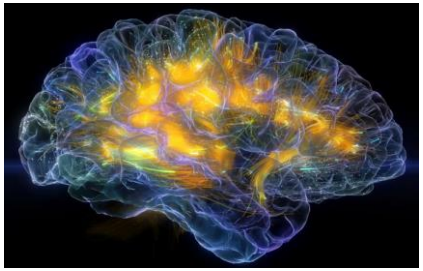
Neuroscience Major

Professor Frank Durgin
fdurgin1@swarthmore.edu

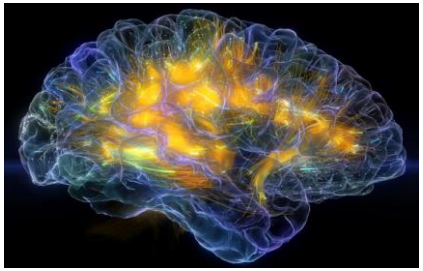


Why study Neuroscience?

- Inherent interest in the relationships between body, brain & behavior
- Considering medical school or graduate studies in a related field
- Can’t decide between Psychology and Biology?
- … a fundamental curiosity about the mysteries of the brain

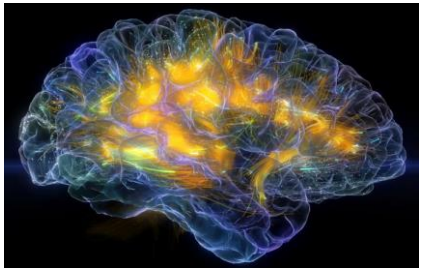
Now, as humans, we can identify galaxies light years away. We can study particles smaller than an atom, but we still haven't unlocked the mystery of the three pounds of matter that sits between our ears. But today, scientists possess the capability to study individual neurons and figure out the main functions of certain areas of the brain. But a human brain contains almost 100 billion neurons, making trillions of connections. So Dr. Collins says it's like listening to the strings section and trying to figure out what the whole orchestra sounds like.

- President Barack Obama on the BRAIN Initiative



What can you do with Neuroscience?

- Medical School
  - University of Chicago
  - U Penn
  - NYU
  - Stanford
- Graduate School in Neuroscience
  - U Penn
  - Princeton
  - Boston University
  - Stony Brook
  - … many, many others!
- Positions that require analytical problem solving skills and natural curiosity!

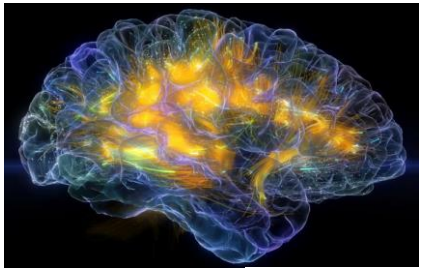


General Info

- Courses in multiple departments:
  - Psychology
  - Biology
  - CS, Math/Stat, Engineering
- Two Options:
  - Course Major
  - Honors Major

- A few example "tracks":
  - Bio-heavy
  - Psych-heavy
  - Pretty equal
- But you can create your own path (*and I'll help!*)

… prereqs come from multiple departments on campus



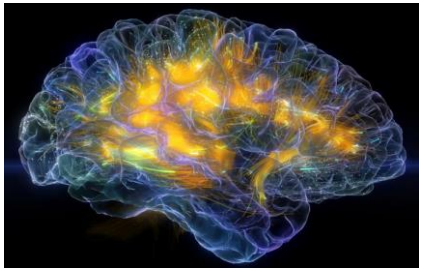
Pre-requisites

Biology	BIOL 001: Cellular and Molecular Biology
	BIOL 002: Organismal and Population Biology
Chemistry	CHEM 010: General Chemistry
	CHEM 022: Organic Chemistry I
Math/Stat	MATH 015: Elementary Single-Variable Calculus
	STAT 011: Statistical Methods
Psychology	PSYC 001: Introduction to Psychology
	PSYC 025: Research Design and Analysis

All prereqs must be completed (or placed out of) before being *admitted* to the Neuroscience Major, but **you *can and should* still apply before your prerequisites are complete. You will simply be deferred** until they are complete, but you will have a neuroscience advisor.

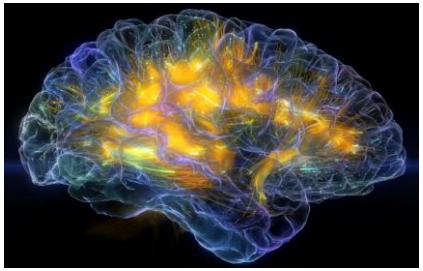
NOTE about Prereqs… most Neuroscience Majors have NOT completed all of their prerequisites before applying for the major.

THIS IS EXPECTED and normal.
We will still assign you an advisor in Neuroscience. We simply ***defer*** your application until you have completed all prereqs. This has ***no bearing whatsoever*** on your standing in the major. You will not miss out on opportunities!



In addition to Prereqs…

- At least eight (8) elective credits including
  - Five (5) group A electives
    - Including from both biology and psychology
    - Including at least one seminar
  - the Comprehensive Requirement (1-2 credits)
    - a practicum course with final paper
    - a thesis project related to neuroscience
  - remaining credit(s) can be group A or group B

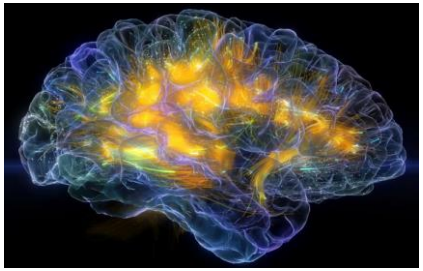


Group A: Neuroscience Electives at least 5 credits

- (at least) 1 Foundation Course
  - **PSYC 030: Behavioral Neuroscience**
  - **BIOL 022: Neurobiology**
- **Group A** intermediate courses
  - BIOL: 020, 021, 027, 029, 030
  - PSYC: 031, 031A, 032, 043
- (at least) 1 **Group A** seminar:
  - BIOL: 119, 123, 123A, 127, 129
  - PSYC: 130, 131, 131B, 132

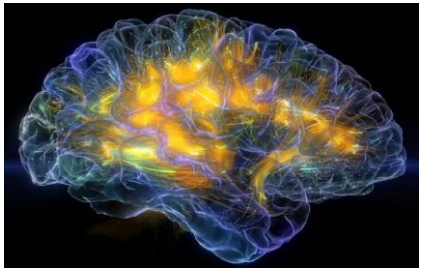
At least 1 Group A must be taken in PSYC and at least must be taken in BIOL.

… several other courses also qualify as Group A electives



Group A: Neuroscience Electives

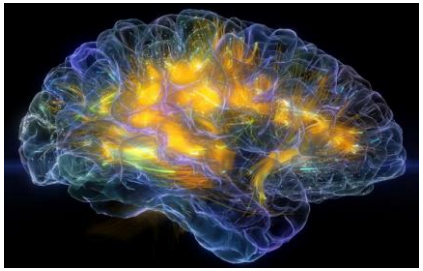
BIOL 022 Neurobiology
PSYC 030 Behavioral Neuroscience
PSYC 031 Cognitive Neuroscience
PSYC 031A Social, Cognitive, and Affective Neuroscience
PSYC 032 Perception (must co-enroll in PSYC 132)
PSYC 043 Computational Methods for Psychology and Neuroscience
PSYC 130 Behavioral Neuroscience seminar
PSYC 131 Cognitive Neuroscience Seminar
PSYC 131A Psychology and Neuroscience: The Social Brain seminar
PSYC 131B Seminar in Affective Neuroscience
PSYC 132 Perception Seminar (must co-enroll in PSYC 032)
BIOL 020 Animal Physiology
BIOL 021 Neuroethology
BIOL 027 Systems Biology
BIOL 030 Animal Behavior
BIOL 119 Genomics and Systems Biology
BIOL 123 Stress Physiology
BIOL 123A Hallmarks of Neurodegeneration
BIOL 127 Behavioral Neuroendocrinology
BIOL 129 Developmental Neurotoxicology



Group B Electives: Courses in Related/Overlapping Areas

- **BIOL:** Genetics, Stem Cell Bio, Cell Bio, Microbio, Omics, Developmental Bio, Evolution, etc.
- **PSYC:** Cog Psych, Psych of Language, Social Psych, Clinical Psych, Developmental Psych, Scientific Computing in Psych, etc.
- **CHEM 038** Biological Chemistry
- **COGS 001** Intro to Cognitive Science
- **CPSC 021** Intro CS & **CPSC 068** Bioinformatics
- **MATH 056** Modeling
- **ENGR 051** Biomedical signals & **ENGR 065** Biomechanics
- Plus many seminars in Psych & Bio

Technically, there is NO Group B requirement for the major!



Comprehensive Requirement:

The most common path is to take one our research practica courses
Group research projects with individual written reports (thesis paper.)

(PSYC 102, 103, 104, 105, 110):

Perception & Cognition,

Mind & Language

Behavioral Neuroscience

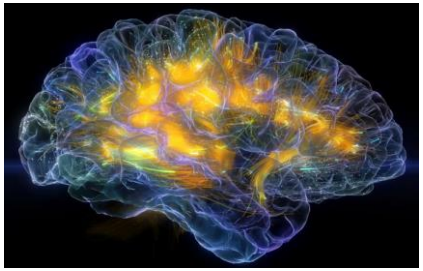
Social Neuroscience

Cognitive Neuroscience

Alternatively, with permission of thesis advisor…

- 1 or 2 credit Neuroscience thesis (BIOL 098 / PSYC 099)
- can incorporate independent research (BIOL, PSYC 094)
- PSYC 096/097: Senior Thesis
- BIOL or PSYC 180: 2-credit Senior Honors Thesis

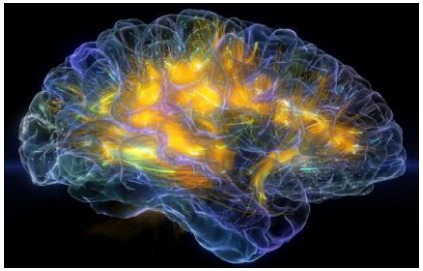
Note: The comprehensive credit must be earned in the senior year.



Comprehensive Requirement

In all cases, the comprehensive requirement is a complete scientific paper based on a research project you conducted related to neuroscience.

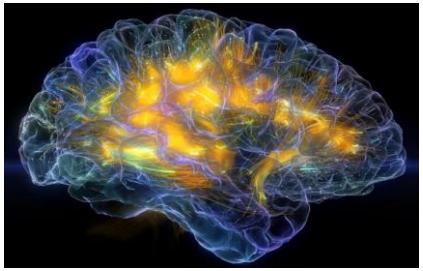
(the *Neuroscience Research Thesis*)



Neuroscience Honors Major

- Fulfill all the requirements for Neuroscience
- Including three 2-credit honors preparations:
  1. BIOL Group A core course (1.0 CR) & seminar (1.0 CR)
  2. PSYC Group A core course (1.0 CR) & seminar (1.0 CR)
  3. Either BIOL or PSYC Group A or B core+seminar
- Your 4th preparation will be the 2-credit Neuroscience Research Thesis (BIOL 180/199 or PSYC 180/180)
- No Honors Minor is possible

Separate core courses required for each of the 3 seminars
You cannot "double dip" (e.g., use BIOL 020 for two different seminars)



Comprehensive Requirement (Ex.)

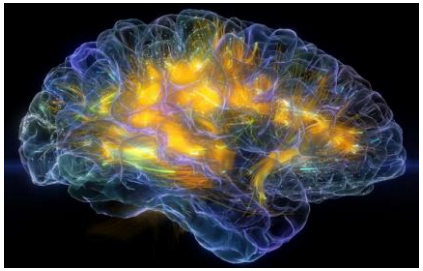
Research Practica offered 2026-2027:

Perception & Cognition (PSYC 102, Durgin):

Behavioral Neuroscience (PSYC 103, Fobbs):

Offered 2025-2026

Psyc 102 RP in Perception & Cognition (Durgin)
Psyc 104 RP in Language and Mind (Grodner)
Psyc 110 RP in Cognitive Neuroscience (Ezzyat)

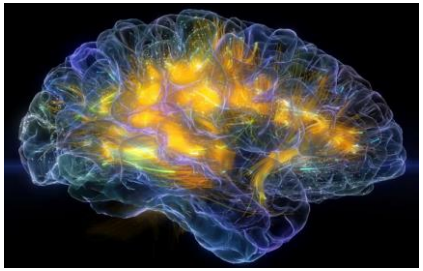


What do YOU need to do now?

- Work on completing the prereq courses

- Think about your Sophomore Plan:
  - How do you plan to complete the major?
  - When are the courses you want to take being offered?
  - How do you plan to complete the comprehensive requirement?

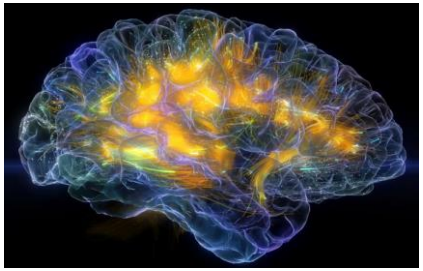
- Start exploring research opportunities – *It might be easier to figure out what you don't like, so start early!*



Neuroscience Faculty Advisor

I meet with ALL students interested in applying to the Neuroscience Special Major.

You can reach out to me at any time to talk about putting together your Sophomore Plan.



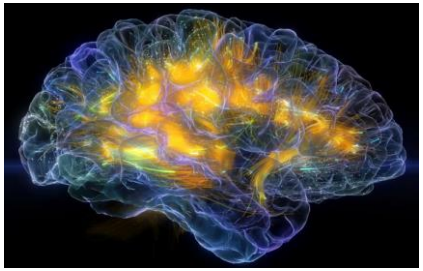
Other Neuroscience Faculty & Staff

BIOLOGY:
Alex Baugh (abaugh1)
Carolyn Bauer (cbauer1)
Eva-Marie Collings (ecollin3)

PSYCHOLOGY:
Wambura Fobbs (wfobbs1) - *on leave F25/S26*
Brian Metzger (bmetzge1)
Dan Grodner (dgrodne1)
Frank Durgin (fdurgin1) – *Neuroscience Coordinator*
Cat Norris (cnorris2) – *serving in Provost's office*
Youssef Ezzyat (yezzyat1)

Administrative Coordinator, Psychology & Neuroscience:
Betsy Durning (edurnin1)

Administrative Assistant, Psychology & Neuroscience
Julia Linden-Chirlian (jlinden2)



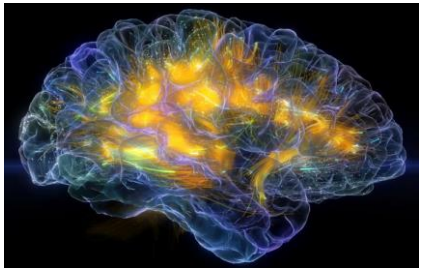
Next Steps

- **January 28 through February 14:** Departments and program info sessions offered.
- **February 17 (Monday) at 1:00 pm:** Deadline for students to indicate major(s) and minor(s) in mySwarthmore
- **February 21 (Friday):** Deadline for departments and programs to assign sophomore plan advisors to students in Major/Minor Department portal in AppGarden
- **February 24 (Monday):** Deadline for students to *draft* a sophomore plan to review with their advisor.
- **February 24 - March 5:** Students and sophomore plan advisors meet individually to review plan
- **March 6 at 1:00 p.m.:** Deadline for students to submit revised sophomore plan in mySwarthmore

Extremely Important: Make sure that you have run your sophomore plan by your advisor and that your advisor has approved it before you submit it.

For more info:

https://www.swarthmore.edu/psychology/neuroscience-major



Comprehensive Requirement (Ex.)

Senior Thesis Research in Psychology:

Shadae Chambers 2022: Apples to Pears: The New Ideal Body

Rachel Sinnex 2022: Don't hold your breath: Investigation of respiratory pauses in virtual reality exposure

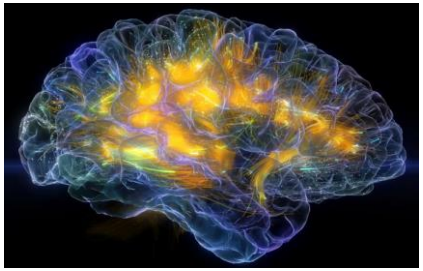
Elise Talley 2021: The Paradox of Gender Differences in Depression and Positive Wellbeing

Seetha Davis 2019: She Sneezed and the Germs Went Onto Him!: Children's Conception of Probabilistic Causality in Illness

Susan Gonzalez 2019: Reconsolidation as the Underlying Mechanism in Modified Extinction Procedure

Tess Wild 2019: Social Media Responses to Self-Concept Threats

Laura Geary 2018: The Open-minded Partisan: The Relationship Between Political Views and Endorsement of Open-mindedness



Comprehensive Requirement (Ex.)

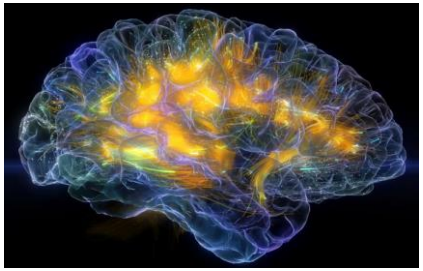
Senior Thesis Research in Biology:

Stewart Silver 2020: Moderately elevated corticosterone levels increase mate choosiness in female Cope's gray tree frogs without impacting sexual proceptivity or preferences

Lillian J. Fornof 2020: Multiple Anti-Predatory Behaviors In Red-Tailed Monkey (Cercopithecus Ascanius) Groups Construct [Mou1] Distinct Landscapes Of Fear

Nick Ambiel 2019: Chytrid fungus infection (Bd) weakens strength of sexual selection via female choice in Tungara frogs.

Katie Stranchan 2019: Transitive Mate Choice not Found in Female Tungara Frogs but High Estradiol Levels Associated with Quicker Decision Making.



Comprehensive Requirement (Ex.)

Senior Thesis in Neuroscience (PSYC 099 or PSYC 096/97):

Jino Chough (2022): Lack of commitment vs too efficient: Overcoming the barrier to artificial second language acquisition

Susan Gonzalez (2019): Reconsolidation as the underlying mechanism in modified extinction procedure

Senior Thesis in Neuroscience (BIOL 098):

Katie Strachan (2019): Transitive mate choice not found in female Túngara frogs but high estradiol levels associated with quicker decision making.

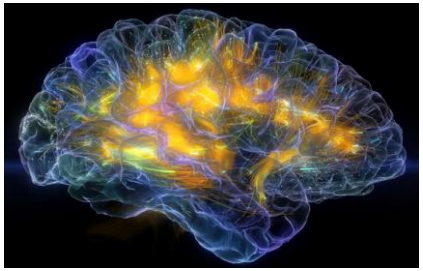
Honors Theses in Biology (BIOL 180) or Psychology (PSYC 180):

Kali Blain (2022): The effect of antecedent gender bias on the processing of singular *they*: an ERP study

Kayla Vieira (2021): Re-examining the efficacy of the retrieval-extinction approach: Preventing recovery of retention

Maria Isabel Barros Guinle (2019): Viewing food images generates arousal and ambivalence in high eating restraint individuals: Evidence from self-reports and skin conductance

Elise Cummings (2019): Can you feel their pain?: An ERP investigation of the influence of stigma on pain empathy



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Elise Cummings (2019): Can You Feel Their Pain?: An ERP Investigation of the Influence of Stigma on Pain Empathy

Makayla Portley (2018): A new elbow in the number perception function: Number processing changes at 20

Fran Reckers (2018): Friend or Foe?: The Effects of Friendship on Emotional Responses to Paired Gamble Outcomes

Christine Yao (2018): Reevaluating liability and prediction error approaches in preventing recovery of fear