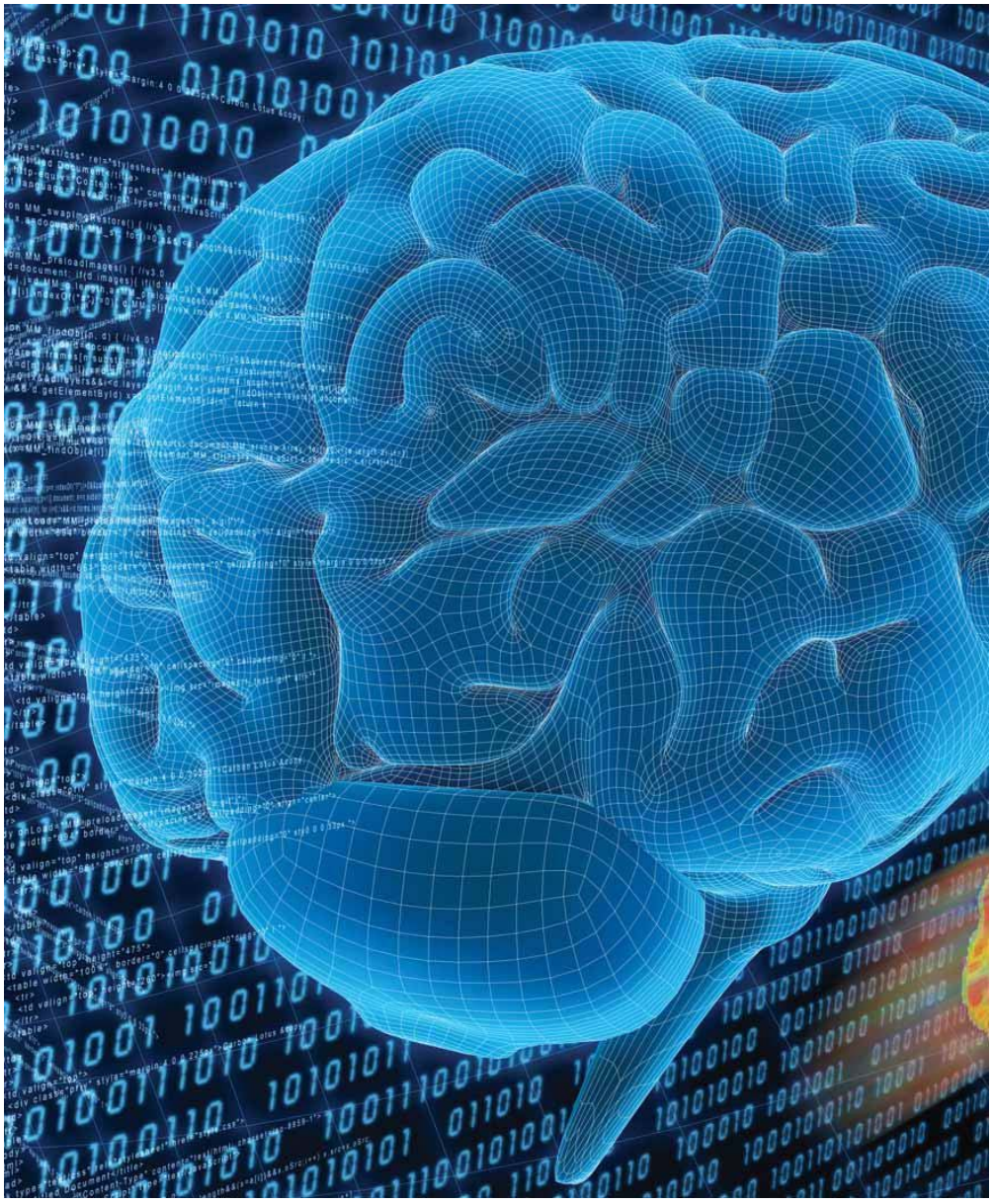
2012-2013
Computational Neuroscience
Student Handbook



Graduate Program for Neuroscience
Boston University

TABLE OF CONTENTS:

TABLE OF CONTENTS:

I. ABOUT BOSTON UNIVERSITY

Boston University is a world-recognized teaching and research university committed to excellence; students have the opportunity to study and conduct research along-side Fulbright Scholars, MacArthur Fellows, Pulitzer Prize winners and Nobel Prize winners. BU has two urban campuses with over 30,000 undergraduate and graduate students and more than 4,000 faculty members, making it one of the largest private universities in the country. The institution is classified as a Research University (very high research activity) by the Carnegie Classification of Higher Education. Students experience the city of Boston as an extension of campus for study, research opportunities, employment, culture and recreational activities.

II. ABOUT THE COMPUTATIONAL NEUROSCIENCE SPECIALIZATION OF THE GRADUATE PROGRAM FOR NEUROSCIENCE

The university-wide Computational Neuroscience specialization of the Graduate Program for Neuroscience (GPN) provides students with a uniquely specialized curriculum that supplements core neuroscience coursework with advanced training in a wide array of computational methods for studying the nervous system and developing neuroscience-related technologies.

Topics of study include: neural network modeling, neural dynamics, sensory, motor, and cognitive modeling, statistical modeling, sensory and motor prosthesis, brain-machine interfaces, neuroinformatics, neuromorphic engineering, and robotics. Coursework is chosen from the wide array of computational and neuroscience courses offered by the many departments and programs of the Boston University Charles River campus and the BU School of Medicine. Students pursue their research interests in laboratories across the University and have the opportunity to combine hands on experimental research with highly sophisticated computational analysis.

III. SCOPE OF THE HANDBOOK

Information in this handbook is not intended to be fully comprehensive nor does it replace information from the following resources:

- University Policy (http://www.bu.edu/academics/resources/university-policy/)
- Academic Conduct of Code (http://www.bu.edu/academics/resources/academic-conduct-code/)
- BU Graduate Program for Neuroscience Website (http://www.bu.edu/neuro/graduate/)
- BU Graduate Program for Neuroscience - Computational Neuroscience Page (http://www.bu.edu/neuro/graduate/computational-neuroscience/)
- GPN-CN Curriculum Page (http://www.bu.edu/neuro/graduate/computational-neuroscience/computational-neuroscience-curriculum/)
- BU Division of Graduate Medical Sciences (http://www.bumc.bu.edu/gms/gateway/students/phd-mdphd/)
- BU Website (http://bu.edu/)
- BU Directory (http://www.bu.edu/directory/)
- BU Course Descriptions Website (https://www.bu.edu/phpbin/course-search/)

- BU Student Link (http://bu.edu/studentlink/)
- University Academic Calendar (http://www.bu.edu/reg/dates/odates-1213.html)
- BU's FERPA policies (http://www.bu.edu/reg/ferpa/ferpa-policy.html)

While every effort is made to keep all information contained in this handbook up-to-date and in agreement with the resources listed above, occasional discrepancies may occur and will be resolved by consultation with the Program Director and/or Associate Director. Please contact the Computational Neuroscience Program Administrator (knelso01@bu.edu) with any questions or concerns relating to the content of this handbook.

IV. COMPUTATIONAL NEUROSCIENCE FACULTY & STAFF

i. DIRECTORS & ADMINISTRATORS

Shelley Russek, PhD
Director, GPN
(617) 638-4303 | srussek@bu.edu
72 East Concord St.
L611-612 Instructional Bldg, MED Campus

Frank Guenther, PhD
Academic Director, GPN-CN
Associate Director, GPN
(617) 353-5765 | guenther@bu.edu
677 Beacon St, Room 309, CRC Campus

SandraJean Grasso
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knelso01@bu.edu
677 Beacon St, Room 202, CRC Campus

ii. COMPUTATIONAL NEUROSCIENCE CURRICULUM COMMITTEE

(Listed Alphabetically)

Uri Eden
Frank Guenther
Nancy Kopell
Mark Kramer
David Mountain
Barbara Shinn-Cunningham

iii. COMPUTATIONAL NEUROSCIENCE FACULTY & AREAS OF SPECIALIZATION

(Listed Alphabetically)

Jason Bohland, PhD
(617) 353-9168 | jbohland@bu.edu
Location: 635 Commonwealth Ave (Sargent)

Speech neuroscience; neuroimaging; neuroinformatics

Daniel Bullock, PhD
(617) 353-9486 | danb@bu.edu
Location: 677 Beacon St. (CompNet)

Neural modeling of voluntary action and reinforcement learning

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Gail Carpenter, PhD
(617) 353-9483 | gail@cns.bu.edu
Location: 677 Beacon St. (CompNet)

Neural networks; pattern recognition; neuromorphic technology

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Michael Cohen, PhD mike@cns.bu.edu	Speech processing; measurement theory; cardiovascular modeling
Stephen Colburn, PhD (617) 353-4342 | colburn@bu.edu Location: 44 Cummington St. (ERB)	Binaural hearing; neural modeling; hearing impairments
James Collins, PhD (617) 353-0390 | jcollins@bu.edu Location: 44Cummington St (ERB 307)	Synthetic biology; systems biology; sensory prosthesis
Uri Eden, PhD (617) 353-9553 | tzvi@bu.edu Location: 111 Cummington St.	Mathematical and statistical modeling of neural spiking activity
Timothy Gardner, PhD (617) 358-1144 | timothyg@bu.edu Location: 24 Cummington St.	Songbird neural circuit development; neural recording technology
Anatoli Gorchetchnikov, PhD (617) 353-4949 | anatoli@bu.edu Location: 677 Beacon St. (CompNet)	Spatial representations and navigation
Stephen Grossberg, PhD (617) 353-7858 | steve@bu.edu Location: 677 Beacon St. (CompNet)	Neural modeling of vision; speech; cognition; emotion; motor control; navigation; mental disorders
Frank Guenther, PhD (617) 353-5765 | guenther@bu.edu Location: 677 Beacon St. (CompNet)	Speech neuroscience; neural prosthesis; neuroimaging
Xue Han, PhD (617) 358-6189 | xuehan@bu.edu Location: 44 Cummington St. (ERB 521)	Neurotechnology, optogenetics, neural prosthetics
Michael Hasselmo, PhD (617) 353-1397 | hasselmo@bu.edu Location: 1019 Commonwealth Ave	Memory-guided behavior; role of oscillations in cortical function
Marc Howard, PhD (617) 353-2580 | marc777@bu.edu Location: 64 Cummington St.	Cognition and neural representation of time and space

Allyn Hubbard, PhD (617) 353-2815 | aeh@bu.edu Location: 8 St. Mary's St. (PHO 329)	Auditory physiology; VLSI; neurocomputing
Eric Kolaczyk, PhD (617) 353-5208 | kolaczyk@bu.edu Location: 111 Cummington St.	Statistical analysis of network-indexed data; biological networks modeling and data analysis
Mark Kon, PhD (617) 353-9549 | mkon@bu.edu Location: 111 Cummington St.	Machine learning and bioinformatics; neural network theory
Nancy Kopell, PhD (617) 353-5210 | nk@bu.edu Location: 111 Cummington St.	Neural dynamics; rhythmic behavior in neural networks
Mark Kramer, PhD (617) 353-4591 | mak@bu.edu Location: 111 Cummington St.	Neural dynamics; neural rhythms in normal and diseased brains
David Mountain, PhD (617) 353-4343 | dcm@bu.edu Location: 44 Cummington St. (ERB413A)	Auditory information processing; biomedical electronics
Hamid Nawab, PhD (617) 353-4461 | hamid@bu.edu Location: 8 St. Mary's St. (PHO 433)	Signal processing of neural activity; auditory scene analysis
Jason Ritt, PhD (617) 353-5903 | jritt@bu.edu Location: 24 Cummington St. (LSE 201)	Sensorimotor behaviors; active sensing; neural prosthesis
Michele Rucci, PhD (617) 353-7671 | mrucci@bu.edu Location: 64 Cummington St.	Active perception; visual neuroscience; robotics
Eric Schwartz, PhD (617) 353-6179 | eric@bu.edu Location: 677 Beacon St. (CompNet)	Computational neuroscience; machine vision; neuroanatomy
Kamal Sen, PhD (617) 353-5919 | kamalsen@bu.edu Location: 44 Cummington St. (ERB 414B)	Natural sound encoding; auditory plasticity; birdsong

Barbara Shinn-Cunningham, PhD (617) 353-5764 | shinn@bu.edu Location: 677 Beacon St. (CompNet)	Auditory neuroscience; spatial hearing; neuroimaging
David Somers, PhD (617) 353-1372 | somers@bu.edu Location: 64 Cummington St.	Visual perception and cognition; neuroimaging; neural modeling
Cara Stepp, PhD (617) 353-7487 | cstepp@bu.edu Location: 635 Commonwealth Ave (Sargent)	Sensorimotor function disorders
Malvin Teich, PhD (617) 353-1236 | teich@bu.edu Location: 8 St. Mary's St.	Biosignal analysis; audition; vision; biological imaging
Jason Tourville, PhD (617) 353-6181 | jtour@bu.edu Location: 677 Beacon St. (CompNet)	Speech motor control; neuroimaging; neuroanatomy
Lucia Vaina, MD, PhD (617) 353-2455 | vaina@bu.edu Location: 44 Cummington St. (ERB315)	Computational models of vision; neuroimaging
Massimiliano Versace, PhD (617) 353-9481 | versace@bu.edu Location: 677 Beacon St. (CompNet)	Neural modeling; whole-brain systems; neuromorphic technology; cognitive robotics
Arash Yazdanbakhsh, MD, PhD (617) 353-9481 | yazdan@bu.edu Location: 677 Beacon St. (CompNet)	Human vision and its modeling; human electrophysiology and psychophysics

V. COMPUTATIONAL NEUROSCIENCE STUDENTS

***A full list of Graduate Program for Neuroscience students is provided in Appendix A.**

Student Name	Advisor	Office Location	Email Address
Eric Denovellis	Bullock / Miller	677 Beacon, Rm 110	edeno@bu.edu
Grant Fiddyment	Kramer	677 Beacon, Rm 101	gfiddy@bu.edu
Nicholas James	Kopell	44 Cummington, Rm 503	njames85@bu.edu
Sean Matlis	Kramer	677 Beacon	smatlis@bu.edu
Samantha Michalka	Somers / Shinn-Cunningham	2 Cummington	michalka@bu.edu
Brendan Murphy	Guenther	677 Beacon St.	murphyba@bu.edu
Emma Myers	Bohland	635 Comm, Rm 415	emyers@bu.edu
Siddharth Rajaram	Shinn-Cunningham	677 Beacon, Rm 111	srajaram@bu.edu
Andres Felipe Salazar Gomez	Guenther	677 Beacon, Rm 102	salacho@bu.edu
Sara Saperstein	Bohland	635 Comm, Rm 415	saperste@bu.edu
Jennifer Segawa	Guenther	677 Beacon, Rm 102	jsegawa@bu.edu
Lena Sherbakov	Versace / Bullock	677 Beacon, Rm 107	lenas@bu.edu
Jason Sherfey	Kopell / Kocsis (HMS)	677 Beacon, Rm 107	sherfey@bu.edu
Austin Soplata	Kopell / Brown (Harvard/MIT)	677 Beacon, Rm 101	asoplata@bu.edu
Dante Smith	Guenther	677 Beacon St	djsmith@bu.edu
Emily Stephen	Guenther	677 Beacon, Rm 102	estephen@bu.edu
Spencer Torene	Guenther	677 Beacon, Rm 101	storene@bu.edu
Christopher Watson	Rivkin (CHB) / Vaina	300 Longwood Ave	cgwatson@bu.edu

VI. REGISTRATION

i. FALL & SPRING REGISTRATION

All continuing students must complete registration prior to the start of the term in accordance with University & GMS deadlines.

Each registration period students must meet with their advisors to go over course selections and have their forms signed. Students must provide their advisor and the Computational Neuroscience Program Administrator (knelso01@bu.edu) with a current unofficial transcript, the most recent version of their GPN PhD Dissertation Tracking Form (available from the GPN Assistant Director) and an updated GPN-CN Requirement Spreadsheet prior to the meeting. The GPN PhD Dissertation Tracking Form and GPN-CN Requirement Spreadsheets can be found in the Appendix section of this handbook. Please plan ahead in order to meet deadlines.

Any GPN PhD student who has not yet met the required total number of credits for their degree (64 credits for post-bachelors PhD students and 32 credits for post-masters PhD students) should typically register for a minimum of 10 credits per semester. **If fewer than 10 credits of coursework are needed, the student should register for directed study at the number of**

credits that will bring the semester total to 10 credits (up to a maximum of 8 directed study credits per semester). Once students have completed the required 64 (post-bachelors) / 32 (post-masters) total required credits they must register as full-time continuing students by completing the Certified Full-Time form, which must be signed by the advisor. Please also note that once students have completed 64 (post-bachelors) / 32 (post-masters) credits, a compelling argument must be made for any additional course for credit. Such students are allowed to audit one course per semester, however.

Copies of all signed registration forms AND Certified Full-Time forms should be left with the Computational Neuroscience Program Administrator and the originals brought to the GPN Assistant Director for forwarding to GMS.

Please note: Students are advised to check their registration status via the LINK each term, as well as to review their transcripts for accuracy.

ii. SUMMER REGISTRATION

Students who will continue in the fall term and who are engaged in full-time research as an essential component of their graduate degree programs during the summer are eligible for summer research registration status, a no-cost mechanism whereby graduate students who are engaged in academic research during the summer can be appropriately registered as students for purposes of loan eligibility and tax considerations. **Students seeking summer research status should complete a PhD Summer Research Status Registration Form from the GMS website, leave a copy with the Computational Neuroscience Program Administrator and bring the original to the GPN Assistant Director.**

Students who will complete their remaining degree requirements in the summer months and *will not* continue in the fall term must register for a tuition-bearing course in the summer term, typically a continuing student status course, in order to satisfy the GRS residency requirement. Please contact the GPN Assistant Director for details.

iii. CONTINUING STUDENT STATUS

Students who will have fulfilled the last of their course requirements must register for continuing student status by completing and submitting a *continuing student status registration form.* TFs returning to continuing student status are also required to complete and submit this form.

iv. COMPLIANCE REQUIREMENTS FOR REGISTRATION

Please check your compliance status via the Student Link at the start of each semester to ensure you maintain compliance. If you are not in compliance, your account will be frozen, and your registration cannot be processed. Compliance requirements are:

1. All students must provide a BU alert phone number and confirm or update this number once per semester;
2. All students must settle their semester account by the established payment deadlines for the semester; and
3. All full-time and international students must comply with Massachusetts law that requires students to provide proof of having completed a series of immunizations.

VII. COMPUTATIONAL NEUROSCIENCE CURRICULUM

Post-bachelors students must complete 64 credits and post-masters students must complete 32 credits. These credits must include the following, with additional credits from directed research or additional graduate-level coursework approved by the student's advisor. Please check the Computational Neuroscience Curriculum webpage for the most current information (http://www.bu.edu/neuro/graduate/computational-neuroscience/computational-neuroscience-curriculum/). Brief descriptions of the courses listed below can be found in Appendix B.

i. REQUIRED COURSES

GRS BI755 *Eldred and Rosene* Principles of neuroscience I: From molecules to systems (4 cr)

GRS BI756 *Moss and TBD* Principles of neuroscience II: From systems to mind (4 cr)

GRS MA681 *Eden* Accelerated introduction to statistical methods for quantitative research (4 cr)

OR

CAS MA684 *Heeren* Applied multiple regression and multivariable methods (4 cr)

Students may petition to place out of up to two of these three required courses if they took substantially equivalent courses prior to entering the PhD program and received a grade of B (or the equivalent) or better. Students can then substitute additional courses (selected in consultation with and approved by the GPN Graduate Education Committee (GEC)) or directed study to replace the credits for any required courses that are waived.

GRS NE800 Lab rotations (2 – 4 cr). A minimum of two rotations (each 1 credit) is required. At least one rotation should be in an area of experimental research. Students are expected to spend 10 hours per week on their lab work for each semester-long rotation.

GRS NE500/501 Frontiers in neuroscience (2 cr). Core seminar course for all GPN students.

ii. BASIC COMPUTATIONAL NEUROSCIENCE COURSES

At least four credits selected from:

CAS CN510 *Gorchetchnikov* Principles and methods of cognitive and neural modeling I (4 cr)

CAS CN580 *Schwartz* Introduction to computational neuroscience (4 cr)

GRS MA665 *Kramer* Introduction to modeling and data analysis in neuroscience (2 cr)

GRS MA666 *Kramer* Advanced modeling and data analysis in neuroscience (2 cr)

iii. QUANTITATIVE SYSTEMS NEUROSCIENCE COURSES

At least four credits selected from:

CAS PS530 *Hasselmo* Neural models of memory function (4 cr)

CAS CN530 *Yazdanbakhsh* Neural and computational models of vision (4 cr)

CAS CN540 *Bullock* Neural and computational models of adaptive movement planning and control (4 cr)

CAS CN560 *Shinn-Cunningham* Neural and computational models of hearing (4 cr)

CAS CN570 *TBD* Neural models of conditioning, reinforcement, motivation, and rhythm (4 cr)

CAS CN720 *Bullock* Neural and computational models of planning and temporal structure in behavior (4 cr)

iv. ADVANCED COMPUTATIONAL NEUROSCIENCE COURSES

At least four credits of advanced graduate coursework (700 level or above) selected from the list below, or approved by the GPN GEC:

ENG BE707 *Ritt/Sen* Quantitative studies of excitable cells (4 cr)

CAS CN720 *Bullock* Neural and computational models of planning and temporal structure in behavior (4 cr)

CAS CN730 *TBD* Models of visual perception (4 cr)

CAS CN740 *Guenther* Topics in sensory motor control (4 cr)

GRS MA751 *Kolaczyk/Kon* Advanced statistical methods II (4 cr)

GRS CN780 *Schwartz* Topics in computational neuroscience (4 cr)

GRS CN810 *Versace* Topics in cognitive and neural systems: Adaptive mobile robots (4 cr)

GMS AN820 *TBD* Introduction to Interdisciplinary systems science: Dynamic modeling (2 cr)

v. ADDITIONAL COURSES

For ***post-masters students***, 4 additional credits in neuroscience or related topics (***neuroscience electives***), selected in consultation with and approved by the GPN GEC.

For ***post-bachelors students***, 16 additional credits in neuroscience or related topics (***neuroscience electives***), selected in consultation with and approved by the GPN GEC. At least eight of these additional credits must come from courses listed above and/or from the set of ***approved computational neuroscience electives***, listed below. Students may petition to add other graduate-level computational courses at Boston University to the list of approved electives. Other coursework can be found on the general link to GPN Electives. Note that courses counted towards the distribution requirements (above) cannot also count towards fulfilling the computational neuroscience elective requirement.

vi. APPROVED COMPUTATIONAL NEUROSCIENCE ELECTIVES

CAS BI502 *Gardner* Topics in the theory of biological networks (4 cr)

CAS CN550 *Gorchetchnikov/Ames* Neural and computational models of recognition, memory, and attention (4 cr)

CAS MA568 *Eden* Statistical analysis of point process data (4 cr)

CAS MA575 *TBD* Linear models (4 cr)

CAS MA576 *Ray* Generalized linear models (4 cr)

CAS MA578 *Gupta* Bayesian statistics (4 cr)

CAS MA581 *Taqqu* Probability (4 c)

CAS MA582 *Ginovyan* Mathematical statistics (4 cr)

CAS MA583 *Eden* Introduction to stochastic processes (4 cr)

CAS MA976 *Kopell* Dynamical systems in neuroscience (4 cr)

ENG BE567 *Ritt* Nonlinear systems in biomedical engineering (4 cr)

ENG BE747 *Colburn* Advanced signals and systems analysis for biomedical engineering (4 cr)

ENG EC505 *Karl* Stochastic processes (4 cr)

ENG EC516 *Nawab* Digital signal processing (4 cr)

ENG EC710 *Caramanis* Dynamic programming and stochastic control (4 cr)

ENG EC717 *TBD* Image reconstruction and restoration (4 cr)

ENG EC719 *Saligrama* Statistical pattern recognition (4 cr)

GMS BY772 *TBD* Nuclear magnetic resonance spectroscopy in biology and biochemistry (2 cr)

GMS IM651 *Killiany* Statistical analysis of neuroimaging data (2 cr)

GRS CN710 *Carpenter* Advanced topics in neural modeling (4 cr)

GRS CN811 *TBD* Topics in cognitive and neural systems: Visual perception (4 cr)

GRS MA781 *Ginovyan* Estimation theory (4 cr)

GRS MA783 *Guasoni* Advanced stochastic processes (4 cr)

GRS PY771 *Rothschild* Biophysics (4 cr)

VIII. QUALIFYING EXAMINATION

Students typically take their Qualifying Examination at the end of their second year of study. The Qualifying Examination tests the ability of the student to think experimentally by generating testable hypotheses based on a foundation of knowledge that can be communicated in a written document and defended orally in front of a committee of GPN members. **The first step in the qualifying exam process is to form an examining committee** and obtain approval for this committee from the GPN Program Directors (srussek@bu.edu and guenther@bu.edu). **This is followed by the written exam,** which must be approved by the student's thesis mentor and distributed to the examining committee (see below) **at least 2 weeks prior to the oral exam.**

i. EXAMINING COMMITTEE

A minimum of three faculty members are on the examining committee (thesis mentor and two additional members). Students should confer with their thesis advisors and/or the GPN Graduate Program Directors for guidance on committee composition. **Each committee member must be expert in at least one aspect of the proposed research, and the committee must**

include at least one member (often the Chair) who is not directly involved in the student's dissertation research. Furthermore, the Chair of the Qualifying Exam Committee cannot be the primary mentor of the student. Committee choice must be reviewed by the Program Directors and GPN Graduate Education Committee (GEC) prior to approval. Every attempt is made to limit committee participation to GPN training faculty unless additional expertise is required as determined by GEC review. The role of the Examining Committee Chair is to coordinate with the student and the GPN office to make sure the exam is scheduled properly and that all participating faculty members receive the necessary documents and understand the goals of the examination process. The Chair also provides objective input to the committee as she/he is not intimately involved in the student's research. The Chair may be a voting member of the committee if the committee is limited to 3 members.

ii. WRITTEN EXAM

The written exam is structured around a proposal that is in the form of an individual NIH Ruth L. Kirschstein National Research Award **(NRSA) training fellowship application.** NRSA applications follow the NIH SF424 (R&R) instruction set. The student must complete following sections of the NRSA fellowship application (note that the numbering is different in the actual application to NIH):

1) Project Summary

2) Specific Aims

3) Research Strategy (includes Significance, Innovation, and Approach sections)

4) Bibliography and References Cited

Abridged instructions for these sections from the SF424 (R&R) instruction set are provided in Appendix J of this document for your convenience.

Please note that the written GPN exam is to be generated by the student, and while mentors can give advice regarding research direction and choice of experiments, they are not to edit the written part of the document as this is an exam. While it is not expected that the document prepared by students will be ready for submission to a funding agency at the time it is submitted to the Qualifying Examination Committee, it is expected that after committee evaluation and successful passing of the qualifying examination, students will be able to make revisions that would allow them to apply for an NRSA if deemed appropriate by the student and their advisor.

The written exam must be approved by the student's thesis mentor and distributed to all committee members at least two weeks prior to the oral exam. After the oral exam, the examining committee may require edits to the written document before approval. **The written exam will also typically serve as the basis for the Dissertation Outline/Prospectus**, as described further below.

iii. ORAL EXAM

The oral exam is a defense of the hypotheses to be tested, potential problems and pitfalls in the experimental approach, as well as general information regarding the field of neuroscience that was emphasized in the core coursework. The exam is expected to be

approximately 1-1.5 hours in length. Students make a 25-30 minute PowerPoint presentation to their committee that frames the research hypotheses and experimental approach of their written document, along with presenting any pilot results. The presentation is followed by a question and answer period with committee faculty. **The committee members may ask questions related to any aspect of the proposed project, including motivation, relevance, relationship to the existing literature, study design and execution, data analysis, and hypothesis generation and testing.** Often a committee member may be an expert or instructor of material that is beyond the scope of the proposed project. We request that these committee members limit their questions to areas of their expertise pertinent to the proposed project.

Upon successful completion of the oral exam, the committee must complete and sign the **Report of Examination** form. **Two weeks prior to the oral exam, students must inform the GPN Assistant Director (sgrasso@bu.edu) of the scheduling of the exam and identify the Qualifying Committee Chairperson.** The Assistant Director will forward the GMS Report of Examination form to the Chairperson, along with instructions for the oral exam and an internal GPN form for exam reporting. The Chair will be instructed to return the completed forms to the Assistant Director for processing after the Oral Exam is completed.

IX. DISSERTATION ADVISORY COMMITTEE

After successful completion of the Qualifying Exam, each student and their research mentor put together a **dissertation advisory committee (DAC) that contains a total of 5 members who will be at the dissertation defense, including 2 readers of the dissertation in addition to the advisor. At least two DAC members must be from the group of GPN training faculty** (ideally one from each campus). **At least one DAC member must come from outside of BU. A completed Request for Special Service Appointment Form must be submitted for each non-BU committee member**; students should submit these forms to the GPN Assistant Director (sgrasso@bu.edu) for forwarding to GMS as soon as the committee is formed. The thesis mentor is the first reader on the dissertation. The outside member can be a second or third reader, although this is not required. **At least one thesis reader must not be a collaborator on the thesis project, although she/he can be a collaborator with the laboratory.** Members of a student's Qualifying Exam Committee can also participate on their DAC; in fact, the three examining committee members may often end up being the three readers of the dissertation, but this is not mandatory. **The Chair of the committee cannot be a reader of the dissertation.** The Chair's chief responsibility is to make sure that the student works with the office to schedule the necessary meetings and serves as an interface between the committee's recommendations to the student and any other concerns that the student or mentor may have during the training process. The Chair also formally introduces the student at the open defense presentation.

Composition of the DAC must be approved by the GPN Program Director and Associate Director in consultation with the GEC. Students should contact the GPN Program Directors (srussek@bu.edu and guenther@bu.edu) to obtain approval for the proposed DAC committee. **Students are expected to meet with their DAC once a semester** to track progress, although not all members of the committee need to be present at each meeting (three members are sufficient for scheduling). During this meeting (**limited to 1 hour**) students make a short PowerPoint presentation to the group highlighting their research accomplishments over the past academic period (with review of research goals) and receive feedback from faculty regarding any issues in

approach or interpretation. Scheduling of the DAC meetings is done by the student (with guidance from the GPN office if needed). **After each DAC meeting, the DAC chair will send the Assistant Director (sgrasso@bu.edu) a brief email summary of the meeting, including an assessment of the student's progress since the last meeting and any recommendations the committee has made for the student going forward.**

X. DISSERTATION PROSPECTUS

Each student must submit a dissertation prospectus to the DAC members at least **one week prior to the Formal Progress Report Seminar** described below. **This document will typically consist of an updated version of the student's written qualifying exam materials, along with an outline that provides proposed chapter and section headings for the dissertation document.** If the student's project has changed substantially from the time of the qualifying exam, the prospectus should reflect these changes while staying within the formatting guidelines used for the written qualifying exam. Once approved by the three dissertation readers (typically at the Formal Progress Report Seminar), the prospectus should be submitted to GMS using the GMS **Dissertation Prospectus Outline Approval Page**. A copy of the prospectus and approval page should be sent to the GPN Assistant Director (sgrasso@bu.edu) for inclusion in the student's files.

XI. FORMAL PROGRESS REPORT SEMINAR

At least **one year before their defense date**, students make a **formal oral presentation (30 min) to the DAC that is open to the neuroscience community at large**. This presentation is followed by a formal meeting of their committee to discuss their progress and whether they are on target for the completion of their research. Students are encouraged to schedule the Progress Report (**third or fourth year in the program**) once they have enough preliminary data to indicate that their Aims are sound and there is sufficient progress in their research direction for presentation and discussion. The outside member usually does not attend this exercise. If the DAC determines that the student is on track to complete their dissertation, the dissertation readers will sign the GMS **Dissertation Prospectus Outline Approval Page** at the conclusion of the Formal Progress Report Seminar. Otherwise the DAC will provide the student with guidance for addressing their concerns before the prospectus can be approved.

XII. DIPLOMA APPLICATION

A GMS **PhD Diploma Application** must be submitted to GMS **approximately 2-4 months prior to the defense date**. The exact due date varies by graduation cycle; see the official **GMS Graduation Calendar** to determine the appropriate deadline for your expected graduation date.

XIII. DISSERTATION ABSTRACT

A dissertation abstract conforming to GMS format requirements must be approved by the three readers of the dissertation and submitted to GMS (using the **PhD Dissertation Defense Abstract Form**) **at least 3 weeks prior to the dissertation defense**. This abstract must be circulated to all DAC members prior to the Pre-Defense DAC Meeting.

XIV. PRE-DEFENSE DAC MEETING

A pre-defense meeting of the DAC occurs **at least two weeks prior to the defense** to make sure that the quality of the dissertation document is close to being acceptable for the degree and to review necessary paperwork. At this time, the committee will review the abstract and title. **Members of the DAC must have two weeks to review a full draft of the thesis before the pre-defense.** There is no oral presentation associated with this meeting. The outside member usually does not attend this exercise but does provide the student with feedback on the document, either by email or phone, before the meeting takes place. In most cases, the Chair of the committee ensures that the views of the outside member are represented in the discussions.

XV. THESIS DEFENSE

After submission of the abstract and at least two weeks prior to the Thesis Defense, students must submit the **Oral Defense Scheduling Form**. At the time of their defense, students will give a **50-minute oral presentation, followed by 10 minutes of questions, that is open to all members of the University**. This public forum will be followed by a **closed session of the DAC** where the student is asked to respond to questions put forth by the committee to test her/his ability to defend the work presented in the dissertation document. It is expected that all members of the DAC will attend the entire formal defense, which should last a **maximum of two hours**.

XVI. DISSERTATION SUBMITTED TO GMS

After the three dissertation readers have signed the dissertation signature sheets, the finalized dissertation is submitted to GMS to complete the PhD requirements. Note that **GMS must approve the dissertation formatting before the final document can be submitted**.

XVII. GMS FORMS AND DEADLINES

Students are strongly urged to become aware of GMS requirements, forms, and official deadlines. The following items should be obtained from the **GMS Division Office PhD Student Forms website**:

1. Thesis Guidelines for Theses and Dissertations
2. Dissertation Prospectus Outline Approval Page
3. Graduation Calendar
4. Ph.D. Dissertation Defense Abstract Form (due 3 weeks prior to defense)
5. Oral Defense Scheduling Form (due 2 weeks prior to defense)
6. PhD Diploma Application and Dissertation Submission Form (due date varies by graduation cycle; approximately 2-4 months prior to defense)
7. Request for a Special Service Appointment Form (due at time of Abstract Approval) for Outside Member.

XVIII. SEMINARS & EVENTS

i. Graduate Program for Neuroscience Seminars

The Graduate Program for Neuroscience sponsors a weekly Neuroscience Postdoc / Student Seminar Series. Seminars are typically on Friday mornings at 9:30 in Room 113 of 5 Cummington Street. GPN also runs a Distinguished Lecture Series with speakers chosen from a list of nominations compiled by neuroscience students. Details of both the Postdoc/Student Seminars and Distinguished Lecture Series will be listed on the Neuroscience Calendar Page (www.bu.edu/neuro/outreach/calendar/) once the schedules are set.

ii. CELEST Science of Learning Seminar Series

CELEST Science of Learning Seminars take place on Fridays at 2:00 PM in the Auditorium (Room B02) of 677 Beacon Street. For a list of speakers and talk titles please visit the CELEST Events & Programs webpage (http://celest.bu.edu/events-and-programs).

iii. Center for Computational Neuroscience and Neural Technology (CompNet)

A student-organized CompNet seminar series is being planned for the 2012-2013 academic year. More information will be available in the Fall '12.
Please check the CompNet events page for more information about this and other CompNet-sponsored events (http://compnet.bu.edu/news-and-events/events/).

iv. Center for Memory and Brain Memory Lunch Seminar Series

The Center for Memory and Brain hosts a monthly seminar series at 2 Cummington Street, Room 109. Please see their website (http://www.bu.edu/cmb/events/) for a current list of speakers, abstracts, dates and times.

v. Hearing Research Center Seminars

The Hearing Research Center (HRC) holds a colloquium series open to all interested persons. Talks are typically held on Fridays at 10:30 AM in room 203 of 44 Cummington Street. For more information please visit their Seminar & Event webpage (http://www.bu.edu/dbin/hrc/calendar/).

XIX. COMPUTATIONAL NEUROSCIENCE SPECIAL INTEREST GROUPS

i. Basal Ganglia Journal Club (BGJC): Reinforcement learning, decision, cognitive control, and sequential planning

This journal club meets once during most weeks throughout the academic year in the CompNET building at 677 Beacon Street. Among the senior facilitators of the meetings are Professor Daniel Bullock of the GPN and Psychology Department, and three BU graduates in Cognitive & Neural Systems who are now postdoctoral researchers in Boston: Drs. Can Tan, Melissa St. Hilaire, and Yohan John. The purpose of the meetings is to keep abreast of new studies of reinforcement learning, decision making, cognitive control, and sequential planning. Of particular interest are

newly-reported data that help constrain the development of realistic models of forebrain circuits, especially loops that link cortex with the basal ganglia and basal forebrain. In each meeting, a participant reprises recent results and then helps lead a discussion of issues raised by the results, which are drawn from a new journal article or book chapter. Those interested in being regular participants, or in making a presentation of their results to the group, should contact Professor Bullock (danb@bu.edu).

ii. SPEECH LAB MEETINGS

Professor Frank Guenther (guenther@cns.bu.edu) organizes one-hour CNS speech lab meetings, held on Fridays at 12:00 PM, approximately twice a month during the academic year and summer. Attendees include several CNS faculty members and graduate students. These meetings are designed to keep students and faculty with an interest in speech neuroscience and/or neural prosthesis abreast of the latest papers in the field. At each meeting, a different member presents a recent article and leads a discussion of the main issues raised by the article.

iii. COMPUTATIONAL NEUROSCIENCE STUDENT ORGANIZATION (CNSO)

The Computational Neuroscience Student Organization (CNSO) is a student-run organization consisting of graduate students whose interests focus on the computational, modeling, and technology aspects of neuroscience. Members are usually students affiliated with the Center for Computational Neuroscience and Neural Technologies (CompNet), the Graduate Program for Neuroscience (GPN) computational track, and the former department of Cognitive and Neural Systems (CNS). Under the support of CompNet, CNSO regularly organizes student talks, social events, and technical seminars on variety of themes for the wider BU neuroscience community. In addition, CNSO leadership serves as a channel of communication between students and CompNet's board of directors. Each year in the Spring CNSO holds elections for president, vice president, secretary, and treasurer from within the community. We recognize the importance of diversity and welcome anyone interested in computational aspects of neuroscience in the BU community to participate in our meetings and events. For more information please contact Byron Galbraith at bvg@bu.edu.

iv. NEUROSCIENCE GRADUATE STUDENT ORGANIZATION (NGSO)

The Neuroscience Graduate Student Organization (NGSO) focuses on creating community and resources for neuroscience graduate students at BU. NGSO is open to all BU graduate students involved in neuroscience research, independent of program or department. NGSO has social events or meetings about once/month, works with GPN administration on speaker series and other events, and works on other resources for the BU neuroscience community. The NGSO email list can be joined at: http://groups.google.com/group/bu-neuro-graduate-students

v. BU COMPUTATIONAL NEUROSCIENCE ON SOCIAL MEDIA SITES

BU Comp Neuro has joined Facebook and Twitter to better connect with our students, faculty, alumni, applicants and staff. For the latest updates and news items please "Like" us on Facebook (https://www.facebook.com/BUCompNeuro) and follow us on Twitter (https://twitter.com/#!/BUCompNeuro).

XX. SECURITY AT 677 BEACON STREET

Locking doors

It is ABSOLUTELY ESSENTIAL that the outside doors at 677 Beacon Street remain closed AND LOCKED at all times. The doors from the lobby to the student offices also need to stay locked, with card access. The loss of computer or projection equipment would have serious consequences for the education of all students in the program, and students' work, books, and other possessions could be lost as well. In addition, please do not unlock or prop open building doors. They should be locked at all times. Using your card is a minor inconvenience when balanced against your needs and safety. Finally, please DO NOT let anyone into the building whom you do not know personally. This may seem unbearably rude at times, but thefts have followed from just such a kindness.

In case of emergency, phone BU Police: 3-2121 or Boston Police: 9-911.

Door Buzzer

Please keep in mind that the door buzzer is intended for guest use only; every time the buzzer is used a CompNet staff member has to stop what s/he is working on to answer the door. All students who need regular access to the building should contact the Computational Neuroscience Program Administrator (knelso01@bu.edu) for swipe access.

Building and Grounds Maintenance and Repair

During normal business hours please report issues in 677 Beacon Street to Carol Jefferson (caroly@cns.bu.edu / room 201A).

Emergency Building Repairs and Maintenance Requests: Phone 3-2105.

Use of department phones

Local phone service is billed at a significantly high rate. Unlimited local calling service, as offered to residential customers, is not available. Except in emergencies, calls from university phones should be limited to business use.

Web pages

Please observe high ethical standards when using all BU and GPN computing resources. Check that your personal web page presents you in a professional manner.

XXI. LIST OF APPENDICES

Appendix A

Graduate Program for Neuroscience Student List

Arrivillaga, Juan
Climer, Jason
Denovellis, Eric
Fiddyment, Grant
Furth, Katrina
Gupta, Kishan
Heys, Jim
James, Nicholas
Kahmi, Jessica Frannie*
Kinsky, Nathaniel
Lin, Amy*
McKenzie, Sam*
Matlis, Sean
Myers, Emma
Michalka, Samantha
Monaghan, Caitlin
Moore-Kochlacs, Caroline*
Murphy, Brendan
Newmark, Randall*
Payen, Marie-Pierre
Quach, Allison
Reilly, Lissa
Robinson, Nicholas
Rajaram, Siddharth
Salazar Gomez, Andres Felipe
Salz, Dan*
Saperstein, Sara
Seiglie, Mariel
Segawa, Jenn
Shackett, Melanie
Shay, Christopher
Sherbakov, Lena
Sherfey, Jason
Smith, Dante
Soplata, Austin
Stephen,Emily
Torene, Spencer
Townsend-Shobin, Eli
Trengrove, Chelsea
Watson, Chris
Witkowski, Ellen
Woodbury, Maya
Yanushefski, Lisa

*PIN student

Appendix B Brief Course Descriptions

CAS BI 502 - Topics in the Theory of Biological Networks
Examines principles for the control of biological systems, focusing on the relationship between network geometry and function. Examples include transcription networks, ecosystems, and neural networks. Assignments include student presentations on primary literature, and the option of computational modeling.

CAS CN 510 - Principles and Methods of Cognitive and Neural Modeling I
Explores psychological, biological, mathematical, and computational foundations of behavioral and brain modeling. Topics include organizational principles, mechanisms, local circuits, network architectures, cooperative and competitive non-linear feedback systems, associative learning systems, and self-organizing code-compression systems. The adaptive resonance theory model unifies many course themes. CAS CN 510 and 520 may be taken concurrently.

CAS CN 530 - Neural and Computational Models of Vision
Current models of mammalian visual processes are constrained by experimental and theoretical results from psychology, physiology, computer science, and mathematics. The course evaluates the explanatory adequacy of competing neural and computational models of such processes as edge detection, textural grouping, shape-from-shading, stereopsis, motion detection, and color perception. Students perform computer simulations of some of the examined models.

CAS CN 540 - Neural and Computational Models of Adaptive Movement Planning and Control
Neural models of eye, arm, hand, orofacial, and leg movements are presented and compared to reveal general organizational principles and specialized neural circuit designs for motor learning and performance. Issues include trajectory formation, synchronization of synergists, variable velocity control, adaptive gain control, map formation, load compensation, serial order, and inflow versus outflow as sources of sensory-motor information.

CAS CN 550 - Neural and Computational Models of Recognition, Memory, and Attention
Develops neural network models of how internal representations of sensory events and cognitive hypotheses are learned and remembered, and how such internal representations enable recognition and recall of these events to occur. Various neural pattern recognition models are analyzed. Special emphasis is placed on stable self-organization of pattern recognition and recall codes in unpredictable and noisy environments, notably by adaptive resonance theory models, and on how such codes direct attention toward predictively relevant combinations of features, while attenuating irrelevant background cues. Experimental data and theoretical predictions from cognitive psychology, neuropsychology, and neurophysiology of normal and abnormal individuals are analyzed.

CAS CN 560 - Neural and Computational Models of Speech Perception and Production
Develops neural network models of speech perception and production processes. Emphasis is placed on the role of learning and on the specialized neural designs that have evolved for purposes of speech communication. Practical, including industrial, applications of neural networks for speech processing are also reviewed.

CAS CN 570 - Neural and Computational Models of Conditioning, Reinforcement, Motivation, and Rhythm
Develops neural and computational models of how humans and animals learn to successfully predict environmental events and generate behavioral actions that satisfy internally defined criteria of success or failure. Reinforcement learning and its homeostatic (drive, arousal, rhythm) and nonhomeostatic (reinforcement) modulators are analyzed in depth. Recognition learning and recall learning networks are joined to the reinforcement learning network to analyze how these several processes cooperate to generate

successful goal-oriented behavior. Maladaptive behaviors and certain mental disorders are analyzed from a unified theoretical perspective. Applications to the design of freely moving adaptive robots are noted.

CAS CN 580 - Introduction to Computational Neuroscience
This introductory level course focuses on building a background in neuroscience, but with emphasis on computational approaches. Topics include basic biophysics of ion channels, Hodgkin-Huxley theory, use of stimulators such as NEURON and GENESIS, recent applications of the compartmental modeling technique, and a survey of neuronal architectures of the retina, cerebellum, basal ganglia, and neocortex.

CAS MA 568 - Statistical Analysis of Point Process Data
Introduces the theory of point processes and develops practical problem-solving skills to construct models, assess goodness-of-fit, and perform estimation from point process data. Applications to neural data, earthquake analysis, financial modeling, and queuing theory.

CAS MA 575 – Linear Models
Post-introductory course in linear models, with focus on both principles and practice. Simple and multiple linear regression, weighted and generalized least squares, polynomials and factors, transformations, regression diagnostics, variable selection, and a selection from topics on extensions of linear models.

CAS MA 576 – Generalized Linear Models
Covers topics in linear models beyond MA 575: generalized linear models, analysis of binary and polytomous data, log-linear models, multivariate response models, non-linear models, graphical models, and relevant model selection techniques. Additional topics in modern regression as time allows.

CAS MA 578 – Bayesian Statistics
The principles and methods of Bayesian statistics. Subjective probability, Bayes rule, posterior distributions, predictive distributions. Computationally based inference using Monte Carlo integration, Markov chain simulation. Hierarchical models, mixture models, model checking, and methods for Bayesian model selection.

CAS MA 581 – Probability
Basic probability, conditional probability, independence. Discrete and continuous random variables, mean and variance, functions of random variables, moment generating function. Jointly distributed random variables, conditional distributions, independent random variables. Methods of transformations, law of large numbers, central limit theorem.

CAS MA 582 – Mathematical Statistics
Point estimation including unbiasedness, efficiency, consistency, sufficiency, minimum variance unbiased estimator, Rao-Blackwell theorem, and Rao-Cramer inequality. Maximum likelihood and method of moment estimations; interval estimation; tests of hypothesis, uniformly most powerful tests, uniformly most powerful unbiased tests, likelihood ratio test, and chi-square test.

CAS MA 583 - Introduction to Stochastic Processes
Basic concepts and techniques of stochastic process as they are most often used to construct models for a variety of problems of practical interest. Topics include Markov chains, Poisson process, birth and death processes, queuing theory, renewal processes, and reliability.

CAS MA 684 – Applied Multiple Regression and Multivariable Methods
Application of multivariate data analytic techniques. Multiple regression and correlation, confounding and interaction, variable selection, categorical predictors and outcomes, logistic regression, factor

analysis, MANOVA, discriminant analysis, regression with longitudinal data, repeated measures, ANOVA.

CAS PS 530 - Neural Models of Memory Function
Computational models of neurobiological mechanisms for memory function and spatial navigation, with a particular emphasis on cellular and circuit models of the hippocampus and related cortical structures.

ENG BE 567 - Nonlinear Systems in Biomedical Engineering
Introduction to nonlinear dynamical systems in biomedical engineering. Qualitative, analytical and computational techniques. Stability, bifurcations, oscillations, multistability, hysteresis, multiple time-scales, chaos. Introduction to experimental data analysis and control techniques. Applications discussed include population dynamics, biochemical systems, genetic circuits, neural oscillators, etc.

ENG BE 707 - Quantitative Studies of Excitable Cells
Focuses on the properties of the membranes of nerve and muscle cells. Classical models of resting potentials, action potentials, synaptic transmission, and sensory receptors are treated. The structure and function of single ionic channels are characterized in detail from patch-clamp recordings, neuropharmacological studies, and molecular studies. Mechanisms of muscle contraction and other forms of cellular motility are also covered.

ENG BE 747 - Advanced Signals and Systems Analysis for Biomedical Engineering
Introduction to advanced techniques for signals and systems analysis with applications to problems in biomedical engineering research. Time-domain and frequency-domain analysis of multiple input, multiple output systems using the fundamental matrix approach. Hilbert transform relations; applications to head-related transfer functions. Second-order characterization of stochastic processes: power density spectra, cross-spectra, auto-and cross-correlation functions. Gaussian and Poisson processes. Models of neural firing patterns. Effects of linear systems on spectra and correlation functions. Applications to models of the peripheral auditory system. Optimum processing applications. Applications to psychophysical modeling. Introduction to wavelets and wavelet transforms. Wavelet filter banks and wavelet signal processing.

ENG EC 505 - Stochastic Processes
Introduction to discrete and continuous-time random processes. Correlation and power spectral density functions. Linear systems driven by random processes. Optimum detection and estimation. Bayesian, Weiner, and Kalman filtering.

ENG EC 516 - Digital Signal Processing
Advanced structures and techniques for digital signal processing and their properties in relation to application requirements such as real-time, low-bandwidth, and low-power operation. Optimal FIR filter design; time-dependent Fourier transform and filterbanks; Hilbert transform relations; cepstral analysis and deconvolution; parametric signal modeling; multidimensional signal processing; multirate signal processing.

ENG EC 710 - Dynamic Programming and Stochastic Control
Introduction to sequential decision making via dynamic programming. The principle of optimality as a unified approach to optimal control of dynamic systems and Markovian decision problems. Applications from control theory and operation research include linear-quadratic problems, the discrete Kalman Filter, inventory control, network, investment, and resource allocation models. Adaptive control and numerical solutions through successive approximation and policy iteration, suboptimal control, and neural network

applications involving functional approximations and learning. Meets with ENGME710 and ENGSE710. Students may not receive credit for both.

ENG EC 717 - Image Reconstruction and Restoration
Principles and methods of reconstructing images and estimating multidimensional fields from indirect and noisy data; general deterministic (variational) and stochastic (Bayesian) techniques of regularizing ill-posed inverse problems; relationship of problem structure (data and models) to computational efficiency; impact of typically large image processing problems on viability of solution methods; problems in imaging and computational vision including tomography and surface reconstruction. Computer assignments.

ENG EC 719 - Statistical Pattern Recognition
The statistical theory of pattern recognition, including both parametric and nonparametric approaches to classification. Covers classification with likelihood functions and general discriminant function, density estimation, supervised and unsupervised learning, decision trees, feature reduction, performance estimation, and classification using sequential and contextual information, including Markov and hidden Markov models. A project involving computer implementation of a pattern recognition algorithm is required.

GMS AN 820 - Introduction to Interdisciplinary Systems Science: Dynamic Modeling
Prereq: consent of instructor. This course in interdisciplinary science will provide students with a hands-on experience in the development and use of systems dynamic and computer based models to study biological systems in research areas such as neurobiology.

GMS BY 772 - Nuclear Magnetic Resonance Spectroscopy and Imaging in Biology and Biochemistry
Prereq: consent of instructor. An introduction to the basic theory and the fundamental measurements of NMR spectroscopy using the predominant biological nuclei, 1H, 2H, 13C, and 31P, and applications to structure and metabolism; NMR and MRI studies of pathological processes.

GMS IM 651 - Statistical Analysis of Neuroimaging Data
Prereq: consent of instructor. This course is designed to give the student a working knowledge of the parametric and non-parametric statistical procedures that are commonly used to analyze data generated from in vivo imaging techniques such as CT, MRI, PET and SPECT.

GRS BI 755 - Cellular and Systems Neurosceince
Survey course in neurobiology. Topics to be covered include: cell biology of the neuron, development of the nervous system, synaptic plasticity, learning and behavior, and netwerk modeling. Three hours lecture, one hour discussion.

GRS BI 756 - Systems and Behavioral Neuroscience
Team taught survey course in neuroscience. Topics to be covered include cortical structures, information processing, synaptic plasticity, learning and memory, and perception. Lectures will draw on reading from current scientific literature.

GRS CN 710 - Advanced Topics in Neural Modeling
Examines current neural network models to prepare students to participate in research on an advanced level. Topics are chosen based upon the latest discoveries and methodologies in the field and upon the research interests of advanced CNS students.

Appendix B Brief Course Descriptions

GRS CN 720 - Neural and Computational Models of Planning and Temporal Structure in Behavior.
Identifies characteristics and principles of serial plan formulation, choice, and learning in humans. Includes theoretical analyses and neural network modeling of such processes as they appear in communicative speech and gesture, handwriting, typing tool use, and object assembly.

GRS CN 730 - Models of Visual Perception
Offers advanced survey of topics in the neural and computational modeling of psychophysical data in mammalian vision. Assignments include oral presentations on selected readings and a term paper containing a literature review and model development and analysis.

GRS CN 740 - Topics in Sensory Motor Control
Topics include spatial representation, speech production, and rhythmic movement. Representations appropriate for handwriting, reaching, speaking, and walking are investigated with emphasis on different levels of representation and interactions between these levels. Material includes psychophysical data, neurophysiology, and neural models.

GRS CN 780 - Topics in Computational Neuroscience
In this seminar, recent research papers and applications in computational neuroscience are reviewed. Topics covered include cortical modeling, analog VLSI, active perception, robotic control, stereo vision, and computer-aided neuroanatomy.

GRS CN 810 - Topics in Cognitive and Neural Systems
Topic for Fall 2011: Adaptive computing: From virtual to robotic agents. Students design biologically-inspired computational models that implement autonomous perception, decision making, and action in virtual and robotic agents. A term project, executed by small groups, is required, including a problem statement and an implementation of a behavioral task.

GRS CN 811 - Topics in Cognitive and Neural Systems: Visual Perception
Problems in visual perception. Visual analyzers; visual pathways; perceptual organization; shape description; object perception; size, shape, and lightness constancy; motion perception; perceptual adaptation.

GRS MA 665 – Introduction to Modeling and Data Analysis in Neuroscience
An introduction to the basic techniques of quantifying neural data and developing mathematical models of neural activity. Major focus on computational methods using computer software and graphical methods for model analysis.

GRS MA 666 – Advanced Modeling and Data Analysis in Neuroscience
Advanced techniques to characterize neural voltage data and analyze mathematical models of neural activity. Major focus on computational methods using computer software and graphical methods for model analysis.

GRS MA 681 - Accelerated Introduction to Statistical Methods for Quantitative Research
Introduction to statistical methods relevant to research in the computational sciences. Core topics include probability theory, estimation theory, hypothesis testing, linear models, GLMs, and experimental design. Emphasis on developing a firm conceptual understanding of the statistical paradigm through data analyses.

Appendix B Brief Course Descriptions

GRS MA 751 - Advanced Statistical Methods II
Second course in a two-semester PhD sequence on post-classical statistical methods and their applications. Selection from topics in statistical learning, such as regularized basis methods, kernel methods, boosting, neural networks, support vector machines, and graphical models.

GRS MA 781 – Estimation Theory
Review of probability, populations, samples, sampling distributions, and delta theorems. Parametric point estimation. Rao-Cramer inequality, sufficient statistics, Rao-Blackwell theorem, maximum likelihood estimation, least squares estimation, and general linear model of full rank. Confidence intervals. Bayesian analysis and decision theory.

GRS MA 783 - Advanced Stochastic Processes
Proof-based approach to stochastic processes. Brownian motion. Continuous martingales. Stochastic integration. Itô formula. Girsanov?s Theorem. Stochastic differential equations. Feynman-Kac formula. Markov Processes. Local times. Lévy processes. Semimartingales and the general stochastic integral. Stable processes. Fractional Brownian motion.

GRS MA 976 – Directed Study: Dynamic Systems

GRS NE 500/501 - Frontiers of Neuroscience
Journal club/seminar series reviewing and discussing key papers including those of GPN seminar series distinguished lecturers. Students are required to attend this seminar series throughout their graduate career, but only a total of 4 credits counts toward the degree

GRS NE 800 – Laboratory Rotations
Research experiences directed by GPN faculty for first-year graduate students. Mentors who have funded research projects provide students with a large number of potential laboratories from which to choose where they will conduct their thesis research.

GRS PY 771 – Systems Biology for Physical Scientists and Engineers
Focus is modern work on modeling biochemical networks. Core material includes signaling, genetic switches, biological oscillators and development. Begins with chemical kinetics in the context of molecular biology. Simple yet informative models based on physics approaches are emphasized.

Appendix C

Graduate Program for Neuroscience (GPN)
Ph.D. Dissertation Tracking Form

Name:_____ Matriculation Date:_____

Dissertation Advisor:_____
Name Signature Date

I. QUALIFYING EXAM (Advisor and 2 Program Faculty / 2nd Year in Program)

Committee: 1. _____ Chair
2. _____ Advisor
3. _____

Approval: _____ _____
S.J. Russek F. Guenther

Dates: Written: _____ Pass / Fail
Oral: _____ Pass / Fail

II. DISSERTATION (At least 2 members from GPN)

Advisory Committee: 1. _____ Chairperson (Cannot be Reader)
2. _____ Advisor (1st Reader GPN)
3. _____ 2nd Reader
4. _____ 3rd Reader/Reviewer
5. _____ External Reviewer (Non-BU)

Approval: _____ _____
S.J. Russek F. Guenther

A. Formal Progress Report Seminar & Prospectus: _____ _____ _____
(At least 1 year before Defense) Date S.J. Russek F. Guenther

B. Approval of Outline: _____ _____ _____
Date S.J. Russek F. Guenther

C. Approval of Abstract: _____ _____ _____
Date S.J. Russek F. Guenther

D. Approval of Dissertation by First Reader: _____ _____ _____
Date S.J. Russek F. Guenther

E. Distribution of Dissertation to Defense Committee: _____ _____ _____
(At least 2 weeks prior to Pre-Defense Meeting) Date S.J. Russek F. Guenther

F. Pre-Defense Meeting: _____
Date

G. Approval for Scheduling Defense: _____
Date

H. Final Dissertation Defense: _____
Date

I. Student Passes / Fails Dissertation Defense: _____ _____ _____
Date S.J. Russek F. Guenther

J. GMS is notified that student passes Dissertation Requirements: _____
Date

K. Approved Dissertation Submitted to GMS: _____
Date

Appendix D

Post-Bachelors Requirement Spreadsheet

Student Name: Date:

Post-Bachelors Requirement (cr)	Fulfilled By	Requirement Options
BI755 Prin of Neurosci I (4)		BI755 or equivalent approved by GPN
BI756 Prin of Neurosci II (4)		BI756 or equivalent approved by GPN
Stats (4)		MA681, MA 684 or equivalent approved by GPN
NE800 Rotation 1 Expt (1)		Any GPN-approved experimental neuroscience lab
NE800 Rotation 2 Comp (1)		Any GPN-approved computational neuroscience lab
NE500/501 Frontiers (2)		NE500 & NE501 required for all GPN
Basic Comp Neuro (4)		CN510, CN580, MA665/666
Quant Systems Neuro (4)		PS530, CN530, CN540, CN560, CN570, CN720
Adv Comp Neuro (4)		BE707, CN720, CN730, CN740, MA751, CN780, CN810, AN820
Comp Neuro Electives (8)		CN510, CN570, CN580, MA665/666, PS530, CN530, CN540, CN560, BE707, CN720, EC516, CN730, MA976 (Kopell), BI502, EC505, CN520, CN550, BE567, MA568, MA583, IM651, EC710, CN710, EC717, EC719, BE747, PY771, BY772, MA783, CN810, CN811
Neuroscience Electives (8)		Any graduate level neuroscience course approved by advisor/GPN
General Elective (4)		Any graduate level course approved by advisor/GPN (e.g., Neuro, Math, CS, Bio, Engr, Psych,...)
Directed study/other (16)		Directed study or any of the above courses

Note to Students:
1. Enter completed course info in **BLACK** in "Fulfilled By" column.
2. Enter upcoming semester course info in **RED** in "Fulfilled By" column.
3. Enter courses you may take in future semesters in **BLUE** in "Fulfilled By" column.
4. Submit completed form to Kate Nelson (knelso01@bu.edu) PRIOR to meeting with your advisor.

Appendix E Post-Masters Requirement Spreadsheet

Student Name: Date:

Post-Masters Requirement (cr)	Fulfilled By	Requirement Options
BI755 Prin of Neurosci I (4)		BI755 or equivalent approved by GPN
BI756 Prin of Neurosci II (4)		BI756 or equivalent approved by GPN
Stats (4)		MA681, MA684 or equivalent approved by GPN
NE800 Rotation 1 Expt (1)		Any GPN-approved experimental neuroscience lab
NE800 Rotation 2 Comp (1)		Any GPN-approved computational neuroscience lab
NE500/501 Frontiers (2)		NE500 & NE501 required for all GPN
Basic Comp Neuro (4)		CN510, CN580, MA665/666
Quant Systems Neuro (4)		PS530, CN530, CN540, CN560, CN570, CN720
Adv Comp Neuro (4)		BE707, CN720, CN730, CN740, MA751, CN780, CN810, AN820
Neuroscience Electives (4)		Any graduate level neuroscience course approved by advisor/GPN

Note to Students:
1. Enter completed course info in **BLACK** in "Fulfilled By" column.
2. Enter upcoming semester course info in **RED** in "Fulfilled By" column.
3. Enter courses you may take in future semesters in **BLUE** in "Fulfilled By" column.
3. Submit completed form to Kate Nelson (knelso01@bu.edu) PRIOR to meeting with your advisor.

Appendix F

GRADUATE PROGRAM FOR NEUROSCIENCE 2012-2013

Laboratory Rotations

Student Guidelines

Training in the Graduate Program for Neuroscience (GPN) includes registration in two to four laboratory experiences under the supervision of GPN training mentors. Each rotation takes place in a laboratory of GPN training faculty over a 7-week period for students in the main Interdisciplinary Neuroscience program or 14-week period for GPN Computational Neuroscience (CN) students,. The student's responsibility consists of approximately **20 hours per week involvement in the research activities of the laboratory for a 7-week rotation**, **or 10 hours per week per 14-week rotation**. During the last week of the rotation, students must prepare a 3-6 page report written in the style of a research manuscript, with an introduction, materials and methods, results, conclusions, and references. The report is to be reviewed by the rotation faculty advisor and you must make corrections as suggested. The cover page of the final version of the report should include the date of the rotation and the signature of the faculty mentor, indicating review of the report and successful completion of the rotation exercise. The final document should be brought to the GPN program office and given to the Assistant Director (Ms. Sandi Grasso) who will notify the Director of your submission. A late report will result in a grade of Incomplete. **Be aware that failure to submit the report will put your GPN enrollment in jeopardy.**

At the start of the first semester, you will have an opportunity to meet with the Director Dr. Russek and/or the Associate Director Dr. Guenther to select GPN faculty mentors for the rotations. **Once a rotation mentor is chosen, please have them sign below to signify that they understand the time commitment for the exercise (see above) and that they are willing to meet with you during the rotation to review progress.**

Student Name: _____

Fall Semester 2012: Rotation 1 (Date:)

_____

Rotation 2 (Date:)

_____

Spring Semester 2013: Rotation 3 (Date:)

_____

Rotation 4 (Date:)

_____

Appendix G

Post-Bachelors Sample Schedule

Post-Bachelors students must complete a minimum of 64 credits.

Semester 1 (Fall) – 15 credits

BI755, Cellular and Systems Neuroscience (4 credits; Required for all GPN)
CN510, Cognitive and Neural Modeling I (4 credits; Basic computational neuroscience requirement)
CN580, Intro to Comp Neuroscience (4 credits; Approved computational neuroscience elective)
NE500, Frontiers in Neuroscience (2 credits; Required for all GPN)
NE800, Lab Rotation (1 credit; Required for all GPN)

Semester 2 (Spring) – 15 credits

BI756, Systems and Behavioral Neuroscience (4 credits; Required for all GPN)
MA583, Intro to Stochastic Processes (4 credits; Approved computational neuroscience elective)
CN570, Neural Models of Reinforcement Learning (4 credits; Quantitative systems neuroscience requirement)
NE501, Frontiers in Neuroscience (2 credits; Required for all GPN)
NE800, Lab Rotation (1 credit; Required for all GPN)

Semester 3 (Fall) – 12 credits

CN720, Neural Models of Planning (4 credits; Advanced computational neuroscience requirement)
MA 681, Accelerated Intro to Statistical Methods (4 credits; Required for all computational neuroscience)
Directed Study, Research (4 credits; General elective)

Semester 4 (Spring) – 12 credits

PS530, Neural Models of Memory Function (4 credits; Quantitative systems neuroscience requirement)
MA568, Analysis of Point Process Data (4 credits; General elective)
Directed Study, Research (4 credits; General elective)

Semester 5 (Fall) – 10 credits

BE567, Nonlinear Systems in Biomedical Engr (4 credits; General elective)
Directed Study, Research (6 credits; General elective)

Semester 6 (Spring) – Full-Time Continuing Student

Certified Full-Time Form required

Appendix H

Post-Masters Sample Schedules

Post-Masters students must complete a minimum of 32 credits; however depending on course choices up to 35 credits may be necessary to meet all program requirements. The sample course schedules for post-masters students included below differ primarily in the size of the first year course load. Plan A represents the preferred plan for most students. Plan B represents an alternative that may be appropriate for students that are performing a relatively large amount of research in their first year.

Plan A

Semester 1 (Fall) – 15 credits

BI755, Cellular and Systems Neuroscience (4 credits; Required for all GPN)
MA681, Accelerated Intro to Statistical Methods (4 credits; Required for all computational neuroscience)
MA665 Modeling & Analysis in Neuroscience (2 credits; Basic computational neuroscience requirement)
MA666 Modeling & Analysis in Neuroscience (2 credits; Basic computational neuroscience requirement)
NE500, Frontiers in Neuroscience (2 credits; Required for all GPN)
NE800, Lab Rotation (1 credit; Required for all GPN)

Semester 2 (Spring) – 15 credits

BI756, Systems and Behavioral Neuroscience (4 credits; Required for all GPN)
PS530, Neural Models of Memory Function (4 credits; Quantitative systems neuroscience requirement)
CN540 Neural Models of Movement and Planning (4 credits; Neuroscience elective)
NE501, Frontiers in Neuroscience (2 credits; Required for all GPN)
NE800, Lab Rotation (1 credit; Required for all GPN)

Semester 3 (Fall) – 4 credits

CN720, Neural Models of Planning (4 credits; Advanced computational neuroscience requirement)

Plan B

Semester 1 (Fall) – 15 credits

BI755, Cellular and Systems Neuroscience (4 credits; Required for all GPN)
CN510, Cognitive and Neural Modeling I (4 credits; Basic computational neuroscience requirement)

Appendix H

MA665 Modeling & Analysis in Neuroscience (2 credits; Neuroscience elective)
MA666 Modeling & Analysis in Neuroscience (2 credits; Neuroscience elective)
NE500, Frontiers in Neuroscience (2 credits; Required for all GPN)
NE800, Lab Rotation (1 credit; Required for all GPN)

Semester 2 (Spring) – 7 credits

BI756, Systems and Behavioral Neuroscience (4 credits; Required for all GPN)
NE501, Frontiers in Neuroscience (2 credits; Required for all GPN)
NE800, Lab Rotation (1 credit; Required for all GPN)

Semester 3 (Fall) – 8 credits

CN720, Neural Models of Planning (4 credits; Advanced computational neuroscience requirement)
MA681, Accelerated Intro to Statistical Methods (4 credits; Required for all computational neuroscience)

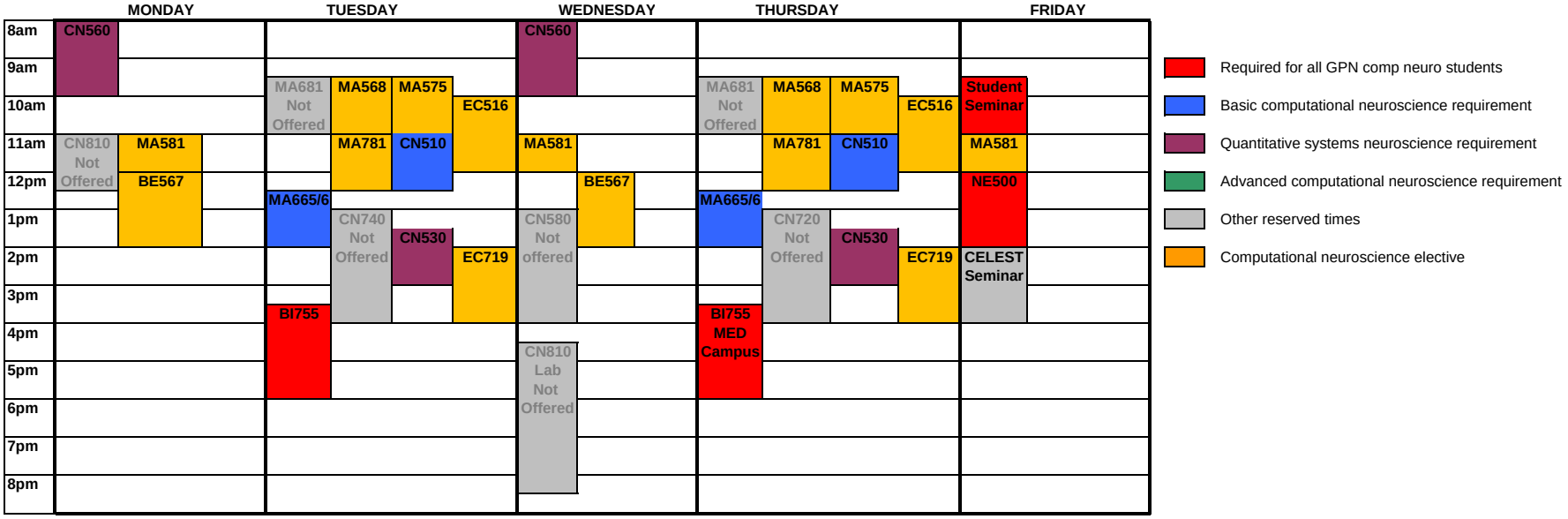
Semester 4 (Spring) – 4 credits

PS530, Neural Models of Memory Function (4 credits; Quantitative systems neuroscience requirement)

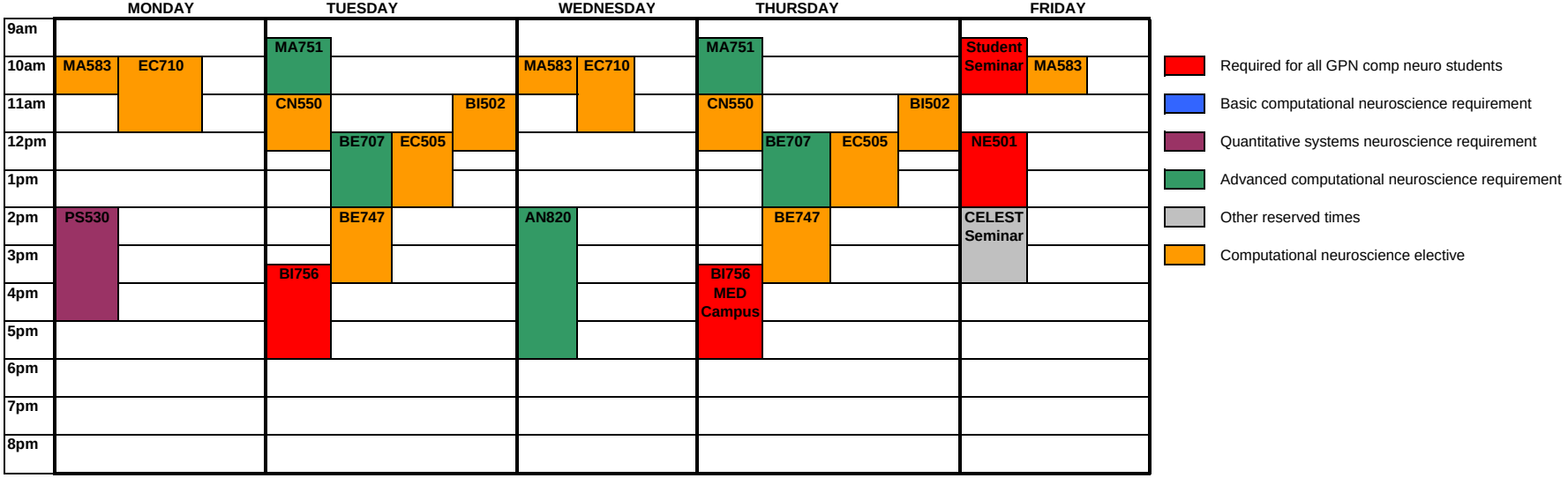
Appendix I '12-'13 Course Offerings Schedule

Information for upcoming semester can be found at: http://www.bu.edu/phpbin/course-search/
Last updated: 7/16/2012

FALL 2012



SPRING 2013 (Updated Information Not Yet Available; Times Listed are from Spring 2012)



Appendix J

Abridged Instructions for NRSA Applications

Formatting Instructions for All Sections:

- Use an Arial, Helvetica, Palatino Linotype, or Georgia typeface, a black font color, and a font size of 11 points or larger. (A Symbol font may be used to insert Greek letters or special characters; the font size requirement still applies.)
- Type may be no more than six lines per inch.
- Use at least one-half inch margins (top, bottom, left, and right) for all pages.

1. Project Summary

The Project Summary must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained description of the project and should contain a statement of objectives and methods to be employed. It should be informative to other persons working in the same or related fields and insofar as possible understandable to a scientifically or technically literate lay reader.

The Project Summary is meant to serve as a succinct and accurate description of the proposed work when separated from the application. State the application's broad, long-term objectives and specific aims, making reference to the health relatedness of the project (i.e., relevance to the mission of the agency). Describe concisely the research design and methods for achieving the stated goals. This section should be informative to other persons working in the same or related fields and insofar as possible understandable to a scientifically or technically literate reader. Avoid describing past accomplishments and the use of the first person. Finally, please make every effort to be succinct. **This section must be no longer than 30 lines of text.**

2. Specific Aims

State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved. List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology. **Specific Aims are limited to one page.**

3. Research Strategy

Organize the Research Strategy in the specified order and using the instructions provided below. Start each section with the appropriate section heading – Significance, Innovation, Approach. Cite published experimental details in the Research Strategy section and provide the full reference in the Bibliography and References Cited section. **The Research Strategy is limited to 6 pages** including all figures and tables.

i) Significance

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
- Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

ii) Innovation

- Explain how the application challenges and seeks to shift current research or clinical practice paradigms.
- Describe any novel theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
- Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

iii) Approach

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.
- Point out any procedures, situations, or materials that may be hazardous to personnel and precautions to be exercised.

If an applicant has multiple Specific Aims, then the applicant may address Significance, Innovation and Approach for each Specific Aim individually, or may address Significance, Innovation and Approach for all of the Specific Aims collectively.

As applicable, also include any **preliminary studies** as part of the Research Strategy, keeping within the three sections listed above: Significance, Innovation, and Approach.

4. Bibliography and References Cited

Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application.

Appendix K – Sample GMS Forms

Boston University School of Medicine
Division of Graduate Medical Sciences

Medical Campus
72 East Concord Street, Room L-315
Boston, Massachusetts 02118
T 617-638-5255 F 617-638-5740

BOSTON UNIVERSITY

CERTIFIED FULL-TIME FORM

A student enrolled for less than twelve credits or registered for continuing study, may be certified as a full-time student by filing this form, signed by the advisor or director of graduate study. For full-time status, the student must be fully engaged at Boston University in a program composed of one or more of the general elements listed below, in ways recognized by the University as related to progress towards competence in the field of the intended degree. Indicate specifically the type and amount of independent work you are doing, in support of your claim to full-time status. Failure to file this form with the registration material results in part-time registration status.

THIS FORM MUST BE SUBMITTED WITH YOUR COMPLETED REGISTRATION MATERIAL:

CALENDAR YEAR 20 ☐ SEMESTER (CHECK ONE) FALL ○ SPRING ○ SUMI ○ SUMII ○

NAME ☐ DEPARTMENT ☐

BU ID# ☐ YEAR OF GRADUATE STUDY ☐

REGISTRATION ☐ NUMBER OF COURSES ☐ NUMBER OF CREDITS ☐ CONT. STUDY ☐

INDEPENDENT WORK PERTINENT TO THE COMPLETION OF DEGREE REQUIREMENTS:
(BE SPECIFIC): ☐

DIVISION OF GRADUATE MEDICAL SCIENCES: (CHECK IF APPLICABLE):

TEACHING FELLOWSHIP: ☐
RESEARCH ASSISTANT/FELLOWSHIP: ☐
RESEARCH ADVISOR: ☐

☐ I agree that submission of this form also serves as my registration for GMS MS 985 or GMS MS 986, (i.e. continuing student no courses)

REQUIRED SIGNATURES:

STUDENT:_____ DATE: _____

MAJOR ADVISOR:_____ DATE: _____

*A student living at a distance may register by mail for Continuing Study, certified full-time, provided the registration form, and the full-time certification form are completely filled out and signed.

Appendix K – Sample GMS Forms

Boston University School of Medicine
Division of Graduate Medical Sciences

Medical Campus
72 East Concord Street, L-317
Boston, Massachusetts 02118-2526
T 617-638-5255 F 617-638-5740

BOSTON UNIVERSITY

PHD STUDENT SUMMER RESEARCH STATUS REGISTRATION FORM (CERTIFIED FULL-TIME)

NOTE: This form is used in place of the Office of the University Registrar's *Registration Form*. You need not submit a Registration Form if using this *Summer Research Status Registration Form*.

A student in a degree program in the Division of Graduate Medical Sciences who is engaged during the summer in full-time research as an essential component of the graduate degree program is eligible to register for Summer Research Status and to be certified as a full-time student. This will establish the individual's official student status for purposes of loan eligibility and tax considerations. There is no charge to register for Summer Research status. Summer Research Status is available only for students continuing their studies in the fall; this status does not satisfy the mandatory registration for the final two semesters during which degree requirements are completed.

REGISTRATION FOR SUMMER **CALENDAR YEAR 20__ __**

NAME _____ **E-MAIL** _____
Last, First

BU I.D. # U __ __ - __ __ - __ __ __ __ **DEPARTMENT/PROGRAM** _____

CERTIFICATE OF FULL-TIME PARTICIPATION IN GRADUATE RESEARCH
(Full-Time Certification Form)

A student registered for fewer than 12 credits or for Continuing Study or Summer Research but engaged otherwise in full-time study, research, or teaching pertinent to the completion of degree requirements or to gaining competence in the field of study, may be certified as a full-time student. If you are eligible for certification, please complete this form, obtain the appropriate signatures and submit it to your department for forwarding to Ms. Millie Agosto in Room L-315.

You must indicate below the specific research you are doing, in support of your claim to full-time status:

_____

Do you have a summer Research Assistantship or Research Fellowship? Yes No
(circle one)

REQUIRED SIGNATURES:

STUDENT _____ **DATE** _____

MAJOR ADVISOR _____ **DATE** _____

DEPARTMENT CHAIRMAN _____ **DATE** _____
or **DIRECTOR OF GRADUATE STUDIES**

Every student is responsible for knowing the general regulations of the Division of Graduate Medical Sciences as stated n the "Policies and Procedures" section of the *GMS Bulletin* and the more specific requirements stated in the individual section on each department, division, or program which may go beyond, or supplement, those of the Graduate School. At any time the administrative staff will be happy to interpret or clarify any rule or regulation. The *Bulletin* is available on-line at www.bumc.bu.edu/gms.

GMS Office use only. Do not write below.

Course number: _____ Staff initials and processing date: _____

Appendix K – Sample GMS Forms

BOSTON UNIVERSITY SCHOOL OF MEDICINE
Division of Graduate Medical Science
72 East Concord Street, Room L-315
Boston, MA 02118

DISSERTATION PROSPECTUS OUTLINE APPROVAL PAGE
(Instructions for completing this form are on the reverse side.)
Please type or Print

NAME_____ DEPARTMENT_____

BU ID#_____ B.U. Phone#_____ Home Phone#_____

PROPOSED TITLE OF DISSERTATION:_____
_____
_____
_____
_____

Language Examination: _____ _____ Qualifying Examination:_____
Date Passed Language

Approved By:
First Reader: _____
Name
_____ _____ _____
Title Signature Date

Second Reader: _____
Name
_____ _____ _____
Title Signature Date

Third Reader: (optional) _____
Name
_____ _____ _____
Title Signature Date

Department Chairman: _____ _____ _____
Title Signature Date

RECEIVED BY DIVISION:_____ APPROVED BY:_____

Appendix K – Sample GMS Forms

DIVISION OF GRADUATE MEDICAL SCIENCES
BOSTON UNIVERSITY SCHOOL OF MEDICINE

2013 GRADUATION CALENDAR

Students may not submit thesis, unless a diploma application has been submitted by the appropriate deadline!

A candidate must be registered for the semester in which the degree requirements are completed and during the preceding semester. Candidates also must adhere to the guidelines as stipulated in the *Guide for Writers of Thesis and Dissertations*, published by the Mugar Memorial Library. Copies of the *Guide* may be obtained from the Division of Graduate Medical Sciences.

Ph.D. DEGREE CANDIDATES

	January 2013 Award	***May 2013 Award***	***September 2013 Award***
Dissertation Prospectus Outline due in the Division Office. Dates are flexible.	April 9, 2012	October 3, 2012	February 3, 2012
***Diploma Application** Due in the Division Office	November 1, 2012	January 25, 2013	June 21, 2013
Dissertation abstract (max. 350 words) Approved by Department, due in the Division Office for review and approval By the Associate Dean in L-317.	**At least three weeks prior to Final Oral Exam**	**At least three weeks prior to Final Oral Exam**	**At least three weeks prior to Final Oral Exam**
Schedule of Final Oral Examination (to be arranged by Department) due in the Division Office with fourteen copies of the approved abstract	**Two weeks prior to the Final Oral Exam**	**Two weeks prior to the Final Oral Exam**	**Two weeks prior to the Final Oral Exam**
Last date to hold Final Oral Exam. (Note: See below deadline for submission of Dissertation).	December 6, 2012	April 3, 2013	August 1, 2013
Dissertation Format Reviewed Email will be sent with actual dates	Two weeks prior to final deadline	Two weeks prior to final deadline	Two weeks prior to final deadline
**Approved and signed dissertation (2 copies due in the Division Office on or before this date)	**December 6, 2012**	**April 3, 2013 (no exceptions)**	**August 1, 2013**

****Prior to the dissertation defense, the candidate must submit hard copy of thesis to Ms. Millie Agosto, GMS Registrar, two weeks prior to final submission. For review of the dissertation format. All Ph.D. degree requirements are complete only when both copies of the dissertation have been certified as meeting the standards of the Division of Graduate Medical Sciences and the Mugar Memorial Library.**

M.D./Ph.D. DEGREE CANDIDATES WHO ANTICIPATE ENTERING BUSM III IN SUMMER 2011

Since M.D./Ph.D. degree candidates are awarded both the M.D. and Ph.D. degrees simultaneously (at the time of completion of both degrees), the dates for submission of dissertations may vary from the above schedule of deadlines for Ph.D. only candidates. Consequently, M.D./Ph.D. students who expect to complete the Ph.D. portion of their studies in the 2012-2013 academic year and anticipate entering BUSM III in the Summer of 2013, the following rules apply:

Oral Defenses should be scheduled prior to returning to the third year. **Dissertation Outline Approval Pages** and transition form are due in the Division Office prior to the scheduling of the Oral Defense.

M.D./Ph.D. students should then submit the **Ph.D. Dissertation Abstract** to the Division Office for review and approval. Once your abstract has been approved and you have scheduled your oral defense, you will need to submit a **Schedule of the Final Oral Examination for the Degree of Doctor of Philosophy**, along with 14 copies of your approved abstracts. **Oral Defenses should be scheduled 2 weeks prior.**

Approved and signed dissertations (2 copies) are due in the Division Office no more than 60 days after passing the Final Oral Examination. M.D./Ph.D. scholarships are not awarded until approved and signed dissertations have been accepted by the Division Office.

Appendix K – Sample GMS Forms

BOSTON UNIVERSITY

SCHOOL OF MEDICINE
DIVISION OF GRADUATE MEDICAL SCIENCES
72 East Concord Street, L-315
BOSTON, MA 02118

PH.D. DISSERTATION DEFENSE ABSTRACT

This form must be submitted to the Division Office, room L-315, School of Medicine, with one copy of the dissertation abstract (maximum of 350 words) at least three weeks in advance of the defense of the dissertation. Prior to submission, the abstract must have been read and approved by your Major Professor, the Director of Graduate Studies, and the Department Chairman. The student will be notified of the approval of the abstract or if revisions are required. Upon final approval by the Division Office, the Schedule of Final Oral Examination (dissertation defense) and fourteen copies of the approved abstract must be submitted to the Division Office. These must be received at least two weeks in advance of the defense date. Please type or print clearly.

Name | *E-mail address* | *Daytime Telephone Number*

I.D./Social Security Number | *Department* | *Tentative Date of Defense*

Abstract read and approved by:

_____
Signature, Major Professor

_____
Signature, Department Chairman

DIVISION REVIEW OF DISSERTATION ABSTRACT

Date received by Division

Associate Provost's review and recommendations.

REVIEW OF REVISED DISSERTATION ABSTRACT

Initials _____

Date returned to Division

Associate Provost's review and recommendations

Initials _____

Appendix K – Sample GMS Forms

Boston University School of Medicine
Division of Graduate Medical Sciences
72 East Concord Street, L-315
Boston, Massachusetts 02118

SCHEDULE OF THE FINAL ORAL EXAMINATION FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Arrangements for a **Final Oral Examination (Dissertation Defense)** *are the responsibility of the individual department or Division. Please see the reverse side for information and instructions pertinent to the scheduling of this examination.*

PLEASE TYPE THIS FORM

CANDIDATE:

DEPARTMENT/PROGRAM:

TITLE OF DISSERTATION:

DATE, TIME AND PLACE OF EXAMINATION:
(INCLUDING ROOM NUMBER, BUILDING DEPARTMENT AND STREET ADDRESS WHERE DEFENSE WILL TAKE PLACE)

EXAMINING COMMITTEE
Minimum of five who have agreed to serve at the designated time
(PLEASE PROVIDE MAILING ADDRESS, INCLUDE DEPARTMENT AND ROOM NUMBER FOR EACH COMMITTEE MEMBER)

First Reader: Name | Faculty Title | Address

Second Reader Name | Faculty Title | Address

Third Reader: Name | Faculty Title | Address

Chairman of Examining Committee: (Other than a reader)

Name | Faculty Title | Telephone Extension

Address | Email address

Additional Committee Members:

Name | Faculty Title | Address

Name | Faculty Title | Address

SIGNATURE, DEPARTMENT CHAIRMAN | DATE

Appendix K – Sample GMS Forms

BOSTON UNIVERSITY

BOSTON UNIVERSITY SCHOOL OF MEDICINE
DIVISION OF GRADUATE MEDICAL SCIENCES

Diploma Application for the Degree of Doctor of Philosophy

Please return this form to the Division of Graduate Medical Sciences Office, Room: L-315, Boston University School of Medicine 715 Albany Street Boston, MA 02118. DEADLINES: NOVEMBER 1st FOR JANUARY: JANUARY 25TH FOR MAY: JUNE 22ND FOR SEPTEMBER GRADUATION. This diploma application is valid for the graduation date specified; a new application must be filled if the student does not graduate as planned. A student must be registered in the semester in which degree requirements are completed and the preceding semester.

NAME: _____ _____ _____
FIRST MIDDLE LAST

BU ID NUMBER: _____ TELEPHONE: _____
NUMBER

PERMANENT ADDRESS: _____ LAST DATE OF OCCUPANCY: _____

_____ _____ _____ POST-GRADUATE EMAIL: _____
CITY STATE ZIP CODE

_____ _____
PROGRAM/DEPARTMENT MAJOR ADVISOR

DEGREE PROGRAM: ☐ Post-Master's Ph.D. (8 or 12 courses) ☐ Post-Bachelor's Ph.D. (16 or more courses) _____ EXPECTED DATE OF GRADUATION

PREVIOUS DEGREE (S) EARNED AND DATE (S) AWARDED:
Print abbreviation of each previous degree earned as it appears on the official transcript.

_____ _____ _____
UNDERGRADUATE SCHOOL OR COLLEGE DEGREE YEAR

Each student must fulfill all requirements for degree of Doctor of Philosophy as published.. Refer to the Policies and Procedures section of the bulletin and to the departmental section for the specific requirements for your degree program. Please indicate in the following section whether of not each requirement has been satisfied and use the line to the right to provide information as to when an outstanding requirement will be completed.

	SATISFIED	NOT SATISFIED	
All courses required to satisfy department Courses requirement:	☐	☐	_____
Qualifying Examination:	☐	☐	_____
Proposal/Prospectus/Outline approved by Department and submitted to Division Office:	☐	☐	_____

Tentative date of defense of the dissertation: _____

Information you think would be helpful when your record is being reviewed (optional): _____

STUDENT'S SIGNATURE:_____ DATE:_____

Appendix K – Sample GMS Forms

Boston University School of Medicine
Division of Graduate Medical Sciences

Medical Campus
72 East Concord Street, Room L-315
Boston, Massachusetts 02118-2526
T 617-638-5255 F 617-638-4842

BOSTON UNIVERSITY

REQUEST FOR A SPECIAL SERVICE APPOINTMENT IN THE DIVISION OF GRADUATE MEDICAL SCIENCES

Please provide the following information when requesting a Special Service Appointment for a person who will serve as a reader on a doctoral or master's thesis, or who will service as a member of a Final Oral Examining Committee (dissertation defense). Please print clearly.

Name of Student

Student's Department/Program

BU ID #

Degree: ☐ M.A. ☐ M.S. ☐ Ph.D.

Name, Title, and Address of Nominee (**A current *curriculum* vitae of thenominee must accompany this request.**)

Committee as now composed:

Appointment:

- ☐ *Second Reader* – Ph.D. Dissertation
- ☐ *First Reader* – M.A./M.S. Thesis (BU Faculty Only)
- ☐ *Third Reader* – M.A./M.S. Thesis
- ☐ Member of Ph.D. Final Oral Examining Committee
- ☐ Member of M.A./M.S. Thesis Examining Committee
- ☐ *Third Reader* – Ph.D. Dissertation
- ☐ *Second Reader* – M.A./M.S. Thesis

Reasons for this request:

Signature of Department Chairman/Program Director

Date

****

☐ Approved ☐ Not Approved

Associate Provost, Division of Graduate Medical Sciences

Date

Appendix L

GPN Computational Neuroscience Alumni Questionnaire

(Please return form to Kate Nelson – knelso01@bu.edu | 677 Beacon St. Room 202)

Name: _____

Graduation date: _____

Post-graduation employment and continued education information:

Company or educational institution name and location: _____

_____

_____

_____

Job title and description:

_____

_____

_____

_____

_____

_____

Email Address: _____
(please provide a personal email address where we'll be able to reach you in the future)

Professional activities of graduates are needed for funding applications and reports as well as to provide students with valuable employment outcome data – please keep us up-to-date!

Appendix M - Computational Neuroscience / Cognitive and Neural Systems Alumni List

Current Computational Neuroscience students should contact the Computational Neuroscience Program Administrator (knelso@bu.edu) to obtain the Computational Neuroscience / Cognitive and Neural Systems Alumni List.