

Syllabus

PSYC GU4491: Vantage Point: Social Communication in Biology, Science, and Society

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Fall 2024: Tuesday, 12:10 pm-2 pm, Schermerhorn Room: 200C

I. Bulletin description

PSYCGU4491. Vantage point (seminar). 4 pts

Meeting: **Tuesday 12:10 pm – 2 pm**

Office hours: By appointment Tuesdays 2:10-2:45

Prerequisites: Basic background in neurobiology (for instance PSYC UN1010, UN2450, UN2460, UN2480, or GU4498) and the instructor's permission.

This course will explore the intersection of social biology and science communication, with a focus on how scientific discoveries in parental and social behavior are conveyed to both scientific and public audiences. Using the adult rodent brain as a model, we will examine the neurobiological changes surrounding childbirth and caretaking behavior, investigating how these experiences shape the brain to ensure offspring survival. Additionally, we will discuss the role of caregivers and parents in fostering the social structures necessary for rearing young. Through an interdisciplinary lens, we will analyze how molecular, behavioral, and circuit-level research informs our understanding of social learning and how effectively communicating these findings can influence public perception, policy, and scientific progress.

II. Full course description:

Marriage, friendships, family, scientific collaborations—social relationships are the foundation of society. Among them, the parent-child bond is arguably the most influential. Negative parenting not only disrupts healthy familial and personal development but also carries broader societal consequences, including increased crime rates and economic burdens. Understanding the biological basis of parental behavior is essential for strengthening these relationships and improving outcomes for future generations. Communicating these scientific insights effectively to diverse audiences—from researchers and clinicians to policymakers and the public—is equally critical for translating knowledge into meaningful impact.

In the first part of the course, we will explore the major hormonal and neuromodulatory mechanisms underlying parental behavior, along with the research tools used to study epigenetic modifications in different model systems, including humans. We will then examine how environmental factors, such as prenatal and early-life stressors, can disrupt sensitive periods in the parent-child dynamic, with potential long-term consequences. Finally, we will discuss how these experiences may shape future generations through epigenetic modifications and how scientific communication plays a role in disseminating these findings to inform public discourse, healthcare practices, and policy decisions.

Course topics will be introduced through instructor-led lectures, followed by student-led journal article presentations. Readings will include review articles and primary research papers, drawing from both human and animal studies. In addition to covering foundational literature on parental behavior, the course will emphasize contemporary research and the ways in which these findings are communicated across scientific and public platforms.

To integrate science communication into the course, students will critically engage with research not only as consumers of information but as communicators. The final assignment will challenge students to translate a chosen research paper on parental behavior into a compelling and accessible "News and Views" article and a public-facing science presentation, equipping them with the skills to bridge the gap between complex scientific concepts and broader audiences.

III. Rationale for giving the course:

The primary goal of this course is to for students to gain in-depth understanding of the parental experience as it pertains to the fields of Psychology and Neuroscience. In order to aid in *remembering*, *understanding*, and *applying* the knowledge gained from the readings and lectures, students will be encouraged to ask questions and participate in discussion throughout the lectures and journal article presentations. In-class small-group activities will give students further opportunity to discuss, *apply*, and *analyze* the topics. Through presentation of journal articles and leading class discussion, students will gain a detailed understanding of a topic, *draw connections* to other course topics, *evaluate* the research, and *create* their own framework for presenting it to the class. The final "News and Views" paper on a paper of the student's choice will further enable students to *synthesize* information from multiple sources, critically *evaluate* it as a whole, and *author* their own review of the sub-field.

More broadly, students will learn how to read primary scientific research articles, think critically, synthesize information, and write organized, evaluative papers. These skills are necessary to be informed citizens in our increasingly technological society, and in all chosen post-graduate disciplines and careers.

The Psychology Program Goals that will be advanced in this seminar (see <http://www.columbia.edu/cu/psychology/dept/ugrad/goals.html>) include 1. Knowledge preliminary syllabus base; 2. Research methods; 4. Critical thinking; 5. Values in psychology; 6. Application of psychology; 7. Communication skills—written; 8. Communication skills—oral; 9. Information and technological literacy.

PSYC GU4491 is an advanced seminar, designed particularly for graduate students, for advanced undergraduates who are majoring in Psychology or in Neuroscience and Behavior, and for students participating in the Psychology Postbac Certificate Program. These students will have priority in registration, followed by junior majors followed by non-majors. The seminar will be well suited to students who have completed two or more lecture courses beyond UN1001, such as UN1010 (Mind, Brain, and Behavior), UN2430, W2450 (Behavioral Neuroscience), UN2460 (Drugs and Behavior).

It fulfills the following degree requirements:

- For Psychology Graduate Students, PSYC GU4491 will apply toward the “two seriously graded seminars” requirement of the Master’s degree.
- For the Psychology major or concentration in the College and in G. S. and for the Psychology Postbac Certificate, GU4491 meets the Group II (Psychobiology and Neuroscience) distribution requirement.
- For the Neuroscience and Behavior joint major, GU4491 will fulfill the 5th Psychology requirement: “one advanced psychology seminar from a list approved by the Psychology Department advisor to the program.”
- For non-majors in the College and GS, pending approval of the Committee on Science Instruction, GU4491 can count as one term of the natural science requirement, provided that students have taken the prerequisite psychology courses. Graduate students, and students who are majoring in Psychology or in Neuroscience and Behavior, and postbac certificate students will have priority over students who are taking the course for the science requirement. For this reason, as well as because of the course prerequisites, we anticipate the course will rarely be used for the science requirement.
- For the Psychology Postbac certificate, PSYC GU4491 will fulfill the advanced seminar requirement.

IV: Syllabus

PDFs of all articles will be available through Course Works/Canvas

Supplemental Text: The Neurobiology of Parental Behavior. Numan & Insel

<https://link.springer.com/book/10.1007/b97533>

(available through Columbia Libraries)

Lecture 1.

09/02/2025: Overview of course

Lecture 2.

09/09/2025: What is maternal behavior?

Presenter: Prof Marlin

Assign Didactics

Didactics- Electrophysiology

Changes in the mammalian maternal brain

1. Liu, 2015. *Nature News and Views*

- <https://www.nature.com/articles/nature14386>
2. Marlin et al., 2015. Nature
<https://www.nature.com/articles/nature14402>
3. The Maternal Brain, Scientific American
<https://www.scientificamerican.com/article/the-maternal-brain/>
4. *Supplemental Reading*: The Neurobiology of Parental Behavior. Numan & Insel
 - a. Neurochemistry and Molecular Biology of Maternal Behavior

Lecture 3.

09/16/2025: Liu 2025 Nature

<https://www.nature.com/articles/s41586-025-08617-8>

Lecture 4.

09/23/2025: Weizhe Hong

Presenter: Dr. Rajyashree Sen

1. News & Views: Meyza & Knapska, 2017. eLife
<https://elifesciences.org/articles/28514>
2. Main Article: Rickenbacher et al., 2017. eLife
<https://elifesciences.org/articles/24080>
3. Optional Student Handout: "Analyzing Research on Maternal Behaviors – How to Read a Research Article" This document serves as a study aid for students who may not have an extensive background in neuroscience. It is provided to help facilitate a deeper understanding of the material discussed in class but is not required for all students. (see "Files")
4. *Supplemental Reading*: Peer Review of Rickenbacher et al., 2017, eLife (see "Files")
5. *Supplemental Reading*: Dulac et al, Science 2014.
<https://www.science.org/doi/10.1126/science.1253291>

Lecture 5.

09/30/2025: What can parents teach for generations? Transgenerational Epigenetic Inheritance in males

Didactics:

Presenter: Professor Marlin

1. Dias and Ressler, 2014. Nature Neuroscience.
<https://www.nature.com/articles/nn.3594>
2. "Can we really inherit Trauma?" 2018. New York Times
<https://www.nytimes.com/2018/12/10/health/mind-epigenetics-genes.html>

3. Supplemental Reading:
Van Steenwyk, 2018. Environmental Epigenetics
<https://pubmed.ncbi.nlm.nih.gov/30349741/>

Dads Diet

Lecture 6.

10/07/2025: Society for Neuroscience Conference Week:
Due 10/14/2025- trigger warning

1. Watch movie “Three Identical Strangers”
<https://www.imdb.com/title/tt7664504/>
2. <https://www.cnn.com/2019/01/09/health/unethical-experiments/index.html>
3. <https://www.statnews.com/2019/02/07/three-identical-strangers-address-ethical-violations/>

Assignment 1: Design an ethical experiment to examine the contributions of nature vs nurture in parallel animal and human models. Include mock figure and conclusion schematic. Answer questions on separate page. Specific Aims Page: *1 pages max. Single space. Size 12 font. Figure separate.*

Study Design:

1. What were the three aims of Neubauer’s experiment?
2. What were the three variables?
3. What were the ethical and experimental pitfalls?
4. Design an ethically sound experiment to address the “Three Identical Strangers” in three clearly described experimental steps. Non-human studies and figures of predicted model and data are encouraged.

Supplementary Reading

How to write Specific Aims: <https://www.biosciencewriters.com/NIH-Grant-Applications-The-Anatomy-of-a-Specific-Aims-Page.aspx>

Lecture 7.

10/14/2025: 4 DAUGHTERS? TRIGGER WARNING; Gorla choi inflammation changes stuff

<https://time.com/6290594/andrew-hubman-lab-podcast-interview/>

Presenter: Dr. Rajyashree Sen

1. News and Views: Belluck, 2011. New York Times
<https://www.nytimes.com/2011/09/13/health/research/13testosterone.html> (see "Files" for pdf)
2. Main Article: Gettler et al, 2011. PNAS
<https://www.pnas.org/doi/abs/10.1073/pnas.1105403108>
3. Optional Student Handout: "Analyzing a research article on paternal behaviors". This document serves as a study aid for students who may not have an extensive background in neuroscience. (see "Files")
4. *Supplemental Reading*: Rilling, 2020. Aeon
<https://aeon.co/essays/how-raising-children-can-change-a-fathers-brain>

Lecture 8.

10/21/2025: Dad Brain: How a father's brain changes after mating (2/2)

Presenter: Dr. Rajyashree Sen

1. News & Views: Rodriguez, 2014. Nature
<https://www.nature.com/articles/509294a>
2. Main Article: Wu et al., 2014. Nature
<https://pubmed.ncbi.nlm.nih.gov/24828191/>
3. *Supplemental Reading*: Interview with Dr. Catherine Dulac. "Catherine Dulac: the social brain has instinct, not gender"
<https://medium.com/neurographic/catherine-dulac-the-social-brain-has-instinct-not-gender-8f2a6af0a4f>
4. *Supplemental Reading*: The Neurobiology of Parental Behavior. Numan & Insel - Chapter 7 – Paternal Behavior (see "Files")

Lecture 9

10/28/2025: What can parents teach for generations?

Didactics:

Presenter: Prof. Marlin & [Clara Liff](#)

1. Liff et al., eLife, 2024
<https://elifesciences.org/reviewed-preprints/92882>
2. Liff et al., Biorxiv, 2023
(Same paper, however supplemental figures can be found here)
<https://www.biorxiv.org/content/10.1101/2023.02.23.529692v2>
3. "Inherited memories: Too good to be true?"
<https://www.discovermagazine.com/mind/inherited-memories-too-good-to-be-true>
4. "When results are too good to be true"
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4196601/>

11/04/2025: Academic holiday, no class

11/07/2024: OPEN

Lecture 10.

11/11/2025: Columbia Parental Brain (CPB) Class Chooses accessible science pitch based on Taconic Parental Brain (TPB) student's proposals

Due 11/14/24: 9:00 am Reviewer comments for Taconic: significance, innovation, approach, social implications. Send to theparentalbrain@gmail.com

Pamphlet Pitch Deck: (Draft due 11/18/2025 for in class work)
2 continuous pages (see PowerPoint pdf in email) consisting of

1. Background
2. **Significance**
3. Approach & Innovations
4. **Social Impact**

The pamphlet pitch deck will be presented to Taconic Parental Brain by your Taconic Student Partner and graded on accessibility, clarity and utility.

Please include 2-3 reference papers

Lecture 11.

11/18/2025: In Class Work: Finalize Accessible Science Presentations

(Final Draft Due 21th, 9:00 am. No exceptions. It will be graded by TBP on 11/21 for accessible science)

11/21 TPB- 1) Vote for best accessible pamphlet

Lecture 12.

11/25/2025: Zuckerman Lab Tour: Marlin Lab, Abdus-Saboor Lab, Axel Lab (Dr. Sen)

Due: News & Views topic choice. Please include justification for choosing paper.

Lecture 13.

12/02/2025: Presentation of Accessible Science Pitch.

Due in class: Class evaluation

Finals Week.

12/09/2025: Academic Finals Week. No Class

Final Due.

12/16/2025: News & Views paper due: "News and Views on Parental Behavior"

Paper from 2023-2024" Include strengths & weaknesses.
2 pages max. Single space. Size 12 font. 1 summary schematic figure.

Spotlight on your Taconic partner's project. (200 page)

V. Course requirements and grading:

Grades:

25% Participation

25% 3 Identical Strangers

25% Individual Assignment: "News and Views on Parental Behavior Paper from 2021-2022"

25% Accessible Science Presentation Pamphlet

Participation (25%): All students are expected to participate in weekly paper discussions, virtually or in-person. If class is over Zoom, I request that students keep their camera on to foster a more collaborative discussion and simulate in-person class. To effectively participate, it is expected that all students read the assigned articles in advance of the class. Papers will be assigned to a student to present. Fellow students are expected to participate in the journal club conversation. Each student (non-presenting) should come prepared with at least one question for the original research article(s) being presented. If medical or other emergencies prevent students from attending a class, an email to Dr. Marlin is required *in advance of class* to explain the absence.

Three Identical Strangers (25%): Design an ethical experiment to examine the contributions of nature vs nurture in parallel animal and human models. Include mock figure and conclusion schematic. Answer questions on separate page. Specific Aims Page: 1 pages max. Single space. Size 12 font. Figure separate.

25% Accessible Science Presentation: All student are expecting to present a 5-7 minute accessible science presentation. Creativity encouraged!

News & Views paper (25%): All students are required to select a recent paper (2021-2022) relevant to parental behavior for a final 2-3 page (single spaced) "News and Views" piece. Students will submit the topic/title and short rationale for its selection to Dr. Marlin for approval/feedback.

VI: Other

Academic honesty

As members of this academic community, we are responsible for maintaining the highest level of personal and academic integrity: "[E]ach one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity.... The exchange of ideas relies upon a mutual trust that sources, opinions, facts, and insights will be properly noted and carefully credited. In practical terms, this means that, as students, you must be responsible for the full citations of others' ideas in all of your research papers and projects... [and] you must always submit your own work and not that of another student, scholar, or internet agent" (from

the Columbia University Faculty Statement on Academic Integrity. All allegations of academic misconduct will be immediately referred to the office of Student Conduct and Community Standards.

<https://www.college.columbia.edu/faculty/resourcesforinstructors/academicintegrity/statement>).

Plagiarism – whether intentional or inadvertent – is a serious violation of academic integrity. If you have any questions about what constitutes plagiarism and/or how to properly cite sources, please come to me. I am more than happy to help. Similarly, if you put yourself in a situation, e.g., starting an assignment very late, in which you think your best option might be to cut some corners, see me. It is far better to have a few points deducted from a paper than to compromise your academic integrity and potentially put your academic standing in jeopardy.

Disability Services

Students with special needs who may require classroom/test accommodations should make an appointment with me before or during the first week of class. You should also contact the Office of Disability Services (ODS) in Lerner Hall before the start of the course to register for these accommodations. The procedures for registering with ODS can be found at <http://health.columbia.edu/services/ods> or by calling (212) 854-2388.

Writing Center

I encourage you to visit the Writing Center, where you can receive free individual consultations on your writing at any stage in the writing process, including brainstorming. Writing consultants work with all members of the Columbia community on any academic or nonacademic writing. You can make an appointment and view drop in hours on their website [www.college.columbia.edu/core/uwp/writing-center].

Notes:

Community to class. Multidirectional engagement