, I can retain the original copy and you can take the copies for your future reference. Printouts & chemical inserts can be taped into both the original and carbon copies.
4. Don't get behind in keeping notes! You should always be recording as you go. Short incubation periods are a great time to catch up on notes. It will help you get started each day if you leave a plan behind for when you arrive.
5. The more information you track, the more you'll be able to determine later. **You should be able to completely repeat an experiment from your notebook. In fact, I should be able to repeat an experiment from your notebook!** Each entry should be written in pen, dated, and should include the following:
 - a. the purpose of that day's experiment
 - b. a detailed protocol, or brief but informative protocol and reference to a reliable source written before the experiment
 - c. details of the procedure that might vary (amount of antibiotic used and at what concentration, number of cells/ml etc) from experiment to experiment
 - d. chemicals or instrument settings used that would be challenging or irritating to determine later (source of chemical, voltage setting)
 - e. notes on things that happened during the experiment that were not planned and observations made during the experiment (I like to have a protocol plan and then make notes about each step as I go)
 - f. information for samples storage ("placed in -80 °C freezer in Reese box 2") and labeling information (pRCD69 miniprep DNA 10/13/04)
 - g. stopping point for the day and summary
 - h. plan for the next lab day or experiment

XV. Satisfactory semester progress & grading policies

1. In addition to weekly group meetings, we can meet individually or in sub-groups to help plan work and monitor progress.
2. Research grading will take into consideration the following: lab attendance, participation and citizenship (15%), progress reports (20%), literature discussions (15%), presentations (15%), semester progress (25%), and lab samples/notebooks (15%).

XVI. Reese lab Schedule:

Date	Agenda focus –
Aug 29	<ul style="list-style-type: none"> - Introductions, lab overview and lab tour with Dr. Reese - Handout reading on lab notebooks
Sept 5	<ul style="list-style-type: none"> - 1:15 presentation by President Ambar - Progress report 1 (plan) due to Dr. Reese's office - No lab meeting (Dr. Reese has a dept meeting following President Ambar's address)
Sept 12	<ul style="list-style-type: none"> - Discuss "Laboratory notebooks" chapter - Each student will present a ~5 minute informal chalk-talk of her project goals & methods for the rest of the lab - Hand out "How to set up an experiment" and "Presenting yourself & your data"
Sept 19	<ul style="list-style-type: none"> - Journal club presentation 1 - Progress report 2 due
Sept 26	<ul style="list-style-type: none"> - Round table progress reports of projects - Discuss "How to set up an experiment" and "Presenting yourself & your data"
Oct 3	<ul style="list-style-type: none"> - Journal club presentation 2 - Progress report 3 due
Oct 10	<ul style="list-style-type: none"> - 15 minute informal presentations by juniors
Oct 17	<ul style="list-style-type: none"> - Journal club presentation 3 - Progress report 4 due
Oct 24	Semi-formal presentation by seniors not presenting to both Reese and Walther labs
Oct 31	<ul style="list-style-type: none"> - Journal club presentation 4 - Progress report 5 due
Nov 7	Formal presentations & joint meeting with Walther lab
Nov 14	Formal presentations & joint meeting with Walther lab - Progress report 6 due
Nov 21	Formal presentations & joint meeting with Walther lab
Dec 5	Final reports due
TBD	End of the semester event at the Reese house (the day after the last day of classes, Fri Dec 5, or as otherwise scheduled)
TBD	Attendance of senior talks and presentations