

Ben Stamp

Interdisciplinary Program: Neuroscience

Hendrix College


Dr. Jennifer Peszka

Dr. Rick Murray

Neuroscience

Neuroscience is a burgeoning field of study and research. As defined by Merriam-Webster's dictionary, Neuroscience is a branch of the life sciences that deals with the anatomy, physiology, biochemistry, or molecular biology of nerves and nervous tissue and especially with their relation to behavior and learning. The overarching theme of this interdisciplinary study is learning how to employ the tools and perspectives of psychology, philosophy, mathematics, biology, and chemistry in order to further one's understanding of the relationship between the brain and behavior. I will follow the basic proposal set forth by the Neuroscience working group and I will follow the Neurobiology track, taking animal physiology as my elective. The proposal is as follows: Neuroscience is a diverse field that draws on biology, chemistry, philosophy, and psychology. The breadth of the field often attracts students with varied interests and career goals. In order to best serve those students, an interdisciplinary neuroscience major includes four parts: 1) a core that all students in the neuroscience major complete, 2) an elective track that focuses the student in either behavioral neuroscience or neurobiology, 3) an independent research project, and 4) a senior capstone experience.

- 1) The Core: All students completing the neuroscience major complete the following core courses:
 - 1) BIOL 150: Cell Biology
 - 2) BIOL 250: Genetics
 - 3) CHEM 110: General Chemistry I
 - 4) CHEM 120: General Chemistry II
 - 5) BIOL 325: Cellular and Molecular Neuroscience
 - 6) PSYC 360: Behavioral Neuroscience
 - 7) PHIL 350: Philosophy of Science OR PHIL 480: Philosophy of Mind
 - 8) PSYC 290: Statistics
- 2) Elective Track: Each student will choose one of the two following elective tracks, A) Behavioral Neuroscience or B) Neurobiology, to follow for completion of their major.

- A) Behavioral Neuroscience Track: Students completing the this track of the neuroscience major would be required to complete the following 3 courses in addition to the core courses listed above:
- 1) PSYC 295: Research Methods
 - 2) Two of the following:
 - BIOL 320: Animal Physiology
 - BIOL 300/PSYC 300: Comparative Animal Behavior
 - PSYC 330: Learning
 - PSYC 335: Sensation & Perception
- B) Neurobiology Track: Students completing this track of the neuroscience major would be required to complete the following 3 courses in addition to the core courses listed above:
- 1) CHEM 240: Organic Chemistry I
 - 2) CHEM 250: Organic Chemisry II
 - 3) One of the following:
 - BIOL 320: Animal Physiology
 - CHEM 330: Biochemistry
- 3) Independent Research: All students completing the neuroscience major would be required to complete a research project that consists of
- 1) Two semesters of research at Hendrix
- OR
- 2) One summer (minimum of 8-weeks at 40 hours/week) of research at Hendrix or another pre-approved summer research program.
- 4) Senior Capstone: All students completing the neuroscience major would be required to complete a senior capstone experience consisting of the following:
- 1) A written report of the students' research project that is graded by the advisor.
 - 2) An oral presentation of the research project to the students and faculty in the program that is graded by the faculty.

As a student requesting to undertake this interdisciplinary program, I intend to provide certain aims that will be best served by completing an undergraduate education in neuroscience. I am very interested in the inner workings of the brain and the implications that an understanding of these will have. This interest manifested in my reading of books concerning what is known about the brain and philosophy concerning thought in general. I was particularly motivated by the idea of using language to investigate our basic

experiences of the world in Steven Pinker's book, "The Stuff of Thought: Language as a Window into Human Nature" and by the progress of memory research presented in Eric Kandel's book, "In Search of Memory: The Emergence of a New Science of Mind." I came to the conclusion that there is a vast amount left to understand about the brain. This seemed to present a very unique opportunity for me: something I was very interested in was also something to which I could make a considerable contribution if I had the proper training. All of this led to my desire to major in neuroscience.

After graduating from Hendrix College with a degree in Neuroscience, I hope to enter an M.D./Ph.D program to further my education in this field of study. In particular, I would like to pursue a professional career in research/teaching. As this is a burgeoning field of research with many neural systems left largely undiscovered or at least incompletely understood, I feel that there are many areas within this field to which I would enjoy the opportunity to make a contribution. Specifically, I would like to be involved in either expanding the understanding of the mechanisms underlying cognitive diseases such as Alzheimer's or in research attempting to identify the direct neural correlates and various subsystems underlying the unity of conscious awareness (which may also suggest the importance of unconscious awareness of stimuli). If this justification were to be accepted, I would be able to take a curriculum of courses that would prepare me for applying to M.D./Ph.D. programs that focus on studying the brain, mind, and consciousness.

I also plan to minor in philosophy, which will complement my interdisciplinary program. Philosophy is a discipline requiring an extensive understanding of the

contemporary scientific endeavors such that one can offer meaningful insights into the ethical questions surrounding scientific fields of research (especially the brain).

One response may be that all of what I have discussed is possible through a number of other majors offered by the school. My response would be that this interdisciplinary program will best allow me to focus my energies on the study of the nervous system. In order to adequately study this complex system a person must have a strong foundation in Chemistry, Biology, and Psychology. The way to best cover all three of these areas is through an interdisciplinary approach. The interdisciplinary program is also more adequately preparing me for the tasks that lie ahead than could any other program offered, as it is most in line with my particular set of interests wherever the culmination of these interests leads to.

References

neuroscience. (2010). In *Merriam-Webster Online Dictionary*. Retrieved March 9, 2010, from <http://www.merriam-webster.com/dictionary/neuroscience>