

Handbook for Graduate Students in the Department of Neurobiology and Anatomy (NBA)

Contents

Introduction	2
Program Information	
Grants and Fellowships	3
Financial Support	3
Student Offices	3
Vacations	4
NBA and NSC functions	4-5
Neurobiology & Anatomy Graduate Committees	6
Curriculum Overview for Ph.D. Students	7-9
Curriculum Overview for MD-PhD. Students	10-11
Key Dates in Completing NBA Ph.D. Program	12
Grading and Performance Evaluation	12
NBA Course Descriptions	
Program Required Courses	13-15
NBA Elective Courses Related to Anatomy	15-16
NBA Elective Courses Related to Neurobiology	16-18
Elective Courses in Biomedical Sciences	19-20
Teaching Assistant Requirements	21
Lab Rotations	22
Thesis Advisor	22
Qualifying Exam Part I	23
Qualifying Exam Part II	
Thesis Committee	23-24
Written paper- NRSA format	24-25
Oral Presentation	25
Requirements, Procedure, Grading	25-26
Ph.D. Thesis Defense	
Requirements	27
Written Paper guidelines	27
Registration guidelines	27-28
After the defense/exit interview	28-29
Academic Honors Program in Medical Neurobiology- MD/MS	30-31
General Information Regarding University	32-33
Policy on Foreign Student Held Outside the US	33
Foreign Student Travel Information	34-35
Important Telephone Numbers	36
Important Web Sites	37-38

Introduction to the Department of Neurobiology and Anatomy (NBA)

The Department of Neurobiology and Anatomy (NBA) is strongly committed to its major academic missions of research and education. Teaching and leadership roles in both graduate and medical education remain enduring commitments today, as they have been since the inception of the medical campus in the 1920s. NBA faculty have received a continuous stream of awards for teaching and leadership efforts over the years, including a fifth of all Dean's Teaching Scholars Awards, and recurrent commendations and awards conveyed by students.

This foundation in education is matched by our commitment to research on the structure and function of the nervous system. Over thirty-five faculty (primary and joint) are actively engaged in research programs across a broad spectrum of interests (outlined below). Close interactions between NBA and other Departments and Centers sharing interests in neuroscience ensure that this discipline holds a leading presence throughout our unified medical and college campus, while the Department of Neurobiology and Anatomy remains central to Rochester's research and teaching programs in the neural sciences. For students at all levels, this translates into a highly attractive environment leading toward careers as scientist/educators and clinician/scientists of the future.

Graduate (PhD) Program in Neurobiology and Anatomy: Overview

The Department of Neurobiology & Anatomy plays a central roll in graduate education in the neural sciences at the University of Rochester. Graduate Education in the Biomedical Sciences (GEBS) is organized into interest areas, one of which is Neuroscience (NSC). *The Neuroscience Graduate Programs provides a unified admissions process as well as a first year core curriculum that is shared by the Graduate Program in Neurobiology & Anatomy (NBA) and the Interdepartmental Graduate Program in Neuroscience (IGPN).* (See: <http://www.urmc.rochester.edu/neuroscience/grad/>) Other degree-granting programs that hold neuroscience among their key missions also utilize core courses. **Students can declare their choice of degree program immediately at matriculation or after their first year of study, specifically by July 1.**

The ***PhD Program in Neurobiology and Anatomy*** is particularly well suited to students in the MD/PhD program and to PhD candidates interested in the characteristics of, and mechanisms underlying, function and dysfunction of the nervous system. The curriculum establishes a firm foundation in fundamental neuroscience and then extends into human neurobiology and disorders of the nervous system within the medical school curriculum. The program is specifically directed toward preparation for academic careers within a medical school setting, where teaching in medical and graduate school curricula comprises a strong component of faculty mission, and where research interests include systems, integrative, and translational/clinical attributes of neural science.

Areas of research emphasis within the Department cover a broad spectrum:

- *sensory, motor and integrative systems*
- *cognition and perception*
- *cell signaling and transmission*
- *development and aging*
- *neurobiology of disease*
- *learning and plasticity*
- *neuro-engineering, and computational neurobiology*

Modern ***state-of-the-art instrumentation and methodologies*** are available to facilitate the study of the nervous system across disciplines and at different levels of inquiry, both within laboratories and across a set of *departmental and institutional research cores*.

Graduate students are encouraged to take advantage of the ***multidisciplinary environment*** provided by NBA faculty in basic and clinical disciplines to achieve their research goals. Similarly, numerous

collaborative programs offer opportunities across departments, bridging the Medical Center with the adjacent College campus. For PhD and MD/PhD candidates, this translates into a highly attractive environment leading toward careers as scientist/educators and clinician/scientists of the future.

PROGRAM INFORMATION

GRANTS & FELLOWSHIPS

Students are encouraged to submit applications for grants and fellowships. They can register in the GENIUS/SMARTS database at: <http://www.rochester.edu/ORPA/funding/index.html> and receive funding opportunities on a daily basis. It is designed for University of Rochester faculty, staff and students only. If you are interested in learning more about grants and fellowship, you may call the Office of Research and Project Administration (ORPA) for an appointment, x54031 (Hylan Building, Rm. 518 on River Campus) or you can visit them on-line at: www.rochester.edu/ORPA/.

Information on various NIH funding opportunities can be found at:

URL for NIH information on Research Training Opportunities

<http://grants.nih.gov/training/extramural.htm>

URL for NRSA forms (PHS 416-1)

<http://grants.nih.gov/grants/forms.htm>

URL for F30 instructions –individual MD/PhD fellowship

<http://grants.nih.gov/grants/guide/pa-files/PA-09-207.html>

URL for F31- NRSA for Minority students

<http://grants.nih.gov/grants/guide/pa-files/PA-09-209.html>

FINANCIAL SUPPORT

Stipend, Tuition and Health Fees: All Ph.D. candidates are awarded Fellowships that provide stipend and full tuition for 32 credit hours per academic year, as well as individual health insurance coverage, as long as they are making satisfactory progress toward their degree and are in compliance with University and Program academic requirements. Stipends are competitive with those of other basic and biomedical graduate programs in the United States. Candidates with outstanding undergraduate records are also eligible for additional stipend support from University fellowships awarded on a competitive basis. The Program currently supports students on a variety of training grants. Students are strongly encouraged to obtain individual training fellowships from the NIH to support their thesis research.

Development Scholarship: Students entering the NBA Graduate Program receive a discretionary fund for use in covering educational costs (e.g. books, meeting costs, PC).

STUDENT OFFICE/ DESKS

Upon entering the NBA Program, students typically acquire office space in their mentor's laboratory; however, students may petition to remain in the student office, located in Room 5-6338, for part of the year. The telephone extension for the office is x54622 and is only for local outgoing calls. Entrance is gained by ID card swipe access. For your security, only those students occupying the office should have access to the room.

VACATIONS

Each student is allowed 10 business days of vacation per year, as mandated by NIH, plus University holidays. University holidays include Christmas Day, New Year's Day, Memorial Day, 4th of July, Labor Day, and 2 days at Thanksgiving. The scheduling of vacations is left to the discretion of the student and his/her mentor so that they do not conflict with coursework, laboratory experiments and other duties.

Before scheduling vacations or any extended absences from the University, students should consult with their lab rotation mentor or thesis advisor. Until they have begun working on their dissertation, both the Program Coordinator and mentor should be notified whenever students will be away from the University. After they are established in a thesis lab, *as a courtesy*, students are asked to notify the Program Coordinator when they will be away for vacations or trips.

*It is extremely critical that ALL international students inform the Program Coordinator of their **international travel** (including Canada) at least 10 days in advance, as there are specific documents from the University that are needed in order to ensure successful re-entry into the United States.

Travel within Rochester, and beyond: The International Services Office (ISO) recommends that international students always carry a university ID, current I-20 or DS-2019, and passport when traveling in the U.S., even within the Rochester area. These documents, including the I-94 card stapled to your passport when you enter the country, document your valid F-1 or J-1 student status. Since Rochester is so close to the U.S. border with Canada, a team of Border Patrol agents routinely check the immigration status of individuals in the community, especially near the airport, train and bus stations. If you are stopped and questioned about your status, the ISO may be contacted to help. When you arrive, you will receive a card with ISO Contact Information to carry with you. For more information, go to <http://www.iso.rochester.edu/index.htm>

NBA and IGPN Program Functions

NBA graduate students are expected to participate in all major functions of the NBA Program. Notices for NBA Program and IGPN functions are sent via e-mail and posted around the Med Center at least one week prior to the function. Program functions include the Neuroscience Annual Retreat, Neuroscience & NBA Seminars, and public student presentations.

▪ **Neuroscience Annual Retreat**

The Graduate Program in Neuroscience sponsors a yearly retreat for all faculty and students. The retreat, planned largely by the Neuroscience Colloquium Committee and graduate student reps, has in the past included: exploration of career opportunities through interaction with guest scientists representing different sectors; specialized workshops; scientific oral and poster sessions; and mock study section grant reviewing.

▪ **Schmitt Symposia**

This unique venue addresses a topic relevant to the mission of the Schmitt Program on Integrative Brain Research, typically in a 1 to 1 ½ day meeting and includes presentations by 2-4 visiting scientists and 2-4 of our local faculty. A poster session is traditionally included (with student contributions) and a banquet.

▪ **Seminars**

The Neuroscience Community holds a weekly one-hour colloquium on Thursdays at 4:00 PM during the academic year. These hosted events are designed to bring the entire Neuroscience community together for an invigorating hour of scientific presentations. Seminars include NBA Seminars, Neuroscience Colloquia, Schmitt Program Seminars, Notter and Forbes Lectures and Center for Navigation & Communication Sciences Seminars (CNCS). Other relevant seminars include

Biomedical Engineering (BME), Center for Visual Sciences (CVS) and Brain and Cognitive Sciences (BCS) seminars.

▪ **NSC Graduate Student Luncheons**

Monthly luncheons are held with the Neuroscience graduate students. Topics affecting graduate education are discussed and, of course, lunch is provided. This session may also include an informal presentation or “chalk-talk” by participating students.

▪ **Poster Sessions**

Throughout the year, the University has opportunities for undergraduates to visit and learn more about the School of Medicine and Dentistry and will oftentimes have poster sessions to reflect the types of work that go on in the different degree granting programs. The NBA graduate students who have posters are asked to volunteer as a representation of our program and its quality. Poster sessions are held twice during the recruitment season, and at the Neuroscience Annual Retreat.

▪ **Neurology Grand Rounds**

On Friday mornings from 9:00 AM to 10:00 AM, visiting guest neuroscientists and clinicians from this country and abroad regularly present basic and clinical neuroscience topics. UR Neurology residents present an interesting case from the Neurology Service for discussion and education from 10:00 AM to 10:30 AM. Informal discussion and refreshments follow Grand Rounds

▪ **NBA Social Functions**

Winter Banquet / Summer Picnic

Neurobiology & Anatomy Graduate Committees

The **NBA Graduate Education Committee (GEC)** serves as the governing body for the NBA Graduate Program. The GEC holds several roles:

Advisorship: The Chair of the GEC (with assistance from GEC members and the Program Coordinator) will oversee each student's progress through the Program, ensuring the achievement of curriculum landmarks (e.g. qualifying exams, selection of thesis committee and advisor) and serving as an independent source of help, advice, and encouragement. All members of the GEC may be used as sources of advice.

Curriculum: The GEC oversees the development of new courses and is responsible for the evaluation and potential adjustments of existing courses offered by the Department.

Recruitment and Communications: The GEC participates in recruitment efforts and initiatives, and oversees relevant web site and other communication venues related to the NBA Graduate Program.

NBA GRADUATE EDUCATION COMMITTEE (GEC):

John Olschowka, Ph.D. (Graduate Director and Chair)

Ed Freedman, Ph.D.

Martha Johnson Gdowski, Ph.D.

William O'Neill, Ph.D.

Scott Seidman, Ph.D.

Ania Majewska, Ph.D.

Graduate Student Liason

NBA SEMINAR COMMITTEE:

Lizbeth Romanski, Ph.D. (Chair)

Kevin Davis, Ph.D.

Ian Dickerson, Ph.D.

David Kornack, Ph.D.

Graduate Student Representative

WEB AND COMMUNICATIONS COMMITTEE:

Greg Gdowski, Ph.D. (Chair)

Gary Paige, MD, Ph.D.

David Pinto, Ph.D.

Owen Zacharias, M.S.

Graduate Student Representative(s)

PROGRAM COORDINATOR:

Ania Dworzanski

PhD Program Requirements

OVERVIEW: Throughout their graduate training, all students are expected to complete 32 *credits each academic year*. Students entering the Neurobiology and Anatomy Ph.D. program have two options to choose from. The first option places emphasis on a broad neuroscience training, while the second option offers a curriculum that stresses medical neuroscience, gross anatomy, and histology. Each path offers ample opportunity for electives to fulfill each student's interests.

OPTION I. The first option shares a common curriculum with the IGPN Ph.D. program during the first year (see below). Students undecided about which Ph.D. program to enter (NBA vs. IGPN) would use this option. During their first year of graduate school, students take Cellular Neuroscience (ANA/NSC 512) and Integrative and Systems Neuroscience (ANA/NSC 531), along with Ethics in Research (IND 501), Graduate Student Seminar (NSC 503), and Journal Club (NSC 592/ANA521). Three lab rotations (ANA/NSC 590) must also be completed by May 31st. Electives may be taken in each semester of the first year as time permits. In the 2nd year of graduate school students choose either of two Medical School courses: Human Structure and Function (ANA 526) or Mind, Brain and Behavior (ANA 525) during their 3rd semester. Those students choosing HSF will be excused from all other course requirements for the semester. Those choosing MBB will be expected to continue Journal Club (ANA 521) and Student Seminar (ANA 522). Finally, all NBA students must show proficiency in Biostatistics. Electives and/or Research fill the remainder of the credits required.

Note: Parentheses indicate course numbers. Some courses are cross-listed as both ANA & NSC.

Year 1: Common NBA/IGPN Neuroscience Curriculum

Fall

- ANA/NSC 512. Cellular Neuroscience (6 credits)
- IND 501. Ethics in Research (1 credit)
- ANA 592. Neuroscience Journal Club (1 credit)
- ANA/NSC 503. Neuroscience Student Seminar (1 credit)
- ANA/NSC 590. Lab Rotation 1 (variable credits)
- Elective courses (3-4 credits) e.g. Cell Biology (IND 408), Biochemistry (IND 409), Foundations in Cellular and Molecular Biology (ANA 511), etc.

Spring

- ANA/NSC 531. Integrative and Systems Neuroscience (6 credits)
- ANA 592. Neuroscience Journal Club (1 credit)
- ANA/NSC 503. Neuroscience Student Seminar (1 credit)
- ANA/NSC 590. Lab Rotations 2 & 3 (variable credits)
- Elective courses (3-4 credits)

Summer

- Lab Rotation 4, if necessary

Year 2: Neurobiology & Anatomy Graduate Program

Fall

- ANA 526. Human Structure & Function (16 credits, Sept-Dec)

Or

- ANA 525. Mind, Brain and Behavior (8 credits, Aug-Oct)
- ANA 521. Graduate Journal Club (1 credit)
- ANA 522. Graduate Student Seminar (1 credit)
- Elective courses (0-4 credits each)¹
- ANA 595. PhD Research (variable credits)

Spring

- ANA 521. Graduate Journal Club (1 credit, choose from list)
 - Multisensory
 - Motor Control
 - Neural Precursors
 - Signal Transduction
 - Neuroinflammation
 - Cortical Circuitry
 - NSC 592 Neuroscience Journal Club

Development of new journal clubs is encouraged.

- ANA 522. Graduate Student Seminar (1 credit)
- Biostatistics elective (3-4 credits)²
- Elective courses (2-4 credits each)¹
- ANA 595. PhD Research (variable credits)

OPTION II. Students directly entering the NBA Ph.D. program in year one have a 2nd option open to them. This option emphasizes gross anatomy, histology and medical neuroscience in the coursework and may appeal to those wishing to teach in an academic setting in the future. This option allows a student to take *both* Human Structure and Function (ANA 526) and Mind, Brain and Behavior (ANA525). It is highly recommended that students choosing this option matriculate July 1 prior to the start of classes in order to complete Lab Rotation 1. Students take HSF (ANA 526) and Ethics in Research (IND 501) in their first semester and are excused from all other requirements. In the second semester students complete Lab Rotations 2 & 3 and take Graduate Student Seminar, Journal Club, and electives. The second year begins by taking Mind, Brain and Behavior (ANA 525), Graduate Student Seminar (ANA 522), Journal Club (ANA 521), PhD Research (ANA 595) and electives. Finally, all NBA students must show proficiency in Biostatistics. Electives and/or Research fill the remainder of the credits required.

Year 1: NBA Curriculum

Summer

- Lab Rotation 1 (Matriculate July 1 prior to beginning of academic classes)

Fall

- ANA 526. Human Structure & Function (16 credits, Sept-Dec)
- IND 501. Ethics in Research (1 credit)

Spring

- ANA 521. Graduate Journal Club (1 credit, choose from list)
 - Multisensory
 - Motor Control
 - Neural Precursors
 - Signal Transduction
 - Neuroinflammation
 - Cortical Circuitry
 - NSC 592 Neuroscience Journal Club

Development of new journal clubs is encouraged.

- ANA 521 Graduate Student Seminar (1 credit)
- ANA 590. Lab Rotations 2 & 3 (variable credits)
- Elective courses (variable credits) e.g., Integrative and Systems Neuroscience (NSC 531). Introduction to Biostatistics (SST 463), etc.

Year 2:

Fall

- ANA 525. Mind, Brain and Behavior (8 credits, Aug-Oct)
- ANA 521. Graduate Journal Club (1 credit)
- ANA 522. Graduate Student Seminar (1 credit)
- Elective courses (0-4 credits each)¹
- ANA 595. PhD Research (variable credits)

Spring

- ANA 521. Graduate Journal Club (1 credit)
- ANA 522. Graduate Student Seminar (1 credit)
- Biostatistics elective (3-4 credits)²
- Elective courses (2-4 credits each)¹
- ANA 595. PhD Research (variable credits)

¹ Students joining the NBA program must complete a **minimum of 20 credits of coursework in year 2**, as well as additional credits towards the PhD research. Students taking MBB (ANA 525) should plan on 0-4 elective credits during the fall semester. Those taking HSF (ANA 526) should plan *no* elective credits during the fall semester.

² All students must display proficiency in biostatistics. STT 463 Introduction to Biostatistics, BCS 510 Data Analysis, or equivalent may meet this requirement. This is best completed in years 1 or 2, depending upon scheduling. In cases where students have completed statistics coursework previously, they may petition the NBA Graduate Education Committee for a waiver.

Qualifying Exam (Part I) to be completed no later than August 1st following the 4th semester of graduate school

Year 3 & Beyond

Teaching Requirement: In the fall of Year 3, students choose a teaching assistantship (3 credits) in one of the courses listed below (typically linked to MBB or HSF).

- ANA 581. Teaching Tutorial in Human Structure & Function
- ANA 583. Teaching Tutorial in Neurobiology

Advanced students in NBA are expected to attend and participate (*but are not required to register for credit*):

- ANA 522. Graduate Student Seminar
- ANA 521. Journal club of choice
- NBA Seminar series during the year.

Qualifying Exam (Part II) to be completed no later than the end of the 5th semester of graduate school.

MD-PhD Program Requirements

(Students entering after 2 years of medical school)

Year 1

Fall

- ANA 521. Graduate Journal Club (1 credit, choose from list)
 - Multisensory
 - Motor Control
 - Neural Precursors
 - Signal Transduction
 - Neuroinflammation
 - Cortical Circuitry
 - NSC 592 Neuroscience Journal Club

Development of new journal clubs is encouraged.
- ANA 522. Graduate Student Seminar (1 credit)
- IND 501. Ethics in Research (1 credit)
- Electives (0-4 credits)¹
- ANA 595. PhD Research (variable credits)

Spring

- ANA 521. Graduate Journal Club (1 credit)
- ANA 522. Graduate Student Seminar (1 credit)
- Electives (0-4 credits)¹
- Biostatistics elective (3-4 credits)²
- ANA 595. PhD Research (variable credits)

¹ Students joining the NBA program must complete *a minimum of 6 credits elective in year 1*, as well as additional credits towards the PhD research.

² All students must display proficiency in biostatistics. STT 463 Introduction to Biostatistics, BCS 510 Data Analysis, or equivalent may meet this requirement. This is best completed in years 1 or 2, depending upon scheduling. In cases where students have completed statistics coursework previously, they may petition the NBA Graduate Education Committee for a waiver.

Thesis Advisor

By the end of the spring semester of the first year, students are expected to select an advisor and laboratory for their PhD dissertation project.

Year 2 & Beyond

A Teaching Assistantship (3 credits) in one of the courses listed below (typically linked to MBB or HSF) is encouraged, but NOT required.

- ANA 581. Teaching Tutorial in Human Structure & Function
- ANA 583. Teaching Tutorial in Neurobiology

Advanced students in NBA are expected to attend and participate (but are not required to register for credit):

- ANA 522. Graduate Student Seminar
- ANA 521. Journal club of choice
- NBA Seminar series during the year.

Qualifying Exam (Part I) to be completed no later than August 1st following the 4th semester of graduate school

Qualifying Exam (Part II) to be completed no later than the end of the 5th semester of graduate school.

Key Dates in Progression through NBA Graduate Program

PhD Students:

September of entering year	Initial Registration/begin classes
October of 1 st semester	Begin first lab rotation
May 31 after 2 nd semester	Complete third/final lab rotation
June 1 after 2 nd semester	Declare NBA as Ph.D. program of choice
October 1 of 3 rd semester	Declare Ph.D. advisor of choice
End of 4 th semester	Form Thesis Committee
Aug 1 after 4 th semester	Complete Part I qualifying exam
End of 5 th semester	Complete Part II qualifying exam
Before end of year 7	Complete thesis defense

MD-PhD Students:

September of entering year	Registration in NBA PhD program/begin classes
End of 2 nd semester	Complete second/final lab rotation
End of 2 nd semester	Declare Ph.D. advisor of choice
End of 4 th semester	Form Thesis Committee
Aug 1 after 4 th semester	Complete Part I qualifying exam
End of 5 th semester	Complete Part II qualifying exam
Before end of year 7	Complete thesis defense

Grading System & Performance Evaluations

All required courses, with the exception of Laboratory Rotations, Journal Club, and Teaching Assistantships, are graded on an A/E system. These exceptions are graded on an S/E system.

A/E System

A	Excellent
A-	
B+	
B	Good
B-	
C	Poor
E	Failure
I	Incomplete

S/E System

S	Satisfactory
E	Failure
I	Incomplete
IE	Incomplete and Failure
W	Withdrawn
N	No Grade Reported

The minimum passing grades for courses and research carrying credit are C or S. However, upon receiving one C in a course, the student is put on probation. If a student receives 2 C's, the adequacy of the student's academic performance is reviewed by the Sr. Associate Dean for Graduate Education, the student, and the program director. It is a NBA Graduate Education Committee policy to dismiss a student upon receiving 2 C's. **For more information, please refer to the GRADES section of the University of Rochester Regulations and University Policies Concerning Graduate Studies, 2008-2010, page 27.*

The Graduate Director reviews the academic performance of second year graduate students at the end of each semester. Annually, they provide these students with a written evaluation of their performance in the program based on course grades and lab rotation evaluations. Beginning in the third year, the student must meet with their thesis committee annually and file a written progress report with the Program Coordinator no later than June 1, which is reviewed by the Graduate Director and the Senior Associate Dean for Graduate Education.

Neurobiology & Anatomy Course Offerings and Descriptions

Program Required Courses

ANA 526. Human Structure and Function

Associate Professor Davis, Associate Professor Blair (Pharm/Physiol Dept) and staff

Credit: 16 credit hours

This 14-week course provides a rare opportunity to join the medical school curriculum in learning the essential concepts and mechanisms underlying human biology from an integrated perspective, including both basic and clinical applications. Didactic lectures are matched with problem-based learning sessions, problem-solving conferences, and laboratory exercises that introduce you to the systematic study of human structure and function. This integrated course encompasses the disciplines of anatomy, embryology, histology, and physiology. The course includes comprehensive laboratory sessions in gross anatomy and histology, and the qualitative and quantitative aspects of human physiology, including fundamental principles and clinical relevance. Students of the nervous system will appreciate first hand the intricacies and ubiquity of the brain's structural and functional interactions with the various systems of the body, as well as their developmental attributes. The course provides an introductory foundation for students interested in understanding and teaching these disciplines in undergraduate, graduate, allied health, and medical school settings. (*mid-September – late December*)

ANA 525. Mind, Brain and Behavior

Professor Jozefowicz (Neurology), Associate Professor O'Banion, Associate Professor Lyness (Psychiatry) and staff

Credit: 8 credit hours

This nine-week course provides a multidisciplinary overview of the structures, functions, and dysfunctions of the human nervous system, integrating both basic and clinical sciences. Basic science portions of this course include the disciplines of neuroanatomy, neurophysiology, neuro- and psychopathology, and neuro- and psychopharmacology. The basic science material is fully integrated with the clinical disciplines of neurology and psychiatry. Overview lectures, problem-based learning sessions, and laboratory exercises introduce students to the basic and clinical sciences underlying neurological and psychiatric disorders. This course provides a foundation for students interested in understanding and teaching neuroscience in undergraduate, graduate, allied health, and medical school settings. [*weekday mornings, mid-August – mid-October*]

ANA 521. Graduate Journal Club

Associate Professor Olschowka and Staff

Prerequisites: ANA 512 and 531 or equivalent

Credit—1 credit hour

Provides graduate students in year 2 with experience in formulating and presenting in a small group setting based upon selections from an area of interest in the scientific literature. Skills involved in literature search, critical thinking, and guiding discussion are honed in a choice of approved journal club venues. (*fall and spring*)

ANA 522. Graduate Seminar

Associate Professor Olschowka and Staff

Prerequisites: ANA 512 and 531 or equivalent

Credit—1 credit hour

Provides experience for graduate students in year 2 in formulating and delivering oral and poster presentations based upon the student's own research, lab rotations, or an area of interest in the scientific literature. Skills involved in designing effective visual aids, abstract writing, and organizing content into venue-specific formats are developed, culminating in the presentation of an oral seminar and a poster session open to the academic community. (*fall and spring*)

ANA 581. Teaching Tutorial in Human Structure and Function

Associate Professors Davis and Stevens and staff

Prerequisites: ANA 526 or equivalent

Credit—2 to 5 credit hours

This course provides an opportunity for students to acquire and develop skills in teaching human gross anatomy and histology. Students may opt for teaching one or both of these disciplines, with credits arranged accordingly. For each discipline taught, students are expected to attend and assist in all laboratories as well as attend relevant lectures. Students will also provide instruction and presentations to lab groups and assist in preparing and setting up examinations. Although designed primarily for advanced graduate students in Neurobiology and Anatomy, other graduate students may elect this course if they meet prerequisites. (*fall*).

ANA 583. Teaching Tutorial in Neurobiology

Associate Professor O'Banion and staff

Prerequisites: ANA 525, or ANA 512 & 531, or equivalent

Credit—3 credit hours

This experience provides an opportunity for students to acquire and develop skills in teaching and course management in Neurobiology, particularly related to Mind, Brain and Behavior (but can substitute other approved options in neuroscience). Students are expected to attend staff meetings, provide instruction in the laboratory, bear responsibility for small group teaching, prepare and deliver formal lectures, assist in the preparation and grading of examinations, and participate in staff-evaluation sessions. Although designed primarily for advanced graduate students in the Department of Neurobiology and Anatomy, other graduates may elect this experience with permission of the instructor. (*fall*)

ANA 495. M.S. Research

Staff

Credit—variable

Opportunity is afforded for qualified students to undertake research under the direction of members of the staff. (*fall and spring*)

ANA 595. Ph.D. Research

Staff

Credit—variable

Opportunity is afforded for qualified students to undertake research under the direction of members of the staff. (*fall and spring*)

STT 463. Introduction to Biostatistics

Faculty

Credit – 4 credit hours

Review of basic statistical and data-analytic methods in medical and clinical research. Topics include summarizing and displaying data, diagnostic tests, hypothesis tests and confidence intervals, methods for comparing means and proportions, and regression analysis. The MINITAB computer software package is introduced and used. The course is strongly use-oriented, stressing practical understanding and interpretation, not mathematical derivation. *(fall)*

BCS 510. Data Analysis I

Faculty

Credit – 3 credit hours

Issues of data analysis in experimental research. The course focuses on parametric techniques, especially analysis of variance. Topics covered include simple and complex designs for between and within subject's factors, including mixed designs; analysis of covariance and trend which students are taught to use a popular statistical package for data analysis.

IND 501 Ethics in Research

Faculty

Credit – 1 credit hour

NBA Elective Courses Related to Anatomy

ANA 501 Histology

Associate Professor Stevens and staff

Credit—variable

This course in microscopic anatomy emphasizes correlating structure with function. The course includes hands-on laboratory sessions during which fixed specimens, prepared by a variety of methods, are examined with a microscope. Information derived by newer techniques (scanning electron microscopy, transmission electron microscopy, immunocytochemistry, stereology, autoradiography, etc.) is introduced where appropriate. The course uses a variety of teaching formats: lecture, small-group conferences, clinical correlation exercises, and clinical case-based sessions. Examinations include both written and laboratory practical parts. *(fall)*

ANA 506 Human Embryology and Developmental Biology

Professor Hansen and staff

Prerequisites: ANA 526 or equivalent

Credit—3 credit hours

This lecture and laboratory course covers classic human embryology with an emphasis on clinical consequences related to congenital anomalies. Additionally, specific lectures in clinical developmental biology with an emphasis on cell and molecular biology will supplement the descriptive embryology and will include topics currently being researched by Rochester faculty. The course will meet each week for 3 hours during the Spring semester and each weekly session will include 2 didactic/discussion hours and 1 hour of laboratory viewing the *Carnegie Collection* of human embryos. Student participation, a midterm library research presentation and final essay exam will form the basis for student evaluation. *(spring)*

ANA 508. Applied Human Anatomy

Associate Professor Piekut and staff

Prerequisites: ANA 526 or equivalent

Credit—variable

This elective in Applied Human Anatomy is designed for students who wish to review gross anatomy and pursue advanced and specialized anatomical dissections in their specific area of interest. This elective will be student-directed and tailored to each student's needs. Each student will define their learning objectives and enroll for the appropriate time needed (1-4 weeks) to accomplish these goals. Student time will be divided between cadaver dissections and preparation for presentations. The elective will facilitate active learning by creating a rich, student-directed learning environment. The weekly presentations will formalize this exchange of knowledge and allow the group to be exposed to areas of review that they did not directly dissect. This elective is offered to both fourth year medical students and advanced graduate students who have previously completed a course in Human Gross Anatomy. (*spring*)

ANA 509. Teaching Methods in Anatomical Sciences

Associate Professor B. Davis and staff

Credit—2 credit hours

This interactive class offers practical applications in the use of various teaching formats in the anatomical sciences (gross anatomy, histology, embryology) including lecture, gross anatomy lab, histology lab, computer-assisted lab instruction (virtual lab), small group discussion and problem based learning. The course will also provide experience in syllabus preparation, learning objective construction, exam question writing and course evaluation. Additional lecture topics will focus on learning theory and selected topics in educational research relevant to teaching methods and outcomes assessment. Students will also prepare and deliver lectures using several different formats (power point, slides, overheads and blackboards), and will lead small-group venues (e.g. laboratory, case study sessions). (*summer*)

ANA 593. Special Topics in Anatomy

Staff

Credit—variable

Directed studies of advanced topics in Neurobiology and Anatomy, supervised by a faculty member and organized to fit special needs of individual students. (*fall and spring*)

NBA Elective Courses Related to Neurobiology

ANA/NSC 512 Cellular Neuroscience

Professor Freeman and staff

(6 credits; 3 credits for MD/PhD students)

Part 1 of the Neuroscience Core Curriculum is a comprehensive course covering a broad range of topics: identification and characterization of cellular components of the nervous system; electrical properties of neurons; development of membrane potentials and signal propagation; molecular properties of ion channels and their role in neuronal signaling; organization of the nervous system; regional neuroanatomy of brain, brain stem, and spinal cord; anatomy of sensory, motor, and regulatory systems; synaptic receptors and channels: signal transduction; modulation of synapses and simple memory mechanisms; biochemical and pharmacological properties of synaptic receptors; neurotransmitter synthesis and transport; excitatory and inhibitory amino acids; development of the nervous system and genesis of neurons and glia; neurotrophic factors and neuronal migration; axonal path-finding; and plasticity and synaptic rearrangement. (*fall*)

ANA/NSC 531 Integrative & Systems Neuroscience

Professor Pasternak and staff

Prerequisites: ANA/NSC 512 or equivalent

(6 credits)

Part 2 of the Neuroscience Core Curriculum provides a critical overview of current knowledge of systems neuroscience. Topics include functional connectivity, neurophysiology, behavioral measures of sensory and motor systems, limbic and hypothalamic systems, memory and attention. *(spring)*

ANA 504/BCS 504 Sensory Systems

Associate Professor Lee and staff

Prerequisites: None- limited to graduate students

Credit—4 credit hours

An introduction to the functioning of the senses and the physiological mechanisms underlying them. Topics include vision, audition, somatosensation, the vestibular system, gustation and olfaction, with an emphasis on the general principles that govern mammalian sensory systems.

ANA 511 Cellular and Molecular Foundations

Associate Professor Luebke and staff

Prerequisites: None- limited to graduate students

Credit—4 credit hours

The focus on this course will be a practical understanding of gene expression, from DNA replication, RNA transcription and processing, to protein translation and trafficking. This knowledge will provide the student with a foundation for understanding how cells function, both alone and in clusters that form tissues and organs. The coursework will also provide the student with a knowledge base to evaluate modern molecular biological techniques and their application to neuroscience. *(fall)*

ANA 513 Neuroinflammation

Assoc. Professors Olschowka & O'Banion, and Res. Asst. Professor Hurley

Pre-requisite: NSC 512 and MBI 473/573 (Immunology) are recommended

Credit—4 credit hours

Inflammation contributes to secondary injury following brain trauma or stroke, and is often a direct cause of neuropathology in the nervous system. And yet, neuroinflammation may also be critical for regeneration and repair. This course will examine the role of inflammation in the central nervous system, and will highlight common mechanisms of response to a variety of neural insults, including autoimmunity, trauma, neurotoxicology, and neurodegeneration. Further topics will include the roles glia, the acquired immune system, and the innate immune system play in response to neural insults in the unique "immune-privileged" environment of the CNS. *(spring of even years)*

ANA 515 Neural Control of Behavior

(Same as BME 515)

Assoc. Professors Freedman and Welch

Pre-requisite: ANA/NSC 531.

Credit—2 credit hours

This advanced graduate course brings students with a basic understanding of the motor system to the forefront of modern investigation. Topics include movement selection, motor learning, distributed control, basal ganglia function, control of gaze, vestibulo-motor responses, muscle compartmentalization, and others based on student interests. *(spring of even years)*

ANA 516 Neural Systems and Impairments in Cognitive Function

Assist. Professor Romanski and staff

Pre-requisite: ANA/NSC 531

Credit—3 credit hours

This course explores the neurobiological basis of diseases affecting cognition, movement or perception. We will discuss recent theories of disease etiology and the neural systems affected by treatment strategies with a focus on relevant animal models. Examples of topics include schizophrenia, frontal lobe lesions, anxiety and mood disorders, William's Syndrome, Alzheimer's disease, Parkinson's disease and additional topics requested by the students. (planned for *spring, even numbered years*).

ANA 517 Advanced Topics in Sensory Systems

(Same as BME 517)

Assoc. Professor Luebke

Pre-requisite: ANA/NSC 512 or equivalent.

Credit—2 credit hours

Prerequisites: ANA 531 or equivalent recommended

This modular course focuses on how sights, tastes, sounds, and other sensory modalities are converted into electrical signals in a form that can be interpreted by the nervous system of invertebrates and mammals. We will discuss the major discoveries that have shown how specialized receptors and organs detect sensory signals. Each module will focus on transduction--the ion channels, G proteins, enzymes, and second messengers--that produce the responses of sensory cells, and ultimately afferent discharge. (*spring*)

ANA 518 Introduction to Neuroengineering

(Same as BME 418)

Asst. Professor Pinto

Pr-requisite: ANA/NSC 531 or BME260

Credit—4 credit hours

This course covers quantitative and computational aspects of neuroscience research. The course begins with a brief review of Hodgkin-Huxley channel dynamics, and extends to advanced topics including cable equations, neural circuits, control systems, and neural models of behavior. There will be an emphasis on simulation and modeling of both single neurons and neural networks and systems. (*spring*).

ANA 524 Stem cells of the CNS in development and disease

(same as GEN 524)

Asst. Professor Mayer-Proschel, Res. Asst. Professor Proschel

Prerequisites: ANA 512 or equivalent

Credit—3 credit hours

This course covers the most recent and relevant advances in the field of stem cell biology with a focus on the CNS. In the first series of lectures we address the basic questions: what makes a cell a stem cell. The differentiation potential of stem cells *in vitro* and *in vivo* is discussed, along with mechanisms of fate determination and the control of differentiation versus proliferation. Students will understand the basic aspects of stem cell biology, and the role of stem cells in disease paradigms. Topics will include: the involvement of stem cells in pathological conditions of malnutrition and carcinogenesis and the potential use of stem cells for transplantation therapies.

ANA 593. Special Topics in Neurobiology

Staff

Credit—variable

Directed studies of advanced topics in neurobiology, supervised by a faculty member and organized to fit special needs of individual graduate students. (*fall and spring*)

Elective Courses in Biomedical Sciences

ANA 491. M.S. Readings

Staff

Credit—variable

Directed studies of advanced topics in Neurobiology and Anatomy, supervised by a faculty member and organized to fit special needs of individual students. (*fall and spring*)

ANA 591. Ph.D. Readings

Staff

Credit—variable

Directed studies of advanced topics in Neurobiology and Anatomy, supervised by a faculty member and organized to fit special needs of individual students. (*fall and spring*)

BCS 521. Audition

Professor Ison

Pre-requisite: ANA/NSC 531, or NSC 201/BCS 240, permission of instructor.

Examines the physiological substrate responsible for hearing. Topics include the physical stimulus for hearing, receptive aspects of speech and language, peripheral physiology (the outer and middle ears, cochlea, and auditory nerve), and central physiology (brainstem nuclei, auditory cortex, descending systems). Introduces electrophysiological techniques used to study auditory function, and explores sensory and perceptual correlates of physiology and sensorineural hearing loss.

BCS 549. Developmental Neurobiology

Professor E. Nordeen

Recommended: BCS 507 (NSC 201), ANA/NSC 512 recommended, permission of the instructor.

The organization of our nervous system defines the ways we behave, perceive, think and feel. This course explores factors that influence the differentiation and survival of nerve cells, the functional specialization of neural regions, how axons navigate to targets and accurately map connections within these targets, and how connections are influenced by early perceptual and hormonal experience. Examples of developmental plasticity are compared and contrasted with forms of neural plasticity normally exhibited in adults.

BCS 524. Advanced Problems in Perception and Action

Pre-requisite: ANA/NSC 531, or NSC 201/BCS 240, permission of instructor.

Assoc. Professor Knill

Credit - variable

An advanced graduate course focusing on in-depth studies of several problems in perception and action. In the first half of the course we will cover four problems in higher-level visual function in some detail -- depth perception, object recognition, visual information processing in natural tasks and the visual control of action. In the second half of the course, students will each develop a research proposal in one of these four areas. The first half of the course will be taught in seminar format, with introductory lectures introducing each of the four problem areas. The second half of the course will be run as a grant-writing workshop in which students develop the major components of a research proposal (problem specification, background review and research plan) through collaborative interactions in the class.

IND 408. Advanced Biochemistry

Professor Dumont

Credit -4 credit hours

This course provides graduate level instruction in biochemistry, as it relates to modern molecular biology, and cell biology and physiology.

IND 409. Cell Biology

Professor Portman

Prerequisite: Biochemistry, concurrent or prior, or permission of instructor

Credit - 4 credit hours

The course will cover: membrane structure and function; cytoskeleton; protein synthesis, modification and targeting, organelles, vesicular traffic, nuclear import/export; cell communication; signal transduction; cell cycle control, apoptosis and growth control. Selected topics will be covered in depth with an emphasis on experimental approaches. Papers from the literature will be discussed in small group sessions. *(fall)*

IND 410. Molecular Biology and Genetics

Professor Bambara

Credit - 4 credit hours

This course will focus on the following areas: DNA replication; DNA repair/mutagenesis; Recombination, transposable elements; Gene expression, prokaryotes; Eukaryotic transcription; RNA processing; Genomics; and Human genetics. *(spring)*

NSC 525. Biology of Neurological Diseases

Professor Joynt and Research Associate Professor Loy

Prerequisite: ANA/NSC 512 or permission of instructor.

Credit—3 credit hours

This course explores the neurobiological basis of human neurological disease, emphasizing the relationship between behavioral dysfunction and neuropathology or neural dysfunction. While this is an overview, we emphasize those diseases for which significant information is available in terms of genetic or molecular control of disease mechanisms or therapeutic approaches. The first half of each class meeting is a lecture by one or two experts in the respective field, usually one physician and one basic scientist. This is followed by 60–90 minutes of discussion of recent research articles (provided the previous week), led by a student and one or both of the course directors. This provides a primary emphasis on neurobiological mechanisms within a clinically relevant context. The course is designed for graduate students in neuroscience or in other disciplines who have a background in neurobiology. Upper-division undergraduate students, particularly those majoring in neuroscience, are also welcome. Medical or postdoctoral students, residents, and/or fellows in neurology or psychiatry may also find the class of interest, and are welcome as auditors or for credit as appropriate. *(spring, even numbered years)*

Teaching Assistant Requirements

All students working towards the Ph.D. are required to act as a teaching assistant in one course. Ideally this experience includes responsibility for a weekly conference, discussion group or laboratory. Students may TA in MBB or HSF (or an approved alternate course). **Approval from the Course Director is required before registering for the teaching assistantship.** Listed below are brief descriptions of the TA courses and the expectations of the course directors.

ANA 581: Teaching Tutorial in Human Structure and Function (September – December)

Course Directors: Barbara Davis, x34862 and Martha Blair, x56655

Prerequisites: ANA 526 or equivalent

Credit—3 credit hours

This course provides an opportunity for students to acquire and develop skills in teaching human gross anatomy and histology. Students may opt for teaching one or both of these disciplines, with credits arranged accordingly. For each discipline taught, students are expected to attend and assist in all laboratories as well as attend relevant lectures. Students will also provide instruction and presentations to lab groups and assist in preparing and setting up examinations. Although designed primarily for advanced graduate students in Neurobiology and Anatomy, other graduate students may elect this course if they meet prerequisites. (*fall*).

ANA 583: Teaching Tutorial in Neurobiology (August - October)

Course Directors: Ralph Jozefowicz, x56380 and M. Kerry O'Banion, x55185

Prerequisites: ANA 525 or equivalent

Credit—3 credit hours

The Mind, Brain and Behavior course runs as an intensive 9-week long course, meeting every morning of the week from 8am until noon. Student teaching in this course for second-year medical students requires an intensive laboratory effort. Teaching assistants are expected to attend lectures and be prepared to help student with areas of confusion or poor understanding. TAs often run review sessions for the medical students. During the first 3 weeks of the course there are laboratories (include gross brain observations, gross brain dissections, horizontal and coronal sections, CAT and MRI imaging, cross-sectional neuroanatomy of the spinal cord and brainstem, and neurohistology), in which the student TAs are expected to actively participate in laboratory group instruction. TAs must prepare the laboratories in advance, be ready to show the sections, slides, specimens, or imaging material, and be prepared to discuss the basic information intended and answer questions for the medical students. Discussion with 4-20 medical students in the individual laboratory sections is sometimes necessary. TAs also assist in question writing for examinations, help to check questions for clarity or ambiguity, help with grading examinations, and assist the faculty in preparation of necessary materials for the course. (*fall*).

Lab Rotations

The purpose of the lab rotation is to learn techniques, to gain an appreciation of different scientific approaches to a problem, and to gain exposure to an area of research that eventually may lead to a focused area of investigation. The experience should broaden one's research skills and, therefore, successive rotations should not be taken with related faculty or in labs where essentially the same techniques are used. However, coordinating the rotations to employ different techniques aimed at investigations into one particular area of neuroscience research is appropriate.

Lab rotations are part of the required curriculum. **Ph.D. students must complete three rotations by the end of the summer after their first year; MD/PhD students are only required to have two lab rotations.** The Associate Dean for Graduate Education has organized a standard set of start and end dates for lab rotations as follows:

Rotation proposal due	Rotation begins	Rotation ends	Evaluations
September 20	October 1	December 15	December 20
December 20	January 1	March 15	April 1
March 1	March 16	May 31	June 15
June 20	July 1	August 31	September 15

Note: Prior to the start of the rotation period, the student and faculty mentor should provide a brief summary of the proposed rotation research project. At the end of each laboratory rotation, a Laboratory Rotation Evaluation is completed by the student and rotation mentor.

Forms for the Student Rotation Evaluation and Faculty Rotation Evaluation can be found at: <http://www.urmc.rochester.edu/education/graduate/faculty-and-staff/forms.cfm>

***All incoming students** attend a Chemical Hygiene, Bloodborne Pathogens, and Radioisotope Seminar on Orientation Day. When selecting a lab rotation, students must check with the mentor to find out whether they will be working with radioisotopes, chemicals and/or animals. Students will be required to take a further seminar regarding radioisotopes. If their work involves animals, they will have to obtain a manual for the Vivarium and will be required to take a quiz on proper usage and care of animals in research.

* **Mentors** should be reminded that UCAR protocols have to be amended to add students rotating in their lab who will be using animals.

Thesis Advisor

Students are expected to select an advisor and laboratory for their PhD dissertation project by the end of October of year 2. The Thesis Advisor must be an appointee in NBA (primary or secondary). Collaborative efforts with faculty outside NBA are encouraged, and co-advisorships are possible with approval by the NBA Graduate Education Committee.

Part I Qualifying Exam

The Part I exam determines whether a student is qualified to pursue further studies toward completion of a PhD dissertation. This determination involves evaluation of the potential of a student for independent thought, his or her approach to investigating a significant scientific problem in a sound manner, and his or her general knowledge of neuroscience. The examination is not intended to be a specific evaluation of the proposed research problem or of the supporting preliminary data. **It is expected that the Part I exam be fully completed no later than August 1st of the second year of graduate study (after 4th semester).** Exceptions to this schedule must be explained in a written petition and approved by the Graduate Director/GEC.

Committee: The examining committee will be made up of 3 tenure-track faculty with expertise in the area of the research. Prior to the examination, each student (with their advisor's help) will submit the names of the proposed faculty to the Graduate Director/GEC for approval. Two members of the Committee must be NBA primary/secondary faculty.

Requirements: The student and Committee will select a minimum of 50 papers relevant to the students' scientific area of interest to be read by the student during a period of 2 months. The student will formulate and submit exam questions to their committee based upon these readings. The Committee will then select a subset of these questions and supplement them with several of its own. For the exam, the student will compose written answers to these questions over a period of 5 business days.

Procedure: Fifteen business days before the exam period begins, the student will submit the names of perspective examination committee members to the Graduate Director and to the Program Coordinator. All students must then notify the Program Coordinator of the date they will receive their list of relevant papers. *This marks the beginning of the 2-month reading period.* Following the examination and grading, each student is required to provide the Program Coordinator a copy of their written exam for their files.

Grading: At the conclusion of the examination, the Examination Committee will assign a grade of "Pass", "Retake", or "Fail". Exceptional performance on the exam will constitute the unofficial grade of "Pass with Honors". Students are given a maximum of two attempts at passing the Part I exam. Failing the exam is grounds for dismissal.

Part II Qualifying Exam: Thesis Proposal

After passing the Part I Qualifying Exam, the student is expected to formulate a thesis proposal with the guidance of his/her Thesis Advisor. The Thesis Proposal, or Part II Qualifying Exam will advance a student to candidacy upon successful completion. **The thesis proposal should, under normal circumstances, be written and presented NO LATER than February 1st of the third year of graduate study (after the 5th semester).**

Topic: The content of the presentation and written paper must include the motivation, preliminary data and research discussion that will introduce the student's final Ph.D. dissertation.

Thesis Committee: the University Council on Graduate Studies has designed Guidelines for the Committee. The students' committee MUST consist of 4 assistant professor or higher ranked faculty members. Of these 4 members, 2 MUST be from the NBA *primary* faculty list and 1 must be from outside the department. Note: a secondary faculty member may be chosen as the outside member if 2 primary NBA faculty have been selected. (Please contact the Program Coordinator for an up-to-date

list of the faculty or check online at <http://www.urmc.rochester.edu/smd/nanat/faculty-research/faculty/index.cfm>). An additional member from outside the University is encouraged to join the Committee for the thesis proposal and defense (requires approval from the Sr. Associate Dean).

NOTE: *if the thesis advisor is a secondary faculty member of NBA, the thesis committee must include two primary NBA faculty and one outside (non-NBA) faculty member.*

Written Paper: The thesis proposal is to be written in the form of an NIH NRSA Pre-doctoral fellowship proposal. The complete NRSA forms and instructions can be obtained at: <http://grants.nih.gov/grants/forms.htm>. After the exam, when corrections have been made, copies of the proposal must be distributed to all committee members and the Program Coordinator.

The proposal is to be written in Arial 11 point type, on standard double-spaced pages with 1/2-inch margins on all sides. The proposal is to be a maximum of 20 pages, not including the abstract, reference, and appendix sections. If the proposal exceeds 20 pages, it will be returned to the student for revision and will be reconsidered only when it meets the page requirements.

The proposal must be written in the following format:

- (1) **Abstract:** State the proposal's broad long-term objectives and specific aims, and describe concisely the experimental design and methods for achieving these goals. The abstract should be a succinct description of the proposed research, even when separated from the proposal. This section cannot exceed 1 page, and is **not** included in the 20-page proposal limit.
- (2) **Specific Aims:** State concisely and realistically what the research described in the proposal is intended to accomplish and/or any hypotheses to be tested. This section cannot exceed 1 page.
- (3) **Significance:** Briefly, sketch the background for the proposed research and critically evaluate the literature in the area. State concisely the importance of the research described in the proposal by relating the specific aims to broad, longer-term objectives. This section cannot exceed 5 pages.
- (4) **Preliminary Studies:** This section should summarize the work already done by the student, or unpublished work of others, to indicate that the proposed studies are feasible and significant. Students are not expected to have a large amount of data accumulated at the time of the Qualifying Examination. In general, details of experimental and statistical methods should not be included in this section: if necessary, they can be included in an Appendix. Graphs, data, and tables that are critical to this section of the proposal should be included: if necessary, other graphs, data, and tables can be included in an Appendix. This section should not exceed 5 pages.
- (5) **Experimental Design and Methods:** Discuss in detail the experimental design and the procedures to be used to accomplish the specific aims of the proposal. The emphasis should be on the rationale and experimental design of the experiments, including necessary controls, rather than the experimental details- for example, do not include reagent concentrations and volumes unless this information is critical to the experimental design and interpretation. Describe protocols to be used and provide a tentative timetable for the project. Include a discussion of the means by which data will be analyzed and interpreted. Describe new methodology and its advantage over existing methodology.

Discuss the potential difficulties and limitations of the proposed experiments, and alternative approaches to achieve the project aims. If applicable, include information about numbers and species of animals to be used, including justifications for these choices. Graphs, data, and tables that are critical to this section of the proposal should be included: if necessary, other graphs, data, and tables can be included in an Appendix. There is no page limit for this section. However, the entire proposal cannot exceed 20 pages.

- (6) **References:** Use the *Journal of Neuroscience* format. There is no page limit for this section and this section is **not** included in the 20-page proposal limit.
- (7) **Appendix:** This section should include graphs, diagrams, tables, and other supporting data necessary for reviewing the proposal. There is no page limit for this section and this section is **not** included in the 20-page proposal limit.

The student may consult with others (for example, his or her advisor, other faculty members, postdoctoral fellows, other students, and investigators outside the University) in preparing the written proposal. It is recognized that there will be some (even substantial) input by the student's advisor, since the thesis generally reflects research activities in the advisor's laboratory. **However, the actual written proposal is to be the intellectual output of the student, and plagiarism from publications or grant applications written by the advisor or others is not allowed.** When the student has completed the written proposal, *the advisor must review it* before the oral examination is scheduled. While the advisor may suggest modifications in the written proposal, all revisions are to be done by the student.

Oral Presentation: The student will publicly present the proposal to the Thesis Committee and Neuroscience Community, using visual aids. The presentation should last approximately 45 minutes, with a question/answer period to follow.

Requirements: The thesis proposal should, under normal circumstances, be written and presented **NO LATER than February 1st of the third year of graduate study**. Any student who has not completed the Part II Qualifying Examination by February 1st of their third year will be placed on academic probation, with this recommendation relayed to the Associate Dean for Graduate Studies. The student will have until the end of the spring semester of their third year, in accordance with the School of Medicine and Dentistry's registration deadlines and blackout periods, to schedule and defend their Part II Exam. *If this exam is not completed by the last possible day in the spring semester of the third year, the Program will recommend to the Dean that the student be dismissed from the program.* Students with extenuating circumstances may formally petition the Graduate Education Committee in writing with a supporting letter from the advisor for an extension.

Procedure:

15 Full Business Days Prior to Exam Date: Submit, in writing to the Program Coordinator, the date and time agreed upon by your Committee for the public and closed exams of the proposal, the names of all Committee members, noting the advisor, and a copy of the title page and abstract from the paper. The Program Coordinator will schedule rooms for both parts of the exam and prepare necessary paperwork and announcements for the public exam.

10 Business Days Prior to Exam Date: The written paper **MUST** be circulated to the Committee and the Program Coordinator. It is at this time that the Coordinator will submit paperwork to the Senior Associate Dean for Graduate Education, who will then select a chair for the Committee.

Examination Procedure and Grading: The Examination will begin with an initial closed meeting of the Examination Committee to review the student's academic record, research performance, and

written proposal. The Committee will also decide on the general areas of questioning for the oral examination. In some cases the Committee may decide based on the student's background or written proposal that they are not ready for examination, and, if so, will inform the student in detail of the steps necessary to correct any deficiencies.

The Chair of the Examination Committee will moderate the examination and assure that each participant has adequate time to ask questions. The Chair is also expected to ask questions. Immediately following the oral examination, the Examination Committee will meet in closed session to evaluate the student's overall performance (including the oral examination, academic record, and laboratory performance). The committee will then vote on the following options: (1) the student may pass; (2) the student may fail; or (3) the student may pass contingent upon meeting some further requirement set by the Examination Committee (e.g., the student may be required to rewrite the proposal and obtain committee approval of the revised proposal, to repeat the oral examination, and/or to take further course work to remedy some deficiency in her or his background). *A three-fourths majority of the committee is required for passing.* All votes will be recorded. The student and advisor will be verbally informed of the committee's decision at the conclusion of the closed session. The Chair of the Examination Committee will notify the Associate Dean for Graduate Studies in writing that the student has passed, failed, or received a contingent pass of the Qualifying Examination.

If the student has passed, the Associate Dean will advance the student to the status of Candidate for the Ph.D. degree. This status is required by University regulations.

If the student receives a pass contingent on meeting some further requirement, the Chair of the Examination Committee will inform the student of this in writing. A copy of this letter will be placed in the student's program file and a copy will be sent to the Sr. Associate Dean for Graduate Studies. When the requirement has been satisfied, the student must send written documentation of this to the Graduate Director and to the Sr. Associate Dean for Graduate Studies.

Should a student fail, the Examination Committee MUST choose between three options: 1) the student may repeat the qualifying exam, no *earlier* than 5 months or *later* than 12 months after their first attempt; 2) the Committee may recommend the student be allowed to complete a Master's degree (Plan A or B), no *later* than 3 months after the failed exam; or 3) the student may be asked to leave the program. If the Master's exam is failed, the student must leave the program.

Guidelines for Preparation and Registration of the PhD Thesis Defense

Requirements:

- Qualifying exam has been passed at least six (6) months prior to the defense of thesis.
- Completion of degree requirements within specific time limits (7 years unless extension granted by Senior Associate Dean for Graduate Education).
- Satisfactory completion of the appropriate number of credit hours for the program (School of Medicine and Dentistry - 90 hours with no outstanding grades excluding current term).
- Program of Study must be on file with all requirements met. Please note that the Program of Study should be filed before student completes the Thesis Proposal exam and will be used as a guideline for completion of his/her degree work. It reflects the minimum courses/credits the student may have to complete the degree.
- Student must have maintained continuous enrollment since admittance into the Graduate Degree Program.
- Committee must be according to the guidelines of the Vice Provost for Research and Graduate Affairs Office*.

**The Committee consists of four people including the advisor and an outside member. The outside committee member is defined as a person from outside the University or a faculty member not listed as Neurobiology & Anatomy Department faculty. An outside committee member who is not from the University must have prior approval by the Graduate Studies Dean and the Vice Provost. Please see page 40 of the '08-'10 Official Bulletin of the University.*

Written Paper: A manual entitled "The Preparation of Doctoral Theses" is available from the Program Coordinator, which may also be accessed online at: <http://www.rochester.edu/theses/> Previous theses are also available in Miner Library for reference. It is the responsibility of the student to see that style, format, margins, paper, binding, etc. are in accordance with University regulations. It is also the student's responsibility to arrange for typing of the thesis. If you have questions or concerns regarding the thesis preparation, please contact Pat McLane or Elaine Kuchman, ext. 5-4279, in the University Dean's Office. The thesis should consist of the following:

- Title Page (formatted as the example in the Graduate Thesis Manual)
- Curriculum Vitae
- Acknowledgments (where relevant)
- Abstract
- Table of Contents
- List of Tables (if applicable)
- List of Figures and/or Plates (if applicable)
- Text of the Thesis
- Summary
- Bibliography
- Appendices

Registration Guidelines: The University Dean of Graduate Studies has set deadlines during the academic year by which a thesis must be registered in order to participate in graduation at the next Commencement. Please refer to the SM&D Graduate Student Academic Calendar on-line at <http://www.urmc.rochester.edu/education/graduate/academic-calendar.cfm> for dates regarding registering thesis, holding the defense and submitting corrected copies. These dates must be adhered to; **there are no exceptions.** Calendars are available from the Program Coordinator and are usually distributed during July/August each year. ***Defenses will not be scheduled after 3:30pm and the timetable for defenses held in the summer is subject to change.***

- ***ASAP:*** Notify Program Coordinator of your intent to defend and the approximate date so that the appropriate paperwork can begin to be processed.

- **Six Weeks Prior to Exam Date:** Submit, in writing to the Program Coordinator, the exact date and time agreed upon by the Committee for the public presentation and closed exam. Along with this, the student MUST submit the names of all Committee members, noting the advisor, and a copy of the title page and abstract from the paper. The Coordinator will schedule rooms for both parts of the exam and prepare necessary paperwork and announcements for the public exam.
- **25 Full Business Days Prior to Exam Date:** The following material must be submitted to the Graduate Studies Registrar's Office (G-9550) by the Program Coordinator:
 - Appointment Form for Ph.D. final exam (w/account number for microfilming charge)
 - Permission to register thesis form signed by department chair or representative
 - Department Statement of Completion of Requirements
 - Program of Study for Doctor of Philosophy
 - One copy of the abstract and title page
- **15 Business Days Prior to Exam Date:** Meeting with the Graduate Registrar, who will notify the student in advance of their meeting time. At this time, the student will register the *defense copy* of the thesis and *no* revisions may be made until the final examination by the committee is completed. The student must register the thesis *in person*. If circumstances do not permit registration in person, arrangements must be made with the Program Coordinator. The thesis must be bound in a black thesis binder. In addition to the thesis, two (2) copies of the title page and abstract are also required. *Binders are available from the Program Coordinator, if needed.* Students will be required to fill out a microfilming form. If the thesis is to be copyrighted, bring a certified check or money order in the amount of \$70.00 made out to PQIL. ProQuest will increase the Traditional Publishing fee to \$70 effective July

Upon the Registrar's review of the thesis and completion of the microfilming form, the student will deliver the thesis along with additional paperwork from the Registrar to the Office of the University Dean, 257 Wallis Hall, River Campus. To ensure that someone will be available to assist you with your thesis registration in the Office of the University Dean for Graduate Studies, please call **the day before** your registration appointment to verify that someone will be available to assist you, extension 5-4279. *Student will receive notification from the University Dean's Office confirming scheduling of defense and the appointed chair.*

After the Defense: Upon completion of any necessary revisions to your Ph.D. dissertation after the final oral exam, please submit the following to the Offices for Graduate Education in a large manila envelope with your name and department printed on the front:

- One unbound copy of the final, approved dissertation
- One digital copy with signed authorization form
- Two additional copies of the title page, abstract, and CV (short-version from your dissertation)
- The Approving Faculty Member Statement (if required by the University Dean for Graduate Studies)
- Change of Status Form to terminate student status (obtain this form from your graduate coordinator)*
- 506 Form to terminate stipend (obtain this form from your graduate coordinator)
- Parking Permits must be turned in at this time also

*** You must give your Graduate Coordinator 5 days notice of the date you intend to submit your final copy of the Ph.D. dissertation so these forms can be completed for you.**

Please call the OGE at 275-4522 to schedule an appointment for an exit interview with the Senior Associate Dean for Graduate Education. You should drop off the final copy of your dissertation when you check in for your appointment with the Dean.

If you have applied for and received financial aid (student loans) while in the graduate program, please contact the Financial Aid Director, at 275-4523 to schedule an exit interview. Please note that an exit interview is required of all borrowers who are planning to graduate or leave the School.

Diplomas are distributed at May commencement; however, degrees are conferred in October, March and May. If a student needs to have their degree confirmed for an employer, a letter can be requested from the Offices for Graduate Education, Room G-9550, or by calling the Registrar at (585) 275-7288 or ext. 5-7288.

Academic Honors Program in Medical Neurobiology MD-MS degree program

The University of Rochester School of Medicine and Dentistry has a long history of training physician-scientists interested in academic careers that combine teaching, clinical medicine, and research. As part of a broad initiative to establish an academic track within the medical school curriculum, the Department of Neurobiology and Anatomy offers an Academic Honors Program in Medical Neurobiology. This five-year Program adds an additional year of study, research and teaching experience to the medical curriculum, culminating in a Master of Science Degree in Neurobiology and Anatomy that is conferred along with the M.D. degree upon graduation.

The overall goal of the Program is to engage students in academically oriented training early in their medical education. This in turn will prepare them for comparably oriented residencies and fellowships that will ultimately lead toward faculty positions in U.S. medical schools as physician-scientist-educators of the future.

Introduction

The Department of Neurobiology and Anatomy is recognized for its excellence in research programs, and for its commitment to teaching and leadership in both graduate and medical education. Over-35 faculty (primary and joint) are actively engaged in research on the structure and function of the nervous system across several levels of inquiry. Areas of interest include: sensory and motor systems, neurobiology of disease, neuroengineering, computational neurobiology, learning and plasticity, cognitive neuroscience, cell signaling and transmission, and development and aging. Students in the Program may select a mentor from among this array of faculty and areas of interest, as well as courses and teaching options tailored to their interests.

Admissions

The Department anticipates that 2-4 second and/or third year medical students will be selected each year for this competitive program. Selection will be based on several attributes:

- **Satisfactory performance** in the first and second year medical school curriculum.
- **Letters of support**, one from an undergraduate research mentor and the other from a medical school faculty member familiar with the candidate.
- A **personal statement** (one page) outlining career goals and the role of the M.D.-M.S. Program.
- **Interviews** with at least two members of the Program Committee.
- **Strong interest and aptitude** for academic medicine and an interest in neurobiology in particular. It is expected that most applicants for this program have had significant undergraduate research experience, although not necessarily in neuroscience.

Prior to matriculating, students entering the Program must:

1. identify an acceptable Mentor/Advisor
2. identify a Co-Advisor, if the Mentor is not a member of the NBA department
3. obtain financial commitment from Mentor towards health insurance and 25% of stipend
4. review Work Study Program application
5. complete GEBS office startup paperwork

Requirements for completion of MS (32 credits or more)

The Program builds upon two major science-oriented courses taken during the first two medical school years: *Human Structure and Function (HSF-ANA 526)* and *Mind, Brain, and Behavior (MBB-ANA 525)*. Ten credits from these two medical school courses may be used toward the MS degree. Other requirements will be completed during an additional year of training beginning by July after Y2 or Y3 of the medical curriculum. Research during the summer after Y1 is strongly encouraged, though

not necessarily in direct relation to the thesis project. Typical MS students will register for 12 credits per semester.

The MS requires the writing of a dissertation and the passing of an oral examination. The dissertation and the research upon which it is based typically represent a minimum of 6 and ordinarily a maximum of 12 credit hours. The dissertation must show independent work, the ability to plan study over a prolonged period, the ability to present the work in an orderly fashion, and an acquaintance with the literature of a limited field. "The Preparation of Doctoral Theses: A Manual for Graduate Studies" is also used to prepare masters theses. It is available at: <http://www.rochester.edu/theses/> The dissertation must be registered with the Associate Dean for Graduate Studies of SMD and copies given to the members of the examining committee at least two weeks prior to the oral examination. The examining committee must include four faculty members including the thesis advisor. This includes at least two *primary* faculty from the department of Neurobiology & Anatomy and one member from an outside department. No student may appear for the final examination without permission of his or her faculty advisor.

Course Requirements: totaling at least 32 credits with 10 credits from prior MD curriculum (HSF:ANA 526 & MBB: ANA 525)

Fall

- IND 501 Ethics (1 credit)
- ANA 521 Graduate Journal Club (1 credit, choose from list)
 - Multisensory
 - Motor Control
 - Neural Precursors
 - Signal Transduction
 - Neuroinflammation
 - Cortical Circuitry
 - NSC 592 Neuroscience Journal Club
- ANA 495 MS Research (variable credits)
- Electives (0-4 credits)
- ANA 581. Teaching Tutorial in Human Structure & Function (2 credits)

Development of new journal clubs is encouraged.

Spring

- ANA 521 Graduate Journal Club (1 credit)
- ANA 522 Graduate Student Seminar (1 credit)
- ANA 495 MS Research (variable credits)
- Electives (0-4 credits)

Note: combined teaching + electives \geq 6 credits

Timeline and Landmarks

June: begin summer research

September: identify thesis committee members

January 1: identify thesis project

Jun-Nov: defend thesis and return to Med School

Support for students in the Program is provided by the School of Medicine and Dentistry, with a stipend of \$18,000/yr derived from the Federal Work Study Program (75%) combined with research funds from the Mentor (25%) and/or the Department. The University will provide tuition for the MS degree.

General University and Program Information

UNIVERSITY INFORMATION

BOOKSTORE

Manager, Scott Russell, ext. 5-2250

Barnes and Noble Bookstore operate three branches for the University; in the Medical Center (on the ground floor, near the bank and post office); on the ground floor of the Frederick Douglas Building on River Campus; and at the Eastman School of Music. In addition to carrying all required and recommended textbooks, the bookstore stocks school and office supplies, University memorabilia and clothing, magazines, greeting cards, as well as, providing services such as book ordering. The bookstore also sells used books and will buy back textbooks at the end of the semester for a portion of the original price. Policy regarding “buy back” is given to students when they purchase textbooks.

Medical Center Store Hours:

9:00 a.m. - 6:00 p.m. Monday – Tuesday

9:00 a.m. – 5:00 p.m. Wednesday - Friday

11:00 a.m. - 2:00 p.m. Saturday (September through May Only)

CLOSED - Sunday

BUS SERVICE

REGIONAL TRANSIT SERVICE (RTS)

The City of Rochester provides public bus transportation from all major suburban areas and the City of Rochester to the University. The complete bus guide and schedules are available through the RTS, 288-1700 or www.rgrta.org.

SHUTTLE BUS SERVICE

The University provides shuttle service for the convenience of students. Schedules may be obtained at the Parking Office and other locations throughout the University community or online at www.rochester.edu/parking

First Transit goes to Marketplace Mall, Eastman Living Center, Pittsford Plaza, the Public Market, Walmart and more! These services are at no cost to students with University ID's. Further information can be obtained by calling **5-ride, ext. 57433** or First Transit at **585-235-6670**.

GRADUATE STUDENT SOCIETY (GSS)

The GSS is an organization that represents full-time graduate students in the Medical Center. Each year the GSS selects a Board of Officers responsible for planning the year's activities as well as serving as a liaison between the students and the Administration. The GSS Board keeps the students informed on all policy matters in the Medical Center and periodically plans social functions (“Philosophy Meetings”) giving graduate students the opportunity to meet students from other departments in a relaxed atmosphere. Each PhD program has the opportunity to select a GSS Representative to serve on the Board of Directors of the GSS. For more information regarding GSS see: <http://www.urmc.rochester.edu/gss/>

I.D. CARDS

University picture ID cards are processed on orientation day. If you lose or misplace it you may obtain another one at the Medical Center ID office (G-7009) for the replacement fee of \$10.00, paid by the student.

MAIL & POST OFFICE

Students mailboxes are located in room 5-7419A. **The internal mailing address is: (Your Name); Neurobiology & Anatomy Graduate Program, Box 603.** This address is for intramural and professional extramural mail ONLY. Due to INS regulations, the University will discontinue the practice of allowing students to use their departmental box number as a mailing address. All students

(domestic and international) must provide a home address, a PO Box number, or a CPU box number (if residing in University Housing). Students who live in the Towne House and do not have a mailing address have the option of purchasing a PO Box through the US Postal Service or applying for a CPU box on the River Campus.

There are two full-service United States Post Offices at the University; one located at the Medical Center, located in area G-5122. The hours are 9:30 a.m. to 4:00 p.m. Money orders are available and no checks are accepted. FedEx is also available; courier boxes are located outside the post office in the Medical Center. The other post office is located on the River Campus, Todd Union.

PARKING

Parking at the Medical Center is by permit only and is administered through the Offices for Graduate Education for School of Medicine and Dentistry full-time, matriculated graduate students. Current fee for 2009-2010 is \$240 a year. To register for parking and obtain a parking permit, students must present to the Medical Center Parking Office (G-6037) UR ID card, and a current vehicle registration. Notification is sent to students annually regarding permit renewal.

Med Center Parking Office Hours

7:30 a.m. - 4:30 p.m. Monday - Friday

WEATHER

To learn whether the University is closed due to extreme weather conditions, call 275-6111, or tune to local radio and television stations.

Policy on Continuation of Stipend and Registration for International Graduate Students Detained outside the United States for Security Clearance Processing

Stipend Support

International students traveling abroad may be subject to extensive security clearance prior to receiving the necessary clearance and documentation required for re-entry into the United States. This extensive security clearance may take up to 90 days, essentially stranding the student for the duration of the process.

A major issue is stipend support for the interim period* in which the student is stranded. Grants should not pay, since payment presumes performance; training grants have somewhat similar restrictions.

As a School we should provide a stipend for up to two months of absence. The Offices for Graduate Education would reimburse grant funds for the interval in which the student is absent and cannot perform as expected by research and training grants. The stipend would be suspended after a two-month period, but would be reinstated upon the student's return.

The risk is a matter our international students must consider. The students cannot expect indefinite support, but they should be reassured that the School will re-admit them and reinstate the stipend if there is a protracted interval.

Course Registration

The issue of course credit is difficult however in fairness and in keeping with general University policy, students who are delayed beyond the first two weeks of the semester would be dropped from all course work, the exception being registration for research. This measure would be sufficient to maintain the student's enrollment status. Work for research credit may be completed over the summer months in which the student is in residence full-time but does not earn credit for the effort.

*The interim period is the time between the date the student was expected to return and the actual date of return. This does not include the vacation period.

Travel Information for International Students

If you are not a US Citizen, you are here on an F or J VISA and will be traveling outside of the United States, please contact the International Student Office to make sure that all of your immigration documents are in order. The I-20 or DS-2019 form must be endorsed (signed on the appropriate line) by an ISO Advisor at least once each academic year to allow you to re-enter the U.S. Stop by the ISO at least one week before your departure to have your documents checked. The ISO recommends that you keep your immigration documents with you when traveling in the U.S. for identification purposes. Please allow 48 hours at ISO for travel signatures.

INTERNATIONAL SERVICES OFFICE
UNIVERSITY OF ROCHESTER
209 Morey Hall, Rochester, NY 14627
Telephone: (585) 275-2866, Fax: (585) 244-4503

E-mail: questions@iso.rochester.edu Web Site: <http://www.iso.rochester.edu>

NOTE: ONLY an Advisor at the ISO may sign your immigration documents.

Travel Documents for F-1 Visa Holders:

- A valid passport
- A valid U.S. Visa stamp in your passport**
- An I-94 card (white card stapled to visa page in passport)
- An original I-20 (endorsed by the ISO)
- Proof of financial support (i.e. a bank statement)
- Transcript showing full-time enrollment
- If your academic major might require your visa application to undergo a Security Clearance, travel with a letter from your department describing your program of study in detail

ATTENTION: If you have applied for post-completion F-1 Optional Practical Training, do not leave the U.S. before you have received your Employment Authorization Document (EAD). If you leave the U.S., you may be considered abandoning your application. When on OPT, it may be difficult to get a new U.S. visa because you have to prove your non-immigrant intent. Ask your International Student Advisor for more details and travel advisories.

Travel Documents for J-1 Visa Holders:

- A valid passport
- A valid U.S. Visa stamp in your passport**
- An I-94 card (white card stapled to visa page in passport)
- An original DS-2019 (endorsed by the ISO)
- Proof of financial support (i.e. a bank statement)
- Transcript showing full-time enrollment
- If your academic major might require your visa application to undergo a Security Clearance, travel with a letter from your department describing your program of study in detail

** If you stay in Canada, Mexico or contiguous territories for less than 30 days, your expired U.S. visa is automatically revalidated as you re-enter the U.S. Automatic revalidation of your expired U.S. Visa also occurs when traveling to the following countries: St. Pierre, Miquelon, Dominican Republic, Haiti, Bermuda, Bahamas, Barbados, Jamaica, Windward and Leeward Islands, Trinidad, Martinique and all other British, French, and Dutch (Netherlands) territories of possession in, or bordering on, the Caribbean Sea. This does not apply to citizens of certain countries including certain Canadian Landed Immigrants and citizens of Iran, Iraq, Libya, Syria and Sudan. Please check the ISO website for up to date information.

U.S. Visa

When traveling to countries where re-validation of an expired U.S. visa is not automatic, you must have a valid U.S. visa to re-enter the United States. If your U.S. visa stamp has expired, you will need to apply for a new one at a U.S. Consulate or Embassy abroad (see ISO handout on "Tips for Applying for a Student Visa"). The ISO does not recommend applying for a new U.S. visa in Canada. If you do wish to apply see the ISO handout "How to Apply for a Visa at a Border Post...Visiting Canada".

Security Clearance Issues

Students who are considered to be majoring in "sensitive areas of study" as determined by the U.S. government may be required to undergo security clearances before a visa can be issued. There is a document called the "Technology Alert List" that visa officers consult for this purpose. The list includes fifteen broad subject areas, with detailed specializations within each area, predominantly in the sciences, technology, and engineering. Please see an advisor in the ISO if you'd like to check the list for your field of study.

Security clearances can add weeks, or even months to the amount of time needed for visa approval. If you feel you may be subject to this, have your department write a letter that details what your research is so that you can present it to the interviewing visa officer. If you find that your visa application is delayed due a need for the consulate or embassy to send your file for review based on your field of study, please notify the ISO by e-mail, fax or telephone of the situation.

Travel to Canada information is available on the ISO website including a link to the Canadian Consulate website where you can download Canadian visa application forms and instructions.

Canadian Visa

Canadian Visa Application forms and instructions are available on the ISO website. Students from many countries are required to obtain a Canadian visa prior to gaining entry to Canada. Citizens of some countries are subject to a waiting period.

The Immigration Office at the Canadian Consulate General in Buffalo, NY accepts applications for Visitor Visas, and Returning Resident Permits in person from 8:30 am to 11:30 am, Monday to Friday. In most cases, the visa documents will be issued on the same day. An application for a visitor visa can also be submitted by mail. Most applications are processed within 4 working days. Visa fees fluctuate. Single entry visas are about \$50.00 US and multiple entry visas are about \$100.00 US.

The Canadian Consulate nearest to Rochester is located in Buffalo, NY. The address is:

Canadian Consulate General, Immigration Section

HSBC Center, Suite 3000

Buffalo, New York 14203-2884

Phone: (716) 858-9500 * Fax: (716) 858-9562

<http://www.buffalo.gc.ca>

Directions: Take Interstate I-90 (New York State Thruway) West to Buffalo. Take Exit 53 to downtown Buffalo. Take the Elm Street exit. Stay in the middle land and turn left on to Swan Street, then turn left on to Washington Street. The Canadian Consulate is located in the HSBS Center. Underground parking is available.

Telephone Numbers

	<u>Extension</u>	<u>Location</u>
Graduate Student Offices	x54662	5-6338
Banking (Chase Manhattan), Med. Ctr.	x55703	G-5111
Bookstore, Med. Ctr.	x52250	G-6210
Bursar Office, Med. Ctr.	x54672	G-7528
Cafeterias: Courtyard Cafe, Med. Ctr.	x54730	G-6125
House of Six Nations	x50952	First Floor, Strong
MRB Link Café	x31490	KMRB
Computer Store	x59747	G-7220B
Copy Centers	x55076	G-7230
	x54847	1-4435
	x52360	Meliora 210
Financial Aid Office, Med. Ctr.	x54523	G-7644
Computer Graphic's Center	x55735	G-7230
Goergen Gym	x57643	River Campus
Housing	x51081	Susan B. Anthony Residence Halls, RC
I.D. Office, Med. Ctr.	x32000	G-7009
ISD Help Line (Help with Email)	x53200	
Library, Carlson	x54488	River Campus
Miner, Med. Ctr.	x53361	1-6220
Rush Rhees	x54471	River Campus
URMC Fitness & Wellness Center	x52437	G-5680
Offices for Graduate Education, Med. Ctr.	x54522	G-9549
Parking Office, Med. Ctr.	x54524	G-6037
Photography, Med. Ctr.	x55731	G-8631
Post Office, Med. Ctr.	x52630	G-5122
Security	x53333	Towne House
University Health Service, Med. Ctr.	Appointments Insurance/billing	G-5097
University Counseling Center	x52662 x52637 x53113	

Important Web Sites

Graduate Student Information:

Offices for Graduate Education:

<http://www.urmc.rochester.edu/smd/grad/>

Academic calendar:

<http://www.urmc.rochester.edu/education/graduate/academic-calendar.cfm>

Graduate Bulletin

<http://www.rochester.edu/GradBulletin/>

URMC Student Resources

<http://www.urmc.rochester.edu/smd/education/studentRes.cfm>

Status Verification form:

http://www.rochester.edu/its/acs/oge_verifies_form.html

Change of Address form:

http://www.rochester.edu/its/acs/oge_address_form.html

Tuition, Billing and Financial Aid

Bursar's Office

<http://www.urmc.rochester.edu/smd/bursar/>

Financial Aid

http://www.urmc.rochester.edu/smd/finaid/Info_Grad.html

Grant and Fellowship Information

ORPA

<http://www.rochester.edu:80/ORPA/>

NIH information on Research Training Opportunities

<http://grants.nih.gov/training/extramural.htm>

NRSA forms (PHS 416-1)

<http://grants.nih.gov/grants/forms.htm>

F30 instructions –individual MD/PhD fellowship

<http://grants.nih.gov/grants/guide/pa-files/PA-09-207.html>

F31- NRSA for Minority students

<http://grants.nih.gov/grants/guide/pa-files/PA-09-209.html>

Miscellaneous

Useful Forms

<http://inside.mc.rochester.edu/sites/Neuroscience/Forms/Forms/AllItems.aspx>

Graduate Student Society
<http://www.urmc.rochester.edu/gss/>

University Health Services (UHS)
<http://www.rochester.edu/uhs/>

University Counseling Center
<http://www.rochester.edu/ucc/>

University Safety and Security
<http://security.rochester.edu/>

International Student Services
<http://www.iso.rochester.edu>