

EEB 369: EXPERIMENTAL ANIMAL BEHAVIOR

Instructor

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MEETING TIMES

LECTURE (Tu 3:30 – 5:10 pm at Tulane, Boggs 400)

LAB (Th 1:00 – 4:00 pm at the Audubon park and/or zoo)

COURSE DESCRIPTION

This course provides students the opportunity to design, implement, write-up, and present an independent research project related to animal behavior. Research will be conducted on live animals at the Audubon Zoo or Audubon Park. The course will emphasize general principles of literature review and synthesis; experimental design; the collection, organization and analysis of data; and written and oral presentation of results. The course consists of 3 hours of laboratory per week (at the park or zoo) and 2 hours of seminar per week (on campus). This course fulfills the Newcomb-Tulane **college intensive writing requirement**. The course also provides an **optional service learning component**, with the related goals of (1) assisting curators at Audubon Zoo and/or Audubon Park with management of animal populations; (2), raising public awareness about the behavioral ecology and conservation of free living or captive animals; and (3) enhancing student understanding of behavioral ecology via experiential learning opportunities provided by the service learning.

SPECIFIC AIMS & LEARNING OUTCOMES

The specific aims of this course are to enable students: 1) to successfully design and conduct an independent research project; 2) to employ relevant literature review and data collection techniques; 3) to conduct basic statistical analyses; (4) to write a coherent paper in the format of a scientific publication summarizing the aims, methods and results of the research project; and (5) to make at least one effective public presentation on the research to the broader community. Students in this course are expected to demonstrate that they have attained the following capabilities, consistent with the learning outcomes for the major: 1) to demonstrate basic factual knowledge of field experimental biology; 2)

to demonstrate competence in collection, organization and analysis of data; 3) to review and synthesize relevant scientific literature; and 4) to demonstrate skills in written and public presentation of one's own work and in critiquing the work of peers. Students participating in the Service Learning component of the course are expected to: 1) work with Audubon Nature Institute staff to identify, design, and develop research topics that will assist Audubon staff with management issues; 2) interact on a regular basis with Audubon staff during implementation of the project; 3) present this information in an accessible format to the public; and 4) develop an enhanced understanding for how behavioral ecology intersects with social, cultural, and political life in the Gulf region.

CO-REQUISITE OR PREREQUISITE

Junior or Senior standing with EBIO 2020, or else by consent of instructor. EBIO 329 ("Behavioral Ecology"), EBIO 304 ("General Ecology"), EBIO 308 ("Processes of Evolution"), EBIO 408 (Biostatistics & Experimental Design), EBIO 368 ("Comparative Animal Behavior") are recommended, but not required.

STRUCTURE OF COURSE

This course requires students to conduct independent work related to literature review, project design, data collection, and written presentation of an independent study related to the behavioral ecology of animals at the Audubon Park. Students will spend 3 hr per week learning basic methods and collecting data, in addition to **20 hr per semester of independent data collection outside regular course hours**. Students will spend 2 hr per week working with peers, teaching assistant, and professor in a seminar format to prepare written and oral presentation of the study. The course is divided into two halves. The first half of the course teaches basic skills through exposure to a range of research methods and study animals. The second half of the course is focused on the design, implementation and presentation of a coherent research project.

READING

Reading materials will be made available online at the course website.

SERVICE LEARNING

This course offers an optional Service Learning component. Students wishing to participate in the Service Learning component of the class **MUST** register for EEB 3890-11. Service learners will receive P/NP for the Service Learning component per se, but *their effort and involvement in the Service Learning component will heavily affect the Performance portion of their grade for the course (10% of overall grade, below)*. Note that there is a high degree of overlap between the SL and non-SL options in the course. Our community partner is the Audubon Nature Institute, which manages both Audubon Park and Zoo. For more information on the Audubon Nature Institute, please see www.auduboninstitute.org. Our general contact is Ms. Trudy Ehrich, but Service Learning students will interact most heavily with the curator who oversees the animal exhibit relevant to their research. Students will also receive guidance and support from Claire Beauchamp, the Service Learning Fellow for this course. Additional information on Audubon Nature Institute and the Service Learning component of the course will be provided at an orientation session on the first day of class.

Service learners have two main goals in the SL portion of the course. First, they will work with Audubon staff to identify species or situations that would benefit from focused study. Examples from the Audubon Zoo might include captive animals exhibiting aggressive behavior toward each other or visitors to the zoo, or acclimation of a newly introduced animal to a stable, pre-existing social group. Examples from the Audubon Park might include the effects of the massive influx of wood ducks on water quality, or the wellbeing of other waterbird species. SL students will meet with the relevant curator or park staff to identify such topics, and will then develop projects in conjunction with Dr. Karubian and the curator to gather data that will be useful in guiding management decisions. Students will provide curators with regular status reports, a copy of the final report for the course and, if desired, and oral report. Second, SL students will educate the local public on the behavioral ecology and conservation / management status of the animals they study for their independent research. The idea is to package the "Gee-whiz" aspects of the behavior of these animals in an easily understood format and get the word out as broadly as possible in an accessible format that will grab the interest and attention of the public. There is also an important component of "solutions-based" narrative, which will explain to the public what the issue facing the animal was and how the study has helped to resolve the problem. By increasing local awareness about the animals in Audubon Zoo or Audubon Park, service learners will be broadening local horizons while providing indirect, but important, assistance with protecting animals in these important sites. A related goal is for service learners to use the experience to gain an appreciation for the ways in which behavioral ecology intersects with animal management and social, political, cultural and economic aspects of our lives in the Gulf Region.

The following are required of all students enrolled in the Service Learning component. The estimated time in hours dedicated to each activity is provided in parentheses. **All Service Learners are required to log 20 hours of service during the semester. Students who do not fulfill the 20 hour minimum requirement will not receive credit for the Service Learning component of the course.**

- Meet with Professor Karubian and Audubon Nature Institute staff to identify suitable themes and study systems for independent research (*1 hr, Jan 23*);
- Conduct independent, library-based research on the behavior, ecology, and conservation of focal species (*4 hr, to be completed in first 4 weeks*);
- Meet with Audubon Nature Institute staff to present results to date and check in for future research (*1 hr, to be completed by week 7*);
- Write a 2 page essay on how the SL component of the course is progressing, ways it might be improved, and aspirations (*1 hr, to be completed by April 29*);
- Prepare a public presentation and a poster summarizing the issue addressed and how the project helped to resolve the issue (*6 hr, to be completed by April 24*);
- Make the presentation with poster at the relevant exhibit at the Audubon Zoo or in a relevant location at Audubon Park, to be attended and graded by Professor Karubian (*3 hr, to be completed by April 24*);
- Write a 2 page essay on how the SL component of the course has influenced your understanding of behavioral ecology, to be read and graded by Professor Karubian (*1 hr, to be completed by April 29*);

COURSE SCHEDULE

DATE	DAY	ASSIGNMENT	LOCATION
Week 1			
1/14/14	Tues	Course Introduction	Boggs 400
1/16/14	Thur	Park Intro / data recording	Park
Week 2			
1/19/14	Sun	Project Idea Due	
1/21/14	Tues	Project proposals & grants	Boggs 400
1/23/14	Thur	Zoo Intro / Curators	Zoo
Week 3			
1/26/14	Sun	Pilot Project Proposal Due	
1/28/14	Tues	Pilot Project Proposal Feedback	Boggs 400
1/30/14	Thur	Data collection	Park/Zoo
Week 4			
2/2/14	Sun	Pilot Intro & Methods due	
2/4/14	Tues	Pilot Intro & Methods Feedback	Boggs 400
2/6/14	Thur	Data collection	Park/Zoo
Week 5			
2/09/14	Sun	Pilot Project Paper due	
2/11/14	Tues	Pilot study feedback	Boggs 400
2/13/14	Thur	Social Network Workshop	Boggs 400
Week 6			
2/18/14	Tues	Individual Meetings	Boggs 400
2/20/14	Thur	Data collection / consultation	Park/Zoo
Week 7			
2/23/14	Sun	Project Proposals due	Text
2/25/14	Tues	Mock Grants panel	Boggs 400
2/27/14	Thur	Data collection / consultation	Park/Zoo
Week 8			
3/4/14	Tues	MARDI GRAS - NO CLASS	
3/6/14	Thur	MARDI GRAS - NO CLASS	
Week 9			
3/9/14	Sun	Intro & Methods I due	
3/11/14	Tues	Intro & Methods I Feedback	Boggs 400
3/13/14	Thur	Data collection	Park/Zoo
Week 10			
3/16/14	Sun	SL Reflection Essay due	
3/18/14	Tues	Individual Meetings	Boggs 400
3/20/14	Thur	Data collection	Park/Zoo
Week 11			
3/23/14	Sun	Intro & Methods II due	
3/25/14	Tues	Intro & Methods II Feedback	Boggs 400
3/27/14	Thurs	Statistics Workshop	TBA

DATE	DAY	ASSIGNMENT	LOCATION
Week 12			
3/30/14	Sun	Results & Discussion I due	
4/1/14	Tues	Results & Discussion I Feedback	Boggs 400
4/3/14	Thur	Data collection	Park/Zoo
Week 13			
4/6/14	Sun	Final Report draft due	
4/8/14	Tues	Final Report Draft Feedback	Boggs 400
4/10/14	Thur	Data collection	Park/Zoo
Week 14			
4/15/14	Tues	In class Presentations I	Boggs 400
4/17/14	Thur	Data collection as needed	Park/Zoo
Week 15			
4/22/14	Tues	In class Presentations II	Boggs 400
4/24/14	Thur	Public Presentations	Park/Zoo
Week 16			
4/29/14	Tues	Professional Preparation	Boggs 400
4/29/14	Tues	Final Report / SL Reflection Due	

ASSIGNMENT SUMMARY

Assignment	Semester Week	Day Due	Feedback Day
<i>Project Idea</i>	2	SUN, 1/19	TUE, 1/21
<i>Pilot Proposal</i>	3	SUN, 1/26	TUE, 1/28
<i>Pilot Intro, Methods</i>	4	SUN, 2/2	TUE, 2/4
<i>Pilot Project Final</i>	5	SUN, 2/9	TUE, 2/11
--	6	--	--
<i>Project Proposal</i>	7	SUN, 2/23	TUE, 2/25
-- (<i>Drunken Revelry</i>)	8	--	--
<i>Intro & Methods I</i>	9	SUN, 3/9	TUE, 3/11
<i>SL Reflection I</i>	10	SUN, 3/16	--
<i>Intro & Methods II</i>	11	SUN, 3/23	TUE, 3/25
<i>Results & Disco I</i>	12	SUN, 3/30	TUE, 4/1
<i>Final Report Draft</i>	13	SUN, 4/6	TUE, 4/8
<i>In class Present. I</i>	14	TUE, 4/15	--
<i>In class Present. II</i>	15	TUE, 4/22	--
<i>Public Presentations</i>	15	THU, 4/24	--
<i>Final Report</i>	16	TUE, 4/29	--
<i>SL Reflection II</i>	16	TUE, 4/29	--

Assignments. This course has a heavy focus on research and writing. The seminar component of the course acts as a writing workshop. Written assignments will be evaluated by peers and discussed in depth in a round-table format. One copy for each member of the course should be turned in for each assignment to facilitate peer review. Each written component of the main research project will have at least one re-write. These are indicated in the syllabus by “I” (the first time an assignment is due) and “II” (when the re-write based on critiques is due). Assignments from the first half of the course are intended to develop general writing skills and topics can vary from assignment to assignment. Assignments from the second half of the course should all be focused on research and are intended to contribute directly to the final paper, due at the end of the course. Students will work individually or in small groups. Composition of the groups will be determined by student research interest, in consultation with the instructor. Colleagues are expected to work together cooperatively and equitably. For assignments related to the main research project, the *Methods* may be identical among all colleagues working on the same project. *Results* may be identical as well, although if an individual decides to conduct extra, independent research this may be included. *Introduction* and *Discussion* should be written independently. Plagiarism is not tolerated, but collaboration with group members in preparing the Introduction and Discussion is encouraged.

Working at the Zoo. Researchers in this class may enter the Zoo with no charge at any time when the Zoo is open by identifying themselves with a University ID card at the Member’s entrance of the main gate. Please do not attempt to bring others into the Zoo under the auspices of this course. Adhere to all Zoo rules, or permission to conduct research could be terminated. Any problems should be brought to the attention of the instructor immediately.

EEBIO 369 ASSIGNMENTS & GRADING DETAILS

GENERAL NOTES ON ASSIGNMENTS

Assignments must be ‘turned in’ by 8pm on the day they are due. This means sent to the Instructor, TA, and all members of your feedback group for that week. All written assignments should be double-spaced and, when printed, using the front and back of the paper.

IMPORTANT: All papers and references should follow the format found in the journal *Animal Behavior*. Consult the following web page for details in this citation format: <http://www.elsevier.com/journals/animal-behaviour/0003-3472/guide-for-authors#20000> Assignments not following this format (both in the text and in the references cited) will be returned.

Focus on concise writing – writing more pages will not get you a higher grade (rather, the ability to express ideas as concisely as possible will be rewarded).

Please do not exceed the suggested page length for each assignment. Papers which exceed the page limit without convincing the instructor that the extra verbiage is justified will be penalized.

ASSIGNMENT DETAILS (ALL SHOULD BE DOUBLE SPACED – REMEMBER FORMAT)

PROJECT IDEA

The project idea assignment should be about a page in length, and describe a project that seems interesting and suitable to you. This is not a rigorous assignment – just something to get the blood flowing. You should include:

- at least one question with hypothesis / prediction, and general description of how you would go about answering the question.
- an explanation of what excites you about the research
- a description of potential challenges / issues you see with the research

PILOT PROJECT PROPOSAL (5% OF TOTAL GRADE)

The Pilot Project Proposal should be **2 - 4 pages in length**, and should follow the format of a NSF Graduate Research Fellowship grant (GRFP). This document should describe the pilot project you plan to conduct for the first few weeks of the course. This project may or may not develop into your main project. You should provide the following information:

- The exhibit / animals you plan to study, the main question(s) you plan to address and associate predictions / hypotheses, and why this question is of interest or important to the zoo community or our understanding of animal behavior / psychology.
- The type of sampling methods to be deployed (from Altmann 1974) and a schedule of when you plan to collect pilot data should be provided in tabular form.
- Expected results and potential interpretation of these results
- At least 3 references in the text (including Altmann 1974), and a References section.

PILOT INTRO & METHODS (5% OF TOTAL GRADE)

The Pilot Intro & Methods should be **2 - 3 pages in length** including references but not including an optional pilot ethogram.

This document should develop the ideas presented in the Pilot Proposal. There is no single formula for a well-written Introduction, but the following guidelines are a good start:

Introduction.

The Introduction should be 3 – 5 paragraphs long. Shorter is probably better for this particular assignment because chances are you do not have a lot that is meaningful to say at this early point in the project.

Think of the Introduction section of a paper as a cone: wide at the top but gradually tapering to a point. Similarly, your Introduction should begin as broadly as possible and gradually narrow to focus on your particular study.

Introduction: Beginning. (1-2 para) You should begin by introducing the general thematic area(s) you plan to address in your research (i.e., social dominance, group living, welfare and wellbeing of captive animals). You should introduce the salient points(s) in this field relevant to your research and highlight question(s) that need work and that will be addressed by your research. These first paragraph(s) should not mention your study organism or any details about your specific study.

Introduction: Middle. (1-2 para) The middle section of your Introduction is a bridge linking the broad thematic coverage of the beginning to the specific questions with which you close. Here, you introduce your study animal and relevant aspects of its' basic biology (including the fact that you are studying a captive population). Only include information that is relevant to your research question: make sure that the information you provide here is directly tied to the broad information you presented above, and the specific questions you present below.

Introduction: End. (1 para) Close your introduction by presenting the specific questions you will address with your pilot research. You should not have to motivate / justify the broad importance questions at this point – you already did that in the first paragraphs above – but you can point out how & why your study system is particularly well suited to answer the questions. You should provide specific hypothesis or hypotheses and predicted results.

Methods

The Methods section should be 2 - 3 paragraphs long. As above, shorter is probably better for this particular assignment.

Active vs. Passive voice: Some people use the active voice when writing scientific papers, while others use the passive voice. Personally, I prefer the active voice (i.e., “we sampled behavior”) rather than the passive voice (i.e., “behavior was sampled”). Either style is acceptable, but be sure to consistently use whichever voice you elect (i.e., do not switch back and forth).

The Methods section should provide the following information at a minimum:

- The location and the duration of the study;
- Detailed information on exhibit or animals that is relevant to your study;
- The specific times of day when data is to be collected, the sampling methods you will use, and how data collection will be portioned among partners.
- Planned statistical analyses. For this pilot project you are expected to calculate basic descriptive statistics such as means (with a measure of variance such as Standard Error) and proportions. You are not required to conduct statistical comparisons (i.e., t-tests, chi-sq, etc) though if you already know how to do so you are welcome to.
- A pilot ethogram may be included as an appended table, but this is not required.

References

You should have 5 – 7 references for this assignment.

PILOT PAPER (10% OF TOTAL GRADE)

INCLUDES INTRO & METHODS (RE-WRITE), RESULTS & DISCUSSION

This document should be **4 - 5 pages in length**, including references and acknowledgements, but not including figures and tables.

This will be a ‘complete’ paper even though the content will be limited based on the short time frame in which the study was conducted. This assignment will include a re-write of your Pilot Intro & Methods section (based on feedback you receive from peers and your instructor) plus a new Results and Discussion section. You will also include Acknowledgements and References.

Results.

The text of the Results section should be short (1-2 para). Here, you provide results but not interpretation.

For this pilot project you are expected to calculate basic descriptive statistics such as means (with a measure of variance such as Standard Error) and proportions. You are not required to conduct statistical comparisons (i.e., t-tests, chi-sq, etc) though if you already know how to do so you are welcome to.

Results can be presented in the text, in figures (such as graphs), and in tables. Figures and tables should have legends following the style in *Behavioral Ecology*.

Do not duplicate data in two places. For example, do not say in the text: “the male spent more time in the tree than on the ground ($22.5 \pm 3\%$ vs. $10.1 \pm 1\%$)” and then have a figure or table showing the same exact data. It would be acceptable to say: “the male spent more time in the tree than on the ground (Fig. 1)” or “the male spent more time in the tree than on the ground (Table 1)” and provide the raw data there.

Provide your Ethogram in the Results. This should be a table with the following headings: Behavior Name / Description of Behavior / Proposed Function. If your study species is well-studied, you can add a “Reference” section where you cite papers that have already described these behaviors.

Discussion

The Discussion section should be 3 - 5 paragraphs long. As above, shorter is probably better for this particular assignment.

The Discussion is like the Introduction in reverse. You should start by summarizing your main findings in 1 or 2 sentences, and then broaden your discussion as you go. After summarizing your results, you should include the following:

-- Discuss your work in the context of other studies conducted in this thematic area. At this point, you can return to studies that you referenced in the Introduction and mention how your findings are similar to or different from these other studies.

-- Highlight what in your work is new or expands our knowledge about either your particular study organism or the general thematic area of your research.

- Discuss any practical applications or management suggestions that follow from your findings. For example, you might provide a list of suggestions for the zoo on how to better manage the exhibit
- Discuss how your research could have been improved. What shortcomings did you perceive in your project and data collection, and how could these be addressed in future research?
- Discuss next steps in this research – what interesting questions still remain and how could they be addressed.

Acknowledgements

The Acknowledgements section comes between the Discussion and References. In this section you should acknowledge any funding sources and support you received. You may want to thank your project partner, zoo staff, and students in the class who provided feedback on earlier drafts of the paper.

References

You should plan to have 7 – 10 references.

Figures & Tables

Here you should provide the Figures and Tables (and corresponding Legends) in the order in which they are cited in the text. These pages do not count toward the 5 page limit.

PROJECT PROPOSAL (10% OF TOTAL GRADE)

The Project proposal should be **3-4 pages in length, not** including references.

The proposal is a different sort of animal than the other writings you will be producing for this course. The ability to write a compelling research proposal is key to a successful career as a graduate student and practicing research biologist. This assignment is intended to give you a first taste at proposal writing.

As with a paper, there is no magic formula for how to write a successful proposal. I suggest your proposal contain these elements in the following order:

- *Introduction*. As with a paper, begin broadly by introducing the broad thematic area you plan to conduct your research in, and then present a key question that needs more work and that your research will address. This is an opportunity to justify your work by contextualizing it within a broader field of research and indicating how and why it represents a significant contribution. (1-2 para)
- *Research Objectives*. Briefly introduce your study system, and then make a bulleted list of your research objectives (1 para). These should be framed in terms of QUESTIONS, HYPOTHESES and PREDICTIONS.
- *Research Plan*. Here, provide information found in the methods section of your paper on how, when and where you will conduct the research, analyze results, and disseminate findings. Your job here is to convince the reader that what you are proposing to do is tractable and that you will be able to achieve your research objectives (2-3 paragraphs).

-- *Significance*. Here, describe why the research you are proposing matters. Why should the reader care about this project? Will it improve the well-being of captive animals? Will it further our understanding of social dominance interactions? How and why will it do so? (1 para)

-- *References*. Provide a list of references at the end of the proposal (3 – 5 refs).

In addition to better-known sources like Fulbright, here is a partial list of other funding sources for undergraduate students:

Barry M. Goldwater Scholarship and Excellence in Education Program

<http://www.act.org/goldwater/index.html>

Explorers Club Youth Activity Fund

http://www.explorers.org/index.php/expeditions/funding/expedition_grants

Tulane's Stone Center for Latin American Studies

<http://stonecenter.tulane.edu/pages/detail/275/Summer-Funding>

Tulane College Grants (several possibilities)

<http://college.tulane.edu/grants.htm>

EPA Greater Research Opportunities (GRO) Fellowships

http://www.epa.gov/ncer/rfa/2011/2011_gro_undergrad.html

OTHER WRITTEN ASSIGNMENTS LEADING UP TO FINAL PROJECT

INTRO & METHODS (5% OF TOTAL GRADE)

Intro & Methods should be **5 pages in length, not** including references, figures and tables.

You should follow the basic guidance provided above and included in the feedback from previous iterations.

INTRO & METHODS (RE-WRITE) (5% OF TOTAL GRADE)

Intro & Methods should **5 pages in length, not** including references, figures and tables.

You should follow the basic guidance provided above and included in the feedback from previous iterations.

RESULTS & DISCUSSION (5% OF TOTAL GRADE)

Results & Discussion should be **5 pages in length, not** including acknowledgements, references, figures and tables.

You should follow the basic guidance provided above and included in the feedback from previous iterations.

FINAL REPORT DRAFT (5% OF TOTAL GRADE)

INCLUDES INTRO & METHODS (2 RE-WRITES), RESULTS & DISCUSSION (1 RE-WRITE)

You should respond to feedback from previous iterations. This should be a complete draft of the final document.

FINAL PAPER (30% OF TOTAL GRADE)

The final paper should be **10 pages in length, not** including acknowledgements, references, figures and tables.

No new material beyond that covered above need be included. This should be highly polished.

IN CLASS PRESENTATION (10% OF TOTAL GRADE)

The ability to communicate your science in the spoken word, as well as in writing, is another necessary skill in science.

Presentations will be jointly presented by both members of a research team. Generally, one member will take the Intro & Methods and the other will take the Results & Discussion.

Presentations should be 20 min in length, with 10 min for Q&A.

Presentations should follow the same general format as the paper, including an Acknowledgements slide at the end and references peppered through out the presentation where relevant.

Useful tips:

- **Practice your presentation several times (preferably in front of friends)** before you get up and give it in the class. Make sure you are coming in at the right time without talking too fast or too slow.
- Do not cram too much information onto a single slide.
- Do not put all your text on the slides, so that you essentially end up reading directly from the slide.
- Face the audience, rather than the screen, when talking. Make eye contact.
- If nervous, memorize your first 5 or 6 sentences. The adrenaline fight or flight rush usually subsides after the first couple of minutes and once you get past it you will feel more comfortable.

PUBLIC PRESENTATION (5% OF TOTAL GRADE)

For this assignment, you should prepare some hand outs that summarize your research and findings, and why it is cool.

PERFORMANCE, ATTITUDE, & ATTENDANCE (5% OF TOTAL GRADE)

Show up for class and work hard. This is a difficult class to 'fake it' in.