BOARD OF HIGHER EDUCATION

REQUEST FOR COMMITTEE AND BOARD ACTION

COMMITTEE: Academic Affairs **NO**.: AAC 11-14

COMMITTEE DATE: March 15, 2011

BOARD DATE: March 22, 2011

MOVED: The Board of Higher Education hereby approves the expedited application of the **University of Massachusetts Boston** to award the **Doctor of Philosophy in Developmental and Brain Sciences (DBS) and the Master of Science in Developmental and Brain Sciences.**

One year after graduating the first class, the University shall submit to the Board a status report addressing its success in reaching program goals as stated in the application and in the areas of enrollment, curriculum, faculty, resources, and program effectiveness.

Authority: Massachusetts General Laws Chapter 15A Section 9(b)

Contact: Dr. Francesca Purcell, Associate Commissioner for Academic and P-16 Policy

BOARD OF HIGHER EDUCATION

March 2011

University of Massachusetts Boston

Doctor of Philosophy in Developmental and Brain Sciences
and
Master of Science in Developmental and Brain Sciences

INTENT

The University of Massachusetts Boston (UMB) has submitted an expedited proposal to offer a Doctor of Philosophy in Developmental and Brain Sciences and the Master of Science in Developmental and Brain Sciences. The University will not recruit students for the master's program. Students who complete the pre-doctoral coursework of the proposed doctoral program and the preliminary qualifying exam will be granted a masters degree en route to the proposed doctoral program. Likewise, students who do not qualify for advancement or desire to terminate will be awarded the master's degree.
The proposed Developmental and Brain Sciences doctoral program intends to focus on behavioral, cognitive, and socio-emotional processes during early developmental stages when underlying brain mechanisms are under active development and particularly sensitive to enduring change in response to environmental input. It intends to provide students with the breadth of training needed to investigate development at both the level of cognition and behavior and at the level of underlying neural mechanisms. It will also provide students with training in research methods in the developmental and brain sciences as well as the skills needed to work effectively in interdisciplinary and translational research teams. A unique component of the program will be the opportunity for training focused on minority-based health disparities in neuro-developmental and adult disorders, and targeted recruitment of students who are under-represented in the sciences. Graduates will be prepared for job placements in multiple arenas including government laboratory sites, academia, industry-based research and development positions related to human factors engineering, biotechnology, pharmaceutical or medical device companies; and hospitals and clinics as clinicians and/or researchers.

The proposed program will complement the existing doctoral program in Clinical Psychology, maximize the use of faculty resources in the Department of Psychology and related departments, and address major growth areas in the developmental, cognitive, and behavioral neurosciences.

The proposal has obtained all necessary governance approvals on campus and was approved by the University Board of Trustees on September 29, 2010. The letter of intent was circulated on November 2, 2010. No comments were received in response to the letter of intent.

MISSION

The proposed program is directly related to the mission of the University, the strategic priorities established by the trustees, and the strategic plan of the University of Massachusetts Boston. These goals and priorities call for maintaining access to excellence, strengthening the research enterprise, renewing the faculty base, enhancing student learning, promoting diversity, and positioning the University effectively in the higher education marketplace. To help meet these goals, the proposed program will provide graduate level training for entry to professional careers in the biomedical sciences and in the life sciences more generally, and will meet the Commonwealth's growing need for employees who are highly skilled in these areas.

NEED AND DEMAND

Trends are toward greater use of interdisciplinary research teams to address complex research problems using multiple advanced technologies and varied expertise. Behavioral and cognitive neuroscience (strongly allied to biology) and cognitive science (strongly allied to computer science) are major growth areas in psychology and allied disciplines. The program is designed to meet national needs for increased training for careers in biomedical research and practice, increased expertise in translational research, and improved cognitive functioning and mental health in the populace. Like psychology in general, neuroscience is a highly diverse field of study.

According to the U.S. Bureau of Labor Statistics, job prospects for the 2008-2018 decade are promising for biological scientists in health-related fields, medical scientists, psychologists in medical settings, and for higher education. Within this decade, the Bureau projects average growth of 12% across all areas of the field, while growth in areas of relevance to the proposed program is expected to increase much faster than the average, with projections largely in the 15-21% range.

In comparing the proposed program to similar programs in the state, the University of Massachusetts Amherst has a broad-based program in neuroscience and behavior that crosses several colleges and departments. However, development is not a requisite integrative theme for the Amherst program. The UMass Boston program is planned to feature a close integration with the clinical sciences, primarily through translational research collaborations. This is also not a defining feature of the Amherst program. Further, UMass Boston will focus on serving students from populations that are underrepresented in the sciences. For example the curriculum will provide formal knowledge and will address research design concerns of importance to understanding and conducting research on minority-based health
A second program of relevance in the Boston area is the Elliot-Pearson Department of Child Development at Tufts University. This program is centrally concerned with behavioral development, particularly as studied from an applied perspective in school-age children. However, the program does not have a neuroscience component, nor does it include the focus on very early development (prenatal, infants, and toddlers) that the UMass Boston program proposes.

ACADEMIC AND RELATED MATTERS

Admission Requirements
Each applicant will be required to submit GRE scores, official transcripts of academic record(s), an essay describing interests and experiences, and three letters of recommendation. Given the multidisciplinary nature of neuroscience, the University will not require a degree in a specific area although training in psychology or other life sciences is expected to be typical. Applicants are anticipated to primarily represent graduates with B.S. degrees and substantial undergraduate research experience. Successful applicants will likely have a record of coursework in both behavioral neuroscience and in cognitive neuroscience, although it is possible that an accepted student may have greater strength in one area than the other.

Projected Enrollment
Each year, the University will accept no more than six full-time graduate students into the proposed Ph.D. program. Neither part-time student enrollment nor enrollment of master's only students will be an option within the program. The program is expected to take five years for completion, with no more than 20 – 30 students in year five of the program. The University plans to enroll its first students in the proposed program in fall 2012. All students will be fully supported for a minimum of five years of graduate study. This will include a tuition and fee stipend, and a $20,000 graduate assistantship.

Curriculum (Attachment A)
Each student will work with a primary faculty advisor and an individually selected advisory committee of the primary advisor and two other program faculty to develop and monitor a cohesive plan of work that reflects both program and individual goals. There will be a set of required courses taken by all students and elective courses, through which the program of study will be individually tailored. Core courses include behavioral neuroscience, cognitive neuroscience, and a choice between developmental behavioral neuroscience or developmental cognitive neuroscience. Other required courses consist of a set of three one-credit introductory modules, including a proseminar and two modules on responsible conduct in science (one focused on research ethics and one focused on communication with diverse audiences) and two methods requirements. Students are required to take four elective courses drawn from a list of specialized courses in the program. Upon approval by the advisory committee, up to two elective courses may be selected from a list of appropriate courses offered by other doctoral programs. Required credits in the program of study will be equally divided between coursework (minimum of 30 credits) and research (minimum of 30 credits, with 24 credits of dissertation credits required).

Students will engage in research under the direction of a program faculty member beginning in the first semester and continuing through the dissertation research. In the course of training, each student will have the option of lab rotations designed to maximize the acquisition of diverse research skills relevant to the student's interests. Formal research products will include a mentored research project and a doctoral dissertation. A qualifying examination will be used to assess knowledge and understanding of the subject matter before the student advances to doctoral candidacy and begins the dissertation.

In addition to successful completion of coursework, mastery will be assessed through a two-part preliminary qualifying exam consisting of an oral presentation and defense of a mentored research project, a written comprehensive exam to be completed by the end of the third year, and completion of the doctoral dissertation proposal, research, and defense. Additionally, students will obtain experience as teaching assistants and course instructors within a mentoring program.

Student Learning Outcomes

The proposed DBS program will focus on behavioral, cognitive, and socio-emotional processes during early developmental stages, when underlying brain mechanisms are under active development and particularly sensitive to enduring change in response to environmental input. It will provide its students with the breadth of training needed to investigate development at both the level of cognition and behavior and at the level of underlying neural mechanisms. Through cross-fertilization with the existing Clinical Psychology program, it will provide students with the translational research skills that are needed to move productively between basic research and clinical applications, including work in minority groups where specialized expertise is required to engage the community.

RESOURCES

Faculty and Staff

The proposed program will be housed in the current Department of Psychology. A graduate program director (GPD) for the proposed program will be elected for a three year term by the faculty of the department. This individual, along with three members of the program faculty, elected by department faculty on an annual basis, will form the proposed program's executive committee. The executive committee will be charged with initiating all policy recommendations regarding the doctoral program. The graduate program director will have primary responsibility for the day-to-day functioning of the proposed program.

Since 2005, the Department of Psychology has utilized an approved strategic hiring plan for eight assistant professor lines, including five lines at the intersections of developmental, cognitive, and behavioral neuroscience. The Department filled four of the neuroscience lines, searched for a fifth candidate this year, and is currently negotiating that hire. One previous hire, a social cognitive neuroscientist, has left the University. Thus, along with prior faculty, the core faculty for the proposed DBS program now include four cognitive neuroscientists (one added since 2005 and one in process), and five behavioral neuroscientists (two added since 2005). Specific areas of expertise of the new hires are cross-modality perceptual development, hormonal influences on behavioral development, and hormonal influences on reproductive development and the control of male reproductive functioning. All faculty engage in teaching, research, and service for the department and all faculty will teach at both the undergraduate and graduate programs. Due to loss of one faculty member, completion of the current hiring plan entails one additional hire for a behavioral neuroscientist.

Facilities/Library Resources

Material resources available to the Department include designated private offices for all full-time faculty and staff and shared offices for part-time faculty and graduate students in the Clinical Psychology Ph.D. Program, a conference room, and three dedicated teaching rooms (two equipped as laboratories and one as a seminar room). Research space includes assigned research laboratories for full-time faculty members as well as shared general use spaces. Common areas for informal meetings include a lounge for graduate students, an office for undergraduate student clubs, and a mailroom with some gathering space. Available space is fully used and faculty growth will require additional offices and research laboratories. The Department has 20 faculty research labs, supporting a broad range of research methods from survey questionnaires to cellular neuroscience, and study populations that include human infants and animals as well as adults. The biology and psychology departments jointly operate an animal care facility.

Planning has begun for expanding research facilities through presence in the planned Integrated Sciences Complex that is under construction. The master plan for the University includes new building construction over the next few years, including a new science building to be completed in March 2013 that will house the Psychology Department faculty for this DBS Program. Planning requests have included space for the graduate students, adjacent to faculty labs. Space for support staff for the DBS Program has also been part of the renovated space planning.

Members of the DBS faculty examined library holdings and met with library staff to discuss the adequacy of holdings and determined that the current electronic and print holdings will meet the needs of the proposed program.

Fiscal (Attachment B)

The University planned the proposed program to maximize use of resources already at the University, instruments and techniques already supported through faculty research and grants, and resources that are planned to be added in response to other strategic initiatives. Therefore, the University projects that the DBS program can be mounted with modest investments beyond those already envisioned for other strategic goals. Furthermore, the University projects that gains (e.g., in new grant activity, visibility for the university) will repay these investments. The University has detailed dedicated program expenses for the first four years of the program in the attached budget.

EVALUATION

The proposed program was reviewed October 3-5, 2011 by Jeffrey R. Alberts, Ph.D., Professor of Psychology, Indiana University, and Mark S. Blumberg, Ph.D., Professor of Psychology, University of Iowa. The reviewers expressed enthusiastic support for the program. They commented that the proposed program has the potential to add to the prestige of the Department of Psychology and the University of Massachusetts Boston, as a whole. The ultimate success of the program, however, depends on how it is implemented and the resources that are provided (e.g., graduate student stipends, faculty hires, and research support).

The reviewers observed that the University's original enrollment projects were unrealistic to expect high caliber students, especially in the short-term, and advised the University against building the proposed program too quickly. Specifically, they suggested that the University's original enrollment projection of 6-8 graduate students per year was too high a number, in light of the $20,000 per student stipends currently allocated by the University.

The reviewers noted that the proposed program will require a variety of new or upgraded institutional capabilities - there will be increasing needs for grant preparation, budget creation and management, and grant writing and editing. Transitioning to a graduate program will also require a restructuring of current teaching loads. The reviewers also advised the University to establish an external advisory committee that will provide ongoing input, feedback, and formative evaluations of the program's progress.

Institutional Response
The University responded that it would admit no more than six students per year and also noted that the program is aware of the need to increase stipends in order to attract top students into the program and will allocate the $120,000 total for stipends in a manner necessary to attract the very best students which may require admitting only 3-4 students/year. All students will be fully supported for a minimum of 5 years of graduate study.

In regard to faculty workload, the University responded that it will rely on the same system that the current Ph.D. program in Clinical Psychology utilizes to generate course load reductions in support of research and mentoring activities. Graduate teaching demands of the proposed program will be offset by the use of graduate students initially as teaching assistants and later as instructors in the undergraduate program.

The University responded that the Department will establish an external advisory committee for the proposed program.

STAFF ANALYSIS AND RECOMMENDATION

The staff has thoroughly evaluated all materials submitted by the University of Massachusetts Boston and finds that the proposal meets the requirements for NEASC-accredited institutions outlined in 610 CMR 2.08. Recommendation is for approval of the institution's petition to offer the Doctor of Philosophy in Developmental and Brain Sciences and Master of Science in Developmental and Brain Sciences.

ATTACHMENT A: CURRICULUM GUIDE

Graduate Program Curriculum Outline

Major Required (Core) Courses **(Total courses required =** *9 course credits; 30 credits research***)**		
Course Number	Course Title	Credit Hours
DBS 6xx.	Proseminar in Developmental and Brain Sciences	1
DBS 6xx	Responsible Conduct in Science I: Research Ethics	1
DBS 6xx	Responsible Conduct in Science II: Scientific Communication with Diverse Audiences	1
DBS 6xx	Behavioral Neuroscience	3
DBS 6xx	Cognitive Neuroscience	3
DBS 6xx	Mentored Research (1-6 credits may be taken)	6
DBS 7xx	Dissertation Research (1-6 credits may be taken)	24
	SubTotal # Core Credits Required	39
Concentration Course Choices (Total courses required = 3) *(attach list as needed)*		
DBS 6xx	Development of Brain and Cognition (choice 1 of 2; 1 required)	3
DBS 6xx	Developmental Behavioral Neuroscience (choice 2 of 2)	3
DBS 670	Advanced Statistics I (choice 1 of 3; 2 required)	3
DBS7xx	Design and Analysis for Developmental Studies (choice 2 of 3)	3
DBS 7xx	Matlab for the Behavioral Sciences (choice 3 of 3)	3
	SubTotal # Concentration Credits Required	9
Other/Elective Course Choices (Total courses required = 4) *(*attach list as needed)		
DBS 7xx	Early Cognitive Development	3
DBS 7xx	The Development and Neural Basis of Higher Cognitive Function	3
DBS 7xx	Development and Evolution of Behavior	3
DBS 7xx	The Visual System	3
DBS 7xx	Brain Development	3
DBS 7xx	Neurodevelopmental Disorders	3
DBS 7xx	Neurobiology of Addiction	3
DBS 7xx	Role of Hormones in Neural Development	3
DBS 7xx	Advanced Hormones and Behavior	3
DBS 7xx	Genes and Development	3
	With approval, 2 courses may be taken from the Clinical Psychology Ph.D. Program or from graduate programs in	

	Biology and Computer Science	
	SubTotal # Elective Credits Required	12

Curriculum Summary	
Total number of courses required for the degree	10 (counting the three 1 credit courses as one 3 credit course)
Total credit hours required for degree	60 (30 coursework; 30 research)

Admission Standards

Each applicant will be required to submit Graduate Record Examination (GRE) scores for the general examination, official transcripts of their academic record(s), an essay describing their interests and experiences, and three letters of recommendation. Given the multidisciplinary nature of neuroscience, we will not require a degree in a specific area although training in psychology or other life sciences is expected to be typical. Applicants are anticipated to primarily represent graduates with B.S. degrees and substantial undergraduate research experience. We expect that successful applicants will have had three or more courses of direct relevance to the developmental and brain sciences. Successful applicants will likely have a record of coursework in both behavioral neuroscience and in cognitive neuroscience, although it is possible that an accepted student may have greater strength in one area than the other.

Requirements for Advancement to Doctoral Candidacy

For advancement to doctoral candidacy, completion of core coursework and oral presentation and defense of the Mentored Research Project to program faculty will constitute the oral part of the preliminary qualifying exam. The preliminary comprehensive written portion of the qualifying exam must be completed no later than the end of the third year. This exam will consist of questions posed by the program faculty to test knowledge in the core areas of the program and to examine the student's ability to critically evaluate and synthesize primary research literature to provide empirically-based summarization on selected areas of interest.

ATTACHMENT B: BUDGET

University of Massachusetts Boston
Ph.D. in Developmental and Brain Sciences

One Time/ Start Up Costs		***Annual Expenses***			
	Cost Categories	**Year 1**	**Year 2**	**Year 3**	**Year 4**
210,000	Full Time Faculty (n=5) *(1/2 Salary & Fringe)*	474,128	490,722	505,444	520,608
	Part Time/Adjunct Faculty	0	0	0	0
	Student Assistantships and Staff	161,000	282,435	403,708	525,019
	General Administrative Costs	7,500	7,500	7,500	7,500
	Instructional Materials, Library Acquisitions	0	0	0	0
	Facilities/Space/Equipment	100,000	100,000	100,000	5,000
	Field & Clinical Resources	0	0	0	0
	Marketing	2000	2000	1000	1000
	Other (Specify)	3,500	3,500	3,500	3,500
	TOTALS	748,128	886,157	1,021,152	1,062,627

One Time/ Start-Up Support		***Annual Income***			
	Revenue Sources	**Year 1**	**Year 2**	**Year 3**	**Year 4**
	Grants (indirect provided; total = 784,292)	240,935	240,935	240,935	240,935
	Tuition	441,000	441,000	441,000	441,000
	Fees	1,636,698	1,636,698	1,636,698	1,636,698
	Departmental	0	0	0	0
	Reallocated Funds	100,000	100,000	0	0
	Other (specify)	0	0	0	0
	TOTALS	2,418,633	2,418,633	2,318,633	2,318,633

UMB BUDGET NARRATIVE

I. Annual Expenses

FT Faculty. The DBS Ph.D. Program began with a hiring plan effective in 2005. This plan included 5 new faculty lines. In the past 5 years, 4 new hires have been made (one of whom has left the University) and an additional hire is in negotiation for a fall 2011 start date. We assume that we will search in fall 2011 for a replacement faculty member who will begin in fall 2012, the first year of the program. Although these faculty have been hired specifically to help build the DBS Program, like all faculty, they have responsibilities for undergraduate teaching, research, and service as well as graduate teaching. There is no clear metric for determining what percentage of faculty salary can be determined to represent the portion appropriate to the DBS program; indeed, all but the graduate teaching and mentoring roles are tasks currently engaged by faculty. Nevertheless, we are using the liberal estimate of half the faculty salary and fringe to represent the portion estimated for DBS Program expense. The budget presents ½ of the actual costs for each of these 5 lines for the first 4 years of the program. For the faculty member with whom we are currently negotiating, we have provided a good faith estimate of salary and start-up allocations that are likely to be made in the 12-13 and 13-14 academic years. For the to-be-determined faculty member (expertise in Behavioral Neuroscience) who will begin in fall 2012, we have estimated salary and estimated the start-up costs based on the average of our last two hires in the Behavioral Neuroscience area. Thus, in Year 1, we are showing costs for all 5 faculty members hired /to be hired under the hiring plan developed in support of this program. With respect to salaries, Year 2 assumes the existing contractual 3.5% increase in compensation. Since contracts for Years 3 and 4 have not yet been adopted, increases of 3% are assumed in each of these years. One time start-up costs are listed for the two newest faculty members (the one now under negotiation and the one to-be-hired next year). During years 2012-2015, start-up funds of approximately $210,000 are expected to be needed.

PT Faculty. The DBS Program will not use any PT or Adjunct Faculty as instructors.

Student Assistantships and Staff Costs: Our proposed budget includes funding for a maximum of six new graduate assistantships ($20,000 used as average for MA and out-of-state students) in each year of the program (year 1 – 6; year 2 – 12; year 3 – 18; year 4 – 24). Tuition and fees are also waived for graduate students. One program administrator is budgeted at a starting amount of $41,000 with the annual increases described above. *Note:* The $120,000/year that is available for each class of students will be flexibly allocated to provide stipends of higher value to a smaller number of students as needed.

General Administrative *Costs:* General administrative costs, including office supplies, telephone and photocopying of instructional materials, and certain animal care expenses are estimated at $7500/year.

Instructional Materials, Library Acquisition: The needs of our faculty are now being met by the electronic and print resources within the library. Our faculty have examined library resources, met with library personnel, and determined that we will not need additional acquisitions.

Facilities/Space/Equipment: Costs associated with the purchase and maintenance of shared research and teaching-related instrumentation and analytical equipment, chemical agents, and statistical software are estimated at $100,000/year in the initial 3 years of the program. In the 4th year, $5000 for maintenance and servicing fees has been estimated.

Field & Clinical Resources: The program has no field or clinical work requirements.

Marketing: Marketing and development of printed and web resources are estimated at a cost of $2000/year for years 1 and 2, and $1000/year thereafter.

Other costs. The GPD for the program will be selected from among current faculty and will be provided a stipend of $3500/year.

Impact on department budget. The impact is expected to be negligible since we have requested sufficient resources for the first several years of the program to avoid depleting our undergraduate program.

II. Annual Income

Grants. Our current faculty have a consistent track record of obtaining external funding and research excellence has been an important criterion in our selection of new faculty. For the single 09-10 fiscal year, the amount of external funding generated by DBS faculty was $784,292 and the amount of indirect received by the University was $240,935. Given the productivity of our faculty, we expect this figure to be a representative estimate for future years.

Tuition: Although the tuition and fees for the graduate students in the DBS Program will be covered through their graduate stipends, it is important to recognize that all faculty teach at both the graduate and undergraduate levels. Thus, through undergraduate teaching, Program Faculty generate income. We have conservatively estimated this income based on the contributions of 10 faculty members each teaching a 35 person, 3 credit course during each semester (350 students/semester; 700/year). These figures are based upon the assumption that 90% (630) of the students taught will be in-state residents and 10% (70) will be out-of-state residents. Tuition for an in-state student is now $71.50/credit; non-resident tuition is $406.50/credit. These figures were used to calculate the income from tuition and fees for 630 in state and 70 non-resident students enrolled in 6 credits/year (i.e. 630 x 71.50 x 6 + 70 x 406.50 x 6 = $441,000).

Fees: Fees for an in-state student are now $370.80/credit; for non-residents, fees are $559.70/credit. These figures were used to calculate the income from fees for 630 in state and 70 non-resident students enrolled in 6 credits/year (i.e. 630 x 370.80 x 6 + 70 x 559.70 x 6 = $1,636,698/year).

Department: There are no direct sources of income for the department.

Reallocated funds: The program will utilize 200,000 in funds reallocated from University College. These funds will be distributed in year 1 and year 2 of the program.

Other: There are no other income-generating resources or activities