24 March 2015

TO: Sarah Mangelsdorf, Provost
FROM: John Karl Scholz, Dean
RE: Request for Permission to Plan a New L&S Undergraduate Major in Neurobiology

CC: Gery Essenmacher, Associate Dean for Student Academic Affairs, L&S
Donna Fernandez, Professor, Zoology, Co-Chair Biology Major
Heidi Goodrich-Blair, Professor, Bacteriology, Co-Chair Biology Major
Jeff Hardin, Professor and Chair, Zoology
Stephen Johnson, Professor, Comparative Biosciences, SVM
Elaine Klein, Assistant Dean for Academic Planning, L&S
Jocelyn Milner, Associate Provost and Director, Academic Planning and Analysis
Eric Wilcots, Associate Dean for the Natural and Mathematical Sciences, L&S

On February 17, 2013, the L&S Academic Planning Council considered, with our CALS colleagues, the attached proposal to implement a new L&S undergraduate major in Neurobiology. Prior to discussion by the two councils, the proposal had been discussed in a joint meeting of our curriculum committees. Representatives from the Biology Major Program Committee (BMPC) were also present at these discussions, and kindly answered questions about the impact this proposal would have on the L&S/CALS Biology major. I’m pleased to report that these advisory and governance bodies recommended approval of the proposal, which we now present to you for consideration.

This proposal was developed by a faculty committee comprised of individuals from across campus, all of whom currently contribute to the successful “named option” in Neurobiology (currently offered under the Biology Major). As described in the proposal, their interest in this work will persist: academic oversight for the program will be provided by a similarly constituted faculty committee that will work with the Department of Zoology, where administrative responsibility will reside. Zoology, which has been granted additional resources to assume these duties, has approved this arrangement, and is enthusiastic about housing this program under its auspices.

We believe we have the capacity to deliver this program, since we already invest resources to support the more than 300 students enrolled in the option. In some respects, offering this program will reduce pressure on the Biology Major (reducing complexity, as well as moving...
students into a more focused major); it will also serve students well, since the requirements will allow students to pursue relevant coursework beyond the Biological Sciences, exploring territory in Computer Sciences and other areas that was difficult to work into the Biology Major. Memos from our colleagues are attached to this proposal; we are particularly appreciative of the support offered by our CALS colleagues.

If the plan to implement is approved, the Neurobiology program committee will work with the BMPC, as well as with staff from CALs and L&S, to develop a “teach-out” plan for the Neurobiology Option of the Biology Major. That plan will articulate criteria for allowing students who can do so to transfer into the new program; it will also identify circumstances where students are better served by staying in their program, to make timely progress toward completion of their degrees. In consultation with APIR, we will establish an end-date for admission to, and for granting awards in, the Neurobiology Option.

The L&S APC approved this request both unanimously and enthusiastically.
REQUEST FOR AUTHORIZATION TO IMPLEMENT A  
BACHELOR OF ARTS, BACHELOR OF SCIENCE IN NEUROBIOLOGY  
AT UW-MADISON  
PREPARED BY UW-MADISON

ABSTRACT
The University of Wisconsin-Madison proposes to establish a Bachelor of Arts (B.A.) and Bachelor of Science (B.S.) major in Neurobiology. The development of a Neurobiology major responds to the increased demand by students and society for training in the field of neuroscience. The Neurobiology major is emerging from the Neurobiology Option within the Biology major at UW-Madison, which has grown to more than 350 students (approximately 25% of the enrollment in the Biology major). The term “neuroscience” includes all approaches to understanding the nervous system. While the core of the proposed major is focused on biology, students will be exposed to a range of neuroscience approaches. Accordingly, “neuroscience” is used in this proposal to indicate the breadth of the discipline. Several upper division neuroscience-related courses offered on campus are ideal for the Neurobiology major, but less compatible with the Biology major. Establishing the Neurobiology major at UW-Madison will enhance foundational neurobiology courses, expand neuroscience laboratory course opportunities, and provide community and peer support among undergraduates interested in neuroscience. The goal of the Neurobiology major will be to provide students with a substantial, rigorous, and focused education in neurobiology principles, research, and laboratory experimental approaches that will make them highly attractive to graduate and professional degree programs in health-related, academic, and other careers that overlap with neuroscience (e.g., biotech industry, education, law, journalism). The program will be comprised of a minimum of 120 credits and based on the already successful curriculum for the Neurobiology Option within the Biology major, but with an expanded focus on neuroscience course work. Students will complete introductory mathematics, statistics, inorganic and organic chemistry, physics, and biology courses before taking foundational neuroscience courses in cellular/molecular and systems neuroscience. Students will be required to take at least a further 13 credits in upper division neuroscience courses that include at least one course each from two categories and two credits of neuroscience laboratory courses or independent study in a neuroscience laboratory. Students will also be required to take an undergraduate seminar course.

PROGRAM IDENTIFICATION
Institution
University of Wisconsin-Madison
College of Letters & Science

Title of Proposed Program
Neurobiology

Degree/Major Designations
Bachelor of Arts, Bachelor of Science in Neurobiology

Mode of Delivery
This is an on-campus program at a single institution, not a distance education program.
Projected Enrollments by Year Five

Currently, there are 250-325 students enrolled in the Neurobiology Option within the Biology major at UW-Madison. This number fluctuates throughout the academic year but has steadily grown over the past ten years. At present, there are ~170 L&S students and ~120 CALS students in the Biology major/Neurobiology Option. Based on overwhelming student interest in this program, we anticipate that some students enrolled in the current Neurobiology Option will seek permission to transfer into the new Neurobiology major. After the BS-Neurobiology is fully implemented, the intention is that the Biology major/Neurobiology option will be discontinued. The Option will be retained during a “teach out” period. We estimate that some senior L&S Neurobiology Option students and some senior CALS Biology major/Neurobiology Option students may seek permission to transfer to Neurobiology. Students who are able to do this without delaying their progress to degree will be allowed to do so. A full teach-out and transition plan will be developed after the proposed BS-Neurobiology is approved and the first term that students are enrolled has been established.

There may be as many as 60 senior and 60 junior students in the first year the Neurobiology major is implemented. We estimate that ~50 students will major in Neurobiology during the sophomore and freshman years. The student numbers in subsequent years indicate the anticipated growth of the Neurobiology major. The administrative and curricular structure proposed here will provide sufficient capacity for the projected enrollment and number of degrees for the first five years as follows:

<table>
<thead>
<tr>
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<th>Implementation Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
<th>5th Year</th>
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<td>New students (Fresh) admitted</td>
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<td>50</td>
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<td>Continuing students (Soph) (Junior)</td>
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<td>55</td>
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<td>240</td>
<td>255</td>
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<td>285</td>
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Tuition Structure
Students enrolled in the program will pay standard undergraduate tuition according to the rates approved by the Board of Regents.

Department or Functional Equivalent
The proposed program will reside within the Department of Zoology.

College, School, or Functional Equivalent
The proposed program will be housed within the College of Letters and Science

Proposed Date of Implementation
September, 2016
INTRODUCTION
Rationale and Relation to Mission

Twenty years ago, the UW-Madison did not have a generally available Biology major, but instead students selected one of many biology-related majors in L&S and CALS. The Biology major was extended from the School of Education (then available to Secondary Education students only) to students in the College of Agricultural and Life Science and in the College of Letters & Science about 15 years ago. The Biology major became very popular and grew to become one of the largest majors on campus at with an enrollment of approximately 1500 students. Options within the Biology major were created to focus on specific disciplines within Biology, such as the Neurobiology option. The Neurobiology Option was created to allow students to focus on neuroscience courses, laboratory courses, seminars, and research experiences. Surprisingly, the Neurobiology Option grew to become about 24% of the Biology major (361 of the 1534 Biology major students were in the Neurobiology Option at the end of the fall 2014 semester). Also, more neuroscience courses were created that did not fit the goals of the Biology major (e.g., brain imaging, neuroeconomics, neuroscience principles in education). Thus, the obvious need for a separate major devoted to neuroscience naturally emerged from the high student demand and unique courses within neuroscience.

A Neurobiology major is being proposed by the Department of Zoology because of the need to: (1) establish solid and sustainable support for faculty teaching the foundational neuroscience courses, (2) establish administrative mechanisms for supporting and expanding neuroscience laboratory courses, (3) establish community and peer support among undergraduates interested in neuroscience, and (4) satisfy the growing demand among entry-level students for a rigorous, interdisciplinary undergraduate program that provides breadth and depth in neuroscience. The University of Wisconsin-Madison has the human resources, facilities and courses to provide a comprehensive major for these individuals.

Principles derived from neuroscience research are used in medicine, education, law, economics, and artificial intelligence. Commercial and government resources are increasingly being devoted to neuroscience-related problems and diseases. Neurobiology major graduates will have a substantial, rigorous, and focused education in neuroscience principles, research, and laboratory experimental approaches that will make them highly attractive to graduate and professional degree programs. Neurobiology major students will be well-positioned to pursue health-related careers (physicians, physician assistants, veterinarian, dentists, neuroimaging technician, counseling psychologist, drug rehabilitation counselor, physical therapists), academic careers (college and university faculty, research scientists, lab technician, K-12 teachers), and careers in pharmaceutical and biotech industries, venture capital and scientific consulting firms, medical and scientific journals, intellectual property law, nonprofit organizations and foundations, and government agencies. UW-Madison is one of the leading universities in the world with more than 90 faculty engaged in neuroscience research, and a graduate program (Neuroscience Training Program) that has remained continuously funded by the National Institutes of Health (NIH) for more than 40 years. The proposed Neurobiology major will serve undergraduates by giving them access to these research faculty in formal classroom environments and through undergraduate research opportunities.

Support for the Neurobiology major has been expressed by the leaders of the Departments of Zoology, Psychology, and Neuroscience, the UW-Madison School of Medicine and Public Health, and the Biology Major Program Committee.
Need as Suggested by Current Student Demand

The Neurobiology Option within the Biology major has experienced extremely rapid growth in the past 11 years so that there are now ~350 students within the Option (one of the largest cohort of students among the biology-related majors). There is strong evidence that the Neurobiology major will be very popular at UW-Madison. In a recent survey of 150 Neurobiology Option students, 88% said that they would prefer a Neurobiology major to the current Neurobiology Option, because evidence of student accomplishment in neuroscience would be more transparent to graduate and professional schools. Neurobiology major students will have greater flexibility to take upper division neuroscience-related courses than is possible in the current option. The approval of the Neurobiology major will likely decrease the number of Biology major students by 200-250 students because the Neurobiology Option within the Biology major will be phased out by the end of the spring semester of 2017 (described in a separate proposal to be developed). This will partially alleviate the concern that the Biology major is getting too large to manage effectively. It is unlikely that other UW-Madison majors will be negatively affected by the proposed Neurobiology major because few majors on campus have significant amounts of neuroscience-related content in their disciplines. The majors with some neuroscience content include Communication Sciences and Disorders, Education, Kinesiology, Psychology, and Zoology. These departments teach courses that are part of the Neurobiology major curriculum. At the most, is anticipated that these courses may increase in size by a small percentage due to the popularity of the Neurobiology major.

Need as Suggested by Market Demand

*National, regional, and state:* At the national level, projections, the category of “Medical Scientists” (which includes Neuroscientists) is predicted to grow by 13.3% between 2012-2022, according to the Bureau of Labor Statistics employment (www.bls.gov/emp/ep_table_102.htm). The same source shows that medical scientists earned a median annual salary of $79,840 in May 2013. The highest-paid 10% earned upwards of $149,310 per year, while the lowest-paid 10% earned less than $42,830. In Wisconsin, data from the Wisconsin Department of Workforce Development shows that medical scientists rank 18 on the list of High Growth Occupations with a 31% projected increase from 2010 to 2020 (worknet.wisconsin.gov/worknet). For neuropsychologists and clinical neuropsychologists, Wisconsin has the highest job vacancy and expected job growth rate (www.recruiter.com). Since the explosive increase in neuroscience research was in the last ~20 years (see following section), detailed information for analyzing and projecting future growth in neuroscience-related jobs are scarce. However, the Society for Neuroscience in particular has seen explosive growth with >40,000 members from 83 countries and hosts annual meetings with ~30,000 members.

Emerging Knowledge and Advancing New Directions

The scientific study of the central (brain and spinal cord) and peripheral (nerves in body) nervous system was traditionally seen as simply a branch of biology. From the 1970s to the present, neuroscience research expanded rapidly due to advances in molecular biology, electrophysiology, imaging, and computational neuroscience. This allowed neuroscientists to study the nervous system in all its aspects: how it is structured, how it works, how it develops, how it malfunctions, and how it can be changed. The emergence of powerful new neuroimaging techniques (fMRI, PET, SPECT) and human genetic analysis combined with sophisticated experimental techniques from cognitive psychology allows neuroscientists and psychologists to
map human cognition and emotion to specific neural substrates. Modern neuroscience is currently regarded as an interdisciplinary science that collaborates with medicine (neurology, psychiatry, neurosurgery, anesthesiology), chemistry and biochemistry, genetics and epigenetics, psychology, physics, computer science, engineering, linguistics, mathematics, and allied disciplines such as philosophy, economics (decision theory), education, and law. Exciting new emerging fields in neuroscience include regenerative medicine (converting stem cells to neurons and glia), brain-computer interface (developing devices that interact directly with brain tissue), electroencephalography (controlling machines using brain waves), neuroprosthetics (cochlear and retinal implants), and neural optics (tracking single molecules, altering neuronal excitability with light). Because of the increasing number of scientists who study the nervous system, several prominent neuroscience organizations were formed such as the International Brain Research Organization (1960), International Brain Research Organization (1961), International Society for Neurochemistry (1963), European Brain and Behaviour Society (1968), the Society for Neuroscience (1969), Federation of European Neuroscience Societies (1998). At the national level, the Decade of the Brain was a designation for 1990-1999 by U.S. president George H. W. Bush as part of a larger effort involving the Library of Congress and the National Institute of Mental Health of the National Institutes of Health "to enhance public awareness of the benefits to be derived from brain research". More recently, the Obama administration established the BRAIN Initiative (Brain Research through Advancing Innovative Neurotechnologies, also referred to as the Brain Activity Map Project) on April 2, 2013 with the goal of mapping the activity of every neuron in the human brain.

DESCRIPTION OF PROGRAM
Administrative Structure and Governance

The program will be housed in the Department of Zoology. Governance will be carried out both by the Zoology Department and a Neurobiology major Steering Committee. The Steering Committee will be composed of five tenure-track faculty with significant neuroscience teaching responsibilities in courses included in the major’s curriculum. Future members will be nominated by the active Steering Committee and appointed by the Zoology chair to serve two-year, staggered terms. The Steering Committee is expected to draw faculty from several departments, such as Zoology, Psychology, Neuroscience, Communication Sciences and Disorders, Comparative Biosciences, Cell and Regenerative Biology, Educational Psychology, Kinesiology, Genetics, and Biomedical Engineering. Each Steering Committee member will be from a different department with one faculty member always from the Zoology Department. Additional ex officio members will include the Zoology Undergraduate Program Committee chair (to assure clear communication between Zoology and the Steering Committee) and the lead Neurobiology major advisor (to keep the Steering Committee informed of degree requirement issues). The Steering Committee will elect a chair to serve three years. The Steering Committee will guide and be responsible for all aspects of the Neurobiology major, subject to approval by the Zoology Department, or the Zoology Instructional Program Committee.

Key faculty involved in establishing and leading the proposed Neurobiology major include Jeff Hardin (chair, Zoology), and current Neurobiology option Steering Committee members: Stephen Gammie (Zoology), Stephen Johnson (Comparative Biosciences), Mike Koenigs (Psychiatry), Lyn Turkstra (Communication Sciences and Disorders). Additional faculty who have contributed to the development of the major include Brad Postle (Psychology,
Psychiatry), Peter Lipton (former coordinator of the Neurobiology Option), and Tom Yin (former chair of Neuroscience, former director of the Neuroscience Training Program).

**Academic Program Structure**

The proposed Neurobiology major program is based on the highly successful Biology major, which allows students to take a series of foundational courses prior to specialization. After completing introductory biology courses, all Neurobiology major students will complete two foundational neuroscience courses prior to taking upper division neuroscience courses. The foundational neuroscience courses include: (1) *Neurobiology* (Zoo 523, cross-listed with Psychology, Neuroscience Training Program [NTP]), which focuses on cellular and molecular neuroscience, and (2) *Behavioral Neuroscience* (Psychology 454) or *Neurobiology II: Introduction to the Brain and Behavior* (NTP 524, cross-listed with Zoology, Psychology), which focuses on systems neuroscience. Responsibility for faculty and staff will reside with the Zoology department for Zoology 523, the Psychology department for Psychology 454, and the Neuroscience department for NTP 524. These courses typically have a course director (often the lead instructor), but often include other faculty from other departments across campus to provide expertise for the topics covered in the class.

**Institutional Program Array**

The proposed Neurobiology major will be unique on campus with its strong orientation towards neuroscience, but the new major will also fit well with other biology-related majors (*e.g.*, biochemistry, kinesiology, molecular biology, psychology, zoology) and non-biology-related majors (*e.g.*, biomedical engineering, computer science, education) at the UW-Madison campus. Students in these other majors will be encouraged to take the foundational Neuroscience courses as well as any other upper division neuroscience-related courses (as long as prerequisites are satisfied). In the future, a Certificate in Neurobiology may be developed and offered to allow students from other disciplines to acquire a basic understanding of neuroscience principles.

**Other Programs in the University of Wisconsin System**

UW-Milwaukee has ~29 faculty studying neuroscience from multiple departments, including Psychology and Biological Sciences. However, similar to UW-Madison, there is no undergraduate major, although students within Psychology can develop a neuroscience track. Undergraduate UW-Milwaukee courses include two core Introductory Neuroscience courses as well as ~20 other upper division neuroscience courses. UW-Milwaukee had no opposition to the Notice of Intent to Create a Neurobiology major at UW-Madison that was circulated within the UW System. At present within the state of Wisconsin, there is only one other Neuroscience Program at Carthage College, but this institution does not offer a major in Neuroscience.

**Collaborative Nature of the Program**

Though UW-Milwaukee is the only other university within the UW System to offer a significant and broad range of neuroscience courses, it does not offer an undergraduate major/minor in Neuroscience at this time. The program we propose, like the current Neurobiology Option, will be available only at UW-Madison. In keeping with current program capacity and resource constraints, no formal collaboration is proposed or envisioned at this time.
Diversity

Student Diversity: Using data provided by the UW-Madison registrar (http://www.registrar.wisc.edu/documents/Stats_DegCntsbyDiversityandDegLvlwnMajorandTerm.pdf), diversity within the Biology Major was consistent during the past three years. Male (43%) and female (57%) students were primarily Caucasian with African-American (2%), Hispanic (3%), Asian & Pacific Island (11%), and Native American (<1%) students. A snapshot of current students in the Neurobiology Option were mostly Caucasian a similar distribution of African-American (2%), Hispanic (3%), Asian & Pacific Island (17%), and Native American (<1%) students. The male/female distribution is identical to the Biology major with 43% male and 57% female students. Student performance in the two current core neuroscience courses (Zoology 523 – Neurobiology, n=278 students; NTP 524 - Neurobiology II: An Introduction to the Brain and Behavior, n=146 students) is comparable to similar upper level classes in the Biology major. During the past 2013-2014 academic year, the overall DFDr Rate (D, F, Drop Class) for these two core courses was 7-8% with no data on targeted minorities and 7% for first generation students (Zoology 523 only). The DFDr rate for the NTP 500 (Undergraduate Neurobiology Seminar) and the NTP 699 (Directed Studies) courses was 0% for 112 and 133 students, respectively.

The Neurobiology major Steering Committee will work with the Biology Major Program Committee to help L&S and UW-Madison diversity programs to reach out and retain underrepresented students. For example, with the Neurobiology major being housed in L&S, administrative staff and faculty members associated with the major will continue to foster relationships with other campus partners. L&S is home to many of the campus programs that serve undergraduates in targeted minority groups, such as the Academic Advancement Program and Pathways to Excellence. This program coordinates many programs and advising experiences for American Indian, African American, Chicano/a, Latino/a, and Southeast Asian American students. Focused efforts will be made to reach out to students with an interest in biology or pre-health career interests. In addition, the Undergraduate Research Scholars Program within L&S is designed to help first- and second-year undergraduates get hands-on experience in research, and can assist students in identifying opportunities working with faculty and research staff in neuroscience-related laboratories, thus promoting interest in and support for involvement in the Neurobiology major.

L&S will also work closely to associate the Neurobiology major with campus-wide initiatives and programs designed to promote interest in science for women through the Women in Science and Engineering (WISE) programs as well as with underrepresented minorities in general through the Wisconsin Alliance for Minority Participation (WiscAMP). Although more women (57%) than men (43%) are enrolled in the Biology major at UW-Madison, women remain underrepresented within STEM (science, technology, engineering and math) fields, including neuroscience. More women than men are currently obtaining their biology-related PhD degree, but the number of women in faculty, department chair, and leadership roles is still less compared to men.

Faculty Diversity: Because the proposed program has been planned with the understanding that no new faculty will be hired specifically for the program, and that the current UW-Madison faculty and course array are sufficient to field the program, the diversity of the faculty is bound by the current faculty profile, and will only be influenced by patterns of hiring and promotion in participating departments. Currently, about 18% of UW-Madison faculty are minorities, and about 33% are women; specific percentages vary somewhat from department to
Within a representative sampling of faculty teaching neuroscience at UW-Madison (e.g., Neuroscience department, Neuroscience Training Program, faculty teaching neuroscience in undergraduate courses), most faculty were Caucasian (82%), with the following distribution of African-American (2%), Hispanic (5%), Asian & Pacific Island (11%), and Native American (0%) faculty. Female neuroscientists represent 29% of the faculty.

At the campus-level, faculty policy toward diversity in hiring is contained in Faculty Senate Document 257, which recommends that deans "withhold approval of any tenure-track appointment not accompanied by specific evidence of a search in which every reasonable effort was made to identify and interest qualified women or minority candidates." Hiring departments must file a Recruitment Efforts Plan (REP) with the campus Office for Equity and Diversity, which reviews REPs before positions may be advertised. The OED offers guidance to departments concerning how to recruit minority candidates and develop diverse applicant pools. Efforts to expand the pool of minority and women candidates in the sciences, in particular, have been the special focus of the Women in Science and Engineering Leadership Institute (http://wiseli.engr.wisc.edu), which has served as a campus- and nation-wide resource for teaching hiring committees how to overcome implicit bias in reviewing applications, interviewing candidates, and making hiring decisions. All chairs of L&S search committees are required to participate in WISELI workshops; chairs of CALS search committees are strongly encouraged to participate in these workshops and most do so.

Student Learning Outcomes

Our goal is to prepare students for a wide variety of neuroscience-related careers and to provide a solid scientific foundation for post-baccalaureate education in neuroscience. Students in the Neurobiology major will be grounded in the basic sciences and mathematics needed to understand neuroscience concepts and experimental approaches (e.g., inorganic and organic chemistry, statistics, physics, biochemistry). Two foundational courses in Neuroscience will provide students with the fundamental neuroscience principles that will allow them to take a wide range of upper division courses that teach neuroscience-related subjects that range from molecular and cellular topics to cognition and behavior.

Since the Neurobiology major will be housed in the Zoology Department within L&S, most students will satisfy the General Education and specific degree requirements for L&S. However, recently, ~41% of Neurobiology Option students within the Biology major were CALS students. Accordingly, the Neurobiology major will seek to successfully integrate CALS students into the major using established precedents on campus. For example, L&S allows students from any other school or college to complete the requirements for an L&S major. However, only students from CALS (or any other school/college that grants undergraduate degrees and allows students to complete "additional majors") may pursue the L&S Neurobiology major in addition to their CALS degree/major combination. Alternatively, if CALS wishes to allow its students to complete the Neurobiology major as a single major, the Neurobiology major Steering Committee will seek permission from both colleges to have the program as a shared CALS and L&S major (as is currently the case for the Environmental Sciences and Microbiology majors).

Neurobiology major goals:

Graduates of the proposed Neurobiology major will be able to:
(1) Demonstrate understanding of basic concepts in biology, chemistry, mathematics, statistics, and physics.
(2) Demonstrate understanding of the ionic basis for the neuronal membrane potential and action potential, and as well as the factors that determine neuronal excitability.
(3) Demonstrate understanding of the basic mechanisms for synaptic transmission, neurotransmitter release, postsynaptic effects, and modulation of pre- and postsynaptic mechanisms. Predict how specific physiological and pathological conditions alter neuronal function at the cellular and synaptic levels.
(4) Differentiate between examples of neuroplasticity at cellular, systems, and organismal levels.
(5) Demonstrate understanding of central and peripheral neuroanatomy, basic functions of brain regions, and well-known neural pathways. Predict how localized disruptions of neuronal function alter behavior, motor function, or perception.
(6) Demonstrate understanding of basic principles underlying motor function, sensory function (auditory, visual, touch, taste), emotion, autonomic regulation, and higher order cognitive functions" (language, memory, attention, decision-making).
(7) Demonstrate how experimental tools in neuroscience are used to address experimental questions, such as intra/extracellular recording, molecular biology techniques, immunohistochemical staining, fluorescent and electron microscopy, genetic manipulation, brain imaging, behavioral testing.

Program Curriculum

The proposed Neurobiology major will require 120 credits for the degree and will be based loosely on the already successful curriculum for the Neurobiology Option within the Biology major at UW-Madison (Appendix A). The goal is to have students acquire the necessary skills and knowledge to enter the Neurobiology major foundational courses as early as possible in their second and third years. Key features of the Neurobiology major curriculum are as follows:

- Students will be encouraged to declare for the Neurobiology major before completing total 60 credits and before the standard declaration requirement for all L&S majors. Notice of these policies will be published in the catalog, on our website, shared with Neurobiology and Biology advisors, and circulated to the Advisor-link email network.

- Students must complete introductory mathematics, statistics, chemistry (inorganic and organic), and biology courses before taking foundational neuroscience courses: Neurobiology (Zoology 523; 3 cr) AND Behavioral Neuroscience (Psychology 454; 3 cr) OR Neurobiology II: Introduction to the Brain and Behavior (NTP 524; 3 cr). Physics may be taken concurrently with Zoology 523, NTP 524, or Psychology 454.

- Students will be required to take at least a further 13 credits in upper division neuroscience-related courses. At present ~20 intermediate/advanced level neuroscience-related courses are available. Upper division neuroscience-related courses will be approved individually by the Neurobiology major Steering Committee. In general, approved upper division courses have course numbers greater than 400 and have more than 50% of the course content devoted to neuroscience. A list of approved upper division courses will be updated regularly and made available to students.
• Students will be required to take two total credits of either neuroscience-related laboratory courses or independent study in a neuroscience-related laboratory. These credits will count towards the 13 credit upper level neuroscience coursework requirement. Students will be strongly encouraged to present their results at local, regional, and national meetings. Two neuroscience lab courses were recently added and with the large number of independent research possibilities available, there are no present concerns about the capacity to serve this requirement.
  • Students will be required to take an undergraduate seminar course (NTP 500 - Undergraduate Neuroscience Seminar) which exposes seniors to neuroscience research on campus.
  • Students will be required to earn a minimum G.P.A. of 2.0 in courses they take in the major, as well as a G.P.A. of 2.0 in all upper-level work in the major.
  • All students must also complete the L&S requirement of at least 15 credits of upper-level work in the major in residence.
  • Because the Neurobiology major is emerging from the Biology major, most courses would currently count for both majors and a student could easily obtain a double major. Thus, when the Neurobiology major becomes active, a double major in Neurobiology and Biology will not be allowed. However, after the Neurobiology major has been active for at least two years, the Neurobiology major Steering Committee will use data to evaluate whether double majoring in Biology can be appropriate. The committee will also perform an evaluation of double majoring in other related majors, such as Psychology and Zoology. The rationale for waiting to evaluate whether or how to allow double major in related fields is that it is difficult to predict what courses students might take and how they would employ them for different degrees.
  • Advising for the Neurobiology major will focus on helping students choose courses in an intentional manner to encourage developmental growth and progress toward timely graduation.

Projected Time to Degree

The projected time to degree for Neurobiology major students will likely be 4.0 academic years. This is based on the recent data showing that students in the Biology major completed their degrees in 4.1 years. An example of a four-year plan is shown in Appendix B.

Advising: Advising for the Neurobiology major will occur within the Zoology Department. L&S has hired an advisor whose duties will include providing advisement for Neurobiology major students (in addition to students in Molecular Biology and Biological Aspects of Conservation). The lead Neurobiology major advisor will be responsible for the major declaration process, assigning faculty advisors, recommending courses and other opportunities, determining appropriate major requirement exceptions (designated faculty on the Neurobiology major Steering Committee will provide final approval on all exceptions), and monitoring student progress. This person will also sit as an ad-hoc member on the Neurobiology major Steering Committee to provide valuable feedback and information with respect to curriculum problems or concerns about student progress. Faculty that teach in neuroscience-related courses or mentor undergraduates in neuroscience research will be recruited to form a pool of advisors that students can contact to obtain specific career advice, get recommendations for laboratory research in neuroscience, and other advice related to neuroscience-related academic questions. Advisors expect to use the campus-wide note-taking system to share academic information with other advisors.
**DARS Maintenance:** The L&S Student Academic Affairs Office for Academic Information Management (AIM) will implement and maintain DARS for the Neurobiology major. AIM will arrange for Zoology to access DARSX, so exceptions can be submitted electronically. In the implementation phase, L&S and the Steering Committee will anticipate and resolve issues to preempt the need for exceptions and minimize the impact on administrative and DARS staff. AIM duties will include initial codification, testing, communication with Zoology and the Neurobiology major Steering Committee, documentation, publication, and updates.

**Program Review Process: Assessment of Objectives and Institutional Review**

Assessment and advising will be guided by a newly constituted Neurobiology major Steering Committee that will work with the Zoology Department to oversee the major. The composition and responsibilities of the Neurobiology major Steering Committee are described below. Assessment will involve standard methods for generating information on student progress towards educational goals and objectives as described the UW-Madison L&S Assessment Plan ([http://provost.wisc.edu/assessment/SC_Assessment_Plans.html](http://provost.wisc.edu/assessment/SC_Assessment_Plans.html)). To assess overall student learning based on the learning outcomes in the Neurobiology major, the proposed major will conduct an abbreviated assessment of the program on a yearly basis as part of the annual report and a comprehensive assessment after five years of operation. The assessment of the program will utilize the learning goals and outcomes to determine the success of the program. To develop this plan we utilized materials from the L&S Handbook as well as from the Provost’s Assessment Manual.

**Learning Goals** - The three major learning goals for the Neurobiology major are:

1. Describe and apply concepts in molecular, cellular, systems, and cognitive neuroscience.
2. Describe current scientific techniques for revealing neural function.
3. Conduct experiments to test neuroscience hypotheses; present results in writing and orally to a scientific audience.

The curriculum map for the assessment plan (Appendix C) shows how the individual courses and experiences (e.g., laboratory research) in the Neurobiology major fulfill the learning goals. The curriculum map allows the Steering Committee to identify any needs, imbalances, or courses that don’t contribute to the learning goals.

**Determining how students are meeting expectations for learning.** Student performance in the Neurobiology major will be assessed directly (academic achievement) and indirectly (surveys, evaluations).

1. **Direct assessment.** The primary mechanisms for directly assessing Neurobiology major students with respect to the learning objectives are performance on final exams in the foundational neuroscience courses (Zoology 523, Psychology 454, NTP 524), and research laboratory performance (laboratory classes and research in neuroscience laboratories). The final exams in the foundational neuroscience courses test many of the basic principles underlying neuroscience. This will provide a direct manner in which to gauge student learning based on a shared student experience. Performance in neuroscience laboratories tests the application of those principles to real problems in
neuroscience research. This will be assessed by collecting student poster presentations (at local, regional, and national science meetings), as well as collecting random samples of student papers or projects (e.g., honors and senior theses). The exam and laboratory performance will be evaluated annually against the stated goals and learning goals of the Neurobiology major.

(2) **Indirect assessment.** Student evaluations of foundational courses and random upper division courses will be examined by the Steering Committee to determine if these courses are meeting the learning goals. Student exit surveys, such as the UW-Madison Post Graduation Plans survey, will provide information on student perception of learning, and allow the Steering Committee to if the flow of the major is conducive to student learning and identify any roadblocks students encountered during their coursework. Because one of the goals of the major is to provide students with the knowledge to compete for top neuroscience-related jobs and graduate programs, one additional assessment piece will be to survey alumni and employers. Surveying alumni will provide information that may shed light on areas in the program in need of expansion or improvement. It will also provide an intentional and meaningful way to reconnect with alumni. Surveying employers will give us information about programmatic success by seeing a snap-shot of students in the workforce and what they bring or are lacking regarding qualifications.

**Annual and periodic review and analysis of assessment data.** The assessment results based on the above protocols will be reviewed annually by the Neurobiology major Steering Committee, and a report will be submitted to the Office of the Provost and Academic Planning Council for discussion. The report will describe key findings (positive and negative), summarize recommendations for change, and submit a plan for implementing changes. To supplement the annual qualitative assessment of the Neurobiology major, L&S will review student enrollment trends including diversity recruitment and enrollment, student retention, and graduation rates. The Neurobiology Steering Committee and L&S will work together to insure the changes are within L&S curriculum guidelines and the goals of the Neurobiology major. In accordance with UW-System requirements, an overall comprehensive assessment will be performed after five years of programmatic operation. Thereafter, the Neurobiology major will be incorporated into the regular ten-year review process. Because the major will be housed in Zoology, the timing of the reviews may be aligned with the review of other academic programs in Zoology.

**Accreditation**

No accreditation is required for the proposed Neurobiology major.

**Resources**

In terms of courses, the vast majority of classes within the Neurobiology major are within L&S. All foundational courses (math, statistics, chemistry, and physics) are from L&S departments. All introductory biology courses are administered by L&S with L&S faculty providing the majority of lectures. The first neuroscience foundation course is taught by the Zoology department (Zoology 523; L&S) and one of the two possible second foundation courses is taught by Psychology (Psych 454; L&S). The other possible second neuroscience course (Zoology 524, cross-listed with NTP 524) has been team taught and administered by SMPH
faculty, but the major does not depend on this latter course. The required seminar course is currently run by a member of the Neurobiology option committee and administered by SMPH (NTP 500). Neuroscience faculty from across campus provide presentations in the seminar, including many from L&S. Operating the seminar course requires minimal cost and effort. With respect to the upper level Neurobiology courses, most are administered by L&S and even those shown to be administered by the Neuroscience Training Program (NTP) designation, these are often cross listed with L&S majors and taught by L&S faculty. As an overview, of the 30 upper level neuroscience courses, 15 indicate either Zoology, Psychology, and Communication Sciences & Disorders (L&S departments) as home for the course. Further, two NTP courses, including the Neurobiology and Behavior lab are run by Zoology and taught or cotaught by Zoology faculty. The only CALS course that is part of the proposed Neurobiology major is Biochemistry 501. The School of Education provides two courses. SMPH administers NTP courses, but these are taught by neuroscience faculty from all divisions across campus. Thus, there is a large and stable structure to courses supporting the Neurobiology major.

To help run the Neurobiology major, L&S will support a Neurobiology Coordinator position. This person will work with help administer the major, work with and be an active member of the Neurobiology steering committee, and also perform the following tasks: advising, coordinating and monitoring courses, preparing the timetable, maintaining the major specific website, attending relevant campus meetings, interacting with potential new students, their families, and alumni, and helping with ongoing assessment of the major.

Letters of Support
Kathryn VandenBosh, Dean, College of Agricultural and Life Sciences
Jeff Hardin, Professor and Chair, Department of Zoology
Hill Goldsmith, Professor and Chair, Department of Psychology
Donata Oertel, Professor and Chair, Department of Neuroscience
Donna Fernandez, Professor of Botany and Heidi Goodrich-Blair, Professor of Bacteriology, Co-chairs, Biology Major Program Committee
Appendix A: Curriculum Requirements for the Neurobiology Major

The study of neuroscience requires 35 credits from the following foundational courses:

**FOUNDATIONAL COURSES IN MATHEMATICS, STATISTICS, CHEMISTRY, AND PHYSICS**

**Mathematics (choose 1):** 211, 217, 221
- MATH 211 - Calculus (5 cr)
- MATH 217 - Calculus with Algebra and Trigonometry II (5 cr)
- MATH 221 - Calculus and Analytic Geometry 1 (5 cr)

*(Note: MATH 171 - Calculus with Algebra and Trigonometry I may be sufficient for B.A. degree)*

**Statistics (choose 1):** STAT 301 or 371
- STAT 301 - Introduction to Statistical Methods (3 cr)
- STAT 371 - Introductory Applied Statistics for Life Sciences (3 cr)

**Chemistry (both required)**
- **General Chemistry:** Either (CHEM 103 and 104) or CHEM 109
  - CHEM 103 - General Chemistry I (4 cr)
  - CHEM 104 - General Chemistry II (5 cr)
  - CHEM 109 - Advanced General Chemistry (5 cr)
- **Organic Chemistry:** CHEM 343 - Introductory Organic Chemistry (3 cr)

**Physics (two semesters):**
- **First Introductory Course:** PHYSICS 103 or 201 or 207 or 247
  - PHYSICS 103 - General Physics (4 cr)
  - PHYSICS 201 - General Physics (5 cr)
  - PHYSICS 207 - General Physics (5 cr)
  - PHYSICS 247 - A Modern Introduction to Physics (5 cr)
- **Second Introductory Course:** PHYSICS 104 or 202 or 208 or 248
  - PHYSICS 104 - General Physics (4 cr)
  - PHYSICS 202 - General Physics (5 cr)
  - PHYSICS 208 - General Physics (5 cr)
  - PHYSICS 248 - A Modern Introduction to Physics (5 cr)

*(Note: Engineering students may substitute EMA 201-Statics or EMA 202- Dynamics or ME240 - Dynamics)*

**REQUIREMENTS FOR THE MAJOR**

**BIOLOGY and NEUROSCIENCE – 30 credits from the following categories**

**Foundational Biology (three options):**
- **Option 1 (2 courses):** ZOOLOGY 151-152
  *(note: a score of 4 on the IB exam or 4-5 on the AP exam will earn ZOOLOGY 151 credit)*
  - ZOOLOGY 151 - Introductory Biology (5 cr)
  - ZOOLOGY 152 - Introductory Biology (5 cr)

- **Option 2 (2 courses):** ZOOLOGY 101-102 and BOTANY 130
  - ZOOLOGY 101 - Animal Biology (3 cr)
  - ZOOLOGY 102 - Animal Biology Laboratory (2 cr)
  - BOTANY 130 - General Botany (5 cr)
Option 3 (6 courses): BIOCORE 381, 383, 485, 587 and two lab courses from: BIOCORE 382, 384, 486 (note: completion of the BIOCORE sequence connotes an Honors award at the time of graduation).

- BIOCORE 381 - Evolution, Ecology, and Genetics (3 cr)
- BIOCORE 383 - Cellular Biology (3 cr)
- BIOCORE 485 - Organismal Biology (3 cr)
- BIOCORE 587 - Biological Interactions (3 cr)

- BIOCORE 382 - Evolution, Ecology, and Genetics Laboratory (2 cr)
- BIOCORE 384 - Cellular Biology Laboratory (2 cr)
- BIOCORE 486 - Organismal Biology Laboratory (2 cr)

Foundational Neuroscience (3 courses required):

**Neuroscience:** ZOOLOGY 523 – Neurobiology (3 cr)

**Behavioral Neuroscience:** PSYCH 454 or ZOOLOGY 524

- PSYCH 454 - Behavioral Neuroscience (3 cr)
- ZOOLOGY 524 - Neurobiology II: An Introduction to the Brain and Behavior (3 cr)

**Seminar:** NTP 500 - Undergraduate Neurobiology Seminar (1 cr)

Upper-Level Neuroscience (13 credits)

**At least one Cellular and Molecular Neuroscience course:**

- BIOCHEM 501 - Introduction to Biochemistry (highly recommended) (3 cr)
- NTP/Phys 610 - Cellular and Molecular Neuroscience (4 cr)
- NTP 629 - Molecular and Cellular Mechanisms of Memory (3 cr)
- NTP 635 - Neurobiology of Disease (2 cr)
- NTP 670 - Stem Cells and the Central Nervous System (2-3 cr)
- NTP 675 - Topic: “Molecular Mechanisms of Brain Damage” (1-3 cr)
- NTP 675 - Topic: “Neuroendocrinology” (1-3 cr)
- PHYSIOL 625 - Brain Cell Cultures and Imaging: A Lab Course (4 cr)
- PSYCH 411 - Topic: “Neuropharmacology” (1-3 cr)
- PSYCH 411 - Topic: “Epigenetics and the Brain” (1-3 cr)
- ZOOLOGY 400 - Modeling Neurodevelopmental Disease (1-3 cr)
- ZOOLOGY 555 - Laboratory in Developmental Biology (3 cr)
- ZOOLOGY 604 - Computer-based Gene and Disease/Disorder Research Lab (2 cr)
- ZOOLOGY 625 - Development of the Nervous System (2 cr)

**At least one Systems, Behavioral, and Cognitive Neuroscience course:**

- CS&D 503 - Neural Mechanisms of Speech, Hearing & Language (3 cr)
- ED PSYCH 326 - Mind, Brain and Education (3 cr)
- KINES 531 - Neural Control of Movement (3 cr)
- NTP 630 - Neuronal Mechanisms for Sensation & Memory in the Cerebral Cortex (3 cr)
- NTP 675 - Topic: “Basic Sleep Mechanisms & Sleep Disorders” (1-3 cr)
- NTP 675 - Topic: “Behavioral Neuroendocrinology” (1-3 cr)
- NTP 675 - Topic: “Functional Brain Imaging of Cognitive Disorders” (1-3 cr)
- NTP 675 - Neurobiology and Behavior Lab (3 cr)
- PSYCH 406 - Psychology of Perception (3-4 cr)
- PSYCH 556 - Hormones and Behavior (3 cr)
PSYCH 411 - Topic: “Neuroeconomics” (1-3 cr)
PSYCH 411 - Topic: “Neural Basis of Cognitive Control” (1-3 cr)
PSYCH 414 - Cognitive Psychology (3 cr)
PSYCH 504 - Affective Neuroscience (4 cr)
ZOOLOGY 619 - Biology of Mind (3 cr)
ZOOLOGY 620 - Neuroethology Seminar (2 cr)

(Note: Topics Courses are expected to transition into established courses within a few years of being taught)

Neuroscience Laboratory Courses and Independent Study Courses (these count towards the 13 upper level neuroscience credits):
Students must take at least 2.0 credits from any of the following courses. Once the 2.0 minimum credit is achieved, students may take neuroscience laboratory courses (PHYSIOL 625, ZOOLOGY 555, 604, 616) and have these credits count towards the upper-level neuroscience course requirements listed above (under Cellular and Molecular Neuroscience courses or Systems, Behavioral, and Cognitive Neuroscience courses).

Neuroscience laboratory courses: PHYSIOL 625, ZOOLOGY 555, 604, 616
PHYSIOL 625 - Brain Cell Cultures and Imaging: A Lab Course (4 cr)
ZOOLOGY 555 - Laboratory in Developmental Biology (3 cr)
ZOOLOGY 604 - Computer-based Gene and Disease/Disorder Research Lab (2 cr)
NTP 675 - Neurobiology and Behavior Lab (3 cr)

Independent study in neuroscience laboratories:
Students may take as many credits of these courses as they wish, but can only apply 2.0 credits of these courses towards their degree.

PSYCH 620 (2 credits apply) - Capstone Mentored Research and Seminar (1-6 cr)
PSYCH 681-682 (2 credits apply) - Senior Honors Thesis (1-6 cr)
ZOOLOGY 681-682 (3 credits apply) - Senior Honors Thesis (1-6 cr)
ZOOLOGY 691-692 (2 credits apply) - Senior Thesis (1-6 cr)
ZOOLOGY 699 (2 credits apply) - Directed Studies in Zoology (1-6 cr)

(Note: Thesis options are two-semester course sequences. Both courses need to be completed to earn credit)

Course Note: All of the above courses are currently active and taught yearly (e.g., Zoology 523, Psychology 454), while others are taught every other year. An updated list of the neuroscience-related courses can be found in the Neurobiology Option requirements for the Biology Major at UW-Madison.

RESIDENCE & QUALITY OF WORK IN THE MAJOR
2.000 minimum GPA on all courses in the major
15 credits in Residence with a 2.000 GPA in upper level courses in the major
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<th>Spring Semester</th>
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<td>Comm A (3 cr)</td>
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### Appendix C: Map of Neurobiology Major Courses onto Learning Goals

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<tr>
<th>Courses</th>
<th>Describe and apply concepts in molecular, cellular, systems, and cognitive neuroscience.</th>
<th>Describe current scientific techniques for revealing neural function.</th>
<th>Conduct experiments to test hypotheses; present results in writing and orally to a scientific audience.</th>
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19
February 24, 2015

To: John Karl Scholz  
Dean, College of Letters and Science

From: Kathryn VandenBosch  
Dean and Director

Subject: CALS Support for New Undergraduate Major in Neurobiology

On February 17, 2015, the CALS Academic Planning Council discussed the Zoology request to implement a new undergraduate major in Neurobiology. The Council voted unanimously to support this request.

At present, neurobiology is available to undergraduate students as a transcriptable option within the Biology Major. It is our understanding that the Neurobiology Major would replace the current option, which would be discontinued, with an appropriate teach-out or transition plan for students currently enrolled in the option. The major could be added as a second major for CALS students if desired, but could not be combined with another major in Biology.

The current option is administered jointly by CALS and L&S and is available to students in both colleges, with substantial instructional and advising contributions from around campus. We understand that the new major, as currently envisioned, would be solely administered through the Department of Zoology.

cc: Jeff Hardin  
Elaine Klein  
Sarah Pfatteicher
March 3, 2015

To: Deans Scholz and VandenBosch
From: Donna Fernandez and Heidi Goodrich-Blair, Biology Major Program Co-Chairs

Re: Request to implement a Neurobiology Major at UW-Madison

The document under consideration (Request for Authorization to Implement a Bachelor of Arts, Bachelor of Science in Neurobiology at UW-Madison) represents the next step in a plan approved by the Biology Major Program Committee (BMPC) in 2013. Currently, students interested in Neurobiology fulfill all of the introductory-level and breadth requirements for the Biology major and then are directed to more specialized biology courses at the Intermediate and Advanced levels.

The proposal generated a considerable amount of discussion about the potential impacts of the proposed Neurobiology Major on students and the Biology Major. The BMPC recognized that creation of this new major would likely be coupled with elimination of the Biology Major's Neurobiology Option. This might be perceived as a move back toward disciplinary specialization, which the Biology Major was originally intended to counter. However, with this move, the Neurobiology curriculum could appropriately develop in interdisciplinary directions that would be difficult to accommodate within the current Biology Major curriculum, which focuses primarily on developing breadth within the biological sciences. In other words, it is clear that the discipline of Neurobiology is itself broad, with elements of Psychology and Physics, and that this breadth only partially overlaps with the breadth of the Biology Major. Therefore, it seems timely to separate these two areas as separate majors.

BMPC members have given extensive feedback to Prof. Stephen Johnson, the Neurobiology Option representative, about possible issues associated with course access, student advising, and the need for flexibility. In particular, we asked that the Neurobiology Major planning committee consider needs of students who might start in either Biology or Neurobiology but desire to move into the other program at a later date.

It is anticipated that the Neurobiology Major planning committee will consult regularly with the Biology Major Program Committee to ensure a smooth transition, including plans for the graduation of current Neurobiology Option students, coordination of curriculum changes that impact offerings for Biology Majors, and transfer of advising responsibilities.

Sincerely,

Heidi Goodrich-Blair
CALS Biology Major Co-Chair
Professor, Bacteriology
University of Wisconsin-Madison
Bacteriology Department
4500 Microbial Sciences Building
1550 Linden Dr
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Donna E. Fernandez
L&S Biology Major Co-Chair
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Phone: 608-262-9033, 608-265-3404

Cc: Jocelyn Milner, Sarah Pfatteicher, Eric Wilcots, Stephen Johnson, Jeff Hardin, Rick Gourse, Elaine Klein, Kelley Harris-Johnson
February 16, 2015

John Karl Scholz, Dean
College of Letters & Science
105 South Hall
CAMPUS

RE: Department of Zoology endorsement of the proposed Neurobiology major

Dear Dean Scholz,

The faculty of the Department of Zoology faculty voted unanimously at the Feb 3rd, 2015 faculty meeting to endorse the Request for Authorization to Implement a Bachelor of Arts, Bachelor of Science in Neurobiology at UW-Madison. The Department of Zoology understands that it will act as the administrative home for the Neurobiology major and has responsibilities as outlined in the Request for Authorization document.

As chair of Zoology, I have worked closely with Drs. Gammie and Johnson as they have prepared the Authorization document. I and my colleagues believe that the new Neurobiology major will provide an important service to our students. It will occupy an important place in the future of our department, the College, and the University. We are enthusiastic about providing the academic home for the Neurobiology major and supporting the major in the future.

Thanks in advance for your careful consideration of this important proposal.

Sincerely,

Jeff Hardin
Professor and Chair
Department of Zoology

cc: Eric Wilcots, Associate Dean for the Natural and Mathematical Sciences
    Elaine Klein, Assistant Dean for Academic Planning; Program Reviews and Assessment; Director of General Education
March 10, 2015

Professor Karl Scholz  
Dean of Letters and Science  
105 South Hall  
1055 Bascom Mall  
Madison, WI 53706

Dear Professor Scholz:

The Neurobiology major is the culmination of an effort that was begun in 1997 by our colleague, Dr. Tom Yin. He not only provided the administrative leadership but has also taught one of the two core courses of the Neurobiology option (524) of the Biology major throughout the intervening years. It is remarkable that over this short period, the Neurobiology option has grown dramatically from a handful of students to 300. It has long been Dr. Yin’s goal that the Neurobiology option becomes a Neurobiology major. Dr. Peter Lipton has also been active in advising students and in teaching electives in the major. It is natural that the department would support the efforts of our dedicated colleagues.

It is my understanding that the conversion of the Neurobiology option to the Neurobiology major will entail significant changes. The role of the Department of Neuroscience is not clearly defined making it difficult to support the major in any specific way. It seems that both core courses, 523 and 524, will be administered by the Department of Zoology but that faculty in the Department of Neuroscience are likely to continue to be involved in the teaching of one or both of these courses. It also seems likely that faculty in our department will participate in teaching of some electives.

I fully support the efforts of my faculty colleagues to participate in teaching courses associated with the Neurobiology major. We are eager to contribute to the rich academic environment of our university. The students benefit from exposure to the research interests of the faculty in our department and the faculty benefit from putting their focused research into a broader perspective that engages undergraduates.

Sincerely,

Donata Oertel  
Chair, Wisconsin Neuroscience Professor
February 10, 2015

To: Karl Scholz, Dean of the College of Letters & Science
Cc: Eric Wilcots, Associate Dean for the Natural and Mathematical Sciences
    Elaine Klein, Assistant Dean for Academic Planning; Program Reviews and Assessment;
    Director of General Education

Dear Dean Scholz:

I write to convey the support of the Department of Psychology for the implementation of a Bachelor of Arts, Bachelor of Science in Neurobiology at the UW-Madison.

Although the administration of the program will reside with the Department of Zoology, Psychology offers many courses that will meet requirements for the proposed major. Perhaps most noteworthy is that Psychology 454, Behavioral Neuroscience, is proposed as a “core course” that will meet a key requirement at the “Foundational Neuroscience” level of the proposed curriculum.

Within the Psychology curriculum, this course fulfills a requirement at the “Breadth” level, and, as such, it is offered on an annual basis. In anticipation of the implementation of the Neurobiology major, we are making two important changes to this course.

- First, beginning in the 2015-2016 academic year, we will be offering Psychology 454 in the Spring semester, a change from its traditional spot as a Fall-semester course. This change will facilitate a two-consecutive-semester series of core courses for the Neurobiology major, with Zoology 523 covering molecular and cellular biology of the nervous system, and Psychology 454 covering systems- and cognitive-level neuroscience.
- Second, also beginning in the 2015-2016 academic year, we will double the enrollment cap on Psychology 454 from its traditional cap of around 100 students (depending on the lecture hall in which it has been offered) to a new cap of 212 students.

Additionally, at the “Upper-level Neuroscience” level of the Neurobiology curriculum, the proposal lists 8 Department of Psychology courses that can be taken to fulfill the requirements at this level. These courses currently fulfill the same function for the Neurobiology Option within the Biology Major, and, as our curriculum evolves, we anticipate adding additional courses that will also be appropriate for this level of the Neurobiology curriculum.
We welcome this opportunity for the intra-campus collaborative program offering the Bachelor of Arts, Bachelor of Science in Neurobiology with the Department of Zoology.

Sincerely,

[Signature]

H. Hill Goldsmith  
Fluno Bascom Professor and Chair  
Psychology Department