



The University of Georgia

University Council
Athens, Georgia 30602

May 2, 2012

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Dear Colleagues:

Attached is a proposal for a new Area of Emphasis in Neuroscience under the major in Biology (B.S.) for consideration by the Full University Curriculum Committee.

Sincerely,

David E. Shipley, Chair
University Curriculum Committee

cc: Provost Jere W. Morehead
Dr. Laura D. Jolly



Franklin College of Arts & Sciences
Division of Biological Sciences

Interim Dean Hugh Ruppensburg
Franklin College
Old College

February 27, 2012

Dear Hugh,

In coordination with the department of Psychology the Division of Biological Sciences would like to propose a major in Biology with a concentration in Neuroscience.

Neuroscience is a program that focuses on the interdisciplinary scientific study of the molecular, structural, physiologic, cognitive, and behavioral aspects of the brain and nervous system. It includes instruction in molecular and cellular neuroscience, brain science, anatomy and physiology of the central nervous system, molecular and biochemical bases of information processing, behavioral neuroscience, biology of neuropsychiatric disorders, and applications to the clinical sciences and biomedical engineering. The proposed neuroscience concentration will involve UGA faculty from across the campus to provide students with an adequate background to develop an interest in, and preparation for, graduate study and careers in the field of neuroscience or related disciplines. The Biology major with Neuroscience concentration combines a strong foundation in basic life sciences with more specialized courses in psychology and biology to examine specific brain functions from a structural, functional, behavioral and evolutionary viewpoint.

Neuroscience is an interdisciplinary area of research that focuses on the entire nervous system and involves various aspects of neurobiology, cognitive psychology, and neurophysiology. Touching on everything from the cell biology of neurons to the anatomy and physiology of brain function, neuroscience is a rapidly growing field that is central to many fields of endeavor. As an area of study, neuroscience has been rapidly expanding and is now offered as a separate degree program at a growing number of colleges and universities.

At UGA there has been a growing number of Biology/Psychology double majors as well as Biology majors with a minor in Psychology (Table 1). An informal survey of these students suggests that most, if not all, would prefer the option of a B.S. degree with a concentration in Neuroscience. Many of these double majors end up taking courses that are of modest benefit to them but are none the less necessary to complete the degree requirements in both Biology and Psychology. Despite the current lack of an undergraduate degree program in Neuroscience at UGA there is an established undergraduate student organization focused on Neuroscience; *Undergraduate Neuroscience Organization (UNO)*. <http://www.uno.uga.edu/>

UGA Enrollment		
	Biology/Psych Double Majors (0115/0688)	Psych Majors w/ Biology Minor
Fall 2005	35	2
Fall 2006	61	5
Fall 2007	89	14
Fall 2008	85	9
Fall 2009	120	15
Fall2010	131	7

Table 1. UGA Biology/Psychology double majors and minors

The Neuroscience concentration will be geared to meet the needs of students who intend to pursue postgraduate professional programs. Many of these will be in the area of medicine with an emphasis on neurology, neurosurgery, or neural development. Others will pursue graduate training that will eventually lead to related careers in basic research. Thus the curriculum will have a heavy emphasis on basic biology combined with a diverse mix of neuroscience electives.

Faculty: At the University of Georgia we currently have a significant number of faculty whose research encompasses aspects of the field of neuroscience. This breadth of expertise will enhance the interdisciplinary nature of the neuroscience program and provide for a unique educational and pre-professional training program.

To meet Georgia's training and research needs in this expanding field, in 2005 the University of Georgia established a new doctoral degree program in neuroscience. Currently this interdisciplinary graduate program in Neuroscience <http://www.biomed.uga.edu/divisions/neuroscience/> is administered by the Biomedical Health Sciences Institute (BHSI) and is comprised of over 30 faculty from fourteen different departments. Support comes primarily from the departments of psychology, biochemistry and molecular biology, cellular biology and veterinary physiology and pharmacology. Neuroscience represents research strength for the university with extramural funding currently exceeding \$11 million. There are also a significant number of undergraduate courses taught by these and other UGA faculty that are directly applicable to a study in Neuroscience.

Facilities: UGA's investment in world class facilities are assets that would greatly facilitate undergraduate research and instruction in the field of Neuroscience. The UGA Bio-Imaging Research Center has a state-of-the-art, General Electric 16-channel fixed-site Signa HDx 3.0 Tesla Magnetic Resonance Imaging (MRI) magnet capable of multiple magnetic resonance imaging techniques including magnetic resonance imaging for structural tissue imaging (MRI), functional neuroimaging (fMRI) for studies of brain activation in real time, magnetic resonance spectroscopy (MRS) for the study of chemical changes in the brain, and magnetic resonance angiography (MRA) for the study of vascular changes throughout the system. Multinuclear spectroscopy (MNS) has recently been added for enhanced spectroscopic studies and includes phosphorous-31. In addition the BIRC has capabilities in MEG, EEG, and a fMRI simulator for training purposes. <http://psychology.uga.edu/BIRC/facilities/index.htm>

The Cognitive and Clinical Neuroscience Laboratory is a collaborative effort based in the Department of Psychology at the University of Georgia. Under the direction of Drs. Brett Clementz and Jennifer McDowell, members of the laboratory are engaged in a variety of experimental and theoretical inquiries within the realm of cognitive neuroscience. <http://psychology.uga.edu/ccnl/>

Advising: Undergraduate advising will be overseen by the advising staff of Biological Sciences and will use a combination of faculty advisors and professional fulltime advisors. Since the majority of students expected to enroll in the Neuroscience concentration are currently Biology/Psychology double majors, we envision that the Neuroscience concentration program will not increase the advising load that is currently borne by either of these two units.

Administrative Staff: The Division of Biological Sciences currently has sufficient clerical and secretarial staff to manage the biology major with Neuroscience concentration program.

In summary, UGA already has many of the faculty and necessary course offerings as well as the world class research facilities it needs to establish a concentration program in Neuroscience.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark A. Farmer". The signature is fluid and cursive, with a long horizontal stroke at the end.

Mark Farmer
Chair – Biological Sciences

Proposal for Area of Emphasis

Franklin College of Arts and Sciences
Division of Biological Sciences
Biology Major
Neuroscience Area of Emphasis

Major Requirements for Biology (January 2012 Bulletin)

A baccalaureate degree program must require at least 21 semester hours of upper division courses in the major field and at least 39 semester hours of upper division work overall.

Students in the Franklin College must earn a grade of "C" (2.0) or better in major required courses.

Required Courses (21-26 hours)

(Minimum grade of "C" (2.0) is required in all upper division [BIOL](#) courses.)

[BCMB\(BIOL\)\(CHEM\) 3100](#) or [BCMB 4020/6020](#)

[CBIO\(BIOL\) 3300](#) or [CBIO\(BIOL\) 3400](#) or [PBIO\(BIOL\) 3600](#)

[ECOL\(BIOL\) 3500-3500L](#) or [GENE\(BIOL\) 3000](#)

[GENE\(BIOL\) 3200](#)

Organismal Biology

Choose one course from the following: (3-5 hours)

[CBIO 3000-3000L](#)

[CBIO\(PBIO\) 4600/6600-4600L/6600L](#)

[ECOL 4050/6050-4050L/6050L](#)

[ECOL 4070/6070-4070L/6070L](#)

[ENTO 3140-3140L](#)

[ENTO 3650-3650L](#)

[ENTO 4000/6000-4000L/6000L](#)

[MARS 3450-3450L](#)

*[MIBO 3510L](#)

[PATH\(PBIO\) 4200/6200-4200L/6200L](#)

[PBIO 4650/6650-4650L/6650L](#)

[WILD\(ECOL\) 3580](#), [WILD\(ECOL\) 3580L](#)

[WILD\(ECOL\) 4040/6040-4040L/6040L](#)

[WILD\(BIOL\) 4050/6050-4050L/6050L](#)

*Prerequisite or Corequisite: [MIBO 3500](#)

Laboratory

Choose one course from the following: 3-5 hours

[BCMB 4030L/6030L](#)

[GENE 4220L](#)

[BIOL 3110L](#)

[GENE 4230L](#)

[BIOL 3710L](#)

[GENE\(BIOL\) 3210L](#)

[BIOL 3720L](#)

[GENE\(BIOL\) 4210L](#)

[BIOL 4960](#) or [BIOL 4960H](#)

[MARS 3450-3450L](#)

[BIOL\(CBIO\) 5050L/7050L](#)

[MARS 4500/6500](#)

[CBIO 3000-3000L](#)

[MARS\(MIBO\) 4620/6620-4620L/6620L](#)

[ECOL 3220](#)
[ECOL\(BIOL\) 3500-3500L](#)
[ECOL 3505H-3505L](#)
[ECOL\(BIOL\) 3510](#)
[ECOL 3530-3530D](#)
[ECOL 3880H](#)
[ECOL 4000/6000](#)
[ECOL 4010/6010](#)
[ECOL 4050/6050-4050L/6050L](#)
[ECOL 4070/6070-4070L/6070L](#)
[ECOL 4110/6110](#)
[ECOL 4130L](#)
[ECOL\(BIOL\) 4150/6150-4150L/6150L](#)
[ECOL 4160](#)
[ECOL\(MARS\) 4225-4225L](#)
[ECOL 4240-4240L](#)
[ECOL\(FISH\)\(WASR\) 4310/6310-4310L/6310L](#)
[ECOL\(BIOL\)\(MARS\) 4330/6330-4330L/6330L](#)
[ECOL 4500/6500](#)
[ECOL\(PBIO\) 4520/6520](#)
[EHSC\(FDST\)\(MIBO\) 4310/6310-4310L/6310L](#)
[ENTO 3140-3140L](#)
[ENTO 3645](#)
[ENTO 3650-3650L](#)
[ENTO 4000/6000-4000L/6000L](#)
[ENTO 4820/6820-4820L/6820L](#)
[FDST\(MIBO\) 4120/6120-4120L/6120L](#)
[FISH\(ECOL\)\(MARS\)\(WILD\) 4300/6300](#)
[FISH\(ECOL\) 4360/6360](#)
[FISH 4500/6500](#)

[PBIO 4230/6230-4230L/6230L](#)
[PBIO 4270/6270](#)
[PBIO\(CRSS\)\(BIOL\) 4500/6500](#)
[PBIO\(CRSS\)\(BIOL\) 4500L/6500L](#)
[PBIO\(GENE\)\(PATH\) 4510/6510](#)
[PBIO 4530/6530](#)
[PBIO 4540/6540](#)
[PBIO\(BIOL\)\(BINF\) 4550/6550](#)
[PBIO 4640/6640-4640L/6640L](#)
[PBIO 4650/6650-4650L/6650L](#)
[PBIO\(BCMB\)\(FORS\) 4670/6670](#)
[PBIO\(ECOL\) 4750/6750](#)
[PBIO 4850/6850-4850L/6850L](#)
[POPH\(MIBO\)\(IDIS\) 4450/6450-4450L/6450L](#)
[POPH\(MIBO\)\(IDIS\) 4650/6650](#)
[POPH\(MIBO\) 4651](#)
[POUL\(BIOL\) 4060/6060](#)
[PSYC 4120](#)
[PSYC 4130](#)
[PSYC 4140](#)
[PSYC 4150](#)
[PSYC 5750/7750](#)
[PSYC 5770/7770](#)
[PSYC 5850](#)
[VPAT 4000/6000](#)
[VPHY 3100](#)
[WILD\(ECOL\) 3580, WILD\(ECOL\) 3580L](#)
[WILD\(ECOL\) 4040/6040-4040L/6040L](#)
[WILD\(BIOL\) 4050/6050-4050L/6050L](#)
[WILD 4060/6060-4060L/6060L](#)

[BCMB\(ENTO\)\(BTEC\) 4200/6200](#)

[BIOL 3110L](#)

[BIOL\(WILD\) 3700](#)

[BIOL 3710L](#)

[BIOL 3720L](#)

[BIOL 4910](#)

[BIOL 4960](#)

[BIOL 4960H](#)

[BIOL\(CBIO\)\(VPAT\) 5040/7040](#)

[BIOL\(CBIO\) 5050L/7050L](#)

[BTEC\(BCMB\)\(PBIO\) 4000L](#)

[CBIO 3000-3000L](#)

[CBIO 3200](#)

[CBIO\(BIOL\) 3300](#)

[CBIO\(BIOL\) 3400](#)

[CBIO\(BIOL\) 3400E](#)

[CBIO\(BIOL\) 3410L](#)

[CBIO 3710](#)

[CBIO\(BIOL\) 3800](#)

[CBIO\(MIBO\)\(IDIS\) 4100/6100](#)

[CBIO 4200](#)

[CBIO 4200H](#)

[CBIO 4340/6340](#)

[CBIO 4500/6500](#)

[CBIO\(PBIO\) 4600/6600-4600L/6600L](#)

[CBIO 4730/6730](#)

[CHEM\(BCMB\) 4190/6190](#)

[CRSS\(HORT\)\(ECOL\) 4590/6590](#)

[CRSS\(MIBO\) 4610/6610-4610L/6610L](#)

[ECOL 3000-3000L](#)

[ECOL 3100-3100L](#)

[GEOG\(PBIO\) 4240/6240](#)

[IDIS\(CBIO\) 3100](#)

[MARS 3450-3450L](#)

[MARS 3550](#)

[MARS\(PBIO\) 4160-4160L](#)

[MARS 4200/6200](#)

[MARS 4500/6500](#)

[MARS\(MIBO\) 4620/6620-4620L/6620L](#)

[MIBO 3500](#)

[MIBO 3510L](#)

[MIBO 3510H](#)

[MIBO 4090/6090](#)

[MIBO 4090E/6090E](#)

[MIBO\(POPH\) 4220/6220](#)

[MIBO\(POPH\) 4220E/6220E](#)

[MIBO 4300E/6300E](#)

[MIBO 4300/6300](#)

[MIBO 4500E/6500E](#)

[MIBO 4500/6500](#)

[MIBO 4600L/6600L](#)

[MIBO 4680/6680](#)

[MIBO 4700/6700](#)

[MIBO 4710L/6710L](#)

[PATH\(ANTH\)\(PBIO\) 3010](#)

[PATH\(PBIO\) 4200/6200-4200L/6200L](#)

[PBIO\(BIOL\)\(CRSS\) 3020](#)

[PBIO 3160-3160L](#)

[PBIO\(BIOL\) 3250L](#)

[PBIO\(BIOL\) 3600](#)

[PBIO\(BIOL\) 3660L](#)

[PBIO 3830-3830L](#)

[CBIO\(BIOL\) 3410L](#)

[CBIO\(PBIO\) 4600/6600-4600L/6600L](#)

[ECOL 3260-3260L](#)

[WILD\(ECOL\) 4040/6040-4040L/6040L](#)

[ECOL 4050/6050-4050L/6050L](#)

[ECOL 4070/6070-4070L/6070L](#)

[ECOL\(BIOL\) 3510](#)

[ECOL\(FISH\)\(WASR\) 4310/6310-4310L/6310L](#)

[ENTO 3140-3140L](#)

[ENTO 3650-3650L](#)

[ENTO 4000/6000-4000L/6000L](#)

[MIBO 3510L*](#)

[MIBO 4600L/6600L](#)

[MIBO 4710L/6710L**](#)

[PATH\(PBIO\) 4200/6200-4200L/6200L](#)

[PBIO\(BIOL\) 3250L](#)

[PBIO\(BIOL\) 3660L](#)

[PBIO 3830-3830L](#)

[PBIO 4230/6230-4230L/6230L](#)

[PBIO 4650/6650-4650L/6650L](#)

[WILD\(ECOL\) 3580-3580L](#)

[WILD\(BIOL\) 4050/6050-4050L/6050L](#)

*Prerequisite: [MIBO 3500](#)

**Prerequisite: [MIBO 4700/6700](#)

Major Electives (9 hours)

For a total of nine hours, choose three or more courses from the list below. At least two of the courses must be 3 or more credit hours and from two different departments.

[ANTH\(ECOL\) 4210/6210](#)

[ANTH\(BIOL\)\(ECOL\)\(ENTO\)\(PBIO\) 4260/6260-4260L/6260L](#)

[ANTH\(BIOL\)\(ECOL\)\(EETH\)\(ENTO\)\(FANR\)\(GEOL\)\(PATH\)\(PBIO\) 4261](#)

[ANTH 4790/6790](#)

[BCMB\(BIOL\)\(CHEM\) 3100](#)

[BCMB\(GENE\) 3433](#)

[BCMB 3600](#)

[BCMB 3600H](#)

[BCMB 4010/6010](#)

[BCMB 4020/6020](#)

[BCMB 4030L/6030L](#)

[BCMB\(CHEM\) 4110/6110](#)

[BCMB 4120/6120](#)

[BCMB 4130](#)

[BCMB 4130H](#)

[FISH\(ECOL\)\(MARS\)\(WILD\) 4550/6550-4550L/6550L](#)

[GENE\(BIOL\) 3000](#)

[GENE\(BIOL\) 3200](#)

[GENE\(BIOL\) 3210L](#)

[GENE 4050](#)

[GENE 4070](#)

[GENE 4200/6200](#)

[GENE\(BIOL\) 4210L](#)

[GENE 4220L](#)

[GENE 4230L](#)

[GENE 4300/6300](#)

[GENE 4500/6500](#)

[GENE\(PBIO\)\(PATH\) 4800L/6800L](#)

[GENE\(PBIO\)\(PATH\) 4810L/6810L](#)

[GEOG\(PBIO\) 4220/6220](#)

Neuroscience area of Emphasis

Proposed *BIOLOGY MAJOR REQUIREMENTS, NEUROSCIENCE AREA OF EMPHASIS*

Proposed for Fall 2012

Required:

(Minimum grade of "C" (2.0) is required in all upper division [BIOL](#) courses.)

BCMB(BIOL)(CHEM) 3100 (4) or BCMB 4020 (3)

GENE 3200 (4 hours)

CBIO (BIOL)3300* or CBIO(BIOL) 3400* (4) or PBIO(BIOL) 3600 (*CBIO 3300 or CBIO 3400 preferred)

ECOL (BIOL) 3500-3500L or ECOL 3505H-3505L or GENE(BIOL) 3000 (4)

Organismal Course (3-4 hours)

Choose one of the following courses

CBIO 3000/L Vertebrate Anatomy

BIOL(WILD)3700 Animal Behavior

PSYC 5750/7750 Principles of Primate Phylogeny

Laboratory Course (3-4 hours)

Choose one of the following courses

BIOL 4960 Undergraduate Research in Biology (preferred)

BIOL 3110L Basic Skills in the Laboratory

BIOL 3710L Animal Behavior Laboratory

BIOL 3720L Field Animal Behavior

GENE(BIOL) 3210L Experimental Genetics

GENE(BIOL) 4210L Molecular Genetics Laboratory

Major-Related Electives (9 hours)

CBIO(BIOL) 3800 Neurobiology (**Required**)

One of the Following:

PSYC 4120 Sensation and Perception

PSYC 4130 Physiological and Comparative Psychology

PSYC 4140 Cognitive Neuroscience

PSYC 4150 Biological Foundations of Health Psychology

PSYC 5750/7750 Principles of Primate Phylogeny (if not taken above)

PSYC 5770/7770 Organization of Primate Social Groups

PSYC 5850 Psychopharmacology - Drugs and Behavior

One of the Following:

VPHY 3100 Elements of Physiology

CBIO(BIOL) 3300 Developmental Biology

CBIO 4200 Biomedical Research in Health and Disease

ANTH 4790 Human Adaptation

BCMB 4120/6120 Human Biochemistry and Disease

BCMB 4130 Mechanisms of Human Disease

CBIO 4340/6340 Biology of Aging

CBIO 4730/6730 Endocrinology

GENE 4050 Behavior Genetics
GENE 4500/6500 Human Genetics
VPAT 4000 Origins of Disease

Rationale: A Neuroscience Area of Emphasis within the Biology major is highly desired by students and will decrease time to degree completion for many Biology/Psychology double majors.

Signatures:

Mark Farmer, Chair
Division of Biological Sciences _____

Date

W. Keith Campbell, Head
Department of Psychology _____

Date

Franklin College Curriculum Committee Chair _____

Date

University Curriculum Committee Chair _____

Date