IB 432: Genes and Behavior (3 credit hours)

Lecture Information

Instructors:
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Office Hours: by appointment; I also plan to stick around ~30 minutes after each lecture.

TAs:
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Schedule: 8:00 – 9:20 AM, Tuesday & Thursday, 2020 NHB

Textbook: 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

Course Description: Concepts, methods, and problems in the analysis of the relationship between genes and behavior, the complex neurobiological processes that mediate action on behavior, in appropriate ecological and evolutionary contexts.

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.

Discussion groups

This course is highly discussion and participation based! Students will work on questions and discuss literature in groups in every class period. The goal is to use this format to help students discuss complex concepts together and then have a class-wide participatory discussion.

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 will 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.***

Assessment	**POINTS TOTAL**
Exam 1	150 (15%)
Exam 2	150 (15%)
Figure Facts sheets (20 x 10 pt each)	200 (20% -1% per sheet)
Student-led literature discussions/participation	150 (15%)
In-class participation	50 (5%)
Final Poster	200 (20%)
Final Poster Presentation	50 (5%)
Final Poster Participation	50 (5%)
GRAND TOTAL	1000 (100%)

Exams (2 exams x 15% each = 30% total grade)
The two exams, with specific details to follow. 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 (FFS) (20 FFS's x 1% = 20% total grade)
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**.

During class, I suggest making changes to your FFS if you have misunderstood something. These are really valuable as study guides for reviewing the papers we read, as they can help you remember the highlights without re-reading all the papers.

Student-Led Paper Discussion (50 per discussion, 150 points total = 15% of total grade)

For each paper listed as being presented by "Students," we will split into groups of 4-5. Each group will have one pre-assigned discussion leader (assignments will be given using a sign-up sheet a few weeks into the class). Every student should expect to be a discussion leader **three times**.

For the paper(s) that the discussion leader is assigned, they will create (3) questions of their own to discuss with their group. These questions will be added to a public forum (details to follow). During class, the discussion leader is responsible for leading the group through that class period's paper(s). Topics that are expected to be covered by the group are as follows, in addition to the discussion questions posted by the group's leader:

1) What was the major question?
2) What was the hypothesis or hypotheses being tested?
3) How were the hypotheses tested?
4) How do you 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?

During the discussion, a QR code will be displayed on the class powerpoint. This code will take you to a google form (open only to illinois.edu accounts) and a two question survey about your group's discussion. *This is also how we will track attendance.*

To earn full points for the student-led paper discussion, for each period that you are scheduled as a discussion leader, you will need to write your discussion questions (along with your name) onto the public forum, attend class and guide your group through the discussion.

Class Participation and Discussion (50 points =5% of grade)

Attendance will be tracked using a QR code displayed during each class. *If this will present an issue for you, please let the instructors know immediately*. 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. *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 to answer and discuss questions from the readings assigned for each class. 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!

That said this course is flexible! Everyone has other things that come up (illnesses, job interviews, etc.). I just ask that, if you cannot make a class, you let me know, preferably ahead of time. If you participate normally, missing a few classes will not affect your participation grade. This is a discussion class and being absent from the discussions will negatively affect your ability to get the most out of the course. But obviously **don't come if you feel sick!!!** No one will be penalized for this.

How will participation be graded? In most class periods, we will read two different types of literature – a scientific 'data' or review paper and a news or perspective piece meant for a more general audience. The goal of this course is to partially recreate the context of a small 'scientific journal club' (like a book club but with scientific papers); this is a common tool used by scientists to keep up with or learn research literature. Often in situations like this, someone leads the presentation of a paper and presents it to the group for discussion. Our discussion system is meant to provide a similar experience.

Final Poster project (Poster: 20%; Presentation 5%; Participation: 5% = 30%)
In the last few weeks of the class, students will work in 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 (200 points). Students will also have to review and provide feedback for other presentations (50 points). Students will have time in class to prepare the posters and presentations will occur during normal class periods.

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 OPT), which is optional reading, but can be a reference in understanding concepts and studying for exams.

(Class) Date	Topic	Reading	Presenter
(1) Jan 17	Intro to Course	Pinker	Dolezal
(2) Jan 19	Exploring Gene-Behavior Relationships	Sapolsky, **Robinson(1)**, **Holden**	Dolezal
(3) Jan 24	Principles of Behavioral Genetics 1: Genetics basics review	Leeper, **Carroll,** Greenspan(1)OPT	Dolezal
(4) Jan 26	Principles of Behavioral Genetics 2: Twins, heritability, and whole genomes	Wright, **Cesarini**, KendlerOPT	Dolezal

(5) Jan 31	Principles of Behavioral Genetics 3: Forward and reverse genetic approach	Flint, **Rietveld**, KyriacouOPT	Dolezal
(6) Feb 2	Principles of Behavioral Genetics 4: Gene expression	Dobbs(1), **Bell**, **Guo**	Dolezal
(7) Feb 7	The fallacy of eugenics	Severson, **Roubertoux**	Dolezal
SECTION 2: Social influences on gene expression and behavior			
(8) Feb 9	Acoustic communication in song birds	WashU, **Dong**, ClaytonOPT	Students
(9) Feb 14	Honey bee aggression	Dobbs(2), **Rittschof**, ZayedOPT	Students
(10) Feb 16	Parasite manipulation of host behavior	Zimmer, **Geffre**, AdamoOPT	Students
(11) Feb 21	Dominance in cichlid fish	Shwartz, **Maruska**	Students
(12) Feb 23	**EXAM 1**		
(13) Feb 28	Epigenetics and maternal care in rodents	Hurley, **Weaver**, ChampagneOPT	Students
(14) Mar 2	Epigenetics and dominance in fish	Skinner, **Lenkov**, Ledon-RettigOPT	Students
SECTION 3: The influence of genes on social behavior			
(15) Mar 7	Genotype-environment interactions	Breed, **Bakermans**, RutterOPT	Students
(16) Mar 9	Gut-brain-behavior axis	TBA	Students
March 11-19: Spring Break			
(17) Mar 21	Monogamy in prairie voles Introduce poster project	Vedantam, **Lim**, DonaldsonOPT	Students
(18) Mar 23	Burrowing behavior in mice	Callaway, **Weber**, HuOPT	Students
(19) Mar 28	Human aggression: amine genes = “mean” genes?	Horgan, **Alia-Klein,** FergusonOPT	Students
(20) Mar 30	Speech in humans and animals and its roots	Yong, **Enard**, FisherOPT	Students
(21) Apr 4	Genes for domestication	Willingham, **vonHolt**, KukekovaOPT	Students

(22) Apr 6	Personality genes	Kraus, **Garamszegi,** Bell(2)OPT	Students
(23) Apr 11	Sexuality in humans	Horton, **Sanders**, Servick	Students
(24) Apr 13	**EXAM 2**		
(25) Apr 18	*Poster Work Day*		
(26) Apr 20	*Poster Work Day*		
(27) Apr 25	*Poster Work Day*		
(28) Apr 27	*Poster Presentations*		
(29) May 2	*Poster Presentations*		

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!

COURSE POLICIES AND ETIQUETTE

1. **Be punctual.** This class is scheduled from 8:00 am to 9:20 am. We will begin promptly and will generally go for the entire 80 minutes. I expect you to be ready to begin at this time, and for you to give me your undivided attention for the entire time.

2. **Be respectful, considerate, 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.

Intolerance, aggression, or any form of denigration is unacceptable. One of the challenges of breakout rooms is that I cannot be present or monitor them all. If, at any time, something occurs in the class that makes you uncomfortable or you need to discuss, I will make time to meet with you ASAP.

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).

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 for additional details. If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact Dr. Dolezal.