

SYLLABUS BIBB 430-601: Neurobiological Basis of Autism, Spring 2020

Instructor: John D. Herrington, Ph.D. **Email:** herringtonj@email.chop.edu **Class time:** Monday and Wednesday, 6:30pm – 8:00pm. **Classroom:** 102 Goddard. **Office hours:** Friday 2-4pm by appointment only. **Office:** Roberts Center for Pediatric Research (CHOP), 2716 South Street (right across South Street Bridge)

Course Description: This course examines neurobiological mechanisms of autism spectrum disorder (ASD). In this seminar style course, we will first examine the clinical phenomenology of ASD. Then the majority of the course focuses on cognitive neuroscience, including functional and structural brain imaging. The cognitive neuroscience literature on ASD will be roughly categorized around major theoretical models and their relation to ASD.

Course Objectives: The central objective of this course is to expose students to the range of cognitive neuroscience research related to ASD that is currently taking place. The course is weighted heavily toward cognitive neuroscience and human brain imaging (as opposed to “bench” science and animal models – though we briefly cover some genetics). In addition to gaining knowledge through lectures and secondary literature, students will develop skills in addressing research questions through critical review of the recent primary literature, including evaluating results of research designs and communicating information orally. Specifically, the following objectives will be achieved through lectures, analysis of scientific literature, class discussions, group presentations, and written assignments.

- 1) Students will gain an understanding of the neurobiological differences in ASD and their relation to cognitive functions.
- 2) Students will understand and be able to present informed opinions on a variety of clinical and basic research papers in the field of ASD.
- 3) Students will be able to analyze and critique journal articles.

CLASS POLICIES

Required Reading: There is no standard text. Class readings are selected from the books, journal articles, and/or popular media perspectives available on topics related to ASDs. This course utilizes the Canvas website for distribution of journal articles and other assigned readings. Please visit <http://upenn.instructure.com> to make sure you can access the course site.

Course Format: In general, Monday’s class will consist of lectures and occasionally quizzes, and Wednesday’s class will consist of student presentations.

Grading: Course grades will be based on class attendance/participation (15%), quizzes/homework (15%), one midterm exam (15%), one oral presentation (20%), and a final paper (35%).

Participation (15%): Please do not be late or leave early, and please do not use cell phones during lectures or discussions. The Neurobiology of Autism is a seminar course designed to familiarize students with current research in the field. Primary journal articles will be read and discussed. As part of your participation grade, you will be asked to post on the Canvas message board one comment or question for every article you are assigned. Additionally, the journal club format necessitates student attendance and participation, which will be monitored. Participation in class discussions is required. Students who prepare for and participate fully in relevant and collaborative ways in class discussions and activities will receive higher grades. To this end, make relevant notes about each of the articles you read, and bring these to class. In particular, take notes on which parts of the articles were interesting and/or thought provoking to you.

Quizzes & Homework (15%): Students will periodically be quizzed on content from assigned readings and class lectures (including student presentations). If you miss class on the day of a quiz, you will get a 0 for that quiz. Approximately 10-15 minutes will be allotted for each quiz, which will typically be 2-4 questions long. Additionally, homework will periodically be assigned. The lowest grade on your quizzes and homework (combined) will be dropped. Any written assignments should be 1.5- spaced, Times New Roman 11 point. *Whenever submitting computer files (Word documents, Powerpoint, etc.), please include your last name somewhere in the file name.*

Midterm Exam (15%): The mid-term exam will consist of short answer questions designed to assess basic knowledge of the concepts discussed in class as well as the ability to apply that knowledge to novel research questions. The student should understand the material in sufficient depth to be able to integrate information from different lectures. The exam will include all lecture and reading materials covered until the day of the exam.

Presentation (20%): During weeks 4-14 there will be student presentations. Each student will give a 25- minute presentation (we'll give two back-to-back on each Wednesday). Presentations will be on the general topic we covered in the lecture from the previous class. I will provide a set of topics and articles you can choose from. We will discuss in class how you can sign up for a presentation. Presentations should focus on the chosen research article and can include information from other sources to help the audience understand the topic/article. PowerPoint format is recommended. Presentations should include: a short introduction to the topic, a discussion of the methods, results and conclusions of the paper, and a general conclusion that should include alternative explanations and future directions and incorporate together the paper's results with other material presented in class. **A one-page outline of your presentation is due 1 week prior to your presentation date.**

Final Paper (35%) DUE MIDNIGHT <DATE TDB>: The final paper (~6-7 1.5-spaced pages, Times New Roman 11 point) will review a topic of interest in autism (already covered in class or novel). Papers must include at least 10 journal articles, of which at least 5 are primary sources. The Journal of Neuroscience reference format (see <http://www.jneurosci.org/content/preparing-manuscript>) should be used in text and for the list of references. Successful papers will reflect students' ability to interpret and synthesize a group of articles, describe these studies in a thorough yet concise manner, and relate the articles to broader concepts in the field. A document

containing a short paragraph describing your proposed topic and including at least 3 references is due in class on 3/27.

It is expected that students will follow the Code of Academic Integrity.

http://www.upenn.edu/academicintegrity/ai_codeofacademicintegrity.html

IMPORTANT NOTE: *I will communicate with the class through Canvas email. Please confirm that the email address listed in Canvas is the email you will be reading on a daily basis.*

The following pages include an outline for the course, and a list of articles. With the exception of the week of 1/15, though questions are due on canvas by noon on the Monday of each corresponding lecture.

Wk	Date (Mon)	Readings (with thought papers due Monday by noon)	Monday Lecture Topic	Wednesday Agenda
1	1/13	N/A	NO CLASS	Class Intro, Intro to ASD
2	1/20	Miller & Herrington ¹ , Constantino & Charman ²	NO CLASS (MLK)	Lecture: ASD Diagnostics
3	1/27	Miller ³ (through page 724), Friedman ⁴ , Herrington et al. ⁵	Neuroanatomy & Neuroimaging 1	Student Presentation Demo
4	2/3	Lindquist ⁶ , Jackson & Bolger ⁷ , Button et al. ⁸	Neuroanatomy & Neuroimaging 2	Student Presentations
5	2/10	Gallagher & Frith ⁹ , Baron-Cohen et al. ¹⁰ , Tager-Flusberg ¹¹	Theory of Mind	Student Presentations
6	2/17	Schultz et al. ¹² , Hadjickani et al. ¹³ , Pelphrey et al. ¹⁴	Faces and Biological Motion	Student Presentations
7	2/24	Solomon et al. ¹⁵ , Gilbert et al. ¹⁶ , Geurts et al. ¹⁷	Executive Function	Midterm
8	3/2	Dapretto et al. ¹⁸ , Gallese & Goldman ¹⁹ , Hickock ²⁰	The Mirror Neuron System	Student Presentations
9	3/16	Baron-Cohen et al. ²¹ , Herrington et al. ²² , Dalton et al. ²³	Anxiety, ASD, and Amygdala	Student Presentations
10	3/23	Kohls et al. ²⁴ , Cascio et al. ²⁵	Repetitive Behavior/ Reward System	Student Presentations
11	3/30	Mevel & Fransson ²⁶ , Yerys et al. ²⁷	Connectomics	Student Presentations
12	4/6	Swanson et al. ²⁸ , Lee et al. ²⁹ , Pang et al. ³⁰	Language	Student Presentations
13	4/13	Happe & Ronald ³¹ , Belmonte & Bourgeron ³² , Parkishak ³³	Genetics	Student Presentations
14	4/20	Guy et al. ³⁴ , Kuiper et al. ³⁵	Peripheral Nervous System Function	Student Presentations
15	4/27	Rogers & Vismara ³⁶ , Maddox et al. ³⁷ , Delorme et al. ³⁸	Treatment	TBD

References

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