

Proposal
Department of Zoology
Tenure-track position – Neurosciences

Rationale

From the standpoint of biomedical research, the 21st Century is sometimes known as the “Brain Century.” The principle U.S. effort is the BRAIN Initiative (Brain Research through Advancing Innovative Nanotechnologies – <http://www.braininitiative.org>), which is funded by private-public partnerships at the level of about \$100 million annually. This effort is complemented by international projects, including The Human Brain Project (<https://www.humanbrainproject.eu>), a \$1.6 billion project funded by the European Union. This enormous investment reflects the fact that science is now poised to make significant progress in understanding the complexity of the nervous system.

Neuroscience is the ultimate multidisciplinary field: neuroscientists engage in research that spans cell biology, genetics, physiology, chemistry, engineering, computing, mathematics, medicine, and psychology. A local example of this multidisciplinary characteristic is the Program in Neurosciences at the University of Utah (<http://neuroscience.med.utah.edu>), which draws on 73 faculty from 15 departments. While many of the departments are associated with the medical school, traditional academic departments are represented as well, namely, Biology, Chemistry, Mathematics, and Psychology. An affiliated program at the U of U is the Scientific Computing and Imaging Institute (SCII – <https://www.sci.utah.edu>), which provides computing and imaging support for neurosciences research and draws heavily on faculty in Computer Sciences.

The prospective hire would allow us to sustain and enhance our capabilities at many levels. The Department of Zoology has a diverse faculty with active scholarship in the areas of ecology, evolution, anatomy, physiology, genetics, and cell biology. There is some overlap in the research interests of Zoology faculty and the other two life sciences departments, as well as the Department of Chemistry, but there is not a single faculty member in the COS with experience and training in neurosciences. Moreover, the college does not offer a single class in this important discipline. The situation beyond the COS is almost as stark, in that the courses offered by the Neuroscience Program at W.S.U. are limited and are often taught by individuals without a background in modern experimental neurosciences.

Although not a peer institution, the programs at U of U illustrate three points relevant to neuroscience at Weber State: (i) This is indeed a field with an unlimited future. Students with experience in neuroscience are employed in large number of academic and private research laboratories across the country. (ii) The multidisciplinary nature of neuroscience means that it could be an organizing force in increasing faculty collaborations, both within the college and with other colleges on campus. (iii) The Neuroscience Program at W.S.U.

(<http://www.weber.edu/neuroscience>), which was established in 2009 with input from COS faculty, has experienced sustained growth, especially in the number of students choosing this field as a Minor:

YEAR	MINOR DECLARATIONS	GRADUATES
2009–2010	8	1
2010–2011	20	3
2011–2012	13	10
2012–2013	18	9
2013–2014	23	11
2014–2015	23	12
2015–2016	32	25

To date, 138 W.S.U. students representing 12 majors in five colleges have declared Neuroscience as a Minor. Zoology students represent the second most-frequent Major, trailing only Psychology. This indicates that Zoology students have a keen interest in this rapidly-growing field. Beyond Zoology majors, a neuroscientist could have a salutary effect on the college's successful pre-medical program. Of the 138 Neuroscience Minors, 19 were/are pre-medical students. The development of new neurosciences courses would clearly enhance the existing curriculum and neurosciences research would provide opportunities for students interested in medicine or biomedical research, areas that are a strong suit of the department and college.

Given the interest in this field on campus, we believe that a cell and molecular biologist with training in the neurosciences could further strengthen the pre-professional programs within the College of Science (e.g., pre-med, pre-PA), while providing broader opportunities for all life-science majors. For students interested in careers in research, regardless of major, we expect undergraduate training in neuroscience to be beneficial for applications to graduate school.

The facilities in the new Tracy Hall Science Center will ensure that we are able to attract a large number of qualified candidates for this position. Neurosciences research has transitioned away from relying on elaborate and expensive equipment (e.g., MRI machines) to the cellular and molecular levels and to computing. Establishing a successful research program at an undergraduate institution is much more feasible with that latter approaches. The extensive animal facility in the THSC, which is exceptional for an undergraduate institution, will be an additional selling point for a new faculty member. The ability to influence the curriculum by developing new courses, and to contribute to the Neuroscience Program at its incipient stage, may also appeal to many candidates. Finally the COS, and the Department of Zoology in particular, have an outstanding record of supporting both faculty and students in a variety of research endeavors.

Departmental Strategic Planning:

Hiring a neuroscientist with expertise in molecular and cell biology is consistent with departmental strategic goals, which were established based on faculty strengths and expertise. Faculty are needed to teach courses at all levels; advise students; engage students in research; and provide service to the university, profession, and community. As outlined above, a molecular cell biologist with expertise in neuroscience would diversify the department and college by adding an academic specialty not currently represented in either. Within the department this would increase the breadth of upper-division elective courses offered and, significantly, provide an additional faculty member to teach cell biology, a course with a substantial non-major enrollment. At the college and university levels, the new hire would contribute to support courses for the major and courses that would be required by both the Neuroscience Program and by the pre-medical program.

Building a Collaborative Research Community:

As described above, neuroscience is a multidisciplinary field and naturally lends itself to collaborations among scientists with varying areas of expertise. Depending on the research focus of this hire, a variety of collaborations are possible on and off campus. Existing COS faculty with potentially complementary research interests include (in alphabetical order):

- (1) Jonathan Clark, Zoology (molecular genetics)
- (2) Tracy Covey, Chemistry (medicinal chemistry)
- (3) Michele Skopec, Zoology (behavioral physiology)
- (4) Barb Trask, Zoology (cell biology)

Outside the COS:

- (5) Lauren Fowler, Neuroscience Program (behavioral genetics and circadian rhythms)
- (6) Todd Hillhouse, Psychology (addiction; pharmacology)
- (7) Jim Hutchins, Health Sciences (neuroanatomy; clinical neurosciences)
- (8) Rod Hansen, Athletic Training and Nutrition (neurological effects of exercise)
- (9) Yong Zang, Computer Science (machine learning and neural networks)

The extensive neuroscience research at U of U would also provide potential collaborative opportunities, and collaborations with local clinicians (e.g., physicians, physical therapists) might also be easily established. At the very least, regular seminars offered at U of U would certainly provide ample opportunities for intellectual stimulation and collaboration. We assume that applicants for this position will be fully committed to teaching and scholarship at an undergraduate institution.