SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS

Intent to Plan for a New Program

UNIVERSITY:	**University of South Dakota**
DEGREE(S) AND TITLE OF PROGRAM:	**Bachelor of Science, Neuroscience**
INTENDED DATE OF IMPLEMENTATION:	**Fall 2019**

University Approval

To the Board of Regents and the Executive Director: I certify that I have read this intent to plan, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.

President of the University | Date

1. What is the general nature/purpose of the proposed program?

The University of South Dakota requests permission to plan a Bachelor of Science degree in Neuroscience, as well as a Neuroscience minor, interdisciplinary programs which will utilize current courses and faculty from the Departments of Psychology and Biology and the Division of Basic Biomedical Sciences. Neuroscience is the interdisciplinary study of the development, structure, function of the nervous system, with particular attention on the brain's role in in behavior and cognition. In addition, contributions to neuroscience from a number of disciplines, including psychology, biology, chemistry, and medicine, among others, provide a better understanding of neurological, psychiatric, and neurodevelopmental disorders and their treatment. The development of a neuroscience major/minor aligns with existing strengths at USD. USD's Center for Brain and Behavior Research (CBBRe) currently includes over 60 faculty across five colleges and 17 departments. The Center has successfully grown the neurobehavioral research enterprise at USD in terms of external funding to individual and teams of faculty as well as equipment and research infrastructure both at the main campus and at the Yankton and Sioux Falls clinical campuses. This will also provide opportunities for student-driven research. Neurobehavioral research by USD undergraduates is already supported by a grant from the National Institute of Health (NIH), the Summer Program for Undergraduate Research in Addiction (SPURA).

Neuroscience is one of the largest scientific fields in the US and is still growing. Membership in the Society for Neuroscience is over 37,000 and there are over 115,000 members in the American Psychological Society. South Dakota is conspicuous in not having a formal neuroscience major at this time. Such majors exist not only at the large universities in the region (e.g., University of Nebraska-Lincoln, University of Iowa), but also at a number of smaller institutions, including Creighton, Drake, Grinnell, and UN-Omaha. Developing an undergraduate neuroscience major was a strong recommendation made by both the 2013 review of USD by the Berkeley Research Group and by the CBBRe External Advisory Committee. Such a major would also have a positive impact on existing graduate programs in Biology and Basic Biomedical Sciences where there are neuroscience specializations, as well as in Psychology, Counseling and Psychology in Education and even Chemistry and Biomedical Engineering. Finally, such a program would be unique within the SDBOR system

given that there is only one neuroscientist at a non-USD institution (SDSU) and 10 or fewer psychology faculty at any of the other SDBOR institutions. From an efficiency standpoint, USD is well positioned to offer this program without requiring additional resources, and the establishment of this program will enable initiatives to seek further external funding for related programming and research.

2. **What is the need for the proposed program (e.g., Regental system need, institutional need, workforce need, etc.)? What is the expected demand for graduates nationally and in South Dakota (provide data and examples; data sources may include but are not limited to the South Dakota Department of Labor, the US Bureau of Labor Statistics, Regental system dashboards, etc.)?**

   There is a clear need for an interdisciplinary program in neuroscience in the state and region, based on the demand for graduate study, workforce need, and anticipated growth. The Bureau of Labor Statistics reports that growth in the national job outlook for medical scientists for 2016-2026 will be 13% (Faster than average) and that the median annual salary in 2017 was $82,090.[1] The South Dakota Department of Labor and Regulations estimates a projected growth in employment by 2024 for Medical and Clinical Laboratory Technicians of 12.7%, and of Medical Scientists, Except Epidemiologists of 14%.[2]

   According to Floh Thiels, program director at the National Science Foundation and an adjunct associate professor of neurobiology at the University of Pittsburgh School of Medicine, with the growth in neuroscience, the training of neuroscientists must adapt to changing demands and needs. More than 50% of Neuroscience PhDs work outside of traditional academics, and with this growth in demand comes a need for a multidisciplinary, team-based learning, broader training, greater awareness of ethical research practices, and collaborative research opportunities.[3] An undergraduate major in neuroscience at USD will help prepare students not only for graduate study in the field, but also will provide them with the interpersonal, critical-thinking skills required for a changing workplace.

3. **How would the proposed program benefit students?**

   As part of a broad-based, liberal arts curriculum, degrees in neuroscience will prepare students for a number of professional paths, including graduate study in behavioral neuroscience, clinical neuroscience, biomedical sciences, or clinical neuropsychology; professional study in medicine, physical therapy, and law; careers in the pharmaceutical and biomedical industries; and careers in science writing and communication.

4. **How does the proposed program relate to the university's mission as provided in South Dakota Statute and Board of Regents Policy, and to the current Board of Regents Strategic Plan 2014-2020?**[4]

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[1] "Medical Scientists," Bureau of Labor Statistics, Occupational Outlook Handbook, "https://www.bls.gov/ooh/life-physical-and-social-science/medical-scientists.htm

[2] "Employment Projections by Occupation," South Dakota Department of Labor & Regulation, http://dlr.sd.gov/lmic/menu_projections_occupation.aspx

[3] "Adjusting Neuroscience Training to Meet New Demands," Society for Neuroscience, Webcast, n/d. http://neuronline.sfn.org/Articles/Program-Development/2017/Adjusting-Neuroscience-Training-to-Meet-New-Demands

[4] South Dakota statutes regarding university mission are located in SDCL 13-57 through 13-60; Board of Regents policies regarding university mission are located in Board Policies 1:10:1 through 1:10:6. The Strategic Plan 2014-2020 is available from https://www.sdbor.edu/the-board/agendaitems/Documents/2014/October/16_BOR1014.pdf.

The statutory mission of the University of South Dakota is provided in SDCL 13-57-1:

> Designated as South Dakota's liberal arts university, the University of South Dakota, established and located at Vermillion, in Clay County, shall be under the control of the Board of Regents and shall provide undergraduate and graduate programs of instruction in the liberal arts and sciences and professional education in business, education, fine arts, law and medicine, and other courses or programs as the Board of Regents may determine.

The mission is provided in BOR Policy 1:10:1, University of South Dakota Mission Statement:

> The legislature established The University of South Dakota as the liberal arts university to meet the needs of the State and region by providing undergraduate and graduate programs in the liberal arts and sciences, and professional education in business, education, fine arts, law, and medicine, and other courses or programs as the Board of Regents may determine. (SDCL 13-57-1).
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> The Board implemented SDCL 13-57-1 by authorizing undergraduate and graduate programs in the liberal arts and sciences and in professional education and by requiring the University to promote excellence in teaching and learning, to support research, scholarly and creative activities, and to provide service to the State of South Dakota, the region, and beyond. The University of South Dakota is the comprehensive university within the South Dakota System of Higher Education.

Both the statutory mission and Board of Regents mission statement for the University of South Dakota designate the institution as the liberal arts university for the State of South Dakota and as the location of the state's only medical school. As such, USD is ideally suited to offer an interdisciplinary program in neuroscience, which draws upon the disciplinary strengths of existing academic expertise in Psychology, Biology, Basic Biomedical Sciences, and other programs, as well as the research and laboratory opportunities afforded by the faculty in these programs. At their 2017 meeting, the CBBRe external advisory committee stated as follows:

> A neuroscience major for undergraduates deserves serious consideration. It not only provides a mechanism for bringing together faculty with different research approaches, but also can serve as a faculty recruitment tool and a boost to undergraduate enrollment. Many universities across North America have successfully established an undergraduate neuroscience major within the last 10 years, and CBBRe faculty members already offer many of the courses needed to begin the process. A viable undergraduate major could also help with graduate training by offering opportunities for teaching assistantships.

5. **Do any related programs exist at other public universities in South Dakota? If a related program already exists, explain the key differences between the existing programs and the proposed program, as well as the perceived need for adding the proposed new program. Would approval of the proposed new program create opportunities to collaborate with other South Dakota public universities?**[5]
   None.
6. **Do related programs exist at public colleges and universities in Minnesota, North Dakota, Montana, and/or Wyoming?** *Add additional lines if there are more than two such programs in a state listed.*[6]

[5] Lists of existing system programs are available through university websites and the RIS Reporting: Academic Reports database available from http://apps.sdbor.edu/ris-reporting/AcademicProgramReports.htm.

[6] This question addresses opportunities available through Minnesota Reciprocity and WICHE programs such as the Western Undergraduate Exchange and Western Regional Graduate Program in adjacent states. List only programs at

	Institution	Program Title
Minnesota	University of Minnesota – Twin Cities	Neuroscience (major)
North Dakota	North Dakota State University	Neuroscience (minor)
Montana	University of Montana	Neuroscience (major)
Wyoming	University of Wyoming	Neuroscience (minor)

7. Are students enrolling in this program expected to be new to the university or redirected from other existing programs at the university?

Although some students may be redirected from existing majors, particularly Biology, Medical Biology, and Psychology, the majority of students are expected to be new to the university. Given the options that are available nationwide and in neighboring states, we expect a significant number of students to enroll who would not otherwise consider USD. Providing an interdisciplinary neuroscience option will help retain South Dakota students, and will offer a strong recruiting tool for talented students from across the nation and the world. The courses included in this program currently have the capacity for additional students, and substantial growth of this program would provide resources for growth, if needed.

8. What are the university's expectations/estimates for enrollment in the program through the first five years? What are the university's expectations/estimates for the annual number of graduates from the program after the first five years? Provide an explanation of the methodology the university used in developing these estimates.

The enrollment for the major is estimated at 15-20 in the first year, divided evenly between existing USD students and incoming first-year students. With addition of 20 students per year, we anticipate the annual number of graduates to reach at least 15 per year after five years. This conservative estimate is based on recent enrollments in several core courses, including BIOL 430 Neurobiology, BIOL 432 Behavioral Neuroscience, and PSYC 301 Sensation and Perception, substantial attention to the growing discipline, and the success of similar programs at other institutions. For example, the neuroscience program at the University of Montana (a university close in size to USD), was launched in the 2015-16 academic year and now includes approximately 80 majors, and, Professor Sarah Certel of Montana's Center for Structural and Functional Neuroscience expects their major to include over 100 students by spring 2019. Likewise, the University of Iowa, with a first-year enrollment approximately 4 times larger than USD, enrolled 72 students in the first year of their Neuroscience major, which further aligns with our anticipated first-year enrollment. USD's Center for Brain and Behavior Research and the departments of Biology and Psychology are prepared to advertise and recruit for the program, both on-campus and at regional events including those sponsored by Sanford Research and the Washington Pavilion.

9. Complete the following charts to indicate if the university intends to seek authorization to deliver the entire program on campus, at any off campus location (e.g., UC Sioux Falls,

the same degree level as the proposed program. For example, if the proposed program is a baccalaureate major, then list only related baccalaureate majors in the other states and do not include associate or graduate programs.

Capital University Center, Black Hills State University-Rapid City, etc.) or deliver the entire program through distance technology (e.g., as an on-line program)?[7]

	Yes/No	*Intended Start Date*
On campus	**Yes**	**Fall 2019**

	Yes/No	*If Yes, list location(s)*	*Intended Start Date*
Off campus	**No**		

	Yes/No	*If Yes, identify delivery methods*[8]	*Intended Start Date*
Distance Delivery (online/other distance delivery methods)	**No**		

10. What are the university's plans for obtaining the resources needed to implement the program?

	Development/ Start-up	Long-term Operation
Reallocate existing resources	**Yes**	**Yes**
Apply for external resources[9]	**No**	**Yes**[9]
Ask Board to seek new State resources	**No**	**No**
Ask Board to approve a new or increased student fee	**No**	**No**

11. Curriculum Example: Provide (as Appendix A) the curriculum of a similar program at another college or university. Identify the college or university and explain why the selected program is a model for the program under development.

The B.S. in Neuroscience at the University of Montana is provided as a model since their institutional size and profile is comparable to the University of South Dakota. Moreover, the inclusion of two specializations provides an example for a similar distinction at USD, based on areas of student interest and faculty expertise.

[7] The Higher Learning Commission (HLC) and Board of Regents policy requires approval for a university to offer programs off-campus and through distance delivery.
[8] Delivery methods are defined in AAC Guideline 5.5.
[9] External sources include NSF, NIH, and private foundations. The NSF, for example, has two STEM focused grant programs that would be applicable to the development and implementation of this new major: IUSE (Improving Undergraduate STEM Education) involves building undergraduate research/education programs and SSTEM (Scholarships for STEM Education) provides scholarships to support STEM students.

UNIVERSITY OF MONTANA

B.S. in Neuroscience, Cognitive Neuroscience option
2017/2018 Catalog

*****A grade of C- or better must be earned in ALL courses required for the major*****

Required Major Courses	credits	semester	grade
Biology/Psychology Core Courses			
BIOB 160/161N—Princ. Living Syst. w/lab	3+1	A/S/Su	_____
BIOB 260—Cell and Molecular Biology	4	A/Su	_____
BIOB 272—Genetics and Evolution	4	S	_____
BIOH 280—Fundamentals of Neuroscience	3	S	_____
BIOH 380—Cellular and Molecular Neuroscience	3	S	_____
BIOH 458W—Neuro Research Techniques Lab*	4	A	_____
PSYX 250—Fundamentals of Biological Psychology	3	A/S/Su	_____
* Together BIOH 458+380 satisfy the Upper Division Writing Requirement			
Additional Major Courses Required for Cognition and Behavior Option			
PSYX 270 –Fundamentals of Learning	3	A	_____
PSYX 280 Fundamentals of Memory & Cognition	3	intermitnt	_____
PSYX 356 —Human Neuropsychology	3	A/S/Su	_____
BCH 380—Biochemistry	4	A/S	_____
***A. Choose at least 2 of the following courses*:**			
BIOB 301—Developmental Biology	3	A	_____
BIOH 365—Human Anat and Physiology I	4	A/Su	_____
PSYX 352—Comparative Psychology	3	A	_____
KIN 330—Motor Control and Learning	3	A/S	_____
BIOH 441—CNS Diseases	3	A	_____
BMED 610 —Neuropharmacology	3	F, alt yrs	_____
BMED 646 —Neurotoxicology	3	S	_____
B. Choose at least 1 of the following set of* Intersection Courses *that explore the intersection of Neuroscience and discovery or scholarship derived from other academic disciplines:			
BIOE 406 Behavior and Evolution	4	A	_____
DANC 345 Teaching Dance to People w/ Disabilities (must take for 3 semesters to satisfy the major)	1,R4	A/S	_____
ECNS 451 Behavioral/Experimental Economics	3	S	_____
HTH 430 Hlth & Mind, Body, Spirit Relationship	3	A	_____
LIT 491 Poetry, Cognition and the Brain	3	intermitnt	_____
PSYX 233 Fundamentals of the Psychology of Aging	3	A/S/Su	_____

UNIVERSITY OF MONTANA

B.S. in Neuroscience, Cellular and Molecular Option
2017/2018 Catalog

*****A grade of C- or better must be earned in ALL courses required for the major*****

Required Major Courses	credits	semester	grade
Biology/Psychology Core Courses			
BIOB 160/161N—Princ. Living Syst. w/lab*	3+1	A/S/Su	
BIOB 260—Cell and Molecular Biology	4	A/Su	
BIOB 272—Genetics and Evolution	4	S	
BIOH 280—Fundamentals of Neuroscience	3	S	
BIOH 380—Cellular and Molecular Neuroscience	3	S	
BIOH 458W—Neuro Research Techniques Lab**	3	A	
PSYX 250—Fundamentals of Biological Psychology	3	A/S/Su	
*or BCH 110/111 (offered spring semesters)			
**Together BIOH 458+380 satisfy the Upper Division Writing Requirement			
Additional Major Courses Required for Cellular and Molecular Biology Option			
BIOB 425—Adv. Cell & Molecular Biology	3	S	
BCH 480—Advanced Biochemistry I	3	A	
BCH 482—Advanced Biochemistry II	3	S	
***A. Choose at least 1 of the following courses*:**			
BIOB 301—Developmental Biology	3	A	
BIOH 365—Human Anat and Physiology I	4	A/Su	
CSD 411—Neuroanatomy of Comm Disorders	3	S	
BIOL 435—Comp. Anim. Physiology	3	S	
B. Choose at least 1 of the following courses:			
KIN 330—Motor Control and Learning	3	A/S	
BIOB 375—General Genetics	3	S	
PSYX 356—Human Neuropsychology	3	S	
BIOB 468—Endocrinology	3	intermitnt	
BIOH 441— CNS Diseases	3	A	
BMED 646—Neurotoxicology	3	S	
BMED 610 —Neuropharmacology	3	F, alt yrs	
C. Choose at least 1 of the following set of* Intersection Courses *that explore the intersection of Neuroscience and discovery or scholarship derived from other academic disciplines:			
BIOE 406 Behavior and Evolution	4	A	
DANC 345 Teaching Dance to People w/ Disabilities (must take for 3 semesters to satisfy the major)	1,R4	A/S	
ECNS 451 Behavioral/Experimental Economics	3	S	
HTH 430 Hlth & Mind, Body, Spirit Relationship	3	A	
LIT 491 Poetry, Cognition and the Brain	3	intermitnt	
PSYX 233 Fundamentals of the Psychology of Aging	3	A/S/Su	