

NEUROSCIENCES

Courses offered by the Neurosciences Program are listed under the subject code NEPR on the (<http://explorecourses.stanford.edu/CourseSearch/search/?view=catalog&catalog=&page=0&q=NEPR&filter-catalognumber-NEPR=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search/?view=catalog&catalog=&page=0&q=NEPR&filter-catalognumber-NEPR=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search/?view=catalog&catalog=&page=0&q=NEPR&filter-catalognumber-NEPR=on>).

Master of Science in Neurosciences

The Neurosciences IDP does not offer a terminal or coterminal M.S. degree. An M.S. degree may only be pursued in combination with a doctoral degree from another department within the University or one of the University's professional schools.

Students interested in pursuing the M.S. must submit an unofficial Stanford transcript and a written scientific justification for adding the M.S. degree to the Neurosciences program administrator no later than February 1, 2021.

Requirements

- Completion of a minimum of 45 unduplicated units of course work, including the Neurosciences courses listed below or approved substitutes. Courses used for the Neurosciences M.S. may not be double-counted to meet the requirements of a Ph.D. degree.
- Course requirements must be completed before the student applies for terminal graduate registration (TGR) Status.
- In addition to required course work, students pursuing the M.S. in Neurosciences must sit for a qualifying exam that includes a written proposal for a thesis project and oral examination.

| | Units |
|---|-------|
| Required Courses | |
| All courses used for the Neurosciences M.S. must be taken for a letter grade and passed with a 3.0 (B) or better. | |
| NEPR 202 | 2 |
| NEPR 203 | 2 |
| NEPR 204 | 2 |
| NEPR 205 | 2 |
| NEPR 207 | 2 |
| NEPR 208 | 2 |
| NEPR 213 | 2 |
| NEPR/COMP MED 201 | 2 |
| NEPR 212 | 1 |
| NEPR 280 | 1-2 |
| Stanford Intensive Neurosciences (SIN) Boot Camp | 9 |
| Graduate Statistics Course (STATS 216 Introduction to Statistical Learning or similar; pre-approval is required) | 3 |
| Two (2) Advanced Level Neuroscience Courses (pre-approval is required) | 6 |

Students enrolled starting Autumn 2016 through Autumn 2018:

Required Courses

| | | |
|---|---|-----|
| All courses used for the Neurosciences M.S. must be taken for a letter grade and passed with a 3.0 (B) or better. | | |
| NEPR 202 | Neurosciences Development Core | 2 |
| NEPR 203 | Neuroscience Systems Core | 2 |
| NEPR 204 | Neuroscience Molecular Core | 2 |
| NEPR 205 | Neurosciences Anatomy Core | 2 |
| NEPR 207 | Neurosciences Cognitive Core | 2 |
| NEPR 208 | Neuroscience Computational Core | 2 |
| NEPR 213 | Neurogenetics Core | 2 |
| NEPR/COMP MED 201 | Neuro-Cellular Core | 2 |
| NEPR 212 | Responsible Conduct of Neuroscience Research | 1 |
| NEPR 280 | Neuroscience Journal Club and Professional Development Series (A minimum of 3 quarters is required) | 1-2 |
| Stanford Intensive Neurosciences (SIN) Boot Camp | | 9 |
| Graduate Statistics Course (STATS 216 Introduction to Statistical Learning or similar; pre-approval is required) | | 3 |
| Three (3) Advanced Level Neuroscience Courses (pre-approval is required) | | 9 |

Doctor of Philosophy in Neurosciences

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees/>)" section of this bulletin.

The interdepartmental Neurosciences Program offers instruction and research opportunities leading to a Ph.D. in Neurosciences. The requirements for a Ph.D. degree follow those of the University and in addition are tailored to fit the background and interests of the student. Qualified applicants should, where possible, apply for the predoctoral fellowships in open competition, especially those from the National Science Foundation.

Admissions

Applications are made through the Graduate Admissions (<http://gradadmissions.stanford.edu>) website and are due by Tuesday, December 1, 2020. GRE is not required. Applicants should familiarize themselves with the research interests of the faculty and indicate their preferences clearly on the application form. Applicants selected for an interview are notified in early January. Admitted students are notified from early March through mid-April. Accepted students receive an award covering tuition, a basic health plan, and a living stipend.

Requirements

Since students enter with differing backgrounds, and the labs in which they may elect to work cover several different disciplines, the specific program for each student is developed individually with an advisory committee. Students rotate through at least three labs during the first year while taking core courses. Passing of a comprehensive qualifying examination given by the student's advisory committee is required for admission to Ph.D. candidacy; the qualifying exam must be taken by the end of the second year. Students are required to prepare a Ph.D. dissertation that is the result of independent investigation accomplished while enrolled in the program that contributes to knowledge in an area of neuroscience, and to defend the dissertation in a University Oral Examination that includes a public seminar. Students must also publish a first-author paper in a peer-reviewed major scientific journal on the defended work and submit a written dissertation prior to completing the Ph.D. degree.

Medical students may participate in this program provided they meet the prerequisites and satisfy all the requirements of the graduate program as listed above. The timing of the program may be adjusted in consultation with the advisory committee to fit their special circumstances.

| Required Courses | | Units |
|--|---|--------------|
| Required courses must be taken for a letter grade and passed with a 3.0 (B) or better | | |
| NEPR 202 | Neurosciences Development Core | 2 |
| NEPR 203 | Neuroscience Systems Core | 2 |
| NEPR 204 | Neuroscience Molecular Core | 2 |
| NEPR 205 | Neurosciences Anatomy Core | 2 |
| NEPR 207 | Neurosciences Cognitive Core | 2 |
| NEPR 208 | Neuroscience Computational Core | 2 |
| NEPR 213 | Neurogenetics Core | 2 |
| NEPR/COMP MED 201 | Neuro-Cellular Core | 2 |
| NEPR 212 | Responsible Conduct of Neuroscience Research | 1 |
| NEPR 280 | Neuroscience Journal Club and Professional Development Series (A total of four (4) quarters are required) | 1-2 |
| Stanford Intensive Neurosciences (SIN) Boot Camp | | 10 |
| Statistics (STATS 216 Introduction to Statistical Learning or similar; pre-approval is required) | | 3 |
| Two (2) Advanced Level Neuroscience Courses (pre-approval is required) | | 6 |

Students Enrolled Starting Autumn 2015 through Autumn 2018

| Required Courses | | Units |
|--|--|--------------|
| Required courses must be taken for a letter grade and passed with a 3.0 (B) or better | | |
| NEPR 202 | Neurosciences Development Core | 2 |
| NEPR 203 | Neuroscience Systems Core | 2 |
| NEPR 204 | Neuroscience Molecular Core | 2 |
| NEPR 205 | Neurosciences Anatomy Core | 2 |
| NEPR 207 | Neurosciences Cognitive Core | 2 |
| NEPR 208 | Neuroscience Computational Core | 2 |
| NEPR 213 | Neurogenetics Core | 2 |
| NEPR/COMP MED 201 | Neuro-Cellular Core | 2 |
| NEPR 212 | Responsible Conduct of Neuroscience Research | 1 |
| NEPR 280 | Neuroscience Journal Club and Professional Development Series (A total of nine (9) quarters are required for students who entered the program in 2015 and 2016; Eight (8) quarters required for students who entered in 2017; Seven (7) quarters for students who entered in 2018) | 1-2 |
| Stanford Intensive Neurosciences (SIN) Boot Camp | | 10 |
| Graduate Statistics Course (STATS 216 Introduction to Statistical Learning or similar; pre-approval is required) | | 3 |
| Three (3) Advanced Level Neuroscience Courses (pre-approval is required) | | 9 |

Students Enrolled Starting Autumn 2014 and Earlier

- Introduction to Neurobiology (NBIO 206 The Nervous System or equivalent).

- Nine (9) quarters of NBIO 300/MCP 300 /NEPR 280 Neuroscience Journal Club and Professional Development Series
- Five (5) advanced level courses within - and at least one course in each of - the following three areas:

1. Systems, Computational, Cognitive and Behavioral Neuroscience. Courses at this level focus on the computations performed by neural circuits and the role such computations play in behavior, perceptions, and plasticity. Students can expect to learn how neurons: Organize circuits into larger functional units; Represent and transform information; Produce myriad movement; and Subserve higher-level processing related to perception, reasoning and learning. Predominant methods in this area include modeling single cells and circuits, design of behavioral paradigms, and statistical analysis of behavioral and electrophysiological data.

Courses that fulfilled this requirement include:

- COMP MED 207 Vertebrate Brain Evolution
- NBIO 258 Information and Signaling Mechanisms in Neurons and Circuits
- NENS 220 Computational Neuroscience
- PSYCH 202 Cognitive Neuroscience
- PSYCH 204A Human Neuroimaging Methods
- PSYCH 232 Brain and Decision
- PSYCH 251 Experimental Methods
- PSYCH 266 Current Debates in Learning and Memory
- NBIO 218 Neural Basis of Behavior
- NBIO 220 Machine Learning Methods for Neural Data Analysis
- NENS 205

2. Cellular, Molecular and Developmental Neuroscience. Courses in this area address fundamental mechanisms that enable cells of the nervous system to develop, function in adulthood, change during learning and memory, and/or malfunction in disease states. Students can expect to learn core concepts in: Cell-cell communication; Intracellular signal transduction; Transcriptional and translational control; mRNA and protein trafficking; Membrane biophysics; and Cell motility. Dominant methods include molecular biology, genetics, cell biology, electrophysiology, and subcellular or multicellular imaging.

Courses offered that fulfilled this requirement include:

- BIO 214 Advanced Cell Biology/BIOC 224 Advanced Cell Biology/MCP 221 Advanced Cell Biology
- BIO 254 Molecular and Cellular Neurobiology
- BIOS 200 Foundations in Experimental Biology
- GENE 221 Current Issues in Aging
- NBIO 254 Molecular and Cellular Neurobiology
- NBIO 258 Information and Signaling Mechanisms in Neurons and Circuits
- PSYCH 204B Computational Neuroimaging
- MCP 216 Genetic Analysis of Behavior (NBIO 216)
- NBIO 216 Genetic Analysis of Behavior (MCP 216)
- BIO 217
- COMP MED 215
- MCP 256 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology/MCP 156 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology
- NBIO 218 Neural Basis of Behavior

- NBIO 220 Machine Learning Methods for Neural Data Analysis

3. Translational Neuroscience. Courses in this area address fundamental concepts in studying disorders of the human brain and the peripheral nervous system and their treatment. Students can expect to learn about basic themes in: Pathophysiological mechanisms; Modeling of human diseases; Approaches to designing diagnoses and treatments; Implementing diagnoses and treatments. The courses highlight studies of human diseases that use genetics, molecular biology, psychological testing, and functional imaging.

Courses offered that fulfilled this requirement include:

- BIO 267 Molecular Mechanisms of Neurodegenerative Disease / NENS 267 Molecular Mechanisms of Neurodegenerative Disease
- GENE 210 Genomics and Personalized Medicine / DBIO 220 Genomics and Personalized Medicine
- CSB 278 Systems Biology
- IMMUNOL 285 Brain and the Immune System
- NENS 205

Courses from outside the Neuroscience core listed below that satisfied the remaining elective requirements include:

- BIO 217
- BIO 222 Exploring Neural Circuits
- BIO 230 Molecular and Cellular Immunology
- BIO 245 Ecology and Evolution of Animal Behavior
- BIO 258 Developmental Neurobiology
- BIOC 224 Advanced Cell Biology/BIO 214 Advanced Cell Biology/MCP 221 Advanced Cell Biology
- BIOE 291 Principles and Practice of Optogenetics for Optical Control of Biological Tissues
- BIOE 332
- BIOS 200 Foundations in Experimental Biology
- BIOS 210 Axonal Transport and Neurodegenerative Diseases
- BIOS 241 Dissecting algorithms for RNA Sequencing
- COMPMED 207 Vertebrate Brain Evolution
- COMPMED 215
- CS 221 Artificial Intelligence: Principles and Techniques
- CS 229 Machine Learning
- CS 379 Interdisciplinary Topics
- CSB 210 Cell Signaling
- DBIO 201 Cells and Signaling in Regenerative Medicine
- DBIO 210 Developmental Biology
- EE 263 Introduction to Linear Dynamical Systems/CME 263 Introduction to Linear Dynamical Systems
- IMMUNOL 285 Brain and the Immune System
- MCP 221 Advanced Cell Biology/BIO 214 Advanced Cell Biology/BIOC 224 Advanced Cell Biology
- MCP 222 Imaging: Biological Light Microscopy
- MUSIC 257 Neuroplasticity and Musical Gaming
- NENS 204 Stroke Seminar
- NENS 267 Molecular Mechanisms of Neurodegenerative Disease/BIO 267 Molecular Mechanisms of Neurodegenerative Disease

- PSYCH 204 Computation and Cognition: The Probabilistic Approach
- RAD 227 Functional MRI Methods/BIOPHYS 227 Functional MRI Methods

Other courses not listed here can satisfy program requirements with prior approval of the Program Director.

The School of Law and the Neurosciences IDP offer a joint program leading to a J.D. degree combined with a Ph.D. in Neurosciences. The joint degree program provides an opportunity for students to develop expertise in both fields, and, in some cases, to prepare themselves intensively for careers in areas relating to both neuroscience and law.

Students interested in the joint degree program must apply and gain entrance separately to the School of Law and the Neurosciences IDP and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Neurosciences IDP may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Neurosciences IDP. Faculty advisers from each academic unit will participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school and must be enrolled full time in the Neurosciences IDP for the first two years of that program, or until the student has passed the Qualifying Exam. At all other times, enrollment may be in the School of Medicine or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the Ph.D. degrees as specified in the *Stanford Bulletin* or elsewhere.

The Law School shall approve courses from the Neurosciences IDP that may count toward the J.D. degree, and the Neurosciences IDP shall approve courses from the Law School that may count toward the Ph.D. degree in Neurosciences. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The total minimum number of university residency units required for both degrees is 190. No more than 54 units of approved courses may be counted toward both degrees.

COVID-19 Policies

On July 30, the Academic Senate adopted grading policies effective for all undergraduate and graduate programs, excepting the professional Graduate School of Business, School of Law, and the School of Medicine M.D. Program. For a complete list of those and other academic policies relating to the pandemic, see the "COVID-19 and Academic Continuity (<http://exploreddegrees.stanford.edu/covid-19-policy-changes/#tempdepttemplatetabtext>)" section of this bulletin.

The Senate decided that all undergraduate and graduate courses offered for a letter grade must also offer students the option of taking the course for a "credit" or "no credit" grade and recommended that deans, departments, and programs consider adopting local policies to count courses taken for a "credit" or "satisfactory" grade toward the fulfillment of degree-program requirements and/or alter program requirements as appropriate.

Graduate Degree Requirements

Grading

The interdepartmental Neurosciences Program counts all courses taken in academic year 2020-21 with a grade of 'CR' (credit) or 'S' (satisfactory) towards satisfaction of graduate degree requirements that otherwise require a letter grade provided that the instructor affirms that the work was done at a 'B' or better level.

Graduate Advising Expectations

The Neurosciences Program is committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the adviser and the advisee.

Graduate students are active contributors to the advising relationship. They should proactively seek academic and professional guidance and take responsibility for informing themselves of policies and degree requirements for the Neurosciences Ph.D. program.

All first year Neurosciences graduate students have an assigned first year adviser. This faculty member provides guidance on lab rotations, coursework, thesis lab selection, and reminds students of their academic and administrative responsibilities.

Graduate students are expected to select a thesis adviser by the end of the first year in the program and are encouraged to work collaboratively with their adviser to establish a dissertation project and form a Dissertation Reading Committee. Advancement to doctoral candidacy and the formation of a Dissertation Reading Committee is expected to occur by the end of the second year of the program.

Thesis advisers are expected to meet with graduate students at least once per year and help develop the student's Individual Development Plan (IDP). Additionally, advisers and students should meet on a regular basis throughout the year to discuss the student's professional development in key areas such as selecting courses, designing and conducting research, navigating policies and degree requirements, and exploring academic opportunities and professional pathways. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the adviser and the advisee are expected to maintain professionalism and integrity.

Graduate students are expected to meet with their Dissertation Reading Committee at least annually in the third and fourth year of training, and at least twice annually starting in the fifth year of training.

Academic progress and student completion of program requirements and milestones are monitored by the program director and staff, and may be discussed by faculty at meetings devoted to assessing graduate student progress. A detailed description of the program's requirements, milestones, and advising expectations are listed in the Neurosciences Ph.D. Student Handbook, found on the program website (<http://med.stanford.edu/neurogradprogram.html>).

For a statement of University policy on graduate advising, see the "Graduate Advising (<http://exploreddegrees.stanford.edu/graduatedegrees/#advisingandcredentialstext>)" section of this bulletin, the Stanford Graduate Academic Policies and Procedures (GAP) (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-3/subchapter-3/page-3-3-1/>) handbook. Additional guidance and resources are available from The Office of the Vice Provost for Graduate Education (<https://vpge.stanford.edu/academic-guidance/advising-mentoring/>).

Director of Graduate Studies: Nirao Shah

Anesthesia: Bruce MacIver

Applied Physics: Surya Ganguli

Biochemistry: Suzanne Pfeffer

Bioengineering: Kwabena Boahen, Karl Deisseroth

Biology: Xiaoke Chen, Russ Fernald, H. Craig Heller, Liqun Luo, Susan McConnell, Mark Schnitzer, Carla Shatz, Kang Shen, Marc Tessier-Lavigne

Chemical and Systems Biology: Joanna Wysocka

Comparative Medicine: Paul Buckmaster, Shaul Hestrin

Developmental Biology: Seung Kim

Education: Candace Thille

Electrical Engineering: Krishna Shenoy

Genetics: Michael Bassik, Anne Brunet, Aaron Gitler

Molecular and Cellular Physiology: Axel Brunger, Miriam Goodman, Daniel Madison, Merritt Maduke, Thomas Sudhof

Neurobiology: Stephen Baccus, Thomas Clandinin, Shaul Druckmann, Lisa Giocomo, Keren Haroush, Michael Lin, Tirin Moore, William Newsome, Jennifer Raymond

Neurology and Neurological Sciences: Katrin Andreasson, Marion Buckwalter, Michael Greicius, Ting-Ting Huang, John Huguenard, Michelle Monje-Deisseroth, Josef Parvizi, David Prince, Thomas Rando, Richard Reimer, Tony Wyss-Coray, Yanmin Yang

Neurosurgery: Lu Chen, E.J. Chichilnisky, Jun Ding, Julia Kaltschmidt, Paul Nuyujukian, Theo Palmer, Giles Plant, Ivan Soltesz, Gary Steinberg, Suzanne Tharin, Xinnan Wang, Bradley Zuchero

Ophthalmology: Jeffrey Goldberg, Yang Hu, Y. Joyce Liao, Sui Wang

Otolaryngology: Alan Cheng, Nicolas Grillet, Lloyd Minor, Anthony Ricci

Pathology: Isabella Graef, Bingwei Lu, Marius Wernig

Pediatrics (Systems Medicine): Dennis Wall

Psychiatry and Behavioral Sciences: Luis de Lecea, Amit Etkin, Robert Malenka, Vinod Menon, Karen Parker, Sergiu Pasca, Allan Reiss, Nirao Shah, Leanne Williams

Psychology: Justin Gardner, Ian Gotlib, Kalanit Grill-Spector, Brian Knutson, James McClelland, Anthony Norcia, Russell Poldrack, Anthony Wagner, Brian Wandell, Daniel Yamins

Radiology: Raag Airan, Jennifer McNab

Courses

NEPR 201. Neuro-Cellular Core. 2 Units.

Focuses on fundamental aspects of cellular neurophysiology. Topics include exploration of electrophysiological properties of neurons, synaptic structure and function and synaptic plasticity. The course consists of didactic lectures and student-led discussions of classical papers. Incorporates simulation program Neuron. Enrollment restricted to students enrolled in Neurosciences Graduate Program.

NEPR 202. Neurosciences Development Core. 2 Units.

For first-year Neurosciences graduate students; open to other graduate students as space permits with preference given to Neuroscience students. Introductory course covers all aspects of nervous system development, from cell fate determination, axon guidance, synapse development and critical periods to neurodevelopmental diseases. The goal is to understand what kinds of questions are asked in developmental neurobiology and how researchers use different tools and model systems to answer these questions. Overview of neural development, experimental approaches, and model organisms; signaling pathways regulating neural development; neural stem cell and neurogenesis during embryonic and adult life.

NEPR 203. Neuroscience Systems Core. 2 Units.

Open to first-year neuroscience graduate students and to other qualified students by permission of the instructors. Introduction to encoding and processing of information by neural systems. Focus is on sensory and motor circuits.

NEPR 204. Neuroscience Molecular Core. 2 Units.

For first-year Neurosciences graduate students; open to other graduate students as space permits with preference given to Neuroscience students. Course provides an overview of molecular neuroscience by focusing on a few selected key topics, such as molecular neuroscience methods, voltage-gated ion channels, synaptic transmission, neuronal gene expression, and signal transduction pathways.

NEPR 205. Neurosciences Anatomy Core. 2 Units.

For first-year Neuroscience graduate students; open to other graduate students as space permits with preference given to Neuroscience students. Focus is on the anatomical organization underlying the principal functions of the nervous system, including sensation, perception, emotions, autonomic responses and movement. Students also learn modern techniques for studying neuroanatomical circuits, in the peripheral nervous system, spinal cord, and brain, and using different model systems.

NEPR 207. Neurosciences Cognitive Core. 2 Units.

For first-year Neurosciences graduate students; open to other graduate students as space permits with preference given to Neuroscience students. Focus is on several domains of cognitive function where cognitive neuroscience approaches have been successfully applied across many different model systems from mice to monkeys to humans: attention, decision-making, and memory.

NEPR 208. Neuroscience Computational Core. 2 Units.

For first-year Neurosciences graduate students; open to other graduate students as space permits with preference given to Neurosciences students. Introduces students to computational and theoretical methods in neuroscience. Emphasis on what questions are important, and how those questions can be answered with quantitative methods. Topics range from cellular/molecular to cognitive, and emphasizes similarity and differences of methods across neural scales.

NEPR 212. Responsible Conduct of Neuroscience Research. 1 Unit.

Enrollment restricted to Neurosciences IDP students. Responsible conduct of research and ethics as it relates to research in neuroscience. Topics are in accord with NIH guidelines. Each topic has guest lecturers with specific insight into the particular topic.

NEPR 212R. Responsible Conduct of Neuroscience Research Refresher Course. 1 Unit.

For Neurosciences PhD students. Responsible conduct of research and ethics as it relates to research in neuroscience. Topics are in accord with NIH guidelines and to meet additional training requirements for predoctoral trainees.

NEPR 213. Neurogenetics Core. 2 Units.

For first-year Neurosciences graduate students; open to other graduate students as space permits with preference given to Neurosciences students. Intensive introduction to genetics. Classical and modern genetics with an emphasis on their application to neurosciences research. Topics include: model organisms, genetic screens, genome editing, genetically-encoded tools, GWAS, next-generation sequencing, epigenetics, genetic interactions, human genetics, and neurological disease genetics. Interactive class with student-led discussions, presentations, and group work, including next-generation sequencing workshops and data analysis tutorials. Limited enrollment.

NEPR 224. Mapping the human visual system. 1-3 Unit.

The human visual system has more than two dozen topographic maps of the visual field. This course will explain principles of topographic maps in the visual system, mapping of visual areas using retinotopy, as well as modeling spatial and temporal computations in the visual system using population receptive fields. The class will combine reading and discussing papers that discovered these maps and computational principles with a lab component in which the students will analyze fMRI datasets that are used to map visual cortex.

Same as: PSYCH 224

NEPR 280. Neuroscience Journal Club and Professional Development Series. 1-2 Unit.

Neuroscience Journal Club and Professional Development Series New description: Required of Neurosciences Ph.D. students in Autumn, Winter, and Spring of the first three years of study. Recent papers in neuroscience literature presented by graduate student.

NEPR 299. Directed Reading in Neurosciences. 1-18 Unit.

Prerequisite: consent of instructor.

NEPR 399. Graduate Research. 1-18 Unit.

Student Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

NEPR 801. TGR Project. 0 Units.

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NEPR 802. TGR Dissertation. 0 Units.

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