Modification to Interdisciplinary Program proposal: Neuroscience

Brie Ross

The following proposed interdisciplinary major was modified to account for a required course that is not offered next year and therefore must be removed or changed to another course so that I may graduate on time. Under the list of required classes, "PHIL 480 Philosophy of the Mind" was changed to "PHIL 490 Topics: Self-consciousness." Although "Philosophy of the Mind" is preferred, I believe "Self-consciousness" is the most suitable alternative, because it fulfills the philosophical requirements while still focusing on the mind. Furthermore, it takes an interdisciplinary cognitive science approach to self-consciousness, which serves me well as it integrates philosophy, biology, psychology, anthropology, artificial intelligence, linguistics and neuroscience according to the course description. All of these disciplines work well with my interdisciplinary major.

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Interdisciplinary Program: Neuroscience

Hendrix College

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Dr. Rick Murray

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The nervous system is one of the most complex systems of the body. Neuroscience includes the scientific study of the link between the molecular and cellular structure of the nervous tissues and the organism's behaviors and thought processes. To comprehend this link, one would need to pull information from multiple disciplines, including biology, chemistry, philosophy, and psychology, and integrate these into one complete understanding of the nervous system's role in the body. This proposed interdisciplinary neuroscience major will include three parts: 1) required courses related to neuroscience with a focus on neurobiology, 2) an independent research project, and 3) a senior capstone experience.

1) The classes: This neuroscience major will require the following courses:

    1. BIOL 150: Cell Biology
    2. BIOL 250: Genetics
    3. BIOL 325: Cellular and Molecular Neuroscience
    4. CHEM 110: General Chemistry I
    5. CHEM 120: General Chemistry II
    6. PSYC 290: Statistics
    7. PSYC 360: Behavioral Neuroscience
    8. PSYC 363: Cognitive Neuroscience
    9. PHIL 350: Philosophy of Science
    10. PHIL 490: Topics: Self-consciousness
    11. CHEM 240: Organic Chemistry I
    12. CHEM 250: Organic Chemistry II
    13. BIOL 320: Animal Physiology

2) Research: This neuroscience major will require 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.

3) Senior Capstone: This neuroscience major will require 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.

I believe the brain is similar to the ocean in that there is an incredible amount left to be discovered. Take glial cells, for example. Once thought to only support neurons as "housekeeping" cells, they are now known to communicate with each other and possibly control the electrical activity flowing through neurons. This is revolutionizing the way we look at medicine in regards to degenerative diseases, injuries and cancer in the brain. In "The Other Brain," R. Douglas Fields describes much of the newfound knowledge on glia, including how glial scars formed after an injury chemically repel the regrowth of a severed neuronal axon. Scientists are beginning to create drugs that will chemically neutralize the inhibitory effects of glia on neuronal axons so that we can repair devastating injuries. It is breakthrough research like this that compels me to broaden my knowledge of the cellular functions of the brain so that we can treat injuries and diseases without invasive surgery. I would like to be that doctor who diagnoses and treats neurological diseases based on the latest research, so my goal is to attain an MD with a focus on neurology.

I believe an interdisciplinary major is the most thorough way to both fulfill my curiosity of the nervous system and prepare for my future medical career. To fully understand the nervous system, I need to draw on the resources available across several departments. I have decided on the neuroscience major instead of combining a biology or psychology major with a neuroscience minor, because the latter alternatives are both deficient in chemistry and philosophy. This way

neuroscience will be central to my education as it pertains most to my future goals and interests me more than other majors offered.