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**IB 432: Genes and Behavior**

Credit: 3 hours

**Lecture Information****Instructor:**

Dr. Adam G. Dolezal

Office: 349 Morrill Hall

Email: adolezal@illinois.edu

Office Hours: 10-10:50 AM Fridays or by appointment

**Schedule:** 2:00 – 3:20 PM, Tuesday & Thursday, 2083 Natural History Building (NHB)**Text:** As a “Frontier” area in biology, there is still no suitable textbook for this course. We will mainly be reading book chapters, primary literature, and newspaper articles provided through the moodle site.**Course Web Site:** Materials for the course will be posted on the course Moodle site:<https://learn.illinois.edu>**Learning Objectives:**

1. To understand the different ways in which genes can affect complex phenotypes, including behavior
2. To appreciate the importance of both genes and environment, and their interaction, in affecting behavior
3. To have a basic understanding of quantitative and molecular genetic techniques, including modern genomic approaches, for studying the genetic basis of behavior
4. To understand how genes that underlie behavior can be deeply conserved across animals, but still evolve and contribute to the evolution of new forms of behavior
5. To be able to read, understand, and critically assess behavioral genetics papers from the primary literature
6. To lead and participate in critical discussions of scientific literature and its portrayal in popular articles
7. Work responsibly, respectfully, and effectively with other students.

**Grading**

1) I use the standard 90, 80, 70, 60% scores as starting cutoff points for A, B, C, and D grades, respectively. Depending on the distribution of points at the end of the semester I **may** drop the cut off points slightly (e.g., 88% might become the A cut off) but I **will not raise** the cut-offs.

2) This is an upper-level course for students interested in the topic. As such, the expectations for preparation and participation are high. That said, they are achievable to all students – i.e., if all students meet these expectations, this will be reflected in their grade. I.e., I have no expectation that some percentage of the class get any given grade (e.g., a bell curve of grade distribution).

Your final grade in the course *will be based on the following point allocations.*

<b>Assessment</b>	<b>POINTS TOTAL</b>
Exam 1	200 (20%)
Exam 2	200 (20%)
Figure Facts sheets (20 x 10 pt each)	200 (20% -1% per sheet)
Student-led paper discussion	100 (10%)
Student participation/attendance	50 (5%)
Final Poster	200 (20%)
Final Poster Presentation	50 (5%)
<b>GRAND TOTAL</b>	<b>1000 (100%)</b>

### **Exams**

The two exams will be held during regular class time. Both will be short answer and essay based. Exam questions will draw heavily from class discussions and lectures, but all of the readings and additional readings are also fair game. You will have the full class time to complete each exam.

### **Figure Facts Sheets**

For each data paper we read, you are required to fill out a “Figure Facts Sheet”, worth 10 points. These are short assignments that are designed to help you in understanding the data papers by focusing on the data presented in each of the major figures in the paper. They will also help me, as the instructor, to know which papers and pieces of data students are struggling with, so we can devote more time to explaining these. These are to be turned via Moodle on the day that the reading is due **by the beginning of class**. You can only turn these in **before class begins**. As such, they will contribute to assessment of attendance and participation.

### **Student Led Paper Discussions**

Students will be responsible for “presenting” one of papers. Work in groups of 3-4 (but we must fill all the sessions). We will have a signup session a few weeks into the class. Read paper together and give an overview for the class. The first ~1/3 of the course I will do this overview, so you will learn what is expected. All students within a group should put in equal effort and all should try to speak and present roughly the same amount. Here are some suggestions about what you will present:

- 1) What was the major question?
- 2) What was the hypothesis or hypotheses being tested?
- 3) How were the hypotheses tested?
- 4) Show and interpret each figure.
- 5) Do the results support the hypothesis/es?
- 6) What are the main conclusions?
- 7) What was good about this study?
- 8) What could be improved about this study?
- 9) What would be a good follow-up study?

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### **Class Participation and Discussion**

This is a paper reading and discussion class. *Attendance and participation are essential!* Most classes will be held as relatively informal paper discussions, with ample time for questions as they arise. We will break up into groups of ~4 students for discussion.

Your attendance will be noted, and participation graded, so *please let me know if you need to miss a class*. To earn class participation points, you should come prepared with 3 questions related to the readings assigned for each class and sign in at the beginning of class. During discussions, I will walk around and discuss these questions with students semi-randomly. Your % participation (% classes attended and % questions shared) will translate into your class participation points. *Coming prepared for these discussions by doing your reading, and noting questions or things that you need clarification on during your reading, will contribute to better and more informed participation!!*

### **Final Poster project**

Students will work in pairs or small groups to come up with a behavior they are interested in and produce a poster describing it and planning a research project to investigate it. The posters will be presented in class for a grade (50 points) and the content of the poster will be assessed (150 points). Students will have time in class to prepare the posters and presentations will occur during normal class periods.

Part of this grade will include attending other posters and making comments on them.

### **COURSE SCHEDULE**

In most classes, we will have one or two main papers (in **bold**) and one non-technical paper (underlined) for discussion (from popular magazines, news, blogs). For some classes, there is a longer review paper (denoted with \*\*), which is optional reading, but can be a reference in understanding concepts and studying for exams.

<b>(Class) Date</b>	<b>Topic</b>	<b>Reading</b>	<b>Presenter</b>
<b>SECTION 1: Foundations</b>			
(1) Jan. 21	Intro to Course	<u>Pinker</u>	Dolezal
(2) Jan. 23	Exploring Gene-Behavior Relationships	<u>Sapolsky</u> , <b>Robinson 1</b> , <b>Holden</b>	Dolezal
(3) Jan. 28	Principles of Behavioral Genetics 1: Genetics basics review	<u>Leeper</u> , <b>Carroll</b> , Greenspan 1**	Dolezal
(4) Jan. 30	Principles of Behavioral Genetics 2: Twins, heritability, and whole genomes	<u>Wright</u> , <b>Cesarini</b> , Kendler**	Dolezal
(5) Feb. 4	Principles of Behavioral Genetics 3: Forward and reverse genetic approach	<u>Flint</u> , <b>Rietveld</b> , Kyriacou**	Dolezal
(6) Feb. 6	Principles of Behavioral Genetics 4: Gene expression	<u>Dobbs1</u> , <b>Bell</b> , <b>Guo</b>	Dolezal
(7) Feb. 11	What about the brain? Filling in the “black box”	<u>Thomson</u> , <b>Landis</b> , Schafer**	Dolezal

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(8) Feb. 13	The fallacy of eugenics	<u>Severson, Roubertoux</u>	Dolezal
<b>SECTION 2: Social influences on gene expression and behavior</b>			
(9) Feb. 18	Acoustic communication in song birds	<u>WashU, Dong, Clayton**</u>	Students
(10) Feb. 20	Honey bee aggression	<u>Dobbs2, Rittschof, Zayed**</u>	Students
(11) Feb. 25	Parasite manipulation of host behavior	<u>Zimmer, Geffre, Adamo**</u>	Students
(12) Feb. 27	Dominance in cichlid fish	<u>Shwartz, Maruska</u>	Students
<b>EXAM 1</b>			
Mar. 3			
(13) Mar 5	Epigenetics and maternal care in rodents	<u>Hurley, Weaver, Champagne**</u>	Students
(14) Mar. 10	Epigenetics and dominance in fish	<u>Skinner, Lenkov, Ledon-Rettig**</u>	Students

<b>SECTION 3: The influence of genes on social behavior</b>			
(15) Mar. 12	Genotype-environment interactions	<u>Breed, Bakermans, Rutter**</u>	Students
Mar 15-22	SPRING BREAK		
(16) Mar. 24	Courtship communication in fruit flies	<u>Greenspan 2, Wheeler, Yamada**</u>	Students
(17) Mar. 26	Monogamy in prairie voles <i>Introduce poster project</i>	<u>Vedantam, Lim, Donaldson**</u>	Students
(18) Mar. 31	Burrowing behavior in mice	<u>Callaway, Weber, Hu**</u>	Students
(19) Apr. 2	Human aggression: amine genes = "mean" genes?	<u>Horgan, Alia-Klein, Ferguson**</u>	Students
(20) Apr. 7	Speech in humans and animals and its roots	<u>Yong, Enard, Fisher**</u>	Students
(21) Apr. 9	Genes for domestication	<u>Willingham, vonHolt, Kukekova**</u>	Students
(22) Apr. 14	Personality genes	<u>Kraus, Garamszegi, Bell 2**</u>	Students
(23) Apr. 16	Sexuality in humans	<u>Horton, Sanders, Servick</u>	Students
Apr. 21	<b>Exam 2</b>		
Apr. 23	<i>Poster work day</i>		
Apr. 28	<i>Poster work day</i>		
Apr. 30	<i>Poster presentations</i>		
May 5	<i>Poster presentations</i>		

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This schedule is subject to change if it becomes apparent that we need to spend more or less time on a given subject. Reading assignments are also subject to change if I find a new and exciting paper to share!

### **GENERAL COURSE POLICIES AND ETIQUETTE**

1. **Be punctual.** This class is scheduled from 2:00 pm to 3:20 pm. We will begin promptly and will generally go for the entire 80 minutes. I expect you to be in your seats, awake, and ready to begin at this time, and for you to give me your undivided attention for the entire time. This means no phone calls, texting, rustling of papers, packing up early, etc.

2. **Be considerate to your classmates.** Students should refrain from unnecessary use of electronic devices, chattering, whispering, note-passing, snoring (I hope not!) etc. Any student whose behavior is distracting to me or to the class will be asked to leave.

3. **Be respectful and open minded.** In this course we will discuss topics involving subject areas that may touch on aspects of the human experience that may be sensitive or controversial. At all times we will maintain a respectful and professional atmosphere of discussion. This means respecting the opinions and thoughts of your classmates, but also respecting discussion and disagreement as long as it remains pertinent to the topic and professionally presented. The goal is to have open discussions to lead to a better understanding of genes and behavior – keep this in mind at all times.

#### **Contesting Grades**

If you feel that your assignment or exam has been graded inappropriately, you are welcome to contest grades via a written statement within one week of receiving the graded assignment. To contest a grade, you must submit a written statement (preferably via email) of what you believe was graded incorrectly and why the grade should be altered. No oral contesting of grades will be considered, nor will we consider any contest of grades submitted after one week.

#### **Disabilities Statement**

If you require special accommodations, please tell Dr. Dolezal as soon as possible. All accommodations will follow the procedures as stated in Article 1-110 of the Student Code ([http://studentcode.illinois.edu/article1\\_part1\\_1-110.html](http://studentcode.illinois.edu/article1_part1_1-110.html)).

#### **Academic Misconduct**

Academic integrity is essential to maintaining a learning environment that promotes excellence. We expect that all students will complete all academic and scholarly assignments with fairness and honesty. We adhere to the academic misconduct guidelines outlined by the Student Code of Conduct and will report any suspected academic misconduct. Please see [http://studentcode.illinois.edu/article1\\_part4\\_1-402.html](http://studentcode.illinois.edu/article1_part4_1-402.html) for additional details. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact Dr. Dolezal.