University of Washington
Graduate Program in Neurobiology & Behavior

Academic Program Review
Self-Study Guidelines 2004-2005

SECTION A: Self-Evaluation

1. What are your unit's strengths? Units generally have a variety of roles and responsibilities within the institution (e.g., undergraduate, graduate, professional education; continuing education; outreach education; research, scholarly, or creative activity; service; consultation; self sustaining activities; patient care). Please describe what you do, focusing particularly on those things you do well. You may wish to include examples of long-term excellence as well as any recent accomplishments or improvements in your unit. In what ways is your unit a leader in your field?

Understanding the brain represents the major scientific challenge of this century. The goal of the Interdisciplinary Graduate Program in Neurobiology and Behavior (NEUBEH) is to train the scientists that will meet this challenge. The NEUBEH Program grew out of a desire to provide an integrated approach to the education of graduate students in neuroscience. The field of neuroscience itself has drawn on a variety of disciplines, including physiology, pharmacology, psychology, anatomy, biochemistry, cell biology, neurology, computer science, and engineering. These disciplines are represented at the University of Washington in a number of different schools, including Arts and Sciences, Medicine, and Engineering, and the creation of a University-wide graduate program has been an effective way to provide a truly cross-campus training opportunity. Currently, the NEUBEH Program draws on over 100 faculty from the University proper, as well as the Regional Veterans Affairs Medical Center and Harborview Medical Center. In addition, several members of the program are at the Fred Hutchinson Cancer Research Center. The research areas represented by the current faculty span all areas of modern neuroscience, from molecule to mental function, basic biophysics to disease. The NEUBEH Program is designed to allow students to obtain both broad training in the neurosciences as well as more intensive coursework in their specific areas of interest.

By the nature of our interdisciplinary organization, we have several key advantages over traditional departmentally based graduate programs. First, we have the ability to rapidly update our membership and hence our training expertise according to the most recent advances. As the field of neuroscience incorporates new approaches and technologies, we can reflect these changes by involving new faculty in our program. For example, we have substantially increased the number of faculty involved in clinical areas of neuroscience to reflect the interests of the students and the increased national focus on translational research. This provides the students in our program with the most up-to-date training

possible. Second, the fact that we draw on faculty from many different departments facilitates the development of interest groups around a specific question or issue, which can provide both a critical mass of faculty and a training focus for the students. Examples include a group of faculty and students that study song learning in birds, from basic neurophysiology to ethology; a synapse group, that has faculty members in Physiology and Biophysics, Pharmacology, and Genome Sciences; and a recently developed group on diseases of the nervous system, with members from both basic and clinical science departments. Third, our faculty can provide a truly cross-disciplinary curriculum for graduate student courses. While most of graduate training is laboratory based, the members of the five founding departments (Pharmacology, Physiology & Biophysics, Biological Structure, Biology and Psychology) developed a three quarter integrated course in neuroscience. This course, and the additional electives that have been added to the curriculum, draws on the expertise of faculty over such a wide range that no traditional department could encompass. This provides the students with access to the best neuroscientists on campus, regardless of department affiliation.

In addition to their laboratory training and coursework, the students in the NEUBEH Program have several Program requirements designed to promote their career development. The program provides opportunities for training in teaching at the undergraduate, graduate or professional school level. In particular, the development of an undergraduate major in neuroscience has been instrumental in providing outstanding teaching experiences for the NEUBEH graduate students. The students select and host the speakers for our bi-weekly seminar series. Students participate in a bi-weekly journal club, where they review the recent publications of the up-coming invited speakers. The students in the program are also given many opportunities to present the results of their research: in their rotation talks in their first year and at the annual program retreat in subsequent years. Several of the students in the NEUBEH Program have also organized a career seminar series, in which Ph.D.s from a variety of career paths visit and share their experiences.

At the core of the NEUBEH Program is a truly exceptional faculty. Many program faculty have received prestigious awards and distinctions including HHMI, McKnight and Sloan Awards. Four NEUBEH program faculty are members of the National Academy of Science, and most recently, two of our faculty

members, Bertil Hille and Linda Buck, were awarded the Lasker Prize and the Nobel Prize in Physiology or Medicine, respectively. What makes this more impressive is that nearly all of these individuals are active participants in the program, attending the annual retreat, the annual faculty meeting, and the recruitment dinners and socials. This has allowed the NEUBEH program to recruit some of the best and brightest students in the country, ranking tenth in the United States (per U.S. News and World Reports, 2002) after only five years in existence.

2. How do you measure the success of your unit as a whole? What teaching, research and service criteria are typical in your field? Which units national do you consider to be your peers along these dimensions?

Ultimately, the success of the Neurobiology and Behavior program is measured by the contributions of our students to the advancement of knowledge about the function of nervous system. On this score, we are among the leading institutions in the United States. From the perspective of the graduate school, our mission is to teach and train doctoral students. We come together as an interdisciplinary program mainly to achieve these goals. Our success is gauged by the accomplishments of our students, while they are at the University and throughout their careers.

Tables 1 and 2 provide measures of the research accomplishments of our students during their graduate studies. Table 1 summarizes the publications produced by the 102 students enrolled in our program since 1996. It is, admittedly, a blunt instrument, but it attests to a high level of scholarship and a satisfactory level of productivity. The number of peer-reviewed papers in competitive journals appears to be increasing. For example, among these 115 articles, 12 were in the Journal of Neuroscience, 6 in Neuron, 3 in PNAS, 1 in Science. Table 2 lists the fellowships awarded to our students. Many of these are awarded through national competitions (e.g., HHMI, NSF). But even the local awards (e.g., Poncin and ARCS) reflect positively on scholarship and the potential to succeed in future competitions.

Journal	Number of Student Articles		Journal	Number of Student Articles
Acta Neuropathologica	1		J. Comp. Neurology	4
Adv Experimental Med Bio	1		J. Investigative Medicine	1
Alcoholism: Clin Exp Res	1		J. Neurobiology	1
Am J Physiology	3		J. Neurochemistry	2
Ann NY Acad Sci	1		J. Neuroendocrinology	4
Behavioral Brain Research	1		J. Neurophysiology	1
Behavioral Neuroscience	2		J. Neuroscience	12
Biology of Reproduction	1		J. Neurotrauma	1
Biological Research	1		J. Vision	1
Biophys. Journal	1		Molecular Cell. Biol.	2
Blood	2		Molecular Cell Proteomics	1
Brain Research	6		Nature Neuroscience	3
Cell & Tissue Research	1		Neurobiol. Dis.	1
Cerebral Cortex	1		Neuroendocrinology	4
Current Protocols in Neuroscience	1		Neuron	6
Cytogen. Genome Research	1		Neuropeptides	1
Development	3		Neuroscience	2
Developmental Biology	4		Neuroscience Letters	2
Developmental Dynamics	2		Pharmacol Biochem Behav	1
EMBO Journal	2		Proc Natl Acad Sci	3
Endocrinology	5		Protein Sci	1
Experimental Neurology	1		Science	1
FASEB Journal	1		Synapse	1
Hearing Research	3		Thalamus & Related Systems	1
Hormonal Behavior	1			
Human Molecular Genetics	1			
International Journal of Developmental Neuroscience	1			
J. Assoc. Res. Otolargyngol.	1			
J. Biol. Chemistry	5			
J. Cell Biology	1		Total Papers	115

Table 1. Peer-reviewed articles authored by students enrolled in the NEUBEH program. The table draws on 102 students enrolled since 1996.

Award Type/Name	Number of Students Awarded*
HHMI Fellowships	4 current/1past = 5 total
NSF Fellowships	4 current/5 past = 9 total
Poncin Fellowships	4 current/1 past = 5 total
NRSA Fellowships	4 current/0 past = 4 total
NIH Training Grants (UW) – Neuroscience, Vision, MSTP, MCB, Auditory, Pathology, CDMR, EnvHealth, NeuroSurgery	35 current; 17 past = 52 total
ARCS Fellowships (includes MSTP)	8 current/2 past =10 total
Other Fellowships (Epilepsy Foundation, Michael J. Fox Foundation, Hall-Ammermer; APA Minority Fellowship)	3 current/1 past = 4 total

Table 2. Fellowships awarded to students enrolled in the NEUBEH program.

Ultimately, the quality of the training our students receive while they are here will be reflected in their accomplishments after they leave. Table 3 lists the postdoctoral fellowships of 25 students who have completed PhDs since the program's inception in 1996.

# of Ph.D. NEUBEH Students	25
# of Ph.D. NEUBEH Students with Postdoctoral Fellowships (18)	Jaime Athos, now at Fisher Research Labs Kathleen Benson, CA Regional Primate Center Elena Chartoff, Harvard Med School, Behav Gen. James Eubanks, Univ of Chicago Xavier Figueroa Masot – UW Bioengineering Sarah Gibbs, University of Pennsylvania Christopher Goode, Johns Hopkins Lisa Madden, Regional Primate Ctr, San Antonio Donna Maney, Rockefeller University Kathryn McCabe, Cal Tech Los Angeles Pablo Monsivais, University College London Brendan O'Brien, Brown University – now faculty at Univ. of Auckland (NZ) Christie Robertston, Geospiza Inc. Jamie Roitman, Univ of NC Mitchell Roitman, Univ of NC Jamie Theobald, Lund University, Sweden Sarah Woolley, UC Berkeley
Other Postdoctoral Activities (7)	Medical School – Ala Moshiri, Joseph Ho, Mark Mazurek; Teaching: Matthew Cunningham, Michelle Braun; Amanda Schivell Private Research – John Hohmann (Nura, Inc.)

Table 3. Postdoctoral fellowships.

Finally, we gain some insight into how the program is perceived by tracking the programs with whom we compete for graduate students. Each year we have become increasingly competitive in the recruitment of graduate students. We regularly recruit students who are also interviewing at UC San Francisco, UCLA, UC San Diego, UC Berkeley, Harvard University, Columbia University, Yale University, University of Pennsylvania, Johns Hopkins University, Stanford University, and Washington University (St. Louis).

3. What are your unit's weaknesses? No unit is perfect. Where could yours most use improvement? What challenges or obstacles make it difficult for you to overcome these weaknesses? What further challenges do you foresee in the coming years?

While the interdepartmental nature of the NEUBEH Program provides many important benefits, as outlined above, this administrative structure leads to critical challenges for the Program at several levels. The Program's faculty have primary appointments in over 15 departments across five different academic schools. The widely dispersed nature of the faculty has the following consequences:

1. Faculty are often split in their time commitments to home department graduate programs and interdisciplinary programs. For example, during the recruitment process, faculty members are engaged in selecting graduate students for their home department, as well as to the NEUBEH program. The demands on their time can limit their willingness to participate in the NEUBEH recruitment. While nearly all the faculty are willing to meet with the prospective students, making the commitment to assume the additional responsibility of serving on the NEUBEH Admissions Committee is a lot to ask.
2. We rely on these departments to "release" faculty from teaching obligations in their home departments so that they may participate in our core curriculum. The faculty that participate in the NEUBEH core courses are from all the "founding" departments, as well as many others. As the pressures on their time increase, the program cannot guarantee the continued participation of any particular faculty member. This is because the program lacks the means to compensate faculty for effort, and the department Chairs do not always view contributions to interdisciplinary teaching in the same way as contributions to Departmental courses.

3. Although the NEUBEH Program, like other interdisciplinary programs, officially reports to the Graduate School, the majority of the program faculty are members of the School of Medicine. Thus, despite our success, we have the sense that we sometimes fall through the cracks of the administration. It has proven difficult to garner reliable financial support, other than the budget that was allocated when the program was started. As the program grows in size and quality, there is no mechanism to provide for growth of the support structure. For example, we do not even have a budget for our seminar series—one of our primary activities—but must raise this money annually from Chairs of the participating departments.
4. After the first year, students receive the bulk of their training in labs and departments that are widely dispersed geographically and intellectually. It is hard to keep track of them and to enforce the rules and requirements of the program. We have actively worked to build cohesion in the student population, primarily via the seminar series and journal club. We educate the faculty and the students on the program requirements at regular intervals. We engage both the faculty and the students in the decision-making process at all levels to increase their interest and investment. The creation of a program office two years ago helped students and staff develop a sense of a “home base.” Yet, despite this, the administrative staff work very hard to ensure students are completing program requirements in a timely manner after the first year.
5. Since NEUBEH is not a departmentlly-based program, we cannot directly influence the types of new faculty that get recruited to the University. Although members of the NEUBEH faculty participate in the recruitment of new faculty to their home departments, there is no coordination of neuroscience faculty recruiting across the campus. For example, many of the best graduate students we interview are disappointed that functional neuroimaging is not better represented at the University of Washington. As an interdisciplinary group, we are unable to respond to this need directly, for example, by devoting positions and resources. Consequently, we fail to attract many of these students.

4. What changes have occurred in teaching, research and service in your field over the past decade that have influenced your conception of the unit's role? What pressures, internal and external, have caused significant changes, and what further pressures and changes do you anticipate in the next ten years? What changes have taken place in the relationships between your field and other related fields? Some changes that may or may not be relevant to your unit include the rise of interdisciplinary studies, international study, experiential learning, and programs in civic education and leadership, as well as technological changes—the rise of online courses and new educational technology. Which (if any) of these have had an impact on your unit? For interdisciplinary programs, please comment on the level of cooperation and support to the program from contributing units.

The creation of the NEUBEH Program was a response to the emergence of neurosciences as a coherent, distinct discipline. The Program was a merger of two smaller programs: a systems oriented Behavioral Neuroscience program and a cellular/molecular oriented Program in Neurobiology. The merger of these programs incorporated breadth, depth and epistemological coherence into the training of graduate students. The Program was designed to facilitate interaction and cooperation within multiple departments and across different academic schools within the University of Washington.

Since the creation of the NEUBEH Program, neuroscience as a discipline has continued to evolve. It is clear that laboratories with traditional emphases on whole organisms and systems (e.g., hearing and vision) now interact with laboratories using molecular and cellular techniques. Similarly, the pursuit of molecular mechanisms (e.g., ion channels, guidance molecules, growth factors) are increasingly focused on the function of these molecules in intact animals. We anticipate that such integration will play an expanding role in the next decade.

Several emerging fields were not well represented by the program at its inception. These include translational, cognitive, and computational neuroscience disciplines. Translational neuroscience, which emphasizes disease models and attempts to navigate between bench and the bedside, has developed into a major program strength in recent years. We owe this to a number of successful faculty recruitments through the School of Medicine, Harborview Hospital, and the Fred Hutchison Research Center. We have begun to make strides in computational and cognitive neuroscience. The departments of Computer Science and Physiology & Biophysics recruited two leaders in the field of neural computation. The Departments of Radiology and Psychology have recruited cognitive neuroscientists. These fields are likely to play expanding roles in many areas of neuroscience.

The program attempts to meet the needs of our rapidly evolving field by offering new elective courses and through a variety of seminar series described elsewhere in this document. The NEUBEH Program has the ability to invite new faculty to join the Program to expand the research opportunities available to students. In the last three year, for example, 26 new faculty in the areas of computation neuroscience and neurodegenerative diseases have joined the Program (see Table 4). Although we are not involved in the recruitment of new faculty to the University, since this is the function of the departments, the members of the NEUBEH faculty work with their home departments to recruit new neuroscientists to the UW. The presence of the NEUBEH program at the UW can be an aid in the recruitment of neuroscientists to various departments, through the promises of a collegial interdisciplinary atmosphere and a chance to participate in the training of excellent, neuroscience-oriented students.

In addition to recruitment, support and retention of NEUBEH faculty, we rely on the Chairs of the participating departments to support the participation of faculty in the NEUBEH program. This includes teaching in the core curriculum, participating on various committees, and training program graduate students. The departments also administer the student stipends once they have chosen a dissertation lab. They back up the dissertation advisor's guarantee of stipend support for our students so long as they remain in good academic standing. Finally, many of the participating departments support the Program's seminar series.

Overall, we believe that the level of support we receive from these departments has been excellent. However, the level of support the faculty receive for participation in the NEUBEH program varies considerably with the department or school in which the faculty has their primary appointment. These departments have different revenue sources, answer to different Deans, and have different teaching and administrative expectations for their faculty. Our program would benefit if steps could be taken to facilitate a common framework for participation in interdisciplinary programs across the University.

Finally, it is highly likely that over the next 10 years, we will see simultaneously an expanded need to train our students in specialized techniques and a reduction in resources needed to development laboratory courses at the graduate level. Presently, we attempt to counter this trend through expansion of

our teaching practicum in which our students teach an undergraduate neuroscience laboratory course (through the Department of Biology). We also send students to special training courses at Woods Hole and Cold Spring Harbor. We expect these highly competitive courses to play an increasingly important role in the education of our students. We have raised approximately $10,000 to help offset tuition for these courses. *It would be a major boon to the program if we could guarantee each student tuition support for one training course during their enrollment in the N & B program* (see Section D).

Faculty added in 2002 (6)	• Chris Diorio (computational neuroscience) • Phil Horner (neurodegenerative disease) • Albert La Spada (neurodegenerative disease) • Kenneth Mackie (signal transduction pathways) • Paul Muchowski (neurodegenerative disease) • Rajesh Rao (computational neuroscience)
Faculty added in 2003 (9)	• Linda Buck (sensory systems – taste) • Raimondo D'Ambrosio (physiology of glial cells) • Valerie Daggett (protein dynamics & folding) • Robert Hevner (developmental neuroscience) • James Olson (neurodegenerative disease) • Nicholas Poolos (neurodegenerative disease) • Hannele Ruohola-Baker (developmental neuroscience) • Jane Sullivan (synaptic transmission) • Inez Vincent (neurodegenerative disease)
Faculty added in 2004 (13)	• Elizabeth Aylward (neurodevelopmental disorders) • Olivia Bermingham-McDonogh (auditory systems) • Horacio de la Iglesia (circadian system) • Adrienne Fairhall (computational neuroscience) • Clifford Hume (auditory systems) • Jeansok Kim (neuromechanisms of stress) • Paul Phillips (neurotransmissions) • Jay Rubinstein (auditory systems) • Luis Santana (ion channels in the heart) • Joseph Sisneros (auditory system) • Billie Swalla (developmental neuroscience) • Stephen Tapscott (developmental neuroscience) • Jing Zhang (neurodegenerative disease)

Table 4. New faculty.

5. Do you observe differences between your view of your role and college and university expectations of your unit? If so, what are these? Do you see any ways to resolve these differences?

The Mission statement of the University of Washington states:

> "The primary mission of the University of Washington is the preservation, advancement, and dissemination of knowledge. It advances new knowledge through many forms of research, inquiry and discussion; and disseminates it through the classroom and the laboratory, scholarly exchanges, creative practice, international education, and public service."

The NEUBEH program embraces these goals and strives for excellence in training graduate students to share in this perspective. In fact, many of the graduate students we train in the NEUBEH program have as their goal a career in academics, carrying out the kind of scholarship, research and teaching outlined in the mission statement for the UW. One can view the NEUBEH program as both fulfilling the current and future missions of the University.

Does this view of the NEUBEH program correspond to the University administration's view of the program? For the most part, we believe that the NEUBEH program is recognized for its efforts in furthering the mission of the University; however, the administration has limited the program in several critical ways. First, due to the cap in the overall number of graduate students allowed by the State Legislature at the University, the NEUBEH program has already exceeded the allotted number of students. The program is officially limited to the same number of students today as seven years ago. While the limit has not been enforced, we were advised to recruit fewer students in the future. Both of these strategies will seriously impact the future of the NEUBEH program. *Therefore, we specifically recommend that the program be allowed to increase to a size of 75 students.*

Growth in the NEUBEH program faculty has kept pace with the expansion in the field of Neuroscience over the past five years. The continued growth of in membership of the Society for Neuroscience (~33% increase in membership from 27,000 in 1997 to over 36,000 in 2004) reflects the growing importance of the field on an ever-increasing number of human activities. However, while growth of the participating faculty has kept up with the research expansion, the number of students we can recruit annually to the program has remained constant or even declined in recent years. The decline in student numbers is due to the almost annual increase in student stipend levels, in the face a flat, or declining, budget from the Graduate School. We understand that the Graduate School and the University

are engaged in actively seeking alternatives for the decline in State funding. Therefore, we propose a mechanism to link the increase in the demand for graduate student training opportunities by the faculty, with the overall increase in Neuroscience-related research at the University. *One possible mechanism would be to direct a small fraction of the indirect costs from all the funded grants of all faculty in the NEUBEH program to the Graduate School for the administration and promotion of interdisciplinary education.*

SECTION B: Teaching

1. For each faculty member in your department, please list: number of courses taught per year, number of credits taught, and total student credit hours. Numbers may be approximate and should illustrate a typical year.

Although we do not have primary faculty appointments, we do have a number of courses that are listed as NEUBEH courses, and we rely on program faculty to participate in these courses. Many of these courses are cross-listed in other departments and are frequently taken by non-NEUBEH students as well. See Table 5.

N&B Course	Coordinator/Instructor	Other Lecturer(s)
NEUBEH 501 Introduction to Neurobiology (3 credits)	Steven Carlson (PBIO)	• Sandra Bajjalieh (Pharmacology; 2001-2003) • William Spain (Neurology; 2001-2004) • Mark Bothwell (PBIO; 2001-2004) • Jane Sullivan (PBIO; 2002-2004) • Linda Wordeman (PBIO; 2001-2004) • David Perkel (Oto/Biology; 2001-2004) • Neil Nathanson (Pharmacology; 2001-2004) • Tom Reh (Biological Structure; 2001-2004) • Ed Giniger (PBIO; 2001)
NEUBEH 502 Introduction to Neurobiology (4 credits)	Helen Sherk (Biological Structure)	• Ed Rubel (Otolaryngology; 2002-2003) • John Munson (2002-2004) • Marc Binder (PBIO; 2002-2004) • Farrel Robinson (Biological Structure; 2002-2004) • Bruce Tempel (Otolaryngology; 2004)

N&B Course	Coordinator/Instructor	Other Lecturer(s)
NEUBEH 503 Cognitive and Integrative (4 Credits)	Michael Shadlen (PBIO)	• Bharathi Jagadeesh (PBIO; 2002-2004); • David Perkel (Oto/Biology; 2002-2004) • Eberhard Fetz (PBIO; 2002-2004) • David Corina (Psychology; 2003-2004) • Helen Brew (Otolaryngology; 2002-2003)
NEUBEH 510 Seminar in Neurobiology and Behavior (0.5 credits)	Thomas Reh (Biological Structure); organized by N&B students & faculty	Invited speakers and UW faculty
NEUBEH 515 Teaching Practicum in Neurobiology & Behavior (3-6 credits; max 15)	Individual mentors (N&B faculty)	
NEUBEH 526 Introduction to Laboratory Research in Neurobiology (4 credits)	Thomas Reh (Biological Structure)	Individual laboratory rotation advisors
NEUBEH 527 Current Topics in Neurobiology & Behavior (1 credit)	Michael Shadlen (PBIO)	Journal club sessions led by hosts of associated seminars
NEUBEH 528 Computational Neuroscience (3 credits)	Rajesh Rao (Computer Science) & Adrienne Fairhall (PBIO)	Will be taught as NEUBEH for first time in 2005; in 2003 has Michael Shadlen (PBIO) and Fred Rieke (PBIO) as additional lecturers
NEUBEH 532 Discussion in Cell Signaling and Molecular Physiology (2 credits)	Fred Rieke (PBIO)	

N&B Course	Coordinator/Instructor	Other Lecturer(s)
NEUBEH 541 Neuroendocrinology (3 credits)	Robert Steiner (PBIO) – 2001, 2003, 2005	• Don Clifton (OB; 2001, 2003, 2005) • Dan Dorsa (Psychiatry; 2001) • Bertil Hille (PBIO; 2001, 2003, 2005) • George Merriam (Med; 2001, 2003, 2005) • John Wingfield (Biology; 2001, 2003, 2005) • Mike Schwartz (Med; 2001, 2003) • Fraley (2003) • David Cummings (Med, 2003) • Horacio de la Igelesia (Biology; 2005) • Scott Weigle (Med; 2005) • Brent Wisse (Med2005)
NEUBEH 545 Quantitative Methods in Neuroscience (2 credits)	Michael Shadlen & Fred Rieke (PBIO	
NEUBEH 549 Molecular Basis of Neurodegenerative Disease (2 credits)	Albert La Spada (Lab Med); Paul Muchowski (Pharmacology); Leo Pallanck (Genome Sci)	
NEUBEH 550 Biophysics of Calcium Signaling (1 credit)	Bertil Hille & Luis Santana (PBIO)	
NEUBEH 551 Mouse Models (1 credit)	Stanley Froehner (PBIO)	
NEUBEH 552 Synaptic Integration (1 credit)	Marc Binder & Randy Powers (PBIO)	
NEUBEH 553 Learning and Memory: Synapses & Systems (1 credit)	Bharathi Jagadeesh & Jane Sullivan (PBIO)	
NEUBEH 554 Motor Learning: Cellular & Network Mechanisms (1 credit)	Eberhard Fetz & Steven Perlmutter (PBIO)	
NEUBEH 555 Sensory Receptors (1 credit)	Peter Detwiler & Fred Rieke (PBIO)	
NEUBEH 556 Axon Pathfinding Mechanisms (1 credit)	Mark Bothwell (PBIO)	

N&B Course	Coordinator/Instructor	Other Lecturer(s)
NEUBEH 557 Ion Channel Gating (1 credit)	Sharona Gordon & William Zagotta (PBIO)	
NEUBEH 600 Independent Study or Research (1-10 credits)	N&B Faculty Dissertation Advisors	
NEUBEH 700 Master's Thesis (1-10 credits)	N&B Faculty Advisors	
NEUBEH 800 Doctoral Dissertation (1-10 credits)	N&B Faculty Dissertation Advisors	

Table 5. NEUBEH courses.

2. How are teaching responsibilities allocated? For interdisciplinary programs: How are teaching loads negotiated and balanced between home departments and the interdisciplinary unit?

There is no formal process for negotiating/balancing teaching loads between the NEUBEH Program and our faculty's home departments. Many of our core courses stemmed from courses originally developed by the founding departments. These core courses continue to be administered by these departments. For example, the core sequence of first year courses—molecular/cellular neuroscience (NEUBEH 501), Systems Neuroscience (NEUBEH 502) and Cognitive/Integrated Neuroscience (NEUBEH 503)—is currently organized by members of Physiology & Biophysics and Biological Structure. These courses tend to viewed as benefiting both the home department and NEUBEH and the University at large. The chairs of these departments have typically recognized and rewarded their faculty for teaching these important courses. Indeed, some of these courses are offered in the faculty's own primary department and cross-listed with NEUBEH in the General Catalog.

In general the system works. In part this is due to the generosity of the faculty with their time and energy and the support we receive from many department chairs. However, there are some critical issues that need better resolution. First, since the faculty effectively volunteer their time, the curriculum is perpetually in jeopardy. A more solid, long-term foundation needs to be established for the manner in which faculty contributions are recognized. Second, since we rely on departmental Chair approval for "release" of their faculty to teach in NEUBEH courses, any changes in the NEUBEH curriculum must be

approved by the relevant departmental Chairs, and this results in a cumbersome process in any major course revisions. If the NEUBEH directors and NEUBEH curriculum committee could rely on faculty members to participate on an equal footing with departmental courses, a more integrated curriculum could be created.

3. Other than classroom teaching, how are faculty involved in undergraduate learning and development (for example, advising, mentoring, and supervising independent study)?

Our program is primarily focused on graduate education. However, many of our faculty members teach undergraduates in the Neurobiology Undergraduate Program (NBIO). Several years ago William Moody (Biology) and William Catterall (Pharmacology) spearheaded a UIF proposal that created an undergraduate major in Neurobiology. This has been a highly successful initiative; some of the brightest undergraduates on campus choose this highly competitive major. Since the inception of the undergraduate major, many of the NEUBEH graduate students have chosen to meet their teaching requirement by participating in one or more of the undergraduate neurobiology courses. More recently, the Program has decided to involve more of the NEUBEH graduate students in undergraduate education by requiring all of the incoming NEUBEH graduate students to teach in the undergraduate neurobiology courses. We anticipate that this will create even more opportunities for interaction between undergraduate and graduate neuroscience education at the UW.

In addition to formal instruction, our faculty mentor undergraduate students in independent study courses, summer fellowships, and laboratory research projects. Undergraduate research experiences are supported through a number of formal mechanisms at the UW, including the Mary Gates Scholar program, and the Annual Undergraduate Research Symposium. Appendix I lists the undergraduate students in N & B labs over the past 2-3years. The number of undergraduate students engaging in neuroscience research is steadily increasing, as students are exposed to neuroscience in their undergraduate courses, and as more faculty become increasingly receptive to the idea of involving undergraduate students in their research programs. We see this as a very positive trend.

4. How do faculty involve undergraduate students in research and scholarship?

See above

5. How does the department evaluate the instructional effectiveness of faculty?

The departments have the primary responsibility for the evaluation of the faculty; however, there are two areas where the program can benefit from evaluation of the faculty: 1) teaching effectiveness in the NEUBEH curriculum; and 2) effectiveness in supervising students in their thesis research. We assess teaching effectiveness of our faculty using formal student evaluation questionnaires, and informally through discussion with students. The teaching evaluations are reviewed by the course chairs of the NEUBEH 501/502/503 series, and they provide this information to the individual faculty members so that they can improve their effectiveness. The directors and other core faculty in the program also solicit input from the students to determine whether the overall curriculum is serving their needs. The curriculum committee reviews the overall effectiveness of the curriculum on a semi-annual basis. There is no formal mechanism for the evaluation of faculty effectiveness in supervision of thesis research. It would be difficult to develop a reliable method of evaluating this process because of the number and variety of factors at play in this relationship and because few faculty supervise more than a few students.

6. Please summarize the data you collect, possibly using OEA or CIDR, to evaluate the impact of your teaching on student learning. You might want to focus on illustrative examples. Please describe selected specific changes you have made in response to the data you have collected.

Course chairs receive feedback of courses using teaching evaluations and through informal discussions with students. They typically use this feedback to alter course content and style the following year. For example, student feedback for Integrative and Cognitive Neuroscience (NEUBEH 503) exposed a need for training in basic applied mathematics techniques. In response, we developed Quantitative Methods in Neuroscience (NEUBEH 545), an elective course offered in alternating years. The innovative format is comprised of five two-week modules in which students learn a mathematical concept through hands-on computer exercises in the first week and tackle a relevant experimental paper in the second week.

In addition to student evaluations, the course chairs of the first year core curriculum meet to harmonize course content, both to minimize redundancy and to expand breadth and rigor. For example, three years ago, we felt that our students were not receiving a sufficiently rigorous introduction to cellular neuroscience (e.g., membrane biophysics) in the first quarter courses. In response, we created a supplementary course (NEUBEH 532) to expose the NEUBEH students with more advanced topics using a quantitative problem-oriented format.

Representative course evaluations are in Appendix J.

7. What procedures, such as mentoring junior faculty, does the department use to help faculty improve undergraduate teaching and learning? What training and support is provided to TAs to help them to be effective in their instructional role?

The role of the NEUBEH program in junior faculty mentoring is discussed in Section C2.

The NEUBEH program has had since its inception a requirement that all graduate students teach for one or two quarters. The current requirement is for two quarters, with the exception of particularly demanding courses in either the undergraduate Neurobiology major (NBIO) or Medical Neuroscience (HUBIO 532). Before 2003, the students in the program arranged their teaching obligations individually with the faculty instructor. Hence the amount of teaching training our students received varied from course to course. The students were given the TA booklet (Appendix K) and used this as a guide to make decisions about how they wanted to fulfill the requirement.

In the past year, we have substantially modified the teaching experience required by the NEUBEH students. We have submitted a course request to the curriculum committee, NEUBEH 515, to make the teaching experience a required course. The course description and information is included as Appendix L. The course is evolving, but our aim is to provide our students with a variety of consistent, high quality teaching experiences. The training and mentoring plans incorporated into the NEUBEH 515 course request are modeled after those currently in use in Dr. Bill Moody's undergraduate neurobiology course. The students taking the course are required to attend the four lectures per week, conduct two 3-hr laboratory sections per week, attend a weekly TA meeting, provide office hours, and grade

assignments. The more labor-intensive duties are shared on a rotating basis with other TA's and course faculty. Each TA receives extensive direct mentoring from two faculty. Each week the course faculty meet formally with all TA's for approximately 4 hrs, during which TA's are shown the laboratory exercise for that week, and complete it themselves under faculty direction. TA's participate in faculty-led discussions of course administrative procedures, problems with any students, and grading schemes. TA's participate in faculty-led discussion of general teaching strategies and methods, including: how to approach underperforming students, how to present certain difficult concepts to students, how to encourage students to think problems through, how to handle interpersonal conflicts between students.

8. How does the unit track and promote innovations and best practices in undergraduate and graduate student learning?

The curriculum committee informally evaluates the effectiveness of the overall curriculum, as well as the General Exam, and makes recommendations to the Directors. The Directors discuss the issues and potential changes with the Program committee and if necessary with the steering committee. In the case of the General Exam, a special committee was formed to draw up a new plan for the exam, and this plan is then voted on by the entire faculty membership before being adopted as policy.

SECTION C: Research and Productivity

1. How does your unit balance the pursuit of areas of scholarly interest by individual faculty with goals and expectations of the department, school, college and University? How are decisions involving faculty promotion, salary and retention made? *For interdisciplinary programs*: How do you balance the demands of home departments and of the interdisciplinary unit?

A large fraction of the NEUBEH faculty contribute extensively to the program with their time and effort. They serve on the various committees (e.g., student progress, admissions, curriculum) and they teach in Neurobiology & Behavior core and elective courses. The faculty train NEUBEH students in their labs much as they would any other student, and we believe they are credited for this in their promotion much as they would be for training departmental students. As far as balancing this with departmental commitments, success as a faculty member requires learning to balance the competing demands of teaching, research and administration. The faculty recognize that the program contributes to their success in research by providing some of the best graduate students at the UW, to their success in their teaching efforts by providing some of the best graduate teaching assistants to their courses and to their success in administration by minimizing program demands. We have only a single recruitment visit for all applicants; the admission committee meets for a single meeting to rank the applicants; we have only one faculty meeting per year to discuss Program issues. Nevertheless, some committee work is inevitable and we count on several members of our faculty who, in addition to the directors, give generously of their time.

While the NEUBEH program provides a significant benefit to the faculty, and they in turn recognize and appreciate these benefits, there are no formal guidelines as to how the faculty should support the program. In particular, there are no guidelines to departments that advise them on how to valuate the faculty contributions to the interdisciplinary programs. Not surprisingly, departments vary in their attitudes to this matter. In many departments, faculty members are recognized for teaching in NEUBEH courses and for participating in NEUBEH committees. This recognition is in the form of release from departmental teaching and administrative activities and in the form of merit recognition (affecting promotion and salary). At the end of the day, however, the NEUBEH program depends on the generosity of the faculty who contribute their time and energy and on the department chairs for encouraging/rewarding their faculty for doing so. We believe that the development of a consistent

approach by the administration to how faculty contributions to interdisciplinary programs are credited across the various schools and departments would help guarantee the long-term success of these programs. *The University administration should address this issue by making formal arrangements with Chairs of participating departments to properly recognize teaching commitments and administrative responsibilities. Contributions to interdisciplinary programs could be formally recognized at promotion and tenure decisions by the Appointment and Promotions committees in the participating schools.*

2. How are junior faculty members mentored?

While we do not formally mentor junior faculty, since this is the responsibility of their home department, we promote their involvement in the program in many ways. We recognize that sometimes the most active and attractive labs for graduate students are those of the junior faculty; frequently these labs will have the most up-to-date technologies and approaches. We encourage students to explore research possibilities in the labs of new faculty by 1) having junior faculty serve on the Admissions Committee, where they are in contact with the students during their recruitment; 2) during the new student orientation in the Fall, where junior faculty are given priority in presenting potential rotation projects possible in their labs during short slide presentations; 3) actively soliciting new faculty to join the program, and if they are not yet members of the Graduate Faculty, supporting their appointments; and 4) giving junior faculty priority for Program seminar dates, where again, they can present their research to the NEUBEH students. We believe that involvement of more junior faculty members, brings enthusiasm and excitement to the program, and without this renewed vitality each year, we would not maintain our excellence.

3. What has been the impact of your research on your field and more broadly over the past five years?

Our impact is best measured by the scientific contributions made by faculty and students to advance our understanding of the nervous system and its disorders. This is at least partly reflected in grants and awards to our faculty. We have not enumerated the grant support to our faculty, but even a cursory glance at the list of faculty reveals an impressive group of active, productive investigators, and a vibrant

pool of junior faculty who are equally if not more promising. Some of the accomplishments of our faculty are summarized in Appendix M.

4. In what ways have advances in your discipline, changing paradigms, changing funding patterns, new technologies or other changes influenced research, scholarship, or creative activity in your unit?

Neuroscience is a rapidly evolving field. We are seeing at once an emergence of new techniques (e.g., 2-photon imaging), an expansion in our knowledge about the genetics of humans and laboratory animal models, and steady advances in theory. Our students and faculty need to embrace these advances in technology to maintain a vibrant graduate program. We adhere to the principle that to train the next generations of Neuroscientists we need to give the students some familiarity with a broad range of conceptual and technological approaches. In their first year, the three required lab rotations expose the students to diverse technological and theoretical experiences. Though a student's thesis research is typically highly focused, we believe that our students must have more than a superficial awareness of other disciplines. The electrophysiologist needs to know about viral vectors; the molecular biologist needs familiarity with the analysis of animal behavior. To maintain the cross-disciplinary training past the first year, we require the students to attend the monthly seminar series. The invited speakers in this seminar series represent a wide range of Neuroscience (see Appendix N for last three year's schedule). Having the students themselves organize the seminar series ensures the speakers will reflect the diversity of Neuroscience represented by program faculty.

We are also aware of the impact that potential changes in funding patterns might have on graduate training and the NEUBEH program. For example, there is a new emphasis in translational research at the NIH. A key element of the NIH Roadmap Initiative is "The creation of Regional Translational Research Centers …to increase interactions between basic and clinical scientists and accelerate the translational development of new drugs, biomarkers, and treatment strategies from the laboratory bench to clinical testing (http://nihroadmap.nih.gov/.)" We have kept pace with this trend by encouraging faculty in clinical departments to become involved in the program. We have had a steady increase in the number of faculty engaged in translational research, and student interest in labs in the Neuroscience of disease research groups has increased significantly.

5. Some units are more heterogeneous than others. What variations exist among your faculty in terms of methodologists, paradigms, subfield specializations? Are faculty offices in the same building, or are they geographically dispersed? What strengths and weaknesses for the unit as a whole are generated by differences among its faculty? Do any of these differences generate obstacles to communication? If so, what strategies has the unit developed to promote communication between different constituencies, and how successful have these strategies been?

Neurobiology is a diverse field. It is hard to imagine a field whose concepts, questions, and methodologies are as broad: from the flight of insects to movement disorders, from quantum release of signaling molecules to nonlinear dynamical systems modeling, from zebra fish to zebra-finch to zebra stripes in the developing cortex. We draw from a diverse set of departments spanning basic biomedical research (e.g., pharmacology, biochemistry, psychology, computer science, bioengineering and clinical neuroscience (neurology, neurosurgery, ophthalmology, otolaryngology, rehabilitation medicine).

We count on these departments to recruit and retain faculty in fields that they recognize as within their purview and expertise. The neuroscientists in these departments direct their faculty to expand and/or concentrate in emerging fields. The community of neuroscientists who constitute our program provide an incentive to top scientists to join the faculty here. An advantage of this arrangement is that our interdisciplinary group can grow flexibly without much central planning. A disadvantage is that the neuroscience faculty cannot build to an area directly.

Our students and faculty work in labs that are dispersed across the campus, our teaching hospitals and the Fred Hutchison Research Center. This poses organizational challenges for assembling PhD committee meetings, teaching elective courses, journal clubs and seminar series. On the other hand, we use these same venues as a way to enhance the coherency of the program. We occasionally experience conflicts in scheduling, but our ability to list courses jointly with departments has minimized this problem. During their first year, our students perform three or four laboratory rotations in addition to required course work. Some find it challenging to negotiate between courses in the Health Sciences Building and rotations at laboratories across town, but many are pursuing this successfully. This requires diligence on the part of the program and faculty at the satellite facilities. This geographical fact will continue to challenge the program in the next five years.

To meet these challenges in the first two years of the program, as well as to create a more cohesive student class, we conduct a variety of program wide activities. A program wide seminar series and journal club operate in alternate weeks throughout the academic year. These activities are required of all students. We also hold an annual retreat, a student orientation, annual faculty meetings, student recruitment visits and faculty hosted dinners. We have recently introduced a new monthly seminar series featuring the work from two laboratories in the program. This is a way for faculty, students and fellows to learn about the exciting research performed by their colleagues.

6. What impediments to faculty productivity exist, and do you see ways of reducing these?

The NEUBEH faculty are among the most productive in the country. The program facilitates productivity by attracting excellent graduate students and by fostering a collaborative, supportive, scholarly neuroscience community. One impediment to productivity is that activities unrelated to research and teaching make demands on faculty time (e.g., preparing this document). The program tries to minimize the administrative demands on the participating faculty by handling most issues through a single faculty meeting held once a year. The program requires faculty to participate in the annual recruitment of new students and in an Annual retreat. Some participation on program committees is also requested, though these obligations can be spread across a large number of faculty to prevent them from becoming burdensome for any individuals. However, because the NEUBEH faculty members are required to serve on similar committees in their departments, they can become overcommitted. The University could reduce this impediment by creating a mechanism for formally recognizing faculty contributions to interdisciplinary graduate education. *This could take the form of a requirement that participation in interdisciplinary programs be considered at the time of promotion or tenure by the Appointments and Promotions committees in the various participating schools.*

7. What steps has your unit taken to encourage and preserve productivity on the part of all segments of your staff? How are staff recognized and rewarded? What programs are in place to support professional development of staff?

The Neurobiology & Behavior Program is currently staffed with only two administrative positions – the Assistant to the Director (a professional staff position) and the Program Coordinator (classified staff position). In recognition of their high level of professionalism and capabilities, these two staff are given a high level of autonomy in the administration of the program and the day-to-day activities of the Program Office. The staff are always encouraged to participate in UW training opportunities as appropriate to their job requirements and if budgeting permits. The Program is currently seeking to reclassify the Program Coordinator to a professional staff position to more clearly reflect the level of professionalism and autonomy required of the position since its creation. Currently the budget for the NEUBEH program does not adequately allow for the compensation of the staff in recognition of their contributions, nor does the budget allow for additional staffing to reflect the 70% increase in student numbers over the past four years. Retention of highly experienced staff may become an issue in the next one to two years.

SECTION D: RELATIONSHIPS WITH OTHER UNITS

1. In what ways do you collaborate with units at other institutions or at the University of Washington? What are the impacts of these collaborations? Do members of your unit engage in or have opportunities to engage in interdisciplinary research? Do ties to other units or other kinds of interdisciplinary opportunities aid you in recruiting new faculty and graduate students? In what ways, if any, do they improve your graduate and undergraduate education? Do you face impediments to developing interdisciplinary research or connections with other units? How could the university aid you in strengthening such ties?

The NEUBEH program was founded by five departments in Arts and Sciences and the Medical School to encourage the interdisciplinary training of graduate students in the Neurosciences. Since its inception, it has grown to include members of over 15 departments. This growth has changed the relationship of the program to the founding units to some extent, though the majority of the program faculty still have primary appointments in the founding departments. In addition to the recruitment and training of graduate students, one of the primary contributions of the program to the University is to provide a mechanism to encourage interdisciplinary research among the faculty. Through its cross-departmental seminar series, journal clubs, and annual retreats, the program facilitates interdepartmental faculty interactions. This has fostered a vital neuroscience community that extends across departmental lines and across school lines. The members of the faculty at the University of Washington have always had a tradition of interdepartmental, collaborative research, historically through the creation of Centers, such as the Regional Primate Center; however, the creation of formal interdepartmental programs, like the NEUBEH program, maintains and promotes this collaborative spirit.

The members of the NEUBEH program also maintain active scientific collaborations with other major research centers in the U.S. and around the world. Our faculty play a prominent role in national and international courses: Gordon Conferences, Cold Spring Harbor Laboratories; Woods Hole; Society for Neuroscience Symposia and Satellites, various European and Japanese summer schools.Ties to other Universities and Societies enhances scholarly development of our students. The NEUBEH faculty also play prominent roles in professional societies: Society for Neuroscience, the Biophysical Society, the AAAS, and the American Physiology Society. These ties to other research units, both within the University, and in the wider academic community, enhance opportunities for innovative research and are

critical for the training of graduate students in cutting edge technology and the most up-to-date theoretical advances in the Neurosciences.

The strength and vitality of the NEUBEH program is an important adjunct to departmental graduate programs in the recruitment of new faculty to these departments; faculty candidates from several different departments frequently meet with the graduate students in the NEUBEH program during the recruitment process, and in some cases the program has been a major "selling point" in the recruitment of new faculty. The program in turn has welcomed the new faculty involved in Neuroscience research, regardless of departmental affiliation, and encouraged their participation in graduate student recruitment and training. This mutually beneficial relationship extends to the undergraduate curriculum in Neuroscience; NEUBEH graduate students become well-trained teachers through their experiences in the undergraduate curriculum, and the undergraduates are exposed to enthusiastic, talented graduate Teaching Assistants.

There are two ways in which the University can promote the further development of collaborative training interactions between the students in the NEUBEH program and the wider academic community. First, our faculty support student travel to national meetings and to attend national courses. In previous years, the directors have raised ~10k to support 1st year students to attend these courses. The funds have also been used to support more advanced students in the lab of new faculty without sufficient support. We found that this was a very effective program: the students that attend courses in Woods Hole, for example, bring back new state-of-the-art techniques relevant to their research, and this impacts their own lab, as well as that of others doing related work. Moreover, we have found that this type of opportunity can be an effective recruiting tool for the prospective students. Unfortunately, the mechanism by which we raised this money is no longer available. *Therefore, it would be a great help if the University could provide financial support to continue this program.*

A second way in which the University can strengthen the ties between the contributing departments of the NEUBEH program is to provide additional support for the annual retreat. Ideally, we would like to have a retreat that would allow us to bring both the graduate students and faculty together, along with those students in the undergraduate Neurobiology major that were involved in research. This

would provide a further fusion of the programs and allow the undergraduates better access to the kinds of research opportunities available to them. *If the University could provide the resources to organize an expanded annual retreat, it would have a lasting impact on Neuroscience at all levels.*

There is an expectation of faculty participation in the governance of the Department, the College or School, and the University. How do faculty members within your unit meet this expectation? How is participation in shared governance encouraged and valued?

Participation in the interdisciplinary program is largely voluntary. There is a clear incentive to participate to enhance visibility and attract the best students. We have enjoyed the support of the faculty as a whole. We hold an annual retreat and an annual program wide meeting. At the annual faculty meeting (see most recent agenda in Appendix O), the faculty discuss any issues that have bearing on the program, any changes to the program from the previous year, and any new initiatives and directions that the program should take. While it is difficult to involve the entire 100+ faculty in most decisions, the program has regular meetings of the Program Committee (see member list below) for reviewing and admitting new faculty into the program, as well as annual meetings of the Steering Committee (see membership list below). Several committees meet more regularly (e.g., to revise the structure of our general exam). We also have a mechanism for offering electives through Neurobiology and Behavior. This recent development has led to a new form of collaboration and it provides an effective avenue for faculty participation in the educational mission of the program.

How does our Unit encourage and value this participation? All we can do is say “thanks!” The program has no way to compensate the faculty that contribute all their time and efforts to these committees. The various department Chairs may or may not give their faculty “credit” in any tangible way for their participation and contributions. *The University could positively impact the future of interdisciplinary education in a very fundamental way by providing a more uniform approach for compensating and acknowledging the contributions of faculty to these programs.*

Neurobiology & Behavior Program Committee
Thomas Reh, Director (Biological Structure) Michael Shadlen, Director (Physiology & Biophysics; Neurology; Primate Center) Neil Nathanson (Pharmacology) William Moody (Biology; Undergraduate Neurobiology Program) Eliot Brenowitz (Psychology)

Neurobiology & Behavior Steering (Executive) Committee
William Catterall (Chair, Pharmacology) – Chair of Committee Stanley Froehner (Chair, Physiology & Biophysics) John Clark (Chair, Biological Structure) William Moody (Biology; Undergraduate Neurobiology Program) Ana Mari Cauce (Chair, Psychology)

Neurobiology & Behavior Admissions Committee
Thomas Reh, Director (Biological Structure) Michael Shadlen, Director (Physiology & Biophysics; Neurology; Primate Center) Sandra Bajjalieh (Pharmacology) David Corina (Psychology) Horacio de la Iglesia (Biology) Bharathi Jagadeesh (Physioloogy & Biophysics) James Hurley (Biochemistry) William Zagotta (Physiology & Biophysics) Max Sizemore (NEUBEH Student)

Graduate Training Committee
Neil Nathanson (Pharmacology) Eliot Brenowitz (Psychology) Jane Sullivan (Physiology & Biophysics) Edwin Rubel (Otolaryngology – Head/Neck Surgery)

Curriculum Committee (includes Program Requirements)
Thomas Reh, Director (Biological Structure) Michael Shadlen, Director (Physiology & Biophysics; Neurology; Primate Center) Neil Nathanson (Pharmacology) Eliot Brenowitz (Psychology) Fred Rieke (Physiology & Biophysics) David Perkel (Otolaryngology – Head/Neck Surgery; Biology)

For interdisciplinary programs: How do you maintain relationships with contributing units? Are there other units that could enhance your interdisciplinary perspective? Do you face impediments in approaching these other units? How could the university aid you in solidifying old relationships and fostering new ones?

As noted in the first part of this section, the NEUBEH Program is by its nature quick to exploit new trends and interdisciplinary research. The program thrives in part because of its energetic and highly collaborative faculty. Impediments are few at the University, and in general there are many excellent examples of successful collaborations by program members. The NEUBEH Program may be one of the best models on campus for interdisciplinary research; although graduate training is the primary mission, graduate students are among the most adventurous in their scientific thinking. Thus, they can often be the focus for the development of a new research direction.

How can the University help? The main impediment to increased research collaborations and new interdisciplinary research is the limit on faculty time. *The University can support interdisciplinary programs by creating University Professorships. These will be awarded to faculty for periods of time, to free them up from their normal departmental duties and invest some of their time and effort into more University wide, interdisciplinary, efforts.* This could be modeled after the Presidential Chair, at UC-Berkeley, where a certain percentage of salary for a defined period of time can be used for interdisciplinary curriculum development. Those faculty with a major amount of their efforts directed to interdisciplinary programs, either in their creation or maintenance, would be awarded a University Professorship for a duration of several years, that would compensate the home department for the percentage of their time devoted to interdepartmental programs.

We suspect that the constraints on Interdisciplinary education at the University of Washington are as few here as anywhere. At the present stage in the evolution of graduate education the departmental programs and the interdisciplinary programs complement one another well. However, the NEUBEH program will not remain the vital, expanding enterprise it is today without adequate support. Whenever the limits to time and energy of the faculty become stretched, the commitment to all-volunteer programs like NEUBEH is the first to lapse. Interdisciplinary education needs to be put on a firm support base at the University of Washington.

SECTION E: DIVERSITY

The University is committed to providing a supportive environment for all members of its community and ensuring that each is included in the life of the University in ways that benefit professional development and success. Underrepresented groups can vary by field, but are most commonly identified by gender, race, or ethnicity.

1. Describe for your unit the inclusion of underrepresented groups for students (by entering cohort – includes students who have graduated or left the program), faculty (by rank), and staff.

RANK/Type	Total	Gender	Total Minority	Total URM*	Total International
Professor	51	M - 42 F - 9	M - 1 F – 1	M - 1 F – 0	0
Associate Professor	22	M - 17 F - 5	M - 1 F - 1	M - 1 F – 0	0
Assistant Professor	20	M - 14 F - 6	M - 7 F - 1	M - 3 F - 0	0
Research Professor	5	M - 2 F - 3	M - 0 F - 0	M - 0 F - 0	0
Research Associate Professor	1	M - 0 F - 1	M - 0 F - 1	M - 0 F - 0	0
Research Assistant Professor	2	M - 1 F - 1	M - 0 F - 0	M - 0 F - 0	0
Affiliate/Adjunct Professor	1	M - 0 F - 1	M - 0 F - 0	M - 0 F - 0	0
Affiliate/Adjunct Associate Professor	0	M - 0 F - 0	M - 0 F - 0	M - 0 F - 0	0
Affiliate/Adjunct Assistant Professor	1	M - 0 F - 1	M - 0 F - 0	M - 0 F - 0	0
1996 Students	10	M - 5 F - 5	M - 0 F - 0	M - 0 F - 0	M - 0 F - 0
1997 Students	6	M - 5 F - 1	M - 1 F - 1	M - 1 F - 1	M - 0 F - 0
1998 Students	9	M - 4 F - 5	M - 0 F - 2	M - 0 F - 0	M - 0 F - 0
1999 Students	9	M - 4 F - 5	M - 1 F - 0	M - 0 F - 0	M - 0 F - 0
2000 Students	10	M - 5 F - 5	M - 2 F - 1	M - 1 F - 0	M - 0 F - 0
2001 Students	8	M - 6 F - 2	M - 0 F - 0	M - 0 F - 0	M - 1 F - 1
2002 Students	14	M - 9 F - 5	M - 2 F - 1	M - 0 F - 0	M - 0 F - 0
2003 Students	11	M - 5 F - 6	M - 0 F - 3	M - 0 F - 1	M - 2 F - 0
2004 Students	8	M - 5 F - 3	M - 0 F - 1	M - 0 F - 1	M - 1 F - 0
Admin Staff	2	M - 0 F - 2	M - 0 F - 0	M - 0 F - 0	M - 0 F - 0

* URM - Underrepresented Minority - An underrepresented minority is someone who identifies him or herself as Aleut, Black/African American, Cuban, Eskimo, Filipino, Latino, Native American, Puerto Rican, Samoan, or Vietnamese. (NIH definition -- Training Grants)

2. Please provide data comparing teaching loads and other duties of any members of underrepresented groups in your unit to others of comparable professorial rank.

The NEUBEH program does not make primary faculty appointments. Our core curriculum is taught by faculty from a range of departments. Women are well represented among lecturers and one of the three courses in our required sequence is organized by a woman (Dr. Sherk). We emphasize scientific, ethnic and gender diversity on our admissions committee. However, we do not recruit faculty, thus we have little control over its composition.

3. What steps, including outreach and recruitment, has your unit taken to ensure an environment that values diversity and supports all faculty, students and staff, including members of underrepresented groups? Have you been able to retain students and faculty from these groups once you have recruited them? What factors aid or impede your efforts to recruit and retain members of underrepresented groups? Is there anything the University can do to help you with recruitment and retention?

Of the three underrepresented minority students enrolled in seven years, none have left without their Ph.D. degree. Of the eleven minority students enrolled in the past seven years, only one has left without a Ph.D. degree. Our outreach is mainly done informally by the directors and faculty who have been contacted by minority students. We strive to achieve a more diverse class, but we are hamstrung by State law (Initiative 200) and by the number of members of underrepresented minorities applying to graduate school. We have begun to pursue two mechanisms to attract these students. We have asked the NIH for permission to use our Neurobiology Training Grant to support students from traditionally black medical schools who would like to participate in a summer research program. Second, several laboratories participate in a Howard Hughes Medical Institute EXceptional Research OPportunities (EXROP) program. The program is in its second year. Two students have participated in EXROP but none in labs of HHMI investigators in our program.

4. Has the increased diversity of the student body and/or faculty in your department generated any changes in the curriculum? In your unit's academic culture or climate? If so, what are the impacts of these changes? Is there anything the University or College can do to help you with these efforts?

Our curriculum meets the needs of our students mainly through the elective mechanism (see Electives

List – Appendix P). Thus far, it is hard to appreciate an impact of demographics on this process.

SECTION F: DEGREE PROGRAM

1. Describe the objectives of your doctoral degree program in terms of student learning and other relevant outcomes, as well as its benefits for the academic unit, the university, and region. Compare your objectives with those for programs at institutions you think of as peers. (Please attach a curriculum description as an appendix to this report.) – See Appendix Q – N&B Program Requirements

All students in the first year of the Program are required to complete successfully the core course series: NEUBEH 501, 502, & 503. This series exposes the students to the breadth of neuroscience, from molecular and cellular to systems, behavior and computational. In addition to the core series, the first year students are required to complete another series, The Molecular Basis of Cellular Function CONJ 531 & CONJ 532. This series provides some additional depth in cell and molecular biology that students need for a coherent view of the cell. More recently, the students have been required to participate in a discussion/problem session, NEUBEH 532, which is designed to complement the NEUBEH 501 course.

Students in the first two years take the weekly journal club NEUBEH 527. This course was designed to encourage students to explore certain topics in neuroscience in more depth than is possible with a broad survey course, like the NEUBEH 501-503 series. With the same goal in mind, we have required all students to attend the seminar series NEUBEH 510. In addition to these specific core courses, we require that all students take at least 10 credits of graded elective courses. This is a requirement of the Graduate School, and the students in the NEUBEH program meet this through specialized courses in the neurosciences, like Developmental Neurobiology (CONJ 534) or Neuroendocrinology (NEUBEH 541). Single credit courses that represent lab meetings, departmental journal clubs, etc., do not fulfill the elective requirement. We also require that all students gain experience in teaching for a minimum of two quarters, though they can fulfill this requirement in a single quarter through the more intensive teaching experiences in the undergraduate curriculum.

In addition to the formal coursework, students in the first year of the program are required to complete a minimum of three lab rotations. At the completion of the rotations, the students are required to either give a ten minute talk, or a poster presentation, on the research carried out during the rotation. The students are evaluated by their rotation supervisors and given written feedback, and their presentations

are evaluated by the faculty present at the rotation talks. This feedback is also provided to the students. Before the end of Spring Quarter of the second year, each student forms a Supervisory Committee. This is typically the thesis supervisor, three other faculty from the program, and one outside faculty appointed by the graduate school (GSR). A University requirement is the General Exam, and the program requires students take this exam by the middle of the third year. Copies of the current and proposed General Exam formats are attached as Appendix R.

The overall design of our curriculum is similar to Neurobiology programs at peer institutions. Most program require a similar mix of coursework, laboratory based research training, and seminars and journal clubs. Qualifying exams and General exams vary in format, but are typically required in similar programs. There are some differences; UC Berkeley does not have a core curriculum, but the course work is designed by the student; Stanford does not require three lab rotations, but instead, three is the maximum. UCSD requires a statistics course as part of their core requirements; UCSD also has a two-step qualifying exam process, with a "Minor Proposition Exam" and a second "Candidacy Exam." The NEUBEH program at the UW is most similar to the programs at UCSF and Harvard. Both of these institutions offer an introductory course very similar in scope to ours, and have similar requirements for lab rotations, advanced courses, journal clubs, seminar series and requirements for teaching.

2. Describe the standards by which you measure your success in achieving your objectives for doctoral programs. Using these standards, assess the degree to which you have met your objectives. Indicate any factors that have impeded your ability to meet your objectives and any plans for overcoming these impediments.

See Section A2. Since our unit has as its mission graduate training, the answer to this question and that in A2 are the same.

3. How do you inform your student of and prepare them for the breadth of opportunities and career alternatives available within and outside of the academy? This would include careers in industry, for instance, as well as academic careers in institutions other than research-intensive universities.

The program participates in the Bioscience Careers Seminar Series, which is designed to educate graduate students and postdoctoral fellows about career paths outside academia. We also support the University's Forum on Science Ethics and Policy, begun in 2004. Although the focus of this lecture series

is on ethical issues (e.g., stem cell research), it also helps prepare students for careers in science policy, journalism, consulting and teaching.

4. How are you staying informed of the career options that graduates of your program typically pursue and the success they are obtaining? How are you using this information in departmental planning?

We have only just begun to compile these statistics because the program has only existed for 8 years.

SECTION G: GRADUATE STUDENTS

1. Recruitment and Retention

a. Please describe recruitment/outreach programs to attract graduate students. Describe the measure you use to assess the success of your efforts. How successful have they been?

During the past five to six years of the Program, we have tried a number of outreach and recruitment efforts to attract high quality graduate students in the neurosciences.

Initially, the administrative staff attended annual graduate school fairs (New Orleans, New York City) to interact with potential applicants, to provide materials, and to generate a general awareness of the new program. Membership and participation in national neuroscience associations (Society for Neuroscience; Association for Neuroscience Departments and Programs) were initiated and have been maintained. Brochure mailings were done on a "per request" basis annually. From 2000 to the present day, the outreach efforts have been more web-based and customized to the individual students needs and interests instead of the previous "broadcast" efforts that were high in time and resource costs, but had low response. Our switch to a more personalized approach to the applications has seen an increased level of completed applications.

Our recruiting methods have become increasingly more applicant-centered and focused on providing the student applicant with as much information about our Program as possible so s/he can make an informed decision. As per the norm for the neurosciences, we invite applicants to interview to our Program during a two-day period. The Program pays for travel, hotel accommodations, and most food while the applicants are interviewing. During the past two to three years, we have invited approximately 40 applicants split between two interview periods each year. All applicants are given an orientation, one-on-one interviews with faculty of their choice, and ample opportunity to interact with both Program faculty and graduate students. All applicants are paired with a current Program graduate student, who is responsible for seeing that all questions and concerns of the applicant are addressed. Depending on funding of the Program, we have made 20-30 offers each year to the invited applicants, and have a 25-50% accept rate.

b. What are your retention rates for master's and doctoral programs? To what do you attribute attrition? What steps are taken to minimize attrition?

Since the program's creation in 1996, 94 students have matriculated to the Neurobiology & Behavior Program (see the table below). Of these, 25 students have completed the Ph.D. degree; 6 students graduated with a terminal Masters degree. Seven students have left the Program with neither degree: three transferred to other Ph.D. programs for personal reasons; four changed their mind about their career and personal goals. We feel that this rate of attrition is reasonable. Our goal is to provide a supportive environment for students to pursue their doctoral research and thus to minimize attrition caused by frustration of this goal. We support students who discover along the way that pursuit of the PhD is not their cup of tea. While we try to minimize the probability that this will occur at the admissions stage, but we do our best to support students who find that they have a change of heart.

Class	# Admitted	Ph.D	MS (Term)	Withdrew/ Transfer	Remaining
Pre-Merger	17	14	2	--	1
1996	10	3	2	4	1
1997	6	5	0	1	0
1998	9	1	1	2	5
1999	9	1	1	0	7
2000	10	1	0	0	9
2001	8	0	0	0	8
2002	14	0	0	0	14
2003	11	0	0	0	11
2004	8	0	0	0	8
Totals	102	25	6	7	64

2. Advising, Mentoring and Professional Development

a. In what ways do you communicate academic program expectations to students? Such information should include timelines, phases and benchmarks of the degree program; procedures for committee formation; coursework, exam and presentation requirements; and standards of scholarly integrity.

The ideal timeline for a graduate student in the NEUBEH Program is as follows: 1) complete the core curriculum and laboratory rotations in the first year; 2) choose a dissertation laboratory at the end of the Spring quarter of the first year; 3) complete most elective coursework and teaching requirements in the second year; 4) take the General Exam at the end of the second year; 5) focus on dissertation research in the third and fourth years; and 6) write and defend the thesis in the fourth or fifth years. Most of the control and monitoring of the student's progress is the responsibility of the thesis committee. When students deviate substantially form this timeline at any point after the first year, the program staff alert the Directors and if action is required, the Directors and staff communicate any concerns to the thesis advisor and student.

Two years ago, the program initiated a better monitoring system in the form of a Student Progress Committee. It is the responsibility of this committee 1) to create and revise as needed the Annual Progress Report form (see Appendix S); 2) to oversee the submission of these forms in a timely manner; 3) to review any significant deviations from satisfactory progress for all NEUBEH students; and 4) to report these concerns to the Directors. The Directors then review the concerns and if needed communicate directly with the student and their thesis advisor. There are few cases where the Directors have had to intervene in this way, but if necessary, they meet with the students, their advisors, end even the thesis committee, to resolve any concerns with student progress.

One of the most important mechanisms that exists in the program for monitoring student progress is the General Exam. In this exam, the student is evaluated on their written and oral performance at several levels. We place considerable emphasis on the ability to synthesize scientific concepts learned in the formal course work and the ability to propose a coherent research plan to test an original hypothesis. The format of the exam is under revision to better meet these goals; however, in the current format, the student 's performance in the exam is communicated either by the committee or the thesis advisor immediately at the completion of the exam.

b. In what ways do you inform students of your unit's graduation and placement record? Such information should include time to degree; average completion rates (Master's and Ph.D.); and employment of graduates two and five years after degree completion.

We inform students about our unit's graduation record formally on two occasions. First, during the recruitment process, we discuss this with the applicants. This is frequently something the applicants are

interested in and helps them compare our program with other similar programs at peer institutions. We also discuss this again at the New Student Orientation in the Fall of their first year. Until recently, the program was too young to furnish meaningful statistics. The data compiled for this program review will be useful for our current and future students, and we will provide these statistics to the new students during the recruitment and new student orientation in 2005 and thereafter.

c. Please attach an example of your department mentoring/advising plan. Such information should include evidence of that each student's work and progress are being evaluation on at least annual basis and that the results of the evaluation are communicated to the student.

The Graduate Program in Neurobiology & Behavior has a mentoring program to help first year students acclimate to the program and navigate toward a dissertation lab. We have chosen faculty members for each student on the basis of shared interests, personality and a history of positive interactions with students. Although each faculty mentor will have his or her personal style of mentoring, we recommend that a mentor meet with his/her student at least once per quarter, preferably near the beginning.

d. Please attach a copy of your professional development plan. Such a plan should address questions such as: What are the career opportunities for a master's or Ph.D. graduate in your field? "What skills/experiences contribute to success in the various academic and non-academic career paths listed above?"

We do not have a professional development plan. Our aim is to provide students with the bench, scholarly, and analytic skills to contribute to neuroscience research at the level of an independent principal investigator. We recognize that not all students will achieve this, and not all students desire this. We offer a wide variety of electives that allow students to create alternative paths that fit their needs. We also support two training/seminar series to expose students to career options outside academia (see item F.4).

3. Inclusion in Governance and Decisions

a. In what ways do you include graduate students in the governance of your department?

The students organize a bi-weekly seminar series. They are responsible for inviting all the outside speakers, typically in consultation with the faculty. The students host the speakers, along with a particular faculty member. The students also organize a bi-weekly journal club that is coordinated with the seminar speakers and their areas of interest. Students have an input on governance and the curriculum mainly through informal exchanges with the directors and other faculty. In addition, we hold a more formal meeting with students as a group to solicit input. We find that students provide

more candid feedback in less formal settings. We organize a party at the home of one of the directors at least once per year.

The students also affect the composition of the next year's class. One graduate student serves as a member of the admissions committee each year. The student is an active, equal member of the committee. The grad students organize the entertainment during the recruitment visits for the prospective students.

Finally, our students volunteer to represent their student interests in the Graduate & Professional Student Senate (GPSS).

b. Please describe your grievance process and characterize the nature of any grievances that have been lodged over the past 3 years. If the characterization is likely to reveal any students' identifies, please address this issue in separate but accompanying document addressed to the Dean of the Graduate School.

The Program in Neurobiology & Behavior does not have a program-specific grievance procedure, but defers to the UW Academic Grievance Procedure (Graduate School Memorandum No. 33) when an issue cannot be resolved informally with directors and the involved faculty & students. The Program has <u>not</u> had a grievance lodged over the past 3 years.

3. For graduate service appointees, please describe:

a. Appointment process

All NEUBEH students who enter as first-year students are provided a 50% graduate service appointment (Predoctoral Research Associate II) during their rotation quarters (usually 3-4 quarters). Funding for those positions is primarily from the Graduate School. Some first year students may have individual fellowships which result in Stipend Fellowship appointments; these are administered through the Graduate School's Fellowships and Grants Division. When students enter their dissertation lab, the advisor takes fiduciary responsibility for funding the student's appointment and for the oversight of the student's progress. Students who transfer into the Program from another department or program (usually from the Medical Scientist Training Program – MSTP) normally go directly into their dissertation lab and receive their appointments from their advisor's home department. In order to maintain their appointments, all students

must maintain satisfactory progress as determined by the Program directors and the Graduate Training Committee.

b. Average duration of appointment.

Our students maintain some kind of graduate appointment during their entire course of study in our Program, six years on average. During this period, the type of graduate student appointment may change (e.g. Predoc Res Assoc 2 may change into a Stipend Grad Trainee appointment).

c. Mix of funding among the various appointments (teaching, research and staff assistantships, fellowships, traineeships).

During their first year, our students are primarily supported by funds from the Graduate School. We have promises of access to emergency funding from the Medical School on an *ad hoc* basis, should we recruit students too successfully. After their first year, funding for Program students comes from institutional training grants and faculty research grants. As shown in Table 7, many of our students also have individual predoctoral fellowships.

Current Students	**Advisor**	**Year**	**Current Funding**
Allred, Sarah	Jagadeesh, Bharathi	1999	RA – PBIO/Dept Funds
Altman, Janet	Rubel, Edwin	2002	FL – HHMI Fellowship
Barot, Sabiha	Bernstein, Ilene	2002	FL – NSF Fellowship
Bullis, James	Poolos, Nicholas	2002	RA – Grant Funds
Cherny, Elena	Robinson, Farrel	2003	TR – Neuro Training Grant
Close, Jennie	Reh, Thomas	1998	RA - Grant funds
Craven, Kimberley	Zagotta, William	1999	RA – PBIO/Dept Funds
Custer, Kenneth	Bajjalieh, Sandra	2001	TR – Neuro Training Grant
Davenport, Christopher	Detwiler, Peter	2001	TR – Neuro Training Grant
Dieudonne, Alexandre (I)	Daniel, Thomas	2001	RA - Grant Funds
Doan, Thuy (M)	Rieke, Fred	2003	FL – Poncin Fellowship
Dunn, Felice	Rieke, Fred	2002	FL – HHMI Fellowship
Fadok, Jonathan	1st Year Student	2004	RA – NEUBEH Funds
Gale, Samuel	Perkel, David	2002	FL – NSF Fellowship
Garelick, Michael	Storm, Daniel	2003	RA – Grant Funds
Gartland, Andrew	1st Year Student	2004	RA – NEUBEH Funds
Gittelman, Joshua	Tempel, Bruce	1998	RA – Grant Funds
Goeke, Scott	Giniger, Edward	1999	RA – Grant Funds
Grote, Sara	La Spada, Albert	2001	TR – NeuroTraining Grant
Guyenet, Stephan	La Spada, Albert	2002	RA - Grant Funds
Hanks, Timothy	Shadlen, Michael	2002	FL -- HHMI Fellowship

Current Students	Advisor	Year	Current Funding
Harris, Julie	Rubel, Edwin	2000	FL – NRSA Fellowship
Hnasko, Thomas	Palmiter, Richard	2000	TR – MCB Training Grant
Kanning, Kevin	Bothwell, Mark	1998	RA – PBIO/Dept Funds
Kiani, Roozbeh (I)	1st Year Student	2004	RA – NEUBEH Funds
Knight, Thomas	Fuchs, Albert	1995	RA – PBIO/Dept Funds
Kuznetsova, Marina	Spain, William	2002	RA – PBIO/Dept Funds
Lamba, Deepak (I)	Reh, Thomas	2003	RA – Grant Funds
Lambert, Talley	1st Year Student	2004	RA – NEUBEH Funds
Land, Benjamin	Chavkin, Charles	2003	RA – Grant Funds
Lauckner, Jane (I)	Hille/Mackie (jt)	2001	RA – PBIO/Dept Funds
Leon, Kam-Sam	1st Year Student	2004	RA – NEUBEH Funds
Margolis, David	Detwiler, Peter	2000	TR – Neuro Training Grant
McCullough, Brendan (M)	Tempel, Bruce	2001	FL – NRSA Grant
McDevitt, Ross	Neumaier, John	2002	TR – Neuro Training Grant
Mease, Rebecca	Fairhall, Adrienne	2003	RA – PBIO/Dept Funds
Meitzen, John	Perkel, David	2002	FL – NSF Fellowship
Patel, Leena Suman	Rubel, Edwin	1998	FL – Epilepsy Foundation
Perez, Francisco	Palmiter, Richard	2000	RA – Grant Funds
Person, Abigail	Perkel, David	2000	FL – NRSA Grant
Ravanpay, Ali (M)	Olson, James	2002	FL – Poncin Fellowship; TR – Neuro Training Grant
Roberts, Melanie	Reh, Thomas	1999	RA – Grant Funds
Robinson, Siobhan	Palmiter, Richard	2000	TR – Neuro Training Grant
Ruffo, Mark	Anderson, Marjorie	1996	External Funds
Sakano, Hitomi (M)	Buck, Linda	2003	FL – Poncin Fellowship
Scheiner, Zachary	Storm, Daniel	2001	TR – Neuro Training Grant
Sebe, Joy	Berger, Albert	2000	TR - MCB Training Grant
Silverstein, Robert	Tempel, Bruce	1999	TR - Auditory Training Grant
Simons, Ann	Spain, William	2000	RA – PBIO/Dept Funds
Sizemore, Max	Perkel, David	2003	RA – Grant Funds
Sorensen, Staci	Rubel, Edwin	1999	FL – NRSA Grant
Stein, Alexander	Gordon, Sharona	1999	RA – PBIO/Dept Funds
Stoick, Cristi	Moon, Randall	2002	TR – Pathology TG
Stoll, Elizabeth	1st Year Student	2004	RA – NEUBEH Funds
Thompson, Christopher	Brenowitz, Eliot	2000	TR - Auditory Training Grant
Ting, Jonathan	Sullivan, Jane	2002	RA – PBIO/Dept Funds
Vincow, Evelyn	Neumaier, John	2003	RA – Grant Funds
Wacker, Douglas	Wingfield, John	2001	FL – NSF Fellowship
Wark, Abigail	1st Year Student	2004	RA – NEUBEH Funds
Wark, Barry	1st Year Student	2004	RA – NEUBEH Funds
Watari, Hirofumi (I)	Catterall, William	2003	RA – Grant Funds
White, Bryan	Moon, Randall	2002	TR – Neuro Training Grant
Wilkinson, Elizabeth	Sherk, Helen	2002	TR – Neuro Training Grant
Wissman, Anne Marie	Brenowitz, Eliot	1998	TR – Auditory Training Grant
(M) Also in the Medical Scientist Training Program (MSTP); (I) International Student			
Number of Current Students – 64	Training Grants – 17; RA (Grants/Dept Funds) – 32; External – 1; Fellowships – 15		

d. What criteria do you use for promotions and salary increases?

We do not establish our salary rate separately, but coordinate the rate with what is determined by the Basic Medical Chairs Committee and approved by the Dean of the Graduate School. This rate is annually reviewed to bring the stipend level to that of peer institutions. Our students receive the same base rate (Predoctoral Research Associate 2) regardless of year in the Program.

e. In what ways are graduate student service appointees supervised?

Students with research associate appointments are supervised by their dissertation advisor and/or the Program directors (see above for Student Progress committee). Those students with teaching assignments are supervised by the instructor of their respective assignment.

f. What training do graduate student service appointees receive to prepare them for their specific roles?

All NEUBEH students receive CIDR training prior to their second year in the Program. This is considered appropriate since students are normally not allowed to accept teaching assignments during their first year in the Program. Students also receive instruction and direction from the course instructor during their actual teaching assignment. Students also take mini-courses on environmental hazards, lab safety and animal use. These are offered during the orientation week prior to the first laboratory experience. In some cases, students will participate in research involving more specific hazards, such as radiation, and they receive training in safe practices prior to engaging in the research.